

Industry
Office Products
Wholesaling

Technology
JSP
JSF
Facelets
JavaScript
HTML

QuipuKit (beta)
Spring
Hibernate
PostgreSQL
Quartz/JAAS/JAI
Java (JDK 1.5)
Swing
Apache Axis
Codehaus xFire
JExplorer

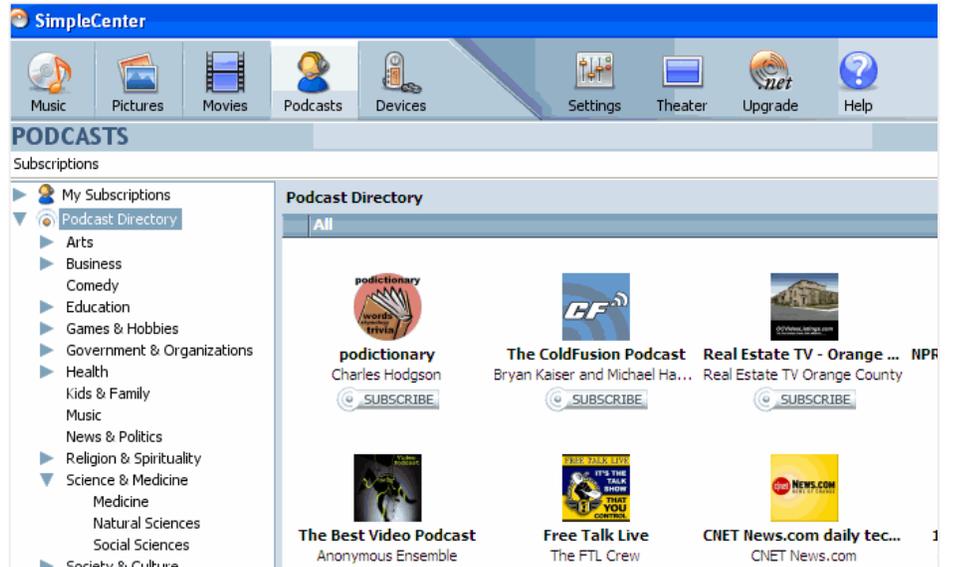
URL
www.uei.com

Country
United States

Project Size
2 developers,
3 months

Podcast Directory Delivers Added Value to SimpleCenter and Enhances Multi-Media Experience of Its Users Case Study

Universal Electronics Inc. is a wireless control technology leader that delivers innovative solutions to bring entertainment devices, digital media, and home systems under user control. The company's portfolio of patented technologies and database of infrared control software has been adopted by many Fortune 500 companies in the consumer electronics, subscription broadcast, and computing industries.



Challenge

Problem Description

For version 4.1 of SimpleCenter, a Java-based multimedia management application for a Windows PC, Universal Electronics faced the challenge of designing and developing an integrated community-created directory of podcasts.

As a way of distributing digital media files via RSS feeds, podcasting was gaining in popularity among Internet users, both content publishers and consumers. SimpleCenter 4.0, released in June 2006 provided podcasting functionality which, like many media aggregators out there, allowed users to subscribe to podcasts, playback and synchronize downloaded files with many popular digital media devices. There was one limitation: before having podcasts added to SimpleCenter, users had to look elsewhere for them, using external podcast directories.

To provide an all-in-one podcast management solution, Universal Electronics intended to extend the existing functionality with an integrated podcast directory that would allow users to browse through a categorized list of podcasts as well as search and submit them to make available to all SimpleCenter users. Selecting each new category would cause the directory to dynamically load all available podcasts, displaying them in order of popularity for added convenience.

Implementation of the podcast directory required other things to consider. With anyone being able to submit a podcast, leaving it “as is” in the directory would pose a risk of exposing poorly authored content to public. To

eliminate it, before being included in the public directory, all podcasts were to go through a review process by dedicated users that would remove all unsuitable contributions and approve good ones via a provided interface.

Apart from the content, there may be errors in the podcast feed RSS. In particular, a podcaster may place a podcast into an incorrect or non-existent category. Therefore, a mechanism to manage podcast categories was to be provided. Additionally, considering that some podcasts may become unavailable over time, their availability state was to be maintained up-to-date.

These and other tasks related to the administration and configuration of the podcast directory were to be performed via a Web-based administration console, access to which was to be restricted to authenticated users having appropriate permissions. This required implementation of role-based authorization into the existing SimpleCenter access control system.

Finally, given that the number of users contributing to the podcast directory would grow rapidly over time, ensuring high performance and scalability for the solution was highly critical.

Background

Having little expertise in Web development, Universal Electronics was seeking a reliable custom software development company to outsource the SimpleCenter Podcast Directory project to. The dilemma of choosing the right company was resolved very shortly.

Before acquired by Universal Electronics in October 2004, SimpleDevices Inc., the original developer of SimpleCenter, had extensively used various Java integration tools from TeamDev Ltd. for SimpleCenter 3.x (these included JNIWrapper, ComfyJ, JExplorer, and WinPack.) Later, SimpleDevices engaged TeamDev in small-sized integration projects that were to make part of SimpleCenter, gradually extending the scope of tasks to general Java programming. Knowing of TeamDev's previous experience in Web application and Web service development and considering the established relationships between the two companies, Universal Electronics included TeamDev in the list of candidates to contract out the SimpleCenter Podcast Directory project. After considering the proposals received from bidding companies, Universal Electronics decided to entrust the SimpleCenter Podcast Directory to TeamDev as its proposal clearly captured all the project requirements.

The SimpleCenter Podcast Directory was supposed to consist of two Web applications: one is a client application integrated into SimpleCenter, and the other — an administration console accessible to dedicated users. After an extensive analysis of existing Web development technologies, TeamDev came up with two options: pure JavaServer Pages (JSP) and JavaServer Faces (JSF).

The rationale for choosing JSF was affected by several facts. By the time of the Podcast Directory project start, TeamDev had extensive hands-on experience with JSF by having exploited it in several custom and own software

Background (continued)

solutions. Furthermore, at that time, TeamDev was developing its own library of advanced JSF components, with rich customization options, AJAX support and client-side input validation. Combining standard JSF benefits (such as a set of basic components, state management, event handling) with the capabilities of the in-house components would enable TeamDev to create a rich and dynamic Web UI for the Podcast Directory cost-effectively and with minimum effort.

Solution

Client Application

The Podcast Directory client application is a Web-based catalog of podcasts integrated into the SimpleCenter media management system. It provides a convenient way for users to browse through, search and subscribe to podcasts in one place through a simple and dynamically built UI. All podcasts in the directory are organized in categories and subcategories, making it easier for users to find things that might interest them. When browsing by category or searching by podcast details, a user can see all available podcasts, easily identifiable artworks with the most popular ones brought to the forefront. The popularity rank in the Podcast Directory is calculated based on the number of subscriptions to a podcast.

Administration Console

The Podcast Directory administration console is an access-protected Web application that incorporates several components: an administration interface for configuring the directory settings, a review interface for checking/validating the Podcast Directory contents, and a directory browser for managing the directory categories,—all designed with simplicity in mind. Access to each of the application interfaces requires a user to log on using appropriate credentials.

All podcasts submitted by users are placed in a queue for review by dedicated users that can accept or reject a podcast, or skip its review for a later date. The system allows multiple reviewers to simultaneously review podcasts. If a podcast complies with the directory standards, it is included in the public directory; though irrespective of its current state, any podcast can be revisited: a reviewer just need to enter its URL. To avoid inconsistency in the directory structure, the hierarchy of categories in the Podcast Directory is built independently of the ones defined originally in podcasts and is additionally monitored by the administrator who can add new categories, edit their titles and descriptions.

Back-end

The tasks related to podcast workflow, automated podcast updates, and podcast thumbnail generation are managed by the Podcast Directory back-end. Each podcast in the directory goes through a sequence of changes in its two states: review state and availability state. When submitted, a podcast starts in the submitted review state and temporarily unavailable state. During availability checks, if the podcast URL is accessible, the podcast state changes from temporarily unavailable to available. Or if a podcast stays in the temporarily unavailable state for longer than specified in the directory settings, it gets permanently unavailable. Only podcasts in the submitted and available states are accessible to reviewers, who can change the review state to rejected or accepted. Accepted podcasts appear in the Podcast Directory. To keep podcast availability state and podcast details up-to-date, the updating process in the Podcast Directory runs constantly over all available or temporarily unavailable podcasts, at the interval specified in the directory settings.

Downloading a podcast image from its original location every time a podcast is requested by a user would be resource-intensive. Instead, the Podcast Directory processes all podcast images into thumbnails of predefined size and format, and stores them on the local server for quick retrieval.

Technical Implementation

Architecturally, the Podcast Directory consists of one full-featured J2EE Web application providing Podcast Directory back-end logic, administration console, and Web services that are used by two client applications—a Web application displaying podcasts and a SimpleCenter Java client providing a hierarchical set of podcast categories and handling requests for podcast subscriptions and submissions.

Both client applications were integrated with each other inside SimpleCenter. The current trend of implementing parts of a desktop application's UI as embedded Web applications provides flexibility in upgrading the software without affecting the major desktop functionality. Seamless integration of the Web-based application into the Java Swing UI was achieved using JExplorer, a proven in-house solution that allows integrating Internet Explorer into Java applications.

To provide external access to the Podcast Directory, a public API was implemented as a Java Web service using Apache Axis framework's SOAP engine. The use of SOAP along with appropriate WSDL descriptors permits any client application, whether in Java or not, to access the directory. During implementation of the Web services, TeamDev had to switch from an originally chosen Apache Axis to Codehaus xFire, a just-released new Java SOAP framework. Transition to Codehaus xFire did not take too long and actually shortened the Web service development, even considering the

Technical Implementation (continued)

time the team spent on mastering the framework. The results of using Co-dehaus xFire were better performance and simplified integration with the Spring application framework.

Access to the Podcast Directory's administration and review interfaces is secured by authentication and role-based authorization provided by Sun's Java Authentication and Authorization Service (JAAS), which was built into the existing access control system underlying SimpleCenter.

For performing scheduled services, such as podcast availability checks, Quartz scheduling system was used. Java Advanced Imaging (JAI) library from Sun Microsystems was chosen to generate high-quality thumbnails from podcast images stored on the server.

One of the major technical challenges was to provide a required system response time for browsing and searching activities. While using the Hibernate persistence framework within a Java-enabled Podcast Directory was an efficient solution, the system performance was optimized by additionally configuring the PostgreSQL database.

Compared to all other parts of the Podcast Directory, implementation of the presentation layer took about 10% of the overall development time. To build the Web UI both for the Podcast Directory client application and the administration console, TeamDev used Apache MyFaces, an open source JavaServer Faces implementation, along with the in-house JSF components (later released under the name of QuipuKit). Designed in a straightforward and simple way, the UI fits perfectly into SimpleCenter's look-and-feel and due to the use of Ajax-enabled components, provides users with smooth experience in podcast management.

On the whole, the use of open source and license-free technologies as well as TeamDev's own products, in particular QuipuKit, drastically shortened the Podcast Directory development time and cut down the costs associated with the project implementation.

Challenges

- Develop and design integrated podcast directory with dynamic Web UI.
- Develop and design Web-based administration console.
- Implement role-based authorization for administration console.
- Provide optimized performance and scalability.

Results

- Reduced development time and costs associated with the solution.
- Tight integration of podcast directory with SimpleCenter environment.
- 99% availability of podcast directory.
- Secure access to administration console.

Current Situation

Since the release of version 4.1, the popularity and competitiveness of SimpleCenter has increased among its consumers. The introduction of the Podcast Directory tied together all podcast management activities in SimpleCenter, making user experience more simplified and enjoyable.

Having all podcasts categorized, the Podcast Directory lets SimpleCenter users quickly discover things that interest them and with simple organization and display of podcasts by popularity users can decide which podcasts to subscribe to. Or if those are unavailable, contribute to the public directory).

And with traditional SimpleCenter's support for multiple media devices, the users can literally enjoy podcast playback experience anytime and anywhere.

Control over the structure and contents of the Podcast Directory is performed by dedicated users via the administration console, where through ease-to-use role-based interfaces, they can review podcasts, manage the category hierarchy, and customize the directory settings.

After SimpleCenter 4.1 release, TeamDev continued to participate in its development and continues up to the present moment.

Client's Feedback

"...Let me congratulate you. I am really impressed ... Thanks so much. This looks really good."

—Jonathan Nichols, then-Director of Desktop Product Development, Universal Electronics. July 07, 2006

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