Chapter 5
A QoS–Aware Service Bus with WSLA–Based Monitor for Media Production Systems

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ABSTRACT
The past few years have seen a dramatic rise in the distribution channels available to media companies. While media companies once distributed their programming through one or two mediums, such as TV broadcasts and video tapes, the same programming is now also distributed through additional mediums such as the Internet and mobile phones. In consequence, media companies are faced with increasingly complex problems associated with translating one piece of programming into multiple formats for distribution. As a result, the IT systems of these companies are now required to handle both new content formats and to ensure that content is simultaneously and successfully prepared in order to meet scheduling and distribution requirements for multiple delivery pathways. This paper describes a solution that was developed to address this problem. It consists of a media asset management system that is used to support media content production and distribution. In addition, this work implements service oriented architecture (SOA) that relies on an enhanced enterprise service bus (ESB). This enhanced ESB, referred to here as a QoS-Aware service bus (QASB), makes it possible to designate which of the available transcoding servers will perform a required task, thus providing a service selection scheme that improves the efficiency of media content production and distribution processes. This system was implemented at Taiwan’s Public Television Service (PTS) in January 2010 and is currently providing complete support to the company’s daily operations. Since implementation, this automated process has i

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increase the average number of transcoding jobs completed daily from 500 to 700 – and increase of 40 percent. This increased productivity has in turn resulted in a decrease in the amount of time staff must wait for jobs to be completed to 3-5 days from a pre-QASB time of 7-10 days.

INTRODUCTION

As the number of content formats and distribution channels used by media companies has grown, IT systems have had to adapt to the rapidly growing need for improved data management and transcoding services (Footen & Faust 2008). Unfortunately, many of these systems are limited in this regard because they are built on heterogeneous platforms that are distributed throughout various business units such as production, programming acquisition and broadcasting (Dettori, Nogima, Schaffa, & Banks 2009). Typically, issues associated with heterogeneity have required manual integration. This approach is time consuming, not only in terms of labor inputs, but also in terms of increased time required to prepare programming for distribution.

To alleviate these problems, and improve the efficiency of daily operations, an automated integration of these diverse business processes is necessary. In many industries, Service-Oriented Architecture (SOA) has become the de rigueur paradigm for system integration and business process management (Liegl 2007). There are many successful examples of SOA use in industries as diverse as telecommunications (Chen, Ni & Lin 2008), healthcare (Yin, Chen, Wu & Pu 2009), government (Lee 2009) and so on.

Figure 1 presents the media production and distribution environment of a typical television station. The media content – both analog tapes and digital files – is acquired from different sources in multiple formats. This content must then be processed and transoded into formats suitable for broadcast or delivery through other pathways. Note that when media is being distributed through different mediums, it must first be translated into target application-specific formats. An increase in the volume of required transcoding, then, results in a performance bottleneck in media production and distribution.

To alleviate this strain on the production process, transcoding service centers contain numerous servers to allow for increased work comple-

Figure 1. Media production and distribution environment