

SOFTWARE INTEGRATION FOR APPLICATIONS WITH AUDIO/VIDEO STREAM

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ABSTRACT. *Developing a software system through integrating existing applications becomes mature and practical. There is already a huge number of multimedia applications today. However, few studies focus on integrating stream-based multimedia applications into a software system. This paper therefore aims to integrate software for applications with multimedia audio/video streams through a wrapper technique. In wrapping multimedia applications, a virtual device approach is used to intercept/redirect the audio/video streams. The wrapper modules are designed for audio and video applications based on two media device interfaces, ALSA and V4L in Linux, respectively. The DMA synchronization between multimedia applications is a critical issue. To demonstrate the feasibility of the proposed approach, a voice control information system for high speed rail was developed by integrating two audio media applications: Skype and Sphinx.*

Keywords: Software integration, Audio/video stream, Wrapper technique, DMA synchronization

1. **Introduction.** Nowadays, component-based software development is already an established approach for developing a large software system [1]. Component-Based Software Engineering (CBSE) is mainly concerned with assembling existing software components into a larger piece of software [2-4]. The important intentions of using component-based development are reducing time to market and improving software quality [5]. Recently, studies [6-10] increasingly proposed approaches to build software systems from Commercial Off-The-Shelf (COTS) software because COTS products are well-tested by customers, thus giving higher correctness. Therefore, COTS software could be encapsulated as components for rapidly providing more reliable building blocks of software systems.

COTS software is usually considered as a black-box, in which the inner software structures and logics are seldom-available. To encapsulate this kind of software into components, the wrapping approach [11] would be a suitable solution. To wrap a software application, a new interface for the application needs to be implemented for passing inputs to the encapsulated application and returning the computing outputs. In our previous works [12-14], we presented a wrapper approach for integrating MS-Windows COTS applications into software systems. This approach can successfully handle input/output data in forms of files and character strings. However, the integration of multimedia applications is not considered yet although there is a huge number of multimedia applications today. COTS video/audio applications could be integrated into systems for providing more diverse multimedia functionalities. Our previous wrapper approach can be used