Assessing the Impact of ISP De-peering:
A Case Study of Cogent's Disconnection from Russian Networks

Liming Liu
Tsinghua University, Zhongguancun Laboratory
China

Yuanyuan Zhang*
Zhongguancun Laboratory
China

Kun Guo
Zhongguancun Laboratory
China

Meijia Hou*
Zhongguancun Laboratory
China

Mingwei Xu
Tsinghua University
China

Jiahao Cao
Tsinghua University
China

Xin Gao
Zhongguancun Laboratory
China

Jiang Li
Zhongguancun Laboratory
China

Yonghong Fu
Zhongguancun Laboratory
China

APNet 2025, Shanghai

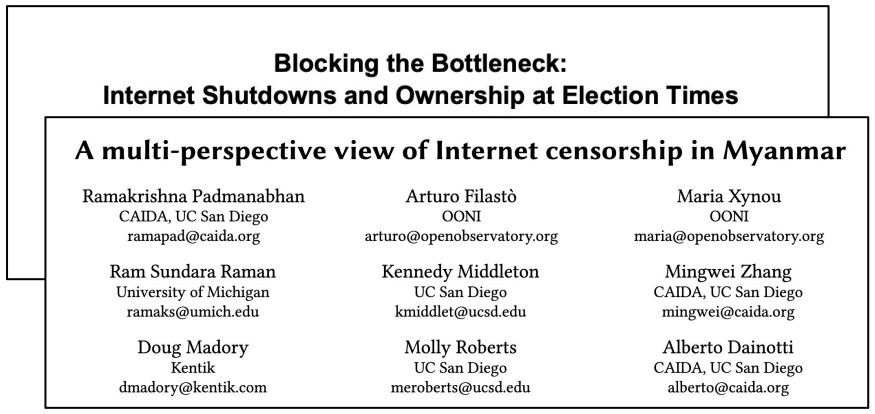
Background & Motivation

- **Russia-Ukraine Conflict**
  - Erupted in February 2022.
- **Cogent's Disconnection**
  - Cogent Comunication (Tier-1 ISP) voluntarily disconnects from Russian networks.
  - **March 4, 2022, at 17:00 UTC**.

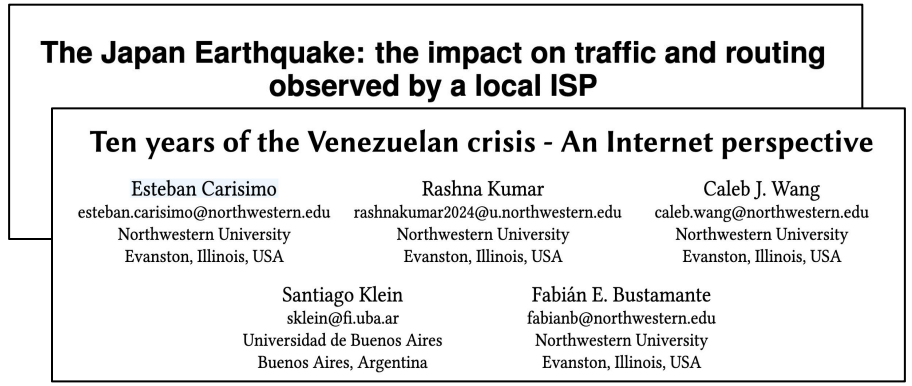
> In light of the unwarranted and unprovoked invasion of Ukraine, Cogent is terminating all of your services effective at 5 PM GMT on March 4, 2022. The economic sanctions put in place as a result of the invasion and the increasingly uncertain security situation make it impossible for Cogent to continue to provide you with service.
>
> All Cogent-provided ports and IP Address space will be reclaimed as of the termination date. For any colocation customers, your equipment will be powered off and kept in the rack for you to collect.
>
> If not collected within thirty days, the equipment will be removed from the rack and stored. For any utility computing customers, you will not have access to your servers after the termination of service. The servers will be disconnected and kept in storage by Cogent for an indeterminate period.

Background & Motivation

- **Cogent's disconnection**
  - A voluntary, large-scale ISP De-peering.
  - Driven by **geopolitical considerations**.
- **Previous study about Internet disruption**
  - State-imposed shutdowns
  - Spontaneous outages
- **Lacking academical study on Cogent's disconnection**



State-imposed shutdowns



Spontaneous outages

?

Voluntary ISP De-peering

Our Study

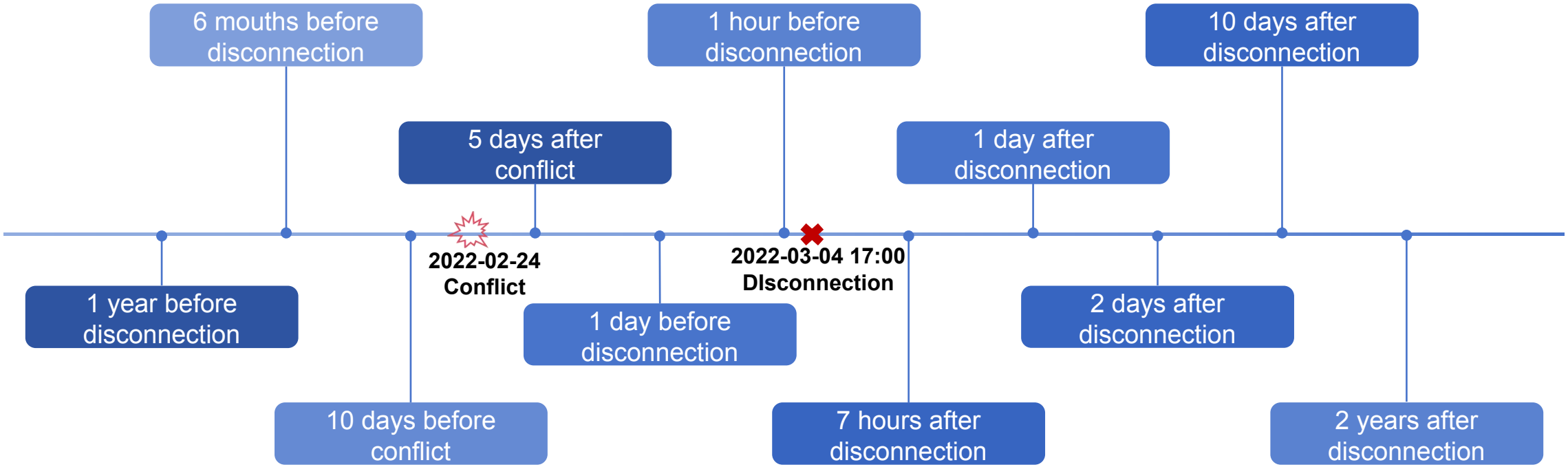
- **Data-driven analysis of a large-scale geopolitical ISP de-peering**

- **Multi-dimensional**
  - AS Impact Analysis
    - What is the impact on Russian networks?
  - Routing Adaptation Analysis
    - How did Russian networks respond to disconnection?
  - Timeline of Recovery
    - When did Russian networks recovery?

Dataset and Methdology

1. Collect BGP Routing Information Base data

- From Mar 2021 to Mar 2024
  - **11 Timepoints**
- Data Source: RIPE RIS, RouteViews, PCH
  - **All Collectors and Monitors**



Dataset and Methdology

2. Extract Russian Routing Information

- Direct routing information from Russian ASes is **limited**.
- Extract AS paths that include Russian ASes.
- Simulate a “Russian perspective” routing table.

Prefix	AS Path
Prefix_1	1 - 2 - 3216 - 20485 - 3
-	-

Split

3216 and 20485 are Russian Ases

Prefix	AS Path
Prefix_1	3216 - 20485 - 3
Prefix_1	20485 - 3

Dataset and Methdology

3. Split Prefix

- Routing entries often contain **overlapping prefixes**.
- Ensure destination prefixes are exclusive.

Prefix	AS Path
192.168.0.0/16	AS_PATH1
192.168.255.0/17	AS_PATH2
-	-

Split →

Prefix	AS Path
192.168.0.0/17	AS_PATH1
192.168.255.0/17	AS_PATH2
-	-

2^{15} IP addresses are routed via AS_PATH1, and other
2^{15} IP addresses are routed via AS_PATH2

Russian ASes Connected to Cogent

- **6 Russian ASes Directly Connected to Cogent Before Disconnection**
  - Observation based on routing data we processed.
  - 6 major Russian ASes had direct BGP connection with Cogent (AS174).
    - VEON(AS3216), TransTeleCom(AS20485), RUNNet(AS3267)
    - MegaFon(AS31133), INETCOM(AS35598), and RASCOM(AS20764)

VEON (AS3216)

AS RANK: 24

TransTeleCom (AS20485)

AS RANK: 33

RUNNet (AS3267)

AS RANK: 477

MegaFon (AS31133)

AS RANK: 27

INETCOM (AS35598)

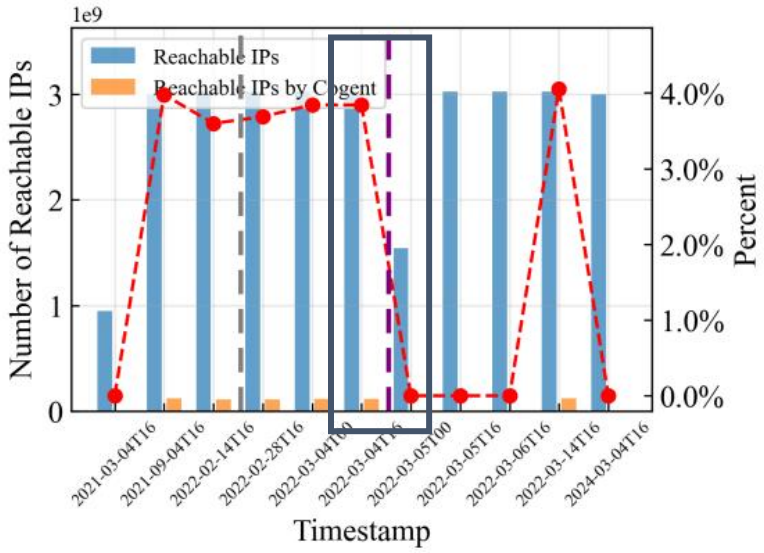
AS RANK: 42

RASCOM (AS20764)

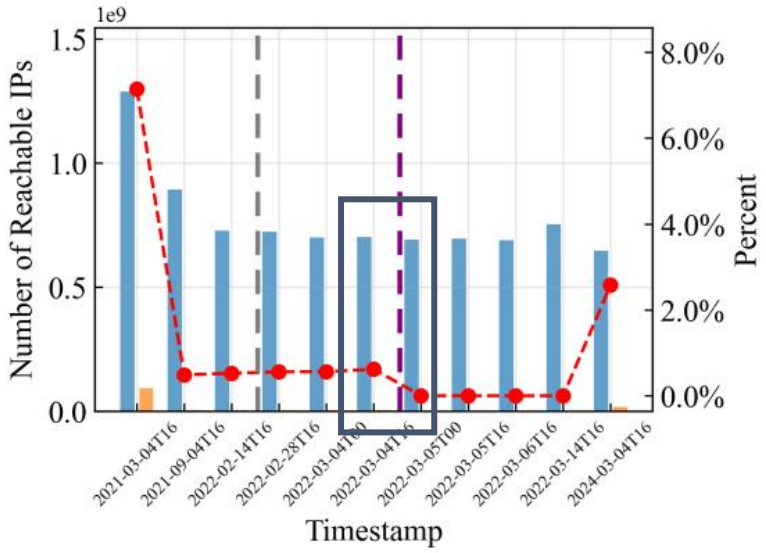
AS RANK: 31

AS Impact Analysis

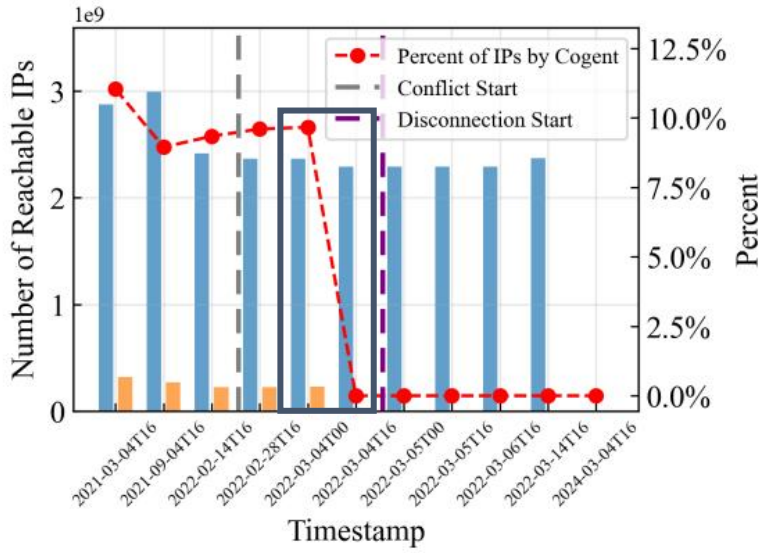
- **Only a subset of Russian ASes were disconnected.**
  - VEON(AS3216), TransTeleCom(AS20485) and RUNNet(AS3267) saw its number of reachable IP through Cogent **drop to 0**.
  - VEON(AS3216) also experienced a significant reduction in total reachable IP.
  - RUNNet(AS3267) was disconnected earlier than the official time (17:00).



(a) IP Reachability for VEON (AS 3216)



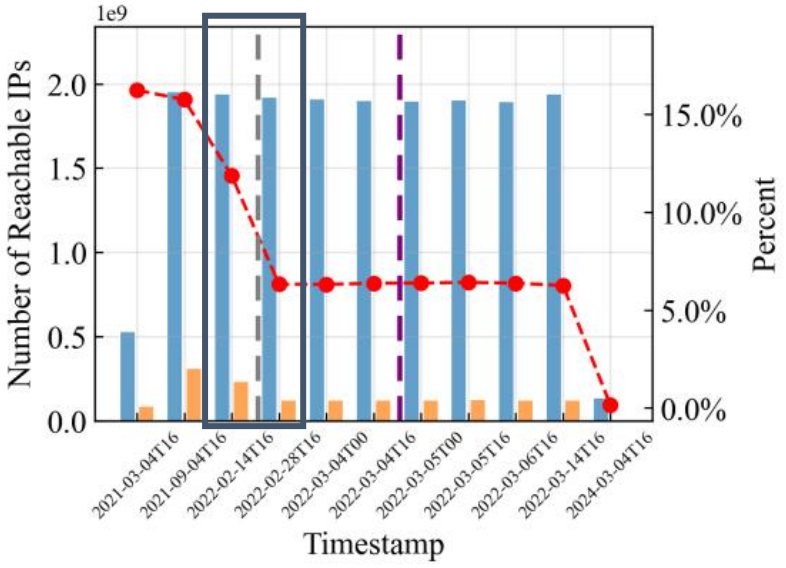
(b) IP Reachability for TransTeleCom (AS 20485)



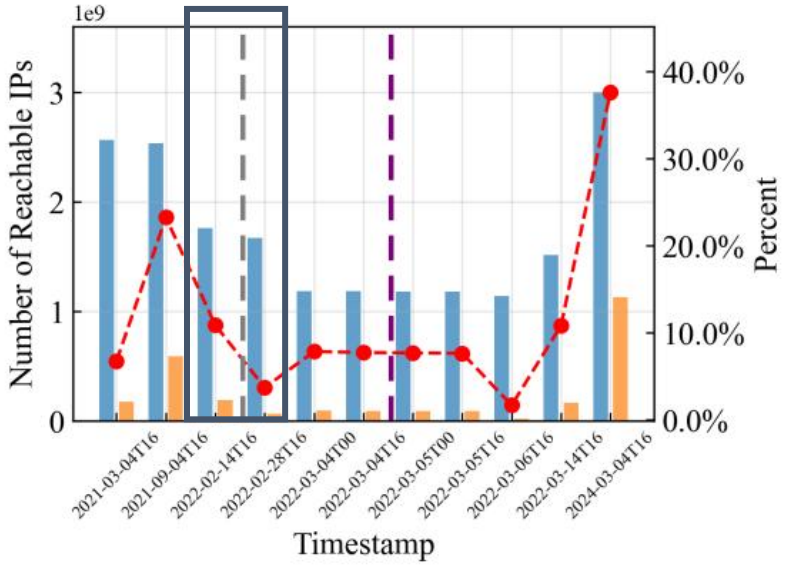
(c) IP Reachability for RUNNet (AS 3267)

AS Impact Analysis

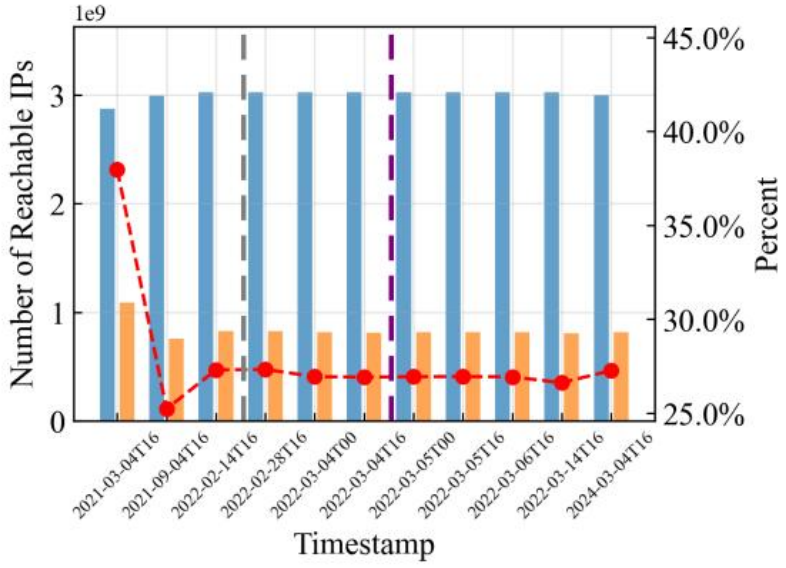
- **Other ASes were not affected.**
  - MegaFon(AS31133), INETCOM(AS35598), and RASCOM(AS20764) were not affected by the disconnection.
  - MegaFon(AS31133) and INETCOM(AS35598) **reduced their reliance** on Cogent at the beginning of the conflict.



(d) IP Reachability for MegaFon (AS 31133)



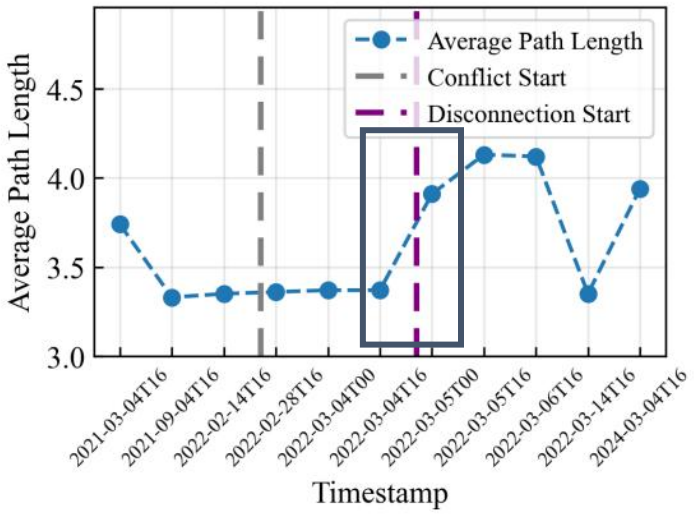
(e) IP Reachability for INETCOM (AS 35598)



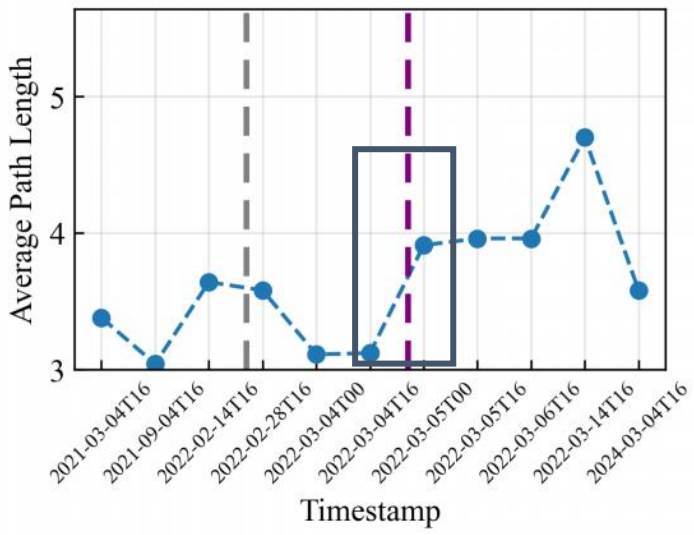
(f) IP Reachability for RASCOM (AS 20764)

Routing Adaptation Analysis

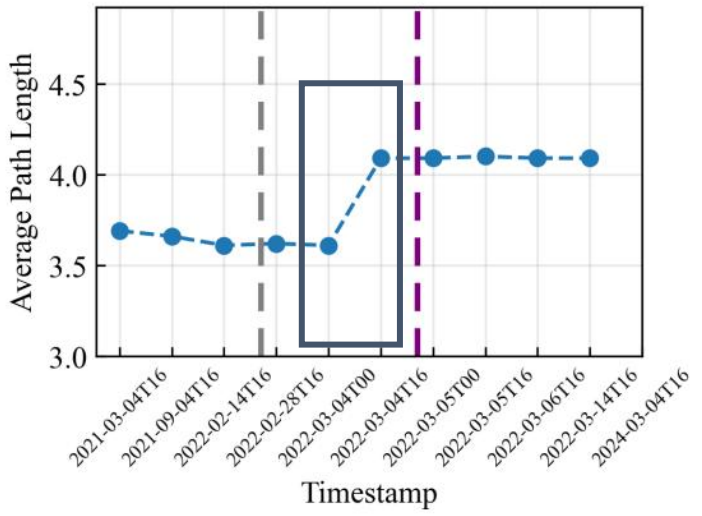
- **Affected ASes switched to longer AS paths.**
  - The average AS path length **increased by 0.7 hops** after disconnection.
    - VEON(AS3216): 3.37 to 4.13 hops.
    - TransTeleCom(AS20485): 3.11 to 3.96 hops.
    - RUNNet(AS3267): 3.61 to 4.10 hops.
  - This could lead to higher latency and lower performance.



(a) Avg. Path Length Change for VEON (AS 3216)



(b) Avg. Path Length Change for TransTeleCom (AS 20485)



(c) Avg. Path Length Change for RUNNet (AS 3267)

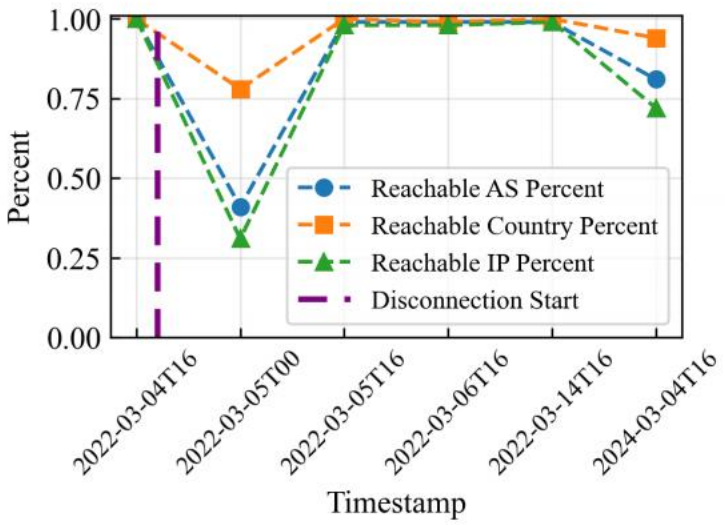
Routing Adaptation Analysis

- **Each AS reacted differently.**
  - In 2022-03-05 00:00 (7 hours After Disconnection)
    - VEON(AS3216): 65% of IPs unreachable, others switched via **Vodafone** and **Lumen**.
    - TransTeleCom(AS20485): 91% unreachable, only 9% switched.
    - RUNNet(AS3267): 81% switched via **Arelion** and **Lumen**, 19% unreachable.
- **Disconnection was limited to direct router-to-router links.**
  - Cogent(AS174) still appeared in AS path from Russian ASes.

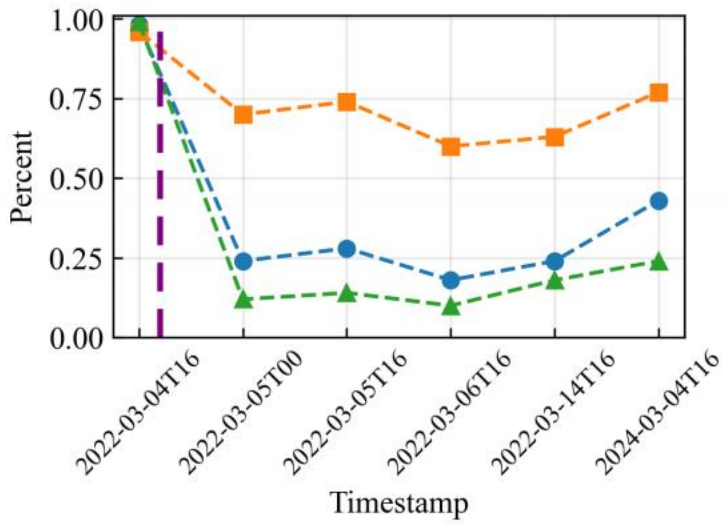
ASN	Category	IP Count	Countries Affected by Unreachable IPs	Alternative ISP (ASN)
3216	Route Unreachable Route Switch	7.52×10^7(65%) 4.09×10^7(35%)	USA(36%), MAR(8%) MEX(8%), FRA(6%)	Vodafone (1273), Lumen (3356) Arelion (1299), Orange (5511)
20485	Route Unreachable Route Switch	3.96×10^6(91%) 3.72×10^5(9%)	USA(31%), MAR(17%) KOR(13%), SVN(11%)	Lumen (3356), Sparkle (6762) Arelion (1299), PCCW (3491)
3267	Route Unreachable Route Switch	4.30×10^7(19%) 1.86×10^8(81%)	USA(56%), MAR(12%) DZA(5%), IDN(3%)	Arelion (1299), Lumen (3356) NORDUnet (2603)

Timeline of Recovery

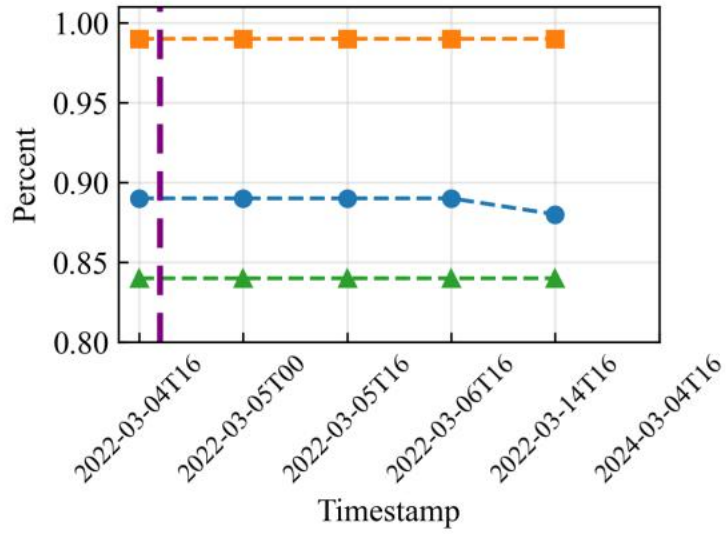
- **Some connections to cogent were restored over time.**
  - For VEON (AS3216):
    - Significant initial disruption.
    - **Rapid recovery** within 24 hours
    - Stabilized over the next 10 days.



(a) The recovery of VEON (AS 3216)



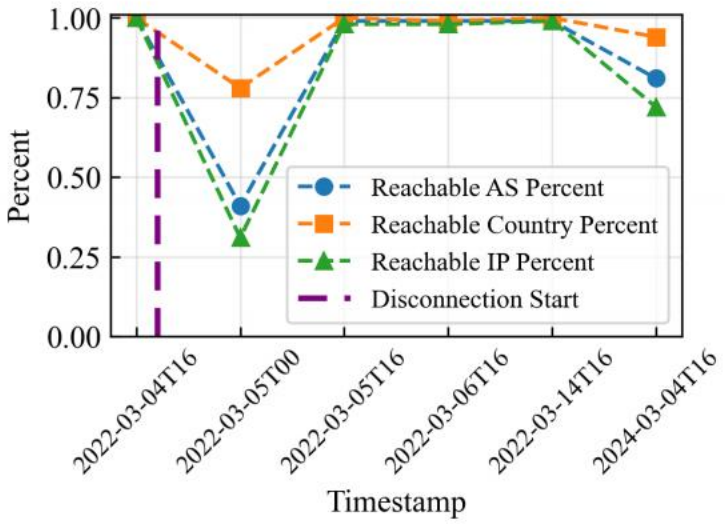
(b) The recovery of TransTeleCom (AS 20485)



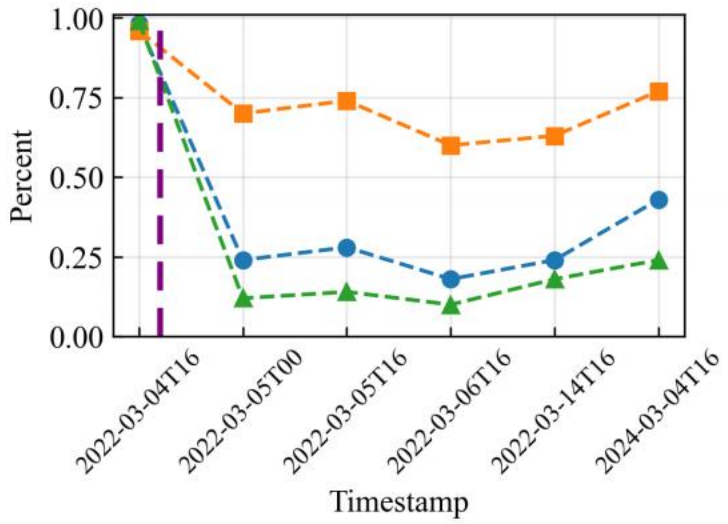
(c) The recovery of RUNNet (AS 3267)

Timeline of Recovery

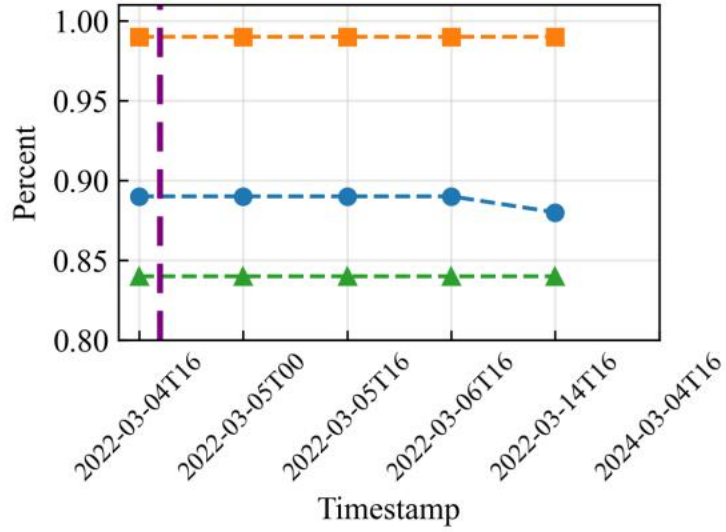
- For TransTeleCom (AS20485):
  - **Slow recovery**, with connectivity remaining below baseline even after 10 days.
- For RUNNet (AS3267):
  - **Degradation began earlier**, maintained for a long time.



(a) The recovery of VEON (AS 3216)



(b) The recovery of TransTeleCom (AS 20485)



(c) The recovery of RUNNet (AS 3267)

Discussion

- **Observations**:
  - Only a subset of Russian ASes was disconnected.
  - Affected ASes switched to longer AS paths.
  - Disconnection was limited to direct router-to-router links.
    - No aggressive route filtering or prefix blackholing.
  - Some connections to cogent were restored over time.

- **Conclusion**:
  - Cogent’s Action
    - Largely **symbolic** with limited practical impact.
  - This disconnection demonstrates the **resilience** of the global Internet.
    - Russian ASes leveraged this resilience to minimize disruption.

Q&A

Liming Liu

llm24@mails.tsinghua.edu.cn

APNet 2025, Shanghai