M1 Deploys *MySQL Cluster*
Carrier Grade Solution from hSenid to Improve Telecom Subscriber Revenue

M1 is one of the mobile communication providers in Singapore, with over 1 million subscribers. It provides a full range of mobile voice and data communications services such as SMS, picture messaging, as well as downloadable games, music videos over its 2G/3G network.

The mobile communications market in Singapore is highly competitive and is under continuous pricing pressure, which required M1 to find new ways to generate more revenue while controlling costs. However, deploying new applications and services using proprietary hardware and software is cost prohibitive. To address the challenge, M1 turned to hSenid (www.hSenidMobile.com), a telecom application and service provider, with expertise and over 10 years of experience in developing solutions using open source software and commodity hardware for a global customer base. Using MySQL Cluster, hSenid developed RewardsPlus, an application that enables M1 to quickly implement promotional campaigns and loyalty programs to reduce subscriber churn.

MySQL Cluster, a cost-effective open source database solution that is designed to meet the high performance and high availability requirements telecom database applications.

"We rely on MySQL Cluster as the key technology behind RewardsPlus, which helps us increase the Average Revenue per User and improve customer loyalty."

Mr. Tan Tiong Heng
General Manager of Core Network Planning, M1, Singapore

Cost-effectively Enabling New Services Using Open Source

To be a leader in the mobile communications marketing, M1's strategy is to constantly deliver value to its customers by rolling out new and innovative applications and services. For example, it was the first mobile provider to offer 3G services to its pre-paid customers. And with hSenid RewardsPlus, it was one of the first to introduce loyalty programs by rewarding users based on their usage patterns.

The rapid rollout of new applications and services presents many challenges to M1s core network planning team. One obstacle that M1 and other service providers face is the cost of introducing new services, which consists development costs and infrastructure costs including database software and hardware costs. If the cost of the infrastructure investment such as proprietary database software is too high, new service projects would never even get started.

To solve this problem, M1 chose a 3rd party solution provider with expertise in delivering cost-effective telecom applications based on an open source platform. By developing applications on top of an open source stack including Red Hat

hSenid Solutions on MySQL Platform at M1	
RewardsPlus	RewardsPlus helps M1 to improve customer loyalty by setting up promotional campaigns and issuing rewards.
Telco Reporting Platform	The Telco Reporting Platform is a Business Intelligence system that helps M1 to make strategic decisions and revenue calculations based on real facts by mining over 2 Terabytes of data
mRecharge	mRecharge enables M1 customers to top-up their pre-paid mobile accounts via SMS

Enterprise Linux, JBoss and MySQL Cluster, hSenid was able to eliminate the high upfront licensing costs associated with proprietary software for M1.

hSenid RewardsPlus

RewardsPlus is a customer loyalty application that enables M1 to set up a wide variety of promotional campaigns and loyalty programs that award bonuses and prizes to their subscribers based on usage patterns. The RewardsPlus application monitors a number of subscriber activities in real-time including voice calls, voice mails, SMS, multimedia message service (MMS), Wireless Application Protocol (WAP). Using this data, M1's marketing and operations departments can run credit expiration campaigns, generate comparison reports on promotional efficiency, send customized SMS

"We rely on MySQL Cluster to process millions of CDR transactions every day to run successful reward programs."

Mr. Tan Tiong Heng
General Manager of Core Network Planning , M1, Singapore

messages to subscribers and more. RewardsPlus has enabled M1 to improve customer loyalty in a highly-competitive market where delivering new value-added services and growing your subscriber-base are key to success. (www.RewardsPlus. hSenidMobile.com)

Real-time Call Management

Real-time Call Detail Records

Being able to effectively implement promotional campaigns and loyalty programs requires processing of M1's 1 million subscriber usage activities in real-time. MySQL Cluster is used to store all Call Detail Records (CDRs) which contain usage information such as the duration of each call, the amount billed for each call, and the total free time remaining in the billing period. MySQL Cluster processes millions of transactions every day to manage all M1s CDRs. By processing this information in real time, M1 can immediately offer promotions, reward customers and notify users of their account status based on their most recent call activity.

MySQL Cluster is an in-memory database that is designed to deliver the performance and throughput of the most demand-

ing telecom applications. MySQL Cluster delivers the following key benefits:

- ◆ **99.999% availability** with no single point of failure

- ◆ **Superior performance** only an in-memory database can deliver

- ◆ **Automatic Sub-second failover** with synchronous replication

Upgrading the CDR database from MySQL Server to MySQL Cluster resulted in a 300% performance improvement and gave M1 the ability to run additional campaigns based on real-time data.
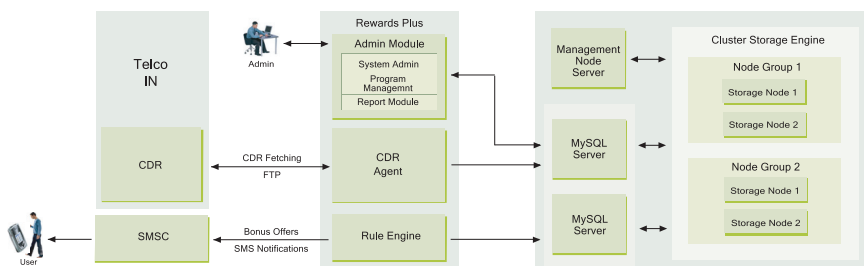
2 TB Data Warehouse

The CDR database is a rich source of usage data about M1's prepaid subscribers. M1 maintains a separate MySQL data warehouse which contains over 2 terabytes of historical data

including CDRs of SMS, MMS, Voice and GPRS data. To better understand their customer behavior and to make informed business decisions about future campaigns, M1 mines this data warehouse using hSenid **Telco Reporting Platform** (www.Telco ReportingPlatform.hSenidMobile. com).

Prepaid Top-up

Prepaid has been the major vehicle for increasing mobile penetration. Much of the growth has come from markets such as low income and youth, as well as the unreachable geographics segments. **mRecharge** is an innovative solution built on top of MySQL enabling mobile users to top-up via the Web as well as ATM, POS, and WAP. Together RewardsPlus and mRechage has allowed M1 to build successful reward programs, increase revenue and build customer loyalty. (www.mRecharge.hSenid Mobile.com)

M1 uses MySQL Cluster to processes usage activity from 1 million subscribers in real-time.

Why Industry Leaders Depend on MySQL

Technical Environment

RewardsPlus

Hardware:	HP Proliant DL 380
OS:	RedHat Enterprise Server 4
CPU:	64-bit Intel® Xeon™ processors, 3.6 GHz
RAM:	• 2 MySQL Cluster data nodes machines 12Gb SDRAM each
	• 2 MySQL Server machines 2Gb each
Hard Disk:	• 6x146Gb HD for MySQL Server machines
	• 6x146Gb HD for MySQL Cluster data node machines
Web Server:	Tomcat
Database:	MySQL Cluster Carrier Grade Edition
Language:	Java
Database Size:	15-20 million data records

About MySQL AB

MySQL AB develops and supports a family of high-performance, affordable database products. The company's flagship offering is 'MySQL Enterprise', a comprehensive set of production-tested software, proactive monitoring tools, and premium support services.

MySQL is the world's most popular open source database software, with over 11 million active installations. Many of the world's largest and fastest growing organizations use MySQL to save time and money powering their high-volume Web sites, business-critical systems and packaged software -- including industry leaders such as Yahoo!, Alcatel-Lucent, Google, Nokia and YouTube.

With headquarters in the United States and Sweden -- and operations around the world -- MySQL AB supports both open source values and corporate customers' needs in a profitable, sustainable business model. For more information about MySQL, please visit **www.mysql.com**

MySQL

The World s Most Popular Open Source Database