Cambodia’s Internet Development

Presented by: Makito Lay

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KHNOG
Cambodia Network Operators Group

KHNOG 6 Conference

About Me

- **Makito Lay**
  - Network Analyst / Technical Trainer @ APNIC
  - Experiences:
    - 18 years in ISP and Telecom industry
    - CCIE # 47682
    - JNCIA-Junos, JNCIS-SP, JNCIP-SP
    - MTCNA, MTCRE, MTCWE, MTCTCE, MTCUME, MTCINE, MTCIPv6E
    - Ex-programmer
  - Areas of Interest: BGP, MPLS, IPv6, Coding & Databases
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Milestones of Cambodia Internet (1990s)

- In May 1997, Cambodian government established Camnet, the first Internet Service Provider (ISP) in Cambodia.
  - First Ping KH - Cambodia with Full Internet (1997.05.24)
  - Following this, Bigpond (Online) and TeleSURF were launched
- Technologies:
  - Dial-up (28.8Kbps – 56Kbps)
    - Requires telephone line
  - Leased Line
- Internet was expensive and unaffordable for household users.
- Many homes did not have telephone line.

Milestones of Cambodia Internet (1990s)

- Internet prices in 1998:
  - Camnet's Dial-up Full Access
    - Registration: $50
    - Monthly: $40 (free 6 hours, $6 per extra hour)
  - Bigpond's Dial-up Standard Plan
    - Registration: $60
    - Monthly: $60 (free 6 hours, $8 per extra hour)
  - Camnet's 9.6Kbps Leased Line
    - Installation: $1,000
    - Monthly: $1,200
- Cambodia's GDP per capita in 1998 was USD 267.40.

Milestones of Cambodia Internet (Early 2000s)

- Internet usage began to grow.
- xDSL (Digital Subscriber Line) technology was introduced.
  - Requires telephone line
- Bandwidth prices were still high.
  - $700 for 64Kbps
  - $4,100 for 512Kbps
  - $6,400 for 1Mbps
- Non-business users were accessing Internet at Internet Café.
  - $0.5 – $1 per hour

Milestones of Cambodia Internet (Early 2000s)

- Internet prices in 2003:
  - Camnet's Dial-up Option 1
    - Monthly: $15 (free 6 hours, $2.40 per extra hour)
  - Online's 128Kbps Reach DSL
    - Installation: $100 (MPTC connection fee)
    - Monthly: $199 (free 1,500MB, $0.10 per extra MB)
  - Camnet's 64Kbps Leased Line
    - Installation: $300
    - Monthly: $700
  - Online's 64Kbps Leased Line
    - Installation: $300
    - Monthly: $350 (free 1,000MB, $0.10 per extra MB)

Milestones of Cambodia Internet (Mid 2000s)

- A few ISPs offer WiMAX or wireless Internet.
  - AngkorNet, Citylink, Online
- DSL technologies were still mainstream.
- Main uplinks were through Vietnam (border cross-connect).
- Internet eXchange Point (IXP) did not exist.
- Major content, cache, and DNS root servers were not widely available within the country.
- IPv6 was not needed ☺
  - Customers were typically assigned public IPv4 addresses for their Internet

Milestones of Cambodia Internet (Mid 2000s)

- Many Internet packages were with data usage limit.
  - Online's MyDSL-E 128Kbps: $99/month, 800MB, $0.08 – $0.10/extra MB
- Some offer packages with dual pricing.
  - Off-peak hours (nighttime, weekend, holiday) are billed at a lower rate
  - Usage during peak time is more expensive or restrictive
- Internet with unlimited data allowance were still costly in 2006.
  - Camnet 64Kbps Leased Line: $350/month
  - Citylink 64Kbps ADSL: $215.95/month
  - Online 64Kbps DSL: $219/month
  - WiCAM 64Kbps ADSL: $199/month

Milestones of Cambodia Internet (Late 2000s)

- New players came into market.
  - Ezecom, MekongNet, Metfone, NeocomISP, SINET…etc.
- ISPs began offering Fiber To The Home (FTTH).
- Most household users remained on DSL.
- Some ISPs tend to hide their prices due to competition.
- Cambodia Network eXchange (CNX) established in 2008.
  - Currently (2024) the biggest IXP in Cambodia
- Uplinks were through land borders to Vietnam and Thailand.
- No one really cared about IPv6 ☺

Milestones of Cambodia Internet (Early 2010s)

- More ISPs joined, of course.
  - Digi, Opennet, SingMeng…etc.
- ISPs finally peered with each other domestically.
- More local content cache and root DNS servers are available.
- Bandwidth prices became more affordable.
- ISPs were offering dual bandwidth packages.
  - Standard Internet speed for international content
  - A separate local speed for domestic content and caches
  - For example: 2Mbps Internet with 10Mbps local bandwidth

Milestones of Cambodia Internet (Early 2010s)

- There were discussions about IPv6, and some networks deployed IPv6 but not offering to customers ☺
  - Carrier Grade NAT (CGN) became increasingly common as ISPs grew and faced challenges in obtaining new IPv4 address space
- A submarine cable called “AAG (Asia-America Gateway)” left a strong impression on me ☺
  - Used by major providers but often experienced outages
  - Good latency to Hong Kong (around 30ms)
    - Helpful for my online game playing
  - When AAG went down, traffic failed over to landlines, resulting in increased latency

Milestones of Cambodia Internet (Early 2010s)

- Monthly fee of unlimited Internet in 2013:
  - Household
    - Digi Home 2Mbps Cable Modem: $25
    - Ezecom Pulse 4.0 1Mbps WiMAX: $69
    - Metfone Metnet2 2Mbps ADSL: $12
    - Opennet HomeLite 3Mbps ADSL: $12
    - Telecom Cambodia CamDSL Gold DSL: $35
  - Corporate:
    - Ezecom Corporate 1Mbps ADSL: $139
    - MekongNet Business Regular 1Mbps FTTH: $85
    - Metfone Met_Eco 2Mbps FTTH: $55
    - Opennet BusinessLite 2Mbps FTTH: $65

Milestones of Cambodia Internet (Late 2010s)

- Casino customers were key focus of Dedicated Internet Access (DIA) services.
  - High revenue per Mbps
  - High Service Level Agreement (SLA) requirements
  - Direct route to China
- Casino-specialised ISPs established for serving demands in Sihanoukville and Poipet.
- Distributed Denial of Service (DDoS) issues were common challenges for ISPs.
  - “When the network is DDoS-ed, our phones are also DDoS-ed”, said a client of mine at that time

Milestones of Cambodia Internet (Late 2010s)

- More ISPs prefer to get household customers pay yearly instead of monthly.
  - Promotional discount offered
- Limited progress in IPv6 deployment.
  - No matter how many IPv6 Workshops APNIC did ☺
- IP leasing became common.
  - IP providers typically do not create ROA for the prefixes
- Many ISPs survived with CGN plus IP leasing and believe this will last forever.

Current Situation

- Some ISPs ceased operation due to license revocation.
- Several ISPs acquired/merged by others.
  - Digi and Opennet became part of Ezecom
- Vast majority of ISPs participated in domestic peering.
  - 43 peers with 40Gbps peak traffic @ CNX (October 2024)
- Bandwidth prices are no longer expensive.
  - Approximately $60/month for 100Mbps FTTH with yearly payment
- ISPs are extending IPv4's life with IP leasing, IP purchase, and CGN although they are expensive.

Current Situation

- Non-ISP networks are aware of benefits of Provider-Independent (PI) address space and applied for own resources.
  - Government agencies
  - Banks
  - Microfinance institutions
  - Universities
  - Enterprises
- ISPs are encouraged to refer their customers to apply for Internet resources rather than leasing IP for assigning to customers.

Current Situation

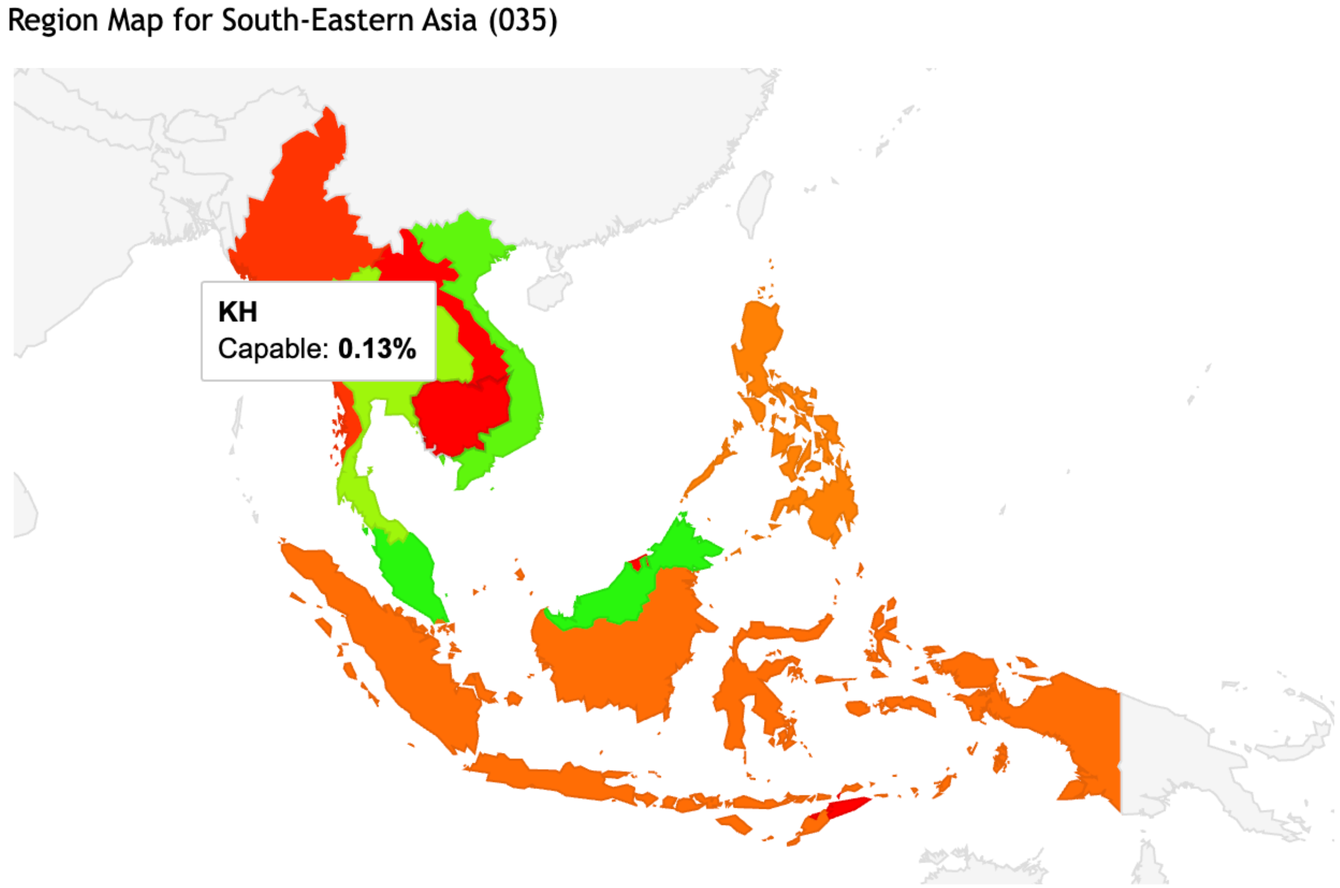
- According to List of Active Telecommunication Operators from Telecommunication Regulator of Cambodia (TRC):
  - Last mile providers are now limited to five
    - (Cambodia) Fiber Optic Communication Network (CFOCN)
    - Angkor Data Infrastructure (ADI)
    - Micromax
    - Telcotech
    - Telecom Cambodia
  - Two providers are permitted to do cross-border connections
    - Angkor Data Communication Group (ADCG)
    - Telecom Cambodia
  - Last Updated: July 2024

Current Situation

- As of now, Cambodian networks are still free to peer with foreign networks.
  - Not the case in some countries like Myanmar
    - An International Gateway (IGW) license is needed
- The plan of National Internet Gateway is on the way.
  - Service Level Agreement (SLA)?
  - Path diversity?
  - Single point of failure?
  - Free market competition?
  - Financial impact to existing Transit Providers?

Current Situation

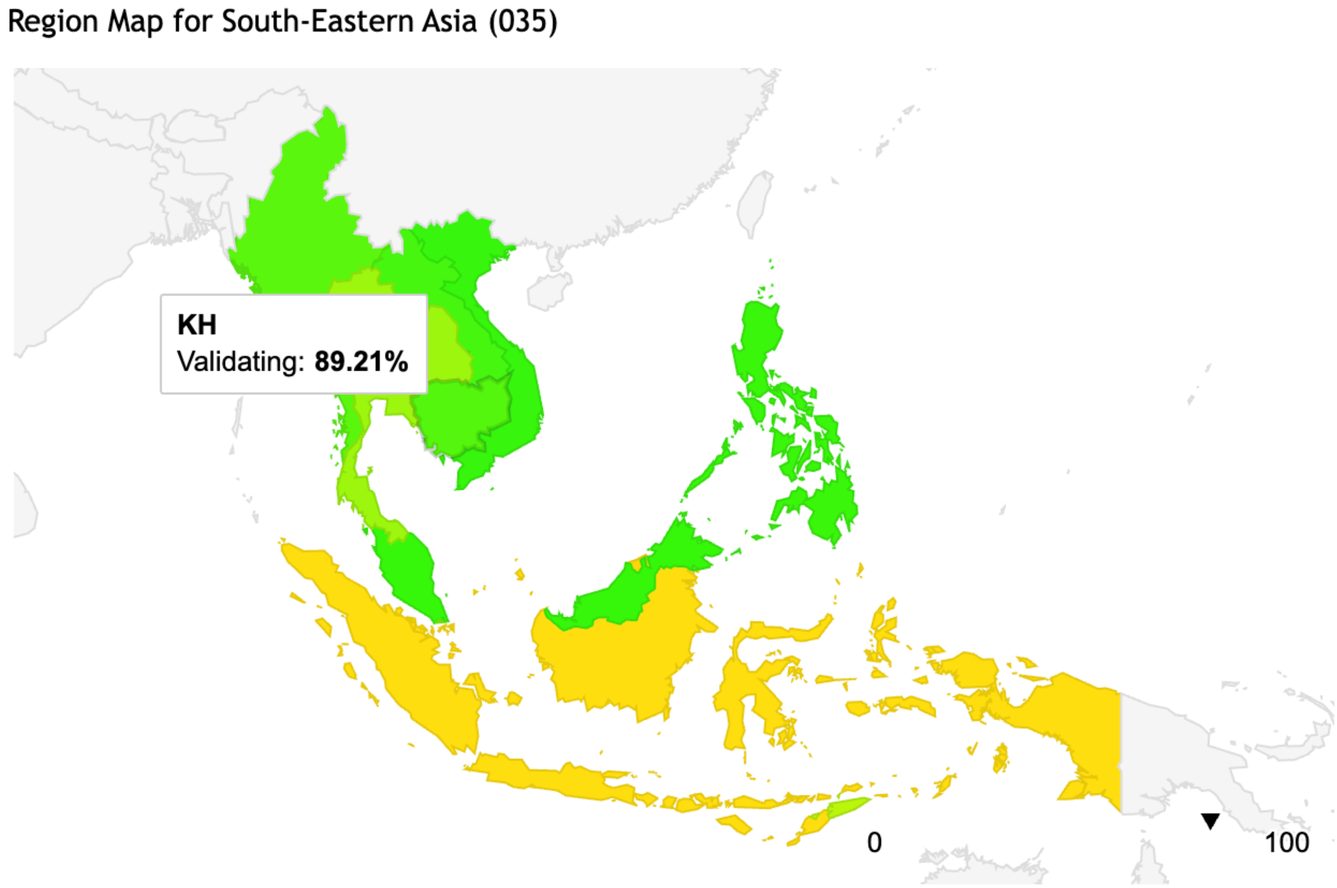
- IPv6 services still do not exist.



Source: https://stats.labs.apnic.net/ipv6/KH (18 Oct 2024)

Current Situation

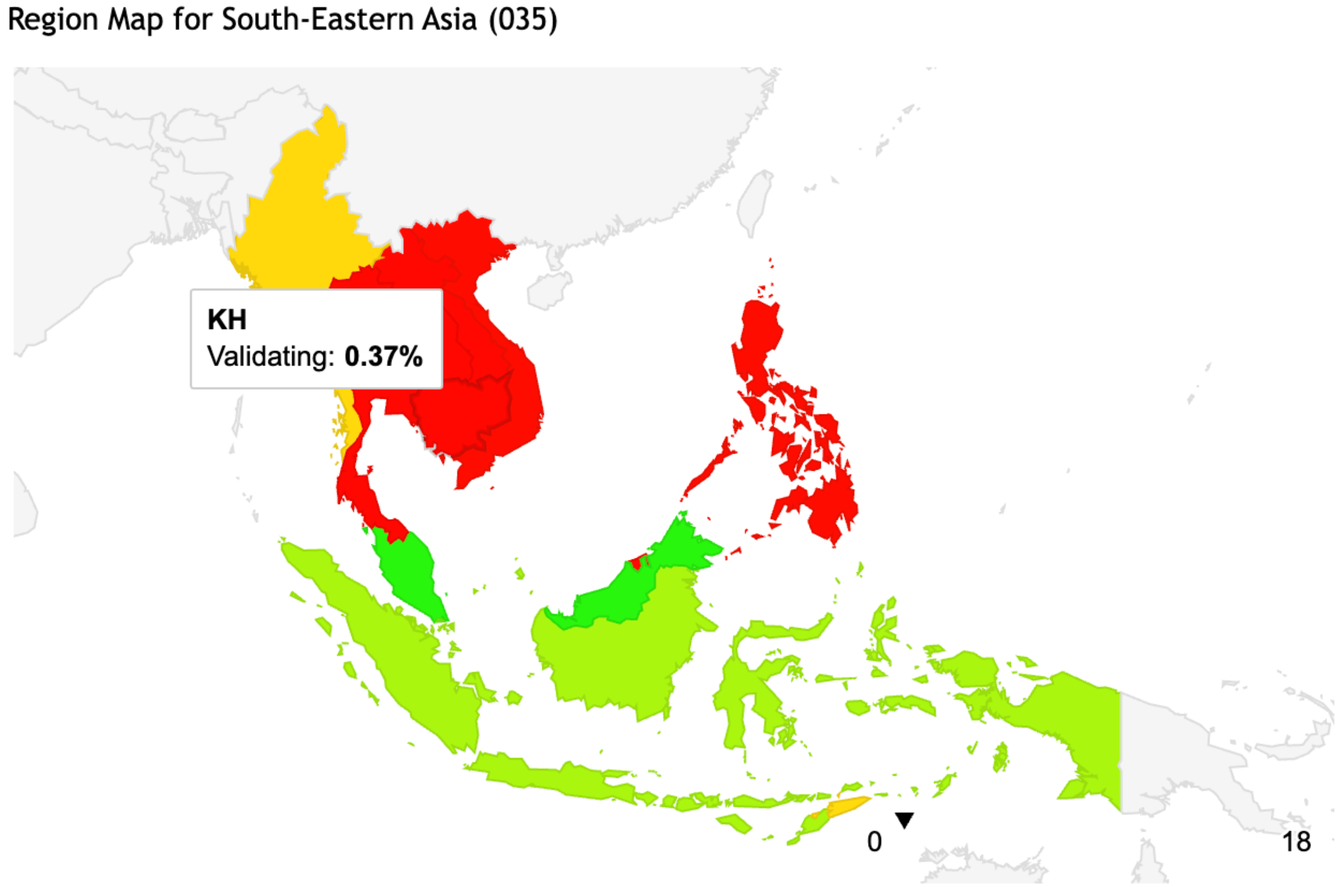
- ROA (Route Origin Authorization) coverage is good.



Source: https://stats.labs.apnic.net/roa/KH (18 Oct 2024)

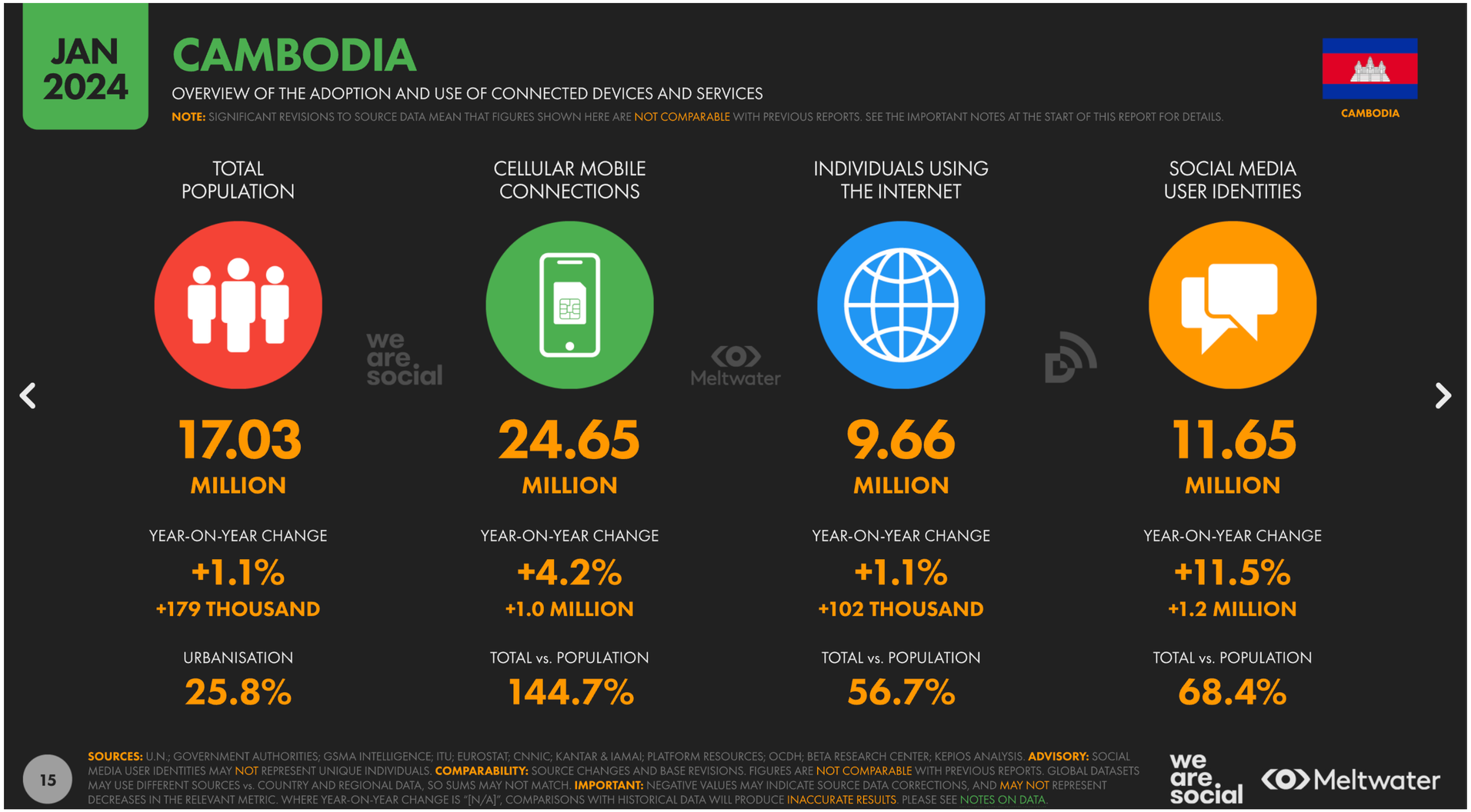
Current Situation

- Almost no one is doing ROV (Route Origin Validation).



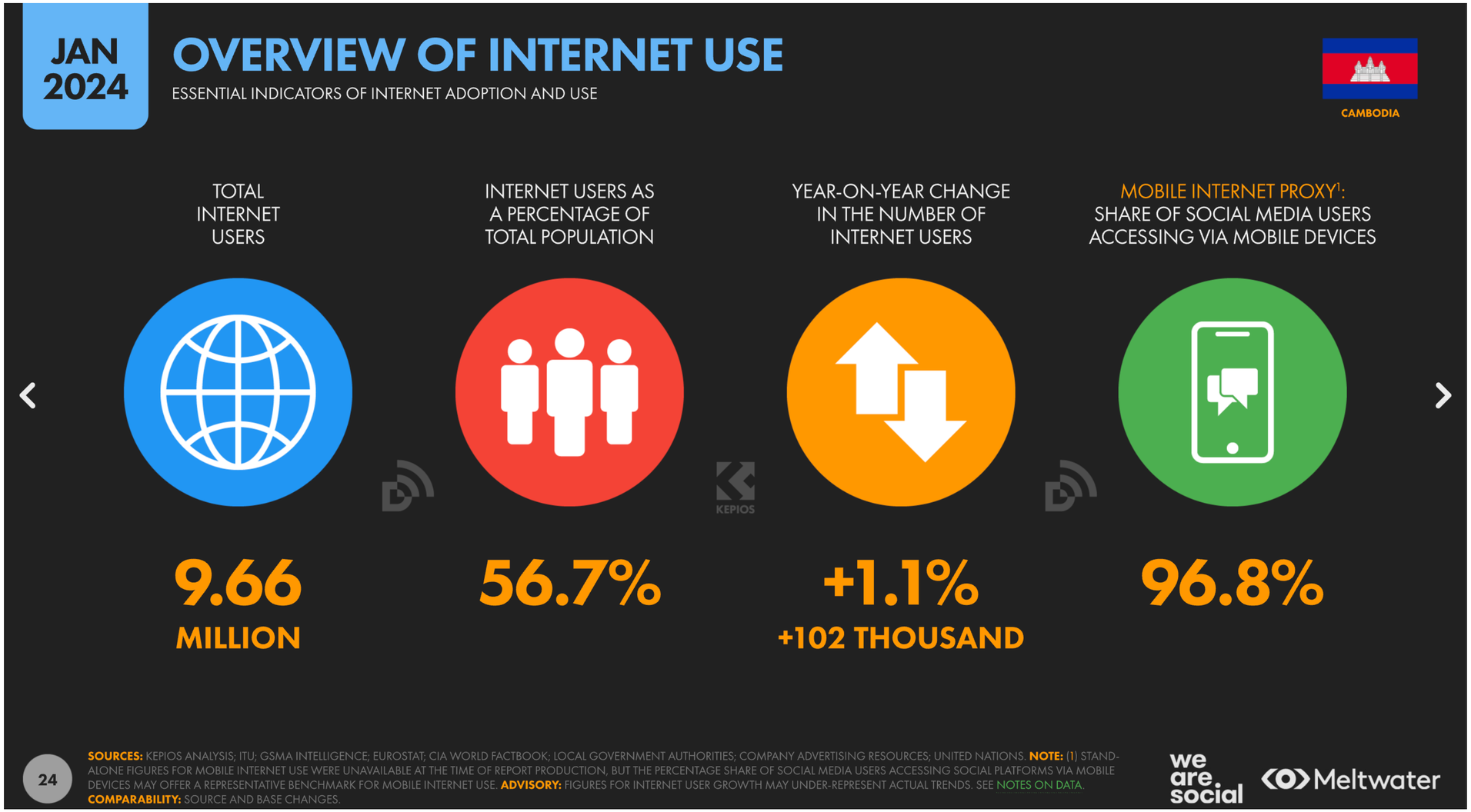
Source: https://stats.labs.apnic.net/rpki/KH (18 Oct 2024)

Statistics – Overview



Source: DataReportal (2024). Digital 2024: Cambodia. https://datareportal.com/reports/digital-2024-cambodia

Statistics – Internet Users



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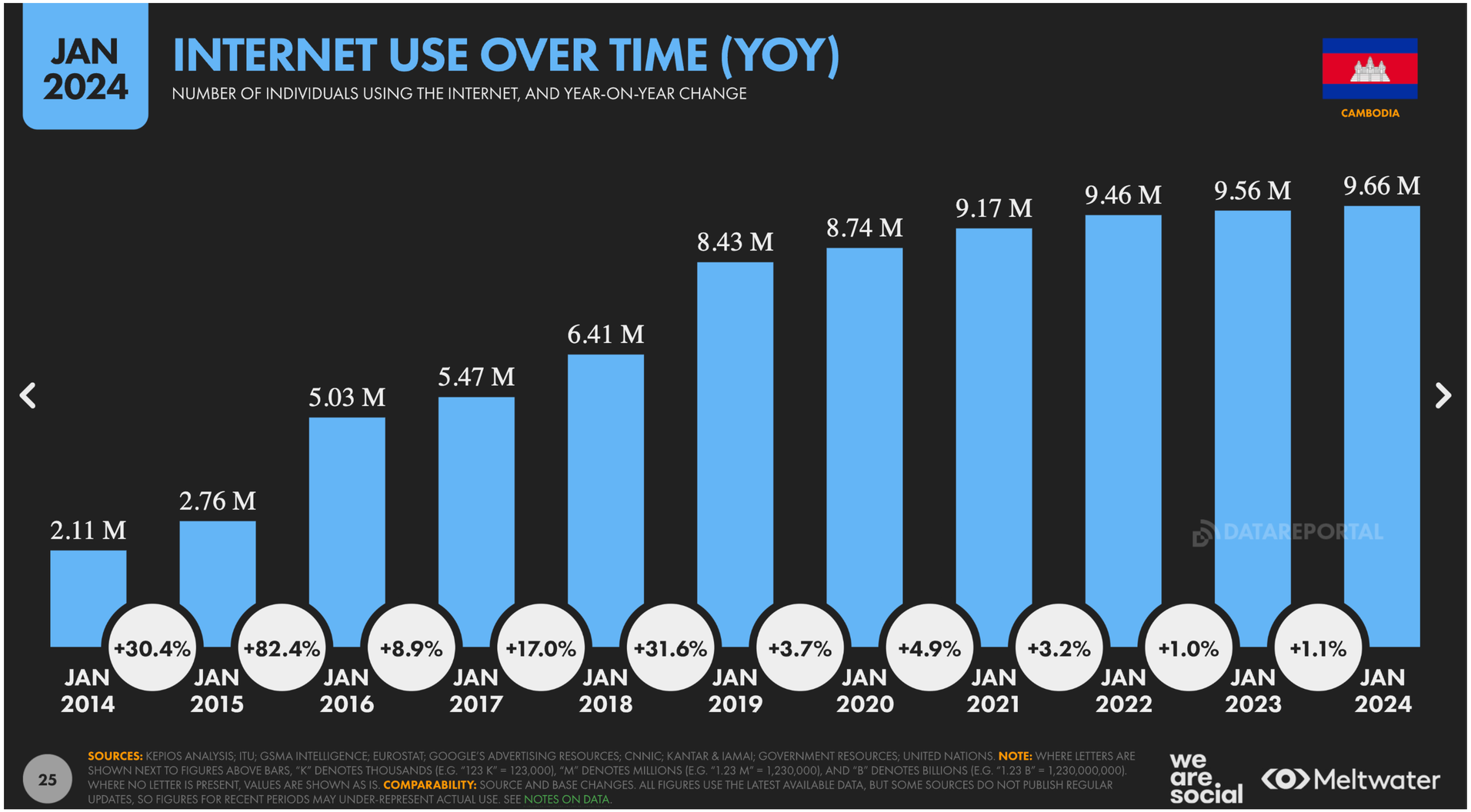
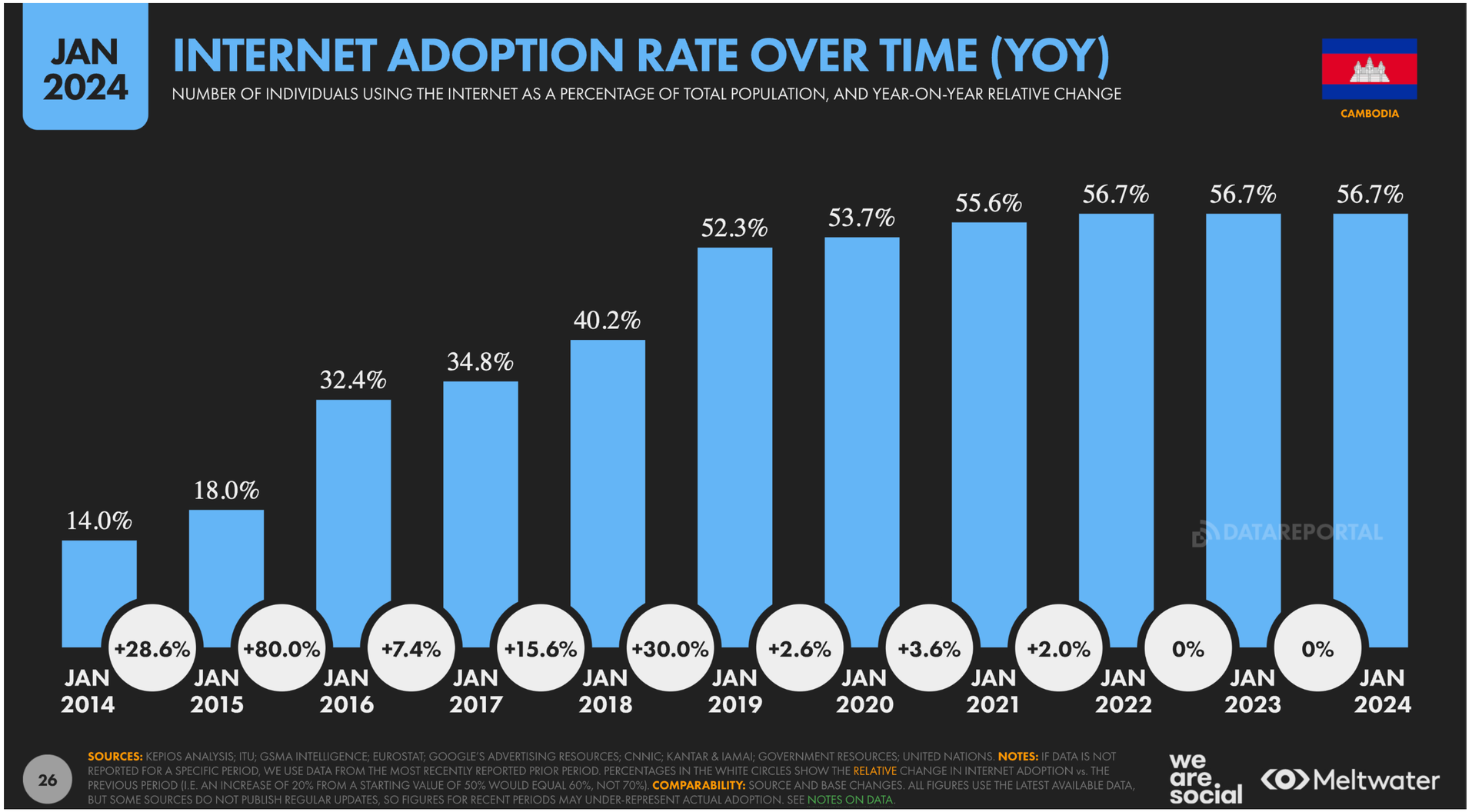
Statistics – Internet Users



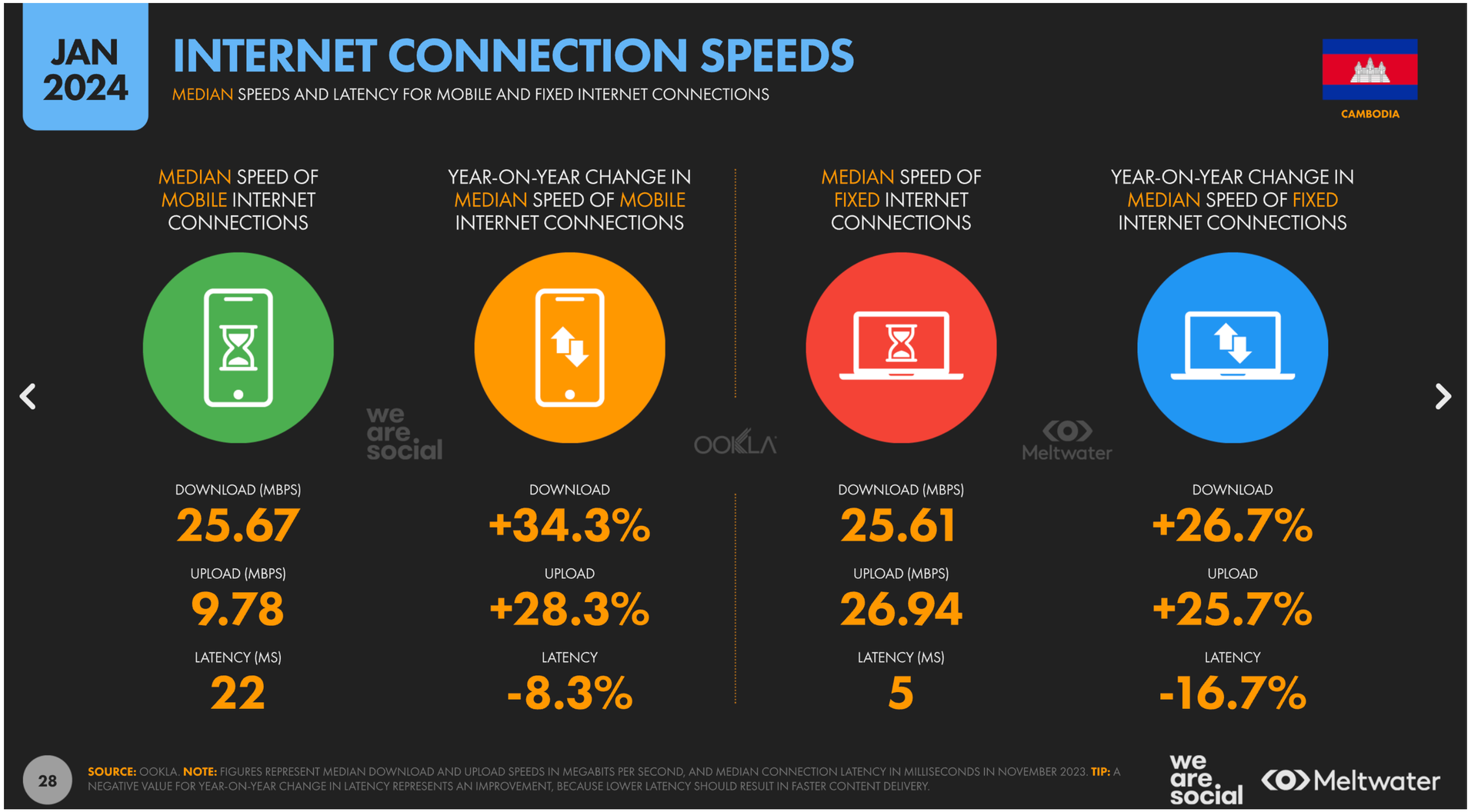
Source: DataReportal (2024). Digital 2024: Cambodia. https://datareportal.com/reports/digital-2024-cambodia

Statistics – Internet Users



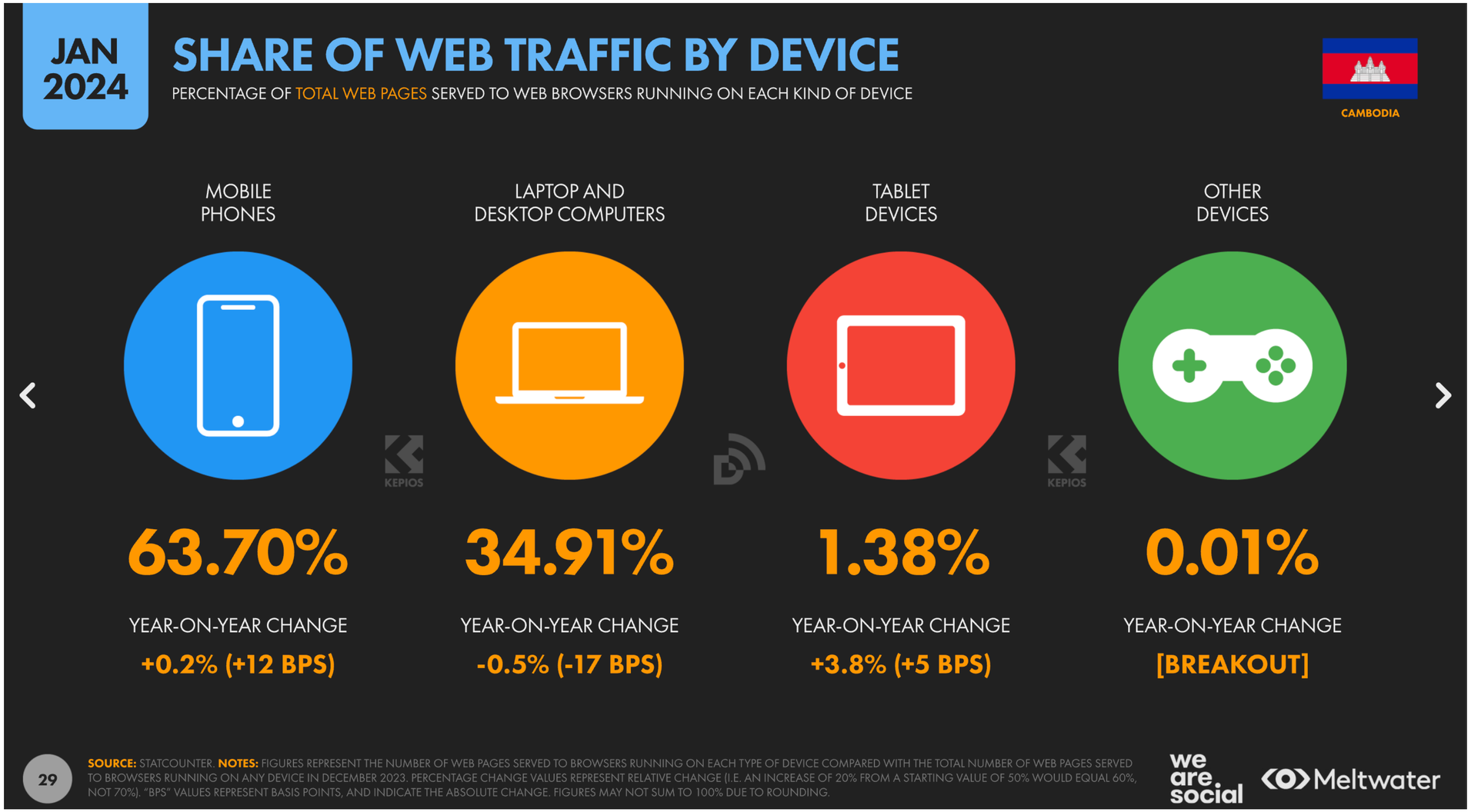
Source: DataReportal (2024). Digital 2024: Cambodia. https://datareportal.com/reports/digital-2024-cambodia

Statistics – Internet Speeds



Source: DataReportal (2024). Digital 2024: Cambodia. https://datareportal.com/reports/digital-2024-cambodia

Statistics – Device Used



Source: DataReportal (2024). Digital 2024: Cambodia. https://datareportal.com/reports/digital-2024-cambodia

What to Expect in 2027?

- 2027 will mark 30 years of Cambodia Internet.
- What should we do before that?
- What will happen next?
- Will our entire country's traffic go through a single gateway? (Security? Path diversity?)
- Will our IPv6 and ROV still be 0%?
- **You all are the people who continue to write this story!** ☺

Need Help?

General Enquiries

APNIC Help Centre
https://help.apnic.net/s

Training Resources

APNIC Academy
https://academy.apnic.net

Technical Discussions

APNIC Academy Technical Assistance Platform (TAP)
https://academy.apnic.net/technical-assistance

Cambodia’s Internet Development

Questions & Answers