

Multimedia Technical Briefs - Set One

by

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Table of Contents

Chapters

1. Topic One: Multimedia Mall Tour Project Risk Management 1

- Introduction 1
- Risks to Consider 1
- Minimizing the Risk 2
- Precautions 3
- Summary 3

2. Topic Two: Synchronization in Multimedia 4

- Introduction 4
- Importance 4
- Difficulty 5
- Processes and Procedures 5
- Products 6
- Summary 6

3. Topic Three: Differences between DVD and CD-ROM 7

- Introduction 7
- CD-ROM Types 7
- DVD Types 8
- Similarities 8
- Differences 8
- Standards 9
- Advantages and Disadvantages 9
- Summary 9

Reference List 10

Chapter 1

Technical Briefs Set One - Topic One:

Multimedia Mall Tour Project Risk Management

The development of a multimedia tour of a new mall is very similar to other software development efforts that have occurred over the past 30 years. In addition, history has shown that most major software development projects are late and over budget (Tannenbaum, 1998). The intellectual activities involved in multimedia projects make them difficult to manage. In light of this fact, this chapter investigates the steps that can be taken to minimize the risks in developing a multimedia mall tour. The following sections cover the risks to be considered and how to deal with them. Also discussed are ways to minimize risk and precautions that may be taken.

Risks to Consider

The risks associated with this multimedia project fall into three categories: technical, cost-related, and schedule-related. Technical risks relate to the multimedia authoring software and hardware chosen for the project. Cost-related risks include all the fixed and variable costs that affect the project's profit margin. Schedule-related risks are linked to meeting periodic milestone and final deadline dates.

Technical

Technical risks are related to the reliability and performance of the hardware and software tools used to develop the mall tour. These tools must be readily available and currently in use by a large number of developers. Technical risk can be dealt with by choosing industry standard multimedia tools such as Flash 4, Director 8, and IPIX. Flash

4 and Director 8 are made by Macromedia. Flash is the foremost authoring software for creating scalable, interactive animation for the Internet (Emberton & Hamlin, 2000).

Director 8 is a complete environment for the creation of multimedia. It is the stage on which diverse multimedia types (e.g. Flash, IPIX, text, audio, and video) can be placed and choreographed (Rosenzweig, 1999). IPIX technology creates 360-degree by 360-degree virtual tours that are viewable over the Internet (IPIX, 2000). IPIX is the appropriate tool to provide potential customers with a virtual tour of the mall over the Internet. All three products have a large community of users and developers.

Cost-related

Cost risks are related to unforeseen fixed and variable project costs. One example would be the cost of keeping a key developer that is threatening to jump ship in the middle of the project. Another would be the purchase of additional IPIX camera equipment in order to meet the resolution requirements of the initial specification. Cost-related risks can be dealt with by including unforeseen expenditures in the original project estimate.

Schedule-related

Schedule-related risks normally result from a change in project scope and/or a lack of resources. They can be best dealt with by clearly defining deliverables in the early stages of the project. Limited resources can be addressed by choosing authoring tools that are in common use.

Minimizing the Risk

Traditional project management tools (e.g. Microsoft Project) are an effective way to plan and control resources, time, and cost. Project planning and control are

fundamental to risk minimization. In addition, content management software (e.g. Bulldog) should be considered to keep track of and leverage the vast amount of multimedia content that is created during a project of this type (Bulldog, 2000).

The project manager can minimize the risks involved by promoting open communication among all members of the project. All involved (i.e. clients, managers, and developers) should be encouraged to identify and discuss risks throughout all phases of the project. Risks should not be kept secret. In addition to open communication, risk can be minimized by anticipating risk areas throughout the development process. Measures should then be incorporated into the project plan to decrease risk in these areas.

Precautions

Perhaps the best precaution is to begin analyzing risk in the early phases of the multimedia project (England & Finney, 1999). The earlier that risk areas are identified and planned for the more likely they will be avoided or minimized. Key to early identification is open communication between all team members. In addition to early risk analysis, back-up planning is vital. Worst-case scenarios should be considered (e.g. the lead developer just left the project for another job) and ready-to-go solutions developed. Another reasonable precaution is to thoroughly test the multimedia tour on a variety of platforms during all phases of its development.

Summary

In summary, the use of risk management is vital to the successful completion of the multimedia mall tour, and open communications is an integral part of risk management.

Chapter 2

Technical Briefs Set One - Topic Two:

Synchronization in Multimedia

Multimedia is the dissemination of information in more than one form. These forms include text, audio, graphics, animated graphics, and video. Multimedia authoring is the process of ordering these forms and is labor intensive and time-consuming (Cruz & Mahalley, 1998). One key component in authoring software, such as Director 8, Flash 4, Authorware, and PowerPoint, is their ability to synchronize the various parts of a presentation. Synchronization techniques embedded within these tools permit different computers to reproduce a presentation that was created on a system running at a different speed. In the following sections, this paper discusses why synchronization is important, what makes it difficult to accomplish, and what processes, procedures, and products are available to accomplish it.

Importance

Synchronization is important because a multimedia presentation consists of two or more media forms in a temporal sequence. This temporal sequence is key to a presentation and often requires multiple media types to be presented simultaneously (Tannenbaum, 1998). In addition to the temporal characteristics of a multimedia presentation, two other components require coordination.

The first is the content relationship between elements of a presentation (e.g. different views of the same object), and the second is spatial management. For example,

multilayered drawings must retain their spatial relationships when they are displayed in a multimedia presentation.

Difficulty

Although synchronization may appear to be easy to accomplish using the advanced multimedia hardware and software available today, this is not always the case. The large quantity of data that must be processed in real-time, along with the complex nature of the algorithms to be processed, put a heavy load on modern systems. Authors are sometimes required to modify their presentations in order to minimize this loading.

Processes and Procedures

As an aid in handling the complex issues involved in the multimedia synchronization process, various models have been constructed. These include the continuous, point, intramedia (serial), intermedia (parallel), and the four-layer synchronization model. Continuous synchronization involves the on-going temporal alignment of two or more data streams (e.g. video and audio during conversations). Point synchronization occurs when the starting or intermediate points of multiple data streams are synchronized (e.g. a still image with an audio explanation).

Intramedia synchronization is used to control the rate of display of sequenced images within a single data stream (e.g. the frames of a motion video). On the other hand, intermedia synchronization is the coordination of separate media streams (e.g. a motion video with text subtitles and an audio explanation). Finally, the four-layer model, or synchronization reference model, is analogous to the layered OSI model for network architecture. This model is made up of the media, stream, object, and specification layers.

Each layer has an interface that outputs synchronization information to other the layers based upon unsynchronized input.

Products

Multimedia developers rely on advance authoring programs to handle the complexities of synchronization. These programs include Director 8, Flash 4, Authorware, and PowerPoint. Director 8 is a complete environment for the creation of multimedia. It is the stage on which diverse multimedia types (e.g. Flash, PowerPoint, text, audio, and video) can be placed and choreographed (Rosenzweig, 1999). Flash 4 is an authoring tool used to create scalable, interactive animation for the Internet (Emberton & Hamlin, 2000).

Authorware is a widely used tool for creating interactive learning programs on Windows and Macintosh. Finally, PowerPoint is a presentation graphics program from Microsoft. It provides the ability to create overheads, handouts, speaker notes, film recorders, and multimedia presentations.

Summary

In summary, synchronization is the control of the spatial, content, and temporal components of a multimedia presentation. Synchronization is both important and difficult to achieve. However, authoring tools (e.g. Director 8, Flash 4, Authorware, and PowerPoint) with built-in synchronization techniques, make the authoring process easier and less time consuming.

Chapter 3

Technical Brief Set One - Topic 3:

Differences between DVD and CD-ROM

DVD refers to a family of optical discs with the same dimensions as a standard CD (Rabinowitz, 2000). The abbreviation “DVD” originally stood for digital videodisc. However, the word video was dropped since DVDs are also used to store data as well as video. The current name, endorsed by the DVD forum, is digital versatile disc or just DVD. CD-ROMs on the other hand are an earlier technology. The following sections explain the differences between DVD format and CD-ROM format. In addition, disc types along with the advantages and disadvantages of each format are discussed.

CD-ROM Types

CD-ROM (compact disc read only memory) discs are the de facto standard used for software and large database distribution. They are used to store text, graphics, and hi-fi stereo audio. A CD-ROM, 120mm disc, holds 650 megabyte (MB) of data. This is equal to 250,000 text pages or 20,000 images of average resolution. CD-ROMs have a silver cast like audio CDs.

CD types include the standard read only CR-ROM and two writable types: CD-R and CD-RW. CD-R technology allows discs to be written just once while CD-RW technology allows discs to be written over approximately 1000 times. The underside of CD-R media typically has a greenish-gold or silver-blue cast, whereas CD-RWs have a blue cast.

DVD Types

There are several types of DVDs: DVD-ROM, DVD-Video, DVD-R, DVD-RAM, DVD-R/W, and DVD-Audio. DVD-ROM is like a large capacity CD-ROM. It stores data, audio, and video. DVD-Video is the movie format and is basically a DVD-ROM with a slightly different logical format. DVD-Video uses MPEG compression and provides around 133 minutes of video per side. DVD-R is the write-once version that is used for creating masters, and DVD-RAM is the rewritable standard sanctioned by the DVD Forum. DVD-R/W is another rewritable type and is an extension of the DVD-R. DVD-Audio is the next generation music format providing higher sampling rates.

Similarities

Like a CD-ROM disc, a DVD disc is 120 mm in diameter. Both are 1.2 mm thick and are composed of two .6 mm bonded substrates. In addition, each is durable and tolerant of dirt and fingerprints. Non-contact laser optics for playback give both disc formats long life and split-second random access.

Differences

DVDs look like CDs but that is where the similarity stops. DVDs hold from four to twenty-eight times as much data. At a minimum, DVD capacity is 750% that of a CD-ROM. This is because its tracks, pits, and lands are more than twice as dense, and it employs a more efficient recording algorithm.

In fact, DVD's digital modulation and error correction was specifically designed to support increased capacity. The EFM PLUS modulation scheme is efficient and is backward compatible. In addition, the RS-PC (Reed Solomon Product Code) error correction system is ten times more robust than that used with CD-ROM technology. The

data transfer rate (1.35 megabytes per second) is nine times faster than a single-speed CD-ROM drive. In addition, there is DVD counterpart of every type of CD. Another important difference is that DVDs are double sided, whereas CDs are single sided.

Standards

The international format standard for the CD-ROM is ISO 9660 (Microsoft, 2000). This standard follows the recommendations of the High Sierra specification developed at Lake Tahoe in November 1985. ISO 9660 provides for read-only interoperability between different computer systems.

For computers, DVDs comply with UDF and/or ISO 9660 standards. The UDF (universal disk format) file format for optical discs was developed by the Optical Storage Technology Association (OSTA). It was designed for read-write compatibility between all major operating systems and between write-once and rewritable media. While DVDs are based on UDF format, it is also an optional second standard for CD-R and CD-RW discs. CD-UDF formatting allows data to be recorded in packets rather than in a continuous stream.

Advantages and Disadvantages

The advantages of DVD include its greater capacity, backward compatibility with CDs, and faster data transfer rates. The disadvantage of DVD technology lies in the current high cost of DVD-RW drives (ten times the cost of a CD-RW).

Summary

DVD represents the next generation of optical storage technology. Existing CD technology will become obsolete when DVD rewritable drives are available at a competitive cost.

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