mWeb: a framework for distributed presentations using the WWW and the MBone

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Distributed presentations

- A distributed presentation is a presentation where some or all listeners are geographically separated but connected through a network
- Usually includes audio, video and some kind of presentation-functionality
- *mWeb* which is presented here today addresses the last category

Related Work

- Several earlier applications exist for distributing HTML-pages using multicasting
  - Vinay Kumar, Shared Mosaic
  - Ed Burns, WebCast
  - Dauphin Gilles, mMosaic
- All these are tightly connected to XMosaic!
- mWeb tries create a framework that is browser and platform independent!

Problems

- There are two main problems with distributed presentations and “slides”:
  1. The distribution of the material to be presented
  2. The synchronization between the receivers
- Solutions used in mWeb:
  1. A new distribution platform called the Tunable Multicast Platform - /TMP
  2. The WebDesk Control Bus

The Tunable Multicast Platform /TMP

- A library created at the CDT
- Includes:
  - An implementation of the Real-time Transfer Protocol, RTP (RFC1889)
  - Scaleable Reliable Real-time Transport Protocol, SRRTP
  - Scaleable Reliable File Distribution Protocol, SRFDP

Real-time Transfer Protocol, RTP

- RTP is the main protocol being used for audio and video transmissions over the Internet and MBone today
- RTP is divided into two separate protocols, RTP for data and RTCP for control
- RTP/RTCP includes functionality for detecting packet-loss, basic membership control and network-distance calculations
- RTP is used as a best-effort protocol

Scaleable Reliable Real-time Transfer Protocol - SRRTP

- An extended version of RTP to include reliable transmission - SRM
- Lost packets are signaled to the group using RTCP
- Each participant of the session helps out with the retransmission's
- Back-off based on the network-distance is used
  - To minimize the number retransmission's and the retransmission delay
- Layered encoding
- Packet-oriented

Scaleable Reliable File Distribution Protocol - SRFDP

- SRFDP is a protocol for:
  - Distribution of files
  - Distribution of META-information about files
  - Distribution of INDEX files (directory-listings)
- It operates above SRRTP
- There can be several distributions simultaneously from several senders
- Every member of the session can retransmit a requested file (or part of a file)

/TMP Usage

/TMP is today being used for

- The distributed generic whiteboard - GWB
- Semi-reliable multicast
  - The retransmission-time in SRRTP is limited to a short time-period. Used for making audio-transmissions more resilient to packet-loss.
- WebDesk Control Bus
- Multicast Talk - mTalk

WebDesk Control Bus

- A simple but powerful messaging platform
- Text-messages being sent using SRRTP
- Each message can be addressed to a single member or to a group of members
  - A member can be an application or a specific part of an application (an agent)
- Similar to the messaging protocol being used in the MBone Vic and Vat applications

mWeb - the application

- mWeb is an application that combines the WWW and the MBone as a distributed presentation medium
- Why WWW?
  - Many existing documents
  - Easy to create new documents
  - Clients exist for virtually any platform

mWeb

- Why MBone?
  - Scaleability! We want to make presentations global with large audiences
  - We can not let each receiver retrieve it’s own copy of the documents to be presented as the burden on the HTTP-server would get very large
  - Synchronization!

An mWeb presentation

- An mWeb presentation consists of a list of URLs to documents and objects to be presented
- This list can contain short tag-names to make it easier for the presenter to sort and find his “slides”

Designing presentations

Presentations can be *designed* in three ways:

1. URLs are collected by hand by the presenter
2. URLs are collected using the Common Client Interface (CCI), either live or during the presentation itself
   - CCI is only supported by XMosaic *(An issue for the W3C!!)*
3. URLs are collected using a proxy-HTTP-server that the presenter connects his browser to

Presenting presentations

- The files needed for the presentation are distributed using SRFDP both
  - before the presentation begins (for all that have started there mWeb client early)
  - during the presentation all members of the session help out with needed retransmission's
- The presenters mWeb send out synchronization (“display URL”) messages using the Control Bus

Presenting presentations

- During the presentation, the presenters sees a list of all his “slides” and can easily jump between different “slides”
- Listeners also see a list of “slides” but only those already displayed.
- “Old slides” can be shown locally or globally. This allows a listener to change “slide” when asking a question. The presenter can lock the session.

Browser interaction

Browser interaction is handled in two ways:

1. Local disk
   - Each received file is stored on local disk
   - Fictive URLs are created with ‘file’ as protocol-part
2. The local mWeb acts as a HTTP-server
   - URLs are created pointing to the local host
   - **Security hole with applets!!!!!!**

- mWeb commands the browser to display that URL

Active objects

- mWeb is not limited to only “dead objects” as HTML-pages and inline images
- Active objects as applets are also handled
  - Data referenced by the applet can be found out using the proxy-HTTP-server or by hand
  - Unfortunately the applet programmer has to be aware of how the applet is going to be used

Programmed presentations

- mWeb can be programmed to imitate a presenter by sending out “display messages” following a “program”
- This results in the future *multicast magazine* and *programmed presentations* which is our version of the:

Web-TV!

:-)

Current status

mWeb and /TMP is being developed using Java to get a platform independent frame-work.

- ✔ RTP - ready
- ✔ SRRTP - working but not finished
- ❑ SRFDP - almost ready
- ❑ mWeb - we are working on it!

The End

Comments? Questions?

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