The global infrastructure market is in the midst of historic change. Companies born on the 3rd Platform have ignited demand for scale-out, software-defined infrastructure designed for hyperscale datacenters that have a limited mix of workloads and little need for traditional enterprise features. Meanwhile, established enterprises around the world are turning to integrated infrastructure to improve long-standing datacenter metrics such as utilization rates, time to deployment, operational costs, and levels of risk. These two buying groups represent two fundamentally different approaches to infrastructure deployment that are driving distinct pockets of investment. This Market Spotlight examines how hyperconverged systems are bridging the gap between feature-rich traditional integrated infrastructure used by enterprises and scale-out infrastructure found within 3rd Platform, hyperscale datacenters. The paper also offers guidance for buyers of hyperconverged systems.

Introduction

Information technology (IT) has been critical to the success of businesses around the world for many years. The idea that downtime within a datacenter has crippling effects on an entire organization is not a new concept. Neither is the idea that inefficiencies within an IT department can materially impact a company's ability to effectively compete in today's ultrafast-paced world. Indeed, the degrees to which today's organizations can be competitive and ultimately profitable have become inextricably linked to decisions made within the datacenter.

Therefore, it should be no surprise that companies have spent many years and a considerable amount of resources optimizing their datacenters to maximize service levels, eliminate inefficiencies, and reduce risks within their business. And while there have been real returns on these investments, these same companies are increasingly reaching a point where they must rethink long-standing practices on the procurement and management datacenter assets. This critical point in time has arrived due largely to 3rd Platform applications focused on social, mobile, cloud, and big data environments. These environments require new levels of scale, automation, and agility that do not align well with the practice of independently buying and managing discrete datacenter resources (i.e., storage, servers, and networking).

As a result, IT organizations around the world need to evolve from the decades-old practices and must break down silos of infrastructure-centric decisions to an environment that enables workload-centric decisions. IDC finds many organizations are now deploying integrated systems to help deal with these important datacenter changes. Such systems are providing a tight integration between the core datacenter infrastructures while also offering centralized management and increased levels of automation. The adoption rate of these integrated systems has grown quickly over the years, and integrated systems have become a multibillion-dollar market, a clear indication of their effectiveness.
Just like today’s IT departments, the integrated systems market is also evolving. An important component of this evolution is the relatively recent emergence of hyperconverged systems, which IDC considers a subset of the integrated systems market. Hyperconverged systems are helping deliver many of the proven benefits of integrated systems (e.g., reduced complexity, risk, and inefficiencies), but they do so through a clustered, scale-out architecture that is built on x86-based servers.

In 2015, hyperconverged systems sales (including hardware and software) were expected to increase 116.2% over the previous year to $806.8 million in value. The market is expected to experience a 59.7% compound annual growth rate (CAGR) from 2014 to 2019, when it will generate more than $3.9 billion in total sales. Hyperconverged systems can currently be purchased either as a complete appliance with all features included or as a software-based solution, which then can be deployed on existing infrastructure or as a software-based solution that can be integrated with new hardware by a value-added integrator. The last type of deployment will normally depend on a hardware compatibility matrix provided by the software vendor.

A key characteristic of hyperconverged systems that differentiate these solutions from traditional integrated infrastructure is their ability to provide all compute, storage, and networking functionalities through the same server-based resources (or nodes). These nodes are usually deployed as clusters with three nodes minimum per cluster. Each node within a cluster contributes all of its resources to an abstracted (i.e., virtualized) pool of capacity, memory, and compute resources. This pool of virtualized resources provides the foundation for all server-centric workloads (e.g., virtual machine, hypervisor, and applications) as well as storage-centric workloads (e.g., data persistence, data management, replication, snapshots, deduplication).

Definitions

Hyperconverged systems are an emerging breed of integrated systems that natively collapse core storage, compute, software, and storage networking functions into a single software solution or appliance. This is in contrast to integrated infrastructure and platforms in which autonomous compute, storage, software, and networking systems are integrated at the factory by the vendor or by resellers.

In addition to integrating storage and compute functions into a single node (or a cluster of nodes, each offering compute and storage functions), all hyperconverged systems employ:

- A distributed file system or an object store that serves as the data organization, management, and access platform
- A hypervisor that provides workload adjacency, management, and containerization in addition to providing the hardware abstraction layer (Further, the hypervisor also hosts essential management software needed to manage the platform.)
- An (optional) Ethernet switch to provide scale-out and/or high-availability capabilities (However, switching and/or networking is not used to bridge the compute and storage layers together.)
Removing Barriers to Adoption

IDC has extensively researched where integrated systems align with the needs of today's IT departments. Companies using or evaluating integrated systems were driven by a need to address resource utilization rates, capital spending, and staff productivity. They were also turning to integrated systems as a method to improve business agility and credibility within their IT department. These benefits are sought after frequently because they represent many of the core problems vexing today's IT departments.

The number of companies that have turned to integrated systems to address these problems is growing rapidly and driving strong market growth. That said, there are still a large number of organizations that don't consider traditional integrated infrastructure an ideal fit within their IT department. IDC research shows that costs, projected returns on investments, and differing refresh cycles of IT infrastructure are among the top challenges for adoption of integrated systems.

Interestingly, these challenges have not drastically impeded the recent strong growth of integrated system sales, but they have held back adoption within many midsized organizations. These same challenges represent market expansion opportunities for the suppliers of hyperconverged systems, as the relatively small building blocks of these offerings allow customers to start small and thus eliminate concerns associated with initial capital costs. After the initial deployment and installation, the scale-out, highly virtualized architecture of hyperconverged systems will allow customers to connect additional nodes to an existing cluster each time a new set of infrastructure resources are due for refresh.

While it is certainly true that hyperconverged systems do and will coexist with traditional integrated infrastructure systems, hyperconverged offerings will ultimately help drive infrastructure convergence into new areas. IDC believes this is especially true within small to midsized enterprises that:

- Have previously held off deploying net-new workloads, such as virtual desktop infrastructure (VDI), because of the expense and complexity associated with SAN-attached external storage.
- Have a highly virtualized datacenter and employ IT administrators who are more comfortable using centralized hypervisor management suites rather than digging deep into a storage system for LUN creation, capacity provisioning, zone masking, and so forth.
- Have an urgent need to reduce the time and resources spent on infrastructure maintenance tasks. Yet the requirements on IT workload require only a relatively small initial system deployment (versus a large buildout of server and storage infrastructure).
Workloads on Hyperconverged Systems

Virtual desktop and client virtualization applications have been a significant driver of early adoption of hyperconverged systems. Figure 1 illustrates the types of workloads running on hyperconverged systems. The market revenue is broken down by workload for 2014 and 2019 (forecast).

FIGURE 1

Worldwide Hyperconverged Systems Revenue by Workload Type, 2014 and 2019

VDI has been an early success story for hyperconverged systems due to the fact that a single group within the IT organization usually controls the decision making and procurement of IT resources. This is different from a typical scenario where the individual server, storage, and networking groups are in control of their distinct technologies. Adoption of a hyperconverged system (or any integrated system) for these general workloads requires consensus across the disparate silos. This can be challenging, but it is not impossible.
As the hyperconverged systems market matures and more success stories emerge, IDC expects the workload portfolio to broaden. In 2019, IT infrastructure will still be the largest proportion of workloads, but business processing and collaboration will represent a larger proportion of share than in 2014. IT infrastructure is expected to account for 37.8% share of revenue in 2019, while business processing and collaboration will grow to 23.6% and 20.1% share, respectively.

To date, a decent portion of market adoption has occurred within larger organizations with relatively large infrastructure budgets. This trend can be seen with the average selling values (ASVs) of integrated systems. According to IDC’s Quarterly Integrated Systems Tracker, the ASVs of integrated infrastructure solutions (only one of the three market segments) were nearly $270,000 per full system in 2014. (Importantly, this ASV excludes the value of all software.) This capital outlay can be a challenge for companies with smaller IT budgets. In addition, companies seeking a system for a single specific workload may not consider solutions at this price point.

Hyperconverged systems present a new opportunity for organizations with targeted infrastructure needs and/or smaller budgets. The scale-out, highly virtualized nature of these systems will allow IT departments to gracefully scale their use of hyperconverged systems over time when needed. IDC sees the expansion of the number and type of workloads running on hyperconverged systems to be a critical factor to future market's success.

Conclusion and Recommendations

All companies, small and large, grapple with infrastructure growth. As businesses become data driven to survive in the new economy, they will seek more data sources, collect more data, and look to analyze and store this data. For many such companies, the infrastructure is an essential part of an on-demand opex-driven cloud for internal and external consumption.

Both traditional and newer use cases, especially highly scalable workloads, will require nontraditional approaches to infrastructure, and hyperconverged solutions fit that profile very well. While a traditional SAN or NAS infrastructure that is connected via Fibre Channel or IP networks to a compute environment still has a place in the modern datacenter, hyperconverged solutions provide a different level of simplification, scalability, and agility. Buyers should look for the following key characteristics when evaluating hyperconverged solutions:

- **Platform scalability** — hardware and software scalability, for the storage and computing stacks. Both computing and storage stacks should be able to scale in performance and capacity independent of each other. As previously noted, hyperconverged systems are usually a minimum of three nodes per cluster; consider solutions that offer fewer nodes initially.

- **Data management.** Data layout and organization is an important piece as it may have performance, efficiency, and availability implications. Over time, as data grows, organizations will face the need to mine existing data for patterns that may build new business cases around new findings. Also look for solutions with consumer-inspired user interfaces for greater ease of use.

- **Storage efficiency.** The larger the data set and the bigger the hyperconverged system, the greater the need for data management and reduction techniques (e.g., data deduplication, compression, thin provisioning). Data optimization technologies (automated data tiering) will also be essential. A solution appropriate for a given environment will allow many, if not all, of the previously mentioned features to be implemented and recalibrated without major disruptions.

- **Data resiliency.** Resiliency capabilities (such as replication and erasure coding) and the granularity with which such capabilities can be applied (i.e., whether policies can be applied at an account, container, or object level) will be important considerations. Data resiliency should also incorporate application consistency, availability, and partition tolerance (CAP theorem).
Workload adjacency and quality of service. Since the entire premise of hyperconverged solutions is to support workload adjacency (which includes storage as a workload), it is important that the solution supports mixed workloads, which include transactional and batch workloads (such as databases and analytics workloads), variable workloads (such as VDI), and user applications (such as Exchange and SharePoint), in the same cluster. A highly capable system needs to support quality of service for both computing and storage functions.

In addition to the platform characteristics, buyers should look for the following vendor attributes:

Vendor’s commitment to the platform now and for the future. Strong road map, customer support and service (including flexible financing), and overall track record on incorporating new features into the platform are some of the attributes buyers should look for in a vendor.

Partner ecosystem for applications and on-ramping. The more comprehensive the ecosystem, the better placed the vendor in offering an end-to-end workload-optimized or use case–focused solution.
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