

Through a Browser Darkly – Prospects for Simplifying the Exhibition of Games

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How can we provide access to archived games?

SOLUTION ONE.

Provide access by installing emulators on client computers.

But the user must have the rights to install the software and understand how to do it!

SOLUTION TWO.

Run in a browser, use emulators developed for HTML5/javascript.

But game code is downloaded to client (IP issues), even today differences might have browser incompatibilities (limits portability) and performance is very sensitive to platform specifications (again limits portability).

SOLUTION THREE.

Provide *remote access* to emulators running on managed servers.

Use a web browser as the client used to access the emulators.

Allows access via mobile devices as well as PCs.

RESEARCH

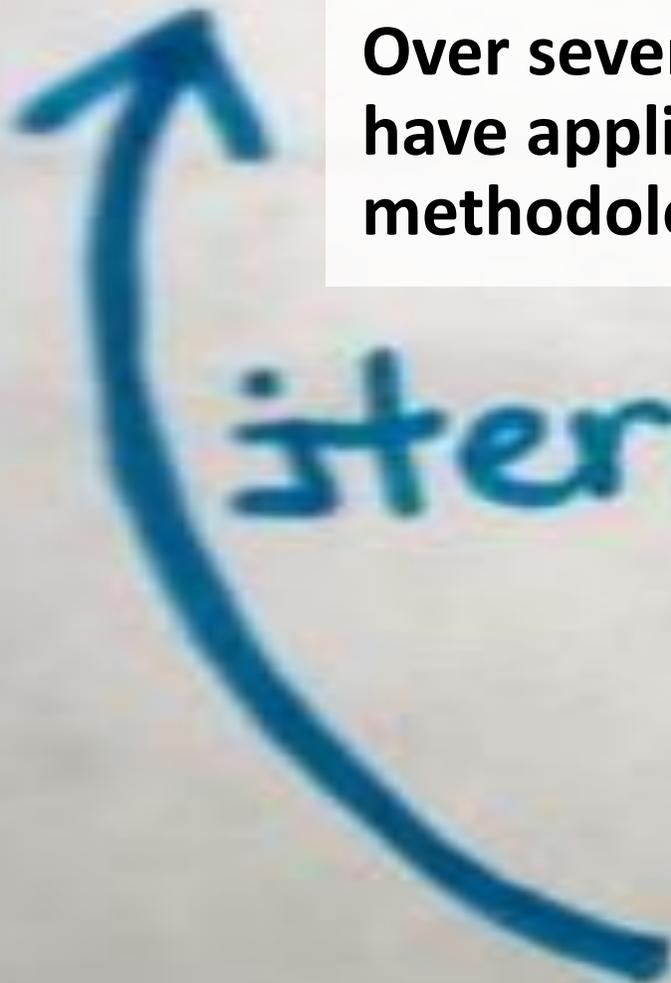
Over several student projects we have applied user-centered methodologies.



DESIGN



VALIDATE



iterate

Research phase: what's the context?

We focused on game players rather than archivists or other researchers.

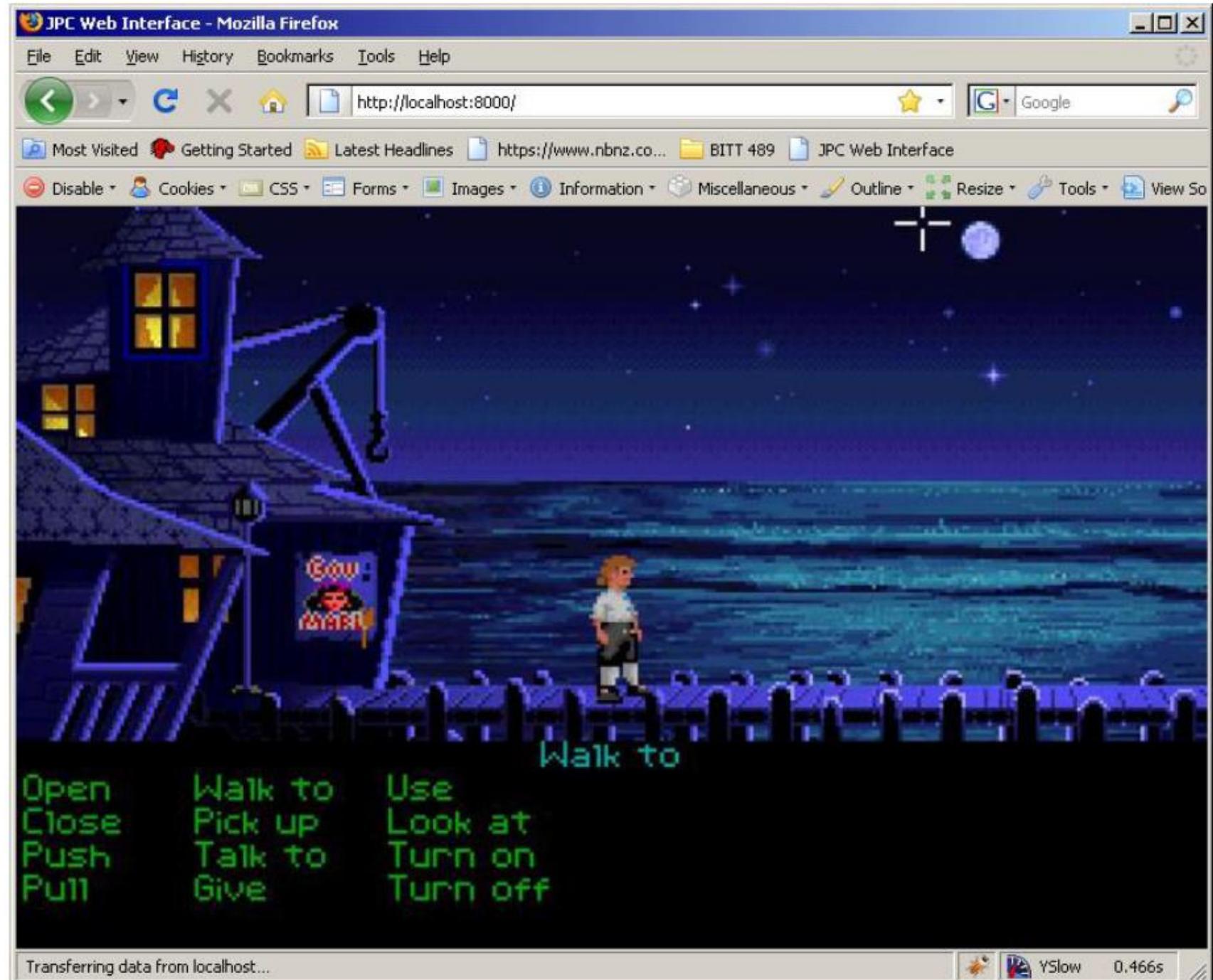
Why? Practical reasons, access to subjects.



*Research phase:
system requirements*

**Zero installation,
reuse existing code
and protect software
from copying and
cross-platform.**

Our previous
demonstrated
HTML/Javascript
remote viewer for
virtualised instances
of emulators.



Research phase: who are potential users?

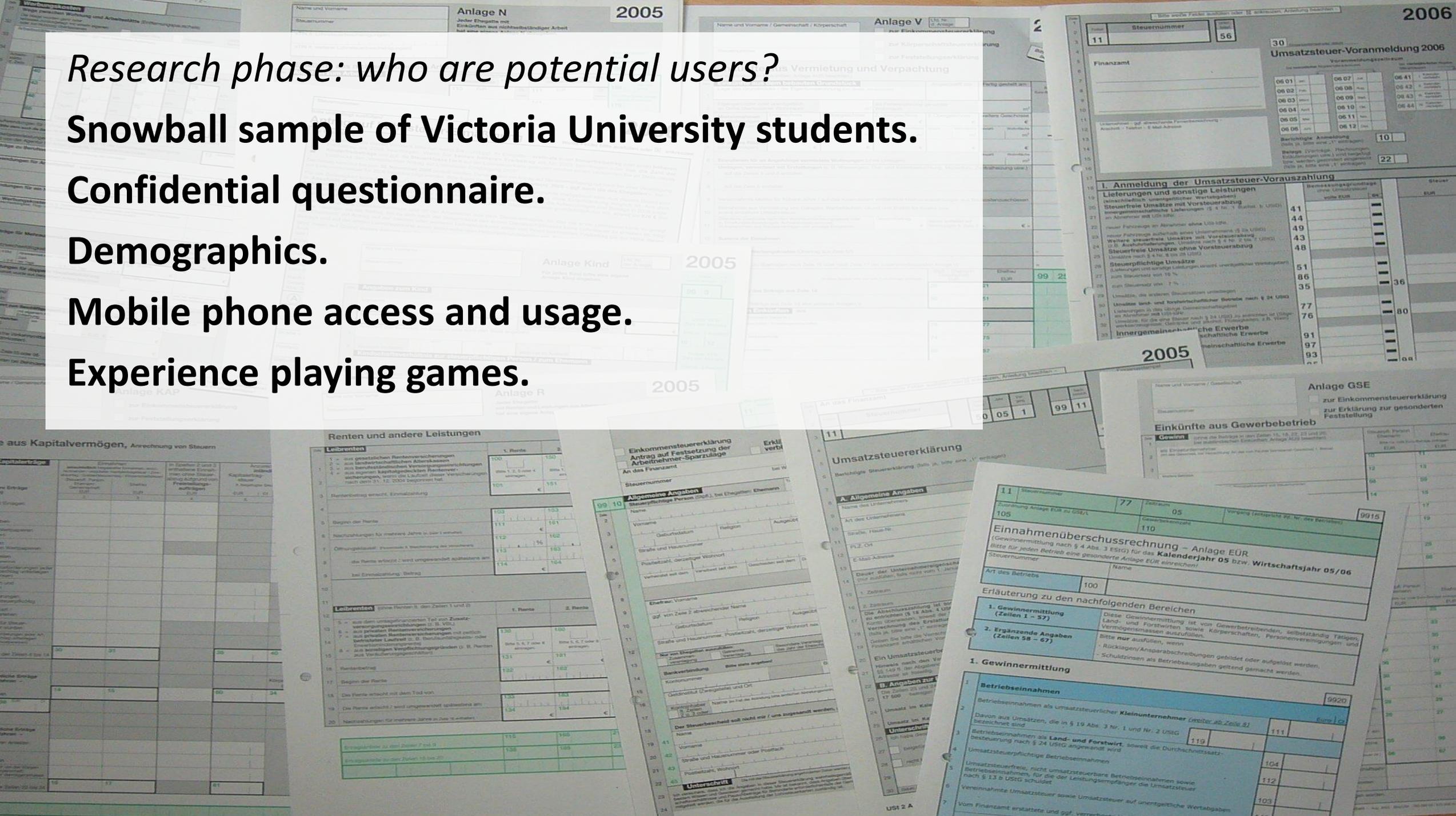
Snowball sample of Victoria University students.

Confidential questionnaire.

Demographics.

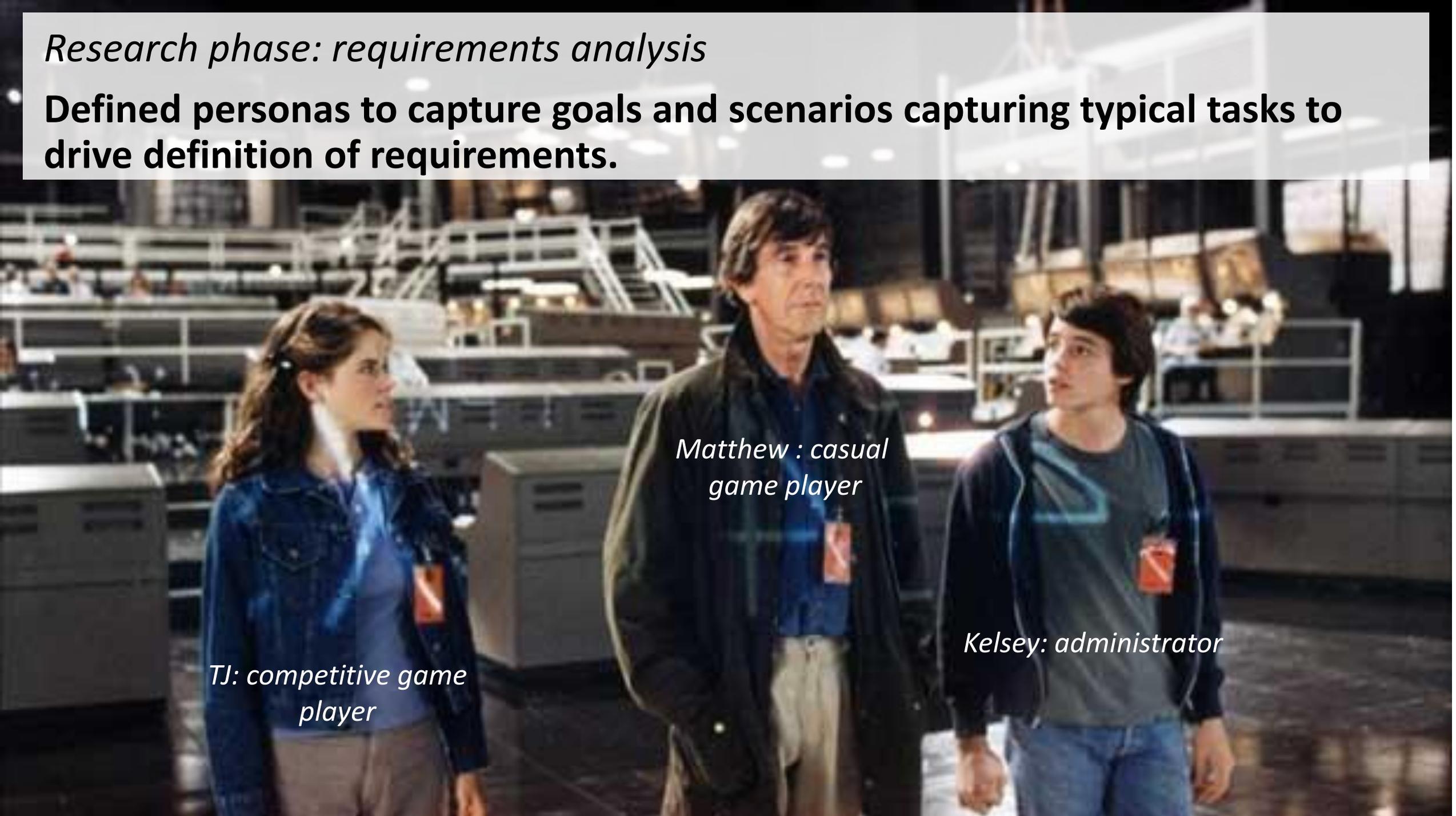
Mobile phone access and usage.

Experience playing games.



Research phase: requirements analysis

Defined personas to capture goals and scenarios capturing typical tasks to drive definition of requirements.

A photograph of three people standing in a server room. On the left is a woman with long brown hair, wearing a blue denim jacket over a blue shirt and brown pants. In the center is a man with dark hair, wearing a dark jacket over a blue shirt and khaki pants. On the right is a younger man with dark hair, wearing a dark blue hoodie over a grey t-shirt and blue jeans. All three are wearing red identification badges. The background shows rows of server racks and metal walkways.

TJ: competitive game player

Matthew : casual game player

Kelsey: administrator

Beyond access, other user requirements

Meta data:

Cheats, gameplay hints, easter eggs ...

Collaborative gaming.

Being able to allow other remote users to view game play.

Persistent gaming.

Users wanted to be able to pause execution and resume later.

Recording games.

Being able record gameplay and replay it to the system, be able to add descriptions to this.

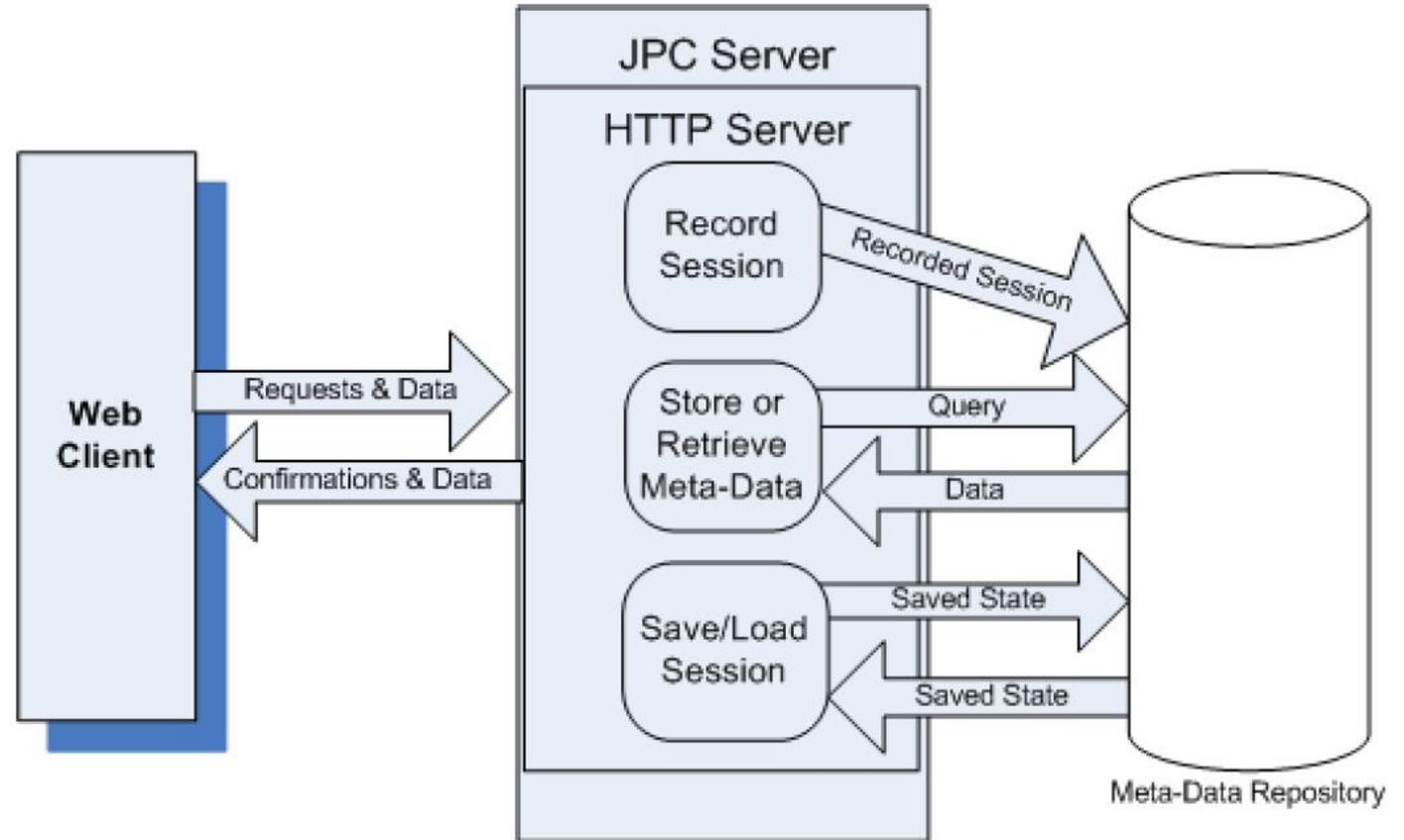


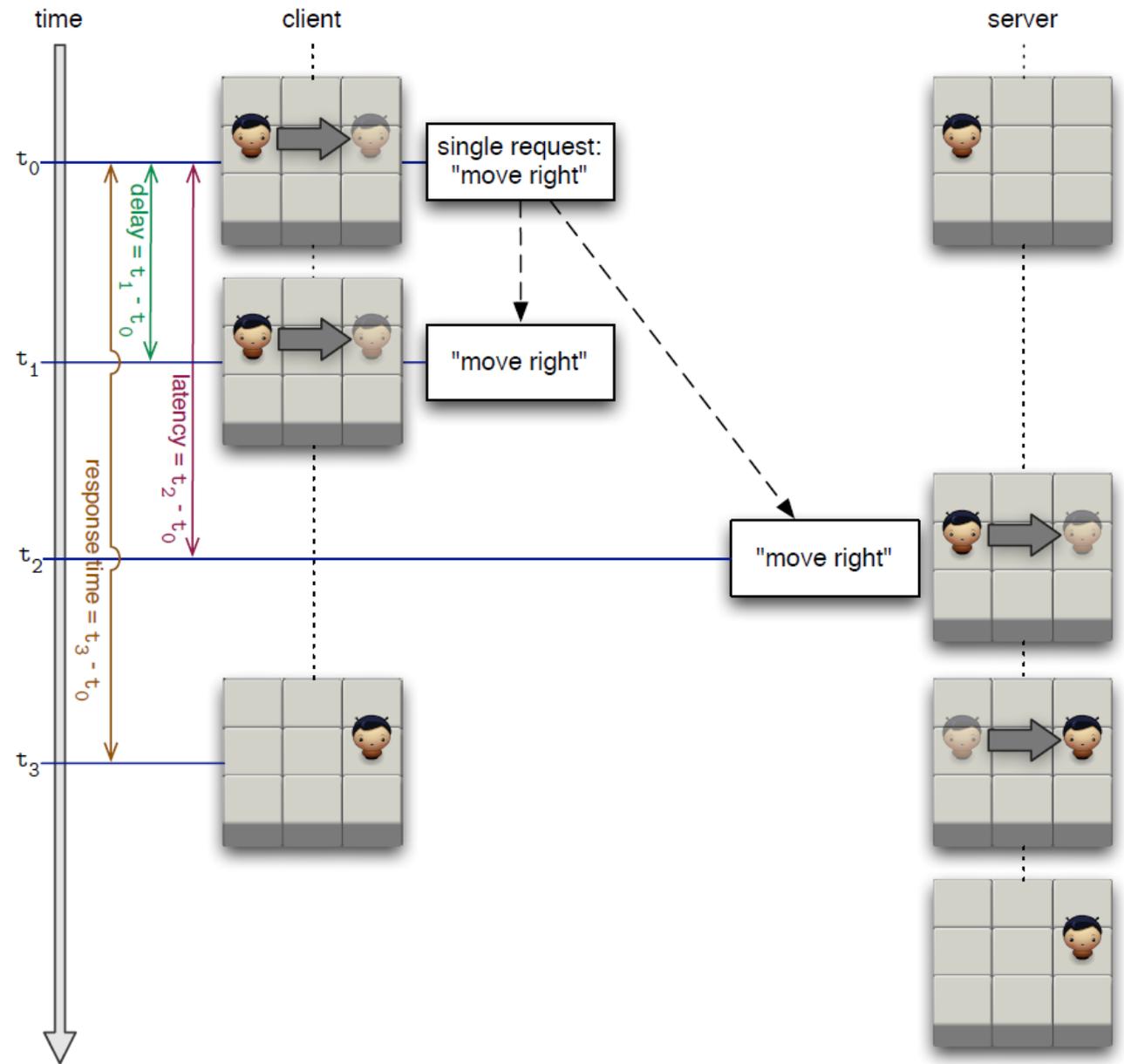
Figure 4: Meta-Data Storage Procedures

*Research phase:
system requirements*

**What is the required
responsiveness?**

Literature suggests
50ms is not
noticeable.

We carried out
research on remote
viewer on mobile
phone and found
150ms as an upper
bound.



Design phase: architecture

Choice of emulator.

Choice of client-server
protocol.

Possible design space:

- Instrument emulator.
- Provide remote access to operating system.

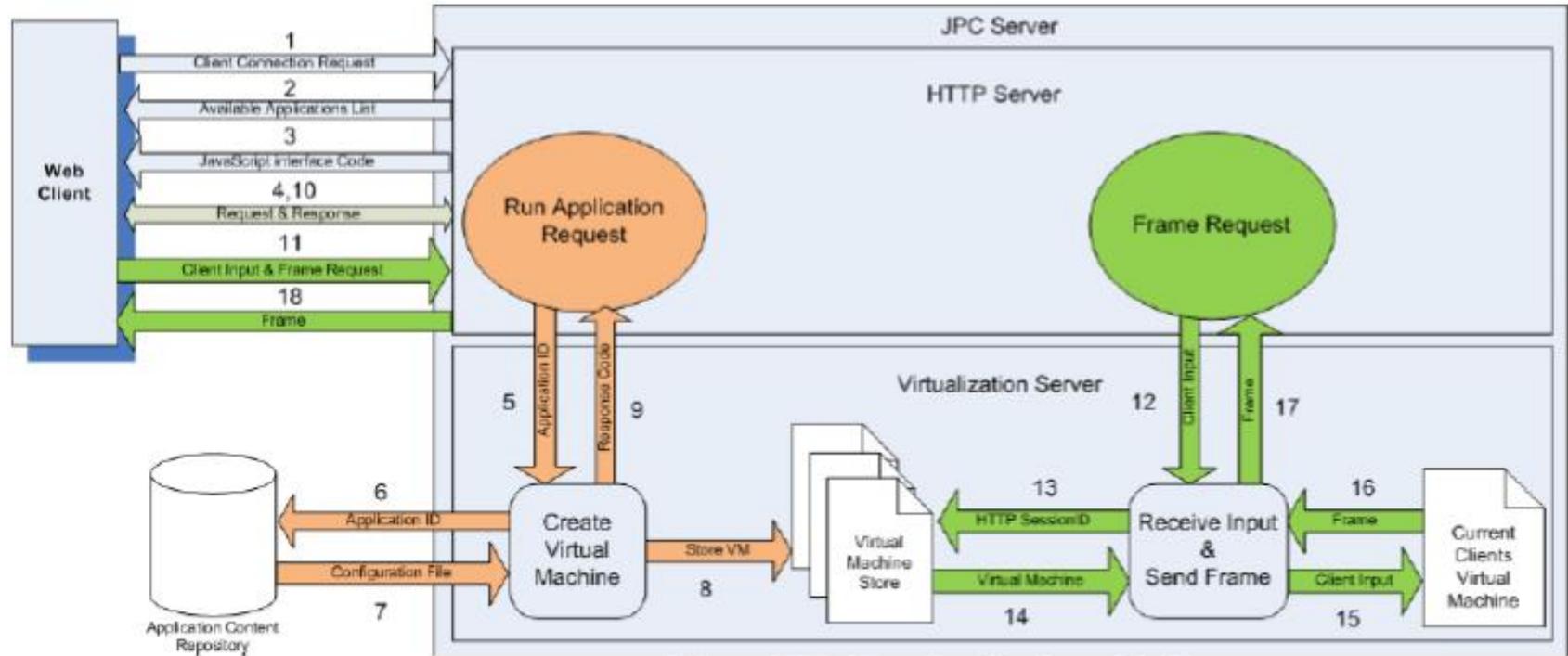


Figure 3: System Architecture Design



Saved Sessions

Application: Duke Nukem Play Time: 00:04:52 Date Started: 05/09/2009 Last Accessed: 03/09/2009		Application: Lemmings Play Time: 00:11:10 Date Started: 14/08/2009 Last Accessed: 01/09/2009	
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Live Games

Player	Game	Actions
627346197	thesecrettomonkeyisland	Watch, Clone, Kill
-723770134	lemmings	Watch, Clone, Kill

Recorded games

Game	Timestamp	Playtime
Duke Nukem 2	12/10/2009	10 minutes 53 seconds
Doom	13/10/2009	15 minutes 22 seconds

Available Games

Reconnect to Emulator

Figure 10: Games Selection screen, showing saved sessions, live game and recorded games.

Design phase: user interface

Using standard Javascript UI libraries implemented scenarios.

User tasks mapped to UI features.

Validation phase: portability

Using standard Javascript UI libraries implemented scenarios.

Prototype focused on Chrome browser on desktop with intention to port to phone.

Libraries capable of working on phone were used.

	JavaScript Interface and Input Methods Supported	Resolution Supported
 IE6	✓	✓
 IE7	✓	✓
 IE8	✓	✓
 Firefox 3	✓	✓
 Safari 4	✓	✓
 Chrome Beta	✓	✓
 Opera 10	✓	✓
 Konqueror 3.5	✓	✓
 Android OS Browser	✗ (Touch screen not supported, but a translation could be implemented)	✓
 iPhone Browser	✗ (Touch screen not supported, but a translation could be implemented)	✓

Table 2: Browser Support

Validation phase: responsiveness and game play

Two adventure games (with different input modes) and first person shooter.

19.8 fps approximately 50.5ms responsiveness.

Another student project using based on similar technology to the EU project's *Emulation as a Service* achieved 50ms without sound and 80ms with sound.

Game	Average Frame Rate (fps)	Standard Deviation (fps)
Monkey Island (mouse input)	22.3	5.6
Prince of Persia	18.6	7.6
Doom	18.4	6.2
Average=	19.8	6.5

*Validation phase:
heuristic evaluation*

How usable was the user interface?

Compared with standard heuristics for web design.

Small group of experts walkthrough the scenarios.

Identified various improvements.

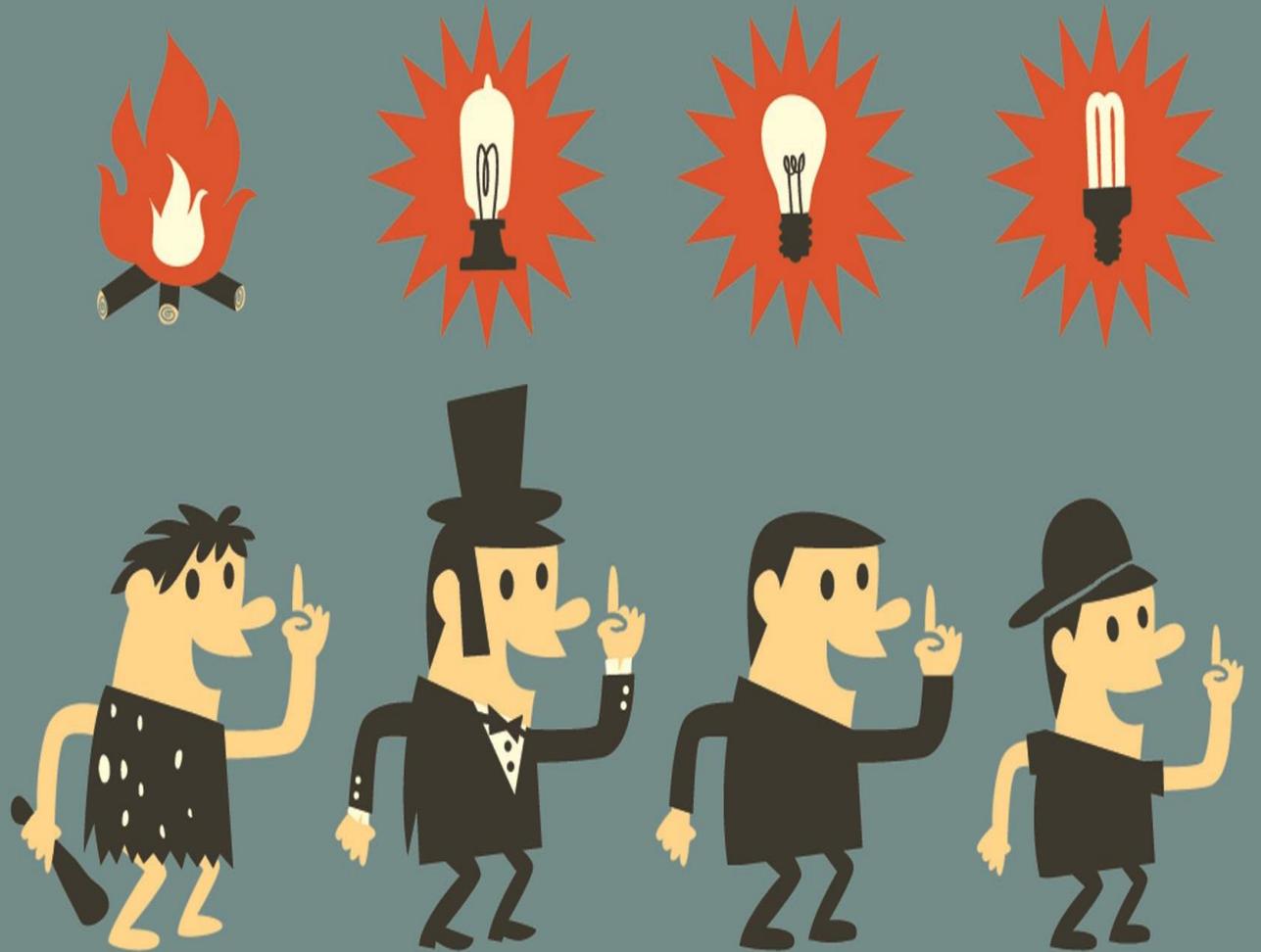
Issue	Rating
Guidance to setup a user account	2
Reasoning for registering	2
Visualisation of Microbee computer	2
Clickable links not clickable	2
Obscured placement of game descriptions	2
Bigger Canvas for Game	2
Contradicting current tape indicator	2

What next?

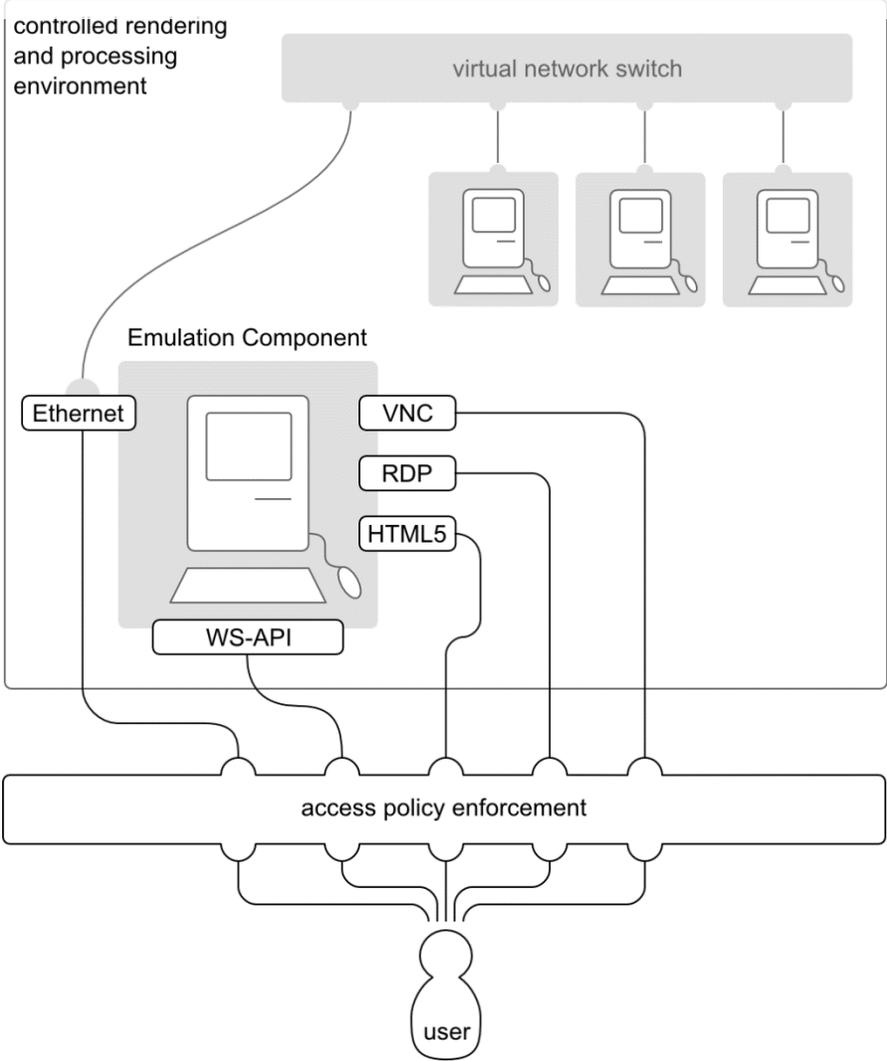
1. Is IP still a problem? If not casual access via Javascript emulators and other users use remote service.

2. Access to a different group of users to validate requirements?

3. Adopt off-the-shelf solutions and implement mobile device support.



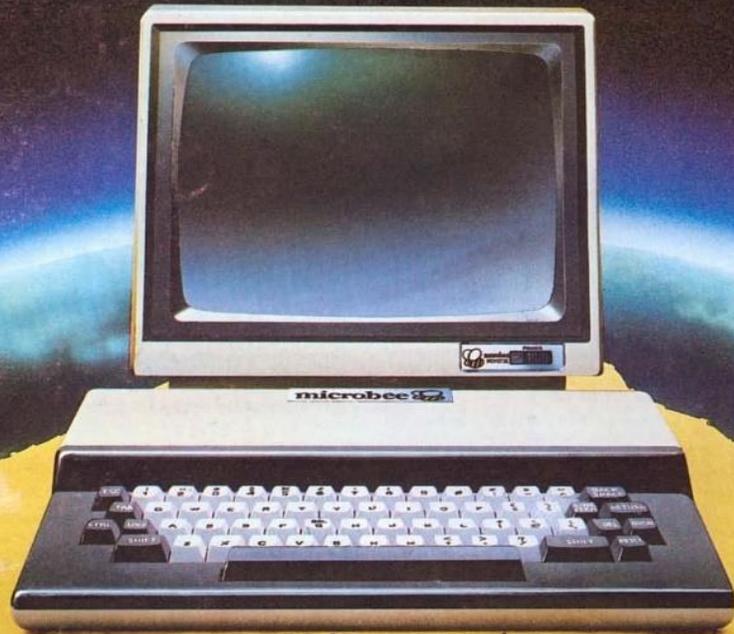
Emulation as a service (Klaus Rechert, Dirk von Suchodoletz, Isgandar Valizada)



**Historical software collection
(Internet Archive)**

MICROBEE

AUSTRALIA'S HOME GROWN COMPUTER



Wanted to focus on delivering experience of using a historically significant computer on a mobile device.

Work situated within the University context, exhibiting to students within the University.

Findings are specific, approach is generic.