How would you like your calls?
On the rocks or STIR & SHAKEN?

| **Whitepaper**

ecosmob
makes your vision a reality

STIR | SHAKEN

The Abstract

It has become imperative to verify incoming calls to decipher the caller's identity and ensure they are legitimate. In case the incoming calls are not verified for their credibility, scammers can camouflage their presence and prove a threat to the end user. STIR/SHAKEN is a technology framework that assures that the identity of the user making call is trustworthy, earning the badge of reliability.

Introduction

There are billions of robocalls made each month, and around 40% are fraudulent. It sums up to two billion calls subjecting to five calls per user. This is where STIR/SHAKEN steps in. STIR stands for Secure Telephony Identity Revisited and is a working group in IETF (Internet Engineering Task Force). SHAKEN is an acronym for Signature-based Handling of Asserted Information Using toKENs (SHAKEN) standards. The primary goals are to ensure the credibility and authenticity of an IP phone call.

It digitally authenticates the handoff of calls between networks in a complex web scenario. This is to affirm that the caller ID number appearing on the phone is, in fact, a trustworthy source. STIR/SHAKEN are industry-ready techniques that allow validating if the calls are actually from the senders from which they pretend to be.

As their implementation is adapted on a large scale, it will give call receivers more confidence in the valid calling party.

Problem Definition

As discussed in the previous section, caller ID spoofing is something frauds adopt to scam receivers. It is utterly difficult to distinguish which call is legitimate and what has been spoofed. Sometimes the calls do not emerge from PSTN but are software-based, where the software can be meddled with and project the call from a peer, leading to falling into the trap.

Sometimes the receivers get multiple spoofed calls in a day which can be very annoying. To eradicate this, some technique needs to come into the picture for creating a safe space. VoIP calls are subject to even more spoofed calls.

Let's dive into a few stats:

• 68.4M Americans report losing money from phone scams – up from 59.4 million in 2021.
• 1 in 3 Americans (33%) report falling victim to phone scams, with 20% more than once.
• The average reported loss was $577 – up from $502 in 2021.
• Robocallers duped 61.1% of these people.
• The money lost to scam calls in the past 12 months equates to an estimated $39.5 billion USD.

High-Level Solution

STIR/SHAKEN is a set of complex protocols to fight caller ID spoofing. It enables service providers to identify and verify the caller ID, thus mitigating caller ID spoofing.

The calling party makes a call with the aid of its service provider. The Service Provider checks the originator and calling party to authenticate the caller is legitimate. Furthermore, it attests the calling party in three ways of attestation:

1. Full Attestation
2. Partial Attestation
3. Gateway Attestation

Full Attestation

It is an A-level attestation that implies a fully trusted source. With this level of attestation, the carrier declares that it completely identifies the caller as a legitimate source. Spoofed calls do not receive this attestation.

Partial Attestation

It is a B-level attestation in which the call origin is authenticated but cannot ensure that the call source is as indicated. Alternatively, the provider affirms that the call origin is as mentioned but cannot assure that the call hasn't been spoofed.

Gateway Attestation

This C-level guarantees that the service provider assures the gateway of receiving the call but the call source can't be verified. This level of call authentication says the call is out of its network and has a potential spoofing threat.
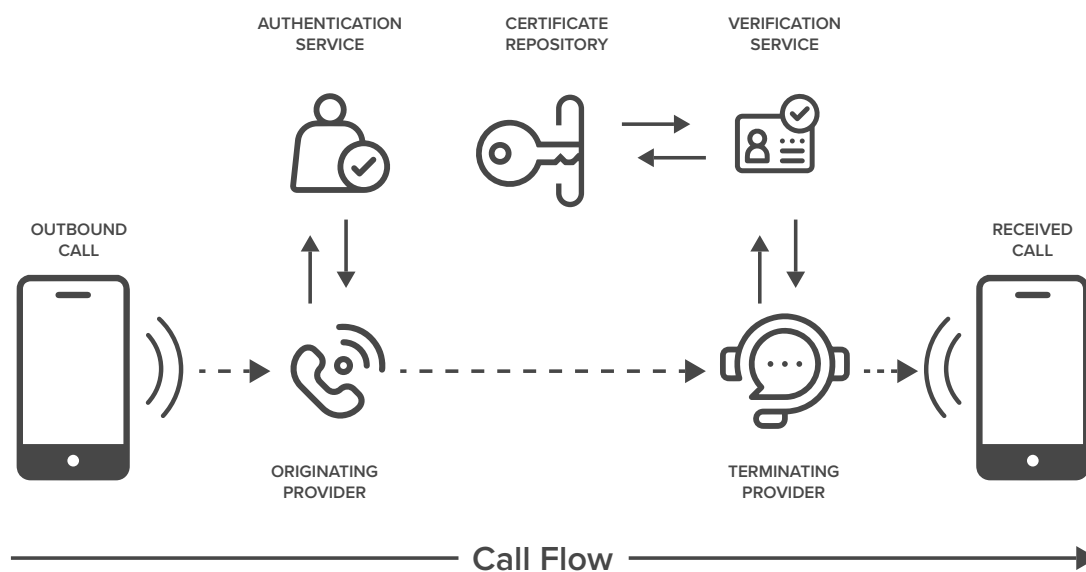
Call Flow

The above diagram ensures how the call flows for authentication after getting verification. Next is the process of obtaining certification. Once the calls get attestation, apt action can be taken.

STIR/SHAKEN software component implements the following roles: STI-PA (Secure Telephone Identity), STI-CA (Secure Telephone Identity - Certification Agency), and STI-SP (Secure Telephone Identity-Service Provider).
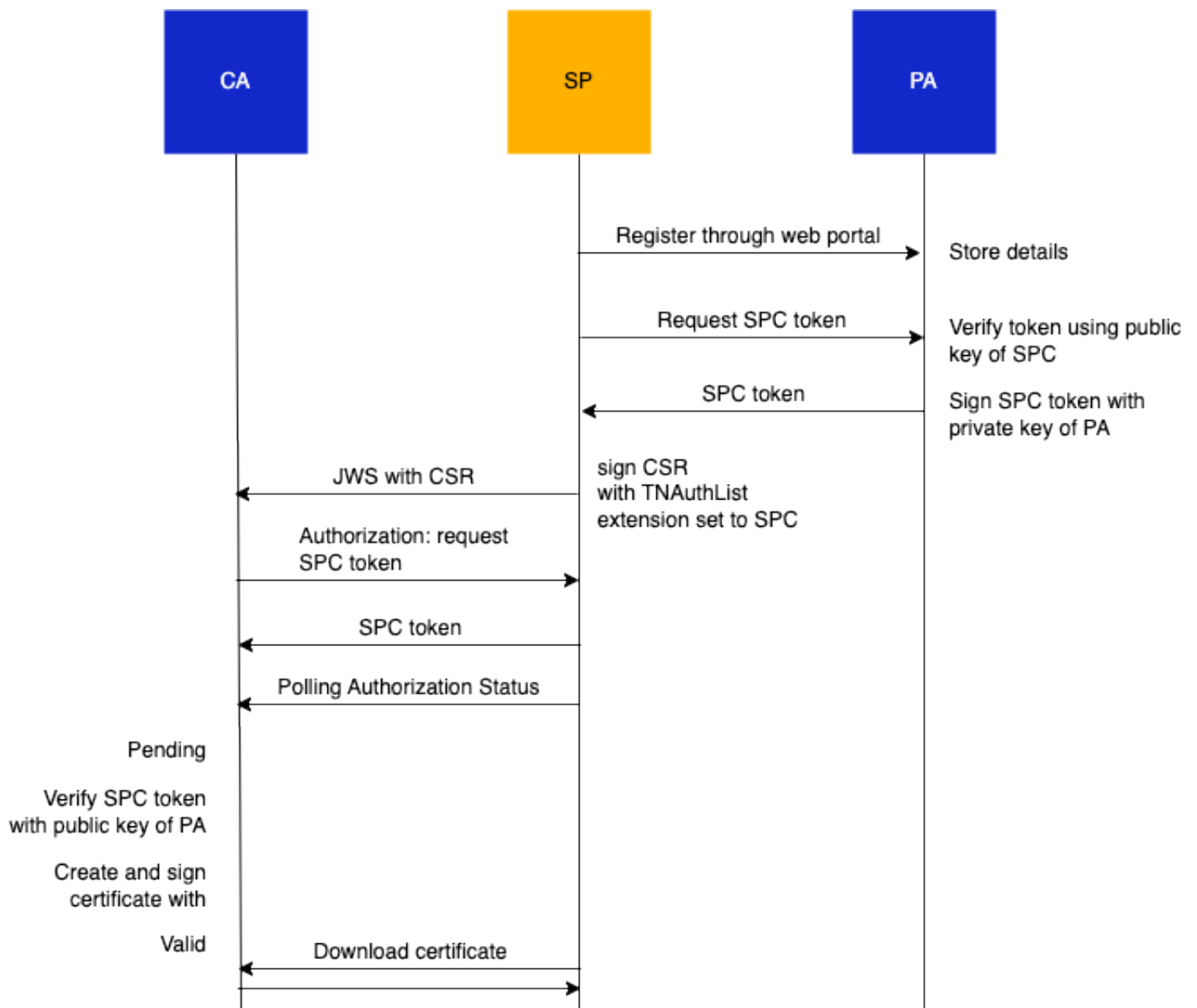
The following process does authentication.

STI-PA and STI-CA grant certificates to the STI-SPs. STI-SP creates and ends secure calls. STI-SP may execute one or two services:

- authentication service (STI-SP/AS) at the call origination point
- verification service (STI-SP/VS) at the call termination point

Thus the authenticity is set up by SSL certificates and security tokens.
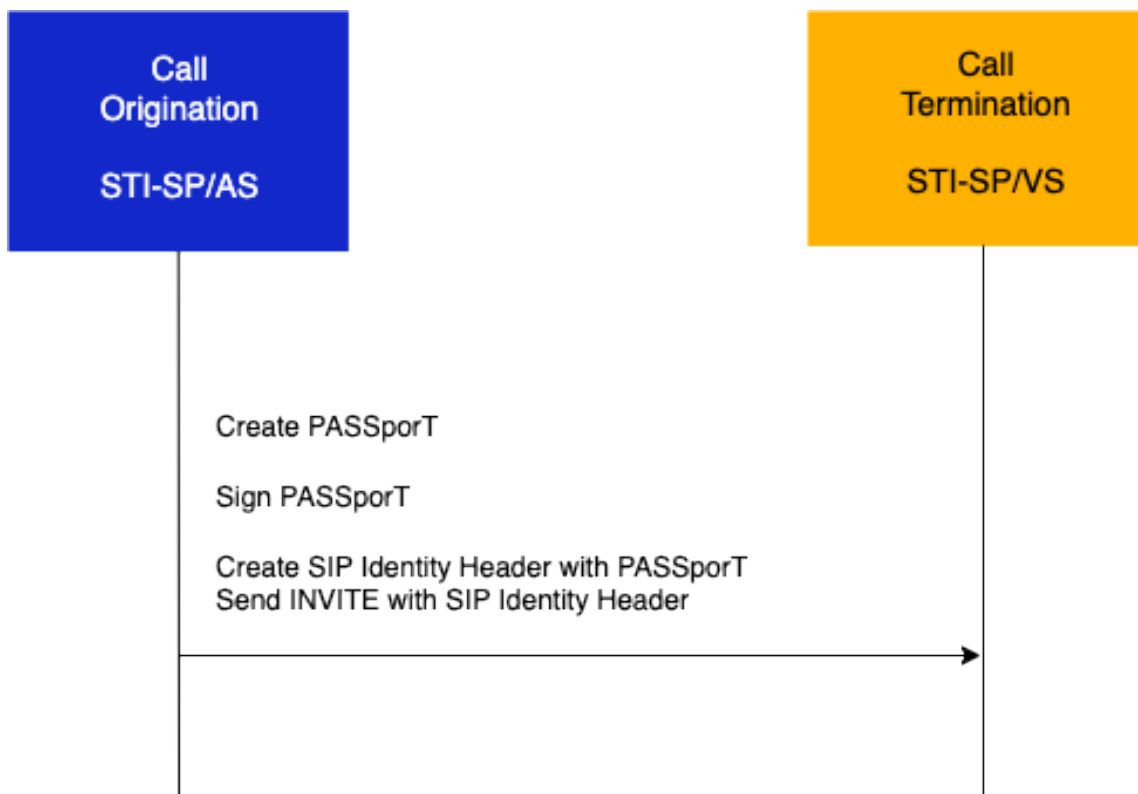
PASSporT

```
{
    "alg": "ES256",
    "ppt": "shaken",
    "typ": "passport",
    "x5u": "https://cr.sansay.com/RXXXXXJ"
}
.
{
    "attest" : "A",
    "dest" : { "tn" : ["1334744XXXX"] },
    "iat" : 1665874663,
    "orig" : { "tn" : "1334744XXXX" },
    "origid" : "26154e13-87d4-468d-98c1-256f5916719f"
}
```

SIP Identity header example

```
INVITE sip:18001234567@example.com:5060 SIP/2.0
Via: SIP/2.0/UDP example.com:5060
From: "Alice" <sip:14045266060@5.6.7.8:5060>;tag=123456789
To: "Bob" <sip:18001234567@1.2.3.4:5060>
Call-ID: 1-12345@5.6.7.8
CSeq: 1 INVITE
Max-Forwards: 70
Identity:
eyJhbGciOiJFUzI1NiIsInBwdCI6InNoYWtlbiIsInR5cCI6InBhc3Nwb3J0IiwieDV1IjoiaHR0cHM6Ly9jZXJ0aWZp
Y2F0ZXMuZXhhbXBsZS5jb20vMTIzNDU2Nzg5LnBlbSJ9.eyJhdHRlc3QiOiJBIiwiZGVzdCI6eyJ0biI6WyIxODAwMTI
zNDU2NyJdfSwiaWF0IjoxNTQ4ODU5OTgyLCJvcmlnIjp7InRuIjoiMTQwNDUyNjYwNjAifSwib3JpZ2lkIjoiM2E0N2N
hMjMtZDdhYi00NDZiLTgyMWQtMzNkNWRlZWRiZWQ0In0.S_vqkgCk88ee9rtk89P6a6ru0ncDfSrdb1GyK_mJj-
10hsLW-dMF7eCjDYARLR7EZSZwiu0fd4H_QD_9Z5U2bg;info=
<https://certificates.example.com/123456789.pem>alg=ES256;ppt=shaken
```
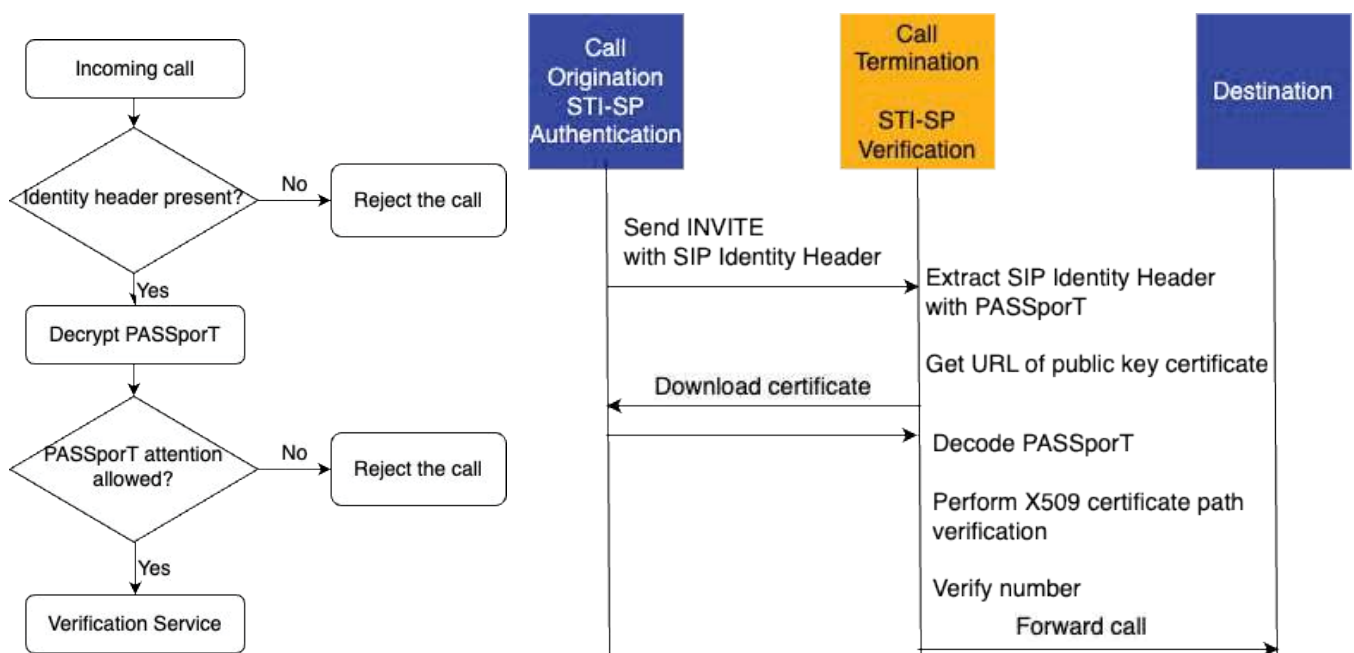
Business benefits

STIR/SHAKEN has many benefits for consumers and businesses.

Eradicate spam calls: Enlightening the customers that a call is fraudulent, thereby saving them spoofed call engagement.

Trust: Verifying the brand's digits by STIR/SHAKEN implies customers can rely on trusted communication from your brand.

Better information: STIR/SHAKEN exhibits the origin of a phone call. Receive only legitimate calls, thus saving oneself from spammers around the globe with STIR/SHAKEN safeguarding.

Summary

STIR/SHAKEN saves consumers from fraudulent calls, robocalls, and hackers but does not guarantee there won't be any spoofed calls. At the same time, STIR/SHAKEN identifies previous robocalls and spoofers but can't stop them from stealing your data and making theft impossible. While this may be a factor, VoIP service providers offer a robust and secure network that makes spoofing as challenging as possible.

If you wish to implement the STIR/SHAKEN protocol for your business, you can contact us at sales@ecosmob.com. We can arrange a free consultation for you and look into your requirements.

ecosmob
makes your vision a reality

REACH US @

📍 INDIA
501-503, Binori B Square 1, Nr. Neptune House,
Ambli -Bopal Road, Ahmedabad-380058,
Gujarat, India.

📍 USA
300 SE 2nd Street, Suite 600
Ft. Lauderdale, Florida, USA 33301

📍 SOUTH AFRICA
340 witch hazel avenue centurion
South Africa.

📍 CANADA
1285 West Broadway, Suite 600,
Vancouver, BC, V6H 3X8

📞 PHONE

🇺🇸 +1-303-997-3139

🇮🇳 +91-7778842856

🇨🇦 +1 (604) 900-8870

🇿🇦 +27 0871353659

✉️ MAIL US AT
sales@ecosmob.com

VISIT US