Discovering New Insights into Turkcell Networks with Teradata

Since its foundation in 1994, Turkcell has evolved into the leading telecommunications and technology company in Turkey and the second largest operator in Europe by subscriber numbers. 71,5 million customers in 9 countries generate annual revenues of nearly 5,5 billion US dollars. The company's vision is "to ease and enrich the lives of their customers with communication and technology solutions". To fulfil this ambitious goal, Turkcell implemented a Teradata Data Warehouse Appliance 2700, which helps the company to better integrate analytics and improve network quality.

Turkcell runs several network layers including 2G, 3G, fiber, voice, data and SMS, and offers a wide range of smart devices, internet and value-added services. In order to provide highest coverage and quality, the company collects signaling data in five minute intervals from around 30,000 base stations and 150,000 network cells in Turkey and Cyprus. They amount to 20 billion rows daily and accumulate to 1.2 PB of data annually.

> "The Teradata system runs data correlations from different network sources. It handles complex queries and manages analyses with high data retention – now 3 to 12 months, compared to one week before."

These massive volumes used to be processed in a reporting solution that could only store the data for a period of up to one week. Moreover, reporting performance was no longer good enough, as there were significant latency times for the data to load, leading to bottlenecks when performing complex queries. In the old system, Turkcell was only able to analyze data from different network layers, for example 2G and 3G, separately. If customers used both layers, an end-to-end analysis for their combined activity was not possible.

Transforming data into knowledge

In 2012, Turkcell started a project to optimize their data analytics. "The project addressed three major challenges," explained Vehbi Çelikbaş, Turkcell network management systems senior expert. "The first was to correlate our data from different network layers; the second challenge was to achieve short loading intervals based on the five minute periods of the source systems. And the third one was to transform this data into valuable knowledge and share it with our users."

Turkcell conducted a Proof of Concept with two providers, and chose the Teradata Data Warehouse Appliance 2700. "Teradata's domain knowledge, performance, customer support and professional services approach were the key points for Turkcell to choose Teradata," Çelikbaş explained. The Teradata Data Warehouse Appliance empowers organizations to react quicker to changing business conditions and provides new and better insights into consumers' behavior and preferences.

After an implementation phase of only seven months, the new system was successfully installed. Now, all data probes from the various network servers with their different protocols are loaded into the Operational Data Store (ODS) layer of the Teradata Data Warehouse (DW) in near real-time. A range of scripts transforms them into the normalized data structures of the DW layer. In the third step, the system generates data marts that are tailored to the end users' specific needs. They include data quality and

operational alarms, dashboards and reports in Cognos as well as batch data extracts for use in SAS models and other specialized local decision support systems.

"The system can now run data correlations from different network sources and handle complex queries. We could previously only retain our results for one week. Now network data is available between three and twelve months," Çelikbaş underlined.

> "What was the subscriber's experience and what happened in the network? These are the key questions that help to transform our business."

An important part of Turkcell's analytics is based on key performance indicators (KPIs) that are derived and compressed from the incoming network data. They can be visualized in dashboards for top management, and viewed in multidimensional cubes, as well as being queried ad hoc from the database. By comparing the same KPIs from different time periods (hourly and daily), Turkcell can for instance detect trouble spots regarding customer experience and trigger alarms to fix them.

Generating alarms used to take 45 to 60 minutes in the old system, as Çelikbaş recalls. "Now we generate them in real-time. Our network engineers can react to detected network problems much faster and provide quicker solutions to customers where required."

Successful use cases underline benefits

A number of use cases has already proven the benefits of the new Teradata Data Warehouse Appliance. For instance, the Teradata solution opens views of the individual device performance. By tracking the causes for a series of customer complaints about dropped calls, Turkcell found out that it was not a network issue. A comparison of drop ratio and terminal type revealed that some devices recorded above-average failure rates.

Their manufacturers were informed so that they could take corrective actions through software updates or product enhancements.

Looking into specific service offerings and their user communities has also created several opportunities. Turkcell analyzed smartphone and tablet usage, as well as their effect on the network, as they present around 40 percent of the devices in operation. The data about service intensity by location was used to identify hot spots such as the use of WhatsApp in the areas around universities. Turkcell initiated special marketing actions for students to promote device replacements or service upgrades.

The very high in- and outbound roaming traffic serves as a good indicator to measure performance and identify potential problems of roaming clients and corporate customers. By jointly analyzing network layers and services, it is possible to identify network bottlenecks more easily and react faster to resolve the issues. This also applies to specific roaming problems which can be specified more precisely and eliminated in cooperation with the roaming partner involved.

The new system can also support external data usage. For example, data is provided for churn models, which are then processed in a SAS environment. Through a special portal (Smartmap), corporate customers such as banks can extract anonymized traffic data related to customers, analyze their behavior and identify needs for new service touch points such as ATMs.

The new analytic capabilities enabled Turkcell to enhance their customer services significantly. "We will further add a data mining workspace to our system for even more advanced analytical methods. And we will also integrate the call center activity, measuring more KPIs and assist call center agents to analyze existing problems independently and to define instant solutions during the calls," Çelikbaş said.

For him, the most important questions are "What was the subscriber's experience?" and "What happened in the network?" These helped Turkcell to transform their business. "The Teradata solution is now a vital part of Turkcell's strategy to provide the best customer experience in the Turkish market" Çelikbaş underlined.

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