SOLUTION SHOWCASE

Oracle Storage Cloud Services—Enabling Enterprises to Go Beyond the Box

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Abstract: Oracle has invested heavily over the last few years to build a compelling, capable, and commercially attractive set of public cloud offerings. By keeping a foot firmly in both the on-premises and the in-cloud camps—indeed by seamlessly integrating the two—Oracle is different from most of the IT vendors that are merely allowing linkages "over the garden fence." The integrated approach is important because most businesses are likely to continue to run a good proportion of their workloads on-premises. For such organizations—those that will be stepping into the world of cloud storage gradually and very pragmatically—a truly compelling cloud storage provider will be one that offers its enterprise customers more than just cloud expertise and abilities; it will be one that provides data center experience and credibility as well, plus a cloud storage solution with enterprise ruggedness. Oracle is taking the "will" out of those statements by offering that combination today.

Analysis

As the overall IT market and ecosystem shifts, its changes not only largely foreshadow but also somewhat reflect a seismic remaking of the storage landscape. Shaped by the nonstop explosion in data growth, and the costs of storing and protecting all of it, storage professionals are envisioning that their storage environments and data centers of 2020 will look dramatically different from today. For enterprise storage managers, trying to keep up with data growth while juggling data security needs, archiving requirements, and cost-containment issues is like swimming upstream with a pile of unvirtualized storage arrays on their backs!

In ESG's latest storage market trends research report, one-third of respondent midmarket organizations now attest to at least 500TB of disk-based capacity—that's up from 10% in 2012 and 2% in 2010. Furthermore, more than 25% of the survey's respondents reported their corporate data growing at more than 50% per year, while the biggest single group (another 25%) cited overall annual storage capacity growth rates in the 11% to 20% range.[1]

And these growth rates may not take into account new storage use cases driven by technology innovations and increased user expectations. As devices from cellphones to appliances get smarter and become connected to the Internet of Things, their sensors are going to gather more and more data. As an example, BMW has figured that its cars are expected to generate around 1PB of data *per day* by 2017. Since every car maker will likely be similarly collecting and analyzing such

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[1] Source: ESG Research Report, *2015 Data Storage Market Trends*, October 2015. All other ESG research references and charts in this solution showcase have been taken from this research report, unless otherwise noted.

data, business intelligence and data analytics workloads are expected to be the biggest drivers (no pun intended) of storage growth in the near term.[2]

Meanwhile, of course, the cost of all the systems and operations required to store and manage all this data continues to hamstring storage environments. ESG's research found that nearly one in five IT organizations cites cost related to either capital expenses (CapEx) or operational expenses (OpEx) as their primary storage challenge.
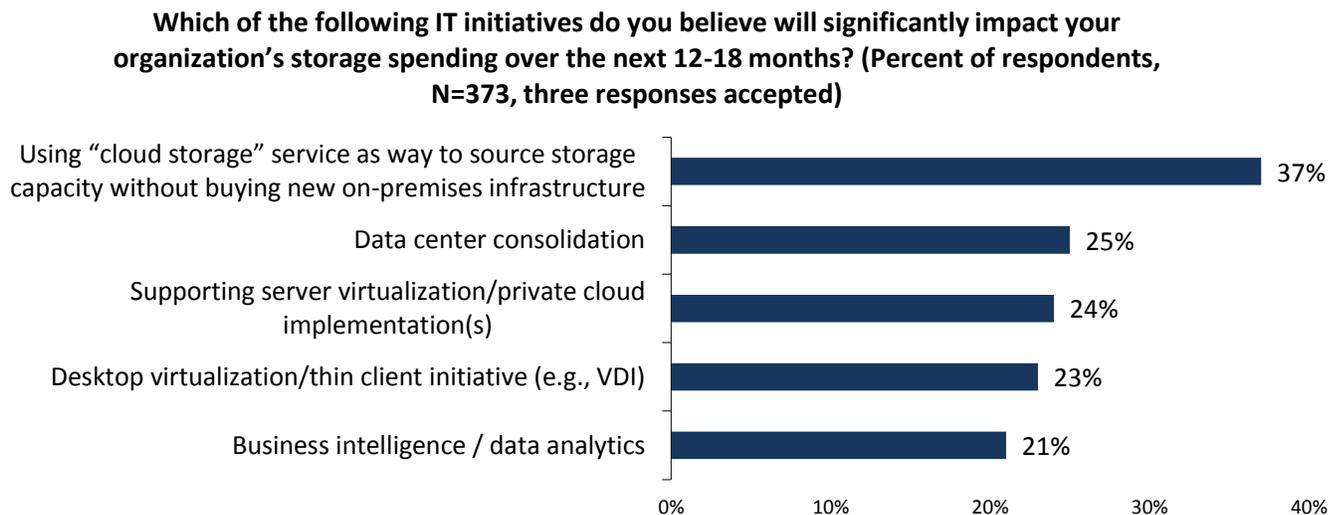
So, what can be done to try to address this onslaught of challenges?

According to ESG's 2015 IT Spending Intentions Survey, many IT organizations are dealing with the challenges by increasing their spending on cloud computing services. When thoughtfully done and optimally deployed, the cloud—and in particular cloud storage—can help to ameliorate the data and cost challenges. Indeed, the relative ranking of the use of the cloud as a cost-containment measure has gone from the ninth most popular response (out of nine) in 2009 and 2010 to the second most popular response (of nine) today.[3] And when ESG asked storage professionals to indicate which IT initiatives would have the greatest impact on their organizations' storage spending over the next 12 to 18 months, the most commonly cited response was "using cloud storage services to source capacity in lieu of buying new on-premises infrastructure." As Figure 1 shows, 37% of respondents—the highest percentage reported for any initiative—reported this approach.

The bottom line is that many savvy storage managers are now buying or actively considering some amount of storage capacity in the cloud. The cloud's scalability and elastic pay-as-you-grow model means they don't have to shell out for a storage upgrade whatever the size or granularity, whether it's a planned or a short-term granular challenge. In addition, consuming cloud services is almost always considered as OpEx, and often is a monthly budget line-item. These are both aspects that invariably make it easier to make, and control, expenditures.

But as rapidly as cloud storage adoption is growing, it's not all clear sailing—there are real (and perceived) concerns about security, flexibility, and cost, as well as whether cloud providers have the "data center chops" that enterprise users need. With most businesses maintaining a hybrid-workload model for the foreseeable future (some on-premises, some in the cloud) what's needed is the ability to step gradually into cloud consumption in a way that is seen to have credibility and that minimizes risk. And that calls for the right cloud provider.

Figure 1. Top Five IT Initiatives That Will Impact Storage Spending Over the Next 12 Months

Which of the following IT initiatives do you believe will significantly impact your organization's storage spending over the next 12-18 months? (Percent of respondents, N=373, three responses accepted)

Source: Enterprise Strategy Group, 2016.

[2] ibid.
[3] Source: ESG Research Report, *2015 IT Spending Intentions Survey*, February 2015.
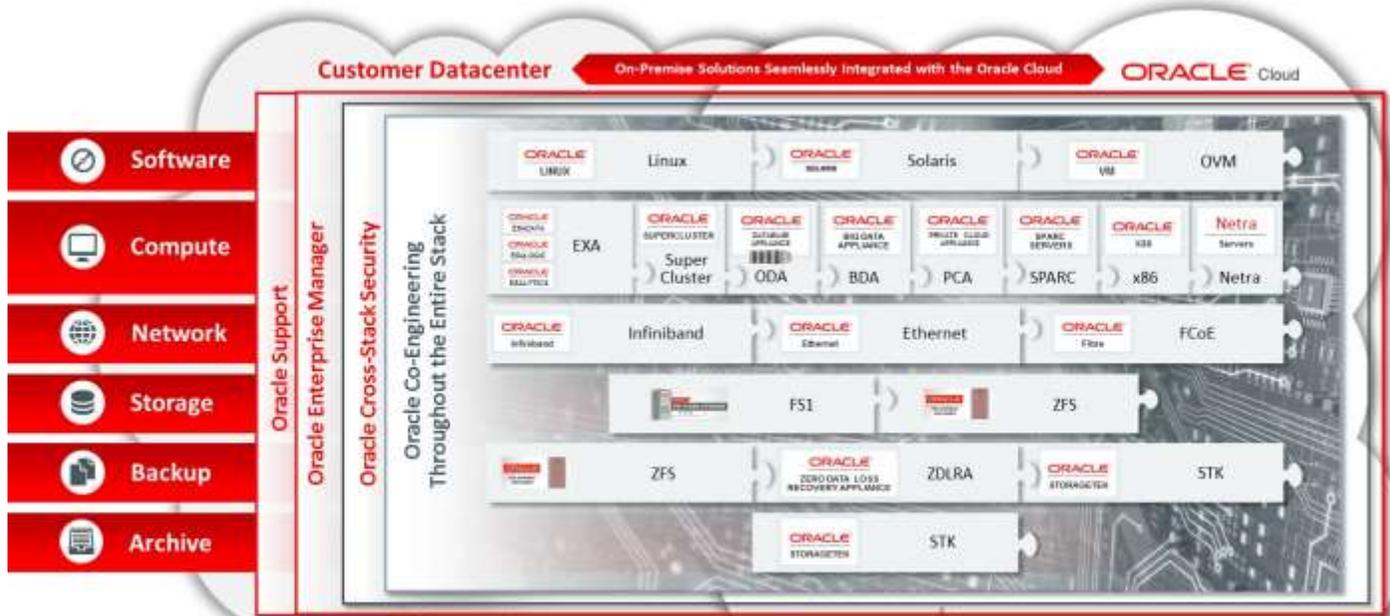
Oracle's Public Cloud

Oracle's overarching strategy is "simply" the seamless integration of a customer's data (center)—including all the on-premises solutions within—with the Oracle Public Cloud. Obviously, for Oracle to achieve this goal, a secure, scalable, and on-demand public cloud storage solution is a prerequisite, and the Oracle Storage Cloud Service is just that, designed to provide an *enterprise-grade*, large-scale, object storage solution for moving files and unstructured data to and from the cloud. Of course, it is a fully public cloud, open to all—i.e., not only to Oracle's existing enterprise customers, but also to first-time Oracle customers who want to use it.

Importantly, Oracle was an early designer and purveyor of what is now commonly called "(hyper-) convergence" (previously simply called "pre-integrated engineered systems" in Oracle-speak), and its public cloud has many key "converged cloud" elements. In other words, the cloud is intentionally designed to be a fully integrated part of an overall data and IT solution, where users are happy to embrace it. While Oracle Storage Cloud Service marks a significant investment for the company,[4] it is also important to understand that it is a prerequisite for Oracle chairman Larry Ellison's vow to see his company as the alpha dog in not only software-as-a-service (SaaS) but also platform-as-a-service (PaaS).

Thus, public cloud storage is but a piece of Oracle's larger cloud story. Oracle's comprehensive cloud portfolio provides the benefits of the entire technology spectrum—the same one that users can run themselves—including databases, chips, and processors (notably the new SPARC M7 family), enterprise applications, servers, big data, and vertical integration engineering. The foundation of a full infrastructure stack—with cloud (storage) and security as needed—seems to bolster Oracle's prediction that IT is on a track of moving away from being a "do-it-yourself" occupation to a matter of "just give me a working, integrated system."

Figure 2. The Oracle Converged Infrastructure Stack

Source: Oracle, 2016.

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[4] Although Oracle is sitting on more than $50 billion in cash, so it can certainly afford it!

This portability from the private cloud to the public cloud and back is based on using the same products and architectures, and leveraging the same standards and skill sets. It is part of a strategy that allows users to develop and deploy anywhere, at any time, from any Internet-connected device. And it is built on a three-pronged approach: object storage, database backup, and archive storage.

- **Oracle Storage Cloud Service** is an OpenStack Swift-compliant global object storage offering employing a true single global namespace (versus being segmented into regions or availability zones). What this means to customers is that when a file in one location is inaccessible for any reason, the end-user is automatically routed to another copy of the file driven by customer-defined policies. This is better than forcing the end-user to manually place a file in one zone, make a replica, and access it from that completely separate zone with its own namespace. It also enables Oracle to deliver a state of tunable data consistency, whereby immediate data consistency levels can be delivered. For business-critical data such as financial data or medical records, users can always be assured that they are downloading the latest copy instead of an outdated version, as all changes to a specific file are immediately reflected across all instantiations of that file across the whole Oracle Storage Cloud. For example, you wouldn't want to be a CFO heading into a board meeting with yesterday's financial reports or a surgeon prepping for an operation with patient files from three days ago. Having a truly global namespace with tunable data consistency is a prime example of what makes Oracle's Storage Cloud so enterprise-centric, in contrast with more consumer- or developer-grade clouds that place less of an emphasis on data integrity and consistency. Customers can also complement Oracle's physical storage systems (such as the All Flash FS and ZFS Storage Appliance) with the Storage Cloud Service as an external, additional tier of storage—to go beyond the confines of a box and provide an end-to-end solution.

- **Oracle Database Backup Service**: This is a technically elegant cloud service that enables Oracle customers to backup directly from their Oracle Database(s) to the Oracle Public Cloud using the Oracle Recovery Manager (RMAN) utility; their familiarity and comfort with RMAN means that backing up data to the Oracle Public Cloud is as intuitive as making a local backup copy. Oracle Database data blocks are transmitted to the Oracle Public Cloud as encrypted RMAN data blocks and stored as encrypted data, with only the customer holding the encryption keys locally. A key value proposition of the Database Backup Service is hence the end-to-end visibility that Oracle provides to its customers. The ability to provide support and diagnostics from on-prem databases to the cloud backups puts Oracle in a position to provide smoother and faster resolution of any customer issues. This is a very different situation from backing up an Oracle Database to some other public cloud, where lack of visibility (into the on-premises operation or end-to-end) and lack of support can become issues that involve time-consuming multi-vendor coordination and inevitable finger-pointing.[5] Another compelling benefit that Oracle offers its customers is the ability to open up encrypted RMAN backups sent to the Database Backup Service as full-blown Oracle Database instances in the Oracle Database-as-a-Service Cloud or Exadata-as-a-Service Cloud to run dev/test cycles or even create a Data Guard (DR) standby instance in the cloud to protect the customer's on-prem databases in the event of a site failure. Having the ability to spin up and discard databases on demand in the cloud makes continuing the arduous process of on-premises test/dev analogous to spending an hour going to pick up food when you can simply click an app such as DoorDash to get your food while you focus on other priorities.

- **Oracle Storage Cloud Archive Service**: The cloud is ideally suited to meet surging demands for archived storage. Oracle Storage Cloud Archive Service provides archived storage for as little as 0.001 cent per gigabyte per month. Oracle's vertical integration—not to mention an annual R&D investment in excess of $5 billion—enables it to deliver a deep cloud archive at such an impressive price point. Customers of any size can now archive data for $12,000 per annum per *petabyte*. For enterprises and SMBs with data that is infrequently accessed—such as those files sitting on high-

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[5] And the economic advantages to choosing Oracle end-to-end can be significant, since Oracle charges a $3,500 fee per RMAN stream to a non-Oracle cloud provider. Whether that is a carrot or a stick is debatable, but it is real money!

end storage arrays that haven't been touched in many months[6]—the decision to move such data to the Oracle Storage Cloud Archive Service and reclaim/reuse capacity on their on-premises systems is not going to strain many people's Excel capabilities!

Some highlight-worthy features and benefits of Oracle Storage Cloud Services:

- Customers can store unlimited pieces of data as objects, organized by containers. This elastic consumption model means businesses need buy only as much storage capacity as they need at any time, then add—or remove—capacity in minutes with no additional—or unnecessary—hardware investment.

- Cloud tiering allows customers to burst data to the cloud during peak business hours or seasons, set varied and variable policies to tier data to the cloud, and replicate to the cloud for disaster recovery.

- Administrators can control or restrict access to data by assigning read and write permissions. They can also track and monitor key storage metrics.

- A customer can store, retrieve, and manage data, or a developer can create and access objects, through two open standards options: simple REST commands based on the RESTful Web Service APIs or a Java client. The Java library offers the advantage of providing encryption for data at rest and in transit, and it offers provisions for encrypting data client-side. Developers can easily create or modify applications (either on-premises or in the cloud) to accommodate their storage needs. Oracle also offers its Storage Cloud Software Appliance (SCSA), which enables customers to simply access the Oracle Storage Cloud using the traditional NFS file system protocol. The Oracle Storage Cloud Software Appliance can be deployed as a Docker image on an Oracle Linux 7 standalone server or an Oracle Linux 7 Virtual Machine.

- Oracle Storage Cloud Service also provides an array of end-to-end security facilities. At the very prosaic level of the Oracle facilities themselves, Level 4 security data centers are provided in multiple geographic locations interconnected as one public cloud, using the latest in biometric security measures and data protection policies with redundancies throughout the architectural design.

Market Relevance of Oracle's Cloud Storage

The value of the Oracle Storage Cloud Service to its users can be viewed operationally and economically.

Operational Value

With its increasingly complete (and converged) portfolio, Oracle occupies the rarified vendor space of having an end-to-end optimized stack from hardware to the cloud, including applications, middleware, and databases, with extended cloud storage options and common security, management, and customer support to boot. For an Oracle customer, that means the ability to work with a consistent architecture, whether running workloads on-premises or in the cloud. It also removes the burden of each user having to make clouds and apps and storage systems work together, and instead allow Oracle support to do all the heavy lifting and engineering work! And for non-Oracle users, it gives Oracle an increasing number of entry points to try to acquire new users. After all, whether they are a startup or an established business, just about any organization can afford—and could benefit from—an archive cloud priced at $12K yearly per petabyte. Many might be shocked to find they spend more on coffee machines or T-shirts and plastic giveaways at trade shows!

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[6] Examples of data well-suited to be stored in the Oracle Archive Cloud include financial records, digital film masters, historical preservation data, and insurance records—indeed any data that falls into the category of "set it and forget it."

But it's not just about cloud, or for that matter, just about the data center, servers, storage, middleware, security, or the foundational database and applications. It's about ALL those things. Oracle's message these days embraces the cloud, security, and infrastructure—an integrated/converged "uber Red Stack."

There are very few organizations that can genuinely converge the three major components—the cloud, security, and hardware infrastructure—together. Some providers focus on the cloud and others focus on the data center ecosystem, but most users don't want one or the other—they want some of each (or, better yet, one that combines both) as well as easy transition and dynamic growth as needed. It means cloud users can dive in fully, wade in carefully, or simply dip their toes if they like. Oracle is simply saying, "We can get you there as quickly as you want or as slowly as you want, and in pretty much any fashion you choose."

Oracle's vision today is an engineered hybrid cloud that lets users (and applications) move freely from public to private cloud and back again. And Oracle has the control to make its vision reality. What do we mean by control? It means that, by virtue of what Oracle calls its "converged infrastructure stack," it owns all the pieces of the stack. And when that's the case, as it is with Oracle, it isn't beholden to—or reliant upon—anyone. At a time when some vendors are shutting down their public clouds and others are busy trying to convince the market as to why the public cloud is bad for their environments (often because they don't have one to offer!), Oracle's pragmatism and integrated technologies strike a pretty compelling note to support the idea of being focused on helping its customers focus on their business priorities.

Among the many vendors that "embrace" the cloud (and it's hard to find one that does not these days, at least from a marketing perspective), most only own one part of the equation, or maybe two legs of a three-legged stool. Oracle owns the whole stool. This is a key point because it means that when customers talk to Oracle about "what workload should go where," they're likely to get an unbiased response. Oracle has no particular interest in what goes where. As long as you're sitting on the Oracle stool, you can lean whichever way makes you comfortable.

And just as important, you'll get the same experience whether deploying on-premises or in the cloud. This includes not only the data consistency and easy access via a global namespace, but such basic—and invaluable—attributes as:

- End-to-end diagnostics (means no finger pointing or confusion between different platforms).

- Easy training (because there is just one GUI: Oracle's) and integration—the cloud tier becomes essentially just another big C: drive. A storage administrator can push data to the cloud simply by moving things around on the GUI.

- Advanced integration—extending the "Red Stack" into the cloud and using it for backup. With Oracle's backup tool, all the component parts understand each other.

Economic Value

It's not an understatement to say that Oracle has not traditionally been thought of as a price leader. But when it comes to cloud storage, the company is not only being aggressive on value, but also transparent—anyone can find most pricing on its website with just a few clicks (see sidebar on Oracle's pricing).[7] Historically, Oracle's reputation has been based on the quality and indispensability of its products, together with high-quality service/support rather than straightforward economic good value, but Oracle seems to be trying to change that. Perhaps that's why there was so much focus at the

Oracle Cloud Storage Pricing for Metered Services:

First TB/month—$0.024

Next 49 TB/month—$0.0235

Next 450 TB/month—$0.0232

Archive storage capacity:

Any—$0.001 per GB/month

Archive data retrieval:

Any—$0.005/GB

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[7] For more, see Oracle's cloud storage pricing schedule.

recent Oracle OpenWorld conference on both *support and affordability*—after all, if you want IT users to increasingly rely upon you, these are traits you'd better have (or at least become known for).[8]

Of course, the cloud (storage or otherwise) is not a panacea. There can be hidden costs and unexpected surprises. Moreover, some users won't want to put all their data "eggs" in one "basket," who don't want to share data with just a single vendor, even if that makes economic sense. For such multi-vendor and "we just like to keep our options open" users, Oracle will need APIs to allow linking and migration to other clouds (something that ESG believes is coming).

The Bigger Truth

If you're a born-and-bred enterprise data center manager, then what Oracle Storage Cloud Service offers is likely to garner your interest because of Oracle's enterprise data center DNA, experience, and credibility … a level of DNA, experience, and credibility that some other big-name cloud providers simply do not have today. Indeed, this represents a major opportunity for Oracle to expand its user base, as its public cloud in general (storage or otherwise) is not just for Oracle's existing customers.[9]

So, each component of the Oracle Storage Cloud Service looks good, but the gestalt is even more impressive. That's because when you have the Oracle components integrated (including, crucially, commonality of management, security, and support) you not only get a mature IT solution, you get extra benefits because it's "Oracle on Oracle." In other words, there are elements of Oracle's multi-pronged cloud storage services that derive "double dipping" from it being all Oracle. There is massive room for this Oracle cloud storage offering to grow—of course, growth is always a challenge in itself, and it's something that Oracle needs to carefully manage.

But it's worth remembering this: No matter how the IT and storage landscapes change, Oracle is among an elite—and very limited—group of vendors that really doesn't care what the final version looks like, since it can work with whatever choice a user makes, and that's an enviable position to be in.

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[8] In attendance at the event, the author of this paper spoke to an extensive range of Oracle users—both in "public" settings and privately—who attested to the fact they were buying Oracle because it was financially more attractive than the competitors they had considered/used.

[9] At Oracle OpenWorld 2015, it was stated that 70% of Oracle Cloud users were first-time Oracle customers—they had never used an Oracle product before, not even its database.

Enterprise Strategy Group is an IT analyst, research, validation, and strategy firm that provides actionable insight and intelligence to the global IT community.

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