

INFINIDAT

STORING THE FUTURE

# A Service Provider Path to Scale and Profitability

White Paper

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# Abstract

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Infrastructure efficiency and effectiveness directly support profit and growth as competition increases in the cloud and managed service provider (xSP) market. Savvy service providers understand that storage choices have a profound impact on not only their profit and growth, but also on their customer experience and retention. They also know that storage challenges in all those areas increase exponentially with scale. INFINIDAT storage platforms allow service providers to build and scale differentiated, profitable solutions without worrying about storage. INFINIDAT technology enables unprecedented efficiency, performance, and resiliency, while flexible business models make it easy for service providers to operationalize those platform advantages — including unique co-branding and promotional opportunities as part of the *Powered by INFINIDAT* program. Cloud providers worldwide trust their businesses to INFINIDAT storage. This paper explores a path for service providers to unlock greater scale and profitability through the right storage solution.

## Service Provider Industry Challenges

Today, the question for most enterprise IT organizations is not “if” they will consume cloud or managed services solutions, but “when.” Data points with regard to the growth of the service provider market include:

- According to Cisco’s 2016 Global Cloud Index, 81% of server workloads run in cloud datacenters in 2016; by 2020, the quantity of server workloads is expected to more than double — and 92% of those workloads will be handled in cloud datacenters.<sup>1</sup>
- A majority of managed service providers (MSPs) in a 2016 survey of more than 400 MSP firms across 30 countries experienced more than 20% growth over the past three years.<sup>2</sup>
- 451 Research’s Market Monitor service estimates the cloud portion of hosting and cloud revenue (including IaaS, PaaS and IT software as a service) will grow to almost 30% of a \$134bn market in 2019, up from 7% of a \$26bn market in 2010.<sup>3</sup>

To take maximum advantage of this market growth, service providers must recognize the forces involved in driving that growth, both on the “buy-side” and “sell-side” of the xSP market.

<b>Buy-side – Enterprise End Users</b>	<b>Sell-side – Service Providers</b>
<ul style="list-style-type: none"><li>• Financial planning decisions; with the rise of more suppliers willing to bear the risk associated with utility pricing models, why wouldn’t organizations move away from capital-intensive IT purchases?</li><li>• Rise of “shadow IT,” due to the very low barriers to entry for consuming cloud services, which empowers users but complicates procurement and compliance arrangements and raises new questions about the value provided by traditional centralized IT organizations.</li></ul>	<ul style="list-style-type: none"><li>• Intense pressure to differentiate their services and truly justify their value-add in the face of hyperscale competitors such as Amazon Web Services (AWS).</li><li>• Dynamic markets based on commoditized technology — assuming some access to capital, the barrier to entry is low for xSP offerings targeting a particular segment.</li></ul>

<sup>1</sup><http://www.cisco.com/c/dam/en/us/solutions/collateral/service-provider/global-cloud-index-gci/white-paper-c11-738085.pdf>

<sup>2</sup><http://www.eweek.com/small-business/managed-service-providers-experience-strong-growth.html>

<sup>3</sup><https://451research.com/report-short?entityId=90037>

In short, there are forces acting to create significant opportunity for service providers, but myriad challenges involved in effectively approaching that opportunity. The 800-lb gorilla in the room is the impact of the hyperscale clouds, which have driven a level of competition and market presence that simply didn't exist since the days of the original 'proto-cloud' providers: service bureaus.

Like the hyperscale clouds of today, IBM's Service Bureau Corporation and its competitors owned by or affiliated with the other computer manufacturers of the 1950s–70s offered relatively flexible access to technology that would otherwise come at a relatively high capital cost, and they drove the bulk of the “proto-cloud” market momentum.<sup>4</sup> The heyday of service bureaus ended with the step-function capital cost reductions that came with the transition from mainframes to minicomputers to microcomputers in the 1980s and early 1990s. But clients' desires to reduce costs and increase flexibility while meeting their business requirements have never changed. In the late 1990s and 2000s, visionary companies like Salesforce.com and Amazon.com recognized this reality and made unprecedented technical and marketing investments to build large-scale service platforms on commodity hardware, defining the market for the modern enterprise cloud.<sup>5</sup>

Commoditization has had a dramatic effect on the 21st century service provider market, in sharp contrast to the 20th century service bureau market, when computer manufacturers had tight control over their bureau partners.<sup>6</sup> The commoditization we see extends through the technology stack:

- Hardware – the rise of generic x86 servers
- Operating systems – the rise of Linux
- Orchestration layers – the rise of OpenStack (still nascent; commercial alternatives such as the VMware stack are certainly still popular — but even the commercial alternatives are more commoditized than mainframe time-sharing solutions of yore)
- Interaction layers – the rise of programmatic control/communication frameworks like SOAP and REST, and de facto standards created by the major public clouds (e.g. AWS S3 object storage protocols)

<sup>4</sup>More about the history of service bureaus can be seen here:  
<http://mainframe.typepad.com/blog/2011/09/did-the-us-government-kill-cloud-computing-over-50-years-ago.html>

<sup>5</sup>More about the history of the modern cloud market can be found here:  
<http://www.computereconomics.com/article.cfm?id=1032>

<sup>6</sup>The US government was concerned about this vertical integration, and actually forced IBM in 1956 to decrease their stranglehold on their service bureau by spinning it into a separate company, the Service Bureau Corporation.

By nearly eliminating barriers to entry at every level of the technology stack, commoditization has enabled a diverse ecosystem of smaller service providers to emerge from the community of vendors, resellers, integrators, and even end customers. This ecosystem realizes that delivering scalable technology services — with low or zero incremental personnel costs per incremental client — can unlock significant economic value. Their growth has created a positive feedback loop of awareness and acceptance of cloud trends among clients. However, more players in a market inevitably increases competitive pressure, as the market itself becomes commoditized. In particular, any service provider who chooses to duplicate a service found on Amazon Web Services, Microsoft Azure, or Google Cloud Platform (GCP) can expect to be undercut (or, in the best case, acquired) in the long term.

Today's non-hyperscale service providers, recognizing that they need to differentiate versus both peer service providers and hyperscale clouds with effectively infinite resources, have five strategic questions to ask when considering pathways to profit and growth:

- **How can we reach above the waves of technology commoditization?**
- **How can we speed up the process of creating unique services?**
- **How can we scale up the delivery of those services more effectively?**
- **How can we improve our customer experience and retention for those services?**
- **How can we optimize our cost basis for those services?**

Storage choices have a surprising impact on those answers.

## Storage Challenges for Service Providers

Today's digital businesses run on data, and persistent storage of that data is at the heart of most services offerings. Yet many service providers spend unnecessary resources mitigating challenges that fundamentally stem from less-than-stellar qualities of common storage solutions, including:

- **Efficiency** – both capital and operational expenses per unit of storage capacity, at scale.
- **Integration** – use of modern orchestration workflows and management environments, specifically in multi tenant scenarios on which most service providers build their business.
- **Business models** – aligning investments to incoming revenue from clients, and predictably managing growth.

These challenges have a direct impact on the strategic questions highlighted earlier. As an example, consider how storage choices influence the strategic question of scaling service delivery:

- Some storage solutions require dramatically different configurations — both hardware and software — to support a single-tenant 50GB application environment, versus a single-tenant 1TB application environment, versus a hundred 1TB application environments in a multitenant system. Creating and testing those different configurations requires human investment in both time and resources, which has an impact on not only operational costs and margins, but also time-to-market.
- If the storage solution doesn't have some kind of orchestration integration like Ansible playbooks to plug in to the preferred DevOps workflows, then time-to-market is further delayed and developers become less productive.
- If the storage solution lacks space-saving techniques like compression and space-efficient snapshots — or if those features can't perform at scale — then raw storage costs in this hypothetical scenario might increase dramatically.
- If the storage vendor's business model isn't compatible with operational pricing and ongoing growth without hardware replacement, then the velocity of the business slows down as new contracts are negotiated and new boxes installed.

Storage solutions are often one of the largest categories of infrastructure costs for shared services offerings, so it's important to consider those choices carefully. Even more importantly, beyond the direct costs, the indirect costs of poor storage decisions can add up to major impacts on the ability to scale a service and drive new revenue and margin opportunities.

## How INFINIDAT Helps Service Providers

Service provider clients choose INFINIDAT storage to support private and public cloud environments with unmatched efficiency at scale, flexible business models, and effortless integration into OpenStack and other orchestration platforms. These capabilities come from core technologies unique to INFINIDAT, as well as a business model that has been optimized for service providers.



## Technology — InfiniBox

The INFINIDAT storage software architecture<sup>7</sup>, as implemented in InfiniBox, embodies the next generation of highly optimized storage for multi-petabyte scale deployments, at a fraction of the cost of traditional solutions. InfiniBox addresses diverse workloads including traditional line-of-business applications, virtualization platforms like VMware, high-performance computing (HPC) environments, cloud platforms like OpenStack, and many other data-intensive activities. This section describes the fundamental platform capabilities and values that enable this kind of large-scale, mixed workload consolidation for our clients.

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*INFINIDAT delivers the scalability, reliability, efficiency, and simplicity that service providers need, so they can stop worrying about storage.*

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### Scalability

InfiniBox was developed with scale in mind. InfiniBox scales to multiple petabytes of effective capacity in a single, standard 42U rack. Today, the most popular InfiniBox configuration includes over a petabyte of capacity; larger clients often choose to deploy more than ten petabytes of InfiniBox storage in their environments. The scale of the INFINIDAT architecture can both consolidate existing workloads — clients have consolidated as many as 11 legacy arrays to a single InfiniBox — as well as support new workloads like OpenStack, all on the same platform. Clients can also choose to start small and grow, with starter configurations available in the 115TB range. Flexible consumption models, including capacity on demand, allow clients with predictable growth rates to deploy a larger system than their current requirements and pay for capacity as they consume it.

Capacity and performance scalability typically go hand-in-hand. InfiniBox is designed from the ground up for unmatched performance, leveraging as much as 3TB of DRAM and 200TB of flash cache to achieve aggregate performance of over 12 GB/s and 1 million IOPS and sub millisecond latency. INFINIDAT storage software maintains a ‘heat index’ for all stored data, and dynamic machine learning processes ensure that the most active data resides in DRAM or flash, while the permanent copy of all data is stored on cost-effective hard drives. This data movement process happens proactively and continually, in contrast to ‘tiering’ approaches, with no need for user intervention or excess data churn within the system. All storage systems implement some kind of caching or tiering layer, but doing so effectively at scale is extremely difficult, and INFINIDAT holds several key patents in this space.



Service providers with mixed workloads at large scale traditionally require multiple storage solutions to scale across both performance and capacity dimensions. InfiniBox delivers the performance and capacity scalability that allows service providers to consolidate diverse workloads.

## Reliability

InfiniBox delivers 99.99999% data availability through an innovative, self-healing architecture and best-in-class replication. This seven-nines availability — the equivalent of 3.15 seconds of downtime per year — yields a level of reliability that is 100 times better than five-nines (99.999%) alternatives. InfiniBox achieves mainframe-class availability without incremental costs from proprietary hardware or excess hardware redundancy.

InfiniBox protects data with a patented dual-parity, declustered RAID-like approach called InfiniRAID™, which automatically distributes data across all the system's enclosures and disk drives. InfiniRAID supports a concurrent loss of two drives without any disruption or performance impact. Since InfiniRAID uses all drives in the system at all times, recovering to a fully redundant state from a double failure of even the largest capacity drives takes only a few minutes. While InfiniBox is designed for performance, InfiniRAID requires next to no overhead to achieve this outstanding resiliency and maintain outstanding performance.

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*InfiniBox delivers the performance and capacity scalability that allows service providers to consolidate diverse workloads.*

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Some clients choose to replicate InfiniBox systems for datacenter-scale disaster recovery purposes. The InfiniBox replication engine uses our innovative snapshot technology, minimizing data transfer across replication links and allowing systems to perform most replication activities leveraging fast cache alone. To replicate volumes, the primary InfiniBox ships snapshot logs to the secondary InfiniBox periodically based on a RPO as low as 4 seconds. The resulting asynchronous relationship is responsive enough to replace synchronous replication in many client environments.

## Efficiency

Overall InfiniBox efficiency comes from several factors:

- Highly efficient InfiniRAID data protection — supporting overall 99.99999% data availability while improving raw capacity utilization versus typical data protection implementations.
- Optimized use of DRAM, flash, and hard drives — effectively combining solid-state performance and capacity-optimized hard drive economics at multi-petabyte scale.
- Data reduction software features without compromises — in-line compression, space-efficient snapshots, and thin provisioning.

While all data reduction features are important, the values of InfiniBox space-efficient snapshots and in-line compression particularly stand out for many workloads. InfiniBox snapshots offer a combination of performance and scale (100,000 snapshots per system) that is particularly attractive for modern DevOps workloads which are designed around many copies of data. InfiniBox snapshots can also be easily integrated into environments from backup solutions like CommVault to active data layers such as OpenStack Cinder. Leveraging snapshots instead of writing redundant data dramatically enhances overall system efficiency. Meanwhile, INFINIDAT real-time data compression increases system capacity efficiency regardless of workload layout, without impacting performance. Compression occurs as data is destaged to disk, after data is protected in mirrored controller memory. As a result, writes get acknowledged quickly, but the compression engine has more time to run before data is destaged, yielding higher compression ratios. These advanced data reduction features multiply InfiniBox efficiency for many workloads.

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*INFINIDAT's end-to-end simplicity allows today's service providers to focus more resources on innovation and less on storage infrastructure.*

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INFINIDAT's designed an efficient product that minimizes environmental impact and physical footprint during both the manufacturing process and product operations. A fully configured InfiniBox with multiple petabytes of effective capacity occupies a single 42U rack and consumes 8 kW of power under peak load, for a green energy footprint<sup>8</sup> of under 4 W per usable TB. Other storage systems offer some combination of efficiency features; however, none provide all as effectively at scale as INFINIDAT.

<sup>8</sup>[http://content.infinidat.com/power\\_consumption](http://content.infinidat.com/power_consumption)

## Simplicity

InfiniBox has been designed to be easy to use and integrate into existing datacenter workflows, regardless of desired consumption model, deployment environment, or level of storage expertise. The INFINIDAT data path already abstracts away many of the challenges of traditional storage and even new, build-it-yourself architectures, with no need to keep track of different storage media or physical data layout through the life of the system. Users also don't need to worry about protocol choices, as InfiniBox delivers truly unified storage designed natively for multiple workloads and protocols, including Fibre Channel, NAS and iSCSI, as well as mainframe FICON. Clients can easily deploy OpenStack via iSCSI, VMware via NFS, and bare-metal workloads via Fibre Channel, all in the same InfiniBox.

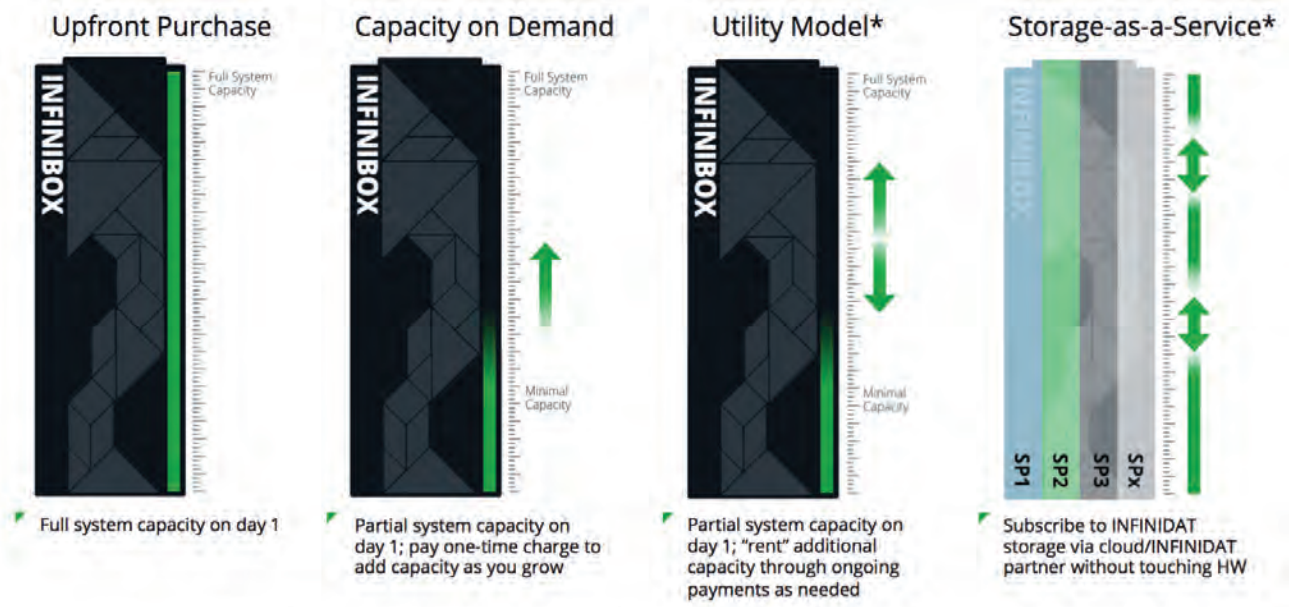
INFINIDAT exposes that simplicity to the administrator via an intuitive HTML5 GUI that facilitates deploying storage within minutes of installing new InfiniBox systems — no training required. Lower-level automation for all InfiniBox functionality can also be controlled using a native non-blocking RESTful API, Python SDK, and command-line interface (CLI), and Ansible playbooks are available. Server-driven workflows and related integrations are available for VMware, OpenStack, and many operating systems are also available through INFINIDAT Host PowerTools™.<sup>9</sup>

Simplicity is also reflected in INFINIDAT's business practices. All systems include 24x7 on-site hardware and software support, and software licenses and pricing are all-inclusive and predicated on usable capacity. Each client is covered by our included white glove service and assigned a technical advisor (TA) to help with deployment, support and any questions they may have about the system. INFINIDAT's end-to-end simplicity allows today's service providers to focus more resources on innovation and less on storage infrastructure.

<sup>9</sup>[http://content.infinidat.com/host\\_powertools](http://content.infinidat.com/host_powertools)

## Business Models Optimized for Service Providers

In addition to unique technical capabilities, INFINIDAT offers a spectrum of business models for storage consumption that allow service providers to align storage investments closer to end customer revenue. A summary of the options are shown below.



\*Not available in all regions. All business models are subject to commercial terms and conditions.

The up-front purchase option always provides the lowest total cost of ownership at scale. Another business model helps to balance cost (essentially, risk borne by INFINIDAT) with greater degrees of flexibility. INFINIDAT's "capacity on demand" option is particularly interesting for many service providers who start relatively small (500 TB or less), but have predictable growth rates. This breadth of options gives service providers the ability to best match infrastructure investments to their business needs.

Beyond economic models, INFINIDAT also believes in building joint success with service provider partners through co-branding and promotion. Our *Powered by INFINIDAT* co-branding program allows service provider partners to demonstrate that they are building solutions that leverage the most differentiated storage technology in the world. Further joint go-to-market arrangements are also possible, depending on the scale of the engagement.

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**INFINIDAT**

# Conclusion

The cloud and managed service provider (xSP) market is heating up dramatically, and service providers who are trying to compete effectively against hyperscale vendors such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP) face strategic questions about how they will sustainably drive profit and revenue. Storage choices play a large factor in those decisions that extend beyond the simple TCO of the storage system itself. INFINIDAT storage is uniquely designed to maximize key values relevant to the service provider community, including efficiency, scalability, and integration. When those technical advantages are paired with INFINIDAT's flexible business model and *Powered by INFINIDAT* promotional opportunities, the result is a compelling value that enables service providers to align investment models with client revenue and reach new clients. With INFINIDAT storage, service providers can stop worrying about storage infrastructure and shift resources toward innovation.

**INFINIDAT**

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