A visualization tool for geographic information of NTP servers

Project Update

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Outline

1. Domain Description
2. Proposed Solution
3. Project Update
4. Conclusion

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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](http://www.ntpsurvey.arauc.br)
- 1,290,819 unique addresses found
- 147,251 complete responses
Available data

- For each server:
  - IP address
  - System information
  - *Stratum* and source of time information
  - Delay, dispersion, jitter
  - Clock stability

- For each association:
  - Source and destination addresses
  - *Stratum*
  - Delay, dispersion, jitter, offset
Tasks

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

- Map of the region in focus
- Rectangle for each subregion
  - Colour: variable in focus (delay, dispersion, etc.)
  - Size: number of servers
- Bottom: Histogram
  - Colour and X-axis: variable in focus
  - Y-axis: number of servers
Main Window

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Main Window

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Sources of time information
Focus on used source
Implementation Approach

- Java2D, Swing
- Maps using GIS boundary information
- Location using GeoLiteCity
What is done

- Geographic visualization
- Zoom and pan with animation
- Organization of NTP servers data
- Datafile with NTP servers data and location information

A visualization tool for geographic information of NTP servers
Main Window - in progress
Next steps

- Color-coding of regions
- Grouping data per continent (at least for Europe)
- Labeling
- Histogram
- Improvement in linking and representation of servers per region
- Detailed view of a server
- Range selection
- Some processing time issues
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