Insights into an Iranian Internet Shutdown

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Paderborn University

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Motivation

- Iran known for sophisticated censorship system

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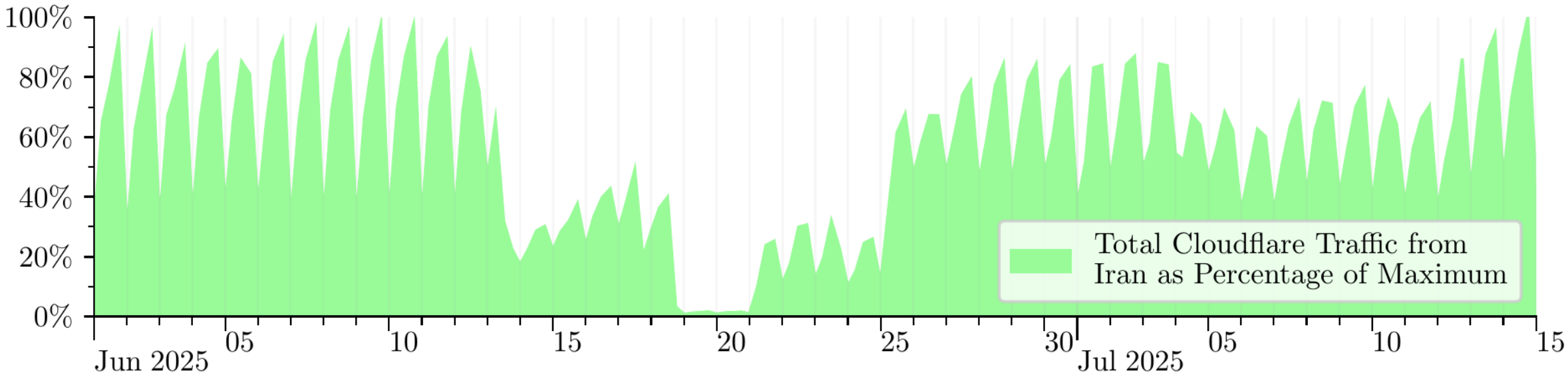
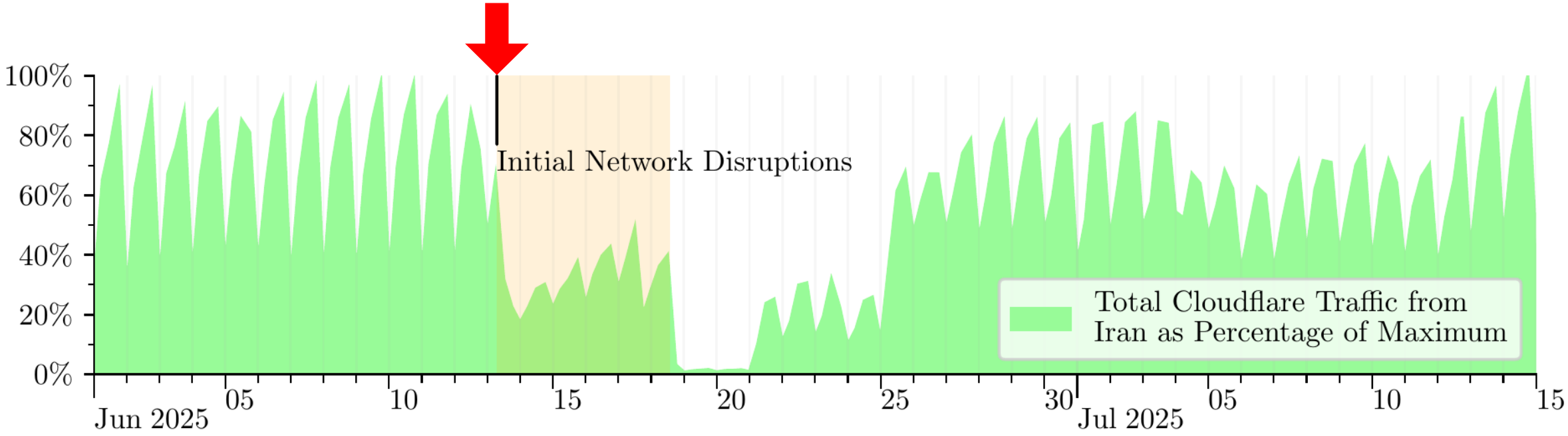
Contribution: Unique measurements surrounding June 2025 shutdown

June 2025 Shutdown



June 2025 Shutdown



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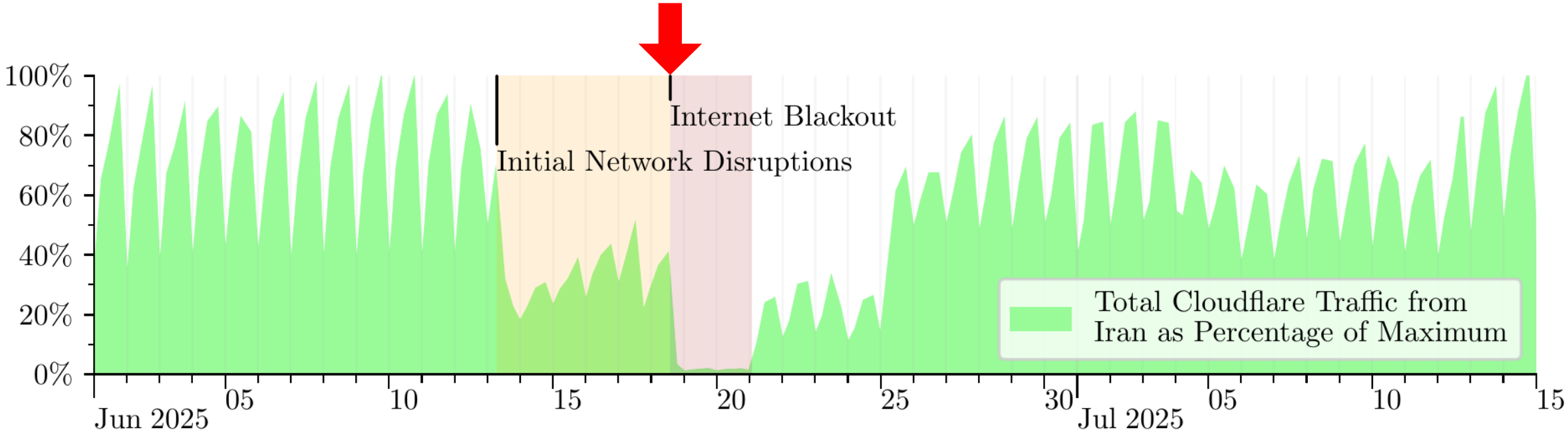

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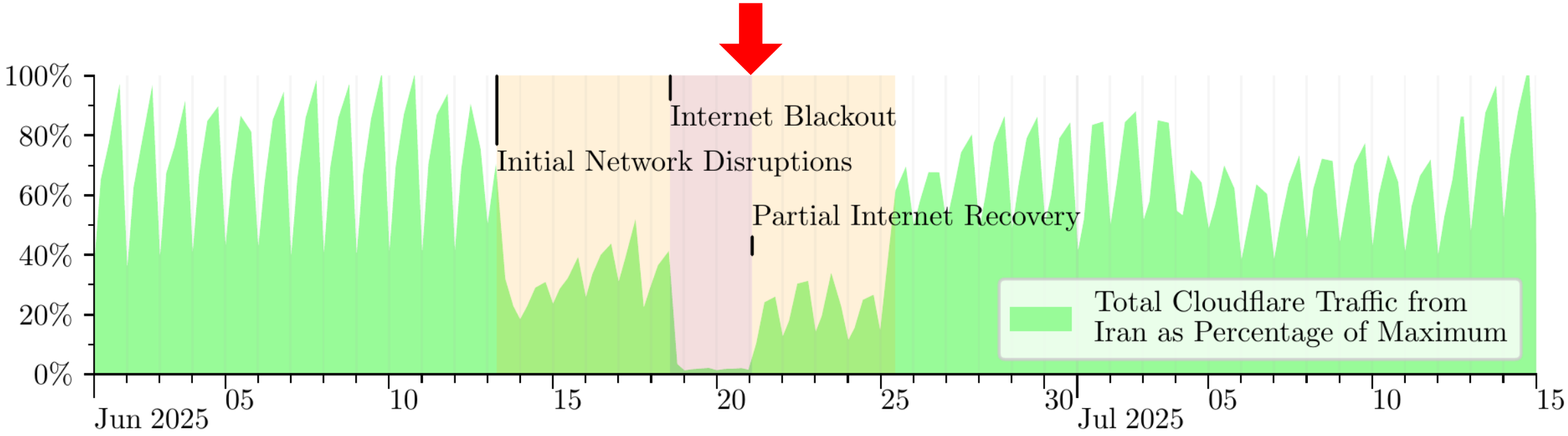

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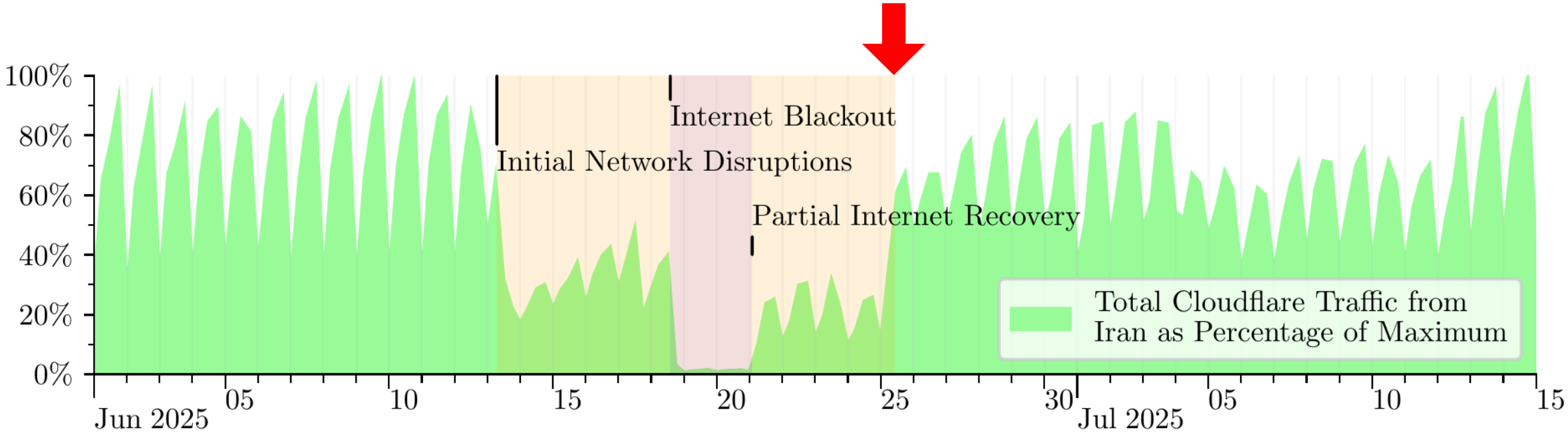

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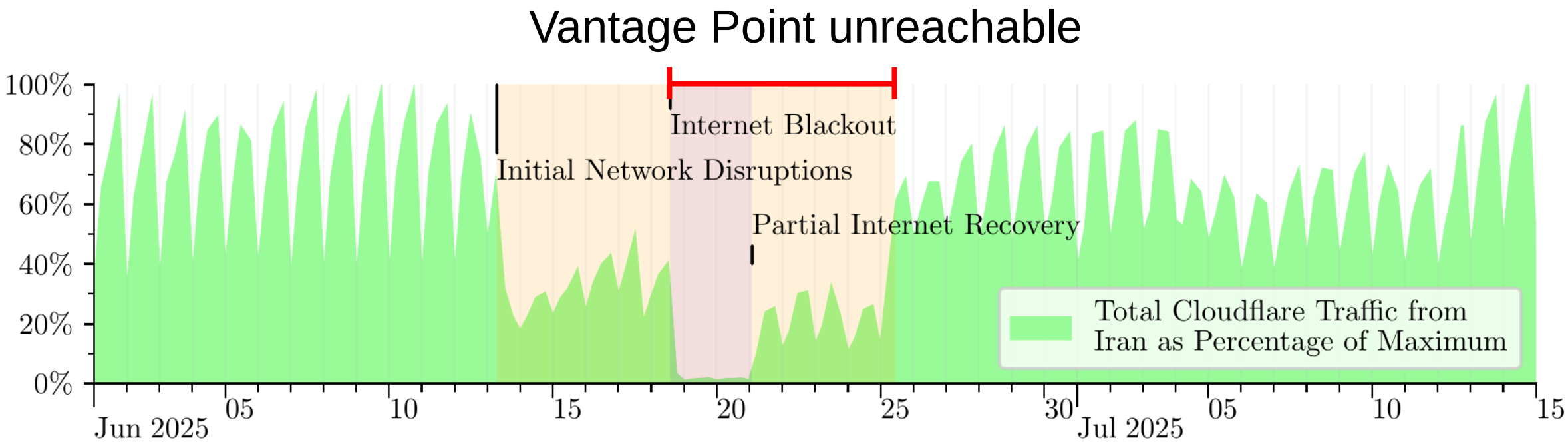

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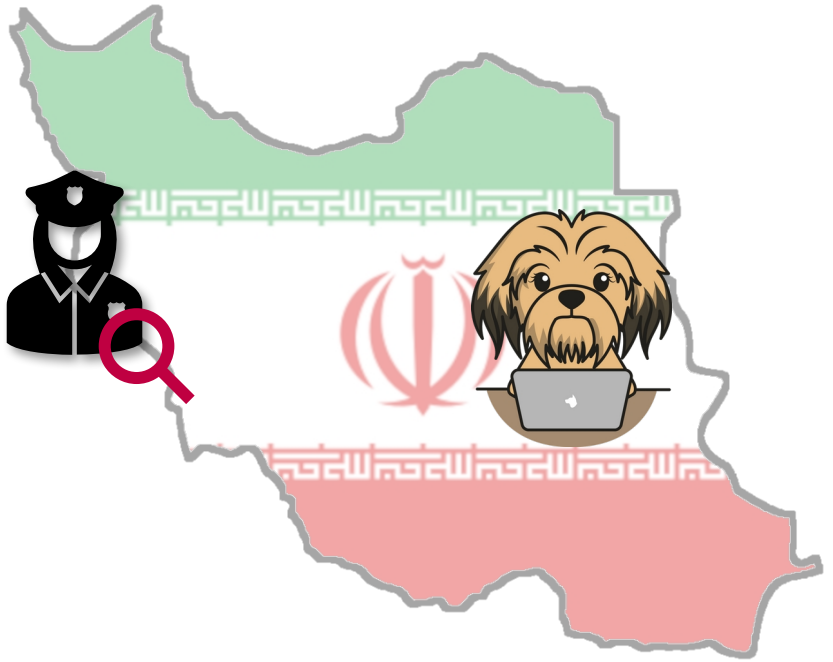

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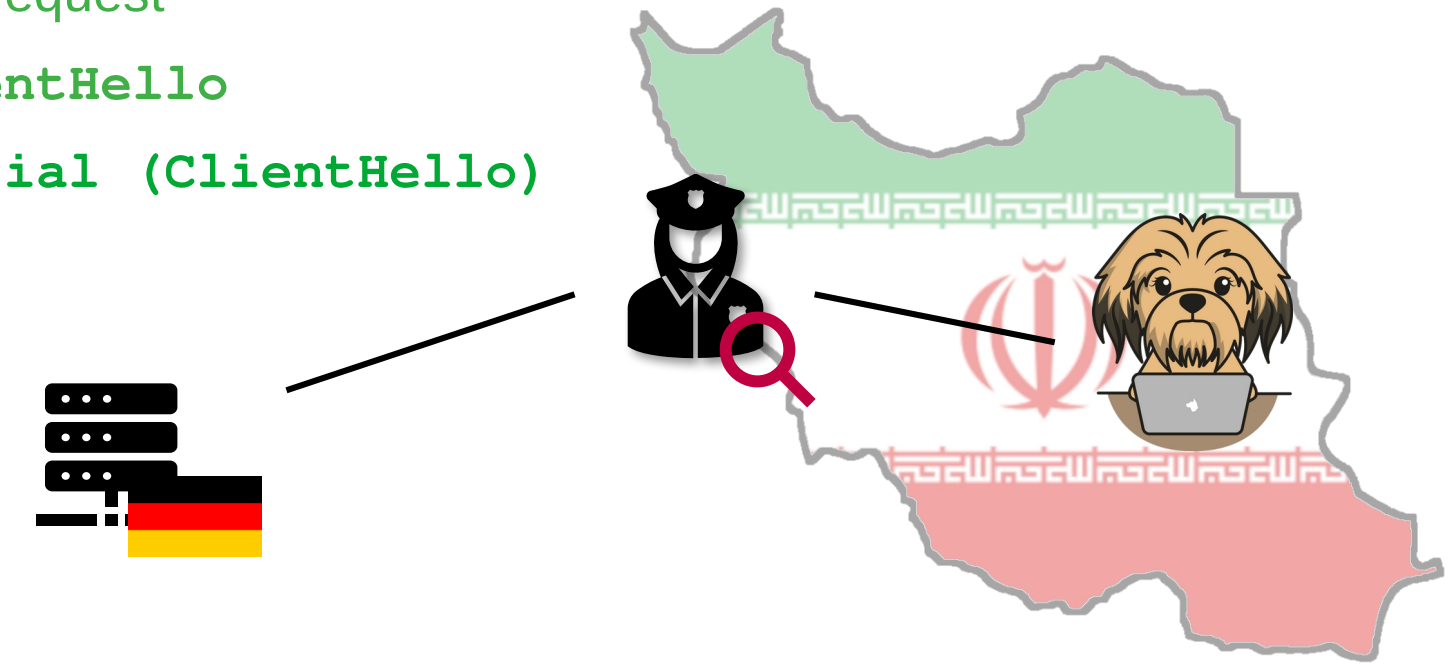

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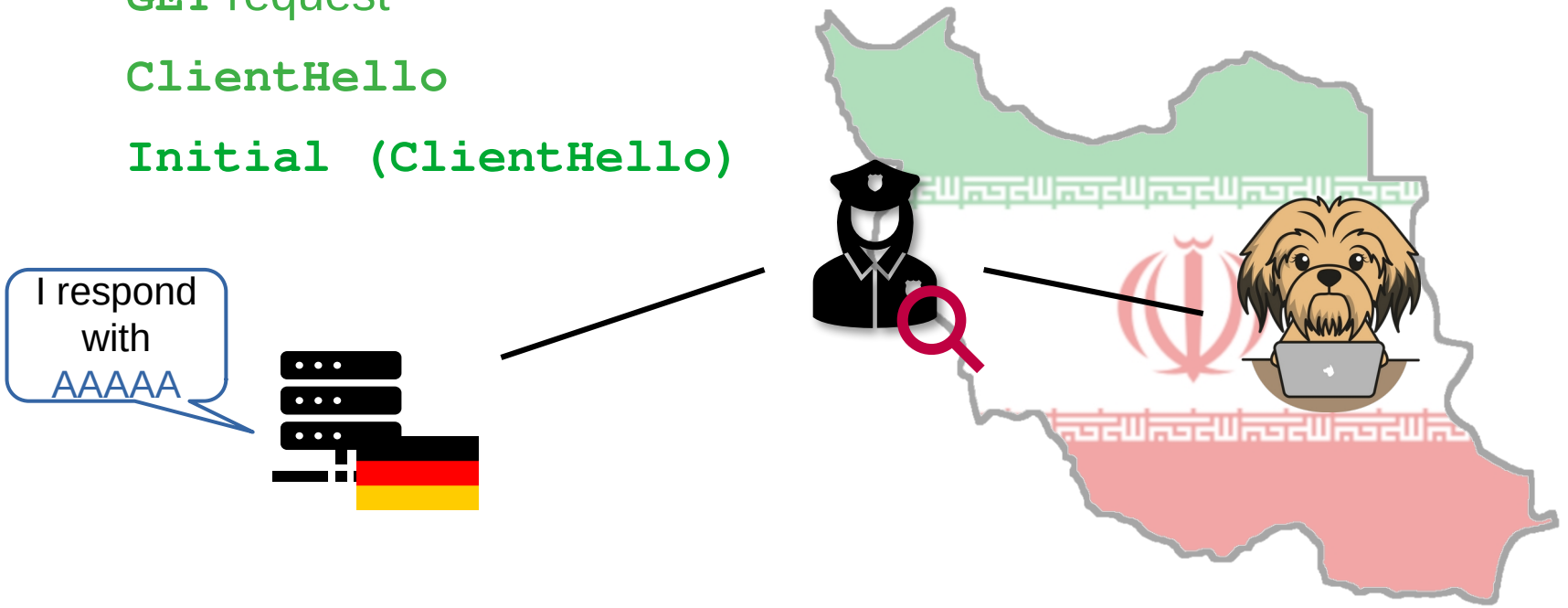

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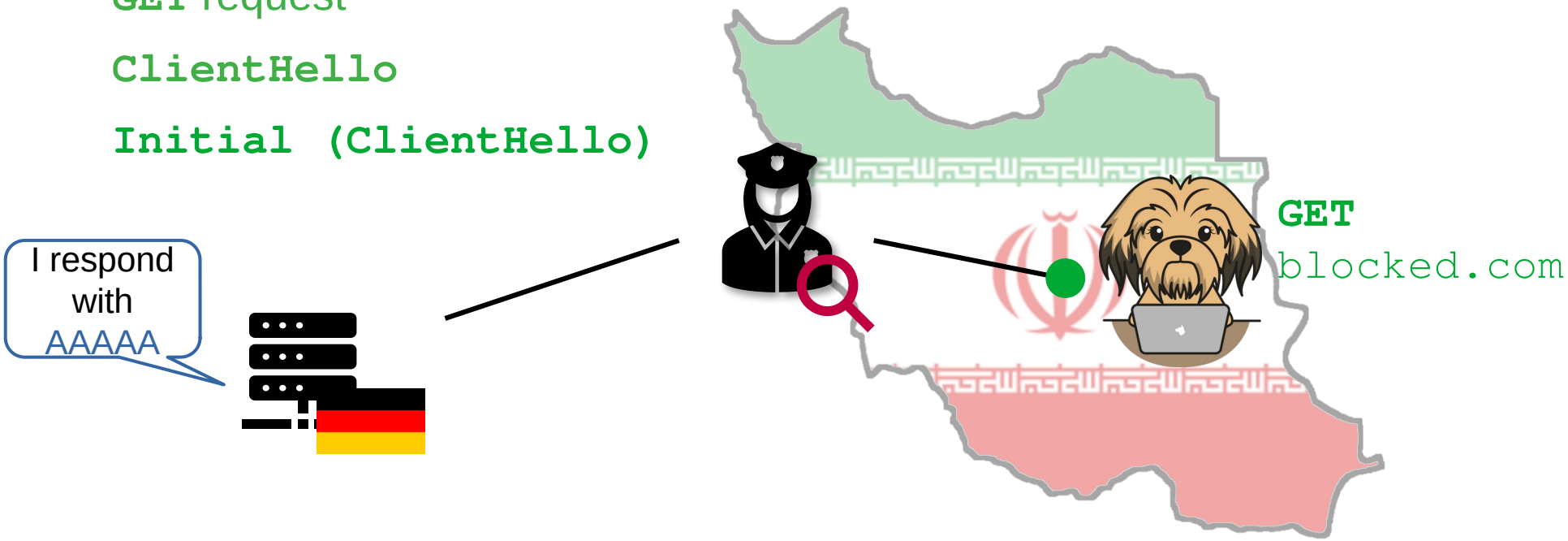

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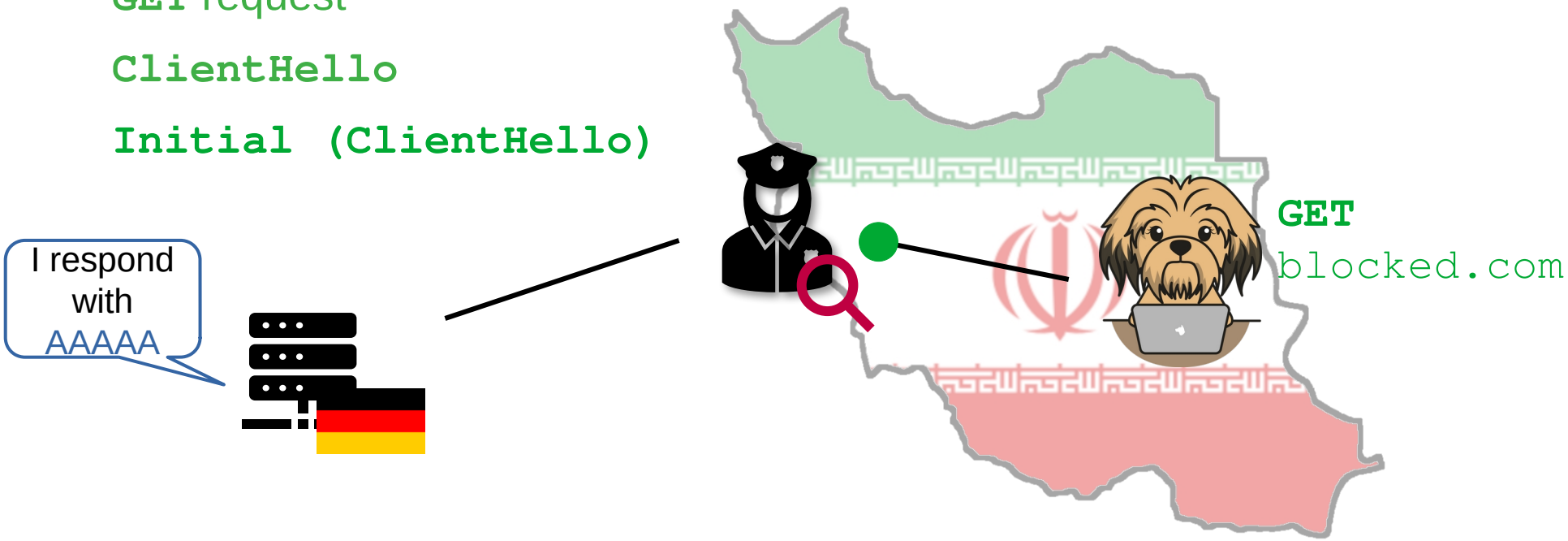

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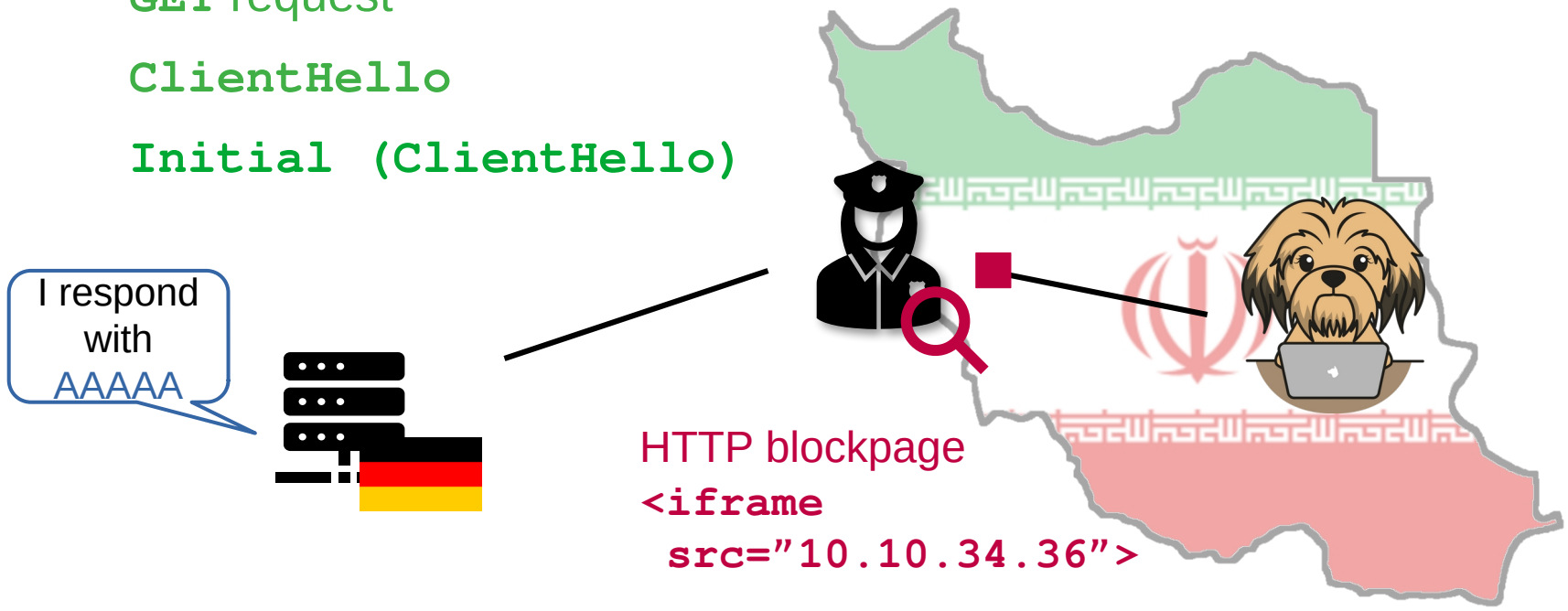

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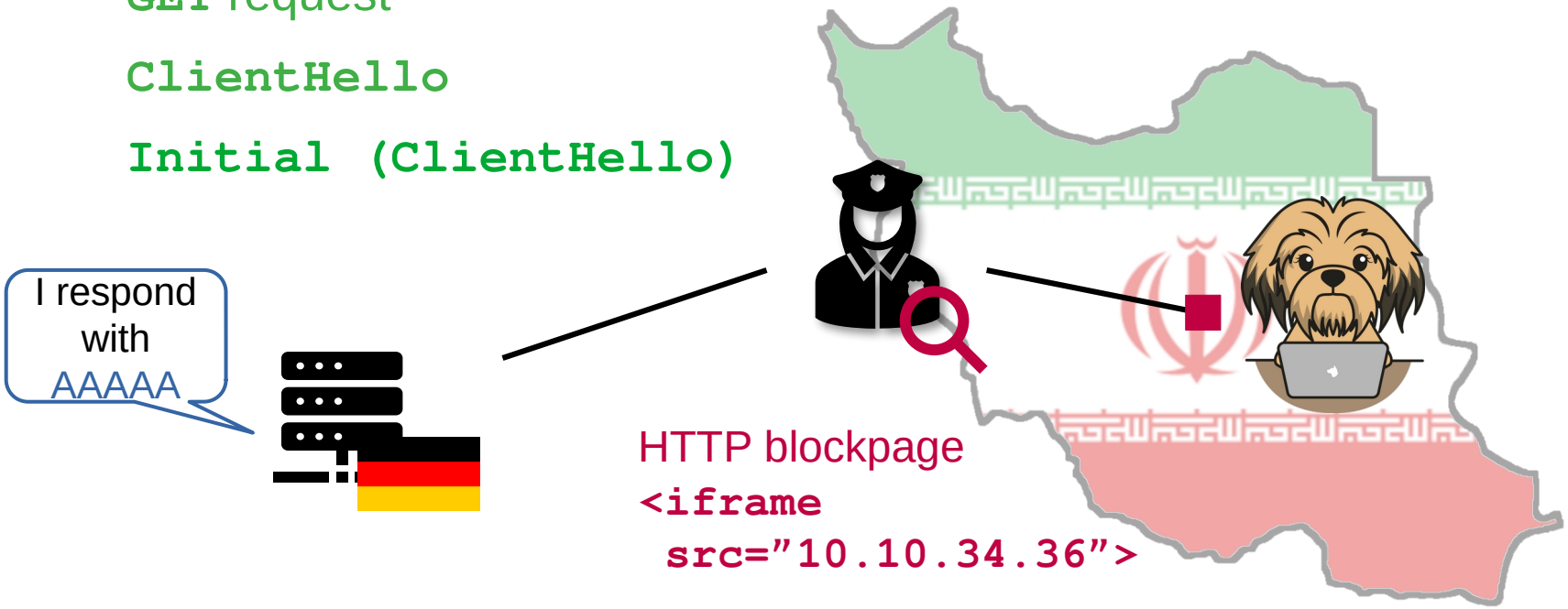
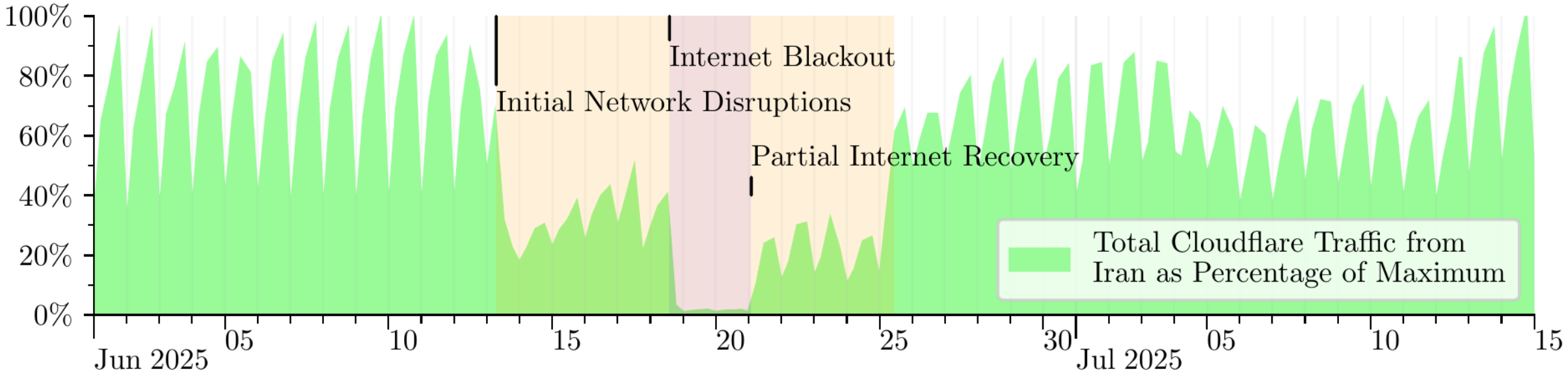


Scan Timeline



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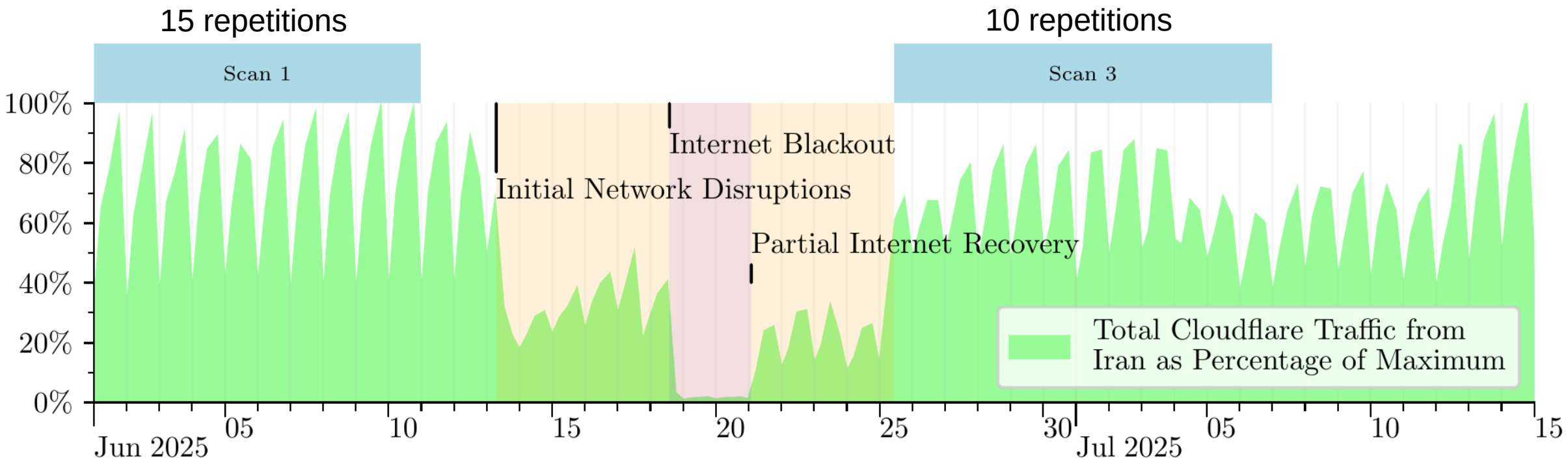

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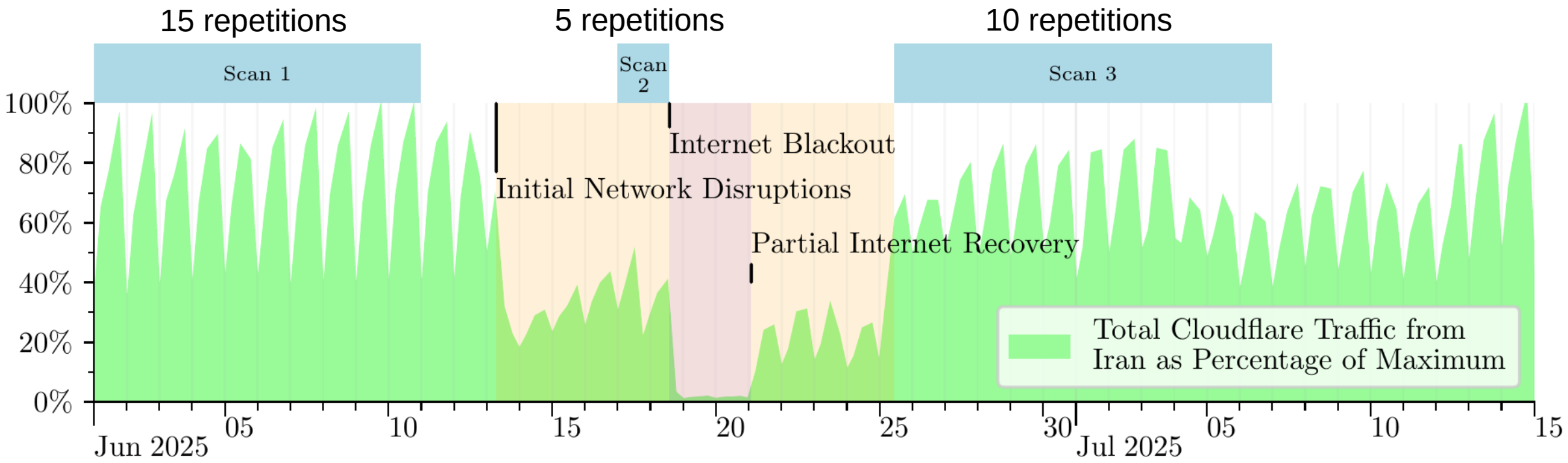
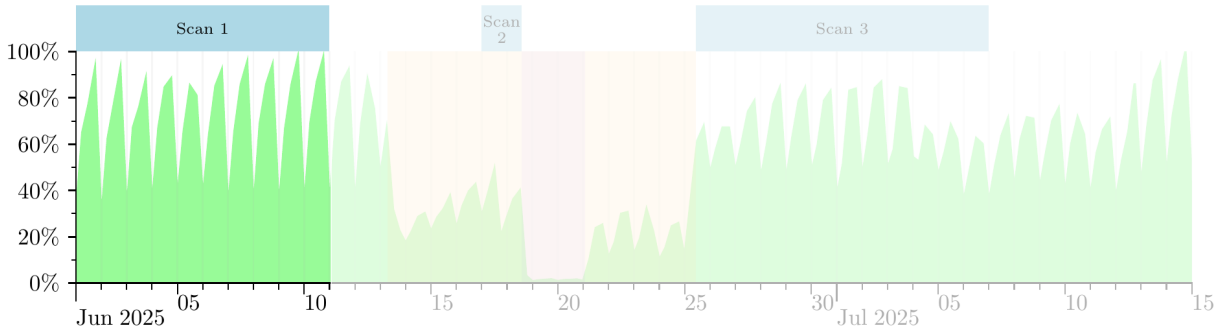


Scan 2: only 9,000 domains

Scan Results

Censorship before Shutdown



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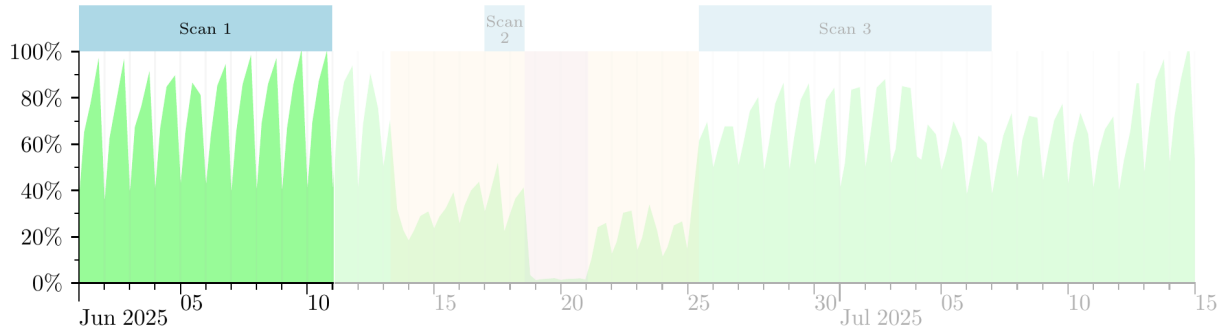
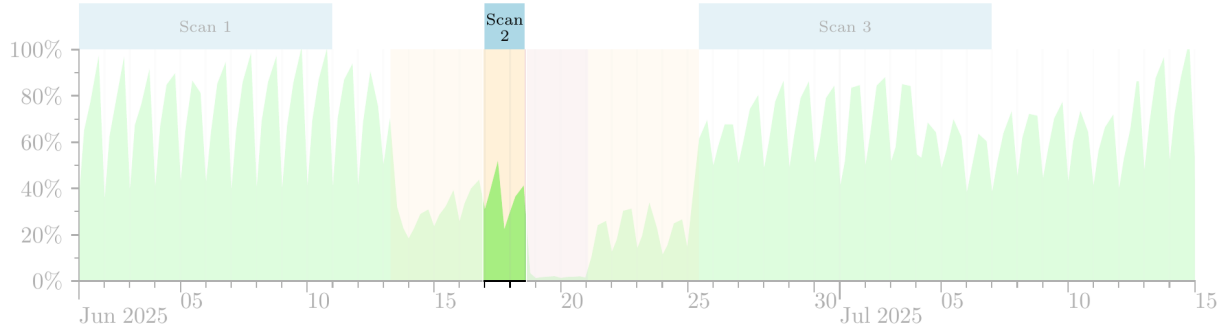


- **Scan 1**:
  - Domain-dependent censorship behavior
    - DNS/UDP 1,361 (15,12%)
    - DNS/TCP 1,361 (15,12%)
    - HTTP 1,375 (15.28%)
    - TLS 1,351 (15.01%)
    - No QUIC censorship
  - 1,216 (13.51%) censored across protocols

Scan Results

Initial Disruptions



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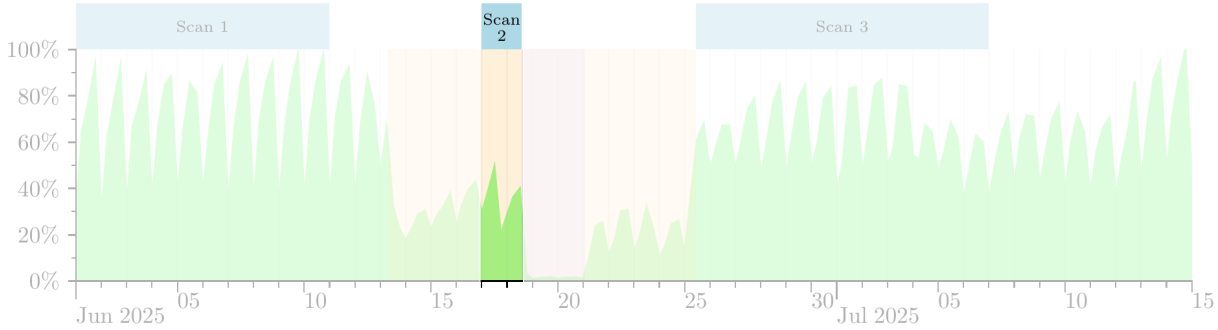

- **Scan 2**:
  - Censorship changes
    - Complete QUIC blockage
    - DNS/TCP:
      96.68% unresolvable
    - temporary blockings of other protocols

Protocol	Scan 1	Scan 2
DNS/UDP	1,361 (15.12%)	1,509 (16.77%)
DNS/TCP	1,361 (15.12%)	**8,701 (96.68%)***
HTTP	1,375 (15.28%)	1,730 (19.22%)
TLS	1,351 (15.01%)	1,555 (17.28%)
QUIC	1 (0.01%)	**9,000 (100%)**‡
Total	9,000	9,000

* No server response after successful TCP handshake
‡ Complete QUIC blocking

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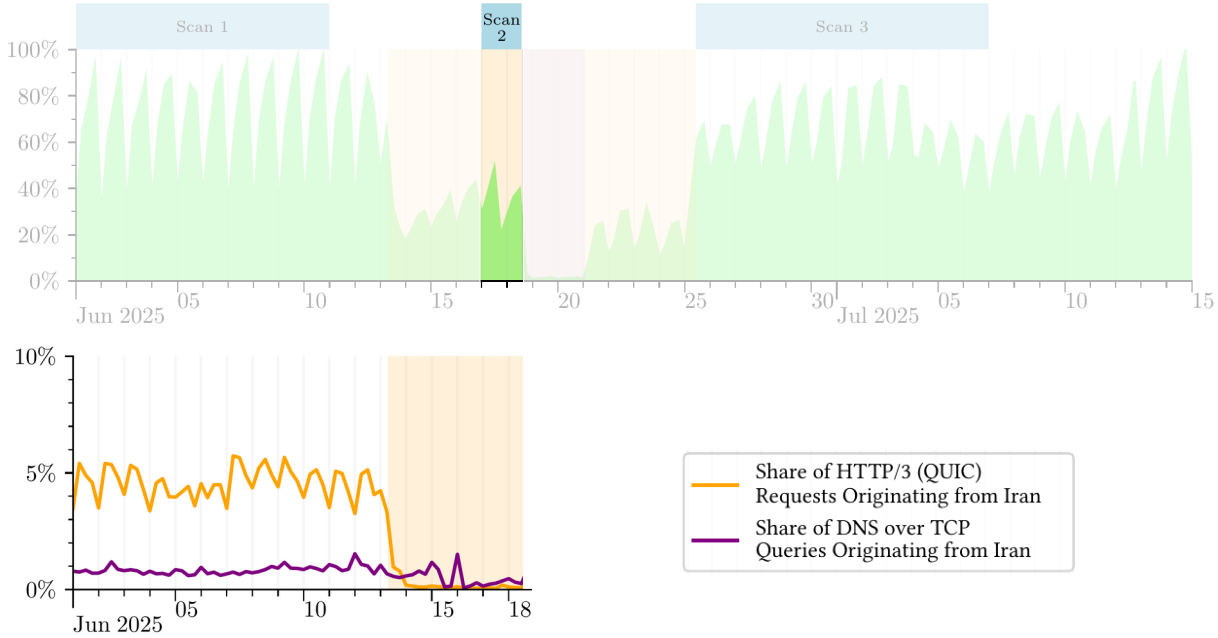

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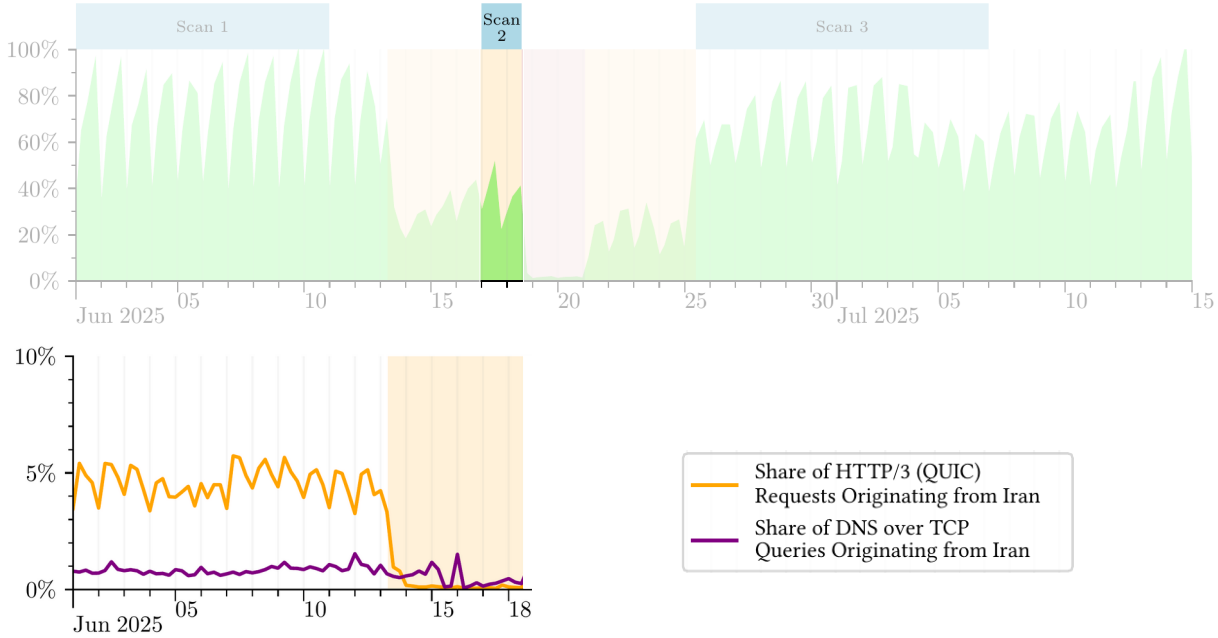
➡ Preliminary steps towards shutdown

Cui et al. [2]: localized shutdown drills



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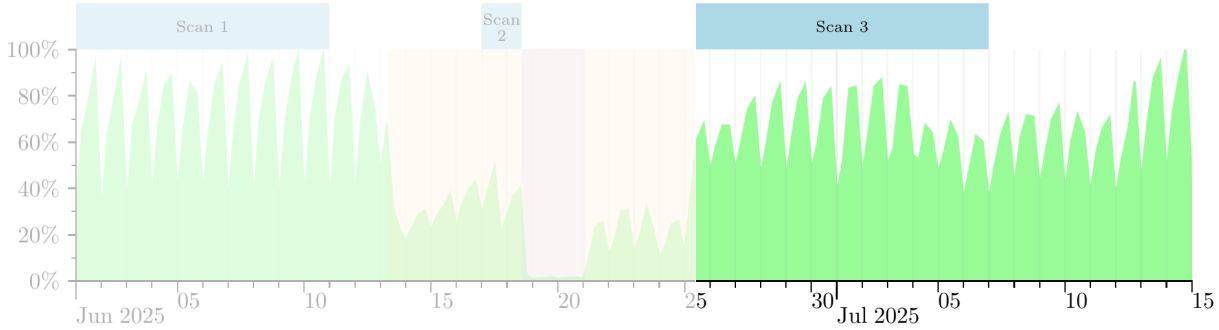

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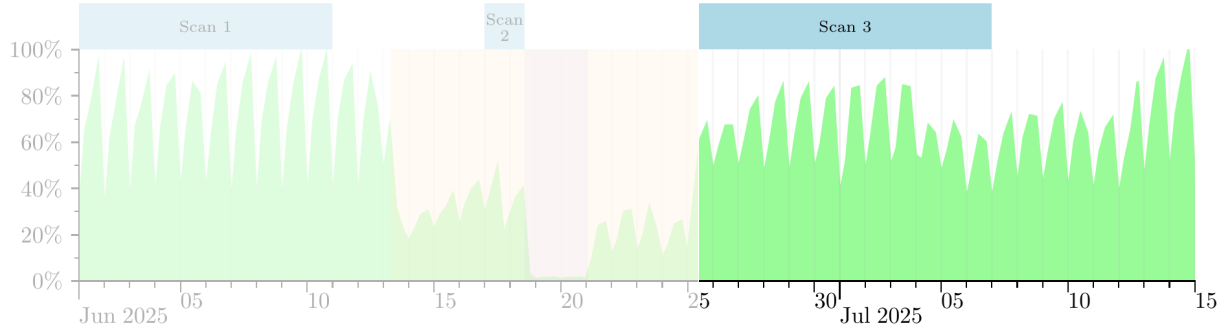

- **Scan 3**:
  - QUIC blockage remained
  - TCP based protocols mostly unaffected
  - DNS/UDP: increased packet drops

Protocol	Scan 2	Scan 3
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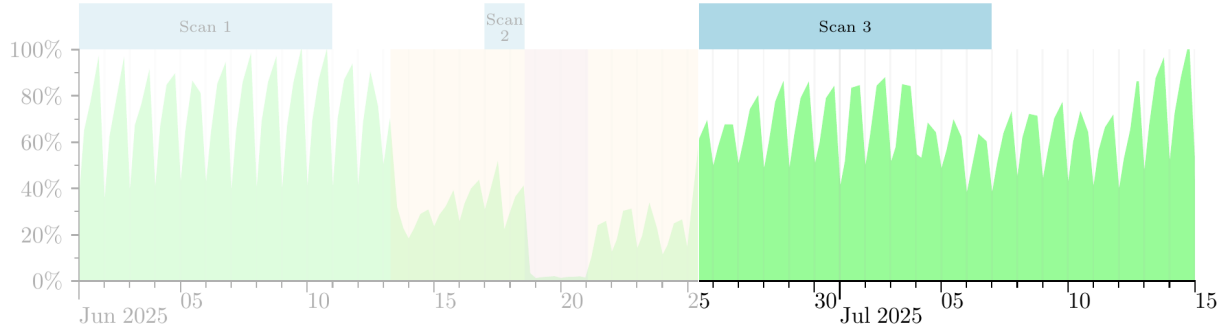

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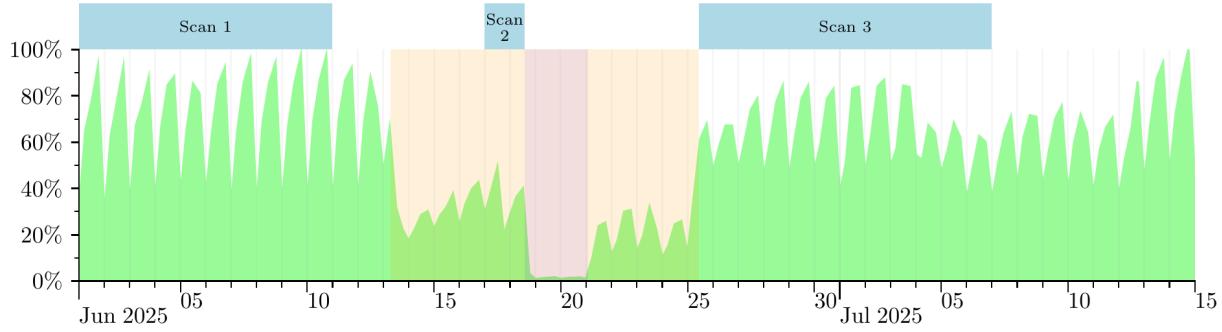
Observed behavior coherent with user reports [3, 4]

Scan Results

Summary

- Censorship policy changes before shutdown
- UDP instabilities after shutdown



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(b) Observed TTL values: 186–188

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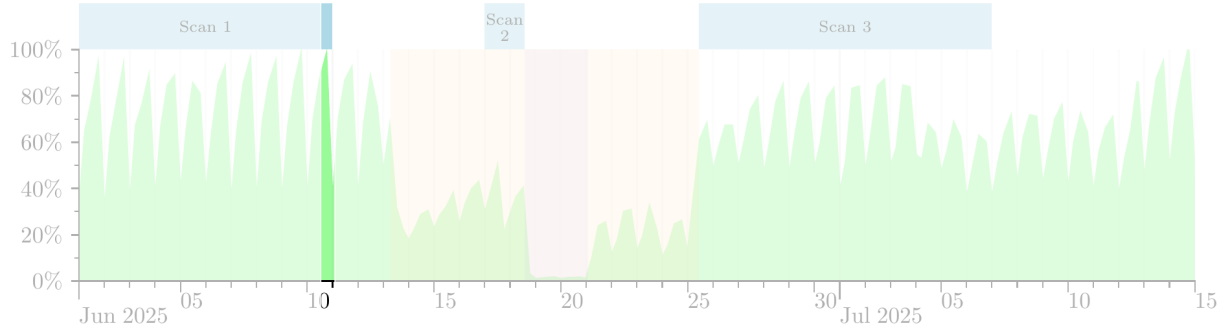


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Further Shutdowns and Predictability

- Fine-grained shutdown: preparation and recovery
- January 2026 shutdown: early signs of disruptions [1]

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Early detection possible, but:

- Long-term measurements
- Vantage point limitation

Bibliography

[1] Giuseppe Aceto, V. Persico, and Antonio Pescapé. 2026. Iran's January 2026 Internet Shutdown: Public Data, Censorship Methods, and Circumvention Techniques. https://www.semanticscholar.org/paper/289dff849784c17d4729d914ae8ba941ccb55795

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