Optimizing Network Performance & Reducing Operation Cost

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Outlines

- Why Need Network Optimizations
- Automatic Network Optimizations
- Case Studies
Why Need Network Optimizations

- Improve the cell coverage
- Increase the network capacity
- Improve user experience
- Automatic configuration, testing, network analysis and adjustment

Maintain Users Satisfactions and Reduce Operational Cost
Network Optimization Helps to Achieve KPI

Constantly Network Optimization Keeps
High Network Quality and User Satisfactions
Network Deployment and Optimizations
Limitation of Traditional Drive Test

Limited Test Range
- Outdoor: Covering main routes
- Indoor: Covering a few important spots

Cost
- Network optimization cost per site
- Other cost: 24%
- Test Equipments cost: 28%
- Labor cost: 29%
- Vehicle: 19%
- Total load > 8 kg (test equipment and laptop)

Need Professional
- Need to know how to use the test equipment and software

Inconvenient
- Need Professional
- Inconvenient
How to simplify the network optimization and reduce the operation cost?
Outlines

- Why Need Network Optimizations
- Automatic Network Optimizations
- Case Studies
Automatic Network Optimizations

Automatic, Anytime, Anyone, Anywhere Network Optimization

- Neighboring-cell automatic optimization
- VIP user performance optimization
- Complaint analysis
- Network performance evaluation

CDT: Call Detail Tracer
CNT: CDMA Network Tester
CNA: CDMA Network Analyzer

- Monitor and Test at anytime and anywhere
- Low drive test cost

- Network data collection
- In-depth data analysis

- Test data replay
- Test data analysis
- Automatic evaluation report

T-Phone: Mobile Drive-Testers
Automatic, Anytime, Anyone, Anywhere Optimization

- Professional
- District managers
- EMS carriers
- Taxi drivers
- Others
Network Coverage Optimization: T-Phones

Traditional Driver Test Tools

T-Phone Provides Coverage Optimization

Automatically by Anyone, Anywhere and Anytime
T-Phone – User-Friendly Optimization Tools

**High Capabilities**
- Professional drive test
- Monitor network at anytime and anywhere
- Run drive test at anytime and anywhere

**Low Cost**
- Reduce drive test cost by more than 75%

**Easy Operation**
- Easy to use
- Anyone can help collecting data for network optimization

**Easy to Carry**
- Could be able to use in the indoor coverage test
Coverage Optimization: CNT/CAN/CDT

- Selective Replay Drive test data
- Display with GPS information
- Replay APM Pilot strength
- Tracing the call
Outlines

Why Need Network Optimizations

Automatic Network Optimizations

Case Studies
Network Optimization in Network Expansion

Add 608 New Sites to Existing Network

- 535 existing sites
- 608 expansion sites

Challenges of Network Optimization

- Inter-cell coverage
- Pilot pollution
- Neighbor cell relation confusion
- PN confusion
- Wrong configuration of neighbor cells
- High RSSI

2 MSCs and 8 BSCs in CTC Chengdu

In early 2009, the number of BTSs in Chengdu were increased from 535 to 1143, up by 113%.
## Success T-Phone Case in CTC

### Network Performance Improvement

<table>
<thead>
<tr>
<th>Date</th>
<th>Network Coverage Ratio</th>
<th>Call Successful Ratio</th>
<th>MOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec-08</td>
<td>97.78%</td>
<td>96.50%</td>
<td>3.12</td>
</tr>
<tr>
<td>May-09</td>
<td>97.99%</td>
<td>97.92%</td>
<td>3.23</td>
</tr>
<tr>
<td>Improvement</td>
<td>0.21%</td>
<td>1.42%</td>
<td>0.11</td>
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</tbody>
</table>

Note: The data comes from China Telecom’s DT/CQT test report.

### Optimization Cost Reduction

#### Composition of network optimization per site

<table>
<thead>
<tr>
<th>Component</th>
<th>Traditional way</th>
<th>T-Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing personnel cost</td>
<td>800</td>
<td>300</td>
</tr>
<tr>
<td>Other labor cost</td>
<td>300</td>
<td>700</td>
</tr>
<tr>
<td>Instrument and meters cost</td>
<td>250</td>
<td>558</td>
</tr>
<tr>
<td>Vehicle rent</td>
<td>100</td>
<td>366</td>
</tr>
</tbody>
</table>

### Optimization Duration Improvement

<table>
<thead>
<tr>
<th>Method</th>
<th>Installation and Initial Test (days)</th>
<th>Drive Test and Network Optimization (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Way</td>
<td>40</td>
<td>80</td>
</tr>
<tr>
<td>T-Phone</td>
<td>15</td>
<td>30</td>
</tr>
</tbody>
</table>

Assumption: 1200 sites and 10 groups of test Engineers

Note: The data is based on the business model database of the CDMA BSS.
Network Optimization with CDT/T-Phone

Traffic Distribution in Cheng Du
(8:00am - 8:00pm)

Call Drop Analysis (8:00am - 8:00pm)
Network Optimization with CDT/T-Phone

More than 30 high-rise buildings in the density region

In-building coverage issues

RF signals reflection.

Interference from neighboring cells

CDT could easily identify the coverage issues and instruct field test engineers to optimize network in efficient way.
Summary

Network Optimization will be simplified when many people are involved.

New technologies make the optimization anytime, anywhere and automatically.
Thanks!

Talking to the future