ESi TECHNOLOGIES

THE ROAD TO HCI

Is Hyper-Converged Infrastructure the Right Choice for Your Enterprise?

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The HCI Crossroad: Hype, "Pixie Dust" or Right Decision?

Recently, I met with a long-time customer who wanted to implement a hyper-converged infrastructure (HCI). Like many enterprises today, this client wanted to ensure that their architecture, data and workloads were operating at the highest levels of optimization.

Part of my role here at ESI is to help our clients make the right investments. That includes migrating to new architectures like HCI. But while HCI is terrific, and while there is a lot of buzz about it today, it is not always suitable for every workload.

That was the case with our client: his workloads were not a perfect fit. We spent a half-day in a whiteboard session, looking at pros and cons and identifying alternatives.

Ultimately, I recommended a converged approach which would better fit his needs. Despite my professional advice, the client wanted the "newest shiny toy". Of course, his decision prevailed based on his selection criteria and risk tolerance and he went along with HCI.

While I personally disagreed, the client was happy with his decision. This is a story that perfectly illustrates what can occur when enterprises consider new technology. Decision-makers sometimes want the "newest" for fear of missing out on a trend or a hype-cycle.

I get it. The "newest shiny toy" can be quite appealing. However, sometimes the latest isn't always the greatest, and I've been doing this long enough to witness how the pendulum of trends and hype can swing from one side to the other.

As the saying goes, "when all you have is a hammer, everything looks like a nail." Customers start hearing about the "next great thing" – like HCI – and see it as a panacea, the solution for all of their infrastructure challenges.

Except, that is not the case for every organization.

HCI is not some magical "pixie dust". It is simply another technological approach to help companies gain efficiencies, improve operations, better host workloads and manage data.

It is our responsibility as trusted value-added partners to go beyond the trends and hype (and even the latest marketing push) to guide our clients with their needs in mind.

This eBook is written to help you discover the value of an HCI platform: where does it fit, when does it work best and where might it not be the right choice.

Because, at the end of the day, what matters the most is that you have the right information to make the best investment decision for your organization.

I hope you enjoy the read.

Martin Gauthier
Director of Architectures & Technology
ESI Technologies

The Hype About Hyper-converged

It's no coincidence that HCI has hype surrounding it.

The name itself - **hyper-converged infrastructure (HCI)** - was first defined in 2012 as a marketing term, and attributed to former VMware CTO Steve Chambers, to describe a fully software-defined IT infrastructure that virtualizes all of the elements in a conventional "hardware-defined" system.[1]

HCI is a segment of the Software-Defined Data Center[2] (SDDC) family – a technology that is currently in demand in the market because of the need for greater flexibility and manageability of data across hybrid architectures commonly found in next-generation data centres.

Within SDDC, HCI is growing at an accelerated pace, with a five-year compound annual growth rate (CAGR) of 26.6 percent, while its revenues are predicted to reach $7.15 billion by 2021 (according to IDC)[3].

Gartner believes that over the next five years integrated systems will become mainstream, and predicts that HCI will be the fastest-growing segment of the overall market for integrated systems, reaching almost $5 billion by 2019, which is 24 percent of the market.

"Although the overall integrated systems market is growing, other segments of the market will face cannibalization from hyper-converged systems." Gartner[4]

Based on these statistics, it is no wonder that most IT departments are seriously considering HCI. But let's dig a little deeper and see if HCI is the direction you should be going.

The HCI Evolution

HCI is an IT framework that puts compute, storage and networking into a single physical system from one vendor, packaged as a pre-tested and integrated offering with simplified deployment tools and a central management console.

An HCI platform includes:

- Hypervisor for virtualizing compute
- Integrated software-defined storage
- Virtualized networking

Compared to more conventional IT infrastructure, HCI is considered a "plug and play" commodity solution that conveniently delivers two basic benefits to the enterprise:

1. Simplicity

HCI was born out of a need to respond more quickly to market pressures by simplifying the time and effort it took to stand up data centre architectures. Essentially, the HCI value proposition includes:

- The hardware is balanced by the vendor, which prevents any single component from becoming a serious performance bottleneck;
- All components are compatible and certified to work together;
- Fast and easy to deploy – everything is up and running in just a few hours and no specialized knowledge is needed;
- Easy ongoing monitoring, management and maintenance.

2. Scalability

HCI can scale. Some call it a "pay-as-you-grow" model, which allows you to purchase new HCI systems as your needs grow.

It's a "Lego approach". When capacity is maxed, you simply add more systems (or building blocks) to the HCI technology stack. This capability allows hyper-converged systems to be flexible and to scale out.

However, scaling across most HCI platforms means scaling all components at the same time.

Most HCI platforms work in that same way, even though some vendors are beginning to offer improved HCI solutions, which can scale each segment separately. But before we explore where HCI is going, let's take a look at how it evolved.

A Brief History of HCI

HCI replaces legacy infrastructure, combining conventional servers, network switches and storage based on either storage area network (SAN) or network-attached storage (NAS). With an increasing demand for simpler and faster to deploy infrastructures that integrate storage, the recent trend has been for major enterprise storage systems vendors to expand their traditional portfolio to include HCI as a mean to address the demand for an HCI market.

In many respects, HCI has evolved in response to business and competitive needs. Traditional architectures could not deliver the levels of agility and flexibility demanded by the business.

Time-to-market is a competitive advantage; companies can no longer afford the weeks or months it takes to spin up a new infrastructure to introduce an offering. Waiting while servers and storage devices are ordered and configured is expensive, delays market entry and drains IT resources.

"Aside from a few odd exceptions, top brands are no longer able to retain their status as market leaders for such long periods. A once loyal customer base can easily disappear within twelve months – just look at how many of Nokia's loyal customers jumped ship to Apple or Samsung without a second thought."

Five Reasons Customer Loyalty is Decreasing*

Competitive pressures are coming from multiple sources – both traditional players and new "born-in-the-cloud" competitors. And while public cloud solutions can help alleviate time-to-market concerns with an IaaS or PaaS offering, many industries are highly regulated and simply can't or won't put their data in the cloud.

Delays cost market share and IT wants alternatives to be a business enabler, not a business bottleneck.

"In a traditional model, you have the servers from vendor A, networking from vendor B, and storage from vendor C, on top of which you add virtualization from vendor D. Even with the professional assistance from a reseller, it may take weeks, if not months, to deploy a new infrastructure." – Martin Gauthier, Director of Architecture and Technologies, ESI
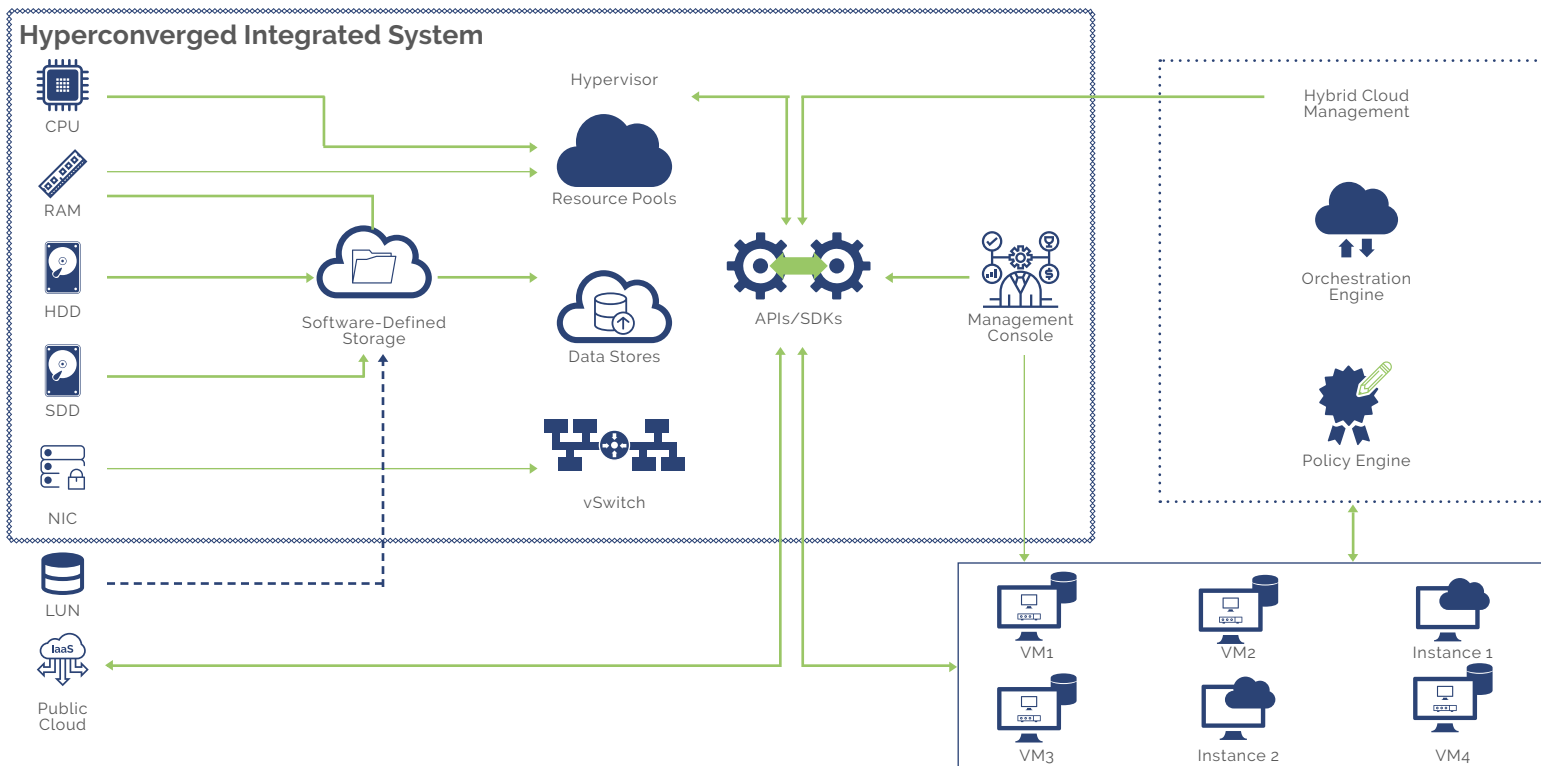
Converged Revolution

To help companies implement new systems faster and to achieve elastic scalability, compute and storage vendors started to offer converged infrastructures (CI). This modular approach to creating data centres combined tightly integrated compute, storage, networking and virtualization resources into a single commodity hardware box or chassis.[5]

Converged infrastructures offer components that are tested and validated to work together for specific documented solution designs, reducing the risk associated with the implementation of a business solution, and accelerating the deployment from months and weeks to only a couple weeks, if not just a few days. Some converged systems are packaged with a single pane view for the different components but still assembled from separate pieces brought together (and often from different vendors).

Even though converged systems are still considered current architectures, they were also the very first step in the development of hyper-converged infrastructures.

Hyperconverged Integrated System

CPU
RAM
HDD
SDD
NIC
LUN
Public Cloud

Hypervisor
Resource Pools
Software-Defined Storage
Data Stores
vSwitch
APIs/SDKs
Management Console

Hybrid Cloud Management
Orchestration Engine
Policy Engine

VM1 VM2 Instance 1
VM3 Instance 2 VM4

Source: Gartner

Hyper-converged Evolution

The main difference between CI and HCI is that hyper-converged infrastructure brings all the components together from a single vendor into an integrated physical piece of hardware, managed from a unified interface or management console.

With HCI, not only is it easier to manage, but deployment is cut down from weeks or days, to a matter of hours![6]

What is also different is that HCI delivers added value through its intelligent software tools, where all data centre components are aware of each other and can work as one fluid ecosphere.

Many HCI solutions also incorporate additional components such as backup software, snapshot capabilities, data deduplication, inline compressions and WAN optimization.[7]

Analogies and HCI Pros and Cons

One of the best comparisons for HCI is an all-in-one-Printer. Home offices used to require that you separately purchase a printer, a scanner, a copier and a fax machine. For a home office, this was an expensive proposition, with increased time to set up, support requirements, desktop real estate and more.

Eventually, the "all-in-one" was introduced, simplifying set-up and reducing cost and footprint.

All-in-one's are perfect if your needs for each of the four functional areas never change. But suppose your needs evolve from printing 20 pages per minute to 50 pages per minute. While the rest of your all-in-one functions still meet your requirements, your printer function does not. You cannot scale up your printer.

You either purchase a new printer, rendering your all-in-one printer redundant and negating the value of an all-in-one, or you retire your existing all-in-one and purchase a higher-end all-in-one that has 50 ppm printing capabilities.

Of course, there is always another option (and the one that a traditional HCI vendor would propose): if you needed more printing, you would simply add one or more of the same all-in-one building blocks to provide more printing, at the same time getting more FAX, copying and scanning capabilities. Even though you don't need these additional capabilities, they are simply artifacts of the consistent building block approach.

This brings us to examine some of the pros and cons surrounding HCI today.

NUMBER 1

VS.

Licensing costs

HCI can be scaled up easily in small incremental adjustments by adding additional nodes as needed. However, for uneven workload and storage capacity needs, enterprises might have to pay additional licensing fees.

For example, to gain more CPU, you may have to pay for more storage and network bandwidth, even if you don't require them, which increases both upfront costs and space and energy requirements.

Reduced Deployment Costs

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NUMBER **2**

VS.

Vendor Lock-In

By unifying all hardware resources under one vendor, there is an inherent risk of putting "all your eggs in one basket".

One of the downsides of a vendor lock-in system is that you lose some negotiation leverage on pricing – the price becomes whatever the vendor sets.

Single Vendor Simplicity

In a single-vendor environment, you know exactly what to expect, and in case of problems, there is a "single throat to choke".

Managing multiple environments can be highly demanding, and with HCI everything is backed by a single-vendor support model. Compatibility issues are not a concern, as the vendor has already done the hard work of integrating the system.

Provisioning, monitoring, diagnosis and file management are all automated and managed through a single portal.

NUMBER 3

VS.

Inflexible Scalability

When you scale one component, you need to count on scaling every other segment as well.

Because HCI solutions are designed as preconfigured appliances, customization is very limited and often results in a growth that doesn't match your workload and storage capacity needs.

Predictable Scalability

Achieving predictable performance and availability is paramount for IT today, as companies now operate in a 24/7 world. In order to accomplish this, every component that goes into the underlying infrastructure must operate with predictive performance as well.

HCI vendors offer tested, certified hardware and software bundles that are predesigned and engineered from the ground up. Because they are prebuilt, they can be deployed upon arrival at the customer's location.

Workloads Drive the HCI Decision

Here are some typical situations when your enterprise might consider an investment in a new HCI solution:

- Most of the components in your infrastructure have arrived at the end of their life-cycle,
- You are at a crossroad, where you either have a new big project or a complex application that requires additional compute and storage capacities,
- The time-to-market for your new project is critical and you need something to deploy fast.

But how can you be certain that HCI is the right long-term fit?

The best way is to look at your workloads and associated storage capacity requirements. Will any of them disappear in the next year? Will you be expecting to scale in the future?

If your workload is predictable and has a more-or-less balanced growth projection across all components (compute, storage and networking), then HCI is most likely a perfect choice.

An example of a good workload use case is the replacement of a Virtual Desktop Environment. When you grow your infrastructure by adding nodes to your stack, you grow the compute and the storage at the same time. Because of its nature, when growing a virtual desktop infrastructure you need to add both compute (CPU and memory) and storage (disk) together following a predictable increase. That's why HCI and Virtual Desktops have an ongoing "love affair".

However, some HCI architectures may not be designed for growth that requires storage and compute to scale independently.

"That does not mean that you can't use HCI, but rather that it's not the most optimal solution for you and you won't get the full benefits, unless you opt for an improved HCI where you can grow the compute and storage separately." – Martin Gauthier

Alternatively, if you are looking at the HCI solution because your storage is old, but your company just acquired a new server farm just six months ago – once again, HCI might not be the best option for you.

Service Provider

HCI can enable IT to quickly ramp up as a service provider to the business because HCI easily deploys pools of resources from which capacity and performance can be allocated, controlled and scaled independently. This provides a very predictable growth pattern, which allows IT to start small (reduced risk) and grow as needed. In the past, when IT wanted to transition to become an internal service provider, they were forced to design big, buy bigger and grow, often after budget approvals. HCI allows IT to minimize the entry point and even use chargeback cash flow to grow, rather than rely on big capital investments and budget cycle constraints.

Skills Gap

A recent example where HCI was a perfect fit was a project for a Canadian military department. While this department had some experience with NetApp's SolidFire storage, they did not have a lot of experts with in-depth IT knowledge. Instead, they were relying on teams of young people (typically aged 19-22) who rotated through IT positions quickly.

HCI was ideal in this case. The systems deploy within hours, using a GUI-based deployment engine. With HCI, this branch of the military did not need highly trained people within their organization; everything was deployed and up and running with relatively little expertise, through a turnkey system.

Workloads Not Suited for HCI

- Real-time applications with high IOPS and low latency, such as HANA databases and big data Hadoop, Cloudera or production workloads

- High transactional OLTP databases,

- Surveillance/security applications,

- Systems responsible for capturing large objects or amounts of data in real time

- Storage-centric applications or settings where regulatory compliance is paramount

Summary and Next Steps

Like everything, HCI is maturing as well, and new generations of this technology are enabling separate scale-up paths, even though they co-exist in a single environment. One of the reasons we would recommend the NetApp HCI solution, for example, is that it allows to grow storage or compute separately, hence mitigating the principal limitation of HCI while delivering all the benefits and reducing any future risk.

The bottom line around making an HCI decision is to begin with you and your organization's needs. What workloads do you need to support? How will those workloads evolve with time? What are the business drivers in your industry? Are you highly regulated? Is IT moving toward a Service Provider role? How is budget allocated for infrastructure? How does the cloud fit into your overall strategy? Where do you see your company in five years?

ESI Technologies is Here to Help

As a leader in the fields of datacenter design and deployment, storage and virtualization solutions integration, ESI applies its expertise to ensure the security, availability and efficient management of clients' data and the cost-effective control of its growth.

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Resources

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