Oracle All Flash FS: The Business Advantage of an AFA Integrated with Oracle’s Public Cloud

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Abstract: Taken at standalone face value, Oracle’s All Flash FS is an impressive unit that leverages a proven Oracle FS storage pedigree, extending it into an all-flash, full-function, easy-to-deploy storage system at an all-inclusive price. But there is a lot more to the story. Oracle’s strategy of embracing “app to chip” is manifested clearly in this All Flash FS, which is built with “engineered in” integration to Oracle’s cloud and database offerings. This means it should realistically allow Oracle to hit a home run in Oracle shops that can derive compelling extra value from its integration with the full “Red Stack.” However, it should also appeal to non-Oracle shops looking for a hugely capable, more-than-competitive (not to mention cabled, racked, and pretested) all-flash array that deploys in minutes.

Solid-state: Solidly Mainstream

Solid-state storage (overwhelmingly that means flash storage today) has transitioned from being a niche product just a few years ago to full mainstream status now:

- ESG’s latest market research (see Figure 1) shows that roughly half (49%) of respondents surveyed are leveraging solid-state in some form today, a rate of adoption that has roughly doubled since 2012 and tripled since 2008.¹

- In 2012, ESG research showed adoption was more prevalent in enterprise IT organizations.² Now usage is fairly equal across both midmarket and enterprise-scale IT organizations. Flash is simply a “norm.”

- Falling prices are continuing to make flash more attractive, but there’s more involved. The operational and financial advantages (i.e., real progress in those aspects and a better market understanding of them) also factor into the dramatic upswing in flash storage use. Indeed, ESG’s latest storage market research shows that although 23% of surveyed respondents identified performance as their primary motivation in buying solid-state, more than three-quarters identified something other than performance—e.g., reliability and TCO considerations.

Into this burgeoning market, Oracle has now introduced its All Flash FS system (an “all-flash array,” or AFA).

¹ Source: ESG Research Report: 2015 Data Storage Market Trends, October 2015. All ESG research references and charts in this solution showcase have been taken from this research report unless otherwise noted.
Oracle All Flash FS: An Impressive and Inclusive New AFA

The Oracle All Flash FS is a brand-new system likely to appeal to both Oracle and non-Oracle customers with full-function design, all-inclusive pricing, and both Oracle Database and Oracle Cloud integration “engineered in.”

As has increasingly been the case as Oracle strengthened and expanded its storage portfolio over the last few years, Oracle’s software customers will also receive incremental “Red Stack” benefits as a result of co-engineering between Oracle Database, Oracle Applications, and the Oracle storage division. Indeed, engineers from the software side of Oracle were directly involved in—not just advising—the R&D of this new FS product.

The All Flash FS is designed to handle multiple concurrent mixed workloads that require consistent and predictable throughput (such as OLTP and data warehousing) with low latency, high IOPS and throughput, and impressive levels of both scalability and security. The All Flash FS’s multi-tenancy can support hundreds of Oracle databases in up to 64 secure storage domains, with one-click application provisioning, data compression of up to 50x, and database query acceleration of up to 12x. It also comes with a host of advanced data services. For example, the All Flash FS auto tiers, auto tunes, and auto compresses Oracle Database data while maintaining “always-on” encryption (24x7) and delivering unique application-centric hooks into core Oracle apps such as JD Edwards and Primavera. On a pragmatic note, Oracle claims “just 30 minutes from pallet to power-on” (the system ships racked, cabled, and tested), with ease of management in production ...

including being able to manage the FS from anywhere with an iPad or smartphone.

Oracle’s feature/function set in the All Flash FS is robust, with such capabilities as multiple RAID types, QoS (in terms of I/O prioritization), copy services, tiering across different flash media capacities, thin provisioning, load balancing, and more. A few notable operational aspects of the included software suite include:

- One-click automated provisioning doesn’t require expertise, and the settings for Oracle Database and Oracle Applications are pre-tuned and pretested. To reduce administration to a minimum, Oracle’s “Flash Profiles” disaggregate Oracle Database components—such as redo logs and control files—to enable a level of automated provisioning that dynamically enhances Oracle Database performance. Why such a high degree of automation? Most

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DBAs would rather the machine do the work for them, just as people would rather use a washing machine than scrub clothes in a sink. And the Flash Profiles—whether new or modified—can be exported to other All Flash FS systems to standardize provisioning across data centers.

- Flash domains provide data isolation for added security.
- I/O prioritization responds to business priority parameters.

Additionally, the system provides high availability (HA) with write mirroring in the second controller’s NVDIMM, plus super-capacitors to protect data and availability further in case of a power outage. HA and consistent low latency really matter, especially for demanding Oracle-type applications, with users increasingly needing to support consolidated, multi-tenancy systems, too. In fact, 62% of the respondents to ESG’s latest storage survey stated that somewhere between 21% and 50% of their applications and workloads require the performance levels provided by solid-state. Of course, that’s just performance. The other attractions and benefits of solid-state were mentioned earlier and are increasingly understood by IT end-users (see Figure 2).

**FIGURE 2. Benefits Realized from Solid-state Storage Usage**

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved application performance</td>
<td>57%</td>
</tr>
<tr>
<td>Improved resource utilization</td>
<td>51%</td>
</tr>
<tr>
<td>Reduced operational expenses</td>
<td>45%</td>
</tr>
<tr>
<td>Improved total cost of ownership (TCO)</td>
<td>44%</td>
</tr>
<tr>
<td>Reduced power consumption</td>
<td>43%</td>
</tr>
<tr>
<td>Improved SLAs</td>
<td>39%</td>
</tr>
<tr>
<td>Reduced/deferred hardware capital expenditures</td>
<td>37%</td>
</tr>
<tr>
<td>None of the above</td>
<td>2%</td>
</tr>
</tbody>
</table>

The fact that the All Flash FS can be managed by Oracle Enterprise Manager—just like Oracle Database and the Oracle Public Cloud—extends the meaning of the term “a single pane of glass.” Oracle customers can literally leverage a single management console rather than having to link and launch multiple unrelated screens to manage different IT offerings. Customers can also leverage the Oracle Enterprise Manager GUI to manage the All Flash FS and Oracle Database and move data from FS to the Oracle Public Cloud as well as between clouds within the global Oracle Public Cloud—effectively enabling them to leverage intra-cloud tiering for higher economic benefit—all from one secure console. Although other vendors may cite an ability to point their storage systems to third-party public clouds, clearly that approach would lack the
end-to-end diagnostics, security, automation, visibility, and single-vendor support that is possible when Oracle is delivering the same integrated infrastructure and applications in both on-premises and global public cloud data centers.

**All Flash FS: User Value, Relevance, and Implications**

Oracle’s avowed strategy is to integrate everything vertically from the app, to the chip, to the cloud. The All Flash FS reflects that strategy because it is as much a new data management system (integrating both hardware and software, even beyond its own rack into Oracle Databases and Oracle Public Cloud) as it is the next-generation all-flash storage manifestation. This “system approach” will likely strike the right chord in the market for a number of reasons:

- In terms of the product itself, IT users are demanding extensive functionality, as ESG research has found. Respondents were asked to state their must-have features for any new storage system, and they produced a laundry list of prerequisite capabilities—everything from HA and data reduction to tiering, snapshots, and replication—that the All Flash FS can deliver against.

- Most IT organizations are averse to risk and complexity; thus, having an identical operational experience and level of security whether they are using on-premises or cloud infrastructures is an added level of both real and perceived comfort. And this desire for uniformity goes even deeper. As new ESG research shows, 74% of all respondents report that it is critical or very important for their cloud service providers to use the same cloud infrastructure as they themselves use in their own internal highly virtualized or even private cloud environments. And when examining the responses of only current public cloud users, that number jumps to 83%. This is something Oracle provides—the same applications, infrastructure, and operational experience whether on-site or in the Oracle Cloud.

- Oracle’s overall integrated approach is very much in line with the contemporary drive to, and desire for, convergence. A recent ESG blog highlighted why this “inclusive” ability makes Oracle’s approach so compelling: “The real-world benefits from one throat to choke, and one ‘system’ approach ... we’re already seeing a huge trend back to integrated computing stacks, and Oracle just happens to be positioned enormously well here.”

The database and security provide two good examples of how system integration can be achieved:

- Looking at Oracle’s bedrock database business—and with Oracle Database 12c now offering up to 4,096 pluggable databases per container database—the All Flash FS is Oracle’s answer for its database users who require secure data isolation for their pluggable databases with no commingling of data from different database instances. (As one of the only AFAs to offer secure flash domains, the All Flash FS is also well suited for Oracle 12c Database cloud deployments.)

- In terms of end-to-end security, the All Flash FS can compress data and maintain full security compliance with Oracle’s encryption policies, aided by the 100% self-encrypting flash drives deployed in the FS. As Oracle was keen to emphasize at its recent OpenWorld event, it is focused on making security “engineered in” rather than bolted on: This means taking security to the component level, including the M7 processors with “Silicon Secured Memory” in its new servers and the self-encrypting drives in the All Flash FS.

Organizations can choose to run their Oracle software on any suitable storage hardware, but when Oracle Databases and applications are run on Oracle storage, in this case the All Flash FS, very intentional and significant extra benefits can be enjoyed. This is the payoff for running a “Red Stack.” A prime example is the co-engineering with Oracle Databases to support “Hybrid Columnar Compression,” an Oracle facility that can reduce the requisite database data that must be stored by up to 50x, which, when efficiently implemented, can reduce actual storage capacity requirements by up to 90%.

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As mentioned earlier, the FS integrates with Oracle Enterprise Manager, including the latest 12c release, so DBAs can manage the storage system directly. Moreover, the FS system is architected to match with the way Oracle Automatic Storage Management works, representing another way to reduce hands-on management.

The All Flash FS certainly tips the scale as a full-function storage system—it’s great to see all-in pricing from Oracle, which hasn’t exactly been renowned for such simplicity—but there are a couple of “balance” considerations. Oracle believes that data reduction is best done where data is created and processed rather than where it is stored. This makes sense, but Oracle hasn’t so far addressed its lack of formal storage-based data-reduction tools. Thus, Oracle might miss out somewhat in terms of providing overall value in non-Oracle-software shops. But it’s nearly certain that Oracle will hit a home run in Oracle shops with features such as Hybrid Columnar Compression and Flash Profiles for leading Oracle apps.

The Bigger Truth

There are two ways to look at the new Oracle All Flash FS.

First, it is an AFA. Oracle clearly thought through this system’s full-function, all-inclusive design to deliver high performance, high availability, low latency, and scalability, with attractive economics and built-in drive encryption. And yet it’s smart to market a system that doesn’t require specific flash management expertise. This approach is perfectly in line with the emergence of flash as a key “regular” component of the storage ecosystem rather than its prior role as simply an application- or workload-specific performance-fix tool. ESG’s latest storage research backs that up. Users who view storage strategically are more than three times as likely to use solid-state storage as those who dismiss it as an afterthought (60% versus 17%).

Second, it is unequivocally an integral, integrated part of Oracle’s overall vertical integration strategy and vision. Unlike other AFAs on the market, Oracle’s All Flash FS can seamlessly tier data to and across Oracle’s Public Cloud offerings and provides compelling co-engineered advantages to Oracle software environments. This All Flash FS extends beyond the confines of its box to encompass the Oracle-owned-and-operated Public Cloud (for Oracle Database backups, object storage, and “deep cloud” archives) while delivering high degrees of automation and always-on encryption in Oracle software environments. All told, this makes it an easy choice for Oracle shops looking for the blistering performance of flash together with (for example) the DBA-centric advantages of Hybrid Columnar Compression, and the consumption-based economics of the cloud.

Not only should Oracle’s new product hit a home run in Oracle shops that can wring significant extra value from its integration with the full “Red Stack”—including one-click Flash Profiles for popular Oracle apps such as E-Business Suite and PeopleSoft—but it should also appeal to non-Oracle shops looking for a cabled, racked, and pretested flash storage system that deploys in minutes and delivers massive levels of throughput and scalability. While Oracle devotees will receive the added Red Stack values and will find implementing this new product to be as near to a no-brainer as it gets in IT, there’s sufficient differentiation and value for others to seriously consider the All Flash FS, too.