



Multimedia and TV Center STB application development

■ Client:

Our client was a German technology company which develops integrated home entertainment solutions.

■ Project description: goals and functionalities

iQuest was commissioned to develop a Multimedia and TV Center running on a SetTopBox developed by a German partner company. The development effort included full project lifecycle including but not limited to requirements elicitation, analysis and design, implementation, and testing.

The new application had to be robust and fast, simple to develop and maintain and simple to use. It had to work on embedded devices running Windows XP Embedded and to be able to adopt fast new and changing hardware.

These general constraints had to be resolved while supporting a rich set of features that were intended to transform the SBT in a real home and TV media center:

- DVB TV Channel playback and management for both High Definition and Standard Definition
- FM and Internet Radio
- Full Media Management and Playback (DVD, S-VCD, DIVX, XVID, Pictures, MP3....)

The full set of features was developed by iQuest. This effort included design, implementation and testing of a XP Embedded multimedia application for DVB TV handling, recording and EPG integration, video (DVD, VCD, SVCD and stored on hard disk), music (CD/locally stored) and photo slideshows.

■ The Solution

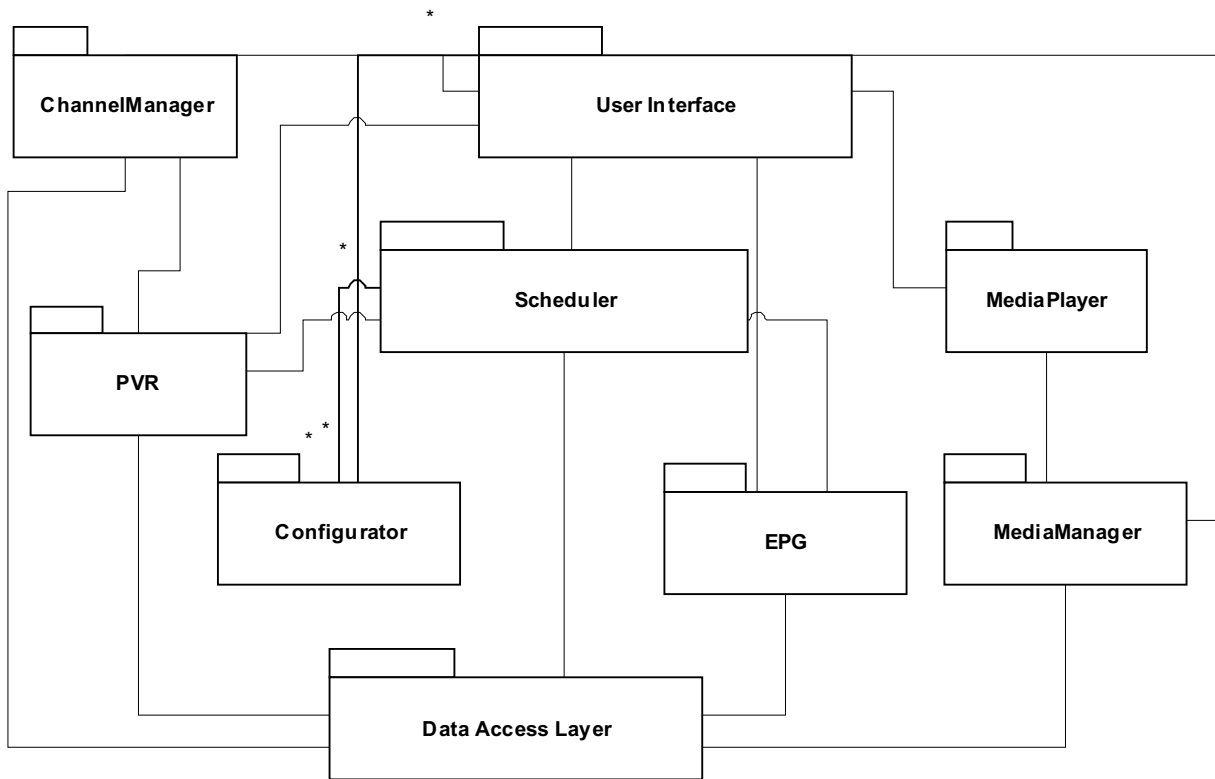
The iQuest team developed the main desktop application, integrating low-level components; TV card driver, PVR library, music/video playback component, skinned custom controls as well as the user interface library needed to fulfill the specific skinning requirements. In addition, iQuest undertook the requirements gathering phase, configuration and change management, including the supporting infrastructure, requirements management, architecture, class-design, testing and associated project management, as well.

The resulting application is offering a plethora of functionalities wrapped in a fast, attractive and intuitive user interface.

■ The Solution: development approach

- Process
 - Risk driven process
 - Looked very close to identify the risks (at least the technical ones)
 - Addressed the higher risks first; this usually solved some of the lower ones.
 - Iterative process
 - Small controllable milestones
 - On-site presence was encouraged in order to obtain agility.
- Development best practices
 - Used fast and established OO design mechanisms (avoided over-engineering)
 - Got back “to the metal”: Used C++ for developing fast lower layer components and used C# (.NET 3.5 with Windows Presentation Foundation) to develop the user interface
 - Used a free, robust and very light database system (MS SQL Compact Edition 3.5), avoid using unnecessary overheads
 - Had clear interfaces between modules, and kept the modules simple and testable
 - Had tests and testing applications for core components (like PVR, EPG or Scheduler)
 - Introduced robust error handling
 - Separated the components development cycles
- The Team
 - Established clear member responsibilities
 - Established communication protocols and check points
 - Continuously explained the path to the team to ensure the team’s full commitment
- Architecture
 - Developed a new system architecture based on simple principles
 - The developed architecture had to:
 - Be optimized for performance
 - Optimized for testing: offer low coupling and testability
 - Be based on clear interfaces
- Proven Technologies (optimized for performance and robustness)
 - .NET 3.0 and 3.5 for the UI and high level tasks
 - C++, ATL, COM for the performance critical, computation intensive tasks (the PVR components like DirectShow Filters and various decoders)
 - WPF, XAML, DirectShow, DirectX, VMR, EVR

■ The Solution:system components



The componentised architecture allowed for a clear and scalable architecture. Implementing it allowed us to accommodate some uncommon STB functionalities like:

- Home network playback, playback from easy to map shared network devices
- On-line software update with guaranteed system consistency preservation in case of infrastructure failure
- Easy extendibility with new functionalities
- Possibility to accommodate new HW components: TV tuners and Video cards
- Interface with various third party service providers (for Internet radio stations, CDDB and EPG providers)

■ The Solution: PVR

The PVR was designed to work. The solution was fast and robust; we use only native DirectShow components and market proven decoders. Besides robustness, the development costs were amazingly low compared to other PV projects.

