



MySQL & Pyro Score at the 2010 FIFA World Cup



Service Delivery Platform

Hardware: IBM BladeCenter Nehalem Server

OS: Red Hat Enterprise Linux

Database: MySQL Cluster 7.1

"MySQL Cluster 7.1 offered the perfect combination of extreme levels of transaction throughput, low latency and carrier-grade availability. We also reduced TCO by being able to scale out on commodity server blades and eliminate costly shared storage."

Phani Naik

Head of Technology
Pyro

Introduction

The Pyro Group has selected the MySQL Cluster database to power their InRoam SDP (Service Delivery Platform). InRoam enables South African mobile network operators to provide low cost, border-less mobile communications services to hundreds of thousands of football fans from around the world as they descend on South Africa for the 2010 FIFA World Cup tournament.

Pyro Overview

Founded in 2000, Pyro is a global communications technology provider with solutions deployed in over 120 telecommunications networks around the world. Pyro's solutions are integrated with the world's leading hardware, software and NEP (Network Equipment Provider) platforms, addressing three central telecommunications market segments in Radio/Core networks; OSS & BSS systems (Operations & Business Support Systems) and VAS (Value Added Services). Pyro's solutions are complemented by an extensive array of Managed Service Offerings, Professional and Consulting services.

Pyro's technology offerings have been endorsed as world-leading with a series of industry awards. Pyro's roaming solutions have received special recognition by the GSM Association, AfricaCom and Global Technology Business Innovation Awards.

The Business Requirements

With hundreds of thousands of football fans visiting South Africa to support the 32 teams participating in the FIFA world cup, local operators have enormous opportunities to monetize extra network usage as fans communicate with each other, and friends and family back at home. As Roaming enables subscribers to use their mobile communications services when traveling outside the geographical coverage area of their home network, this was an opportunity for Cell C, one of the largest operators in South Africa, to immediately monetize their services within a new set of subscribers.

Cell C has differentiated its services by offering extensive international roaming agreements with excellent coverage levels around the world. Cell C has nearly 540 roaming partners in over 186 countries offering subscribers access to the leading communications networks. By using Pyro's InRoam SDP, subscribers using Cell C or their partners' services enjoy the benefits of being treated as a 'local' customer in terms of pricing, while retaining the functionality of their home network service.

InRoam is an intelligent application that helps subscribers recharge, transfer airtime, receive and send messages with ease across borders, without prefixing country codes while dialing. Subscribers even have the added value of having the short code services used in their home network seamlessly recognized as they roam to visited networks in other countries. By layering this

Pyro

functionality into international roaming, subscribers can enjoy the benefits of all of their services, and operators do not sacrifice user revenues, even when the subscriber is traveling.

Pyro's InRoam SDP offers the complete range of roaming solutions including Roaming Management Solutions, Traffic Steering Solutions, Seamless Roaming Solutions, Roaming Billing Solutions, Roaming VAS Solutions, Roaming Service Delivery and Roaming Services.

The Business Problem

The InRoam solution was originally developed on a Microsoft platform, including the Microsoft SQL Server database. As the InRoam solution gained widespread adoption among global operators, so the demands to support a greater range of deployment platforms became a priority. However, Pyro found themselves locked-in to the Microsoft stack. They also found themselves commercially restricted by Microsoft's licensing policies.

As a result, Pyro ported InRoam to Linux, and offered their customers a choice of either Oracle or MySQL databases to handle the SDP's data management requirements. With the porting complete, Pyro migrated operators in 24 countries in Africa & Middle East from the Microsoft based InRoam platform to the new Linux platform, running either Oracle or MySQL databases, depending on the operator's specific requirements.

The MySQL Cluster Solution

Pyro had initially used the MySQL Server with replication and failover to provide the back-end data services to InRoam. This solution continues to meet the SLAs (Service Level Agreements) demanded by many of their customers.

A global tournament like the World Cup will generate vast amounts of extra load on communications networks as a result of fans visiting the event. When a subscriber roams onto a new network, a high volume of traffic is generated by the exchanges between the home and visited network including location updates, AAA (Authentication, Authorization and Accounting) functions and billing.

Pyro needed to ensure their database could keep pace with the application demands for performance and availability, while at the same time minimizing Total Cost of Ownership.

After rigorous evaluation, Pyro selected the latest release of MySQL Cluster to power their InRoam SDP for Cell C. "MySQL Cluster 7.1 offered the perfect combination of extreme levels of transaction throughput, low latency and

Pyro and MySQL Cluster Solution Overview

- Pyro InRoam SDP is an intelligent application enabling subscribers to communicate with ease across borders
- Migrated from a Microsoft platform with SQL Server to offer greater choice and less restrictive licensing
- MySQL Cluster selected to power the SDP as a result of high transactional throughput, low latency, carrier-grade availability and low cost
- MySQL Cluster database supports 7 million roaming subscribers per day, performing 1,000 reads or 500 writes per second on up to 1TB of data accessed over SQL and the native NDB C++ API

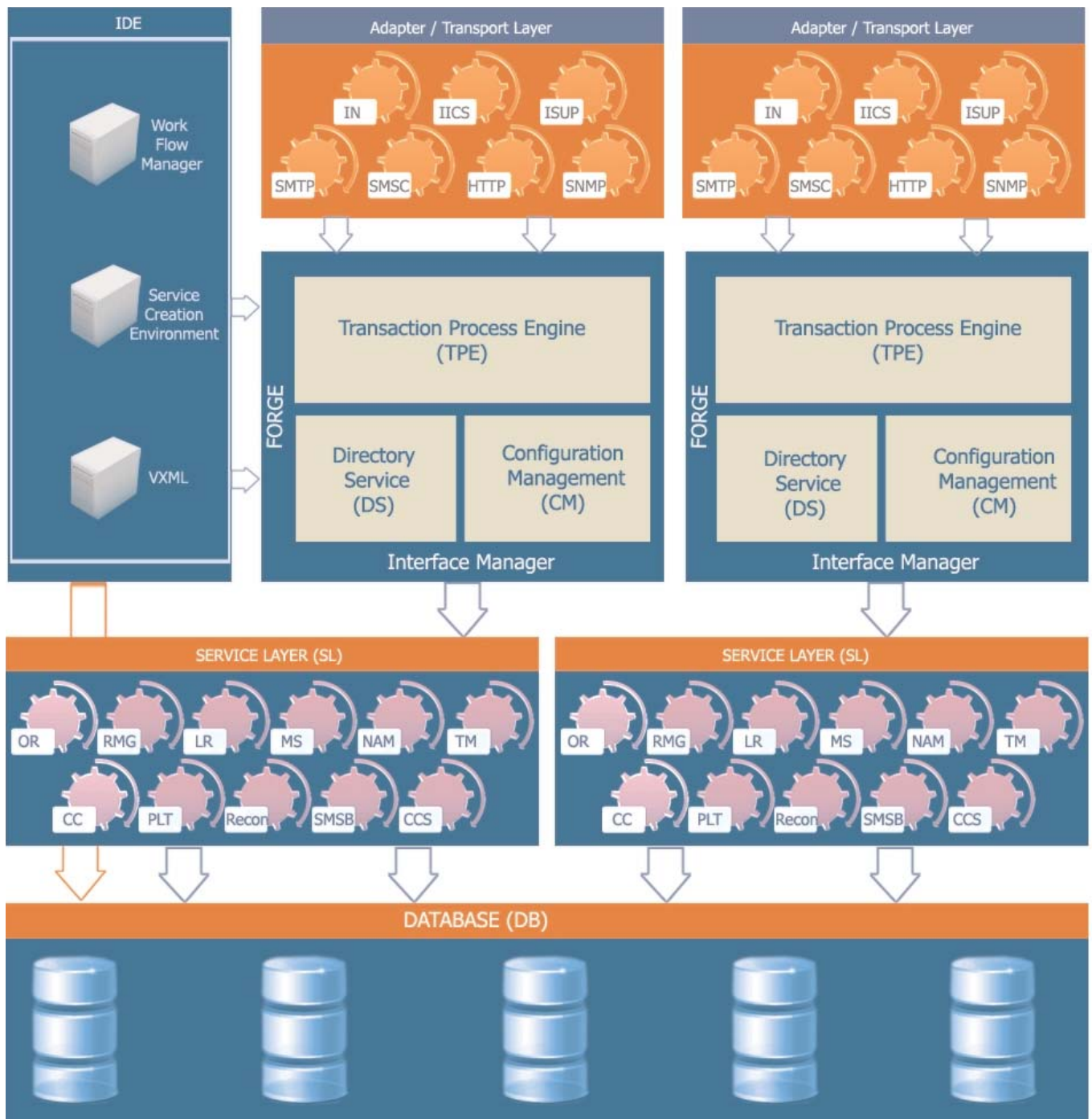
carrier-grade availability. We also reduced TCO by being able to scale out on commodity server blades and eliminate costly shared storage", said Phani Naik, Head of Technology at Pyro.

The MySQL Cluster database supporting the InRoam SDP has been dimensioned to support 7 million roaming subscribers per day, performing 1,000 reads or 500 writes per second on up to 1TB of data accessed over both SQL and the native NDB C++ API embedded as a service call within the application.

Pyro's InRoam SDP deployment typically takes four weeks per customer site. For the Cell C deployment, this phase was successfully completed in just one week.

The Future with MySQL

Pyro continues to develop new technology solutions to service the demands of the telecommunications marketplace, and MySQL is central to their platform strategy due to low cost, ease of use and high reliability. Pyro has a range of new mobile social networking applications, enabling operators to grow ARPU (Average Revenue Per User), reduce churn and grow their subscriber base with new generations of smart phones coupled with smart services.



Products

- Inroam
- Roaming Retention
- Border Roaming Service
- Prefer Roaming
- Optimal Call Routing
- Pyro Collect Call

Adapter / Transport Layer

- Intelligent Network (IN)
- ISUP Signalling (ISUP)
- Simple Network Management Protocol(SNMP)
- Inter Inroam communication server (IICS)
- Simple Mail Transfer Protocol(SMTP)
- ESME Adaptor (SMSC)
- Hypertext Transfer Protocol (HTTP)

Service Layer (SL)

- Optimal Routing (OR)
- Roaming Messaging Gateway (RMG)
- Local Recharge (LR)
- Message Service (MS)
- Network Agreement Manager (NAM)
- Collect Call (CC)
- Payload Transfer (PLT)
- Reconciliation (Recon)
- SMS Billing (SMSB)
- Currency Conversion Service (CCS)
- Transaction Module (TM)

Figure 1: The InRoam SDP from Pyro

MySQL Cluster

The Leading Open Source, High Availability Database for Real-Time, Mission Critical Applications

MySQL Cluster is the industry's only true real-time database that combines the flexibility of a high availability relational database with the low TCO of open source.

Carrier Grade Availability

MySQL Cluster features a "shared-nothing" distributed architecture with no single point of failure to assure 99.999% availability, allowing you to meet your most demanding mission-critical application requirements.

High Throughput and Low Latency

MySQL Cluster's real time design delivers consistent, millisecond response times with the ability to service tens of thousands of transactions per second.

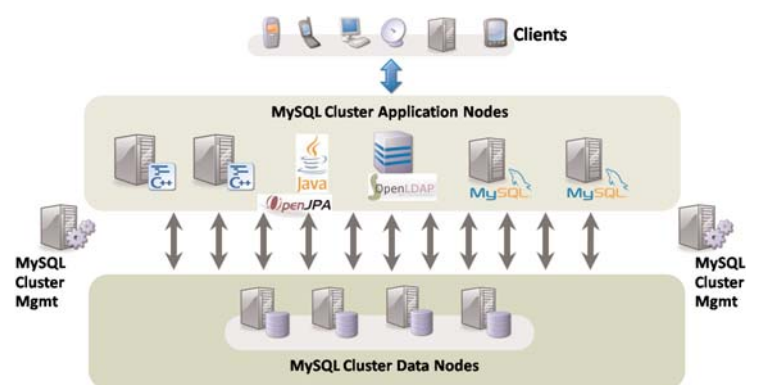
Linear Scalability

Support for disk based data, automatic data partitioning with load balancing and the ability to add nodes to a running cluster with zero downtime allows almost unlimited database scalability to handle the most unpredictable web-based workloads.

The MySQL Cluster architecture has been designed for 99.999% availability and delivers massive read/write scalability

MySQL Cluster Target Applications:

- AAA / RADIUS / Diameter Data Stores
- Application Servers
- Data Store for LDAP Directories
- DNS/DHCP for Broadband
- eCommerce
- Mobile Content Delivery
- Online application stores and portals
- Payment Gateways
- Service Delivery Platforms
- Subscriber Databases
- VoIP, IPTV & Video on Demand
- Web Session Stores



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 Websites, critical business systems, communication networks, and commercial software.

For more information, go to www.mysql.com/cluster

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