Fujian Unicom implements “pre-assessment, post-evaluation” construction model

Through its innovative “pre-assessment, post-evaluation” closed-loop iterative network construction model, China Unicom Fujian (Fujian Unicom) has found the perfect balance between investment, user perception and network quality to effectively support 2G/3G/4G mobile market development.

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Iterative network construction

Internet companies employ iterative updates to quickly respond to user needs, and use short-cycle, low-density software updates to optimize services and improve user perception. Learning from the concept of iterative development, and based on its experiences from 2012 to 2014, Fujian Unicom established its own “pre-assessment, post-evaluation” iterative network construction model. During the construction of its mobile networks, we established a pre-assessment, post-evaluation model centered on “network returns, user perception and network quality.” By verifying iterative updates and continuous effects, Fujian Unicom can now quickly respond to market developments and changes in user perception. The model involves the following steps.

Establish baselines: First, a large network is divided into smaller grids that are analyzed in terms of network return, user perception and network quality so that network characteristics can be summarized and weaknesses identified. Carriers can then establish a baseline archive of network requirements for the entire province and make dynamic adjustments.

Pre-assessment to determine construction order: To determine the order of construction, list management is performed based on the aforementioned baseline archive. The three key network characteristics are then associated with resource utilization to build trust.

Post-evaluation to modify construction order: Three months after network construction, the three characteristics for each grid are updated.
Changes are assessed and return on investment (ROI) is evaluated to see whether expected goals are met, whether improvements have been made in terms of network quality, and whether user perception and market development objectives have been achieved. The results will serve as the baseline for future investment.

In this iterative, granular, low-density modification process, Fujian Unicom makes adjustments based on constantly evaluating the network and identifying issues with user perception and changes in network quality. Combined with its accountability mechanism, Fujian Unicom ensures accurate and effective investment, and has noticeably improved user perception. With support from Fujian Telecom's management, many provincial branch departments have partnered with Huawei on key pilot and verification projects. Partner departments included network construction, finance, planning, operations and maintenance, customer service and network optimization, and the design institute.

Fujian Unicom completed the first systematic, E2E multi-dimensional analysis of its 3G network, allowing it to summarize and analyze the characteristics of value grids, potential grids and non-value grids.

Diversification: User perception & grid value

Traditional network construction follows an extensive and planned management model...
from the 2G era. The model suits the voice-dominated 2G era well, and can assure network quality. However, it can no longer meet demand for 3G, much less 4G. On the one hand, the rapid development of mobile data services means that new demands will continue to emerge and the development cycle for new services will continue to decrease. On the other, network quality alone can no longer reflect the user perception of experience, and user complaints tend to increase even though network quality is improving. This means that network construction, operations and maintenance must change and adapt to changing markets and new services. In turn, resources must be effectively allocated.

As data overtakes voice as the dominant mobile service, Fujian Unicom needs to promote diverse network construction models to replace traditional methods that center solely on network quality. First, Fujian Unicom must improve user perception and network returns to form a three-pronged approach on par with network quality. User perception refers to the network speeds perceived by high-value users when they browse websites or watch online videos. Network returns refer to the comprehensive investment recovery period for single mobile units. Network quality refers to the weighted average of 2G, 3G and 4G coverage, interference, and transmission delays. Second, Fujian Unicom divides its expansive network into smaller grids, and takes its marketing grid as a blueprint for analyzing and mapping out network needs to better control operating responsibilities, costs, investment, and other resources at the grassroots level.

Through quantification, classification and analysis, the overall network becomes a huge province-wide chessboard. The grids within the chessboard are then comprehensively evaluated, filed and sorted. Value grids are prioritized, while potential grids indicate areas with untapped market potential. Even non-value grids are approached in an aggressive manner. In this way, Fujian Unicom can improve investment precision and network effectiveness, promote investment in high-efficiency regions, and improve provincial revenue and the percentage of high-value users while ensuring appropriate 2G/3G/4G coverage.

**Perception-based network construction**

During the implementation of our "pre-assessment, post-evaluation" model, Fujian Unicom deployed probes to detect the service composition of each grid and quantify data, including service structure, proportion and speed. Following big data analysis from 15,000 2G/3G/4G base stations, Fujian Unicom discovered that 83% of data traffic throughout
Fujian Unicom adopted a "build as needed" strategy in which it balances the service and user demands of each grid based on the expected service rate in its development plan for first-, second- and third-tier cities, respectively.

The province is concentrated around 21% of station sites located in the cities of Fuzhou, Xiamen and Quanzhou. Meanwhile, in terms of hits, traffic and usage time, short video services have continued to grow. This shows that urban users are the main consumer of mobile services, and that 3-to-5 minute short videos will become a basic data service.

With the diversification of mobile Internet services, urban users will continue to demand faster mobile network speeds, which will force operators to figure out how to balance the growing demand for faster network speeds with ROI from urban network construction. Fujian Unicom adopted a "build as needed" strategy in which it balances the service and user demands of each grid based on the expected service rate in its development plan for first-, second- and third-tier cities, respectively. We will then carry out mobile network construction in different cities based on different standards, involving either an increase in 3G capacity or deployment of an LTE network that ensures good user perception while efficiently and effectively allocating network resources.

According to Fujian Province’s 2014 Q3 Mobile Brand Development report, 60.3% of customers selected Fujian Unicom for its fast network speeds, and 65.7% of urban users chose Unicom as their mobile service provider.

### U900 for wide coverage

The development of users and business in rural areas lags behind urban areas, but the market potential for both is significant. From 2012 to 2014, the voice services of Fujian Province’s rural grid increased by 10%. On par with the urban grid, browsing, videos viewing and gaming in rural areas grew by 23%. Mobile networks will inevitably transition from 2G to 3G, so rural network construction is imperative.

The topographic complexities, unbalanced spending power, and diverse range of terminals in rural Fujian all posed challenges to 3G construction. Fujian Unicom chose to effectively use spectrum resources and selected U900 technology for low-cost coverage in rural areas. First, we implemented frequency re-planning for spectrum resources at 900MHz band and built GU900 co-stations to successfully deliver broadband mobile Internet access to rural users. Secondly, we adopted "pre-assessment, post-evaluation" and studied the distribution of rural investment returns, U900 terminal penetration, and market channel distribution across its grids to identify the highest-potential towns and villages. The practical results from 2014 showed just how useful this strategy has been. Through 3-to-4 months of market expansion, both rural users and services increased, with a 300% growth in data traffic.

With mobile Internet construction in full swing, Fujian Telecom forged ahead with a positive spirit, developed the "pre-assessment, post-evaluation" iterative network construction model, and struck balanced development between network returns, user perception and network quality. The constant support from Huawei in the process of project implementation also proved crucial.