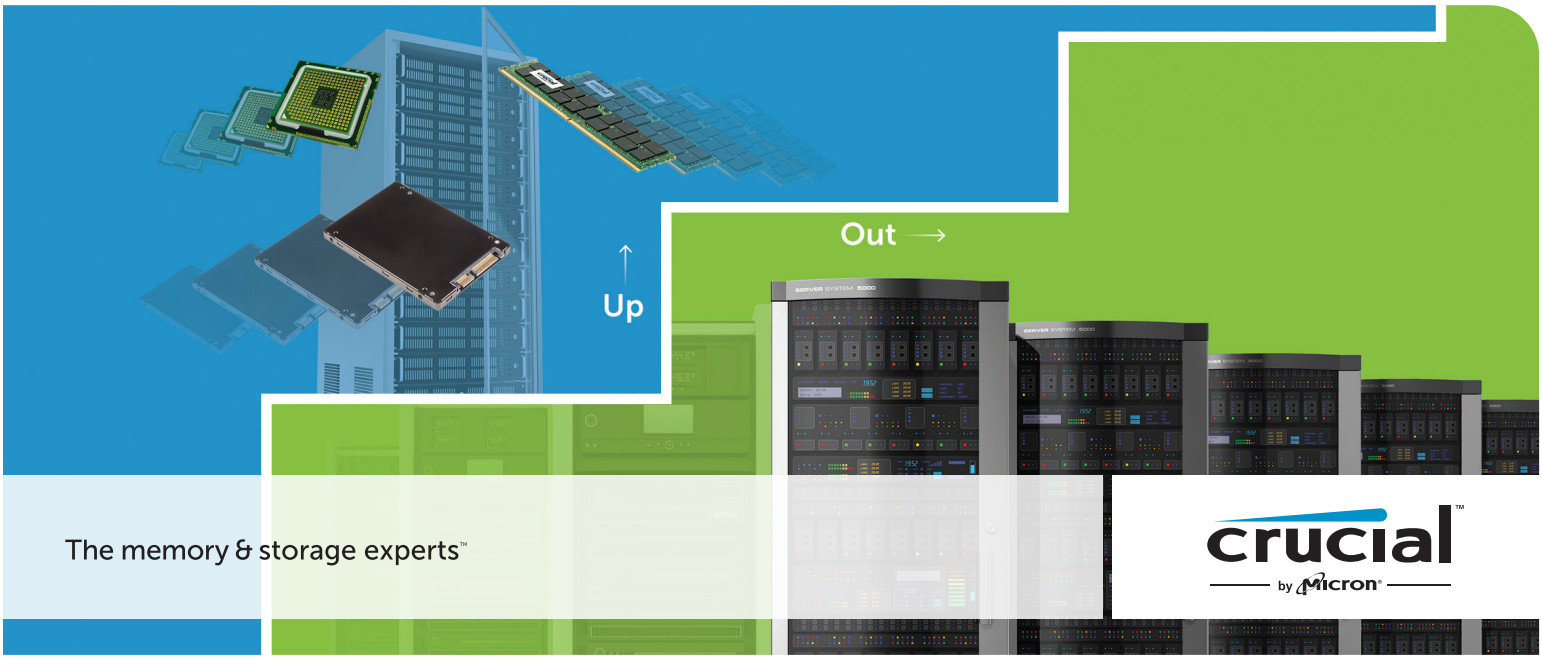


Should you scale up or scale out your data center?

How to use both approaches to optimize infrastructure and performance

Every year, the increasing demands of corporate IT require exponential growth in data center output. There are two ways to achieve this: you can scale up by upgrading existing servers, or you can scale out by adding more servers. There are pros and cons to both approaches, and many of our data center customers find that it makes sense to do both – but at different times.

SCALE UP (VERTICAL SCALING)

What it's all about: Increasing the performance potential of your data center by upgrading existing servers

Scaling up is all about upgrading processors, RAM, and storage in existing servers. Typically, scaling up starts with upgrading CPUs, but when you do this, you usually want to upgrade your memory accordingly, as higher-end CPUs require more memory capacity in order to optimize compute capability.

4 ways to scale up and get more out of existing servers

1. Upgrade outdated CPUs that limit performance
2. Install as much memory as possible in each server
3. Instead of RDIMMs, use Crucial® LRDIMMS, which come in higher densities and deliver a higher level of performance and efficiency (as long as your system is compatible with LRDIMMs)
4. For hot server storage, swap out hard drives for Micron® enterprise SSDs

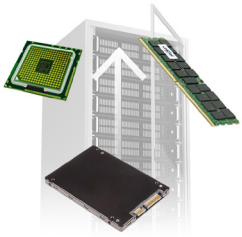
SCALE OUT (HORIZONTAL SCALING)

What it's all about: Increasing the performance potential of your data center by replacing existing servers and/or adding additional servers

Once you've exhausted the performance potential of existing servers, it's usually time to scale out. When scaling out, choose servers with the latest processor and memory technology. This gives you the flexibility to scale up in the future by adding high performance memory and storage components as workloads increase.

SCALE UP VS. SCALE OUT

Scale Up

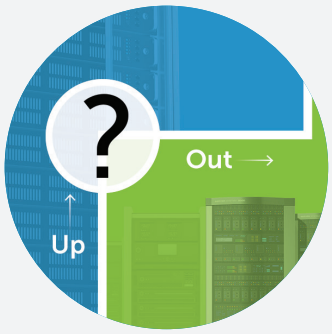


- Cost-effective way to increase performance and extend the lifecycle of existing hardware
- DRAM and CPU upgrades are easy to install and implement
- Lower power consumption since you're running and cooling fewer servers
- Lower licensing costs
- Lower networking equipment costs
- Older hardware can often be outperformed by newer hardware
- May experience vendor lock-in, which limits future upgradeability and software support
- Not a long-term solution – servers can only be upgraded to their performance threshold

Scale Out

- Allows you to move beyond the constraints/performance ceiling imposed by older servers
- Newer server technology makes it easier to run fault tolerance, monitor your systems, and minimize downtime
- Higher power and cooling costs
- Higher licensing costs
- Higher networking equipment costs (more routers and switches are often required)
- Allows you to take advantage of the latest and greatest memory, storage, and processor technology
- Allows you to scale up in the future
- Larger data center footprint

THE BOTTOM LINE



Scaling up makes sense when you haven't maximized the performance potential of your existing systems. If you're nowhere close to hitting your performance ceiling, there's no reason to scale out – just upgrade your CPUs, memory, and storage. However, if you've exhausted your infrastructure's performance potential, it's probably time to scale out. Choose the approach that best compliments your budget, workload, and short/long-term performance goals.

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