## SOLUTION SHOWCASE

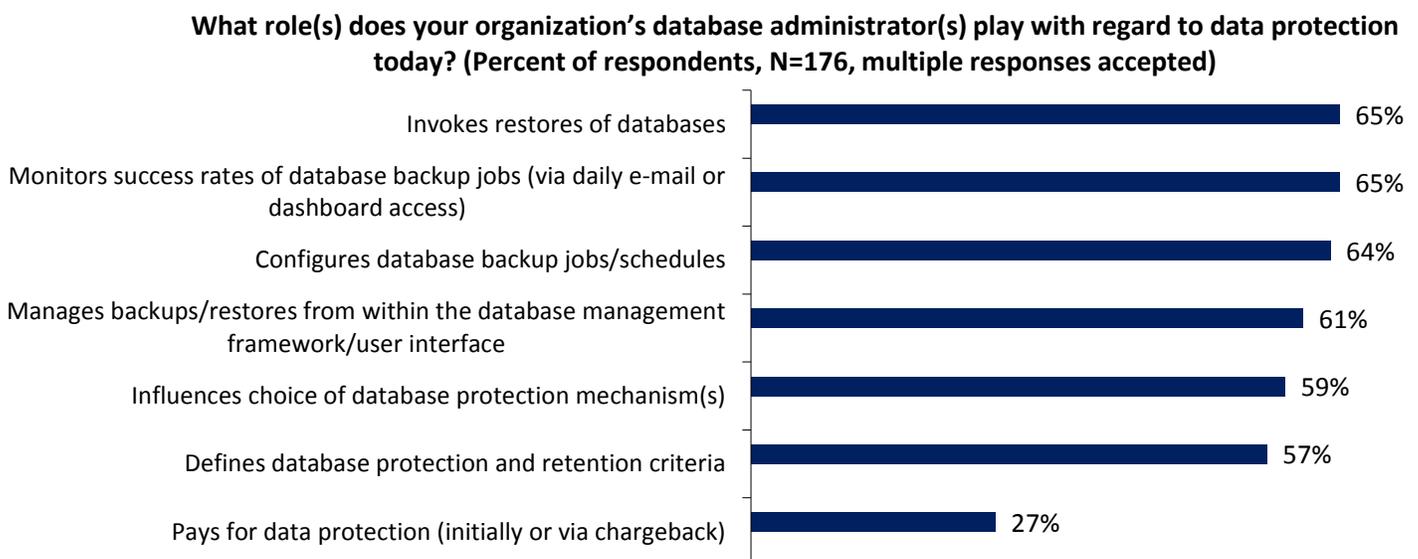# Oracle Leverages Its Database Expertise to Deliver a Truly Purpose-built Recovery Appliance

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**Abstract:** By introducing the Oracle Zero Data Loss Recovery Appliance (Recovery Appliance)—a turnkey data protection appliance integrated into the Oracle ecosystem—Oracle has shed light on database-centric backup/recovery problems and helped database administrators (DBAs) solve them. The Recovery Appliance delivers Oracle data protection-as-a-service (DPaaS) throughout an enterprise or as a public cloud service, accelerates database performance by alleviating production database servers, and serves as a self-contained solution enabling companies to recover to levels of extreme granularity, which Oracle calls Recovery Point Objective "0," which aligns with the constant demand for less downtime and data loss seen in other ESG research. This showcase examines the vertical scenario of DBA-driven data protection and the horizontal interest among organizations in using turnkey data protection appliances. The outcome could be that the Recovery Appliance becomes a significant part of a modern data protection strategy.

## Introduction: Why Are Database Administrators So Active in Protecting Their Platforms?

DBAs have been active in "personally" protecting the data in their databases (see Figure 1).[1] This is not a new trend.

**FIGURE 1.** Current Roles of Database Administrators in Data Protection

**What role(s) does your organization's database administrator(s) play with regard to data protection today? (Percent of respondents, N=176, multiple responses accepted)**



| | |
|---|---|
| Invokes restores of databases | 65% |
| Monitors success rates of database backup jobs (via daily e-mail or dashboard access) | 65% |
| Configures database backup jobs/schedules | 64% |
| Manages backups/restores from within the database management framework/user interface | 61% |
| Influences choice of database protection mechanism(s) | 59% |
| Defines database protection and retention criteria | 57% |
| Pays for data protection (initially or via chargeback) | 27% |

*Source: Enterprise Strategy Group, 2015*

In fact, DBAs are known to be active in nearly every aspect of protecting the data in their environment—from choosing a protection technology through monitoring invocations of backups and initiations of restores. It's been common to observe

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[1] Source: ESG Research Report, *Data Protection Personas and Methods*, February 2015.

DBAs supplementing the protection practices defined by the central IT team—or even bypassing the traditional, centralized practices altogether. DBAs often acted in this manner solely because they wanted to ensure good backups and reliable, consistent restores. If they were dissatisfied with how centralized backups were being handled for their databases and didn't feel their concerns were being heard, they resolved to find and use their own tools to correct the situation.

Oracle, recognizing these needs, developed and offered incremental functionality within its database tools and platforms to support better database-centric backup and recovery. As DBAs leveraged those tools, they gained freedom and autonomy, and as a result grew even more dissatisfied with general-purpose backup. That spiral took them, in many cases, to the point of going rogue.

What "general-purpose backup-related inadequacies" bothered DBAs so much? They included:

- **Agent-related inadequacies**—Generic backup solutions typically use agents that bring myriad data sources into the same universal backup containers. But those agents don't always employ best practices for ensuring reliable protection and thereby recoverability of databases. In addition, agents are expensive and affect a database server's performance, slowing down critical production databases needed for transaction processing and revenue generation.

- **Backup windows**—Typical backup processes often operate only during off-peak hours, exposing any data created after the backup window to potential loss until the next nightly operation. Complex manual backup processes increase backup windows unnecessarily.

- **Lack of visibility**—Generic backup solutions do not provide DBAs with per-Oracle-database recoverability status. DBAs have no idea whether protected databases are likely to be recovered within their designated window.

- **Lack of application awareness**—Storage-based snapshots and replication technologies are commonly used to supplement protection of crucial systems such as database servers. But such block-based technologies are often application agnostic, resulting in a potential for data loss or inconsistencies between databases and their logs.

- **Inadequate reliability**—No data protection approach matters if that data isn't recoverable. But general-purpose approaches to database backup didn't always result in successful restores. Even today, only 47% of the respondents ESG has surveyed report being very confident in their ability to recover their organizations' databases reliably.[2]

As a result, many DBAs have either "taken over" protecting their own platforms or are demanding approval of any technology used to protect their platforms. It's a predictable outcome. Ultimately, it is the DBAs who are accountable for the database platforms, so it is reasonable for them not only to want to be part of the protection process, but also to consider themselves best-suited to understanding *how* a database's data should be protected and recovered.

## Why Data Protection Appliances Make Sense

When such situations unfold, data protection appliances (DPAs) can make life easier for all. And it appears organizations are looking increasingly to DPAs as the building blocks of their modern data protection infrastructures.
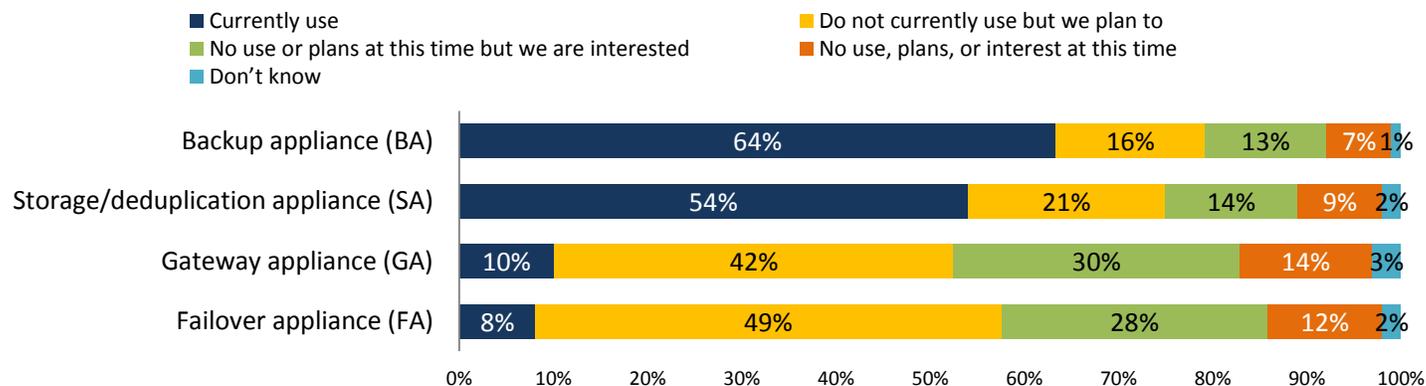
ESG has identified at least four kinds of DPAs, categorized by the protection scenarios they cover: turnkey backup, storage deduplication, cloud gateway, and failover. In regard to turnkey backup devices specifically, it's notable that 64% of the organizations ESG surveyed are leveraging those appliances somewhere in their environments (see Figure 2).[3] Another 29% combined say they plan to or at least have an interest in doing so. *That brings the percentage of organizations that use or may soon use turnkey backup appliances to 93%.*

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[2] Source: ESG Research Report, *2015 Trends in Data Protection Modernization*, September 2015.
[3] Source: ESG Research Report, *The Shift Toward Data Protection Appliances*, March 2015.

**FIGURE 2.** Use of Data Protection Appliances

**Please indicate your organization's usage of or plans for each of the following appliances.**
**(Percent of respondents, N=299)**

- Currently use
- Do not currently use but we plan to
- No use or plans at this time but we are interested
- No use, plans, or interest at this time
- Don't know

| Appliance | Currently use | Do not currently use but we plan to | No use or plans but interested | No use, plans, or interest | Don't know |
|---|---|---|---|---|---|
| Backup appliance (BA) | 64% | 16% | 13% | 7% | 1% |
| Storage/deduplication appliance (SA) | 54% | 21% | 14% | 9% | 2% |
| Gateway appliance (GA) | 10% | 42% | 30% | 14% | 3% |
| Failover appliance (FA) | 8% | 49% | 28% | 12% | 2% |

*Source: Enterprise Strategy Group, 2015*

The near-ubiquitous usage and/or interest is sensible, considering what some of the backup appliances on the market now offer. The quality and amount of integration within the appliances can vary greatly, but the better examples tend to have the following characteristics:

- **They are designed for more than just ease of acquisition/deployment**—Any backup software app can be preinstalled on generic hardware. That doesn't always equate to "an appliance experience." Better backup appliances are more than prepackaged parts offering only short-term gains tied to easier acquisition and deployment.

- **They are optimized internally for a particular usage scenario**—The hardware and software components are built to interoperate, with the hardware meeting or exceeding the software's performance requirements. Also, the solution overall is architected for one or more pre-identified core data protection scenarios, i.e., database protection.

- **They are integrated within a broader ecosystem**—The backup appliance operates in conjunction with management software, production applications, and other relevant IT components. Better backup appliances are built to be part of something bigger … not to be "just another isolated thing that must be managed."

## Oracle's Zero Data Loss Recovery Appliance (Recovery Appliance)

When examining the distinctive nature of databases, the priorities of the people who manage them, and the widespread appeal of turnkey backup appliances, an intersection of trends becomes evident. That intersection is manifested in Oracle's Zero Data Loss Recovery Appliance offering, which is a turnkey backup/recovery solution created explicitly to protect Oracle databases, specifically versions 10-12c (see Figure 3).

Arguably, the familiar descriptor "purpose-built backup appliance" (PBBA) applies to the Recovery Appliance more than to any other backup appliance on the market today. Other vendors may use "PBBA" simply to indicate that their platform is intended to deliver data protection, in contrast to being primary storage or supporting some other IT function. But the Recovery Appliance truly is *built for the purpose* of protecting and recovering Oracle databases, and as such will cause some folks to reconsider their presumptions on what purpose-built data protection appliances should be.

**FIGURE 3.** Oracle's Zero Data Loss Recovery Appliance Overview
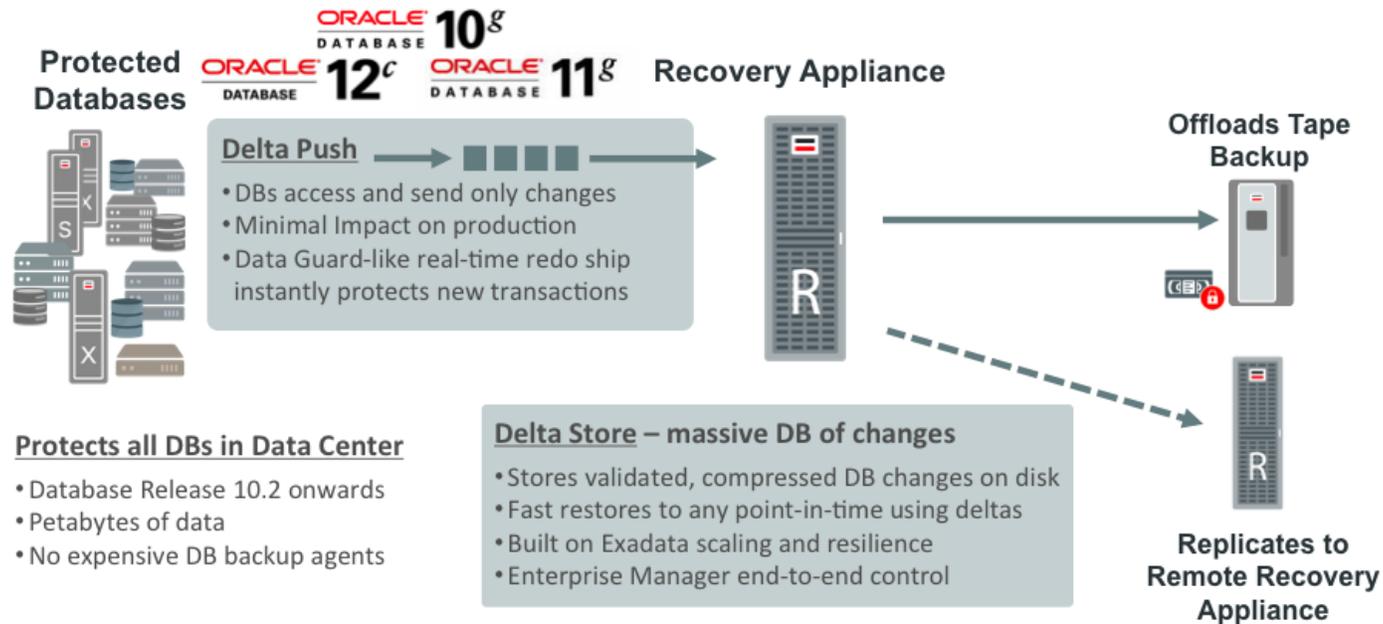


Source: Oracle, 2015

DBAs, backup administrators, and IT architects should understand three things about the Recovery Appliance.

## It Is Oracle Database Specific, and Therefore Optimized

- Instead of requiring expensive and sometimes intrusive backup agent technologies that affect database server performance, the Recovery Appliance leverages built-in data protection and replication APIs within the production databases themselves. By eliminating backup agents from production database servers as well as all backup operations (i.e., merge, compress, validate, or delete), Oracle claims that database performance will improve with each backup offload, by up to 25% in some environments. For an enterprise with thousands of Oracle databases, such a performance increase could bring massive improvements to the overall Oracle deployment. Oracle's solution represents another milestone in the broader IT industry's evolution from "generic and nightly backups" to "workload-savvy and continuous data protection."

- The Recovery Appliance uses an automated approach it refers to as *Delta Push* to replicate database changes from the production databases to the appliance, eliminating manual processes.

- The Recovery Appliance is designed specifically to receive database changes, and its *Delta Store* architecture has been optimized to retain massive amounts of database changes within a small storage footprint.

## It Is Architecturally Designed for the Large Enterprise with Thousands of Oracle Databases

- An initial implementation of Recovery Appliance can be achieved in what is referred to as a base rack, including two controller nodes plus three storage nodes.

- The solution becomes expandable by adding storage nodes until a rack is fully populated. A single rack scales to 580 terabytes of usable capacity and scales out to 18 racks via a high-speed 40Gb/sec InfiniBand interconnect for a total of 10PB of usable capacity. The Recovery Appliance continually compresses, deduplicates, and validates backups at the database block level and creates virtual full backups on demand. (A virtual full backup is essentially a full RMAN

backup-set backup created to the point of an incremental backup.) Oracle claims a database changes approximately 10% per day, and the recovery appliance supports 5.8PB of virtual full backups per rack, or 100PB across 18 racks.

- Multi-rack solutions are integral to the architecture, allowing for scale-out *and* scale-up of a truly enterprise-caliber solution, capable of backing up tens to thousands of mission-critical databases across an enterprise.

- The storage within the Recovery Appliance is built on Oracle's Exadata Database Machine, which is designed for massive scale.

**It Is Designed to Be Part of a Comprehensive Database Protection Strategy**

- The appliance stores data within its internal disks, supports long-term retention to tape via the Oracle Secure Backup utility, facilitates an organization's use of various cloud services, and can replicate data to other Recovery Appliances.

- The Recovery Appliance complements Oracle's broader Maximum Availability Architecture, including being able to protect data from either production databases or active replicas.

- The Recovery Appliance enables enterprises to leverage DPaaS by implementing policy-based service levels per database. Multi-tier DPaaS can be delivered via user-defined policies, enabling databases to be grouped at Gold, Silver, and Bronze levels—by SLA and service tier.

- The Recovery Appliance is managed through Oracle Enterprise Manager, which is extremely familiar to DBAs in Oracle environments.

That last element—management through Oracle Enterprise Manager—is perhaps the most intriguing. It speaks to the pure focus of this product's design: The Recovery Appliance is meant for Oracle databases within Oracle ecosystems, to be managed in full or part by Oracle database administrators. The Recovery Appliance also provides real-time recovery status on all protected databases. DBAs know at a glance whether they can meet the recovery window for any database.

## What the General Data Protection Market Can Learn from This Appliance

An Oracle-centric data protection solution may not fit every IT environment's requirements. Some organizations, for technical or cultural reasons, may continue to choose unified data protection approaches. That being said, the market can learn at least three important lessons from Oracle's Recovery Appliance offering:

- Generic backup mechanisms are viewed as insufficient. From a "poor/good/better/best" perspective, "poor" equals treating databases as disparate files. "Good" is a database-aware backup app. It's "better" when the approach leverages Oracle RMAN and other Oracle APIs in a more cohesive solution. But "best" for Oracle is perhaps a solution that is specifically optimized to protect such a vitally important IT workload.

- Data-loss exposure for critical systems are unacceptable. ESG research shows that high-priority workloads such as Oracle platforms and their applications have per-outage downtime tolerances measurable in minutes[4]—far shorter than what traditional backup supports. They are also characterized by extreme intolerance to data loss. According to Oracle, the Recovery Appliance can support RPOs below one second, reducing data loss to virtually zero.

- DBAs need to be empowered, or at least collaborated with. These admins must be included in a protection tool's evaluation and operation. Regardless of whether IT opts for a workload-specific or unified protection approach,

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[4] Source: ESG Research Report, *The Evolving Business Continuity and Disaster Recovery Landscape*, to be published.

communication between workload admins (who best understand data's business criticality) and data protection specialists (who understand corporate mandates for how data should be protected and preserved) is paramount.

## The Bigger Truth

DBAs historically "went rogue," conducting backups/dumps to the only storage they had access to: expensive, high-performance production storage. That process permitted fast recovery when needed, without relying on cumbersome, less-reliable backups provided by peers. Centralized storage became the compromise, but the conflict between how database protection/recovery should be done (and who should do it) remained.

In considering the appliance trend and the data protection pedigree across Oracle, it should come as no surprise that this vendor is addressing that problem with its own technologies, leveraging its deep-rooted database insights as well as its own engineered systems architecture, storage, and tape/cloud offerings to develop a data recovery-focused solution specifically for its core audience—Oracle DBAs.

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