

Cisco UCS and SAS: A Platform for Fast Data Analytics

Solution Brief
July 2014



Cisco in collaboration with SAS



We help you respond quickly to changing business conditions by mining datasets and delivering answers in real time.

Businesses are challenged to make better, more informed decisions faster. These decisions rely on complex analysis of ever-growing data in real time. This type of decision making is known in the industry as fast data, which is complementary to big data. Several of these time-sensitive applications include detecting anomalies over millions of online trades, synthesizing call records to predict customer turnover, or setting optimal pricing for an airline to sell a fixed capacity over a finite sales horizon.

Highlights

Reliable Scalability

- Cisco Unified Computing System™ (Cisco UCS®) delivers reliable scalability of hardware and management to increase business agility, operational efficiency, and help you rapidly respond to changing business requirements.

Reduced TCO and Improved Staff Efficiency

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

SAS and Cisco UCS

- SAS® Analytics on Cisco UCS helps organizations gain analytical insights and reveal opportunities in real time with performance accelerated by the highly scalable and reliable Cisco UCS infrastructure.

Traditional infrastructure and software solutions struggle to respond to changing business conditions. These environments require administrators to spend all their time configuring new servers, storage, and network resources to keep up with the scale demanded by the growing computing and storage needs. The Cisco Unified Computing System™ (Cisco UCS®) is designed to deliver high-performance computing, networking, and storage access and scale with your business needs. Cisco UCS takes one-third the steps to configure out of the box than traditional systems and only minutes to scale.

Cisco UCS: Platform of Choice for Enterprise Applications

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

Scalability

Cisco UCS goes beyond convergence to bring simplified management, greater deployment flexibility, and easier scalability to the scale-out nature of many of today's applications. The 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 ability to rapidly respond to changing resource requirements. These benefits have made it the platform of choice for critical business applications.

Unified Fabric

This solution uses important Cisco UCS innovations of unified fabric, unified I/O, and unified management for all connected devices. Deployed in redundant pairs, Cisco fabric interconnects offer high-bandwidth, low-latency connectivity to servers, full active-active redundancy, performance, and exceptional scalability needed to support SAS analytic workloads.

The Cisco Fabric Extender (FEX) technology enables connectivity without adding the cost and management complexity required by top-of-rack switches. Cisco UCS Manager enables rapid and consistent server configuration using Cisco UCS service profiles, automating ongoing system maintenance activities such as system software updates across the entire cluster as a single operation and advanced monitoring with options to raise alarms and send notifications about the health of the entire cluster.

Reduced TCO and Improved Staff Efficiency

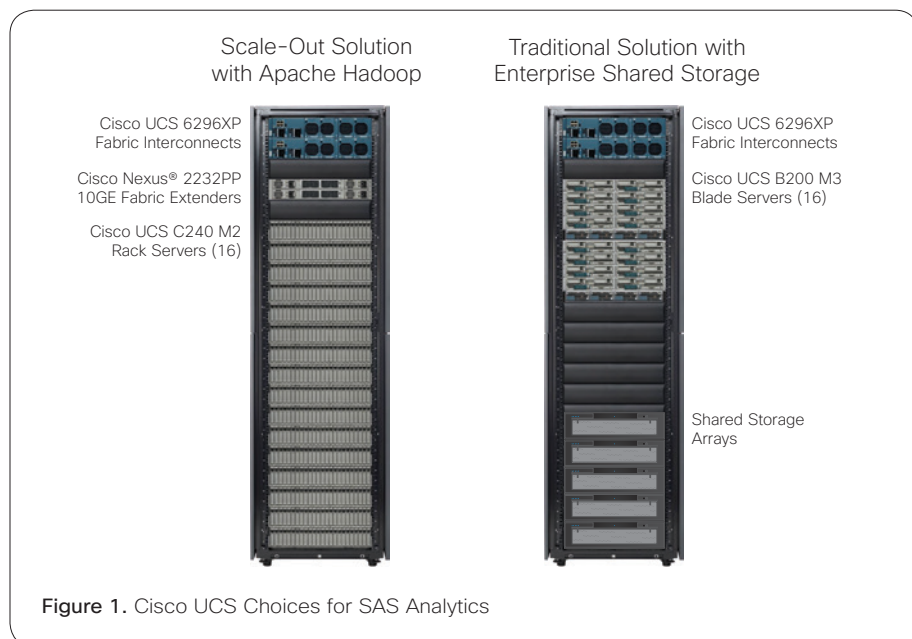
This simplified, intelligent infrastructure reduces your total cost of ownership (TCO) with fewer management endpoints, switches, adapters, cables, power, and cooling components.

Through the use of the embedded management and automation, your staff's ability to quickly and efficiently deploy and troubleshoot Cisco UCS will greatly lower operating expenses and allow staff to focus on strategic business initiatives rather than infrastructure maintenance.

SAS Analytics Solutions

SAS Analytics solutions hold the key to your unlocking unprecedented business value. SAS has been the gold-standard leader in business analytics, and the SAS Visual Analytics Platform lives up to that reputation going well beyond traditional query 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. It empowers business users to explore huge volumes of data very quickly to find key patterns and trends, uncover opportunities, and make precise business decisions faster than ever before. By providing self-service, unplanned visual data discovery and exploration, it puts lightning-fast insights within your reach through both web-based and mobile devices.

- SAS Visual Analytics eliminate the need for disk-based processing, allowing for much faster analysis.
- SAS in-Database Analytics embed logic into the database itself for improved agility and governance.
- SAS Grid Computing technology creates a centrally managed, shared environment for processing large jobs and efficiently supporting a growing number of users.



Sophisticated analytics, including decision trees, in-real-time forecasting, and scenario analysis, have been integrated with features that are easy to use. Because data can be quickly pulled into the memory, analytical computations can be handled much faster and with better response times. SAS and Cisco combine industry-leading analytics software with high-performance computing technologies to produce fast and precise answers to previously unsolvable problems—and enable you to gain greater competitive advantage.

SAS Analytics on Cisco UCS

Cisco UCS and SAS Analytics together reduce the impediment for customers to quickly process these growing data volumes. SAS Analytics on Cisco UCS integrates high-velocity 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):

- **Scale-out solution for SAS with Hadoop:** This solution is based on the Cisco UCS Common Platform Architecture for Big Data (Cisco UCS CPA for Big Data), an industry-leading solution that was engineered to optimize long-term value to your big data workloads today and into the future. This solution comprises a cluster of Cisco UCS C240 M3 Rack Servers with internal direct-attached storage in which both SAS and Hadoop can coexist. The solution

is highly scalable—the compute and storage scale together.

- **Traditional shared-storage solution with Cisco UCS Invicta™ Series Solid-State Systems:** Cisco UCS Invicta Series Solid-State Systems bring very fast, flash-memory-based storage closer to the application. The Cisco UCS Invicta OS maximizes write and read performance of flash memory with sustained high throughput, high input/output operations per second (IOPS), and ultra-low latency, overcoming the write performance and longevity challenges typically associated with multilevel cell (MLC) flash memory. This solution, designed for fast data analytics, consists of Cisco UCS B200 M3 Blade Servers and the Cisco UCS Invicta Series in which the compute and solid-state components can scale independently.
- **Traditional shared-storage solution with enterprise-class storage from Cisco partners:** This solution is the traditional one based on Cisco UCS B200 M3 Blade Servers combined with enterprise-class storage from Cisco partners where compute and storage components can scale independently.

Rack or Blade Servers

You have the flexibility of choosing rack or blade form factors for your SAS Visual Analytics deployment on Cisco UCS, delivering exceptional levels of performance, memory expandability, and I/O throughput, or Cisco UCS

B200 M3 Blade Servers and Cisco UCS Invicta Series or enterprise-class storage from Cisco partners (refer to Table 1).

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 scale the scale-out solution with additional Cisco UCS C240 M3 Rack Servers and built-in disk storage. You can scale out the shared-storage solutions with additional Cisco UCS B200 M3 Blade Servers and increased shared storage capacity. And you can upgrade to the powerful Cisco UCS B460 M4 Blade Server or the Cisco UCS C460 Rack Server. Powered by the Intel Xeon processor E7-4800 v2 family, these servers support up to 60 processor cores and 6 TB of memory (using 64-GB LRDIMMs) to accelerate in-memory analytic operations.

Cisco UCS and SAS Analytics: The Combination That 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 executing concurrent, ad-hoc reporting and analytical requests of varying workload types. The test results

Table 1. Cisco Solutions for SAS Analytics

	Scale-Out Solution for SAS with Hadoop	Traditional Shared-Storage Solution with Cisco UCS Invicta Series	Traditional Shared-Storage Solution with enterprise-class storage from Cisco partners
Base rack	<ul style="list-style-type: none"> • 2 Cisco UCS 6296UP 96-Port Fabric Interconnects • Direct connectivity to fabric interconnects or indirect connectivity through optional Cisco Nexus 2232PP 10GE Fabric Extenders • 16 Cisco UCS C240 M3 Rack Servers, each with: <ul style="list-style-type: none"> ◦ 2 Intel Xeon processors E5-2680 v2 ◦ 384 GB of memory ◦ Cisco UCS Virtual Interface Card 1225 (VIC) 1225 ◦ 24 300-GB 15,000-rpm SATA disk drives 	<ul style="list-style-type: none"> • 2 Cisco UCS 6296UP 96-Port Fabric Interconnects • 2 Cisco UCS 5108 Blade Server chassis with: • 2 Cisco UCS 2208XP Fabric Extenders • 16 Cisco UCS B200 M3 Blade Servers, each with: <ul style="list-style-type: none"> ◦ 2 Intel Xeon processors E5-2680 v2 ◦ 384 GB of memory ◦ Cisco UCS VIC 1240 ◦ 2 300-GB, 15,000-rpm SAS disk drives per blade server (for the operating system) • 2 Cisco UCS Invicta C3124SN Nodes • 2 Cisco UCS Invicta C710SR Routers 	<ul style="list-style-type: none"> • 2 Cisco UCS 6296UP 96-Port Fabric Interconnects • 2 Cisco UCS 5108 Blade Server chassis with: • 2 Cisco UCS 2208XP Fabric Extenders • 16 Cisco UCS B200 M3 Blade Servers, each with: <ul style="list-style-type: none"> ◦ 2 Intel Xeon processors E5-2680 v2 ◦ 384 GB of memory ◦ Cisco UCS VIC 1240 ◦ 2 300-GB, 15,000-rpm SAS disk drives per blade server (for the operating system) • Enterprise storage of your choice from our leading storage partners

showed consistent and predictable performance and scaling.

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 it easy to scale as your requirements evolve to tackle larger problems and more complex scenarios. It also reduces your total

cost of ownership (TCO) by requiring fewer infrastructure components and reducing 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 big data, please visit: <http://www.cisco.com/go/bigdata>.

- For more information about Cisco UCS CPA for Big Data, please visit: <http://blogs.cisco.com/datacenter/cpav2>.
- For more information about SAS Visual Analytics, please visit: http://www.sas.com/en_us/software/business-intelligence/visual-analytics.html.



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