

Analyzing the Collateral Impact of Cable Cuts in Africa

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Outages Disrupt and Cripple Economies

For instance, NetBlocks, the watchdog that monitors cybersecurity and the governance of the internet estimates that Nigeria may have lost over N273 billion in the four days between March 14 to March 17.

Felix Sogah, an economics tutor at Chemu Senior High School in Tema City, said the Internet shutdown over the past few days has affected his work.

“I do research to update my figures and obtain data for what I teach my students. I have been doing this for years. However, for the past few days, it has been extremely difficult to access the Internet to obtain the data I require for my work,” said Sogah.

Angela Aidoo, a Ghanaian mother of two, said she has difficulty accessing the Electricity Company of Ghana's application to pay her electricity bill.

“Because of the Internet disruptions, I cannot buy electricity and have to sleep in darkness when my meter goes off,” said Aidoo.



African Internet Observatory Project Goals



**Characterize impact
of outages**

Terrestrial



Low Earth Orbit

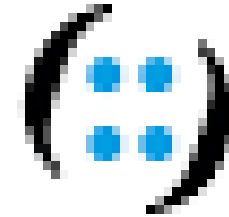


**Analyze effectiveness
of Alternatives**



**Design faster
resolution
techniques**

Data Sets Used for Outage Analysis



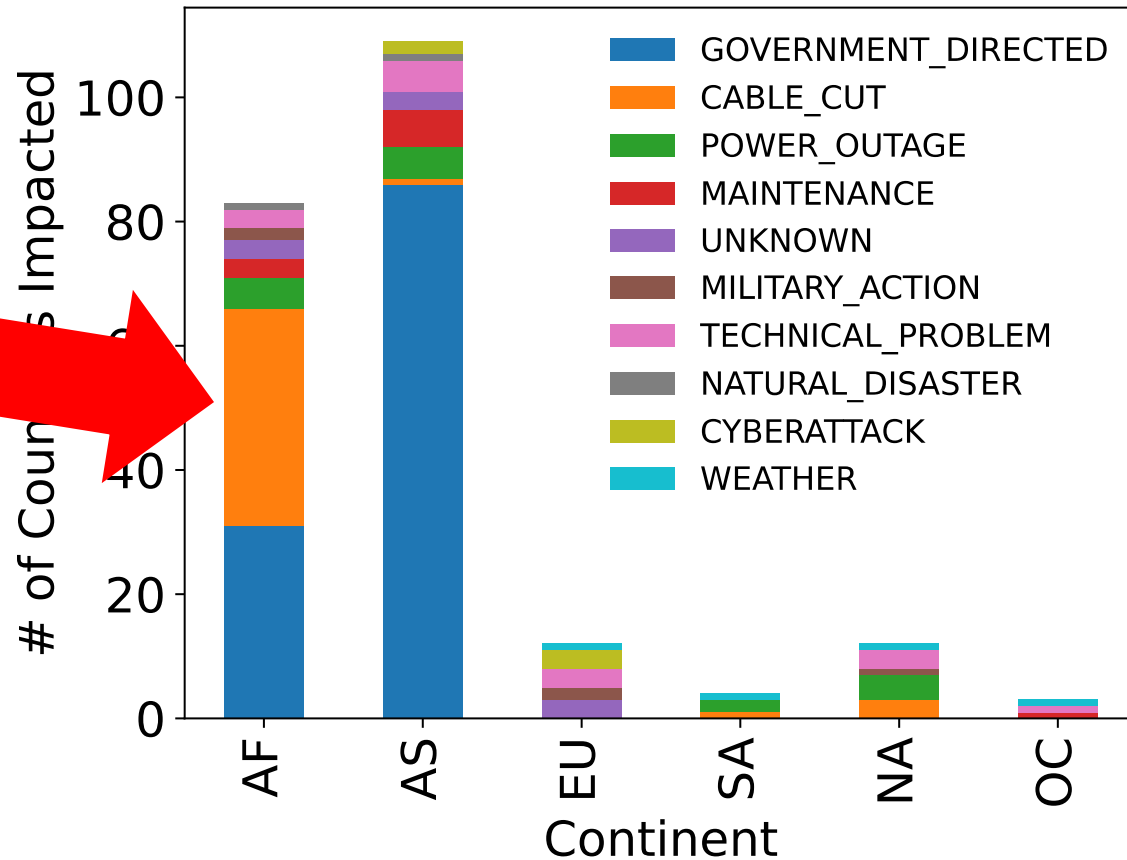
Outage Analysis (Cloudflare Radar)

- Database of outages and meta data (time, cause, duration)
- 12 months

DNS Analysis (Cloudflare Radar)

- Database of DNS resolver usage
- 12 months

Most Outages in Africa are due to Cable Cuts



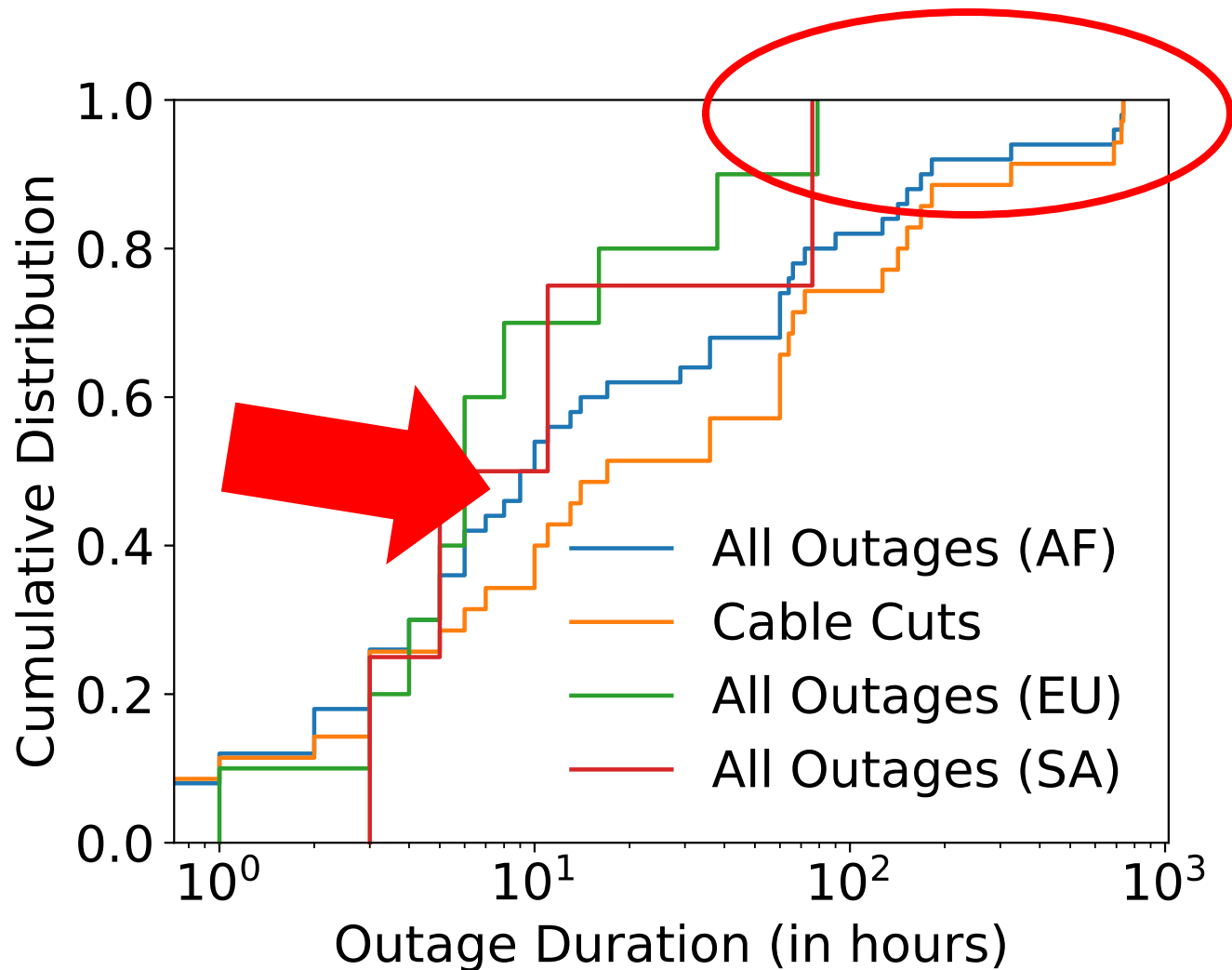
Significantly more cable-cut based outage events in Africa

Several key cuts-based outages in the last 6 months:

- West Africa in March
- East Africa in April

*countries are double counted if they are impacted by multiple outage

Cable Cut-based Outages Generally Take Longer to Recover From Than Other Types of Outages



Cable cuts take longer to recover from

- Longer median and p99s

Cable repair requires

- Contract negotiations
- Ships to sail to location
- Government/regulatory approvals

Traffic rerouting is the most common form of resolution but requires

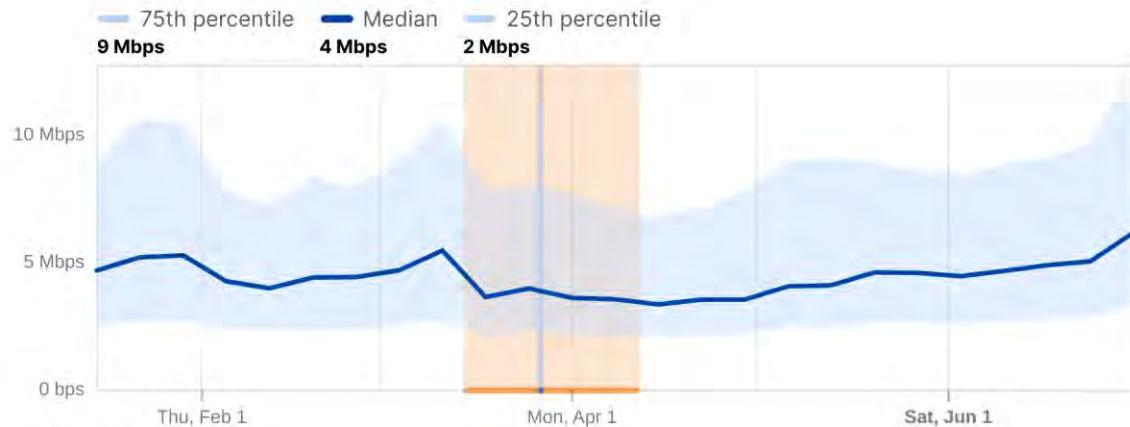
- Routing negotiations/reprovisioning

Outage Have a Long-Term Impact on the Region

(Case Study: West Africa Outage in March 2024)

Bandwidth in Ghana

IQI estimated download speed under average utilization

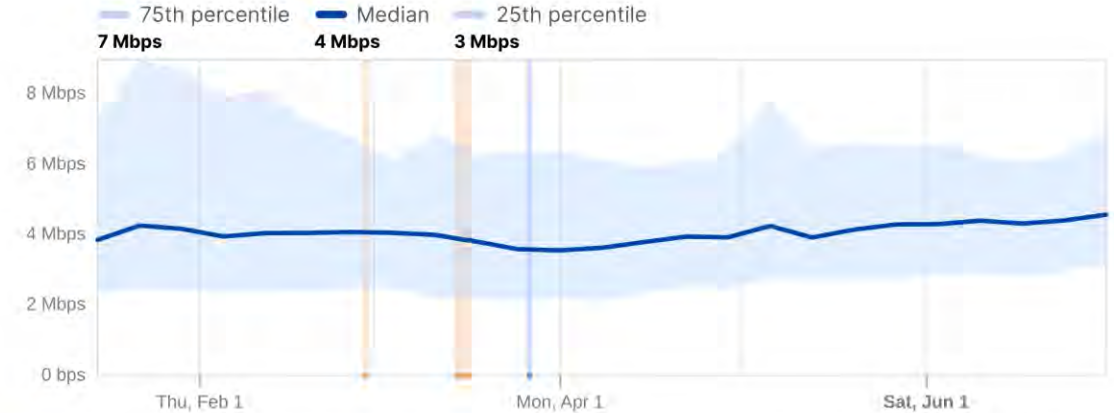


Cloudflare Radar

Last 6 months | Jul 1 2024 11:29 UTC

Bandwidth in Nigeria

IQI estimated download speed under average utilization

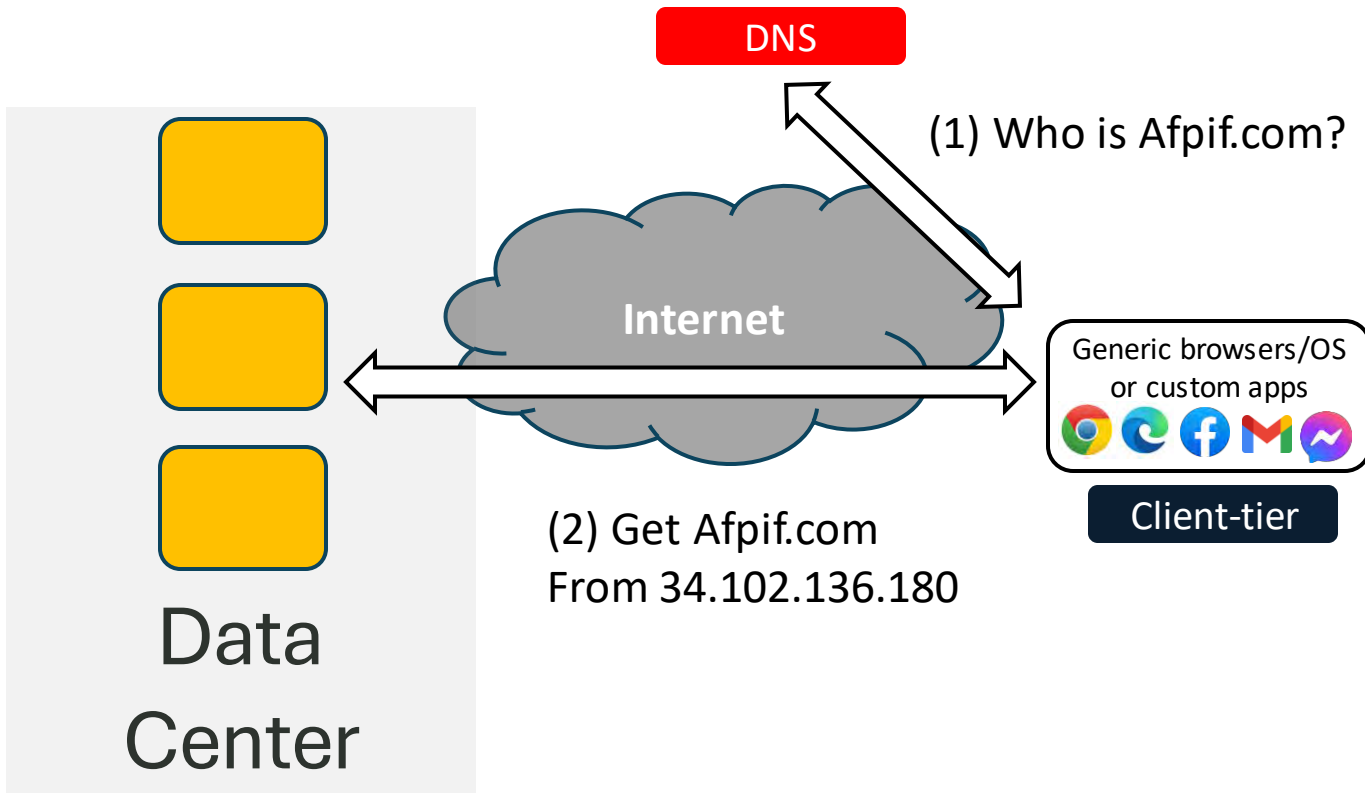


Cloudflare Radar

Last 6 months | Jul 1 2024 11:29 UTC

Rerouting impacts the region: worsens performance due to lower aggregate capacity

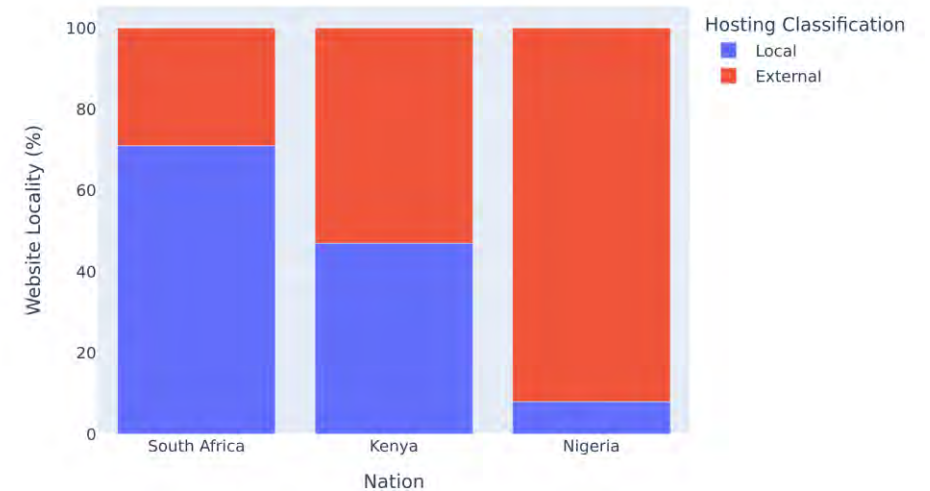
Cloudification Introduces Remote Dependencies Which Magnify Outage Impact



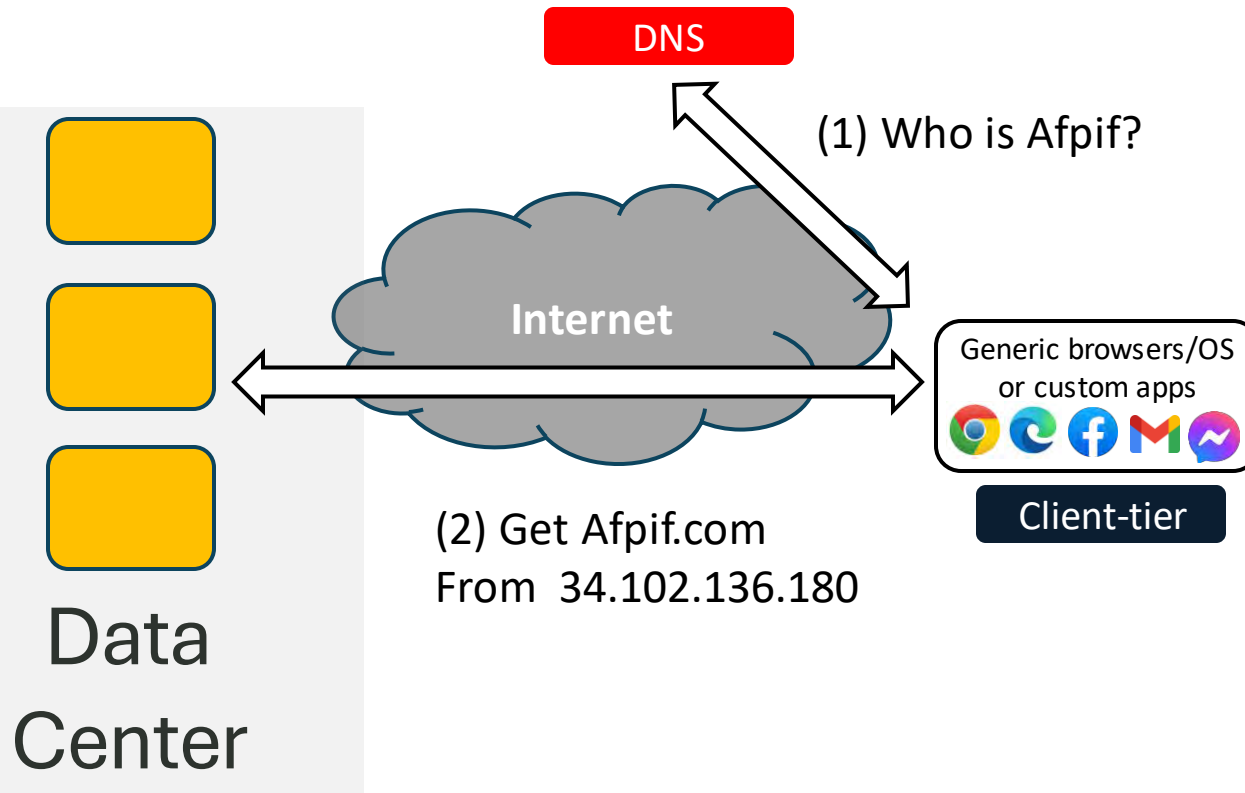
Types of remote dependencies

- Non-local content
- Non-local DNS resolvers

Locality Comparison for three Countries



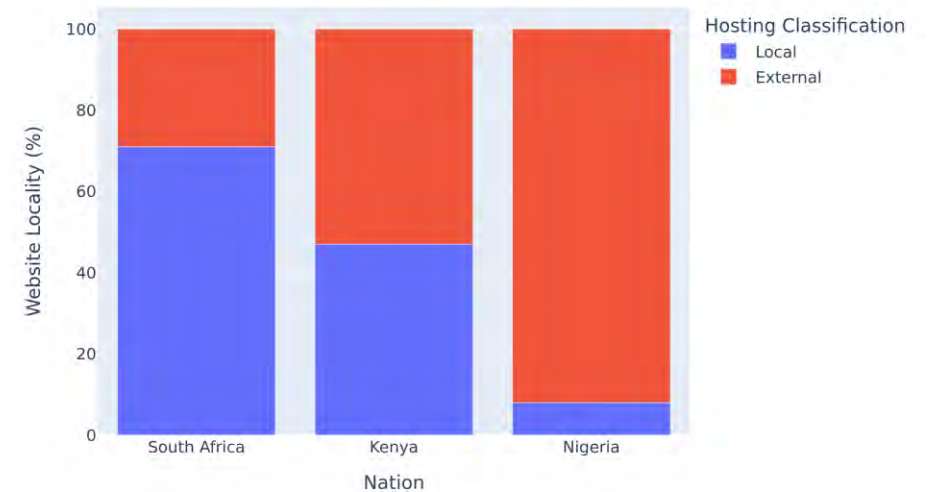
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Types of remote dependencies

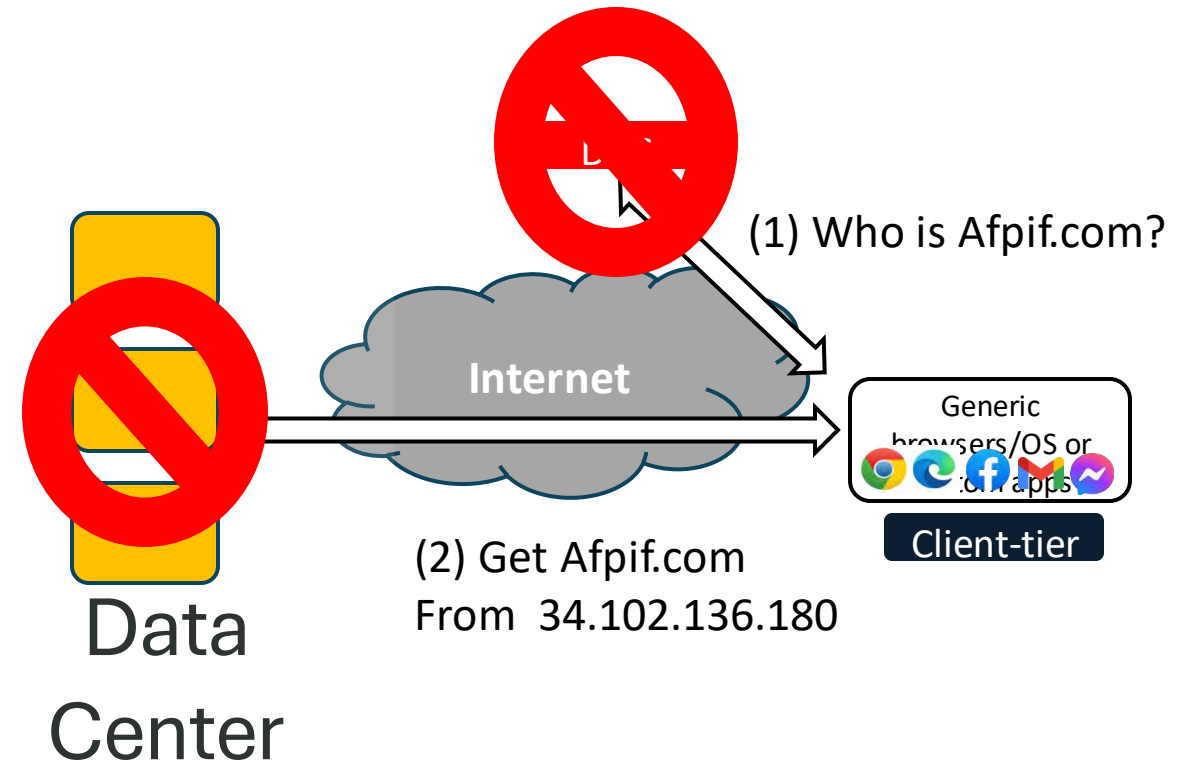
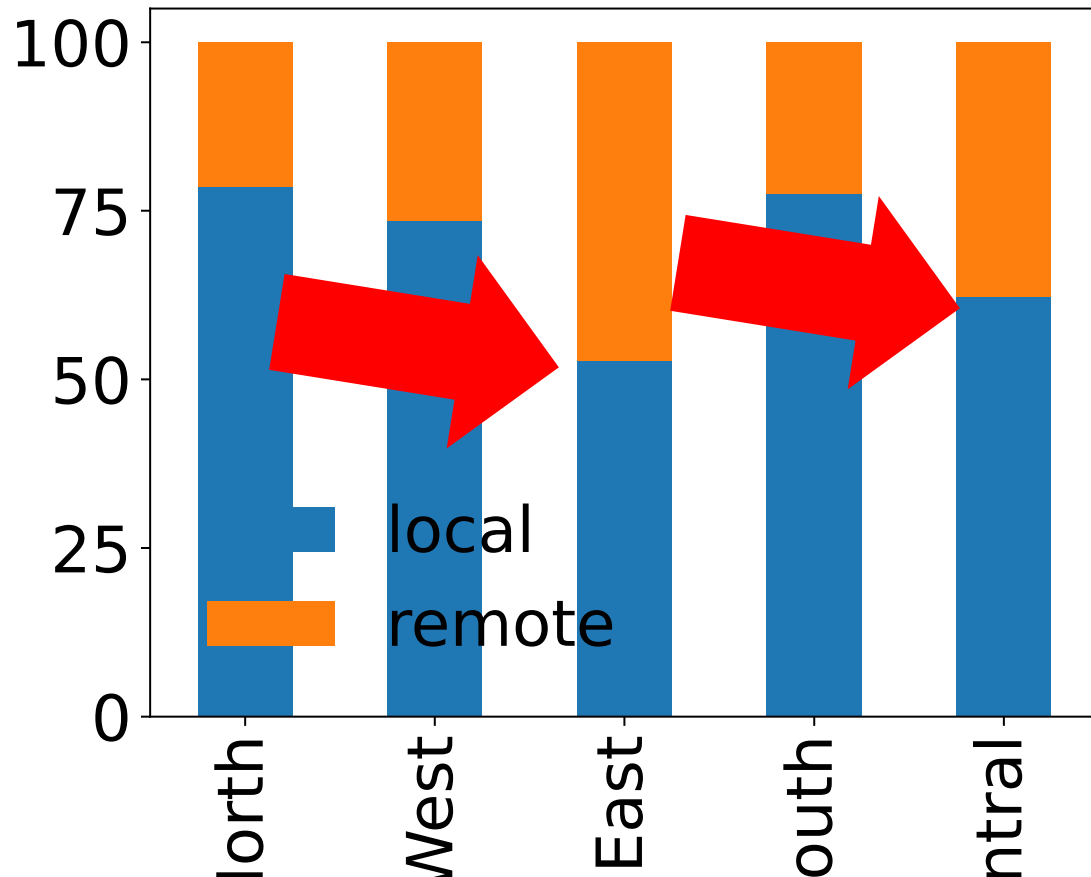
- Non-local content
- **Non-local DNS resolvers**

Locality Comparison for three Countries



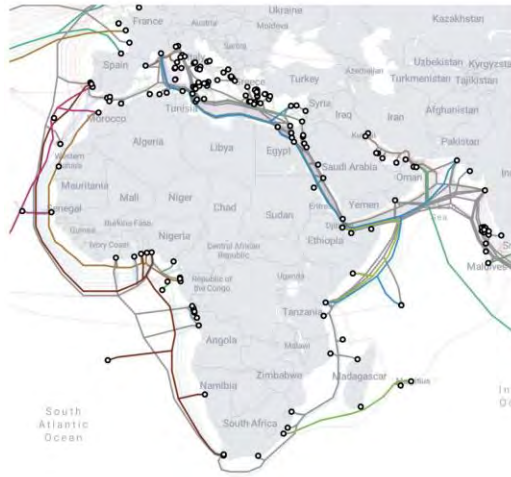
Hidden remote dependencies makes local content seems remote

Africa's Hidden Remote Dependencies Amplify Cable Cut-based Outages

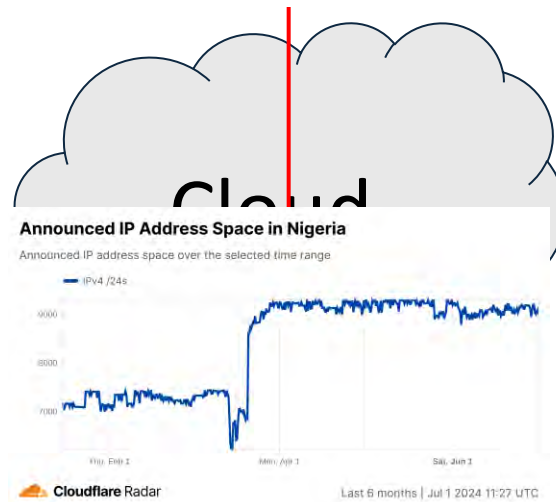


Hidden remote dependencies makes outage analysis non-trivial

Concluding Remarks



Impact of cable cuts
differentiates African
connectivity



Remote dependencies
magnify outages during
cable cuts



We need a **systematic**
analysis of alternatives
(e.g., terrestrials, Starlink)

Come work with us to analyze and understand Africa's connectivity challenges

Citations

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