



## Multimedia Streaming Solutions for Mobile Phone Clients

### ■ Client: Hewlett-Packard

HP focuses on simplifying technology experiences for all of its customers from individual consumers to the largest businesses. With a portfolio that spans printing, personal computing, software, services and IT infrastructure, HP is among the world's largest IT companies, with revenue totaling \$107.7 billion for the four fiscal quarters ended Jan. 31, 2008. More information about HP (NYSE: HPQ) is available at [www.hp.com](http://www.hp.com)

### ■ Project overview: defining lifestyles

As the world of personal telecommunications becomes increasingly sophisticated, and its users are become driven more and more by technology, as well as peer group pressure, the mobile phone defines modern lifestyles as much as it enables them.

Users are constantly on the look-out for the next big thing; for telecommunications operators, competitive differentiation comes about through making it available before anybody else does.

Working on behalf of a worldwide telecommunications operator, Hewlett-Packard aimed to implement a multi-system solution to deliver multimedia streams to the operator's 3G mobile phone clients. The streaming platform comprised both pre-existing applications ('legacy systems') and newly developed systems.

Speed and adaptability are the fundamental cornerstones of success in global technology innovation. Clients require high-tech solutions at a competitive price. In the telecommunications sector specifically, streaming technology offers significant potential for delivering new consumer services; it allows multimedia content, such as personalised audio and video or interactive TV, to be delivered to the user as a continuous real-time flow with minimal delay.

## ■ Project description: no single point of failure

The overall project goal was to deliver the software solution for the multimedia streaming platform.

As a nearshore solution provider, iQuest was commissioned to investigate, develop and test the new streaming platform and to create the integration interface with existing customer systems. The legacy systems were the source of one of the key challenges.

Legacy systems come with a pre-prescribed usage, already established in the normal operations of the customer. They are not regularly replaced with newly developed applications, mainly for cost reasons.

Additional challenges lay in the requirements for robust system performance, scalability, availability and security. The system itself gave a particular 'edge' to the project challenge; with a requirement that it has to be available 99.98% of the operating time for customer requests. System response time must not exceed 500 milliseconds from client request to first data packet sent in response. The solution must be scalable horizontally. There cannot be any single point of failure.

Specific security constraints included:

- The solution had to work on a hardened RedHat Enterprise Server OS.
- Access was protected by firewalls (including firewalls amongst some system components).
- No password or personal information could be transmitted and stored.

Time to production: 800 person-days project delivered in 10 weeks.

## ■ Challenges and Solutions

Challenge	Solution
Integrate with existing legacy systems for age verification, charging, monitoring.	Java backend to obtain information from the streaming servers and send to customer legacy systems using web services.
Communication between Linux native applications (streaming server and proxy) and a Java 2EE application (backend).	Custom messages sent over sockets and a J2EE JCA Connector on the Java backend side.
How to handle multi-language content (Native in Java, but not in the Streaming Component)	Unicode usage for all text in the messages applied for inter-system communication.
Find out events and streaming statistics from the streaming server, without interfering with its internals (obtain the information from the server logs).	Use a Java log consumer, extract the required information and send it as message to the backend for processing and later usage.
Integrate the streaming server with the backend without interference into the streaming server internals.	Create a native streaming proxy application to be in the middle of client/server/backend communication path.
Provide a highly-scalable and high-performance streaming proxy.	Implemented the streaming proxy in C++ using modern parallel processing techniques (20 client sessions handled by existing open source solutions, 800 handled by the developed solution).

### ■ System description:

There are two main parts of the system: the Frontend and the Backend. The Frontend is responsible for streaming to mobile clients, while the Backend is responsible for controlling, reporting and administration.

The Frontend contains the streaming server (C++), the streaming proxy (C++) and the log consumer (Java).

The Backend contains the core business and control logic (J2EE/Spring) which communicates with the legacy systems, the administration server (Java web) and the statistics server (Java web).

### ■ Results: into the future

The users benefit from streaming by experiencing instant delivery of medium, without the frustration of having to wait for the entire data to be downloaded before being able to determine whether it meets their needs or interests. In most cases, this download process took a long time, and was impractical for widespread acceptance.

Java provides many libraries and APIs that allow collaboration with legacy systems without development effort or cost. Implementing security, scalability and availability does not require a full-weight J2EE implementation, since lightweight frameworks (i.e. Spring) are sufficient. As a result, most project effort can be expended on implementing the business logic and functionality, not support code and framework code.

Through a continuous integration process, the development team delivered high-quality code. In parallel, each development delivery was integrated in the Testing Lab. This enabled early feedback from the client, a high degree of transparency of the project status and results, and excellent quality level at the project end.

At the end of the 10-week project, having involved teams from two locations in Romania and one in Germany, all customer requirements were met, the project was delivered on time and in budget, and an excellent quality level was achieved. iQuest has implemented the software solution in close cooperation with HP. HP, as prime contractor of the project and iQuest's customer, has decided to continue the partnership with iQuest on larger projects into the future.

### About iQuest

Headquartered in Germany and having two development centres in Romania, iQuest is an IT solution provider delivering customised solutions in financial services, telecommunications, life sciences, logistics, media and IT. With over 12 years of experience and more than 320 employees in its 7 European locations, iQuest delivers best-in-class services for long-term clients in Germany, the United Kingdom, Switzerland and Sweden.