WHITE PAPER

# SGI® Origin®400

## The Integrated Workgroup Blade System Optimized for SME Workflows

## Executive Summary

SGI® Origin® 400 is a highly integrated 'business-in-a-box' blade system with seamless installation, migration and growth capabilities. It delivers exceptional value, together with the reliability, flexibility and simplicity that are essential for the SME market.

## The IT Challenges Confronting SMEs

When it comes to managing their information technology (IT) resources, small to medium-sized enterprises (SMEs) face increasing—and often conflicting—challenges. While many SMEs need access to complex computing resources at their fingertips, the ability to manage these resources is becoming increasingly difficult—especially given the challenges of hiring, staffing and funding IT professionals with the necessary skills for the job. Many SMEs have therefore resorted to outsourcing, which solves some of these issues, but can be expensive and unresponsive to the diverse requirements of SME workflows.

In terms of functionality, most SMEs need an IT infrastructure that is very similar to that of larger enterprises. This will typically include:

- A backend database server to store customer or order records, track inventories, payments and credits, and manage employee information.
- An applications server (or servers) to run the company's core applications such as ERP, Microsoft Exchange and other more business-specific applications.
- A web server to support and drive the company's web presence.
- Virtual Display Interfaces (VDIs) as an alternative to separate PCs (each requiring maintenance) at each workstation.
- Some level of redundancy—as few SMEs can afford to have a day's operations grind to a halt while a server is repaired.

These requirements are exactly what the new SGI Origin 400 has been designed to address. SGI has a long history of meeting the needs of enterprises—both large and small—with flexible, dependable and powerful compute resources. And, although the company's focus has clearly been on technical computing, SGI has a tradition of taking its best designs from the technical computing space and making them available to enterprise customers. Numerous corporate enterprises, have deployed SGI Challenge™ or Origin® servers, for example, including many in the SME arena.

## What IT Options do SMEs Have?

Assuming that an SME decides against outsourcing and opts instead to manage their IT resources internally, they may well end up considering the deployment of a traditional blade or rackmount solution. Should they choose to do so, they will then face the significant challenges inherent in these solutions, including:

- The acquisition costs and total cost of ownership (TCO) of traditional blade solutions or equivalent resources in a standard rackmount server environment.
- Deploying the hardware, software, networking, cabling and power supplies required for these solutions is a non-trivial issue for SMEs.
- The complexity of adding and managing multiple servers, storage resources, operating systems and applications.

By comparison, as a fully integrated compute/storage solution, Origin 400 delivers great value to SME workgroup customers, by providing a 'business-in-a-box' blade system with seamless installation, migration and growth capabilities:

- The system's flexibility and high level of integration deliver exceptional value for SMEs looking for an optimum integrated solution. Virtualization maximizes flexibility and eliminates the need to over-invest in hardware, while the costs of components purchased separately together with software of equivalent capability would exceed the price of Origin 400.
- Origin 400 is designed to concurrently serve a broad range of SME workloads where virtualization support is critical. Its integrated virtualized SAN is also a perfect match for software virtualization such as VMWare® ESX 4.0.
- Industry standard operating systems support—including Microsoft® Windows® Server, SUSE Linux® Enterprise Server and Red Hat® Enterprise Linux—results in a platform optimized for high application performance.
- The system scales to six dual-socket compute blades and 14 2.5 inch SAS hard drives within a 6U rack-mount enclosure. It also fully exploits the Intel® Xeon® processor 5500 and 5600 series to accelerate application performance and increase density and power efficiency with up to 72 cores per system.
- The solution integrates Gigabit Ethernet networking and simple 'point-and-click' management.

## Optimized for the SME Environment

With its award-winning Altix® ICE 8200 design, SGI won awards but also pioneered the use of virtual storage (i.e. no individual storage on each blade), integrated networking and switches, and an integrated management software layer. Through Origin 400, these technologies—which debuted in the demanding environment of high-performance computing—are now available to SMEs.

Origin 400 functions seamlessly as a web server, applications server, email server and backend database server; and addresses a variety of enterprise verticals including regional healthcare, education, local government, retail, software development, call centers, community banking, accounting and legal. Key benefits of Origin 400 in these markets include:

- **Flexibility**: Increases capacity on demand with hot swappable compute and storage capabilities. Virtualized storage reduces hardware cost and maximizes flexibility. Dramatically simplifies IT infrastructure.
- **Simplicity**: Exceptionally easy to deploy. Integrated web-based 'point and click' management makes set-up, administration and management fast and easy.
- **Reliability**: Designed for enterprise workloads. Rich set of reliability, availability and serviceability (RAS) features includes robust hardware (power supplies, cooling fans, RAID controllers and networking modules can be configured redundantly and are hot-pluggable for rapid serviceability), compute blade failover capabilities and extensive software certifications.
- **Exceptional value:** Reduces acquisition costs with a complete, fully integrated solution designed for departmental budgets while delivering high-end features. Reaches break-even with rackmount servers with as few as two out of the six blades populated. Complete solution reduces TCO through faster time to deployment, dedicated SAN (avoiding the pain of setup and management) and single point of management.

## Origin 400 in Detail

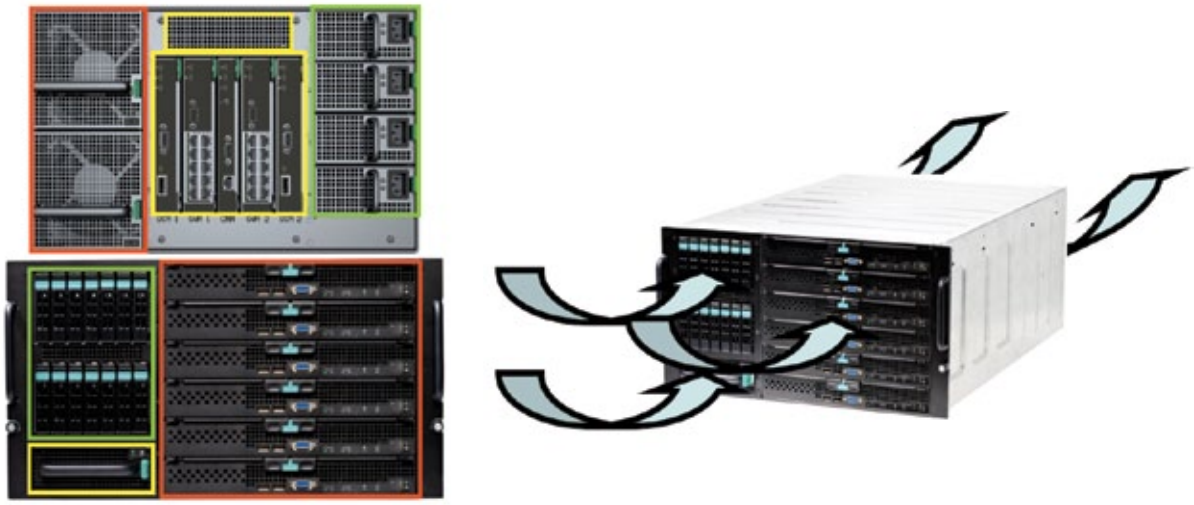
Origin 400 is a single enclosure, but combines the capability of a bladed system with a SAN storage array in a single package. The enclosure fits in a standard 19 inch rack, making it comfortable in both the data center, and in the data rooms employed by most SMEs.


## Power

From a power perspective, less is more with the Origin 400. It can operate from as few as two 1000 watt power supplies, but also service the needs of a large SME with up to four power supplies, with one being available to provide N+1 redundancy. The power supplies are auto-ranging from 100-127 Volts AC (VAC) or 200-240 VAC. They are also load-balancing, and hot-swappable—ensuring that if a power supply goes down in an N+1 environment, it can quickly be replaced with a convenient spare without taking down the whole system.

## Cooling

Cooling capability is supplied by two hot-swappable fans. There are three cooling zones within the Origin 400: (1) the compute blades, (2) the I/O modules, and (3) the power supplies and storage drive bay. The fan speed is monitored and controlled by the chassis management module (CMM).



*Airflow is traditional front-to-back airflow through the system.*

## Compute

The heart of the Origin 400's computing capability is an Intel® technology-based two-socket blade based on either Intel® Xeon® 5500 or 5600 microprocessors.

Each blade (up to a total of six in an enclosure) has 12 memory DIMM slots allowing for sufficient memory for SME applications. With 8 GB 1333, 1066 or 800 MHz DDR3 memory DIMMs (with ECC), a single blade can support up to 96 GB of RAM memory. The blade includes an Intel chipset, two GigE Ethernet ports, USB and video ports.

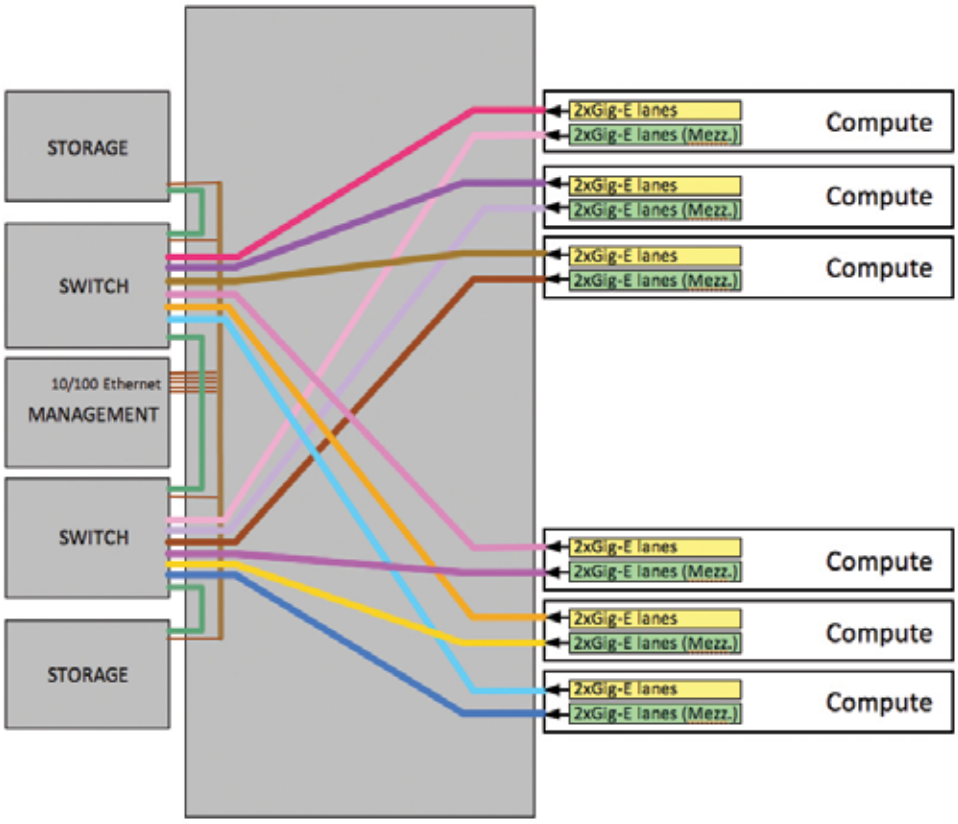
The compute blades are hot-swappable and plug into a backplane (capable of 10GigE speeds) that provides the interconnect for the blades in the system. An additional mezzanine card can be added to the compute blade to yield an additional two GigE ports for redundancy.

## Networking

Origin 400 has an integrated GigE backplane and up to two 22-port GigE switches (one for redundancy, with the second switch requiring a mezzanine card per compute blade). There are 12 internal 1 Gb ports and ten external 10/100/1000 Mb ports. The switches are non-blocking, fully managed and capable of the following features:

- Access Control Lists (ACL)
- Quality of Service (QOS)
- Link aggregation for external ports
- Trunk Group Failover
- VLAN support
- Support for Spanning Tree and Rapid Spanning Tree

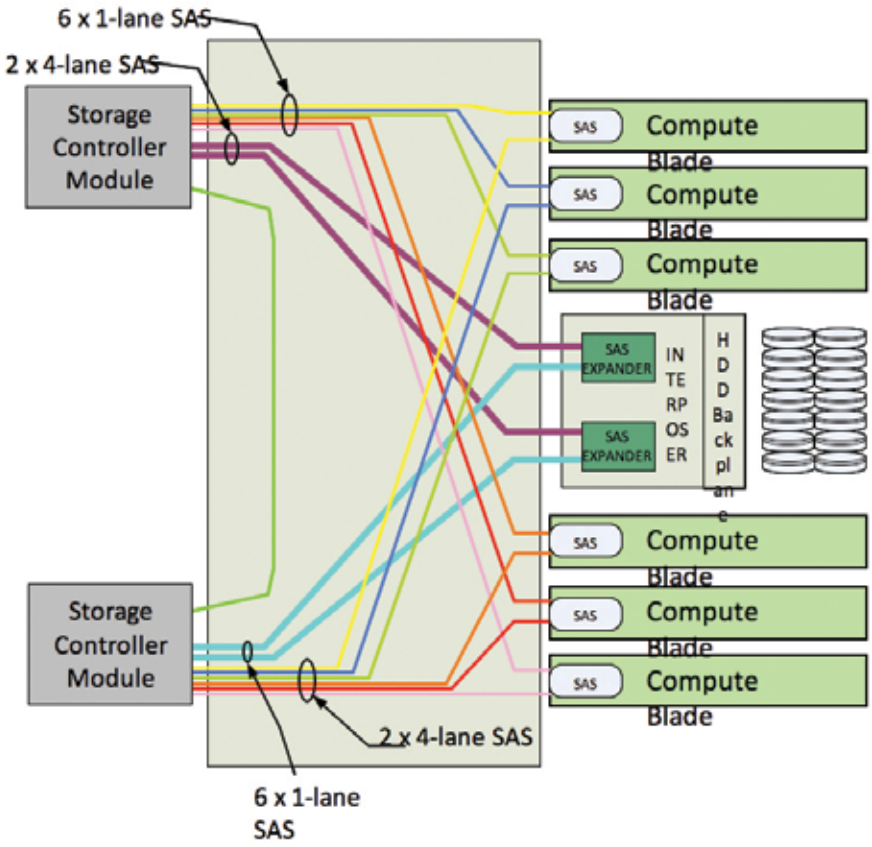
The internal wiring diagram of the Ethernet backplane is shown below:



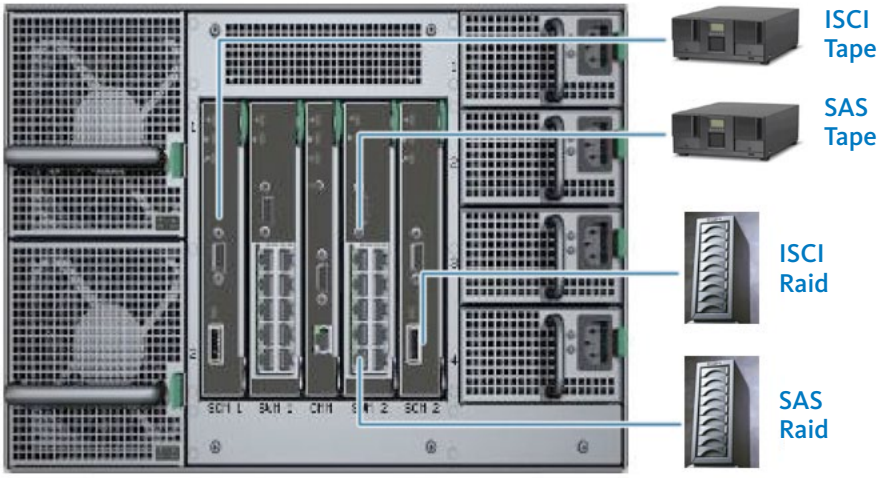
## Integrated Storage

Origin 400's integrated storage capability is where the platform really provides a lot of easy-to-use capability for SMEs. Origin 400 can support either 2.5 inch or 3.5 inch SATA or SAS drives (the drive enclosure is a unique choice, so there is currently no capability to mix drive sizes). Given the desire for SAS's unique value in terms of speed and reliability for SMEs, it is the more obvious choice—although SATA provides some price-performance features for some businesses. A SAS to SATA conversion cable is needed to hook up 2.5 inch SATA drives. As with the Ethernet switch modules, there is the capability for a redundant (and hot-swappable) second SAS controller in the enclosure as well.

With SAS drives, Origin 400 provides the capabilities of much more expensive and complex Fibre Channel-based SANs. The integrated internal SAS capability is shown in the diagram below:




Origin 400 also has the capability of hooking up to external storage either via the external GigE ports on the Ethernet switches or via external ports on the SAS controller.

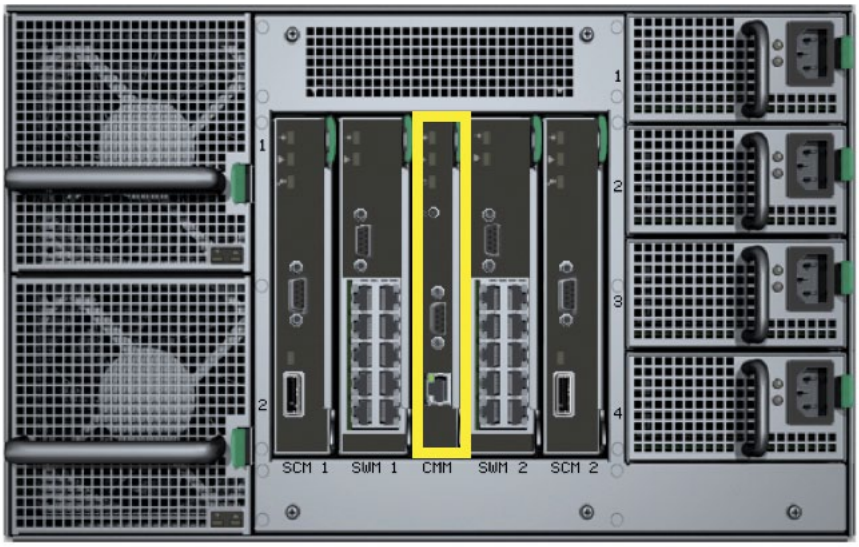



Flexible storage expansion:

- External SAS or iSCSI arrays
- Support access to SAS or iSCSI tape drives

## 'Point and Click' Management

Impressive as its hardware features are, Origin 400 would not be as compelling as it is for SMEs were it not for its integrated management features. At the heart of Origin 400's management is the chassis management module (CMM), which connects to all the chassis through the mid-plane. The CMM monitors and manages compute modules and all other components of the chassis, and enables remote control and configuration. The location of the CMM in the chassis is shown below:



Origin 400 is managed through an intuitive 'point and click' interface that allows quick and easy initial set-up, as well as ongoing maintenance and monitoring of the system.


Key Origin 400 management features:

- Unified console for end-to-end health monitoring and management
- Remote media
- Remote power on/off/reset
- KVM over IP (Out of Band)
- Concurrent KVM (Up to six sessions at one time)
- Event notification
- CLI, SNMP
- System logs
- Environmental monitoring and control

## Example Configurations

There are a number of common use cases for Origin 400:

- A minimum configuration would have an enclosure, three server blades (one for running a database, one for applications and one for web interfaces), two power supplies, the integrated and included GigE switch, SAN module and management module, and two fans.
- For a true 'data center in a box,' Origin 400 could have as many as six blades, with redundancies for the back end, applications and network edge layers. This would require three power supplies, with a fourth recommended for N+1. (A suggested configuration is shown below)

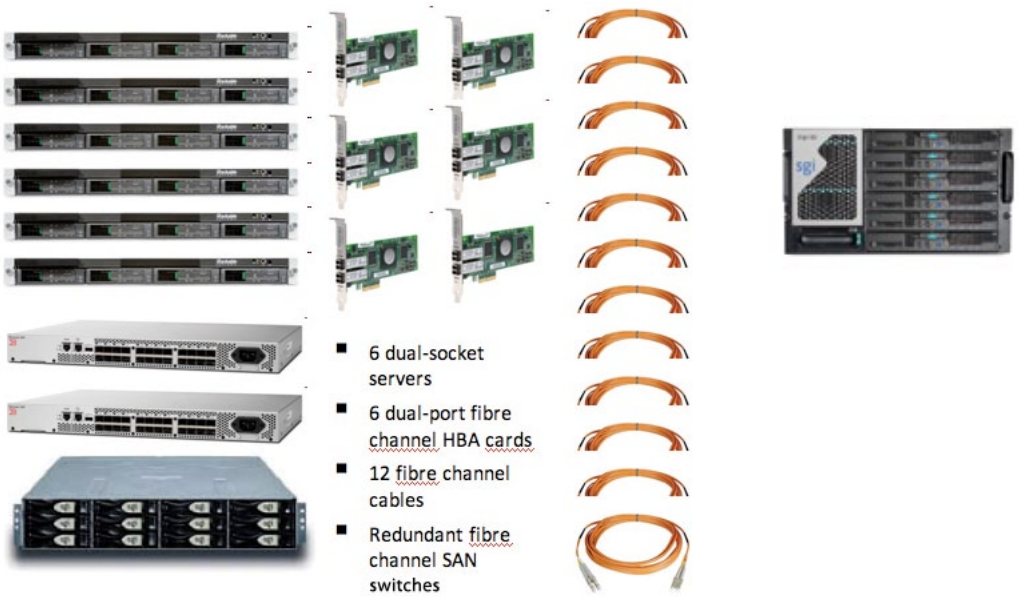

Blades 1 and 2 Cluster Database (i.e. Oracle 11g/RAC Standard Edition)
Blades 3 and 4 Virtual Environment for Application Servers
Blades 5 and 6 Virtual Environment for Web Servers and Email Servers

- Another use example is in a virtualized desktop interface with five blades hosting up to 150 users, and another blade as a redundancy spare.

Blades 1, 2, 3, 4 and 5, up to 30 Users per Blade (up to 150 users per Origin 400)
Blades 6—Spare Blade for failover of users

## Origin 400 Versus Rackmount Servers

The diagram below shows the difference in complexity between a series of rackmount servers with their associated cables and interconnects, versus a single Origin 400.



To summarize, and as highlighted by this comparison, Origin 400 is a highly integrated “business-in-a-box” blade system with seamless installation, migration and growth capabilities. It delivers exceptional value, together with the reliability, flexibility and simplicity that are essential for the SME market.

## Further Information

To find out more about Origin 400, please visit www.sgi.com/origin400.

**Corporate Headquarters**
46600 Landing Parkway
Fremont, CA 94538
tel 510.933.8300
fax 408.321.0293
www.sgi.com

**Global Sales and Support**
North America +1 800.800.7441
Latin America +55 11.5185.2860
Europe +44 118.927.8000
Asia Pacific +61 2.9448.1463