



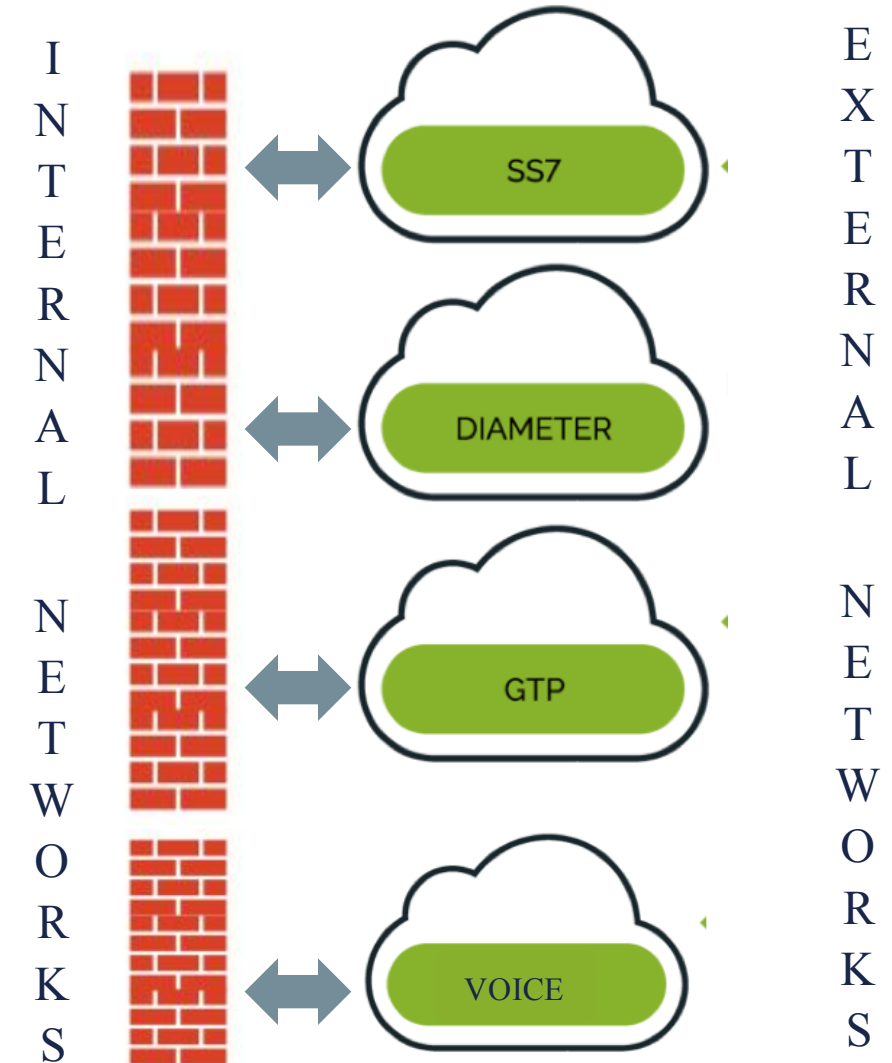
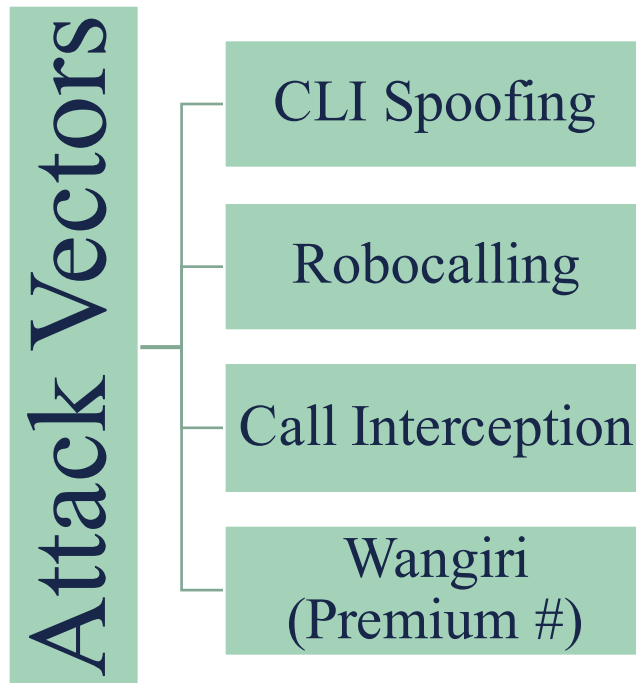
MOBILEUM

Voice Firewalls



Protecting Subscribers

- Voice is still key to many interactions
 - › Accessing enterprises like banks, healthcare, and other call centers that provide services based on CLI





Robocalling & Caller-ID Spoofing

World's biggest DDoS attack record broken after just five days

Memcached attacks are going to be this year's thing

By Iain Thomson in San Francisco 5 Mar 2018 at 23:59

19 SHARE ▼

Megan Leonhardt | @Megan_Leonhardt | 10:32 AM ET Wed, 6 June 2018

Americans received over 16 billion robocalls so far this year—here's how to stop them



It's not your imagination — robocalls are on the rise

August 14, 2018 | 9:37pm

Robocalls — those annoying, automated spam and scam messages — are on the rise. So far in 2018, more than 16.3 billion spam phone calls have pestered people across the...

Got a missed call from overseas? Don't call back! 'Wangiri' scam on the rise leaving victims with hefty phone bills



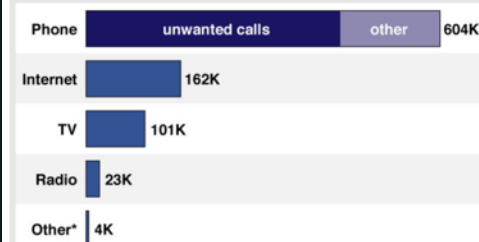
FCC fines man \$120M over massive robocalling campaign

May 10, 2018 | 6:19pm

The Federal Communications Commission on Thursday voted to issue a \$120 million fine to a Florida man alleged to have made almost 100 million robocalls to trick consumers with “exclusive”...

Unwanted calls far outnumber other FCC complaints

FCC complaint volume from October 2014 to July 2017:



Notes: "Unwanted calls" category includes historical robocalls and telemarketing categories from before October 2016. *requests for dispute assistance, "accessibility" and "emergency complaints."



Action Fraud is continuing to receive reports of businesses falling victim to “PBX Dial through fraud”. Find out what it is and how to protect against it.

Choosing the Wrong IP-PBX Can Cost You \$\$\$\$ in Toll Fraud

Apr 30, 2015 | VoIP Application Notes, VoIP PBX News and Blog



Sample Rule Evaluations for Voice Firewall

- Examine A-number in call & validate corresponding signaling info.
 - › Is A-number according to numbering plan definition?
 - › If no-national roaming, should A number be on a national interconnect call?
 - › If A-number is in HPMN (not roaming), should A number be on an incoming international interconnect call?
 - › Is A-number same as B-number?
 - › If A-number is roaming and performed a VoLTE attach, is call on IMS or ISUP?
- Integration with CAMEL triggers
 - › Did A-number originate a call to B-number?
 - › Unconditional Call Forwarding status for A-number and B-number
- Is A-number in IRSF or DRSF list?
- STIR/SHAKEN certificate history checks
- IMEI checks (if on-net call)
- Examine SIP headers to trace route of call and enforce validations



STIR / SHAKEN

- Mandated by regulators (FCC) in the North American market

According to the FTC, fraudulent phone calls, which includes illegal robocalling, scam Americans out of \$9.5 billion a year. The FTC receives the most complaints regarding robocalls. In 2017, it received more than 4.5 million robocall complaints, up from 3.4 million in 2016.

- Nuisance Call Management

- › SIP Caller Id Spoofing prevention. Does not work on ISUP calls.
- › Analytics to identify nuisance calls – Incoming/Outgoing call & SMS ratios, Call duration, Call location, device types, MSISDN ⇔ IMSI ⇔ IMEI mapping for on-net robocalling, etc.
- › Call blocking at STP, GMSC, and SBC

- STIR: Secure Telephony Identity Revisited

- SHAKEN: Signature based Handling of Asserted Information using ToKENS

- Originating party adds a SIP Header

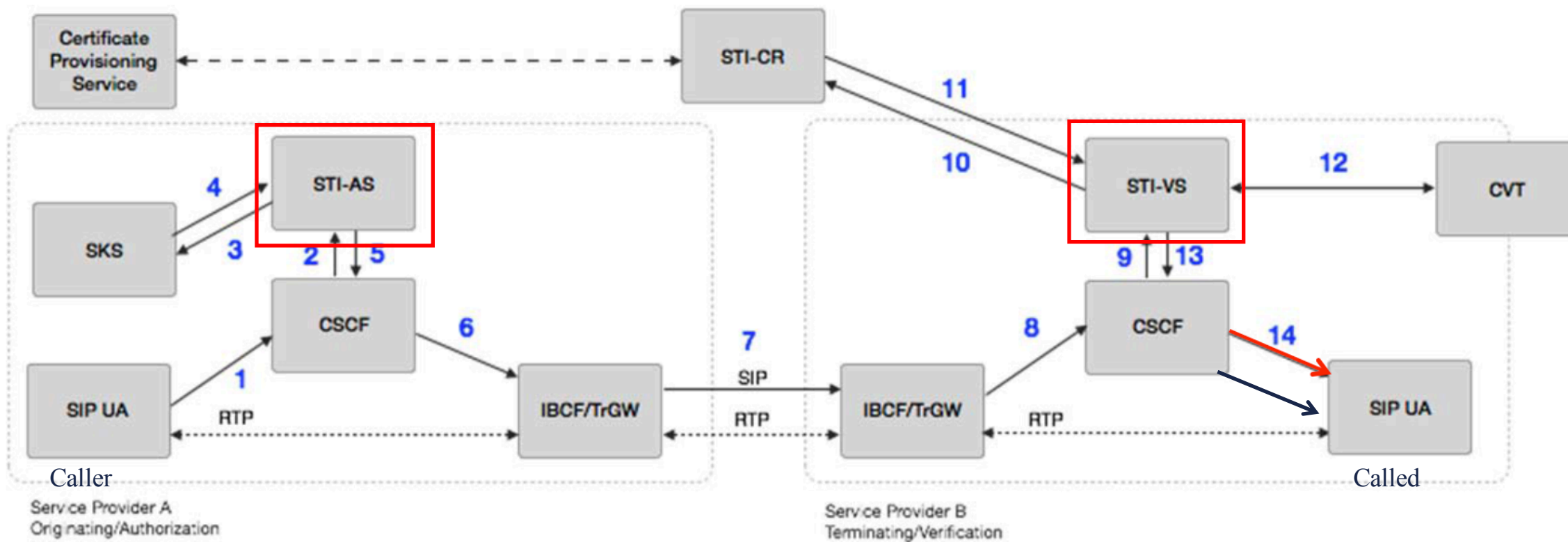
- › PASSporT and Digital Signature headers

Verified Identity in Browsers

   Citigroup Inc. (US) | <https://online.citi.com/US/login.do>



STIR/SHAKEN Architecture





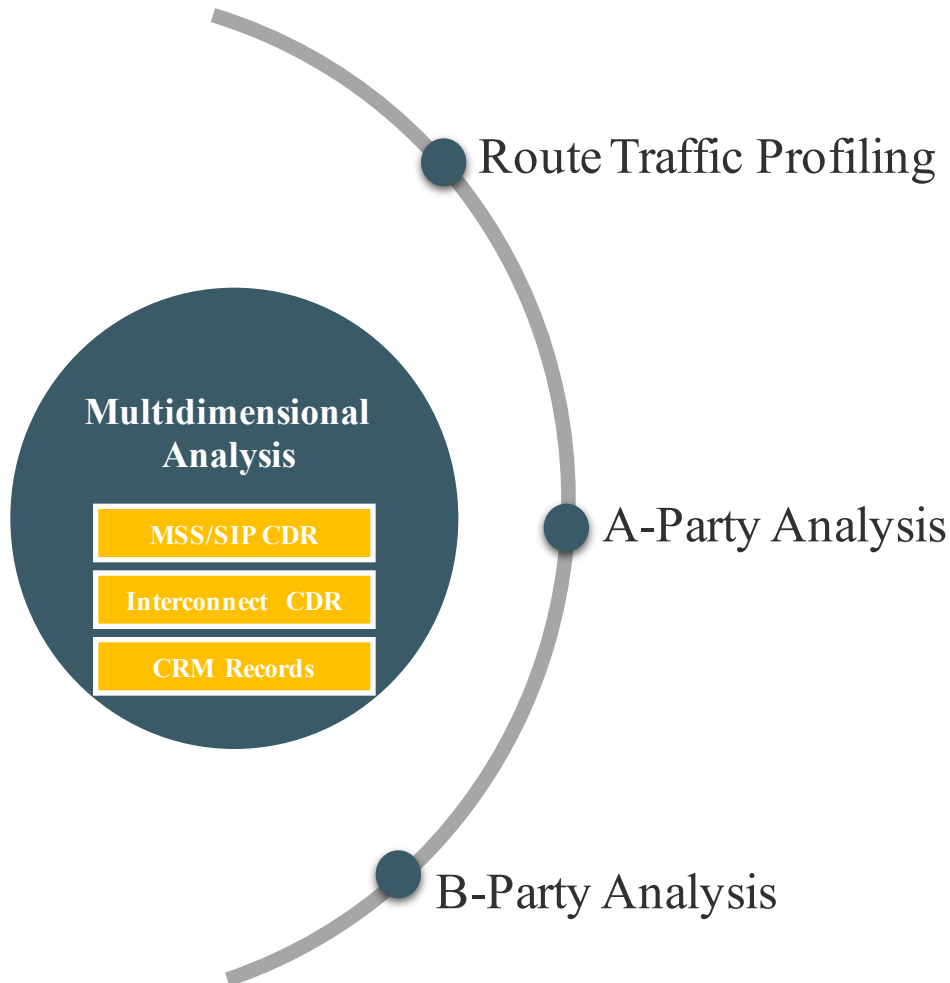
Scam Likely Notifications on Devices

- Analysis of calls to determine which are likely scammers & Robocallers
 - › Call duration
 - › Call direction
 - › Frequency of calls
 - › IMSI / MSISDN / IMEI changes
 - › Location of call origination
 - › SIP parameters
 - › Subscriber Location (Roaming, Local, etc.)
 - › Numbering plan information
- International & National calls handled





Robocalling Solution



Analysis Performed

- Suspect route identified using route traffic analysis
- Pruned by using A-Number Analysis
- Suspect MSISDN identified using CLI profile analysis
- B-Number analysis for identifying associated B-list

Solutions Provided

- **Detection** – Using Machine Learning Algorithms/Behavioral Analysis
- **Trace Back Reporting** – Providing A Party/ANI with Top Sending Carriers/Origination Points
- **Prevention** – Diverting Calls to IVR/Whisper Announcement or Releasing Calls Using Home Policy

Key Insights

Fraudulent Route

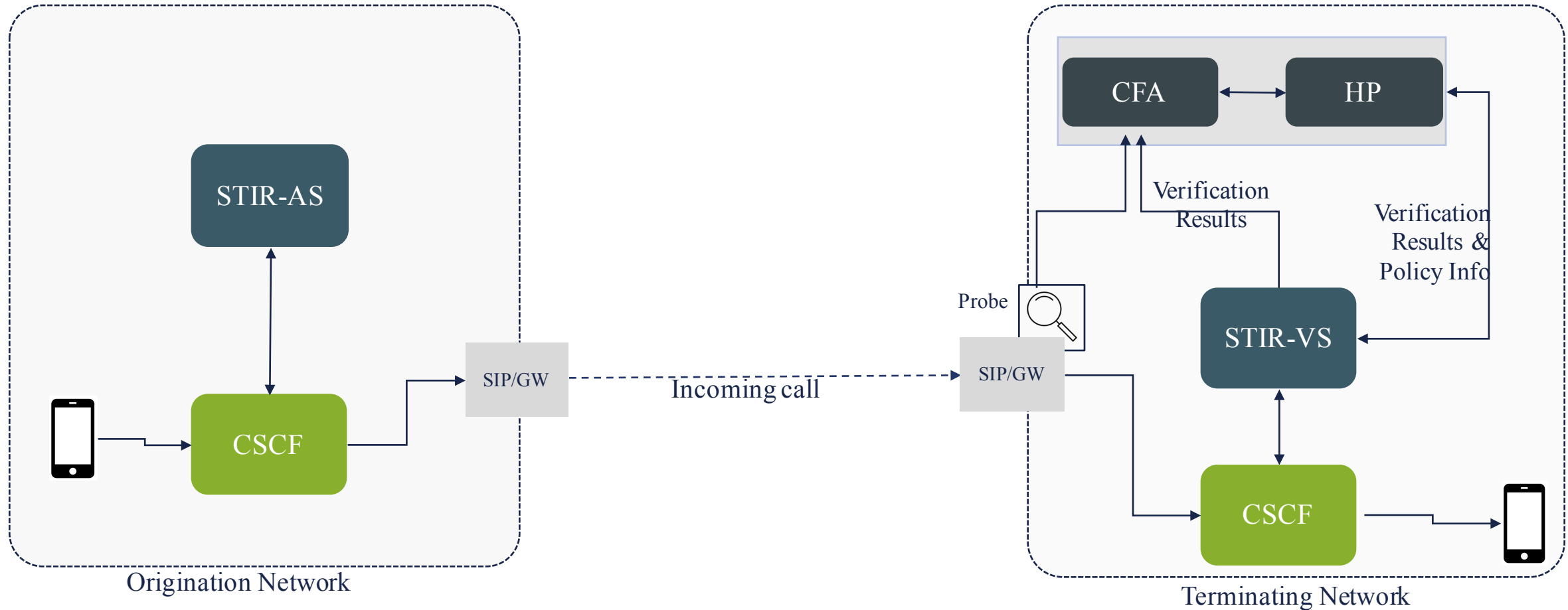
Spoofed CLI List

Subscribers receiving refiled calls

MoU & Revenue Details



Enhanced Fraud Detection Through CFA & STIR





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THANK YOU