

# Enterprise Case Study: Oracle Autonomous Data Warehouse accelerates performance for Turkcell

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In tests Oracle ADW outperforms a control database by over 270%

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## Summary

### Catalyst

Turkcell is a mobile phone service provider based in Turkey that also operates around nearby countries, with a total of 50 million subscribers, making it the third largest in Europe. The company is a major user of Oracle databases, with some 13 petabytes of data managed across 405 Oracle databases, over 14 Oracle Exadata environments, and another 3 petabytes of big data in Hadoop data lakes. Turkcell recently started using Oracle Autonomous Data Warehouse (ADW) in a proof-of-concept (POC) trial. ADW was launched in March 2018 and is the first product under the Oracle Autonomous Database architecture that exploits machine learning to automate database administration and offers self-tuning and self-configuration.

### Key messages

- ADW reduced database provisioning time from 15 days to two minutes.
- ADW exploits machine learning to minimize database administration.
- The ADW POC at Turkcell outperforms the control database (Oracle Exadata) by 270% for ETL tests and 500% for report generation.
- DBAs are freed from doing low-value administration tasks such as patching and backup, and now have more time to work on high-value tasks for the business-like data architecture.
- ADW is easy to use, lowers the barrier to data warehouse application development, and is a good fit for the digital transformation taking place in businesses.

### Ovum view

Turkcell has more than 5 billion call detail records to process every day and needs to produce mission-critical reports for senior executives for guiding the business and for satisfying audit and regulation requirements. Its current data architecture comprises a mix of Oracle Exadata Maximum Availability Architecture and other data warehouses and databases (largely Oracle). It has a major operation for ingesting and processing data, with extract, transform, and load (ETL) tools such as AB Initio, Oracle Data Integrator, Oracle Golden Gate, and Hadoop. The company decided to trial the new ADW to satisfy a business need for the faster turnaround of report requests.

With a business request for a new type of report requiring the provisioning of a database with heavy mining of data, the usual process would require a lengthy lead time for planning and infrastructure procurement, and such a process could take up to six months before the first results are produced. A typical scenario with the existing on-premises environment would take 15 days to set up a virtual infrastructure or six weeks for a physical installation. Tuning the infrastructure could take months or even years. In addition, the on-premises environment might have constraints as well as security requirements that require attention. The development/test environment needs to be managed, and should the solution need scaling, this may require huge investment and planning six months prior to production. Creating a high-availability solution is a significant project in itself, requiring much effort. In addition, the traditional environment is patched manually, backup is configured manually, and overall a high degree of DBA expertise is needed.

The experience with ADW overcomes many of the bottlenecks and limitations of the traditional on-premises approach. Being on the cloud means the infrastructure requirement is on-demand and takes only a few minutes to set up. In addition, the physical infrastructure provided is optimized for data warehousing workloads. Managing resources is simple, and the connectivity is secure. The data ingestion is also an easy process.

The facility was used by the development and test teams, which were able to provision and manage their environments with little effort. A major difference with traditional environments is that patching and backup is automatic, and does not require DBA intervention. Users can work on the data warehouse with minimal database administration skills.

From a cultural point of view, organizations need to manage the change. Turkcell introduced a change management team to help adapt the organization to a new environment. For example, the ticketing system needed to adapt to a cloud environment, the security and governance needed to change, and how applications were run needed to adapt to a more open, cloud-connected environment.

## Recommendations

### Recommendations for enterprises

Oracle ADW is the first of a series of low/zero admin databases that will radically change how databases are operated, supporting the need for businesses to be agile and move quickly in a market being transformed by digitalization. Being able to spin up infrastructure rapidly and deliver reports to business demands provides a competitive edge where competitors are still using legacy systems. In time, as this technology gains adoption, it will become an essential capability to do business in the market.

There are also profound changes to how these new-generation databases are managed and administered. Turkcell has experienced the change in the DBA role from administrator to data architect. The data architect is directly concerned with business needs and can provide the capability to meet business demands by creating database environments and data repositories for developers to build next-generation applications.

## Improving the performance of data warehouse applications

### Setting the business context

Turkcell needed to move rapidly in a market being transformed by digitalization. It needed to be able to set up datamarts instantly, to create self-service business intelligence applications, and to enable developers to create on-demand dev-test environments. With the adoption of microservices architecture in application development, and the opening of APIs, a new generation of databases are required to provide a good fit.

Turkcell has been trialing ADW to fulfill these requirements, setting up proof-of-concept environments and databases with less frequently accessed data and at a low cost. This is preparation for an eventual production rollout.

## Technical solution

The POC trial of ADW involved comparing the new database against an existing Oracle Exadata X4-2 database. The comparison was performed over several ETL tasks and report-generation tasks. Some 800GB of data was involved, with Oracle Cloud Object Storage used as a staging area. The ADW employed eight Oracle CPUs and had fixed parallelism. None of the tasks were tuned and the results are shown in the tables in Figures 1 and 2, giving the average elapsed time.

**Figure 1: ADW performance tests: ETL tests**

	<b>ADWC TIME(Seconds)</b>	<b>EXADATA X4-2 TIME (Seconds)</b>
<b>ETL1</b>	198	258
<b>ETL2</b>	9	6
<b>ETL8</b>	130	96
<b>ETL11</b>	340	233
<b>ETL9</b>	84	172
<b>ETL5</b>	211	381
<b>ETL4</b>	15	12
<b>ETL13</b>	2031	1372
<b>ETL14</b>	645	2041
<b>ETL15</b>	364	1433
<b>ETL16</b>	176	1167
<b>ETL17</b>	86	900
<b>ETL18</b>	490	4458
<b>ETL19</b>	43	900
<b>TOTAL</b>	<b>4822</b>	13429

Source: Turkcell

**Figure 2: ADW performance tests: report tests**

	ADWC TIME(Seconds)	EXADATA X4-2 TIME (Seconds)
REPORT1	182	545
REPORT2	48	4
REPORT3	6	4
REPORT4	50	6
REPORT5	32	27
REPORT6	33	935
REPORT7	55	64
REPORT10	13	209
REPORT11	3	371
REPORT9	20	16
REPORT12	32	233
REPORT13	31	253
REPORT14	65	4
REPORT15	25	118
REPORT16	10	10
REPORT17	9	18
REPORT18	7	3
REPORT19	223	1576
REPORT20	27	25
<b>TOTAL</b>	<b>871</b>	<b>4421</b>

Source: Turkcell

The results show that ADW significantly outperforms the control database (Oracle Exadata). Overall in ETL tests, ADW ran 2.7 times faster (270% improvement), and report generation ran five times faster (a 500% improvement). Most significant is the reduction in provisioning time from 15 days for the on-premises database to two minutes for ADW, over 5,000 times faster.

## Oracle ADW changes the role of the DBA

ADW represents a major change by Oracle regarding low to zero database administration. Consequently, the role of the DBA will change. In Turkcell's experience, this means becoming more of a data architect performing high-value work on data with business goals, and less of a database administrator performing daily repetitive chores in maintaining performance and operation because Oracle has introduced machine learning technology to automate such tasks.

Turkcell has found that the new DBA role requires less effort to perform several typical tasks, including dealing with end-user problems and helping dev/test users, with less time spent on query tuning, dealing with infrastructure, and generic tasks.

There was also more time for the DBA to perform high-value tasks, such as research and development, designing databases and modeling data, securing data, building machine learning models and performing data analytics, and performing application-level tuning.

Because the skills required of the new DBA will be different from the traditional role, organizations will need to adjust, and DBAs will need to become better acquainted with the database needs of data science.

ADW is designed to be a zero-administration database with all the traditional capabilities expected of an Oracle database, but with built-in ease of use, including quick provisioning with the automation of all the necessary functions of backup, patching, encryption, and high-availability. The ML capability performs automatic tuning, with elastic scaling enabled by the cloud service, making pay-per-use licensing possible.

## Appendix

### Methodology

Ovum spoke with Turkcell about its use of ADW. Ovum also drew upon its expertise in database, data science, and AI technology and applications.

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### Ovum Consulting

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