

ORACLE AUTONOMOUS JSON DATABASE



AS THE NEXT STEP in its converged database strategy, Oracle has announced *Autonomous JSON Database*, offering a cloud-based NoSQL capability as part of the Autonomous Database family that enables developers to store and manage their JSON data natively, access it via a document API and analyze it via SQL.

Recommendation: Oracle *Autonomous JSON Database* merits a closer look, especially from customers seeking a database capability to support cloud-native JSON-based application development that is easy to use and takes the burden of managing the database away from the development teams by means of the built-in autonomous database capabilities. ●

DOCUMENT DATABASE SYSTEMS — also often called NoSQL database systems — have become a popular option over the past 15 years, especially for web application developers. These databases store hierarchical data objects referred to as “documents” and provide access via an application program interface (API) that aligns naturally to programming languages. The document objects are typically stored in a self-describing and self-containing format such as JSON or XML.

For many web applications, a relatively simple document management paradigm is all that is needed from the database. These applications typically require transactional storage and retrieval of documents — e.g., a booking or purchase order — and text search on the stored documents. To many developers a document API is more appealing and more natural for such use cases than a relational database paradigm built around tables, schemas and sets of rows. A popular example of such a document database is MongoDB. Amazon Web Services offers a cloud service in the same category called AWS DocumentDB as well as Atlas, which is MongoDB-as-a-service.

The recently announced Oracle *Autonomous JSON Database* offers a new and noteworthy cloud-based option for addressing this same document database requirement, while at the same time autonomous capabilities address a large set of related database needs and interests for developers. Like other document databases, *Autonomous JSON Database* supports native storage of JSON documents and features a document API called SODA (Simple Oracle Document Access). *Autonomous JSON Database* also provides a document-centric command line interface that enables developers to build applications without SQL knowledge. The SODA API is standalone open-source and is similar to the MongoDB API that many developers may already be familiar with. It works with Oracle *Autonomous JSON Database* as well as Oracle Database. Oracle says that developers can lift and shift their apps to the cloud with no code changes required.



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Purpose and Methodology for this Report

This *WinterCorp Research Note* covers the recent announcement of Oracle *Autonomous JSON Database* and its implications for database customers. In developing this report, WinterCorp drew on its own independent research and experience, interviewed Oracle customers and employees, attended Oracle events and analyzed Oracle documentation and literature. Oracle was provided an opportunity to comment on the paper with respect to facts, in its capacity as the sponsor of this research. WinterCorp has final editorial control over the content of this publication and is solely responsible for any opinions expressed.



Oracle’s new native JSON data type provides an optimized binary format for storage of the JSON data. Oracle says the new binary format will typically yield a 4-to-5 times improvement in in-document (partial) update times and as much as 20-to-30 times improvement for scanning very large JSON documents, when compared to its previous text-based storage option for JSON data.

Oracle has priced *Autonomous JSON Database* to be competitive with MongoDB Atlas and AWS DocumentDB in a low-end (8 OCPU) configuration. As customers scale up from this configuration, however, they have more granular scaling options with Oracle, which combined with faster performance can result in cost savings in comparison to the fixed shape scaling and slower performance associated with other options. In addition, *Autonomous JSON Database* has built in online auto-scaling that, if enabled, will automatically scale up and down as the workload changes. This results in an additional economic advantage to the customer, who would be scaling up and down manually and off-line with MongoDB Atlas or AWS DocumentDB.

The Oracle always free tier is also offered with the *Autonomous JSON Database* capabilities, which means that developers can start working with the product for free using a minimum configuration of 1 OCPU (equivalent to 2 vCPU) and 20 GB of storage.

There are two especially interesting differences between Oracle *Autonomous JSON Database* and the typical NoSQL cloud database product. First, an *autonomous database* greatly simplifies the application development process from initial set up and provisioning right through production operation and maintenance, reducing skill requirements and saving time. Second, *Autonomous JSON Database* is *integrated* with Oracle’s full relational database, meaning that the same data stored by the application program can later be accessed for other uses, including reporting and analytics, via SQL. ●

To give one example of the value of the “autonomous” feature to the application developer, with Oracle the developer does not need to think about indexing: the system creates indexes as needed; maintains them; and, automatically tunes the database in production. With either MongoDB or AWS DocumentDB, physical design — including index selection — is a developer responsibility, as is any tuning needed during test or production use.¹ Reduced effort designing and tuning the database frees developers to focus more on application function and business value.

Customer Example



Retraced GmbH (retraced.co), a startup company headquartered in Düsseldorf, Germany, provides visibility into the supply chain for consumer brands. A retail customer who purchases CANO footwear in Germany, for example, can use

¹ See www.wintercorp.com/publications for separate research notes on Oracle Autonomous Transaction Processing and Oracle Autonomous Data Warehouse, including an account of hands on experiment with the latter.

technology provided by Retraced to learn that huaraches he or she is purchasing were hand made in Mexico by people who were fairly compensated and that only vegetable dyes were used in making the shoes. Retraced provides this information via an application implemented with Oracle *Autonomous JSON Database* Transaction Processing (ATP), Oracle Blockchain Platform and Oracle Autonomous Data Warehouse (ADW). Of central importance in its implementation, Retraced uses the JSON features and API of ATP, the same interface now also available under a separate offering as Oracle *Autonomous JSON Database*.

The application maintains comprehensive, near real-time information on the brand and its supply chain. A shopper in a store, or on a website, can use a mobile app to trace the item under consideration all the way back to the original suppliers of all the components. While some consumer products already display various certifications to address the concerns of consumers about the ethics of manufacturing and farming, the Retraced solution is both more detailed and more reliable, since certifications can expire, and it can be difficult for the consumer to understand exactly what they mean. By contrast, Retraced can follow the supply chain through actual orders and deliveries all the way back to the root sources for a product, accounting for every step along the chain.

According to Peter Merkert, CTO at Retraced, his small development team is able to operate much more efficiently than it has in the past, due to the autonomous features and the integrated nature of the Oracle cloud database solutions that they use. They store a variety of JSON documents connected with the application, including copies of orders placed by brands with suppliers and images associated with products, components, brands, factories, farms, etc. The backbone of the application is a blockchain but the product development is significantly simplified by the integration between the blockchain, the JSON data and the Autonomous Data Warehouse used for analytics, query and reporting.

In a Zoom interview, Peter told me about his experience with Oracle's Autonomous Database products and how much they reduced the effort, skill requirements and complexity involved in setting up the application. In his view, "the best DevOps is no DevOps" and he has almost

no operational complexity to deal with, even though his team uses an agile approach involving frequent introduction of changes to the operational system.

Two examples he gave were the web of network connections involved in the operation of his system and the database backups. With other cloud services he tried, there was a lot of work involved in setting up and maintaining network connections; with Oracle Cloud Infrastructure, there is virtually none. He estimated that the production system ordinarily maintains 20–40 different network connections among the applications, micro-services and databases, depending on how many replicas are running. The creation and maintenance of these connections is almost completely automatic with the Oracle Autonomous Databases.

With other cloud services, he and his team also had to be involved often with database backups, insuring — among other things — that the backups were actually being run and were always being created and maintained on servers separate from the systems they were using.

Both the networking and the backup — just two of several operational issues — at times added complexity and cost and drained the efficiency of his small, lean development team. With Oracle Cloud, both functions are highly automated. In general, he doesn't spend much time thinking about databases and he wants his team focused on developing business solutions that add value for customers. Because they use the Oracle Autonomous Database, his team spends hardly any time on backup or other operational database concerns.

Peter participates in the Oracle Global Leaders Program and says that Oracle has been effective in partnering with him and supporting his development effort. He would like to see continued attention by Oracle to further streamline the cloud development cycle. Two areas where there could be further improvement are in with respect to cloning and network troubleshooting. When a developer tests a change, he or she generally needs to create a clone of the operational system, complete with databases, at the moment of the test. Oracle provides this facility, but Peter would like the process to be faster and simpler. When the production system drops a connection, he sometimes finds it is difficult to pin down the cause: is it an application error or a component failure? He'd like more visibility into the running system to trace such problems. In general,

About WinterCorp

WinterCorp is an independent consulting firm expert in the strategy, architecture and scalability of the modern analytic data ecosystem.

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Peter says that Oracle has provided a lot of support to his development effort and he is confident that Oracle will partner with him and other customers to make improvements in these areas.

Overall, Peter feels that working with Oracle Autonomous Database, including the JSON capabilities, has been an enormous success for his development team, yielding significant simplifications, agility and time-to-value for his innovative and successful startup.

Recommendation



CUSTOMERS DEVELOPING modern applications for the cloud should take a close look at Oracle Autonomous JSON Database. This new product promises to accelerate application development through auto-nomous capabilities while capturing the data in a full-featured database that will secure it, protect it and manage it as an asset. Oracle Autonomous JSON Database provides JSON-centric development with a previously unavailable ease of use, making the JSON data also available via SQL for a broad range of other use cases. ●