Supporting Context-Aware Applications Using Thin Clients

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UCSD
Introduction
  - Sample device
  - Sample application

Definitions
Adding a Smart Proxy
Proposed Experiment
Conclusion
Devices

Zypad Wearable Computer
128 MB Ram
GPS, Accelerometer

Video Glasses
Application

- Displaying contextual information about the user’s location

Virtual Worlds
Maps
Historic Information
Introduction

Definitions
- What is thin client computing?
- Why thin client computing?

Adding a Smart Proxy

Proposed Experiment

Conclusion
What is Thin Client Computing?
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Diagram:

- User input
- Internet
- Screen updates

User interacts with a client device that communicates with a server via the internet. Updates are sent to the client's screen.
Why Thin Clients? Lightweight Devices
Why Thin Clients?

Intensive Applications

- Machine Learning/Vision
  - Object recognition
  - Speech recognition
- Graphics
  - Rendering
- Data Storage
  - Video
Introduction

Definitions

Adding a Smart Proxy
  - Resource Assumptions
  - Server-Client vs Server-Smart Proxy-Client
  - Uses of the Smart Proxy

Proposed Experiment

Conclusion
Resource Assumptions: Active Wireless Spaces

- **Client**
  - Wireless link
  - Computing resources
  - Internet
  - Server

- **Server**
Server-Client vs Server-Smart Proxy-Client

Server-Client

client --server

Server-Smart Proxy-Client

client --smart proxy --server
Uses of the Smart Proxy

- Buffering updates
- Compress or Decompress Updates
  - Scalable Video Coding
- Video Processing
- Encryption
- Introduction
- Definitions
- Adding a Smart Proxy
- Proposed Experiment
  - Experiment
  - Advantages
- Conclusion
Experiment

- Server sends smart proxy larger chunks of video based on GPS coordinates from Zypad client.
- Smart proxy selects which video should be displayed based on accelerometer and sends it to the client.
Advantages

- Smart proxy can quickly send fine-grained updates to the client.
- Smart proxy can cache video and data related to its locality.
- Smart proxy doesn’t need to keep large amounts of video, since all video is originally stored on the server and sent to the smart proxy as needed.
- Client doesn’t have to do anything more complicated than displaying video and forwarding GPS and accelerometer coordinates.
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Conclusion

- By adding a smart proxy to thin client systems, we can have faster updates that are finely-tuned to fit the client device’s needs.
- This will help us build context-aware applications that require a significant amount of computation, but can be accessed by low-power devices.