FEATURE

Cloud computing lessons from US Steel

Just as US Steel saw its market dominance usurped by Nucor Corporation with its mini-mill model, the behemoths of the cloud datacentre market may see a new degree of fragmentation brought to the fore as a result of the impact of computational storage and wider tech trends that gravitate around compartmentalisation and IT portability.

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Software runs on data, obviously. This means that it usually makes sense to put data as close to where it is being processed as possible, in order to reduce latency for performance-hungry processing tasks.

Some software application and data management architectures are designed with large amounts of memory-like storage located close to the compute function. Conversely, for some application and data use cases, it makes more sense to move the compute nearer to the bulk storage, a technology paradigm usually known as computational storage.

The Storage Network Industry Association (SNIA) defines computational storage as where Computational Storage Functions (CSF) can be coupled to storage to enable the offloading of host processing or reducing data movement.

In basic terms, we're simply talking about putting some processing power right next to where data is stored and so alleviating the burden on the core CPU. The concept is designed to improve application performance and infrastructure efficiency. It also enables parallel computation and alleviates constraints on memory, storage and Input/Output loads.

Low latency low down

What all this delivers is IT engineering with the advantages of low latency. Basically so we don't have to wait as long for our apps and services to do what they have been built to do; further, we can enjoy the fact that they are able to do it more efficiently, when they do do it.

Proponents of computational storage will rave about its use in real-time application environments, but David Friend, CEO and co-founder of cloud storage company Wasabi Technologies argues that just about every ‘banal’ task will see efficiency improvements from this increase in speed.

“I see these growing efficiencies as something akin to improvements in the internal combustion engine at the start of the 20th century - just as we saw an unexpected and diverse range of vehicles pop up to capitalise on that technology, so too will we see a diverse range of new workloads take advantage of computational storage in the years ahead,” explained Friend.

Cloud’s carbon cost

The impact of computational storage inside cloud datacentres has yet to fully play out i.e. this is a technology that has really only been in its heyday for somewhere around the last half-decade or so.

We hear a lot about edge computing and the Internet of Things (IoT), but this is a technology that could drive edge storage. Moving data back and forth to the cloud can be wasteful, so there is a carbon footprint argument here at some level and it could surface more prevalently going forwards.

Wasabi’s Friend uses a hospital MRI installation as a working example. “If, for example, a hospital wanted to run an MRI system with a typically high degree of data being generated and handled. In all likelihood that data would be generated, analysed and consumed locally,” he said.

For his money, in this scenario, he suggests that the most efficient setup would be to reconcile storage and computing functions on the edge, which is obviously where computational storage itself comes in.

US Steel vs. Nucor

“Another analogy that clarifies this shift in the cloud market can be seen through what happened to the steel industry,” said Friend. “Back in the day, US Steel dominated the American steel market through its giant mills. However, at the end of the sixties, Nucor Corporation then came along with super-efficient mini-mills that were a fraction of the price and could be quickly deployed and placed near their customers.”

Assuming not everyone will be conversant with a history of American steel manufacturing plants, Friend notes that subsequent to Nucor entering its market, US Steel's market dominance lasted less than thirty years. The company couldn't compete with a service that gave customers cheap and rapid access to what they needed.

Longer-term, we may be looking at a relatively logical evolution of the datacentre model that currently describes the lion's share of the way we build cloud networks. That future, with computational storage driving a degree of change, may see fewer mega-datacentres built and perhaps hundreds or thousands of smaller ones existing.

Just as US Steel saw its market dominance usurped by Nucor Corporation with its mini-mill model, the behemoths of the cloud datacentre market may see a new degree of fragmentation brought to the fore as a result of the impact of computational storage and wider tech trends that gravitate around compartmentalisation, containerisation, microservices and IT portability.