CenAlert: Amplifying User Voices to Rally Censorship Measurement

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Landscape of Censorship Measurement

Active Measurement

OONI: Crowd-sources tests for blocking at multiple network layers.

Censored Planet: Remote measurements over six different protocols.

Shutdown Detection

IODA: Monitors BGP advertisements and network telescope traffic.

Industry Data: Google, Cloudflare, and Mozilla telemetry show traffic drops.

Circumvention Metrics

Tor & Psiphon: User metrics react to new censorship policies.

Growth Spikes: Often indicate new blocking of social media platforms.

Over the years, we have learned that **censorship observatories perform at their best** when **empowered by real-time alerts** from the NGOs and communities living through it.

CenAlert: Repurposing Data for Oversight

The Challenge

Traditional **censorship alert channels (NGOs/activists)** are **increasingly threatened** by anti-NGO legislation and funding cuts.

This creates a gap and bias in detailed research on different regions.

The Opportunity

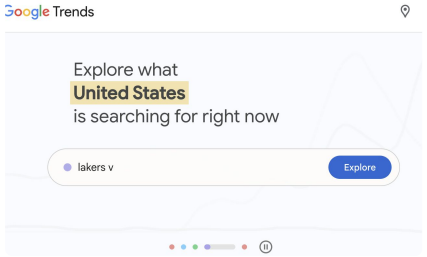
Big Tech companies collect vast amounts of user data.

→ It can be used to **support anti-censorship efforts**.

The Solution: CenAlert

CenAlert leverages **Google Trends** to detect shifts in search interest for circumvention tools.

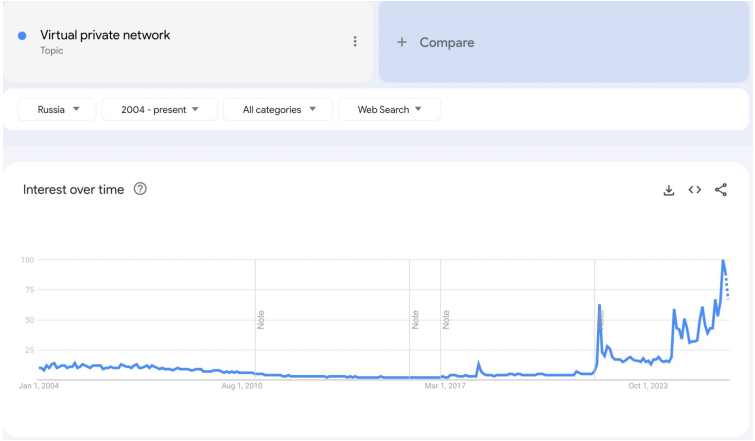
User-Driven: Detects spikes in demand for VPNs and other tools.



Using Google Trends for Censorship Alerts

The Role of Google Trends

Google Trends provides anonymized, aggregated search data dating back to 2004.



Key Data Challenges

- **Variability:** Random sampling can yield different results for identical queries.
- **Normalization:** Values are relative to the time series maximum (0-100).
- **Resolution:** Daily data is only available for windows up to 270 days.
- **Sparsity:** Time series may contain high proportions of zero-volume days.

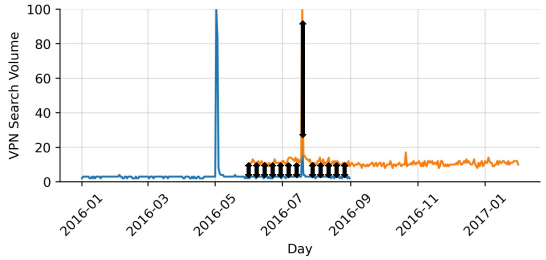
Censored Planet

CenAlert Methodology: Raw Data to Alerts

Data Collection & Stitching

CenAlert aggregates multiple random samples to mitigate variability.

Short windows are stitched into a single longitudinal time series using median ratios for normalization.



STITCHING & SCALING

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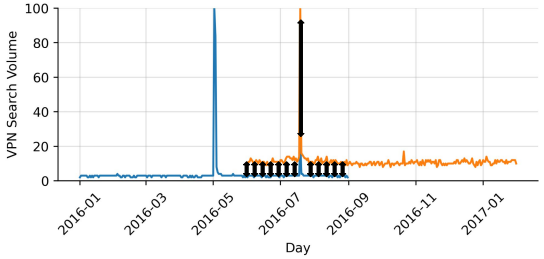
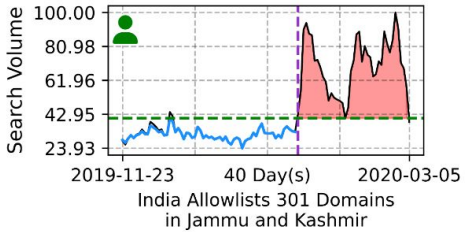


STITCHING & SCALING

Dynamic Anomaly Detection

Uses Z-Score for standard patterns and Croston's Method for sparse, intermittent data.

Per-country parameter tuning optimizes for visibility vs. effort.



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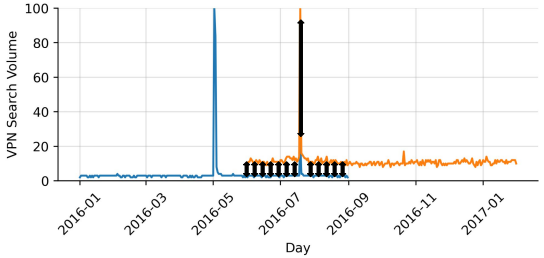

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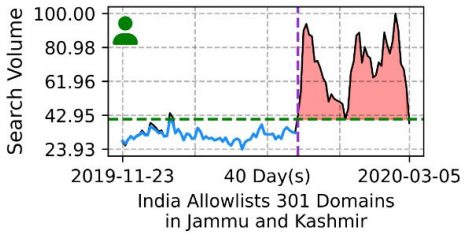
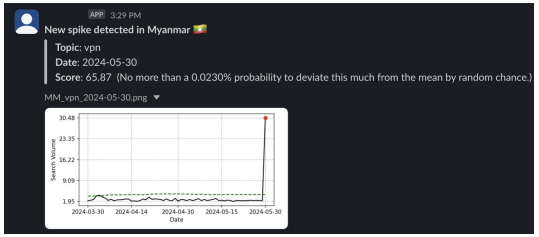


ANOMALY SCORING

Impact Scoring & Alerting

Spikes are assigned an **Impact Factor** quantifying the cumulative demand shift.

Notifications are pushed via **Slack webhooks** and API for community investigation.



PRIORITIZED ALERTS

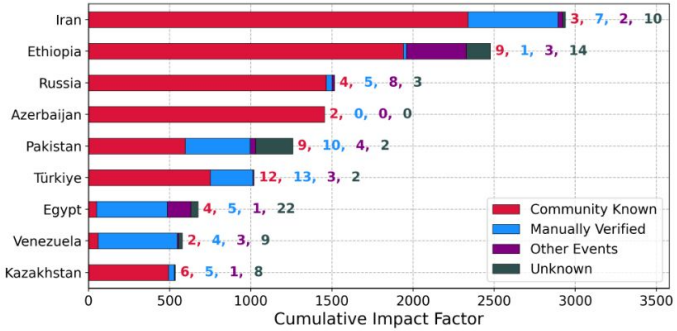
CenAlert Effectiveness & Validation Results

Global Performance

Excluding Shutdown events

14-Year Success: 191 explainable spikes out of 269 selected.

- **New Findings:** 68 censorship events detected were not previously reported.



153 CENSORSHIP EVENTS

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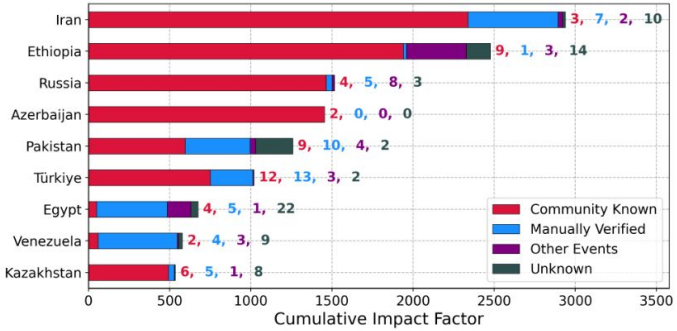

153 CENSORSHIP EVENTS

Detection Accuracy

- **Timeliness:** 108 cases **detected on the same day as the event.**
- **Reliability:** 91.2% of impact factor in restrictive nations is censorship.

HIGH-FIDELITY ALERTS

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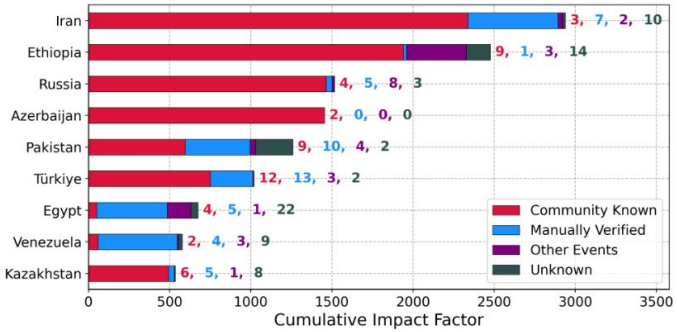

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HIGH-FIDELITY ALERTS

Operational Scope

- **Manageable:** Avg. <100 spikes/year; well within observatory capacity.
- **Low Effort:** Max-volume regions receive only ~1.79 alerts/month.

	Africa	APAC	Europe	EECA	LAC	MENA
Last 1 Month	2	1	0	1	0	1
Last 3 Months	4	6	1	4	0	4
Last 6 Months	5	13	6	8	6	9
Last 12 Months	10	25	9	12	9	21
Last 24 Months	21	43	14	26	12	43

MANAGEABLE VOLUME

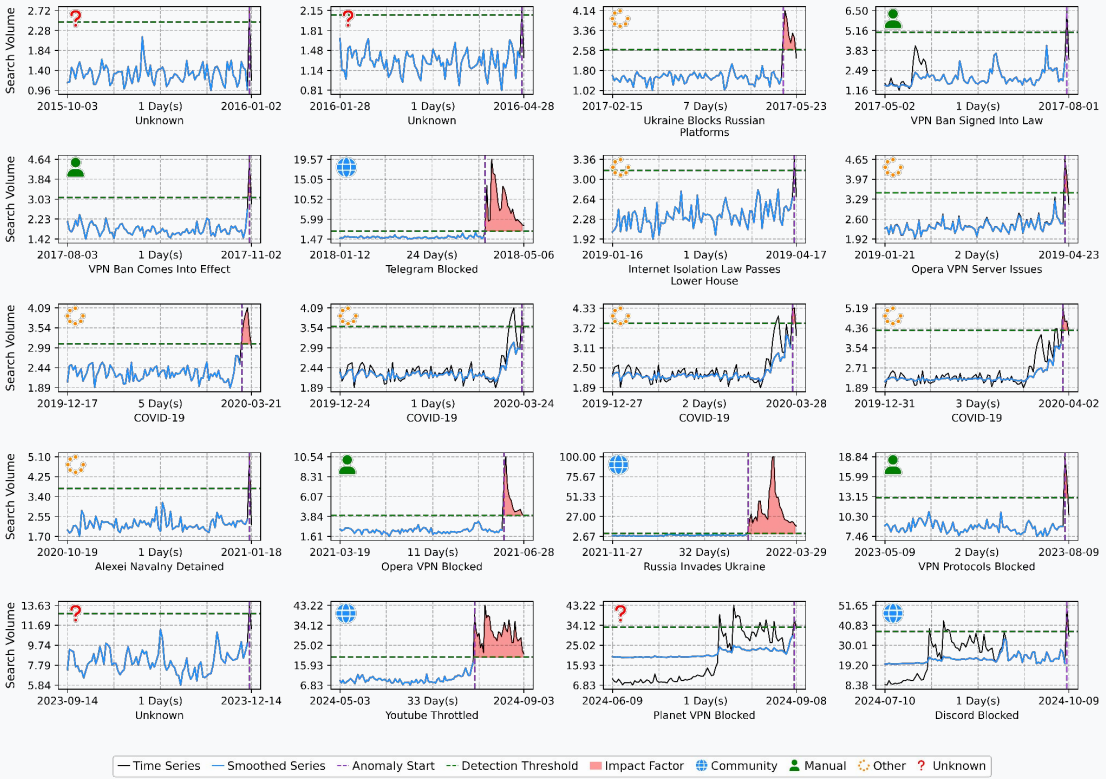
Case Study of Russia

CenAlert captures many high profile censorship events:

- Telegram blocked (April 2018)
- Russia's invasion of Ukraine (February 2022)
- VPN protocols blocked (August 2023)
- YouTube throttled (August 2024)

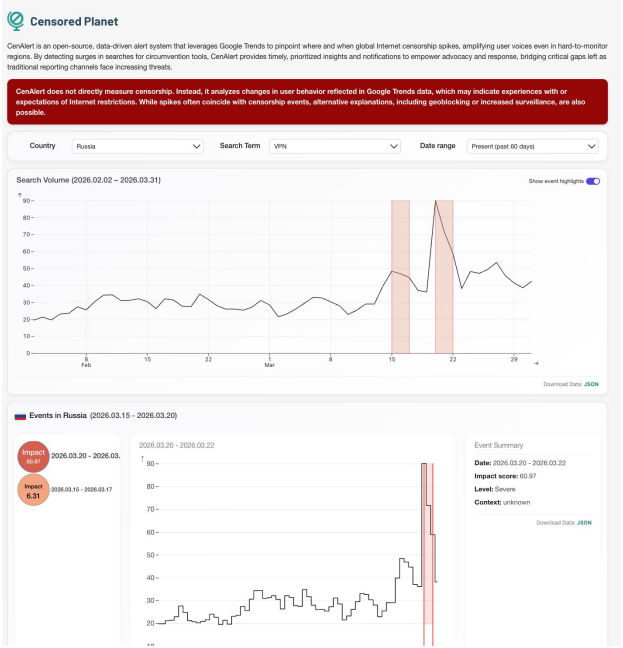
And political events and legislation affecting Internet freedom:

- Ban on VPNs used for circumventing blocking signed into law (July 2017) and takes effect (November 2017)
- Sovereign Runet law passes lower house (April 2019)
- Alexei Navalny detained (January 2021)



CenAlert in Practice

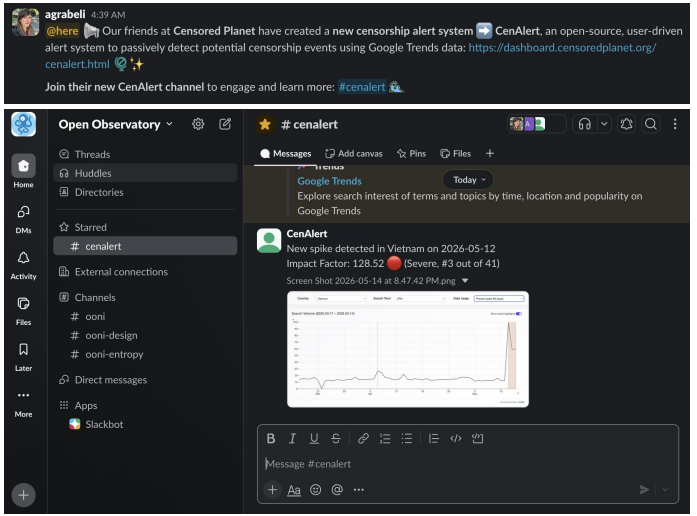
https://dashboard.censoredplanet.org/cenalert.html



CENALERT PUBLIC DASHBOARD

#cenalert in openobservatory.slack.com

OONI has **50+ partnerships** with NGOs and their Slack workspace hosts a community of **2,000+ Internet freedom researchers, activists, and advocates**.



OONI SLACK INTEGRATION

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