New Horizons for Database Administrators

Forward-looking DBAs see Oracle Autonomous Database as an opportunity to take on new responsibilities—and move into more challenging roles.

Cloud Essentials
From Manual Operations to Automated Assistance

As Oracle’s new self-driving, self-securing, self-repairing database enters mainstream use, IT professionals are relieved of mundane administrative tasks that were formerly the domain of highly trained database administrators. Rather than feel threatened by these developments, more and more DBAs see Oracle Autonomous Database as an opportunity to embrace new types of creative work. Astute database administrators view it as a shift from data custodian to data architect. They are no longer just managing data. They are helping the business derive more value from that data. By eliminating mundane management chores related to databases, operating systems, storage, and networks, these technology professionals have more time to work with developers, collaborate with data scientists, as well as architect, model, and tune critical business applications.

While some pundits fear a future in which artificial intelligence (AI) and machine learning will make most of the current workforce obsolete, history suggests otherwise. Spreadsheets didn’t put accountants out of work; they simply helped them do more work in less time—and expanded the horizon of possibilities by handling routine calculations and solving equations much more quickly than their human counterparts could do. What’s the salient point for IT professionals? Better tools don’t replace us—they make us more productive.

According to a recent report by Unisphere Research, many types of database workloads are being moved or will soon be moved to the cloud. Enterprises need to be proactive in monitoring and understanding how their information is being managed in the new environment. “Cloud is creating an important shift in data managers’ responsibilities and career prospects,” the report says, as managers are “relieved of many of the more heads-down technical tasks associated with database management—freeing them to work more closely with the business, assuming the role of advisor, teacher, and evangelist.”

For example, using Oracle Autonomous Data Warehouse, business users can build their own data warehouses, data marts, and sandboxes—in seconds. They can specify tables, load data, and run analytic workloads with a few clicks. Since no manual tuning or maintenance is required, DBAs are freed from mundane maintenance activities such as provisioning, patching, and backing up databases. They can work with the business to select service levels and help line of business (LoB) managers extract more value from their data.

Furthermore, since Oracle Autonomous Database is cloud-based, the infrastructure can automatically adjust to meet changing workload demands, letting DBAs focus on the front-end work of data architecture and building better systems and queries. Powered by Oracle Database 18c, Oracle Autonomous Database eliminates human labor, human error, and manual tuning.

A Shift in Perspective: From Administrator to Architect

Jim Czuprynski, a data enterprise architect with Zero Defect Computing and an Oracle ACE director, says that DBAs who oversee Oracle Autonomous Database will still use Oracle Enterprise Manager to ensure that everything is working properly. "You’ll use the same management tools that we have been using since Oracle Database 11g Release 2," he points out. "You will still observe performance attributes and misbehaving SQL statements the same way that you did before. But you will do more monitoring and less intervening because most of the time things will run just fine."

According to Czuprynski, learning to "keep your hands off the knobs" may be a gradual process for some DBAs. "There is a tendency to try to tweak performance, especially with new queries," he continues. "However, with Oracle Autonomous Database, you need to give it time to learn. And it will."

Although Oracle’s new self-driving database handles routine maintenance tasks, plenty of other tasks remain, such as devising new data models and writing application code to maximize interactions with the database. Czuprynski thinks forward-looking DBAs will become DEAs, or data enterprise architects, who help data scientists curate their data and make business applications faster and more reliable. In addition, as more and more data and applications move to the cloud, he encourages DBAs to learn about virtual networking. "There will not be as many network administrators onsite," he predicts. "If you don’t understand how to configure a virtual network, or if you screw up the connections between your application server and your other IT assets, performance will suffer."

The automation extends to other IT professionals as well. For example, developers can use Oracle Autonomous Transaction Processing or Oracle NoSQL Cloud to instantly provision an entire database environment for new application development. Data scientists and business analysts can use Oracle Autonomous Data Warehouse to create an analytic database. In all of these cases, there is still a need for technology professionals who understand RESTful API scripting, as well as for people who can orchestrate development, test, and production configurations to ensure a stable and consistent DevOps environment.

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Jim Czuprynski, Data Enterprise Architect, Zero Defect Computing
A New Era of Automation

Oracle Autonomous Database is the world’s only data management system to automatically patch, upgrade, and tune itself. It handles routine database maintenance tasks while the system is running—without human intervention.

What tasks remain for the human experts?

- Defining the database architecture
- Creating data models
- Integrating new data sources
- Tuning business applications
- Managing security configurations
- Orchestrating a smooth transition to the cloud

In addition, business users will continue to look to DBAs to keep track of where the data resides, what it represents, and which users and applications can access it.

“Technology is constantly evolving. Successful IT professionals anticipate and adapt.”

Maria Colgan, Master Product Manager, Oracle
An Upward Path to Cloud

While most Oracle customers are in the process of moving applications and databases to the cloud, for the foreseeable future, there will still be on-premises databases. Most Oracle customers have adopted a hybrid model as they contemplate which IT assets to keep in the data center and which to upgrade to the cloud. Maintaining these hybrid environments will also be the province of DBAs.

Over the long term, as data and business processes move to the cloud, IT responsibilities will shift as well—requiring expert administration. Cloud vendors are responsible for a growing number of administrative tasks such as provisioning infrastructure and backing up databases. Many Oracle customers are following a steady path on this avenue to automation, from customer-managed clouds to vendor-managed clouds to autonomous clouds, and DBAs can help orchestrate a smooth transition.

• With a customer-managed cloud, the cloud vendor hosts the basic infrastructure, but the customer must handle routine operational tasks. There is no built-in automation for backing up data, scaling capacity, applying security patches, establishing automatic failover and disaster recovery, or tuning applications and databases for maximum performance.

• In a commodity cloud, the cloud vendor sets up rules to automate basic operational tasks including OS installation and patching, software patching, and backup and restore operations. However, the customer must decide when to back up corporate data, when to scale the infrastructure, and when to add or remove capacity.

• With Oracle Cloud, patching, backups, scalability, and tuning are all handled automatically, with no human intervention required. Early adopters of this model have demonstrated lower total cost of ownership, lower risk of security breaches, and no need to attend to mundane operational tasks.
As IT teams make a decisive shift from operations to innovation, they discover new ways to develop and deliver apps and services, and new ways to harness an abundance of data to gain predictive insights. Embracing autonomous operations can help teams work smarter, more efficiently, and more securely—while increasing performance. For example, automatic indexing optimization can help further improve database performance.

Successful IT professionals adapt to change, anticipate opportunities, and update their skills, whether it’s gaining proficiency with new DevOps procedures or creating new types of AI interfaces using mobility and chatbots. Other opportunities will arise in the context of big data initiatives. Jim Czuprynski advises DBAs to learn about partitioned external tables in Oracle Database 18c to accommodate Internet of Things (IoT), big data, weblogs, and real-time event streams. "Businesses need to make decisions in real time and near real time, and these new data sources represent the future. Now you can point Oracle Database at an HDFS [Hadoop Distributed File System] file or Hive table, as well as use Kafka for live streaming data. This is what DBAs should be focusing on. You don’t need to pull the data into Oracle Database. You can leave it in Hadoop or read it from an event stream. Stop twiddling with the knobs and start figuring out how to enable these new business models.”

Plus there is always a need for modeling data, reviewing security configurations, and monitoring cloud usage to make sure day-to-day activities coincide with approved budget outlays.

Jim Czuprynski, Data Enterprise Architect, Zero Defect Computing

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A New Type of Automation Based on Machine Learning

AI technology can make workers more productive by automating redundant tasks, detecting patterns within large data sets, and uncovering insights that may be difficult for people to discern. The best AI systems augment human skills rather than replacing them. For example, within the context of an enterprise database, machine learning algorithms monitor workload fluctuations to adjust query execution plans and indexes. The algorithms learn to distinguish normal from abnormal behavior—an important aspect of security monitoring—and thus get smarter over time. Oracle Autonomous Database will notice if an administrator grants nonstandard access to a database table. It can also make sure legitimate account credentials aren’t being hijacked or compromised.

Oracle’s self-driving, self-securing, and self-repairing database can help you reduce administrative costs by up to 80 percent and save up to 70 percent of ongoing runtime costs by dynamically adjusting and scaling resources. Oracle also reduces risk and accelerates time to insight. For example, by provisioning a data warehouse in seconds, you can accelerate time to innovation, time to market, and time to action.

Oracle Autonomous Database continually analyzes diagnostic data to identify anomalies and make sense of a relentless barrage of alerts. If an anomaly is found, diagnostic information is automatically gathered and compared to known causes. If there is a question about a root cause, human agents can intervene. Plus, DBAs need to address integration concerns, data loading issues, and security concerns as business users bring in new types of data. Oracle Autonomous Database is automatically encrypted as part of the basic service, but who holds the keys? A database expert must be able to understand and classify the data.
A Long History of Automation—and DBA Empowerment

The transition to autonomous databases is part of a larger trend that has been advancing for decades. Consider the steady history of automation within Oracle Database, as represented in this diagram:

Starting in Oracle Database 9i, DBAs have taken advantage of a growing list of automation capabilities, from memory management and space management to workload monitoring and tuning. The automation continued during the development of Oracle Database 10g, 11g, 12c, and right up to the present day with Oracle Database 18c. For decades, DBAs have benefitted from progressively greater degrees of automation from the database.

Oracle Autonomous Database builds on these previous innovations and greatly enhances them by bringing automation to key operational tasks such as provisioning, patching, and high availability.

Consider engineered systems and database appliances. Part of the lure of these finely tuned systems is that they are preconfigured and preprovisioned, so DBAs don’t have to worry about myriad setup and configuration details. However, most organizations are still happy to know that an experienced database administrator is keeping an eye on these devices—and on the data they contain.
Innovation Aided by Emerging Technologies

Oracle Autonomous Database is a key component of Oracle Cloud Platform, a suite of platform services that simplify business processes, boost efficiencies, and free IT resources for strategic purposes. The portfolio is anchored by Oracle Autonomous Database, which is characterized by three unique attributes:

- **It’s self-driving**, which means it automatically provisions, secures, monitors, tunes, and upgrades itself—lowering costs and increasing productivity.

- **It’s self-securing**, reducing risks by protecting cloud resources from external attacks and malicious internal users. This includes automatically applying security patches with no downtime, automatically encrypting all data, and intercepting data leaks with preventive controls.

- **It’s self-repairing**, maximizing uptime and productivity with 99.995 percent availability. That’s less than 2.5 minutes of both planned and unplanned downtime per month, and the complete elimination of administrative errors.

**Your Automated Future**

AI technology is fundamentally altering enterprise computing by changing how organizations receive, manage, and secure business data. By 2020, Oracle predicts that 90 percent of all applications and services will incorporate AI at some level—and that more than half of all enterprise data will be managed autonomously.

Oracle Autonomous Database represents an entirely new category of software based on machine learning that empowers you to focus on your core business, worry less about day-to-day operations, and enable opportunities for innovation. Oracle Cloud puts these emerging technologies to work by allowing customers to establish new IT capabilities quickly, affordably, and securely.
Intelligence at Every Layer
Oracle’s complete, integrated cloud platform includes intelligent solutions that span the SaaS, PaaS, and IaaS layers. For example, Oracle embeds intelligence into all of its apps. Oracle also extends intelligence into the platform, making it available for any developer to build upon. The goal is to make cloud technologies simpler to access, easier to create, and more efficient to secure, manage, and run—so you can achieve real business outcomes.

Bring Your Own License
Oracle recently introduced two new programs to make it easier to buy and consume cloud services, helping you get more value from your hardware and software investments.

- Oracle Universal Credit Pricing enables you to access current and future Oracle Cloud Platform and Oracle Cloud Infrastructure services under a single umbrella contract.

- Oracle’s Bring Your Own License program enables you to apply your on-premises software licenses to equivalent Oracle services in the cloud.

These popular programs alleviate cloud adoption challenges by simplifying the way your organization purchases and consumes cloud services.

Cloud Essentials
Learn more about Oracle Autonomous Database, and find out what sets Oracle apart from other cloud providers. Try Oracle Cloud today. Go to cloud.oracle.com/tryit