A Glimpse at the Internet Performance in the 2022 Conflict in Ukraine

Tal Mizrahi, Jose Yallouz
Technion – Israel Institute of Technology

IETF 114, MAPRG
July 2022

Russian Invasion of Ukraine

24 February, 2022
Data Sources

This research is based on publicly available data from various sources:

- UNHCR
- Cloudflare Radar
- Google Transparency Report
- similarweb
- RIPE Atlas
- statcounter
- SPEEDTEST

Data was captured on the first half of May, 2022.
Internet Performance: An Asymmetric Trend

Speedtest median results on the first month of the war

- Can be explained by damage and disruptions to infrastructure.
- Can be explained by the reduction in streaming consumption.

Dotted line marks the beginning of the war.
A significant decrease in Ukraine, an increase in Russia.
“As the conflict has continued, we’ve seen a dramatic increase in requests from Russian networks to worldwide media, reflecting a desire by ordinary Russian citizens to see world news beyond that provided within Russia.”

Cloudflare CEO Matthew Prince
Streaming in Russia

Youtube traffic rate dropped on March 4th. Correlated to social media blocking.

The significant drop in streaming traffic can explain the Speedtest performance improvement in Russia.

[Yahoo News, 7 March 2022]

[CBS News, 4 March 2022]
Web Search Rate [Google]

Normalized Search Traffic - Ukraine

Normalized Search Traffic - Russia

Mizrahi, Yallouz
The Ukrainian Refugee Crisis

Ukrainian Refugees

[UNHCR] publishes daily statistics about Ukrainian refugees crossing the border to neighboring countries.

> 9 million crossed the border [July, UNHCR]
> 25% of the population internally displaced [estimated numbers]
Focusing on the First 3 Weeks

First 3 weeks of the war

Derivative

Mizrahi, Yallouz
Correlating the Refugee Rate to Internet Measurements

Refugee rate is highly correlated to navigation apps and to mobile device usage.

Refugee Rate [UNHCR]

Google Maps Traffic Rate [Google]

Mobile-to-desktop ratio [Statcounter]

The Refugee Flow

While there is accurate data about refugees that cross the border, there is no accurate data about where refugees end up staying. Traveling within the EU is not monitored.

[UNHCR]

A first step towards helping and supporting refugees is knowing where they are.
UNHCR Data

- Data collected from the government of each country
- Data collected from humanitarian organizations such as the red cross

Use publicly available Internet measurements - the approach presented in the current work

A complementary approach that does not compromise privacy issues

Border crossings

Non-public measurement data, e.g., from mobile operators, content providers, etc.

Not clear if this is done today, and may have privacy issues

Mizrahi, Yallouz
Using Website Analytics

We combined two sources of data:
- Top accessed Ukrainian sites [Similarweb]
- Website visit location [Cloudflare]

4.84% of the visits to google.com.ua came from Germany
Estimating the Ukrainian Presence

- Top 15 accessed Ukrainian sites [Similarweb]
  Eliminated international sites such as facebook.com and yandex.ru

- For each site: extracted the visit percentage from each country [Cloudflare]

**Maximum likelihood** estimation of the percentage of Ukrainians in each country.
Each website had a weight that is proportional to the number of visits per month.

Work-in-progress: estimating the number of refugees by comparing to historical data.
Conclusion

• This work-in-progress shows how the refugee crisis affected Internet performance in Ukraine and around it.
• We presented a method of mapping the Ukrainian presence throughout the world using website analytics.
• The methods presented in this work can potentially be use as a complementary means for assessing the distribution and the flow of refugees throughout the world.
Thanks

Our hearts are with the families of the casualties and with the refugees. We hope that the conflict will be resolved soon.
References
