

The background of the slide features a complex network topology visualization. It consists of numerous small, light gray circular nodes connected by thin, light gray lines. The nodes are distributed across the entire slide, with a higher density in the upper right and lower left areas, creating a sense of a global or interconnected network. The overall aesthetic is clean and technical.

Network Topology Visualization

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BGP Network Topology

► Goals

- Define and measure nodes of interest
- Gather data with the right tools
- Visualize results



Tools

Data Gathering

- ▶ Icmplib
- ▶ Ipinfo
- ▶ Aslookup

Visualization

- ▶ Django
- ▶ JQuery
- ▶ Chart.js
- ▶ Openlayers

Debugging

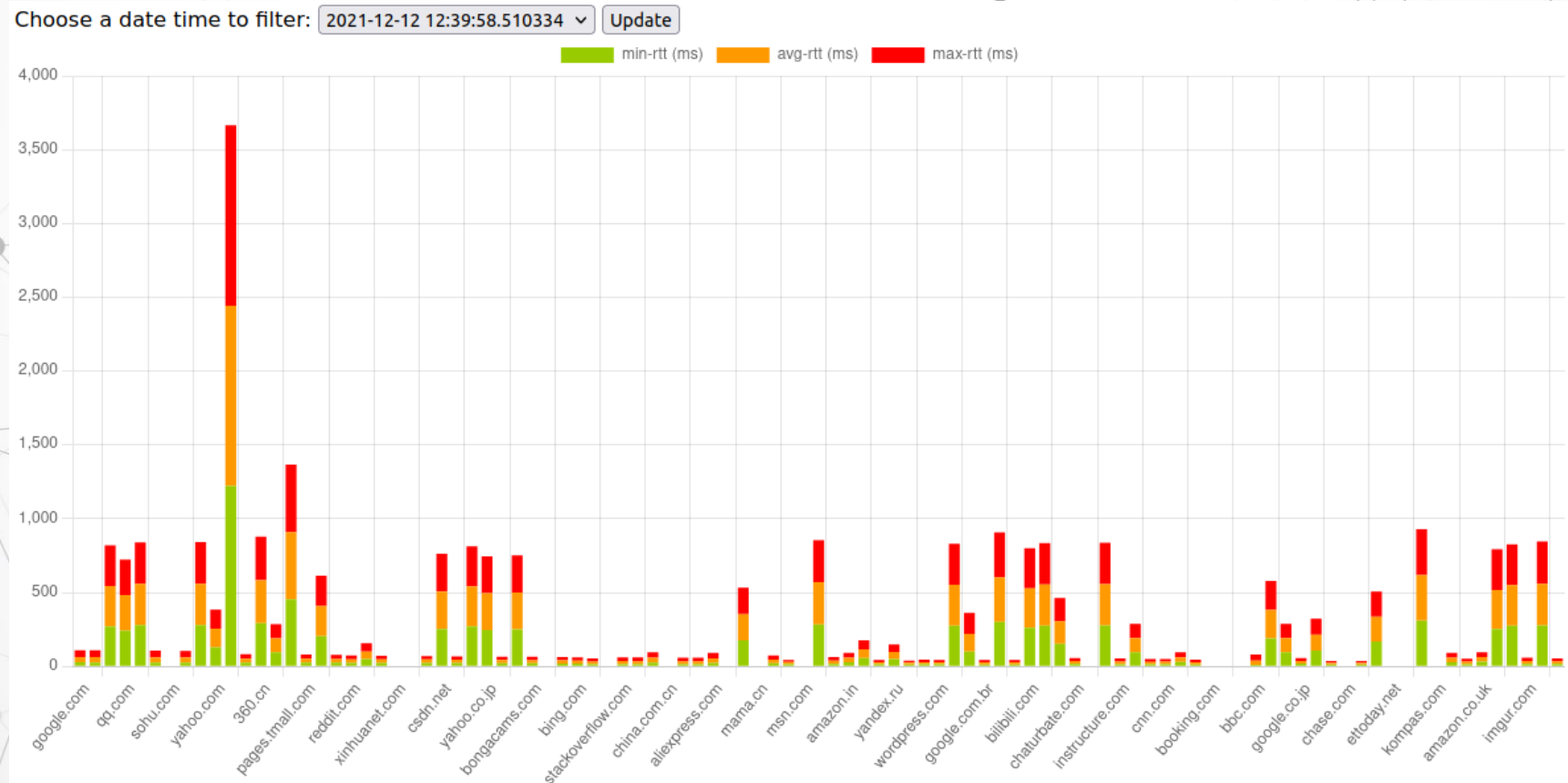
- ▶ Wireshark
- ▶ Dropwatch

Measurements & Data

- ▶ Measurements:
 - ▶ Parsing handled by packages
 - ▶ Stored using Django database model
 - ▶ SQL access and insertion
 - ▶ Data extracted and converted to JSON
- ▶ Data:
 - ▶ Top 100 websites
 - ▶ Newspaper websites + social media
 - ▶ VPN

Ping Visualization

► Min-rtt, average, max



Ping Visualization

► Timeline visualization for host

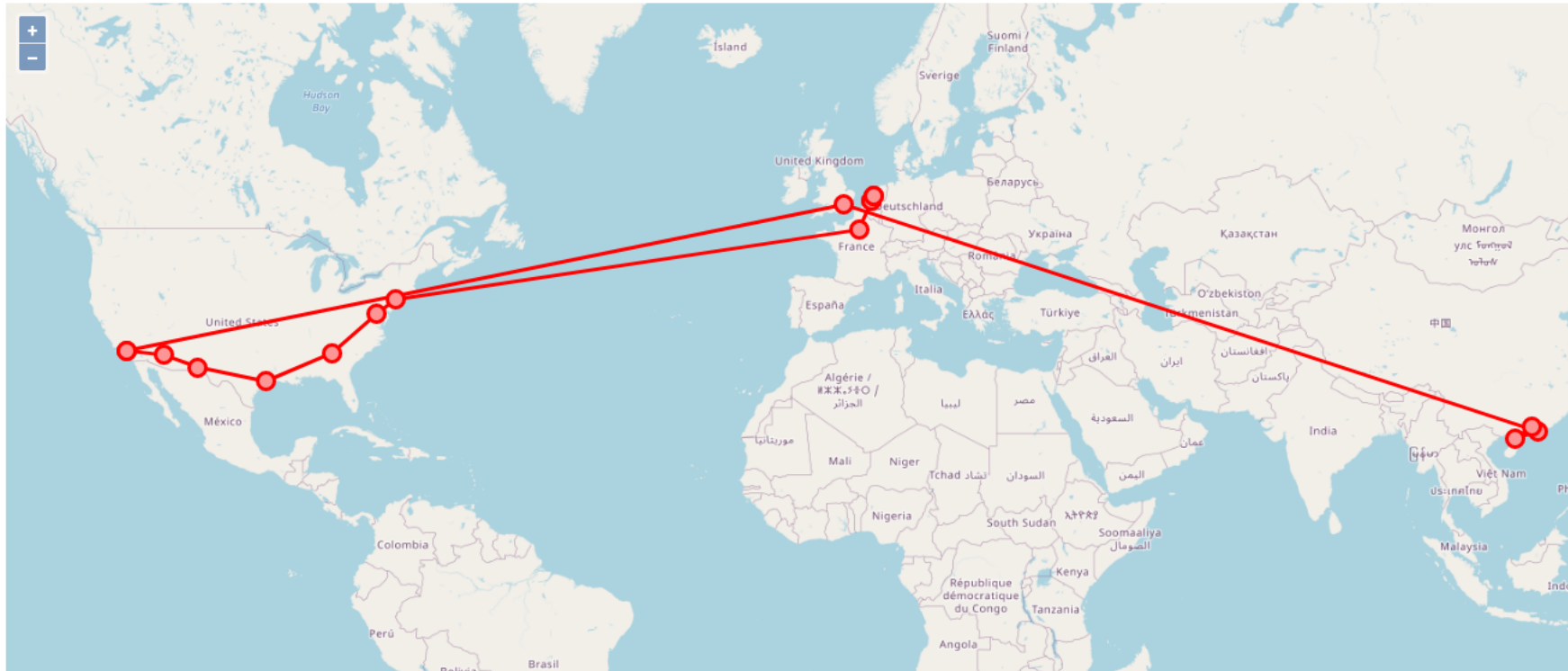


Traceroute Visualization

► AS number + Countrycode path and Map (geolocation)

Choose a date time to filter: 2021-12-12 11:43:02.472259 Choose a domain name to filter: chinadaily.com.cn Update

AS15435(NL) -> AS15435(NL) -> AS174(NL) -> AS174(NL) -> AS174(FR) -> AS174(US) -> AS174(US) -> AS174(US) -> AS174(US) -> AS174(US) -> AS174(US) -> AS174(US) -> AS174(US) -> AS58453(GB) -> AS58453(HK) -> AS9808(CN) -> AS9808(CN)



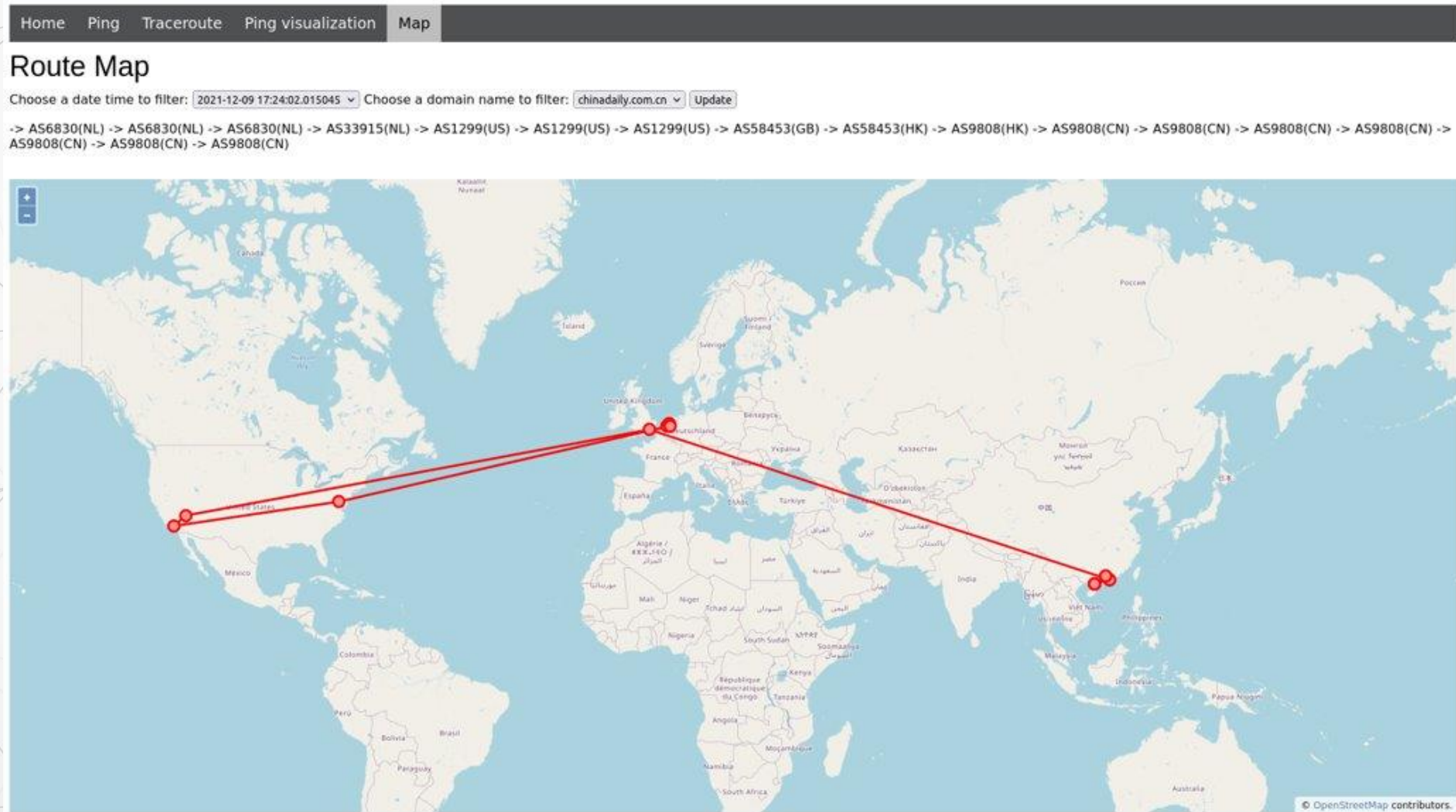
The background of the image is a light gray with a subtle, abstract pattern of interconnected nodes and lines, resembling a network or a molecular structure. The nodes are small circles of varying shades of gray, and the lines are thin, light gray lines connecting them. The pattern is more dense in the corners and fades towards the center.

DEMO

Results

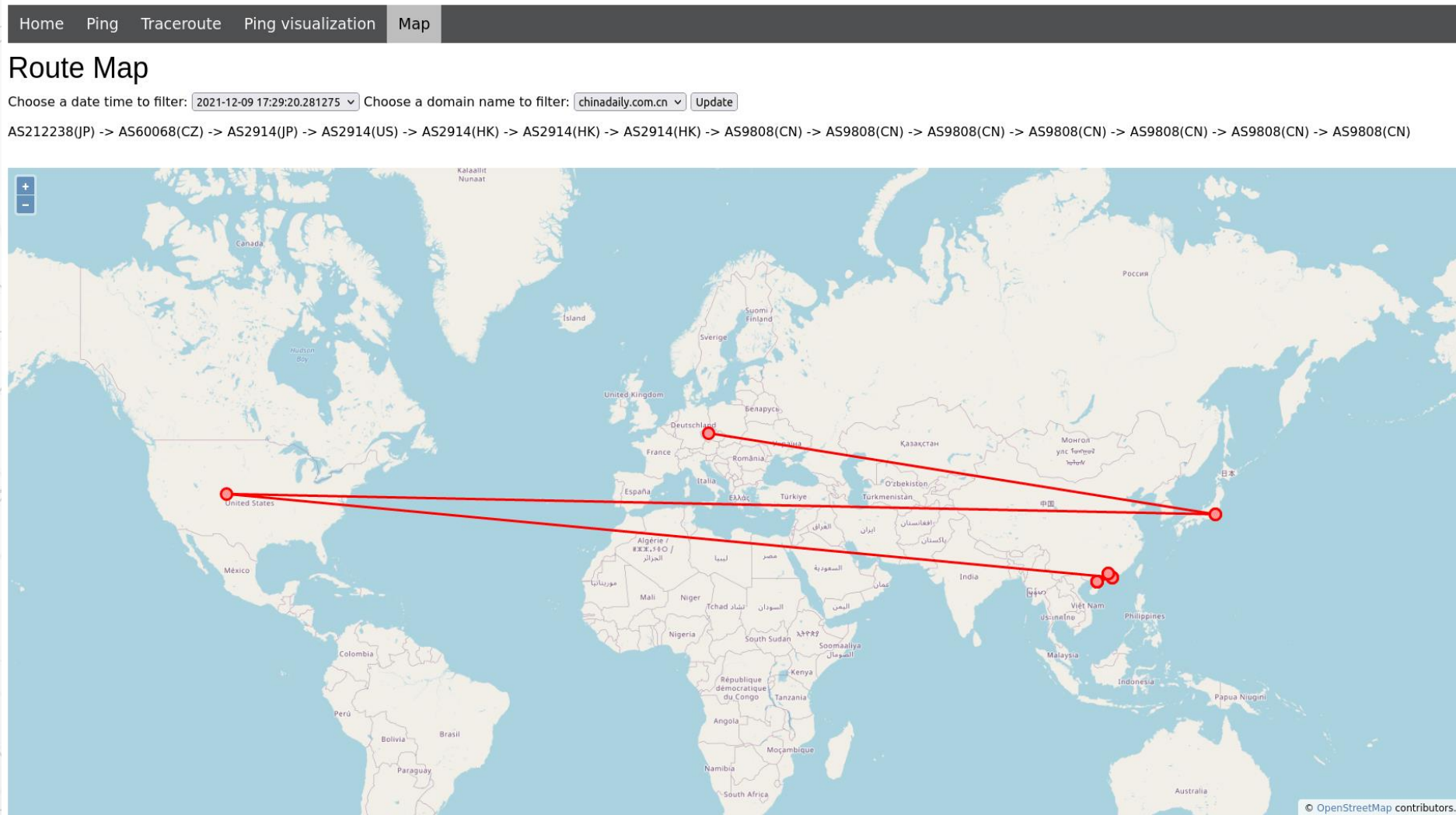
- ▶ Chinadaily.com.cn
- ▶ No VPN vs. VPN

Chinadaily.com.cn (No VPN)



Chinadaily.com.cn (Japan: VPN)

Note: Starting point is visited twice sometimes!



Limitations

- ▶ Corelation ping & traceroute
 - ▶ Possibly different paths
- ▶ Use 1 specific API/database for the GeolP lookup
 - ▶ Different API's might return different locations
- ▶ Difficult to explain routing decisions
 - ▶ No ground-truth
- ▶ Network unreliable
 - ▶ Packet drop by kernel if hugely parallel
 - ▶ Debugging can be difficult and time consuming (dropwatch, wireshark)

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QUESTIONS?