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THE MOVE TO 4G: WINNING CUSTOMERS AND BOOSTING PROFITS

NETWORK ANALYTICS CAN GIVE CARRIERS THE KNOW-HOW TO DRIVE THEIR TECHNOLOGY TRANSITION

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EXECUTIVE SUMMARY

The wireless telecom carrier landscape is changing. Carriers are under tremendous pressure to deliver more services, driven by accelerating smartphone penetration and the popularity of mobile applications, online gaming, video on demand, and location-based services. At the same time, carriers face demand for improving the customer experience. The key to resolving these pressures is to upgrade existing mobile networks to fourth-generation (4G) technology.

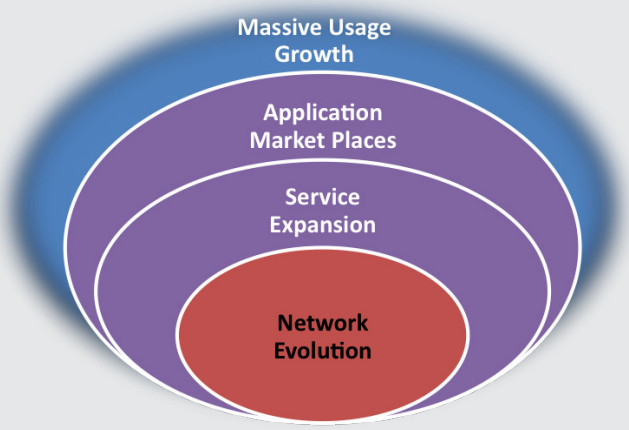
Yet this complex, costly migration is made even more difficult because of the challenges involved in understanding existing customer behavior, device performance, and network traffic flows in a consistent and timely manner. Successful migration depends on getting accurate, detailed answers from the vast amounts of data that are being generated every second of network operations. By integrating data from disparate sources and efficiently analyzing it, carriers can achieve better understanding of customer behavior; develop the most profitable and timely path to 4G migration; keep high-value customers happy; create dynamic service offerings; and even improve market brand performance.

CHALLENGES OF 4G MIGRATION

Usage per wireless subscriber has doubled in the past four years, and this growth rate continues to increase every month. Application marketplaces, carrier pricing policies, and changing customer behavior are driving demand for third-party over-the-top (OTT) mobile services such as Skype, Netflix, and Hulu as well as for mobile productivity tools. Although these applications generate a tremendous amount of traffic data, carriers are finding it difficult to convert this traffic increase into revenue opportunities. Fierce competition among telecom firms is also driving efforts to expand services in an effort to limit costly customer churn.

At the heart of all this is the need for carriers to evolve their networks to support the latest 4G technology (see figure).

The complexity of the environment required to make 4G work is daunting. Carriers must push through a tremendous amount of technological, business, and organizational changes to make the 4G migration process succeed. Yet many chief technology officers are flying blind because they lack current information, a situation compounded by having to reconcile conflicting data from inventory management, element management, and other operational systems.



The evolution of the network from 3G to 4G is the epicenter of the challenge facing carriers today

Then there's the customer angle. Even the largest carriers—the Verizons and AT&Ts of this world—are not in complete control of what the customer does anymore. In addition to the OTT layers of Skype, Netflix, Facebook, and other services that execute customer actions, the smartphone era has enabled a wide range of customer-specific video and gaming activities that are rending traditional traffic management policies useless.

The challenge is how to make the right data available to the carrier in near-real time to guide decisions. The issue isn't one of simplification because the process can't be simplified. It's complex by nature. However, it is possible to *clarify* the interactions between all the data points—such as customer activity, network performance, and application usage—that are continuously flowing into the carrier's systems to produce useful analyses.

4G TELECOMMUNICATIONS: A PRIMER

4G is the fourth generation of continually evolving mobile telecom standards. (Earlier standards were called 2G and 3G, successively.) A 4G network is capable of delivering broadband Internet access to mobile devices and is designed to move all customer utilization to a more efficient IP transport environment. Because of this broadband capability, users of wireless mobile devices such as laptops (with wireless modems), smartphones, tablets, and other mobile devices can access the Web, watch high-definition television, and conduct videoconferencing and other activities that were previously not possible due to spectrum and networking limitations.

THREE STEPS TO 4G MIGRATION SUCCESS

From a customer-experience perspective, carriers need to follow three steps during a 4G migration to ensure that the move will be successful—both operationally and financially. Step 1 is collecting data and understanding the linkages between all the data points before migration begins; step 2 is performing in-depth analyses of the data during migration; and step 3 is performing post-migration analyses to ensure that the migration has been successful. All three steps require a sophisticated and comprehensive analytics solution to "discover" the right information amid the ocean of data being collected and analyze the information to provide answers to relevant questions.

Step 1: Gathering and reconciling the data

Every time a wireless customer initiates a session, the carrier collects an enormous amount of data from a variety of different sources:

- **Session information:** This includes session details such as end points, usage, and error conditions, among others.
- **Network activity:** This refers to the network activity required to support the session and encompasses everything from the network elements to the underlying technology.
- **Device activity:** This refers to the specific device used for the session and the metrics associated with the device.

Networks are not homogeneous. Every piece of the network, every device, every customer session event has its own data format. For example, the length and volume of a session is measured in one data record. Yet the cost, routing information, and interconnect details are captured in other records and sometimes have to be modified and enhanced by downstream processes. So the information collected as a result of a single customer action can exist in a variety of forms and multiple data stores. It is a monumental task to analyze such diverse datasets together to get necessary insights.

An important step, then, after collecting data is to reconcile or "normalize" it by implementing a comprehensive data model, either the carrier's own or a vendor's. This data model translates the data into a common format and creates relational links between the formerly disparate datasets. This data model needs to be extensible and reach across all operations impacted by a customer's actions: marketing, finance, and operations, among others. Then the carrier needs to apply master data management (MDM) to standardize naming conventions. This gives carriers an additional way to refine the data relationships that helps, for example, to tie together networking activities to billing information, or marketing campaigns to billed levels.

Once this data is collected, normalized, and integrated, carriers can develop analytics to facilitate the migration process:

- **Create customer profiles:** From the data generated by customer actions, carriers can build profiles that answer questions. How many sessions and how much usage is this customer generating? How many customer service requests has this subscriber made? How many store visits has this customer made? What devices is this customer using? How many Web inquiries? Is this customer likely to churn?
- **Define high-value customers:** This involves identifying which customers are generating the most revenue for the carrier. Who are the heaviest smartphone users? Who are the heaviest data users? Which enterprise customers generate the largest average monthly bills? Which customers routinely convert to the latest devices as soon as they become available?

- **Generate market value profiles:** Customer usage doesn't always dictate value. Other factors come into play, such as what service plans are available in a particular market. Some markets might sell unlimited data plans, while others might only offer limited data plans. Also, there are costs that accrue from traffic interconnect and from "roaming" traffic, when a mobile user moves out of a service area, requiring the carrier to pay a fee to another carrier for servicing that user. All these factors come into play when deciding which markets offer the greatest migration value for a carrier.
- **Generate market-quality profiles:** Markets have to be profiled by quality as well as value. What's the carrier's quality distribution across a given coverage area? This helps the carrier see which markets are most in need of improvements. Which markets have the highest incidences of dropped calls? The highest data latency? The highest level of roaming within the coverage area. Alternatively, which markets are the best-performing? Those may be the ones you choose when creating marketing campaigns, or you can choose to introduce new devices.
- **Develop a 4G technology rollout footprint:** Most of all, collecting, normalizing, and analyzing data can help carriers decide where to deploy 4G technology, and on what schedule. This can include new services such as Voice over Long-Term Evolution (VoLTE), tiered services, machine-to-machine (M2M) services, and self-optimizing networks. Of course, the actual deployment timeline also has to take into consideration a number of other factors such as capital, equipment and resource availability, and any regulatory and local permitting requirements.

Step 2: Performing in-depth analyses of data throughout the 4G migration process

As a carrier begins its 4G migration, it should continue to use network analytics to optimize use of 4G networks, performance, and revenue. The metrics calculated during this step should include those covering quality, migrated customer usage, high-value customer usage, and device-performance analysis.

Having the right data analytics solution during this step enables carriers to do the following:

- **Analyze initial coverage areas:** Markets covered only by old technology must develop spectrum reuse plans for deployment of 4G services. Markets only covered by 4G footprint can be considered new territory. Markets covered by both technologies represent target market opportunity for converting customers.
- **Create target market value ranking:** Here is where carriers use network analytics to take total customer traffic, high-value customer traffic, and enterprise customer traffic in target markets to determine the highest-value markets.
- **Create target market "inverse quality" ranking:** This will represent a carrier's at-risk revenue. Carriers should use network analytics to identify high-value and enterprise customers in these markets, representing a customer segment at risk of churning.

THE MOVE TO 4G

According to forecasts by GSMA Wireless Intelligence, 3G and 4G technologies will account for half of all global mobile connections, or 4.25 billion of the 8.5 billion connections, in 2017. This is a dramatic increase from the combined 1.7 billion of the 6.5 billion total in 2012, which represents just 26 percent of all connections.

As the wireless world migrates to 4G technology, data management will become even more of a challenge due to higher bandwidth availability and growing device capabilities. Smartphone vendors are continuing to package more and more functionality into their devices, including a larger and wider variety of sensors (location, time, acceleration, movement, etc.), increasing processing and storage capabilities, and high-definition video and camera options.

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Step 3: Performing post-migration analyses

Finally, to ensure that a 4G migration is progressing the way that it should, carriers should use all the data they've collected and normalized to do post-migration analyses. This will allow them to do the following:

- **Create a comparative metrics (older technology versus 4G) dashboard:** This should include comparisons between the revenue generated, the quality of connections, the percentage of customer churn, and the rate of customer acquisitions/migration in markets and users served by 4G instead of older technologies. This process should also include vendor scorecards that measure the relative performance across technologies of both device and network vendors.
- **Identify cost improvement opportunities:** In addition to the network optimization opportunities available with 4G technology, carriers should understand where they are paying for roaming and developing methods to reduce that dependency and cost.
- **Understand statistical market "outliers":** Which markets are the top/worst market performers in revenue; quality; churn? Develop contingency plans based on integrated data to address those problem areas.
- **Initiate a customer-recovery process:** Within the first six months after migration, carriers should begin a concerted effort to recover customers lost to other carriers. This should include proactive care, demonstrations of device performance on the new 4G network, and targeted campaigns that address the key reasons for churn.
- **Determine a cost-recovery process:** The data collected throughout the migration process can be used to begin determining how earlier network technologies can be decommissioned and their associated spectrum repurposed (if possible) to address expanding 4G requirements.
- **Utilize data monetization analytics:** There is an enormous amount of customer density and behavior data that can be used to support a wide variety of revenue-producing activity, both near-real time (ad insertion) and post activity (density studies, co-marketing, affinity programs, etc). This data can be made anonymous to address any privacy concerns and legal/regulatory issues.

TERADATA: THE OPTIMAL PLATFORM FOR 4G NETWORK ANALYTICS

Teradata® linearly scalable platforms are capable of supporting growth in a variety of different dimensions including call volume, variety, number of users, and query complexity. Furthermore, Teradata platforms can support numerous applications concurrently.

Specifically, Teradata Aster® Discovery Platform enables carriers to understand patterns within complex data streams, especially the relationships between different types of data. Alternatively, Teradata Aster SQL-H™ enables Teradata Aster Discovery Platform to easily access data in Apache™ Hadoop® environments. It provides high-speed connectors between Teradata environments to make the discovery capabilities more efficient and enable data transfer between them.

CONCLUSION

Telecom customers, both consumer and enterprise, are eagerly adopting new mobile devices as they are introduced. They're also demanding that those devices support the new free OTT services they've grown accustomed to using at home and work. Demand for 4G technology is therefore escalating around the world, but migrating to 4G is a complex process. Carriers need access to near-real time information from a variety of sources that can be integrated to support sophisticated analyses. Integrating and analyzing data from a broad range of disparate network sources for effective analysis brings multiple benefits. Carriers can achieve better understanding of customer behavior, develop the most profitable 4G migration path, keep high-value customers happy, and create a reputation for market performance that bodes well for the bottom line.

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