Alcatel-Lucent Delivers Next Generation Converged Services with MySQL Cluster Carrier Grade Edition

Technical Environment

Hardware: The XDMS system can be deployed on both ATCA (Advanced Telecommunications Computing Architecture) and RMS (Rack-Mounted Servers)

OS: Red Hat Enterprise Linux 4.0

Database: MySQL Cluster Carrier Grade Edition

"We have successfully implemented MySQL Cluster Carrier Grade Edition for our highly mission critical XDMS application which will enable the next generation of converged services"

François Leygues
Software Architect, Alcatel-Lucent

Alcatel-Lucent Overview

As a leader in fixed, mobile and converged broadband networking, IP technologies, applications and services, Alcatel-Lucent offers end-to-end solutions that enable service providers, enterprises and governments worldwide, to deliver voice, data and video communication services to end-users.

The Business Challenge

Convergence is prompting a major transformation in person to person communications. End-users increasingly demand a more sophisticated communication experience tailored to meet their unique needs, anytime, anywhere, and on any device. The fixed, the mobile telephony and the internet domains are merging, allowing users to access, create, consume and share digital content like never before. IP based multimedia services are now recognized as the future of the mobile communication industry. To survive and thrive in today's hyper-competitive telecommunications marketplace, operators are not only challenging legacy business models offering "triple play" or "quadruple play" services to their customers, but they are also moving towards an IP based services architecture, capable of supporting multimedia and service integration. IMS (IP Multimedia Subsystem) is a major enabler of the move towards IP convergence and furthermore allows operators to cost-effectively introduce new services faster to meet rapidly changing customer's demands.

Key applications of the IP converged world include Voice over IP, Push to Talk, Content sharing, Video sharing, Messaging, and Presence management. Presence management (commonly used on the internet with instant messaging and voice over IP) is not only an application in itself but together with contact management is an enabler and enhancer of other applications such as Push to Talk or online gaming. Alcatel-Lucent's XDMS, at the heart of IMS communication services, is a performant and secure building block that can be re-used across any number of innovative person-to-person or group communication applications. The expense of implementing and maintaining new services that make use of lists of friends or co-workers, e.g. video conferencing, is reduced. End users manage their presence enabled contact information that is stored in a central repository in the operator network. They can access all their data whatever the service or access. Key functionalities such as search function enables the creation of innovative services.

The MySQL Solution

After an extensive evaluation including performance benchmark tests, Alcatel-Lucent selected MySQL Cluster Carrier Grade Edition as their database of choice for their XDMS system.

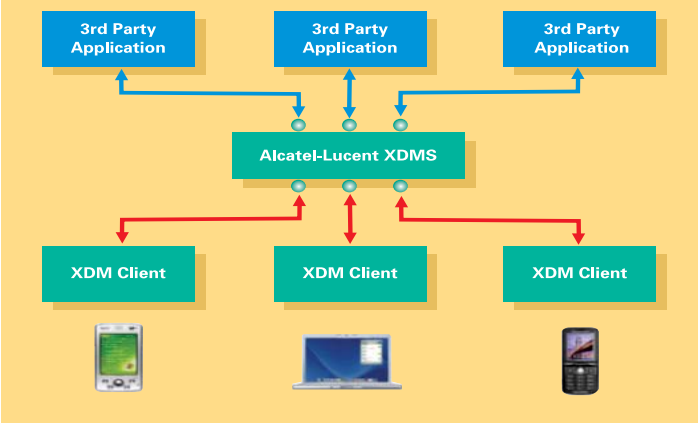
MySQL Cluster Carrier Grade Edition: Flexibility & Low TCO of a Real Time Open Source Relational Database

Information Available Anytime, Anywhere, from any Device

Alcatel-Lucent's objective was to provide its customers with an integrated "out of the box" solution, so that service providers can get up and running quickly, including a database system that would guarantee both high performance and high availability.

François Leygues, Software Architect at Alcatel-Lucent recalls, "Key features of the XDMS system include security, end user authentication, and multiple identity support. The database needs to act as the repository for a single list of contacts that are presence enabled, handle the multiples identities of users in the different systems and synchronize the data from phones, PDAs, or PCs". With the multiplicity of communication services (voice, SMS, MMS, Instant Messaging) and devices (mobile phone, PDA, PC), contact information is dispatched to multiple databases and terminals. Moreover, it often happens that accessing a contact list would allow the use of additional services, but there are unfortunately no connections between the services and the end-user's contact list.

Typically, this is the case when an end user wants to send a SMS or a MMS from the operator's Web site; the contact phone numbers are stored in his phone, but can't be accessed from the Web interface. The XDMS solves this problem by allowing end-users to manage their contact information and group memberships in a unified list stored in the operator's network. Their contact lists, with all the details, can then be accessed from any service, whatever the access point, and whatever the device. In addition, the XDMS checks the availability of the contacts to allow presence management functionalities. Presence information is highly useful data to communicate. Not only does it allow end users to indicate their own willingness to communicate by setting their presence status, it also provides vital information to others so they can use the most appropriate means of communication such as SMS, Instant Message, etc… The system gathers presence information from various sources and provides unified presence information to end users, or applications (such as an on-line gaming). Figure 1 presents an architectural overview of system.



Cost-Effective Scalability and High Availability

Key requirements for the database powering the XDMS system included:

- Extremely fast replication capabilities so that subscriber data is available in real-time across all database nodes
- Low latency of transactions to ensure high performance and scalability
- Ability to scale out incrementally, adding capacity to an initially small system on an as-need basis, scaling out to handle millions of users
- Geographic redundancy ensuring data is consistent and highly available within a data center and across different data centers
- Low Total Cost of Ownership

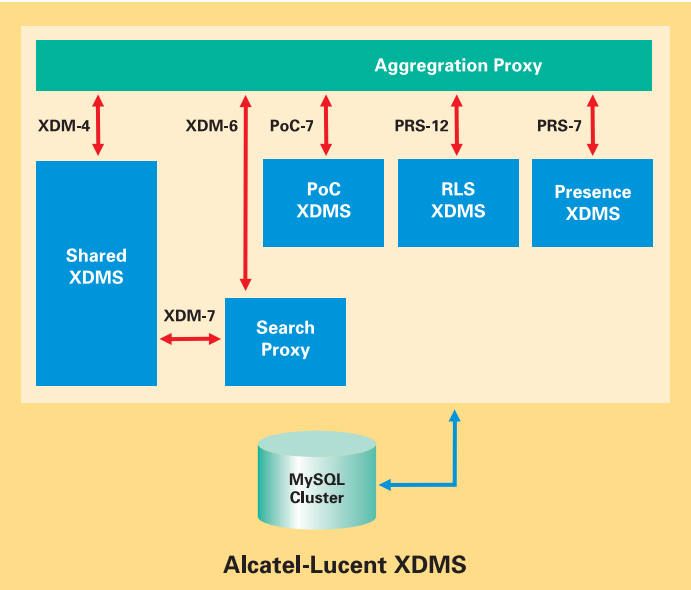
The team evaluated several databases but only MySQL Cluster Carrier Grade Edition could offer the scalability and the high availability required for the system. "We tested MySQL Cluster Carrier Grade Edition extensively and it clearly proved to the best choice for us "declares François Leygues. "Our benchmark tests showed excellent scalability with high volumes of data. Moreover, MySQL Cluster Carrier Grade was already used for Alcatel-Lucent's HLR (Home Location Register) solution which gave us confidence in the product. MySQL Cluster Carrier Grade is product of high quality, extremely robust, and meets our demands in terms of performance and high availability. Plus, MySQL Cluster Carrier Grade Edition is very cost-effective. We evaluated shared-disk clustered databases but the cost would have been at least 10x more."

Architecture

MySQL Cluster Carrier Grade Edition is the database for the Alcatel-Lucent XDMS system, which is at the heart of the new IMS infrastructure.

The XDMS server is an HTTP server using the database (figure 2 describes the architecture of the solution). Users can access it via their devices to create, update, delete and retrieve XML documents. They are used to configure various aspects of the global user profile, including the contact lists, as well as the presence server which enables the dynamic address book, showing the presence status of the contacts. Those XML documents may also configure the preferences of other communication enablers, for example the Push to Talk over Cellular, or the Instant Messaging applications.

MySQL Cluster acts as an XML database accessed by users via XCAP protocol (including XPATH) to select XML elements and attributes. It is designed to support millions of users generating a high level of traffic. Indeed, 50 million users generate up to a thousand transactions per second during peak hours.



Alcatel-Lucent XDMS

MySQL Cluster is configured as follows:

- Local Replication in memory
- Geographically remote cluster continuously kept synchronized and ready to take over in case of failure of the primary cluster
- Native data access via the NDB API for maximum performance

The XDMS system is based on industry standards: IETF/3GPP/OMA specifications as well as SIP and XCAP protocols.

Next Generation of Converged Services

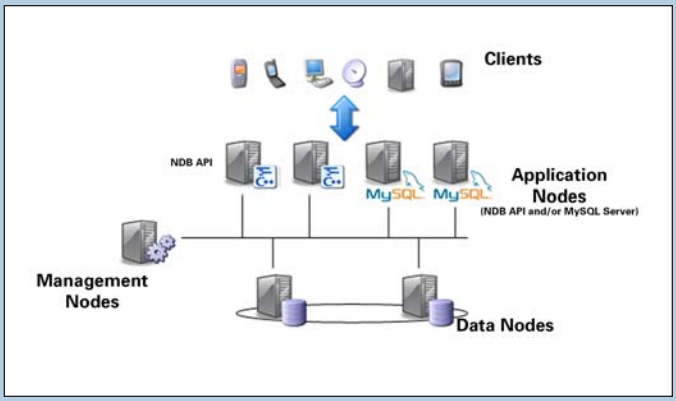
MySQL Cluster Carrier Grade Edition is already powering Alcatel-Lucent's subscriber databases, its mission critical HLR and HSS solutions, and selecting MySQL Cluster Carrier Grade Edition for its XDMS system marks another important milestone in the firm's cooperation with MySQL AB. The XDMS system will be used for new and innovative telephony and TV oriented applications.

"Alcatel-Lucent is committed to convergence" states François Leygues, "we're committed to the convergence of business models and the move towards quadruple play services, but also to the convergence of technologies. Technologies used by IT organizations and telecom companies are now converging, we have successfully implemented MySQL Cluster Carrier Grade Edition for our highly mission critical XDMS application which will enable the next generation of converged services."

MySQL Cluster Carrier Grade Edition

MySQL Cluster Carrier Grade Edition provides the telecom industry with a true real-time database combined with the flexibility of a relational database and the cost savings of open source. It is specifically designed to meet the business and technical challenges currently facing Telecom Equipment Manufacturers (TEM) and Network Service Providers (NSP) with the next-generation of services and applications for converged networks. MySQL Cluster Carrier Grade enables telecom organizations to:

- **Increase Performance** – Satisfies the real-time and low latency requirements or Subscriber-Centric Networks with the best price to performance ratio in the industry
- **Maximize Reliability and Availability** – A parallel server architecture coupled with geographic replication allows for no single point of failure and delivery of 5 nines of availability (99.999%)
- **Promote Interoperability and Flexibility** – Compatible with database-independent APIs or existing subscriber models
- **Lower Total Cost of Ownership (TCO)** – Incrementally scale your applications in a linear fashion on ATCA based, Linux Systems



MySQL Cluster Carrier Grade Edition has a flexible distributed architecture which gives you complete control over the level of performance, reliability and scalability you need to match your application requirements.

About MySQL

MySQL AB develops and supports the MySQL database server, the world's most popular open source database. Over 11 million installations use MySQL to power high-volume Web sites and other critical business systems — including industry-leaders like The Associated Press, Yahoo, NASA, Sabre Holdings and Suzuki.

MySQL is an attractive alternative to higher-cost, more complex database technology. Its award-winning speed, scalability and reliability make it the right choice for corporate IT departments, Web developers and packaged software vendors. For more information about MySQL, please go to **www.mysql.com/enterprise**

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