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White Paper

Achieving Exceptional TCO Savings with 8U SuperBlade®



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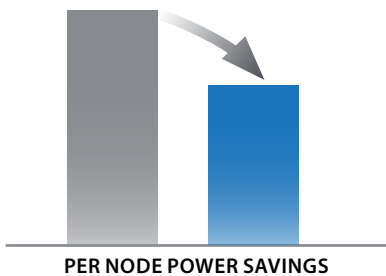
Executive Summary

Supermicro high performance, density optimized and energy efficiency blade server solutions can significantly reduce initial capital and operational expenses for many organizations. In particular, Supermicro's new generation SuperBlade® product portfolio has been designed to optimize key components of TCO for today's datacenters, such as free-air cooling, power efficiency, node density and networking management.

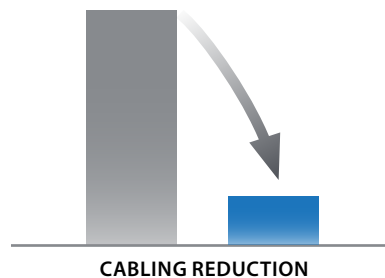
Total Cost of Ownership (TCO) analysis can provide valuable insights into real-world IT scenarios of typical 1U rackmount server deployments versus blade server solutions. This white paper demonstrates that the 8U Supermicro SuperBlade can offer \$2,296 per node TCO reductions over traditional 1U rackmount servers per 42U rack, which can potentially save over two million dollars in four years for a large-scale 1200 node deployment.

Estimated Savings	Per Node Savings	Savings For 1200 Node Deployment
CAPEX savings	\$341	\$409,290
OPEX over 4 years	\$1,955	\$2,346,000
Total TCO savings over 4 years	\$2,296	\$2,755,290

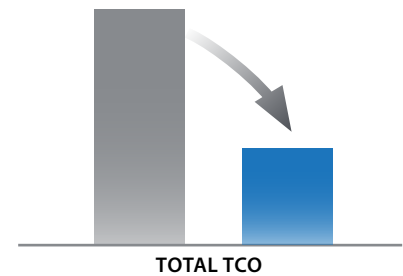
20% Less Power



\$210,840 Less Cabling Cost



Over \$2.7 Million Savings



■ 1U ■ 8U SUPERBLADE®

CAPEX Savings with SuperBlade® Solutions

Cabinet

With only 12x 42U racks, SuperBlade can deploy 1200 high-performance dual-socket nodes for up to 205W CPU TDP support with free-air cooling, integrated high-speed networking backplane options including 10GbE/25GbE and 100Gbps EDR IB and Intel® OPA, chassis management modules, this will save a total of 21 racks at \$1,250/rack when compared to an equivalent deployment with standard 1U rackmount servers (37 servers per rack), before any floor space and other facility expenses are included.

Assumptions

The CAPEX and OPEX of SuperBlade® was compared with those of industry standard servers using the following assumptions based on industry estimates except where noted. Specific results may vary.

Supermicro® SuperBlade®

- 8U SuperBlade®
- 42U rack
- 100x SuperBlade® DP server nodes per rack

Industry Standard Rackmount Servers

- 1U industry standard DP rackmount servers
- 42U racks
- 37x 1U DP servers per rack
- 4x 1U Standard ToR switches
- 1x 1U management switch

Cabling

One of the most significant advantages of SuperBlade® solutions is the large reduction in cabling. An 8U SuperBlade enclosure only requires a total of 7 cables per enclosure for 20 dual-socket nodes, including 6 power cables and 1 Ethernet cable for server management.

A single 1U dual-socket rackmount server requires 7 cables, including 2x 25GbE SFP28 DACs, 2x 10GbE DACs, 2 power cables and 1 Ethernet cable for IPMI.

Assuming 3 meters of 10G SFP+ and 25G SFP28 DAC cables are deployed at an average cost of \$40 per cable, \$4 per GbE cable and \$7 per power cable. The total cabling cost per 1U DP server is \$178. In contrast, a 8U SuperBlade® enclosure with 20 DP servers costs only \$46 for cabling, or \$2.30 per node.

PDU

Assume a typical PDU costs \$2000, for an average of two PDUs per rack.

This study does not consider the deployment of any UPS infrastructure. Supermicro® SuperBlade® solutions offer integrated Battery Backup Power (BBP®) options that seamlessly protects SuperBlade® servers without requiring any additional space, which can reduce both CAPEX and OPEX.

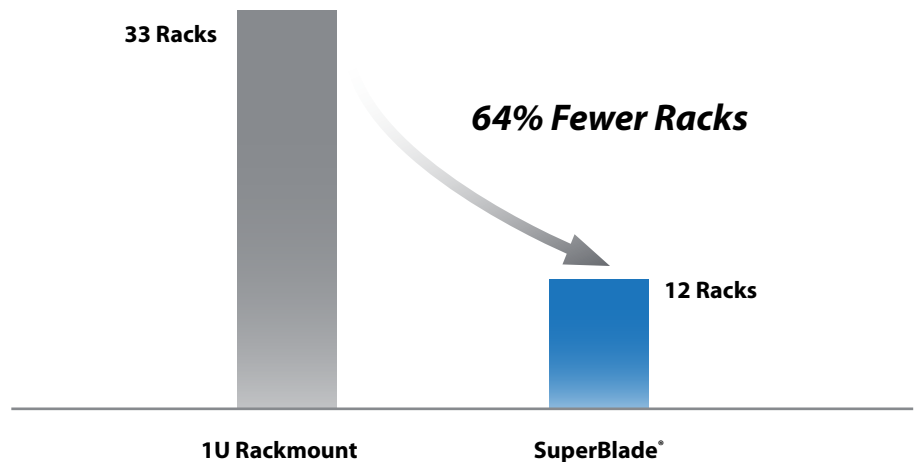


Figure 1. SuperBlade® can eliminate 21 racks for deploying 1200 dual-socket nodes when compared to standard 1U rackmount servers.



Figure 2. SuperBlade® Redundant 25G Ethernet Switch



Figure 3. SuperBlade® 100G EDR IB Switch (Intel® 100G OPA Switch Also Available)



Figure 4. 1200W Redundant Battery Backup Power Module

Rack Integration

In this scenario we assume a flat fee of \$2000 per rack for all labor costs occurred during rack integration process.

Shipping Containers

In this scenario we assume an estimated cost of \$700 of shipping container cost per rack.

Logistics

In this scenario we assume an estimated shipping cost of \$1500 per rack.

Summary

Assume a typical datacenter deployment of dual-socket nodes configured with redundant networking and redundant power, SuperBlade® can save up to 67% of space when compared to standard 1U rackmount servers.

CAPEX estimation includes cabinets, cabling, power, rack integration, switches, shipping crates and domestic logistics (United States). Total CAPEX savings \$341/node.

Cost Type	Savings for 1200 Nodes	Notes
Cabinet	\$26,250	Elimination of 21 server racks
Cabling	\$210,840	Less cabling for all 1200 nodes
PDU	\$84,000	Savings from the # of PDUs required
Rack Integration	\$42,000	Labor costs for integrating 21 racks
Shipping Containers	\$14,700	Cost of shipping containers for 21 racks
Logistics	\$31,500	Costs of logistics for 21 racks
Total CAPEX savings	\$409,290	

OPEX Savings with SuperBlade® Solutions

Assumptions

Note that all dollar amounts are provided as estimations and varies based on the actual local utility rate.

We assumed the cost of commercial electric power is \$0.10 per kilowatt-hour. In another white paper we illustrated how it can be estimated. The link is provided below:

[Data Center Power Savings with Supermicro](#)

We also use the Power Profiler tool from EPA to estimate CO2 emissions:

<https://www.epa.gov/energy/power-profiler>

Configurations

Each 1U rackmount server and SuperBlade® server is configured with

- Dual Intel® Xeon® Scalable 8180 processors
- 12x 16GB DDR4 memory
- Broadcom® SAS 3108 with 2 SATA SSD drives
- Intel® PCH C622 onboard 10GbE
- All system tests are performed at 35°C ambient temperature

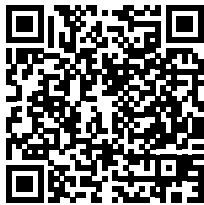


Figure 5. *White paper: Data Center Power Savings with Supermicro*

Summary

We performed power measurements in a lab environment for 20 nodes of standard 1U rackmount servers and 20 nodes of SuperBlade servers in a 8U SuperBlade enclosure.

The estimated OPEX savings per node over 4 years is \$1,955. Total estimated OPEX savings for 1200 node deployment over 4 years is \$2,346,000.

	1U Servers	SuperBlade®	Savings
Watt per Node	645.8	514.5	131.3
PUE	1.7	1.05	N/A
OPEX per Node (4Y)	\$3,850	\$1,894	\$1,955
OPEX 1200 Nodes (4Y)	\$4,619,000	\$2,273,000	\$2,346,000

Conclusions

In the study, we found that SuperBlade® can provide an estimated reduction of TCO per node of \$2,296 over 4 years when compared to 1U rackmount servers. This can save over two and a half million dollars on a large-scale deployment of 1200 SuperBlade® nodes.

The initial capital savings were primarily due to the significant lower cost of cabling and PDUs required to deploy the same number of servers with SuperBlade solutions compared with industry standard 1U servers.

With the superior density and the more energy-efficient hardware architecture offered by the SuperBlade platform, operational expenses were reduced from hardware components including cooling fans, power supplies and network switches.

There were also other potential capital savings that were not considered in this study, including the savings from floor space, maintenance and server manageability.

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About Super Micro Computer, Inc.

Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology is a premier provider of advanced server Building Block Solutions® for Data Center, Cloud Computing, Enterprise IT, Hadoop/Big Data, HPC and Embedded Systems worldwide. Supermicro is committed to protecting the environment through its “We Keep IT Green™” initiative and provides customers with the most energy-efficient, environmentally-friendly solutions available on the market.

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