

Multi-Channel Production Issues

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A content production system is usually designed to target support for a specific service and its specific demands. Creating a multimedia multi-channel production line requires careful consideration of many issues, spanning from service properties and business models to editorial and technical issues. This report gives a brief review of the most important aspects of multi-channel multimedia production.

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1. Introduction

1.1 Background and Purpose

At the close of 1999, Norsk Regnesentral (NR) [1] was awarded a Strategic Institute Programme (SIP) by the Research Council of Norway. This SIP is a five-year, nationally-funded Research Programme addressing “Service Architecture and Service Channeling in the Personal and Professional Information Society”; its working title is **channel S** [2].

The document serves to summarize the results of one of the tasks carried out during year 2000 within *Project A: The Multimedia Multi-Channel Infrastructure (M3Ci) Platform* [3]. More information about the M3Ci Platform can be found in [4].

1.2 Problem Statement

Streamlined multimedia production for several channels is a new area, and not much literature is available. This document therefore rests upon experience gained in other projects at NR — projects which have demanded new research and concrete development to tackle some of the challenges in this area [5].

A content production system is usually designed to target support for a specific service and its specific demands. Therefore, it is difficult to describe content production design principles in a general fashion. Creating a multimedia multi-channel production line requires careful consideration of many issues, spanning from service properties and business models to editorial and technical issues. This report gives a brief review of the most important aspects of multi-channel multimedia production. More in-depth descriptions require a well-specified service (see e.g., [5]).

Sections 2 to 5 discuss some issues that should be taken into consideration when creating a service. Section 6 sums up with some concluding remarks

2. Service Properties

Different services have different properties, thereby demanding different requirements upon the content production line. The type of service, different service platforms and different interaction models are examples of such properties. Another property which is gaining greater importance is the degree of personalization of the service. *During service use*, however, this issue will first and foremost be a subject for the server and client sides of the service, not the content production line. Later, more advanced real-time services may impose requirements upon content production; this issue will not be addressed here, however.

This section provides a brief introduction as to how the specific properties of a service and its expected use contexts can affect the content production line for that service.

2.1 Types of service

Banking services, for instance, are characterized by a high demand for security and content correctness. The service itself will probably remain the same for a relatively long period of time and needs no real-time production line. The customer does have relatively high demands for real-time data transfer, however, but that is not a content production issue.

A news service will usually have high demands upon the production speed of the content production line. In the electronic world, being first with the news people want will be an important competitive advantage — even stronger, perhaps, than in the paper-based news world. However, the news service provider will likely allow only limited possibilities for user interaction.

A third example can be financial stock trading services, where the customers need the information without delay, and where a secure and rapid communication from customer to broker companies will be essential.

These three examples have very different requirements for

- Real-time content production
- User interaction
- Data rate requirement and
- Multimedia and graphics content.

2.2 Service platforms and their use

Another service issue is the client platform. Today most electronic clients are web-based though some experiment with WAP and mobile phones. In the future there will probably be lots of services delivered on

- Mobile platforms (PDAs, Mobile phones, distributed terminals)
- PC-based platforms and
- (Interactive) digital TV.

Though new standards like XML may provide the framework for delivery of one service to several different platforms, content production for these platforms remains a challenge. The platforms themselves are very different, the user situation is different and even production of the same kind of content for different platforms may be different, as indicated below.

Focusing on mobile platforms alone will be a great challenge. The context for mobility may sometimes demand that the user's eyes are occupied with something other than the service (e.g. driving a car). In such contexts, the user cannot interact with the service and may need an audio interface instead of a visual one. Other times she may be in a noisy environment where audio cannot be used as content carrier, but where reading text from the screen may be possible.

Research also indicates that the same content which works well text does not necessarily work well as audio, e.g., texts read by a newsreader. The complexity of text-based content often makes it hard to follow in when delivered in an audio format. In non-visual contexts, we also know radio-based audio is more informative than television-based audio. For example, without visual cues, the audio delivered from a *radio reporter* at a hockey match is (usually) more informative than the audio delivered from a *television reporter*, since the television reporter naturally need not comment about e.g., which team and player has the puck: such information is obvious for viewers having normal vision.

Variation in these various kinds of contextual properties places very different demands upon the production line.

2.3 Interaction models

User interaction shall continue to be an increasingly important part of all electronic services over the years to come. Different service platforms have different interaction possibilities which, together with the user context, have greatest impact upon which interaction models work best for different services.

Whether different interaction models incur demands upon content production is hard to say in general. However, it will probably be necessary to design content in such a way that it can support (or be accommodated by) the interaction model of the service.

3. Business Models and their Requirements

To say something in general about electronic services and their business models is very difficult, probably impossible. This section helps provide some of the basic understanding about relations between business models and (certain) service properties.

As always, “knowing your customer” is essential. That is, whether your customer wants a cool, media-rich service, or a text-based but *reliable* one. Some other essential questions include:

- What is the customer willing and able to pay for ?
- Is she using the service for business or pleasure ?
- Is the business kernel of your organization real-time delivery, media-richness, user interaction or uniqueness of service?

There are many examples of well-designed, web-based services — with high quality implementations — which failed to earn money because an appropriate payment model and associated payment function did not exist as part of the service (e.g. New York Times / Dagens Næringsliv). It is therefore necessary to ask some of the questions below:

- What is the age of the customer?
- Does the customer want a stable service with reliable content, rather than a cool configurable service ?
- Is the service important or critical for the customer’s business ? If so, what kind of credibility check is needed for the content (e.g., does the customer carry out economical transactions based on the information ?)
- Can and will your organization’s production system be integrated with some existing information infrastructure ?
- What is the real-time requirement for the content of the service ?
- What is the information throughput necessary for the service ?
- How unique is the service? What are its strengths compared to those of your competitors ?

The age of the customer and whether it is used for business or pleasure may give indications concerning the need for media-richness, cool features and what kind of service properties the customer is willing to pay for. Clearly, if the service can be integrated into the customer’s business process, it will also be easier to charge for it.

Another, integral part of this picture is the production cost for the service provider. It is crucial to remember that real-time production of media content is usually expensive. There are ways, however, of creating “live services” and the production processes feeding such a service which do not necessarily generate much cost. For instance, creating animations from existing audio or video sources, or generating audio and animation based on pre-existing text. However, it is important to design each step in the production process carefully for each specific need.

4. Editorial Issues

In a number of services, editorial issues are of only small concern. For other services, content quality may be the requirement having greatest priority. These latter kinds services require and must involve the editor responsible for service content, as well as copyright management for third party content, within the production line. For production process which also place high demands upon content *throughput*, is it obviously necessary to include the editor(s) in the production line in as streamlined a fashion as possible.

5. Technical Issues

The technical solutions for content production can be very demanding, depending on service properties and expected contexts of use. This section describes in more detail some of the technical implications.

5.1 Required production speed for each content item

When the service is a real-time service with several competitors, the production time for each content item can become critical. Spending time and money creating a highly-automated production system often pays back in terms of long-term production costs.

5.2 Update frequency

Update frequency is also an important issue. It is very different to produce content for a service being updated once a day, then for a radio station which continuously broadcasts fresh content.

The update frequency impacts both how much content overhead is necessary for the editor to have and the production capacity of the in-house production line. If the content is to be produced from an existing information source, such as an information database, the production can be in-house and automated to a great extent. One major issue may then be fitting or adjusting the content — in an effective and efficient way — for different client devices screen sizes, multimedia capabilities and usage profiles. When this is the case, most of the service preparation process will concern the creation of templates and XML structures which are well-suited to the content type and client platforms. The content production process will then concern the editing of content to fit the service profile, for each of the different client devices to be supported.

In some cases it may be desirable to open the production process in such a way as to make it possible for personnel ordinarily *external* to the production process (e.g., journalists) to remotely deliver / publish their content directly within the in-house production line. This can be designed to integrate smoothly with the rest of the production line; in such cases, however, it may become necessary to distribute editorial responsibility.

5.3 Database issues

Studies of Internet services show that services built upon existing content are more likely to succeed than services where the total concept with content, marketing and customer relations must all be built from scratch. If the service is to be permanent, it should be carefully worked out as to how to integrate the content production process with the existing content database. This may save costs and ensure the production ability of the service.

Whether service distribution should be based upon the content database or a specific service depends upon the nature of the service. In cases where the content is media-rich or highly time-critical and the clients are greatly diverse, it might be useful to have client-specific servers delivering different (client-specific) “versions” of the service, rather than designing and developing a single service interface for the existing database. This design consideration needs to be analyzed for each service to be provided.

5.4 Distribution issues and architecture

Distribution issues involves everything from security options and scalability to client requirements. It is very difficult to be specific about these demands in general; still, some basic aspects are highlighted below.

The security needs for the application should be analyzed to identify what kind of security options will be demanded from the user and how well the service needs to be protected. For example, strong security solutions must be designed when the service integrates with sensitive information about bank accounts, stocks or health information. This is also the case when the service requires the user to return information such as payment information.

Scalability is also an important aspect. There is a tendency today towards more personalized services. Service providers with services having thousand of users, each with their own service profile, are certainly faced with issues of scalability.

When media-rich services are to be delivered to clients with little local processing power, servers may be required to pre-process content before delivering it to the client. The same may be the case when the bandwidth to the client is very narrow and a stream-based service is required to reduce delay. When the server has many clients with needs like this, scalability issues again arise.

When service properties permit, it may be possible to address scalability through the creation of “near on-demand” services and the use multicast protocols.

As a distribution issue, one should also analyze the need for multimedia on the various clients. Is it better to rapidly update a poor picture or to more slowly update a picture of higher quality ? Do service properties and use context permit animation to be substituted in place of video on mobile devices ? Can images be used together with audio, instead of video with audio, for certain platforms ? When should the service contain different media types on different terminals, and where should this difference be introduced in the production – server – client chain ?

6. Concluding Remarks

This report has presented some of most fundamental issues involved in the consideration and design of content production processes. These issues include service properties, business models and their requirements, editorial and technical issues. In each of these areas important considerations have been pointed out and illuminated.

In general, it is necessary to carefully consider all parts of a service — the demands from the server, the client and the user — prior to designing a content production process for that service. From the current technological standpoint, including the heterogeneity of services and service delivery platforms, it seems that one production line will always differ from another. Further research is required in order to determine whether it is possible to create a generic production process for all kinds of services and, if so, what the characteristics and nature of that process should be.

Presently, the key to an effective and efficient production process can only be found through careful and thorough analysis of the service.

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