Disaggregate to Innovate

Software Defined Commodity Hardware?

One question that comes up with interactions with our customers is that they do not see value in anything but commodity hardware since they differentiate their offerings with software. The software-defined age has given us great solutions to problems that we could not have imagined even a decade ago. Software applications like Uber and Airbnb are two examples of software that can provide a new market that was not easily accessible or previously did not exist.

When you look at the chain where applications fit and where the underlying software that feeds these applications fit, at the bottom of the chain is the data center. Data centers, whether on premise or cloud-based, are the engine that allow applications to be successful. Many data center components are software-defined with underlying commodity storage and servers.

Hyperconverged storage drives software solutions

For the most part, the more powerful the storage or the server, the more expensive it is to purchase and operate this equipment. The expense comes from higher priced CPUs with multiple cores, DDR DIMM memory which in quantity can add a big portion of server cost. These components contribute to higher energy usage and cooling costs. However, when users want the fastest performance, as when buying a car; the faster ones just cost more.

Hyperconverged Infrastructure is a good example of where software leverages commodity hardware using lower cost servers that are aggregated together to create scalable storage, compute and memory for use by applications. Hyperconverged software was engineered to take advantage of commodity hardware; on the downside for some of the consumers of Hyperconverged is the pain of purchasing new server hardware and paying annual licensing fees just for the ability to add storage beyond what they currently have installed. A better way would be having the ability to disaggregate storage from the servers to allow independent scaling of storage without perpetual additional storage licensing costs.

Does hardware innovation still matter or is commodity hardware the future of IT?

Enter in performance. As mentioned, tied to server and storage performance is price. If more performance is needed, more SSDs or another server needs to be added. If a move to NVMe drives are desired, this changes the way the complete infrastructure may look. If you really want to take advantage of NVMe drives en masse, you need to buy much more expensive servers that can handle the performance characteristics of this high-speed tier of flash.

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XstreamCore® storage controller

- The XstreamCORE® storage controller provides a versatile connection point that allows storage and compute to scale independently of each other and disaggregates SAS storage so that it can be shared and managed more effectively.

- XstreamCORE base functionality is a protocol bridge that allows Fibre Channel or Ethernet to connect to SAS storage to allow multiple hosts to access and share storage at direct attached speeds with very little latency.

- Both rack and blade servers can benefit from added raw storage connected by Ethernet or Fibre Channel via individual SAS JBOD enclosures with each drive individually mapped and assigned to physical servers.

- XstreamCORE relies on client-side software (software defined storage solutions) to handle features such as snapshot, data redundancy and deduplication.

- XstreamCORE presents SAS connected drives or RAID Groups out to compute as iSCSI or Fibre Channel LUNs which can be mapped individually to a single physical host or multiple hosts.

NVMe or even SAS SSD storage in the server-based storage world is tied to the performance of the server and locked in to that server; you cannot simply share performance of a server installed flash drive to other servers. Most times servers may be connected to a LAN that enables sharing of this storage over a 10Gb Ethernet network, which is limiting when you are talking about multiple flash drives and trying to access that performance outside the server.

So, how can companies who innovate in software differentiate themselves with hardware and not just use the same server hardware every one of their competitors use? They could use Enterprise All Flash Storage Arrays and scale them up to keep up with performance needs, but this is a costly method. A better option is to disaggregate.

Enter Disaggregation

Disaggregation has been inundating the IT market lately; this philosophy is beginning to take off in system and data center architect planning. Being able to disaggregate components in the data center provides distinct advantages over cooling, power, equipment and licensing costs and maybe most importantly performance.

When we talk to those running data centers to determine storage and server performance today, we find that it is usually unknown or that it is just not fast enough. When asked about how fast one server performs in terms of IOPS or MB/s there is usually silence as the capabilities vary so greatly depending on server hardware. When you hook up a fast SSD to a server this SSD most likely will max out the performance of the server. So if several SSDs are installed in that server, there ends up being a bottleneck that leads to frustration due to so much being spent on these fast SSDs but only getting a fraction of the expected performance.

Disaggregation leads to new efficiencies and better costs

An accelerated protocol bridge is an agnostic appliance that enables disaggregation. This bridge allows the sharing of the high performance generated by flash SSDs to multiple hosts via Ethernet or Fibre Channel eliminating bottlenecks. Before hardware acceleration was developed, bridging technology was slower, due to cost-effective components being used while running software to convert protocols from one to another (Fibre Channel to SAS for instance). These devices were viewed as too slow to keep up with SSDs and were thought to be more for slower tape or hard drive technologies.

That is until hardware acceleration was introduced. Hardware acceleration technology is targeted at the high throughput and IOPS capabilities of SAS SSDs via JBOD and JBOF storage so that these performance characteristics can be spread out over multiple servers.

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ATTO XstreamCORE® Hardware Accelerated Protocol Convertors

ATTO has been developing hardware-based xCORE acceleration for over 6 years, currently on their 4 generation with over 50,000 units in the field. The product line, XstreamCORE, features this hardware acceleration and is the only product that allows software and hardware manufacturers to step out from the commodity storage game and differentiate themselves from their competition. By taking JBOD storage and attaching up to 64 hosts to up to 960 SSDs and then using ATTO's Host Group Mapping feature these SSD drives are locked on a per server basis, any remote drive looks like an exclusively connected local drive to the server with the benefit of added performance, easy scalability and simple serviceability.

ATTO XstreamCORE FC 7550 Fibre Channel to SAS Storage Controller

Scalable Storage Solution

HCI hosts with single 16Gb links to Fibre Channel Controller

Your brand of JBOD or JBOF storage with HDDs or SSDs installed

Add up to 960 total drives

SAS SSD JBOF shelves with dual controllers, each with 12Gb SAS connection to the XstreamCORE Storage Controller