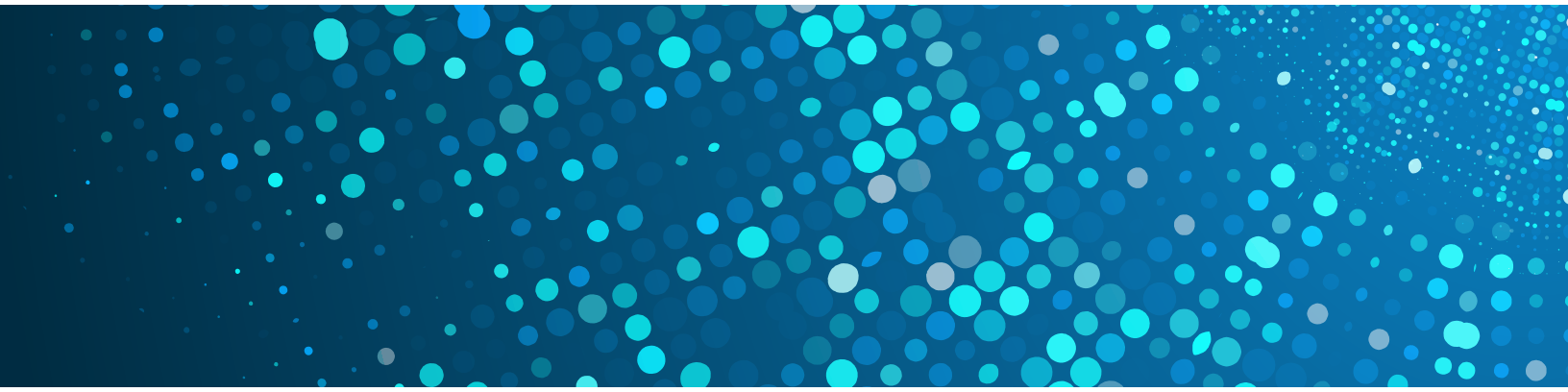

Cisco UCS and SAS: A Platform for Real-Time Analytics

Highlights

- **Respond quickly to changing business conditions with predictable performance**

  Cisco Unified Computing System™ (Cisco UCS®) is a proven platform for enterprise analytics applications with the performance and scalability needed to meet growing business demands.

- **Lower total cost of ownership and improved staff efficiency**

  This simplified, intelligent infrastructure reduces your total cost of ownership (TCO) with fewer management points, servers, switches, adapters, cables, and power and cooling components.

- **Reduced risk with a SAS and Cisco UCS joint solution**

  The joint validation of SAS Analytics on Cisco UCS helps organizations gain analytical insights and reveal opportunities in real time with out-of-the-box performance and reduced risk.

Respond quickly to changing business conditions by analyzing data sets and delivering answers in real time

Businesses are challenged to make better, faster, more informed decisions. These decisions often rely on complex analyses of ever-growing accumulations of data in real time. For example, time-sensitive applications may need to detect anomalies within millions of online trades, synthesize call records to predict customer turnover, or set optimal pricing for an airline to sell a fixed capacity over a finite sales period. IT organizations with traditional infrastructure and software solutions struggle to respond to changing business conditions and to manage this infrastructure. These environments require administrators to spend much of their time configuring new server, storage, and network resources to keep up with the scale demanded by growing computing and storage needs.

This combined SAS and Cisco Unified Computing System™ (Cisco UCS®) solution is designed to scale with your business needs and deliver real-time analytics with high-performance computing, networking, and storage access. Cisco UCS as delivered takes one-third the steps required by traditional systems to configure, and it takes only minutes to scale.

Cisco UCS: Platform of Choice for Enterprise Applications

Cisco UCS changes the way that organizations do business through policy-based automation and standardization of IT processes. It combines industry-standard x86 blade and rack servers, networking, and enterprise-class management into a single, integrated system.

Scalability

Cisco UCS goes beyond convergence, bringing simplified management, greater deployment flexibility, and easier scalability to the scale-out requirements of many of today's applications. System configuration is entirely programmable using unified, model-based management to accelerate deployment of infrastructure, applications, and services. Cisco UCS delivers increased agility, operational efficiency, and the capability to rapidly respond to changing resource requirements. These benefits have made it the platform of choice for critical business applications.

Simplifying Three Networks into One

Cisco UCS builds on Cisco's strength in enterprise networking. It is integrated with a standards-based, high- bandwidth, low-latency, virtualization-aware 10-Gbps unified fabric, with a new generation of Cisco UCS fabric enabling organizations to update to 40 Gbps. Cisco® SingleConnect technology is implemented with an end-to-end system I/O architecture that uses Cisco Unified Fabric and Cisco Fabric Extender Technology (FEX Technology) to connect every Cisco UCS server within a single network and a single network layer. The system is wired once to support the desired bandwidth, and it carries all IP, storage, management, and virtual machine traffic with security isolation, visibility, and control equivalent to that of physical networks. The network fabric exceeds the bandwidth demands of today's multicore processors and eliminates the costs of having to provide separate networks for each type of traffic. At the same time, it increases workload agility, reliability, and performance. As customers expect from Cisco, the Cisco UCS I/O architecture is based on open standards and is reliable, available, and secure.

Reduced total cost of ownership and improved staff efficiency

This simplified, intelligent infrastructure reduces your total cost of ownership (TCO) because it uses fewer management endpoints, switches, adapters, cables, power, and cooling components. Through the use of its embedded management and automation capabilities, your staff can quickly and efficiently deploy and troubleshoot Cisco UCS, greatly reducing operating expenses and allowing staff to focus on strategic business initiatives rather than infrastructure maintenance.

SAS Analytics Solutions

SAS Analytics solutions empower you with greater business value. SAS is a leader in business analytics, and the SAS Visual Analytics platform lives up to that reputation, with capabilities well beyond traditional querying and reporting. It takes advantage of SAS LASR in-memory architecture to visually explore massive, complex data sets and deliver answers in real time instead of hours or days. SAS Grid Manager increases the availability and processing power of your analytics environment with workload balancing, high availability, and parallel processing. These SAS solutions running on Cisco UCS empower business users to explore huge volumes of data quickly to find important patterns and trends, uncover opportunities, and make precise business decisions faster than ever before. By providing self-service, impromptu visual data discovery and exploration, it puts immediately available insights within your reach through both web- based and mobile devices.

- SAS Visual Analytics eliminates the need for disk-based processing, allowing much faster analysis.
- SAS In-Memory Analytics embeds logic into the database itself for improved agility and governance.
- SAS Grid Computing technology creates a centrally managed, shared environment for processing SAS jobs, however large or small, and provides a platform that can efficiently support a growing number of users now and in the future.

SAS Analytics on Cisco UCS

Cisco UCS and SAS Analytics together reduce the impediments to quick processing of growing data volumes. SAS Analytics on Cisco UCS integrates high-speed computing, networking, memory, and storage access with simplified management to accelerate the delivery of information in real time. Cisco gives you the choice of three configurations to meet your business and cost needs (Figure 1).

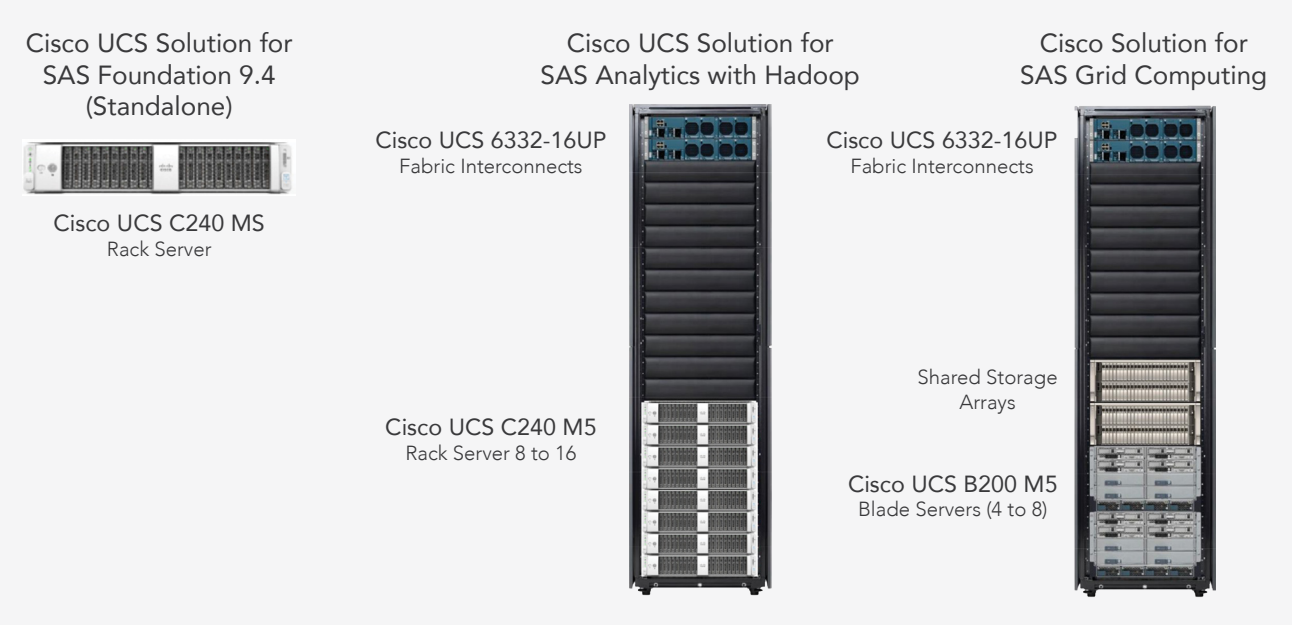

Figure 1. Cisco UCS Reference Architecture for SAS

- Cisco UCS Solution for SAS Foundation 9.4 (Standalone): This solution provides a simplified architecture, increased security, and mobile-access and self-service options for data access, reporting, and exploration. It is based on a standalone Cisco UCS C240 M5 Rack Server with internal, direct-attached storage. This storage and I/O-optimized, 2-rack-unit (2RU) server delivers industry-leading performance for the most data-intensive workloads such as SAS Foundation 9.4.
- Cisco UCS Solution for SAS In-Memory Analytics Cluster with Hadoop Distributed File System: This solution is based on Cisco UCS Common Platform Architecture for Big Data, an industry-leading solution designed to optimize long-term value for your big data workloads both today and in the future. This solution consists of a cluster of Cisco UCS C240 M5 Rack Servers with internal direct-attached storage in which both SAS and Hadoop Distributed File System (HDFS) can coexist. The solution is highly scalable.
- Cisco UCS Solution for SAS Grid Computing: This solution is the traditional configuration, based on Cisco UCS B200 Blade Servers in combination with enterprise-class storage from Cisco partners (you choose the partner), in which computing and storage components can scale independently. Note that storage capacity and performance sizing are crucial to a successful SAS Grid deployment. You need to be sure to properly size the storage resources to deliver optimal performance for your business needs.

Choose rack or blade servers

You have the flexibility to choose rack or blade form factors for your SAS deployment. You can use Cisco UCS C-Series Rack Servers, delivering exceptional levels of performance, memory expandability, and I/O throughput; or you can use Cisco UCS B200 Blade Servers and enterprise-class storage from Cisco partners (Table 1).

	Cisco UCS Solution for SAS Foundation 9.4 (Standalone), with SAS Visual Analytics 7.3	Cisco UCS Solution for SAS In- Memory Analytics Cluster with HDFS	Cisco UCS Solutions for SAS Grid Computing
Connectivity		2 Cisco UCS 6332-16UP Fabric Interconnects	2 Cisco UCS 6332-16UP Fabric Interconnects
Server configuration	1 Cisco UCS C240 Rack Server with: • 2 Intel® Xeon® Processor Scalable Family 6132 CPUs (2 x 14 cores and 2.6 GHz)) • 512 GB of DDR4 memory • Cisco UCS Virtual Interface Card (VIC) 1387 • 4 x 1.6-TB Enterprise Value SATA solid-state disk (SSD) small-form-factor (SFF) drives • 22 x 600-GB 15,000-rpm SAS	8 to 16 Cisco UCS C240 Rack Servers, each with: • 2 Intel Xeon Processor Scalable Family 6132 CPUs (2 x 14 cores and 2.6 GHz)) • 512 GB of DDR4 memory • Cisco UCS VIC 1387 • 26 drives of 1.8-TB 10,000-rpm SFF SAS HDDs or 12 x 1.6-TB Enterprise Value SATA SSDs	2 Cisco UCS 5108 Blade Server Chassis with: 2 Cisco UCS 2208XP Fabric Extenders 4 to 8 Cisco UCS B200 Blade Servers, each with: • 2 Intel Xeon Processor Scalable Family 6132 CPUs (2 x 14 cores and 2.6 GHz) • 512 GB of DDR4 memory • Cisco UCS VIC 1340 • 2 x 600-GB, 15,000-rpm SAS
Data storage	Local file system	HDFS	Distributed shared POSIX-compliant file system such as General Parallel File

Table 1. Cisco Solutions for SAS Analytics

Grow your solution

As your business needs grow, you can create larger clusters or use more powerful servers. You can add blade or rack servers and storage consistent with the solution chosen from Table 1. You can expand the scale-out solution with additional Cisco UCS C240 M5 Rack Servers and built-in disk storage. You can scale out the shared-storage solutions with additional Cisco UCS B200 M5 Blade Servers and increased shared storage capacity. And you can upgrade to the powerful Cisco UCS B480 M5 Blade Server or the Cisco UCS C480 M5 Rack Server. Powered by two or four Intel Purley Skylake family processors, these servers support up to 112 processor cores and 6 TB of memory (DDR4) to accelerate in-memory analytics operations.

Cisco UCS and SAS Analytics: A combination You Can Trust

Cisco and SAS have partnered in several strategic areas. Extensive performance benchmarks have been run with SAS Analytics on Cisco UCS. These benchmarks are designed to generate and simulate traffic during a quarterly or annual reporting cycle. They place a heavy load on the servers by running concurrent, impromptu reporting and analytical requests of various workload types. The test results show consistent and predictable performance and scalability.

SAS Analytics on Cisco UCS enables organizations to gain analytical insights and reveal opportunities by taking advantage of the highly scalable and reliable Cisco UCS infrastructure. Cisco UCS is radically simplified architecture with embedded management that makes your system easy to scale to address larger problems and more complex scenarios as your requirements evolve. It also reduces your TCO by requiring fewer infrastructure components, and it reduces operating expenses associated with staff time. This solution enables customers to solve complex analytical problems, improve business performance, and mitigate risk rapidly and confidently.

For more information

For more information about Cisco UCS and SAS, see https://www.cisco.com/go/bigdata.

C22-739252-00 07/17