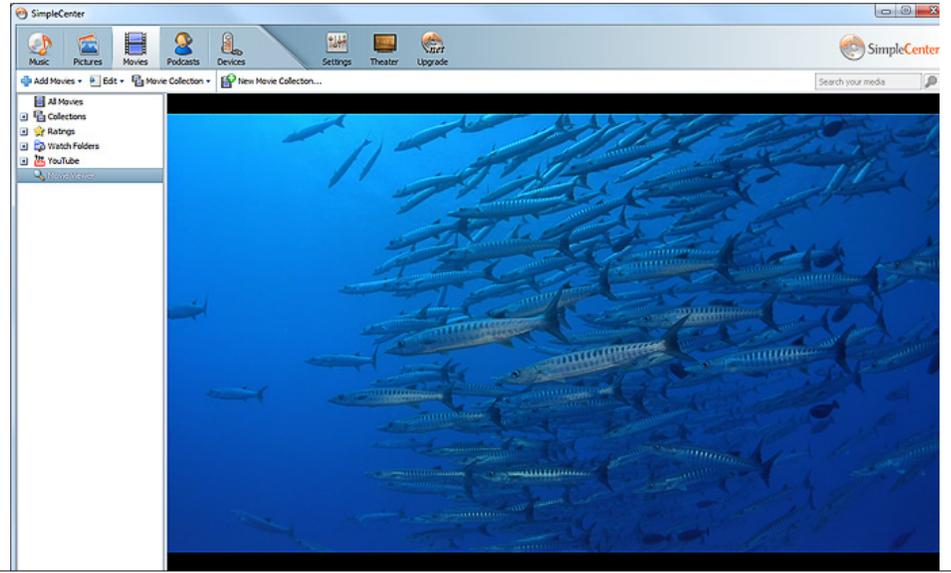


Industry  
Software  
Tools & Technology  
ComfyJ



## Summary

Universal Electronics Inc. (UEI) is the global leader in wireless control technology for the connected home. UEI designs, develops, and delivers innovative solutions that enable consumers to control entertainment devices, digital media, and home systems. The company's broad portfolio of patented technologies and database of infrared control software have been adopted by many Fortune 500 companies in the consumer electronics, subscription broadcast, and computing industries.

## Challenge

As the variety of multi-media devices and digital media players continues to grow, consumers are demanding ubiquitous access to their media, forcing electronics and media player manufacturers to tackle the problem of supporting multiple formats to enable transfer of digital content from one medium to another.

SimpleCenter—a digital media player application developed by Universal Electronics—required transcoding functionality, i.e. conversion of data from one format to another for transmission and playback on a target device. To seamlessly transcode audio and video content to each specific device, SimpleCenter required support for multiple codecs. To provide it, each of the required codecs needed to be implemented as COM objects by using the Microsoft COM-based DirectShow API.

However, taking into account that SimpleCenter is a Java-based application, it required an intermediate COM layer in order to communicate with DirectShow components. To integrate SimpleCenter with native components and native API, there were two options: to write a piece of software from scratch using JNI programming or to use a ready-for-operation solution that would enable the integration without the need to write native code.

## Solution

As we already successfully accomplished some projects for them at that moment, Universal Electronics decided to involve us in this project as consultants. We offered them Comfy, our in-house bi-directional bridge technology specifically designed to embed any COM/OLE/OCX/ActiveX objects into Java-based applications and to implement and expose Java objects as COM objects, all in the Java language.

To support needed formats, the codecs (encoders and decoders) were to be implemented as DirectShow filters. Each filter, representing a distinct step in processing media data, was to be implemented as a COM object, registered in the Windows Registry, and connected with other filters to build a filter graph for video/audio playback in a certain format. By using ComfyJ, TeamDev extended DirectShow to support a required set of third-party audio and video codecs.

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## Results

Synchronization of media content with various multi-media devices is no longer an issue for SimpleCenter as its users can easily transfer their music and movies to iPod, PlayStation Portable, Nokia N series phones and other devices.

In addition to providing transcoding across many devices, TeamDev created a video player based on the technology developed for parsing and decoding media data in SimpleCenter. The new video player supports all the standard playback functions and is compatible with many common video formats, including WMV, DivX, MPEG-2, MPEG-4.

In general, integration of SimpleCenter with DirectShow via ComfyJ resulted in low-level control over processing of the media content, simplifying its management and customization and making it future-proof against evolving standards and codecs.

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## Contact Information

TeamDev Ltd.

47 Nauky Ave.  
Kharkiv 61103,  
Ukraine

+1 425 223-3079

+380 57 766-4330

FAX +380 57 766-4343

[sales@teamdev.com](mailto:sales@teamdev.com)

[www.teamdev.com](http://www.teamdev.com)