Tema Networks Selects MySQL Embedded Server to Power its Real Time Mobile Billing Solution

Tema Networks Overview

Tema Networks develops billing and Value Added Services (VAS) solutions for mobile network operators around the world. Based in Finland, Tema Network's management team are seasoned professionals with a combined experience of over 40 years, holding senior level positions within leading suppliers to the Communications industry.

This experience provides them an in-depth insight into the most significant challenges faced by network operators as they attempt to integrate and deploy new communications services and Business Support Systems (BSS) into their infrastructure. Tema Networks addresses these challenges by building fully customized solutions for each of their customers on top of their proven Tema Telecom Platform. This approach ensures they are able to provide solutions that match the complete functional and technical requirements of the operator, with an accelerated time to market, and without the risks and costs associated with building each solution from scratch.

The Business Challenge

Mobile device penetration among consumers is already saturated in many developed markets, with active mobile accounts actually exceeding population levels in some countries. To sustain growth, mobile operations need to find new sources of revenue and enter new market segments.

As mobile network speeds increase and mobile devices become more functional, so there are opportunities to deliver enhanced, data-driven services to subscribers. Such Value Added Services are therefore one means for operators to develop new revenue streams. To address new market segments, many operators are promoting the concept of Fixed Mobile Convergence (FMC), enabling users to roam seamlessly between wired and wireless networks on a single device, thereby extending their communications capability.

Further extending this concept, operators are also promoting the mobile device as a complete replacement for fixed lines in the home or office. The benefit to users is simpler access to voice communications, more transparent billing and a single contact telephone number – whatever their location. This concept is gaining traction with an estimated 15% of households in the US now eliminating their fixed line and opting instead for mobile devices for voice communications. However, one inhibitor to such replacement is the perception of higher mobile telephony costs.

Tema Networks has developed their Home Zone Billing (HZB) solution to address this perception. HZB is location aware, allowing for variable tariffs based on the location of the subscriber at the time they make a call. This enables the operator to offer competitive pricing of mobile communications when used as a substitute for fixed lines in the home, while maintaining revenue and margin when real mobility outside of the home is required.

Telecommunications

OS: CentOS 5

Hardware: Sun Fire X4100M2 Servers

Database: MySQL Embedded Server Pro 5.1

"The pricing model of MySQL, and its ability to run on commodity systems directly contributed to the competitiveness of Tema Networks' solution, saving our customer nearly 1 million Euros compared to proprietary database offerings."

Tero Heinonen
CEO, Tema Networks Ltd

Tema Networks Saves Their Customers Millions Using MySQL Embedded Server

The Home Zone Billing solution has recently been adopted by one of the leading mobile operators in the European and Asian markets, serving 90 million subscribers across two continents. By investing in this solution, the operator can secure new revenue streams and higher ARPU (Average Revenue Per User) through Fixed Mobile Convergence and through fixed line migration, providing all the convenience of a single telephone number, while ensuring telecommunications costs remain within their users' telephony budget.

The MySQL Solution

The database plays a key role in any new communications and billing service due to the high data volumes coupled with demanding performance and availability requirements. This is especially true of Tema Network's Home Zone Billing solution which needed a proven database with many millions of customer deployments and readily-available best practices for development and deployment.

Because the HZB system provides real time tariffing for both pre and post-paid subscribers, Tema Networks needed a database system capable of maintaining the most stringent throughput and availability requirements, while delivering a consistent response time of just a few milliseconds. For their new customer, Tema Networks had to deploy the HZB system over five sites, up to 6,500 kilometers apart, separated by remote terrain and spanning seven different time zones. The database is dis-

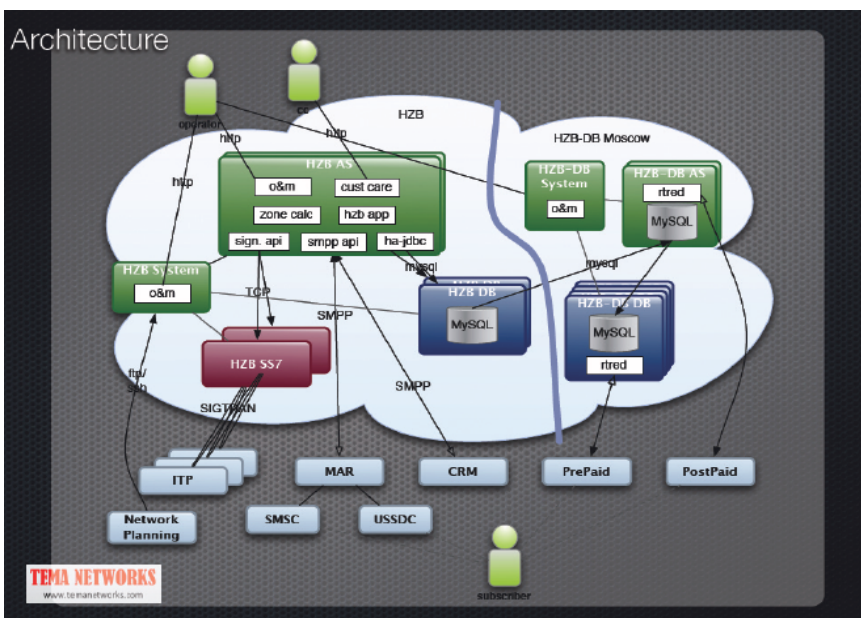**Tema Networks and MySQL Embedded Server Solution Overview**

- Real-Time, location aware, mobile billing solution
- Supports greater mobile network usage and higher ARPU
- MySQL selected to support 1,000 operations per second, in real time
- Regular quarterly service packs, monitoring and support reduce database TCO
- Operators save nearly 1M Euro per year using MySQL rather than proprietary databases

tributed across these sites and must maintain data consistency and integrity at all times while also achieving high availability.

After evaluating different open source and proprietary databases, Tema Networks selected MySQL as their database vendor of choice. MySQL Embedded Server 5.1 with its fully integrated transaction-safe, ACID compliant storage engine offering full commit, rollback, crash recovery and row level locking capabilities has enabled Tema Networks to meet their demanding database requirements. It has also provided the ease of use that has made MySQL the industry's leading open source database.

By selecting MySQL Embedded Server, Tema Networks receive access to the latest binaries with predictable quarterly updates, comprehensive monitoring tools to optimize query performance and reduced management costs, and technical support to ensure continuous availability of the database.

The MySQL database is split into providing two functions: the HZB Server and the HZB DB. The HZB Server is responsible for subscription and provisioning of the Home Zone Billing service to users, and recording their location. This data is then replicated to the geographically distributed HZB DBs which are responsible for recording the local mobile cell of the user. Based on the location of the user when they make a call, the HZB DB reports to the operator's billing system if the subscriber is within a provisioned zone, thereby ensuring the appropriate tariff is applied.

Architecture of Tema Network's Home Zone Billing Solution

Tema Networks has extended their use of industry leading open source solutions beyond the MySQL database. Java application servers sit above the database and connect to MySQL via the HA-JDBC driver. Linux Virtual Server (LVS) is responsible for load balancing across the systems allowing for fast failover and planned maintenance operations.

MySQL Embedded Server Pro currently handles 1,000 Queries per Second and tens of Gigabytes of data, with rapid data volume growth expected as the service is deployed to more regions. The databases are deployed onto Sun Fire X4100M2 servers running CentOS 5. Sun systems were selected based on Tema Networks' previous experience of Sun hardware stability and price/performance, and the fact that many of their operator customers had standardized their IT infrastructure on Sun hardware.

Tema Networks was able to accelerate their time to market through the seamless integration of MySQL with the software architecture of the Tema Telecom Platform. Development time and quality was also boosted by the pervasiveness of MySQL allowing access to a vast knowledge pool of expertise and best practices.

"The pricing model of MySQL, and its ability to run on commodity systems directly contributed to the competitiveness of Tema's solution, saving our customer nearly 1 million Euros compared to proprietary database offerings." said Tero Heinonen, CEO, Tema Networks Ltd.

The Future with MySQL

The use of leading open source products is a crucial part of building modern, competitive solutions for the communications industry. This philosophy is a key element of Tema Networks' strategy of ensuring their customers receive technically advanced solutions which exactly meet their requirements and which are delivered at a competitive price. MySQL is an elementary building block of Tema Telecom Platform, which will bring these benefits to many other operators, who select nothing less than the very best of technology solutions to meet their most demanding needs.

"For us, MySQL is the gold standard in databases. It met our most stringent performance and availability requirements running in clusters over vast geographic areas. The extensive knowledge base and simple architecture enabled us to quickly and simply integrate MySQL into our Home Zone Billing solution."

Tuomas Ranta
Chief Software Architect, Tema Networks

MySQL Embedded Server for OEMs, ISVs, and VARs

MySQL Embedded Server is a full-featured, zero administration database that enables ISVs and OEMs to bring their applications and solutions to market faster. MySQL's small footprint, zero administration and support for 20+ platforms gives ISVs and OEMs ultimate flexibility to ship a highly reliable SQL-compliant, transactional database with just about any software application or hardware appliance.

MySQL Embedded Server enables OEM/ISV/VARs to:

- **Reduce COGS and improve profitability** by embedding a cost-effective database without artificial license restrictions on CPU, memory, and servers

- **Bring applications to market faster** by embedding a proven database rather than building and maintaining a proprietary database in-house

- **Deliver a differentiated solution** that can capture, store and report on data with speed and granularity by embedding a full-featured, relational database

- **Win competitive comparisons** using a SQL-compliant, relational database with superior performance and reliability

- **Deliver a zero-administration solution** so that their customers don't have to hire dedicated DBA resources

- **Make reporting and analysis easy** using a cost-effective open source reporting solution like Jasper for MySQL: OEM Edition.

MySQL Embedded Server is Ideally Suited for:

Software Applications

- Network & Performance Management
- Monitoring Systems
- CRM & ERP
- Educational Software
- Email, Anti-Spam Software
- VoIP & Online Messaging
- Healthcare & Practice Management
- Biotech

Hardware Appliances

- Networking Equipment
- Routers & Traffic Controllers
- Security Appliances
- Retail Kiosks
- Point-of-Sale (POS) Systems
- Diagnostic Instruments
- Sensory Devices
- And more...

About MySQL

MySQL is the world's most popular open source database software. 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!, Google, Alcatel-Lucent, Nokia, YouTube and Zappos.com.

For more information about MySQL Embedded Server, please go to **www.mysql.com/oem**

To contact MySQL online or via telephone, please go to **www.mysql.com/contact**

The World's Most Popular Open Source Database