

# A visualization tool for geographic information of NTP servers

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# Outline

- 1 Domain Description
- 2 The Solution
- 3 Software Demo
- 4 Conclusion

# Domain Description

- NTP - Network Time Protocol
- Self-organized network
- Frequent exchange of messages

# NTP Survey

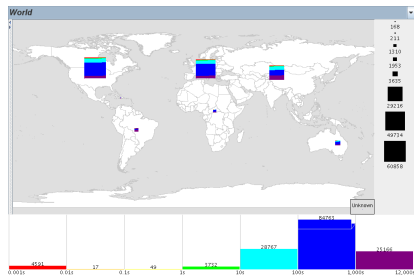
- NTP survey in 2005
- Data query, collection and analysis
- <http://www.ntpsurvey.arauc.br>
- 1,290,819 unique addresses found
- 147,251 complete responses

# Tasks

- Overall visualization of the geographic topology
- Deficient NTP servers identification
- Geographic topology and deficient NTP servers identification in a specific geographic region

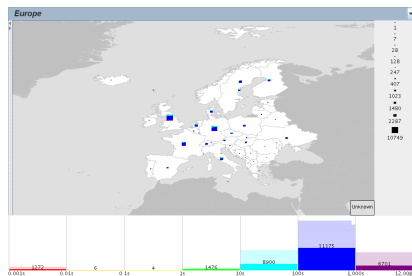
# Main Window

- Map of the region in focus
- Rectangle for each subregion
  - Colour: delay
  - Size: # servers
- Bottom: Histogram
  - Colour and X-axis: delay
  - Y-axis: # servers



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# Implementation Approach

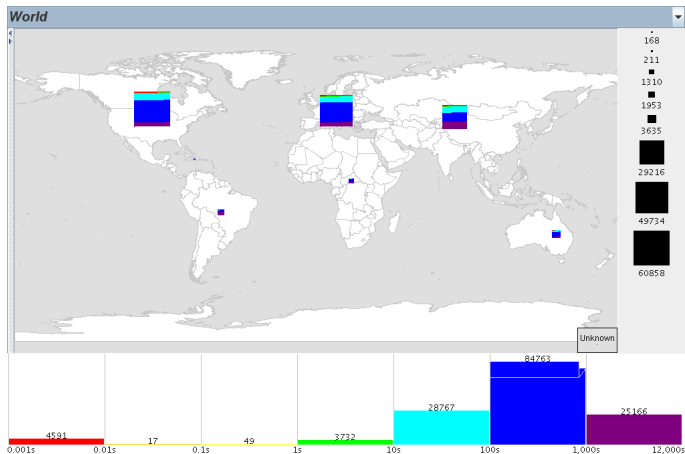
- Java2D, Swing
- Maps using GIS boundary information
- Location using GeoLiteCity data
  - Location information previously obtained for each server



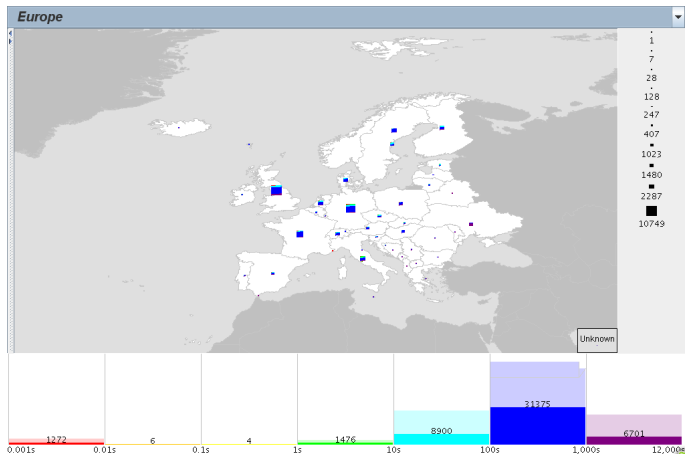
# Software Demo

- Demo
- Scenario of Use

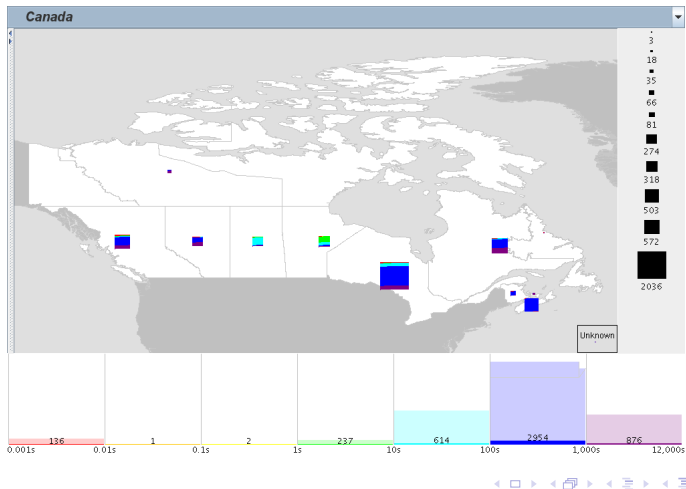
# Screenshots



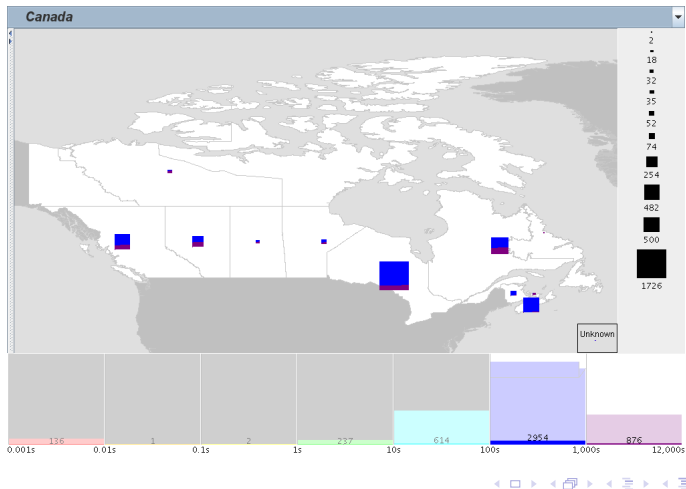
# Screenshots



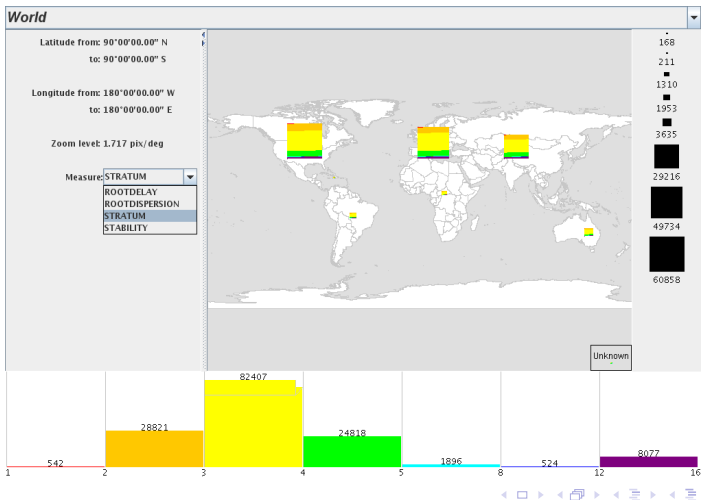
# Screenshots



# Screenshots



# Screenshots



# Conclusion

- Visualization tool for geographic visualization of NTP servers
- Search for good or deficient servers in a region

# Future Work

- Performance improvement (reduce latency and usage of CPU)
- Multiple filtering
- Detailed view of servers
- Filter by IP address



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