

# TOP 5 REASONS WHY COLOCATION IS THE RIGHT CHOICE FOR YOUR HPC REQUIREMENTS



**H**igh-performance computing (HPC) has transitioned from the realm of science fiction into a fundamental component of many organisations' business intelligence operations. With its extraordinary processing power and capacity to decode vast amounts of unstructured data, HPC is now a necessity for enterprises seeking to maintain a competitive edge. The question is not whether to invest in HPC, but how best to leverage it to achieve strategic business goals.

Today, an increasing number of companies are investing in their own in-house supercomputers to tackle ever-more complex algorithms and boost profitability. However, given that HPC represents a unique class of computing with its own set of specific requirements, is investing in your in-house systems truly the optimal approach or is there a much more cost-effective, reliable, and sustainable alternative?

Despite their reduced size, compared to even the recent past, supercomputer installations still demand substantial space, in addition to specific power and cooling provisions. Therefore, businesses are increasingly turning to colocation as a means of gaining access to HPC systems whilst another party handles the physical needs of the computers. In this guide, we will uncover the challenges and complexities of establishing an HPC system and explore the top five reasons why colocation is the right choice for your HPC requirements.

## 1. Ample Space

The first consideration when it comes to HPC is whether you have sufficient space to house a high-performance system. Given that these machines are many times more powerful than anything else in the corporate data centre, it's not just a matter of racking another box in the server room. HPC rigs generate a significant amount of heat that needs to be managed carefully. Depending on the power of the system, existing cooling systems may be insufficient, and upgrading the cooling system to accommodate HPC requirements can be a costly and time-consuming process that involves removing large volumes of generated heat.

### WHY COLO?

Vantage's CWL1 campus is the largest in Europe. Its 46-acre facility has the scale necessary to house the most demanding HPC deployments, with private halls from 20 footprints upwards, and 148MW of IT power available.

## 2. Efficient Cooling

For more advanced HPC systems, an air-cooling upgrade may not be enough. Therefore, liquid-cooled systems, which circulate and recirculate within water-cooling systems, become a necessity. These systems typically snake in and out of the building and are worth considering, even if your HPC needs are relatively modest. Retrofitting these systems once a system is in operation can be an even more complicated, costly, and time-consuming process that involves significant downtime.

### WHY COLO?

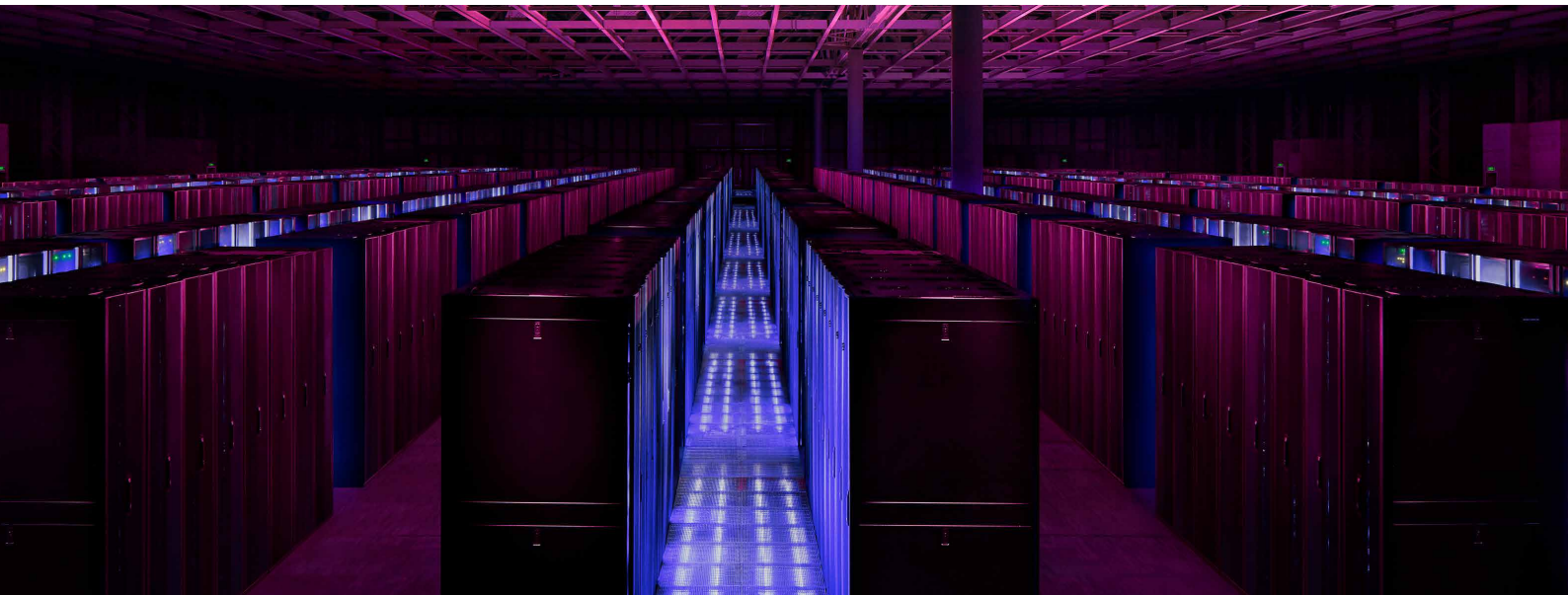
Vantage's Cardiff facility is designed specifically to accommodate any HPC requirements. Whilst the prevailing climate supports free-air cooling for most of the year, custom liquid-cooled systems are available on demand. With colocation, the headaches of managing heat, cooling, and other infrastructure complexities are almost completely removed.

## 3. Abundant Renewable Power

HPC systems, due to their high-component density, necessitate specialised power and cooling provisions. While standard computing systems commonly operate on a power density of 5-8kW per rack, with high-density blade platforms running at approximately 12kW per rack, HPC systems can require significantly higher levels and some even reach a peak of 30kW per rack.

The energy demands of HPC systems are remarkable. To put it in perspective, a 40-teraflop system requires around 2MW of power, roughly the equivalent of a small data centre. And as HPC systems become more advanced and power-hungry, the challenge of meeting their energy demands only increases.

To address the colossal power requirements of HPC systems, one could arrange a dedicated power supply from the local electricity grid.







***“HPC systems are rather specialised, and you’ll need to hire and train staff to operate and maintain them. In addition, the mechanical and electrical kit is more complicated, typically involving water cooling. Everything requires significant skills in the infrastructure support team.”***

*- Adrian Wander, Specialist in HPC Procurement and Tenders*

However, the bureaucratic hurdles and extensive infrastructure upgrades involving up to three local substations and cable installations can be time-consuming and complex.

Adrian Wander, a well-known name in the field of HPC with over 30 years of specialist experience in procurement and tenders, warns, “HPC systems are power hungry. The current number one supercomputer in the world is running at 414 teraflops and drawing nearly 30 megawatts of power. Very few places in the UK have that kind of power available and supplying it to existing machinery may require a significant upgrade to the electrical infrastructure, not just in the machinery but downstream through upgrades to local substations”.

While these challenges are not insurmountable, they can significantly add to costs. With colocation, you don’t have to worry about any of that.

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#### WHY COLO?

Vantage’s Cardiff data centre campus is designed with futureproofing in mind. As your energy usage increases, we can easily turn up the power. Offering 148MW of IT power, the campus boasts a direct, 400kV connection to the UK’s SuperGrid, further enhancing its capabilities.

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#### 4. Efficient Operation

Maintaining an HPC system is no small feat and demands a specialised skill set. Merely relying on your existing IT department will not suffice. The complexities of a supercomputer require dedicated professionals with deep expertise. It is not just one role but several full-time positions that need to be fulfilled around the clock. When you invest in a multi-million-pound computer system, idle time is simply not an option.

You’ll need data engineers to identify and address glitches in programming, and hardware engineers to rectify any physical faults. However, adding these skilled professionals to your in-house team comes at a high cost.

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#### WHY COLO?

Colocation data centres offer a solution to the staffing challenge. These facilities boast a comprehensive team of highly skilled technicians who are available on-site to swiftly address any issues that may arise within your system. The advantage of having immediate backup and access to expertise cannot be overstated.

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#### 5. Economies of Scale

As noted by Adrian Wander, there is much more to powering a hungry HPC than simply plugging it in. “Don’t underestimate the amount of ancillary expense involved in HPC systems,” he warns. “It should always be remembered that HPC requires significant mechanical and electrical kit”.

The good news is that colocation facilities have already taken care of such issues with built-in power supply redundancy and uninterrupted power supply (UPS) systems that guarantee high availability and service continuity, regardless of power disruptions.

Colocation providers can spread the costs of staffing, maintenance, and infrastructure across multiple clients, which reduces the overall cost per client. This means that you can access top-tier facilities and expertise without having to make a significant investment in infrastructure and staffing.

Moreover, by utilising colocation, you can free up your internal IT resources to focus on other critical areas of your business. This can help you save on wages, pension, and other employee-related expenses, while also ensuring that your IT team is not overburdened with the responsibility of managing an HPC system, 24/7.

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## WHY COLO?

Colo data centres are built from the ground up with both cooling and energy already taken care of. Sharing floorspace with other businesses reduces the aggregate power usage per machine, as well as the shared cost of cooling, ultimately lowering your carbon footprint and offering you the benefits of economies of scale.

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## Not all colocation providers are the same

While utilising a colocation provider resolves several power and cooling challenges, only a limited number of providers can adequately cater for HPC requirements. This limitation stems from various factors, such as insufficient access to consistent power supply from the national grid and facility designs that are ill-suited for high-density HPC platforms. Cooling can also pose difficulties, as traditional methods may not meet the targeted cooling needs of HPC. Additionally, effectively managing heat removal remains a concern, even with modern in-row cooling solutions.

Furthermore, maintaining uninterrupted power during grid failures proves crucial for HPC workloads. Some colocation providers expect customers to prioritise workloads, which may be acceptable for general computing and storage tasks but is impractical for HPC, where the entire workload must be sustained to avoid significant time and resource losses. Therefore, conducting thorough due diligence on colocation partners becomes essential before committing to their facilities.

Colocation providers are committed to delivering exceptional service to their clients. Service level agreements guarantee that any outages or glitches will be swiftly resolved with utmost efficiency. Their vested interest lies in restoring operations promptly and comprehensively. By embracing colocation, you can rest assured that your interests are being diligently safeguarded by a team of experts.

***“What you get is economies of scale. If you have one engineer who is servicing 15 generators for multiple clients, they have more work to do than your in-house engineer serving just one generator, but you still have to pay him the same salary.”***

*- Adrian Wander*

## How Vantage Data Centers can help

Colocation facilities like Vantage's Cardiff campus offer a tailored environment designed to accommodate HPC requirements effectively. These future-proofed facilities mitigate complexities related to heat management, cooling, and power demands. With expert professionals and seamless scalability, colocation empowers businesses to focus on growth and innovation while reducing costs and environmental impact.

The CWL1 campus features a direct 400kV connection to the UK's SuperGrid, ensuring robust power capabilities. Spanning 46 acres in Cardiff, the campus will encompass three data centres - two of them currently in operation - across over 20 hectares, offering a critical IT load of 148MW upon completion. These state-of-the-art data centres adhere to the highest industry standards, including specifications mandated by the UK government and military.

The decision between housing HPC infrastructure on-premises or leveraging colocation facilities can significantly impact your organisation's agility and scalability. Take the leap towards embracing the HPC revolution with confidence by taking advantage of the benefits that colocation facilities offer and eliminating the hassle of setting up in-house HPC.

To discuss your business needs and learn more about Vantage's Cardiff campus, contact us at [info-cardiff@vantage-dc.com](mailto:info-cardiff@vantage-dc.com).



## Accelerate your growth in the Vantage Cardiff data centre campus.

- Hosting, connectivity, HPC and data centre services for the enterprise sector
- 2 million square feet of space to grow and scale
- Carrier-neutral with regional, national & international telecommunication services
- 148MW of upgradeable power availability
- High-efficiency with use of free air cooling
- 100% sustainable energy
- Designed and built using the highest industry standards
- Unrivalled service continuity since 2007

T: +44(0)1633 988 021

E: [info@vantage-dc.com](mailto:info@vantage-dc.com)

W: [vantage-dc-cardiff.co.uk](http://vantage-dc-cardiff.co.uk)