Improving VNC Performance with the Smart Proxy Architecture

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UCSD
Introduction
  - What is Thin Client Computing?
  - Why Thin Clients?
  - What is VNC?
  - Latency and Performance
  - Defining Performance

The Smart Proxy Architecture
Results & Conclusion
What is Thin Client Computing?
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User input

Screen updates

internet
Why Thin Clients?
Lightweight Devices
Why Thin Clients?
Intensive Applications

- Machine Learning/Vision
  - Object recognition
  - Speech recognition
- Graphics
  - Rendering
- Data Storage
  - Video
Why Thin Clients?
Security & Data Loss

- A lost laptop doesn’t mean lost data
- Helps companies stay compliant with privacy laws such as HIPAA
What Is VNC

- VNC is a widely-used thin client system with several available open-source implementations.
Latency and Performance

Desktop

Thin Client

internet
Defining Performance

1. Client requests new update
   - Client
   - Server
   - request

2. Client waits
   - Client
   - Server

3. Server sends update
   - Client
   - Server
   - update

4. Client processes update
   - Client
   - Server
Introduction

The Smart Proxy Architecture
  - Resource Assumptions
  - The Smart Proxy Architecture
  - The Proxy & VNC
  - Example

Results & Conclusion
Resource Assumptions: Active Wireless Spaces
Smart Proxy Architecture

- GPS
- video
- earpiece
- PDA
  - client
- wireless
- smart proxy
- internet
- server
  - web server
  - game server
  - web server
  - world
The Proxy and VNC

- The Smart Proxy sends requests to the server at the rate the client is processing them, without waiting for an update from the server.
- This lets the Smart Proxy adjust for time delays between the client and server.
Example

- Client sends request - 200 ms
- Server processes - 5 ms
- Server sends update - 200 ms
- Client processes - 5 ms

Total time = 410 ms
Example

- Proxy processes - 5 ms
- Proxy sends update to Client - 15 ms
- Client processes - 5 ms
- Client sends request - 15 ms

Total time = 40 ms
Example

- The proxy sends requests to the server at the same rate the client is processing them, without waiting for a response from the server.
Results
Conclusion

- We can improve VNC performance by having a Smart Proxy mediate the update rate over network delays.
- Faster thin clients can help us integrate powerful computing into our mobile lives.