HYPER-LINKED COMMUNICATIONS

WebRTC enabled asynchronous collaboration

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OVERVIEW

1. Introduction
2. Related Work
3. Proposed Architecture
4. Methodology
5. Conclusions

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INTRODUCTION

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CONTEXT

Written communication could never replace face to face communication.

> “No computer in our lifetimes will ever rival a human voice’s capacity to conveying rich and complex social and emotional meaning”
>
> — Geddes, Martin

Today, we can achieve more.

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PROBLEM STATEMENT

Real-time communication applications can make a difference on business, education and health sectors.

An application that provides a way to remember our past communications would be a strong tool.

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PROBLEM STATEMENT: USE CASE

A teacher record and streams an interactive class, some students participate in real-time others may participate later.

The teacher adds information to its class (create tags, add links, overlay images ...).

Students can answer to quizzes.

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THESIS GOALS

Development of an application that applies the hypermedia concepts.

Record and playback interactive video.

Use only standard technologies like JavaScript, WebRTC, HTML5 and CSS3.

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RELATED WORK

RELATED WORK

1. Introduction

2. Related Work

2.1 Early days of the Internet

2.2 Real-Time communications

2.3 Signaling

2.4 Hypermedia

2.5 Collaboration & Time manipulation

3. Proposed Architecture

4. Methodology

5. Conclusions

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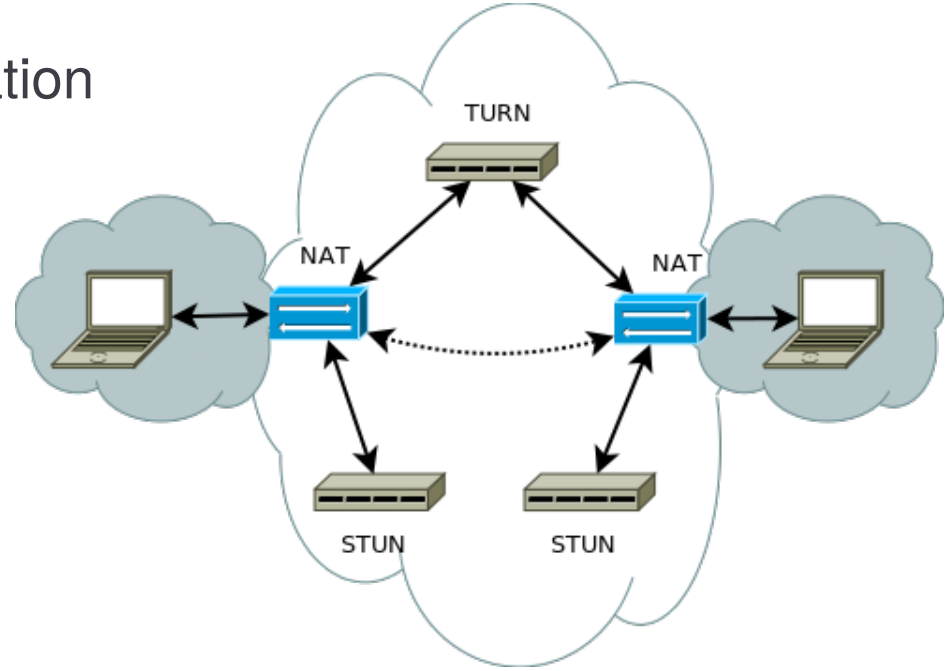
EARLY DAYS OF THE INTERNET

- IPv4 Address Exhaustion
- Network Address Translation
- Client-Server model
- STUN + TURN = ICE



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REAL-TIME COMMUNICATIONS

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REAL-TIME COMMUNICATIONS

WebRTC (Web Real-Time Communications)

- MediaStream
- DataChannel
- RTCPeerConnection

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SIGNALING: MEET AND GET TO KNOW

- Own Implementation
- SIP
- XMPP
- SigOFly

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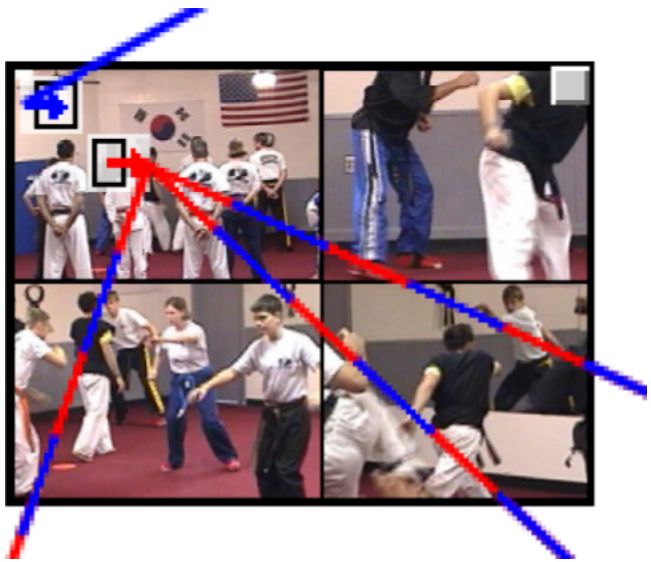
HYPERMEDIA: MORE THAN WORDS, MORE THAN IMAGES

- **Concepts:** HyperText & HyperMedia & HyperCommunications
- **Implementations:** HyperCafe & HyperHitchcock



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HYPERMEDIA: MORE THAN WORDS, MORE THAN IMAGES

- **Languages:** HyVAL & SMIL
- **WebBrowser:** Ambulant & SmillingWeb & SVG

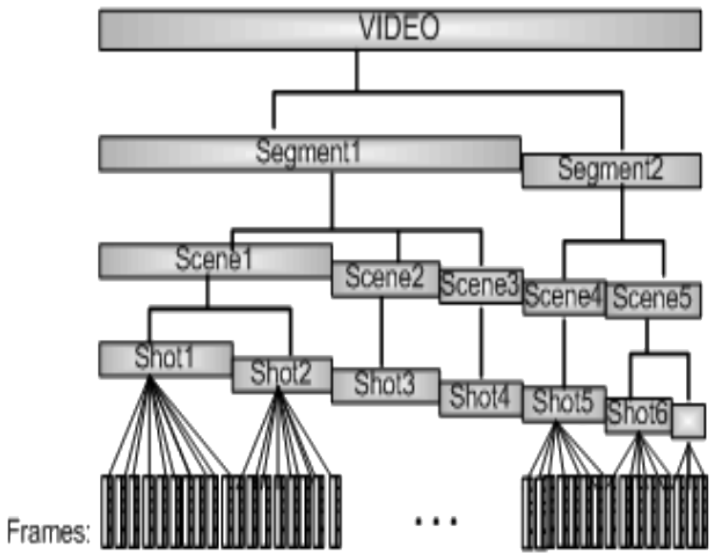

Figure: HyVAL structure

```
<par endsync="select">
 <img id="btn_a" src="..." dur="10s" />
 <img id="btn_b" src="..." dur="5s" />
 <excl id="select">
   <text src=".../todays_txt.html"
       begin="btn_a.activeEvent"
       dur="25s"/>
   <video src=".../todays_video.mpg"
       begin="btn_b.activeEvent" />
 </excl>
 <audio src=".../todays_tune.mp3"
     repeat="indefinite"/>
</par>
```

Figure: SMIL example

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WEB-BROWSER PLUG-INS

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EXTENDING COLLABORATION TOOLS WITH TIME MANIPULATION

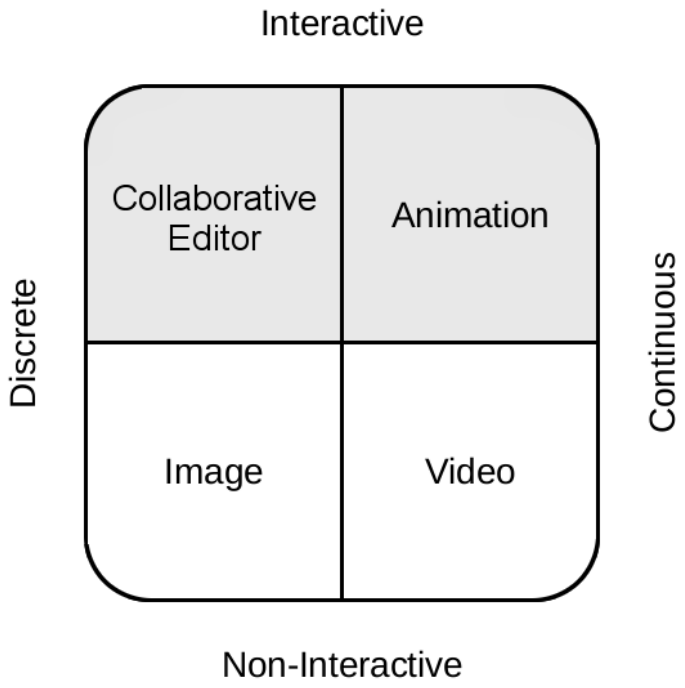

Figure: Media Types

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EXTENDING COLLABORATION TOOLS WITH TIME MANIPULATION

- Streaming and Recording (RTP, SRTP)
- Recording and Streaming Interactive Media
- Collaborative Environment (TogetherJS)

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PROPOSED ARCHITECTURE

RELATED WORK

1. Introduction

2. Related Work

3. Proposed Architecture

3.1 Modules

3.2 Implementation Proposal

4. Methodology

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MODULES

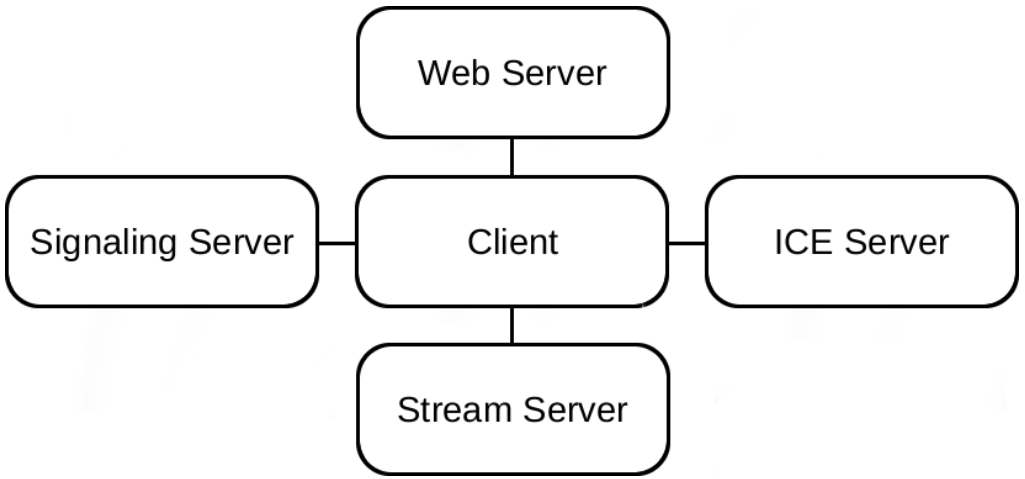

Figure: System Modules

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IMPLEMENTATION PROPOSAL

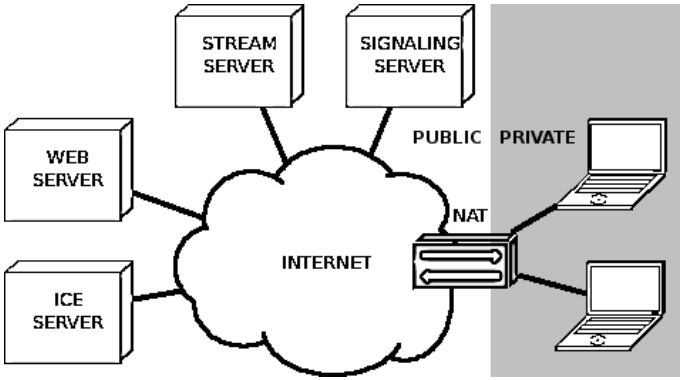

Figure: System Infrastructure

- **ICE Server**: restund
- **Signaling Server**: Ejabberd
- **Web Server**: Play Framework
- **Stream Server**: Jitsi VideoBridge

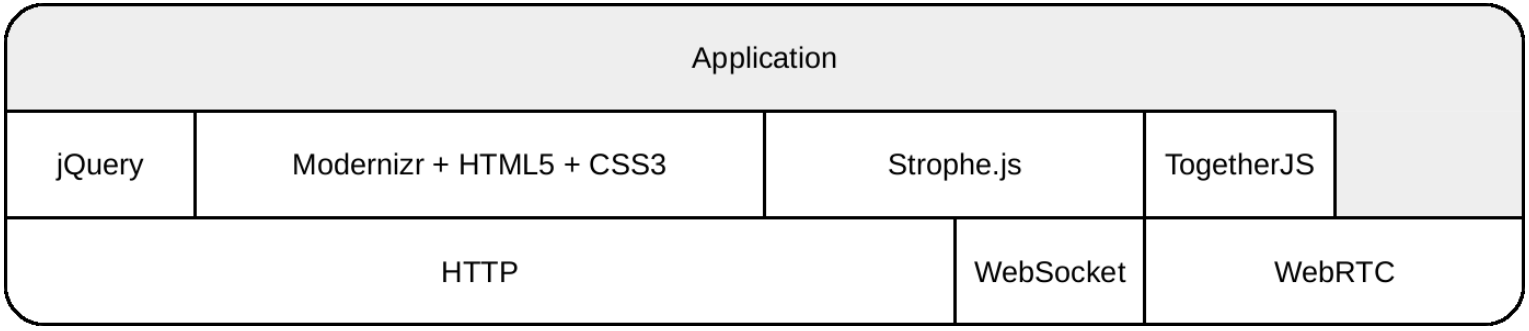

Figure: App Architecture

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WIREFRAME

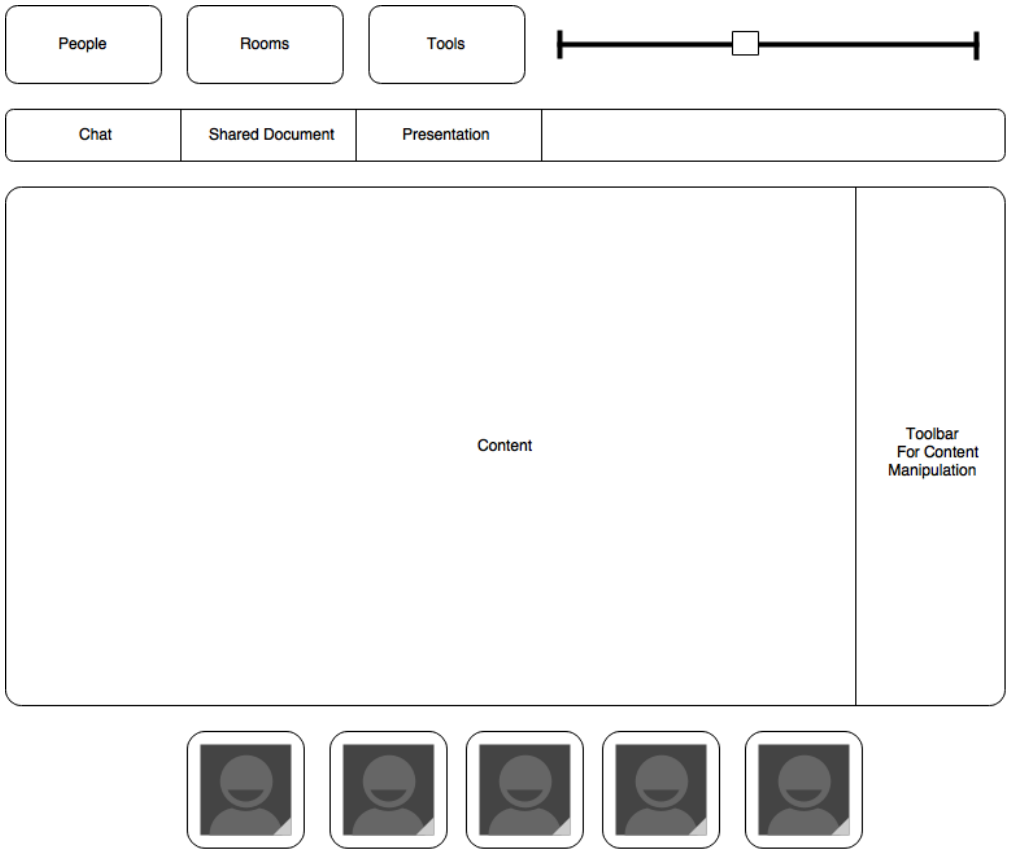

Figure: Application wireframe

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METHODOLOGY

RELATED WORK

1. Introduction

2. Related Work

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4. Methodology

4.1 Evaluation

4.2 Planned Schedule

5. Conclusions

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EVALUATION

Qualitative and quantitative evaluation.

- Tests with users.
  - Task duration.
  - Feedback.
- Benchmarks.
  - Amount of users.
  - Parallel conversations.

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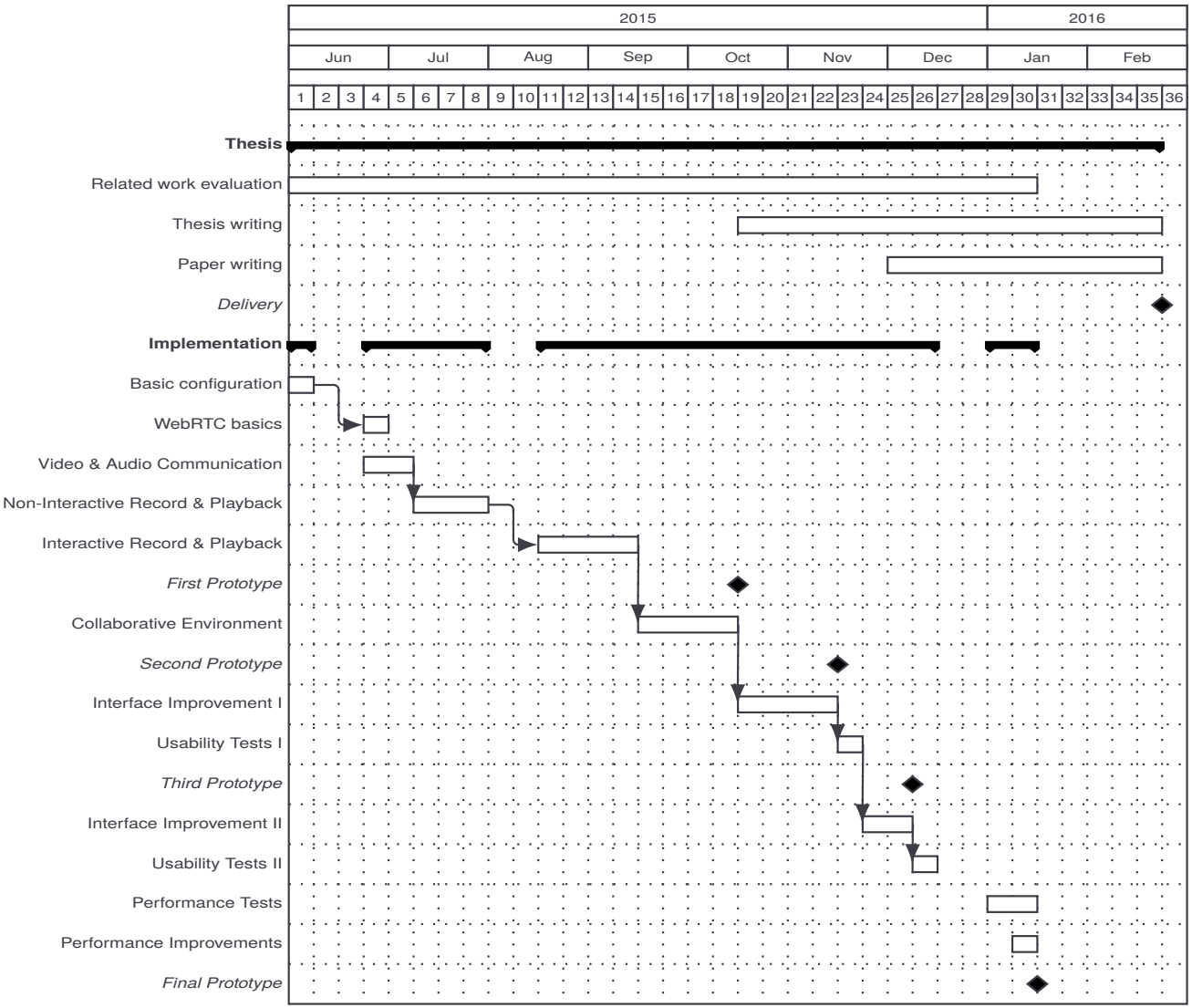
PLANNED SCHEDULE



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CONCLUSIONS

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CONCLUSIONS

- New usage scenarios for communication and collaboration applications.
- Enrich communications using hypermedia concepts. Record, playback and collaboration features.
- Prototype implementation and testing.

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Questions?

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