

## Case Study

# Agile Development of a Digital Vending Machine from concept - to - market



### ➤ THE CUSTOMER

A start-up company that was looking to provide easy digital content access to millions of consumers in India through a network of Digital Vending Machines (DVMs) or kiosks. Their vision was to become a consumer brand in the digital content landscape by delivering all forms of digital content and services at a low cost, through multiple retail networks such as music cafes / lounges, staffed express delivery counters, self-service kiosks and music vending machines.

### ➤ THEIR NEED

The customer wanted to outsource the entire kiosk software development – server and client – while they focused on content acquisition and preparation. Through their digital vending machines, they wanted to provide instantaneous downloads of good quality digital content to any make and media device of a consumer's choice. They had legal licensing arrangements with over 200 music companies in India to access content in various Indian languages.

The customer had defined a clear scope for Version 1.0 of the product and had a fixed budget and firm release date. They wanted to follow an iterative process to allow for changes in the product features based on the market needs and to be able to quickly adapt to those needs.

### ➤ OUR DEED

Aspire took full ownership and developed the product from scratch allowing users to browse, preview, purchase and download digital content via the DVM interface (typically a touchscreen on a PC) to a device of their choice. The product's UI was configured for different locales in India and supported 5 different languages at the initial launch. Also, Digital Rights Management was implemented in the product.

Aspire adopted an iterative approach for product development with several small releases, continuous integration and very close interaction with the customer. The entire kiosk development, from concept to launch, was completed on time (in exactly 4 months) and within budget.

### ➤ TOOLS & TECHNOLOGIES USED

**Languages** : Java, C++, Python  
**Frameworks** : Swing, Spring, Hibernate, Libmtp, HAL  
**Middleware** : Tomcat 5.x  
**Databases** : MySQL  
**OS** : Ubuntu Linux Server  
**Design Tools** : MS Visio  
**IDE** : Eclipse

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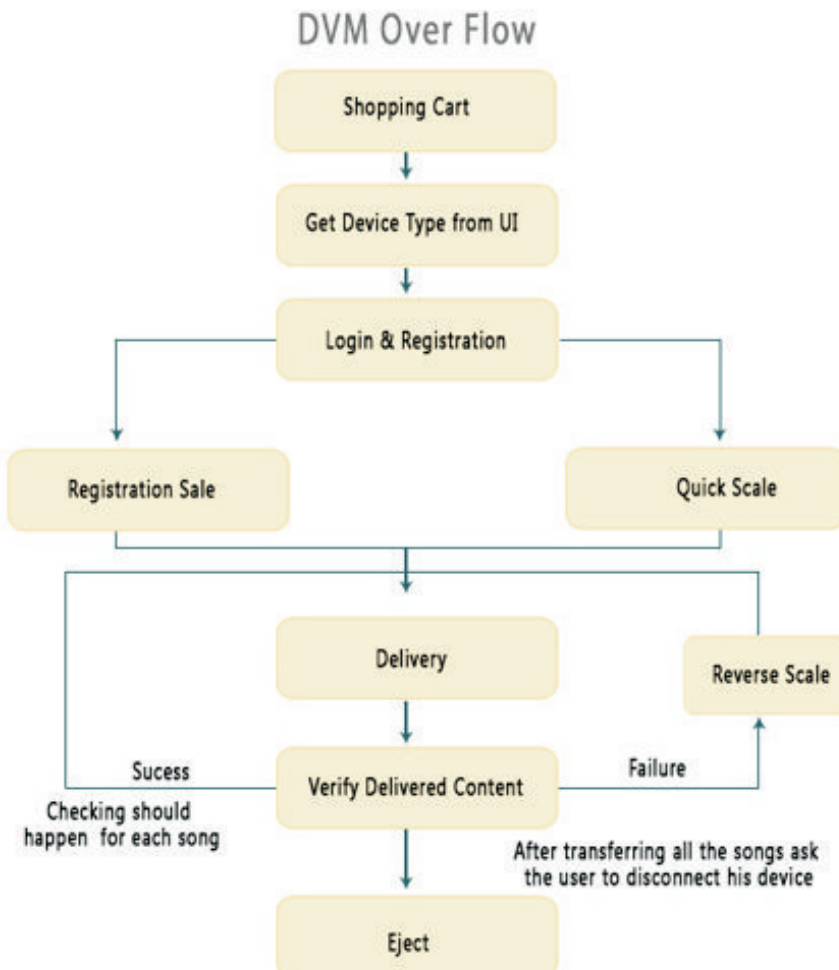
## Digital Vending Machine

The customer conceptualized a DVM that would enable consumers to buy good quality, legally licensed digital music instantaneously from a neighborhood music or mobile shop at a low cost. DVM counters could be associated with a vendor to help first-time users register and buy/download songs. Alternately, unmanned/self-service kiosks allow existing users to login, browse and download music by themselves and pay for it through an associated credit facility.

Music at a DVM could be browsed by genre, language, artist, title and so on. While the content itself (songs) was available in various languages like Tamil, Telugu, Kannada, Malayalam etc., the content metadata (where the metainfo represents different categories, artists, albums and so on) was also available in the different languages that were supported, making it search and user-friendly.

Music (songs) could be delivered to any make and device of the consumer's choice that was supported by the DVM. Supported devices include mp3 players, CD or DVD drives, memory chips or sticks and most mobile devices. The device needs to be plugged into the DVM and for first-time users, registered, before proceeding.

*The product's UI was configured for different locales in India and supported 5 different languages at the initial launch. Digital Rights Management was implemented in the DVM so that DRM locked songs could be transferred only to DRM-enabled mobile phones.*



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## Iterative development process

### Some of the salient features of the process followed were:

- ✍ The team didn't know beyond the next iteration as to the features that would be included in the next development iterations.
- ✍ The team did have a clear product vision, and a general idea about what features were needed in the product.
- ✍ There was active involvement from the product marketing organization of our customer.
- ✍ Team had knowledge on absolute time deadline and resource constraints.
- ✍ Team had an overall product platform architecture.
- ✍ Within the above, team delivered tested features every two weeks and then adapted their plans to the reality of actual product testing.

The team's process was one of evolution and adaptation, not planning and optimization. In the end, product was delivered on time, met high quality standards, and has been a success in the marketplace. The team didn't start with anticipated architectures and plans but with a vision followed shortly by the first iteration of the product. The rest evolved as the team adapted to the reality of the market and the technology.

## End-to-end development

While the customer had a team to do the data-intensive parts of the product such as categorizing and labeling all songs, artists, albums and categories, Aspire performed the entire development process, right from technology selection and product design to development, testing and UI design.

The DVM software runs on a standard PC with a customized touch screen which Aspire developed.

Windows OS was deployed for development purposes and Linux Ubuntu Server for the production and test environments. Swing based GUI and Web based GUI were used for client and server modules respectively.

Certain music distributors have a requirement that their songs can only be distributed to DRM (Digital Rights Management) enabled devices. DRM-locked songs are typically cheaper than those which are not, but they typically have limitations in terms of how many times one can listen to them and they cannot be freely shared. The files that need to be DRM-enabled were wrapped into another format by Aspire team so that only when DRM enabled devices try to access it, it would respond and allow data transfer, else it would prevent copying or transferring such songs.

Aspire also built the product keeping in mind that it would cater to various people across different language zones and developed virtual keyboards for the supported local languages. Also, a utility to update meta-info online was built to immediately update any new songs or content that was added.

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Aspire was also closely involved in the back-end system integration where transactions and admin data are displayed. If needed, vendors involved in DVM music sales could also have data specific to their sales displayed at their end.

In every DVM, all available music files (or any content) are stored on the existing file system of the PC (in the hardware) but in encrypted format. When there is a download request for the file (song/album) and the payment is confirmed, the system verifies the transaction details with the customer's back end system through a web server, which then sends an authentication key to the vending machine to release the file(s).

## Key Benefits

Aspire helped the customer build this new innovative product from concept to market within budget and a fixed timeline. By adopting an agile, iterative process, feedback from alpha and beta customers could be taken into consideration and worked on right away.

The customer is now in a position to lead the digital music market by scale and may consider foraying into selling videos, movies and games through the same DVM model.

## ABOUT ASPIRE SYSTEMS

Aspire Systems is an Outsourced Product Development firm committed to helping our customers build software products better and faster. We work with some of the world's most innovative Independent Software Vendors and software-enabled businesses, ranging from start-ups to established industry leaders, transforming the way software is built.

Aspire provides complete product lifecycle services, ranging from new product development and product advancement to product migration, re-engineering, sustenance and support. Our product development teams are spread between our Global Innovation Center in Chennai, India and offices in the United States.

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