

# China Mobile Marketing Promotion System

## Chongqing Mobile Subsidiary

### Application Overview

- Industry : Telecom
- Business : Business & Operation Support System
- Application : Marketing Promotion System
  - Promote China Mobile products to various channels including website, APPS, SMS, WeChat, etc.
  - 30 million target subscribers
  - 15 million successful promotions per day

### Challenges

- Highly concurrent mobile locations based query
  - For every subscriber in the mobile carrier network
- High transaction throughput with consistent low latency
  - Read mostly application with small amount of DML and DDL
- Scalability to achieve higher throughput

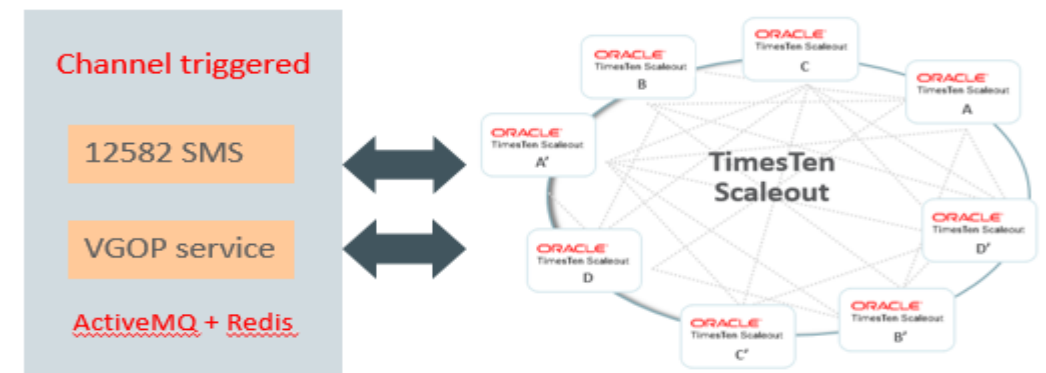
### Solution

- TimesTen Scaleout with K=2 for High Availability

### Why TimesTen Scaleout ?

- End-to-end response time ~200 milliseconds via C/S connection mode
- New LBS (location based service) module with 2000 concurrent connections in peak time
- Easy, automatic high-availability
- No application code changes moving from TimesTen 11.2.2 to TimesTen Scaleout
- Scalability for future growth

Marketing Promotion System currently supports over 30 million subscribers and populate 15 million marketing messages per day.



# Introduction

This is a read mostly marketing promotion system which requires in-memory technology to handle the high concurrency (over 2000 concurrent connections) & low latency (200 millisecond) required by the application.

There are 18 application nodes deployed on 3 hosts using Java Spring framework as connection pool to connect to database.

The system is currently running on top of TimesTen 11.2.2 with A/S pair. Customer is satisfied with TimesTen product which has the ACID compliance and excellent low latency (less than 10 millisecond).

Each of their connections will perform 90% read, 5% update, 5% insert as well as occasional drop old table and create new table operations.

Due to the high concurrency demands and mixed workload, customer was looking for a new architecture without changing the current application code.

TimesTen Scaleout is very compatible with TimesTen 11.2.2 and it is easy to migrate from 11.2.2 to grid.

There are over 800 tables which are all distributed via "Duplicate" mode.

The benefit of this distribution method is that it delivers low latency and high concurrency for queries and can also support low volumes of DML and DDL within the workload.

# Configuration

	ZooKeeper	Instance Type	Databases
Host1	Y	Data	Grid-RS1_DS1
Host2		Data	Grid-RS1_DS2
Host3	Y	Mgmt1/Data	Grid-RS2_DS1
Host4	Y	Mgmt2/Data	Grid-RS2_DS2
Host5		Data + Backup Repository	Grid-RS3_DS1
Host6		Data + Log Repository	Grid-RS3_DS2

- Hardware & OS information per each physical host  
SUSE  
80 vCPUs per each host  
512GB Physical RAM  
Single bonded network via two physical 10 GbE NICs  
1 TB local SSD disk
- Database Configuration:  
Permsize=102400  
Tempsize=20480  
LogBufMB=1024  
LogFileSize=1024

# Customer Quotes

Our Chongqing Mobile Marketing Service System currently runs on the 11.2.2.8 version of the TimesTen in-memory database on x86 servers and adopts a highly available deployment method via active and standby replication.

Although the current TimesTen database can basically meet the business needs of low latency. However, as the business continues to increase, there is a higher demand for highly concurrent read and write transactions.

By adopting TimesTen Scaleout distributed architecture on x86 servers, the performance is improved by about 3 times compared with the previous A/S pair application architecture. The business experience also brings about a tremendous increase:

## 1): The marketing exposure of the CRM system

Marketing exposure is a major part that determines a company's success in their market.

The number of marketing exposure has increased from the previous 500K-600K per day to the current 1 million to 1.5 million.

## 2): SMS group sending

The number of successful messages sent per day is now improved to 2.5 million, with the peak volume at about 5 million. This kind of improvement strongly supports out LBS (location based service), DPI, as well as data volume traffic threshold group promotion modules during the 2018 World Cup.

## 3): Actual daily inquiries

The throughput of database queries improved from the previous 8 million per day up to 40 million per day.

(Note: The LBS and DPI modules require highly concurrent throughput. Due to the limitation of CPU resources on single host hardware, these modules can be applied only on TimesTen Scaleout)

# Customer Quotes - Summary

In summary:

As the world's first TimesTen Scaleout PoC and go live customer, our marketing service system was successfully deployed under the new TimesTen Scaleout architecture with almost no application code changes!

The entire system has not only improved performance by more than three times, but also successfully supported a number of new high concurrent business modules!

This fully demonstrates that Oracle TimesTen Scaleout is an excellent distributed relational in-memory database product for OLTP SQL based applications!

Head of Construction and Maintenance Department of Chongqing Mobile - Tang Tang