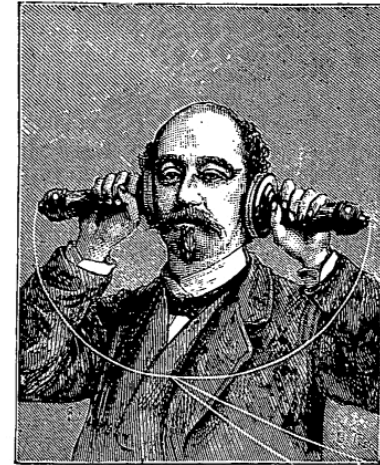




Personne parlant.



Personne écoutant.

LE TÉLÉPHONE.

Review of STIR/SHAKEN in US

The story so far

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VP Systems Engineering, Somos

Co-chair, ATIS/SIP Forum IPNNI Joint Task Force

Co-chair, US STI-GA Technical Committee

Board of Directors of SIP Forum



STIR/SHAKEN in US | 1115.2022



Administrator of

- Toll-Free Numbers (TFNA)
- North American Numbering Plan (NANP)
- Reassigned Numbers Database (RND)

TFNRegistry, TSSRegistry, TFNIdentity,
RealNumber DNO, RealNumber RTU

Chris Wendt | VP System Engineering @ Somos | @chriswendt | cwendt@somos.com



- Provider of global Number Intelligence & Trust services to the Telecoms & Messaging ecosystems
- Trusted provider of network and subscriber information used for optimized routing, fraud mitigation and identity validation



Impersonation

Impersonation



Impersonation



Impersonation

Consumer Complaints

Truth in Caller ID Act of 2009

Amended the Communications Act of 1934 to make it unlawful for any person in the United States, in connection with any telecommunications service or Internet protocol (IP)-enabled voice service, to cause any caller identification (ID) service to transmit misleading or inaccurate caller ID information with the intent to defraud, cause harm, or wrongfully obtain anything of value

Spoofer Calls

While this is obviously an important and legitimate use of telephone numbers for applications that use telephone applications to better communicate, there was of course an **implied trust that rules would be followed.**

Hard Truth: Over time, rules were bent, many customers demanded more flexibility and threatened to go to other providers that would be willing to bend the rules, checks and balances were for the most part ignored freely and not enforced, and as we all know, we are where we are.

The telephone industry is in good company for using implicit trust as a mechanism until things go bad. Internet and many other examples exist. **Implicit trust works until it doesn't**, and unfortunately whether you implement explicit trust early or late, it is hard work, but is needed.

Spoofting and Robocalls

So not only have spoofing and robocalling practices on their own grown to be problems, but the combination of both is really the key issue that has led us to where we are.

Spoofting of telephone numbers to trick people to pick up calls (e.g. neighborhood spoofing, random uses of numbers to avoid tracking or analytics) has become the norm. Even legitimate robocalling has adopted the same techniques in order to compete with the bad actors.



Both properties of spoofing and robocalling make the overall problem extremely hard to enforce

Impersonation

Consumer Complaints

Truth in Caller ID Act of 2009

Robocall Strike Force, October, 2016

FCC NANC CATA

Call authentication/Trust Anchor WG

May 2018 - *Report on Selection of Governance Authority and Timely Deployment of SHAKEN/STIR*

- established Governance model and initiated formation of the STI-GA/STI-GA-TC/STI-PA RFP

Sept 2020 - *Best Practices for the Implementation of Call Authentication Frameworks* - Subscriber Vetting, TN Validation, Attestation, 3rd Party Validation, International, Robocall Mitigation

Oct 2021 - *Deployment of STIR/SHAKEN by Small Voice Service Providers* - Technical Report detailing overcoming any perceived barriers to deploying STIR/SHAKEN

Jan 2022 - *Best Practices for Terminating Voice Service Providers using Caller ID Authentication Information* - Provides a review of many of the tools provided by STIR/SHAKEN and beyond that can be utilized to determine the legitimacy of a call



Impersonation

Consumer Complaints

Truth in Caller ID Act of 2009

Robocall Strike Force, October, 2016

TRACED Act - December, 2019

Pallone-Thune Telephone Robocall Abuse Criminal Enforcement and Deterrence

FCC action to date

Caller ID Authentication

- **STIR/SHAKEN:** Implementation by large providers by June 30, 2021 and smaller providers by June 30, 2022
- **Robocall Mitigation Database:** Providers need to register their STIR/SHAKEN or robocall mitigation plan status in RMD, providers not in database can no longer receive calls from other providers, providers found not compliant have been removed from RMD
- **International Gateways:** calls that originate overseas entering American phone networks with NAMP telephone numbers must support STIR/SHAKEN
- **Robotexts:** Recent call for solutions to increasing robotexting problem with recommendation to consider STIR/SHAKEN authentication framework for messaging

Partnerships

- **Collaboration:** The Federal Trade Commission, Department of Justice, and State Attorneys General

Enforcement

- **Cease-and-Desist:** Providers found to be facilitating illegal robocalling have been penalized by allowing US service providers to block all calls coming from their network
- **Major Fines:** Multi-million dollar fines including \$225M fine against telemarketers for apparent illegal robocalling

FCC action to date – cont'd

Other Actions

- **Unassigned, Unallocated, Invalid Number Blocking** - allowed blocking
- **DNO (Do Not Originate)** - allowed blocking of telephone numbers that are known or claimed to not originate calls
- **Addressing Robocaller Number Access** – policies to reduce access to phone numbers by perpetrators of illegal robocalls and new gateway provider rules addresses foreign robocallers' use of U.S. NANP numbers.
- **Protecting 911 Call Centers** – Requiring voice service providers to block robocalls made to 911 call center telephone numbers listed on a PSAP Do-Not-Call registry.
- **Fining the Robocall Sources** - FCC's Enforcement Bureau also works with an industry group to "traceback" the traffic of illegal calls to the originating provider.
- **Robocall Blocking Apps** – Empower consumers with effective robocall blocking tools. The information made available through STIR/SHAKEN standards is now a critical resource for such tools.
- **TRACED Act** – Following Congress's adoption of the TRACED Act, the FCC took a series of actions to implement the law.
- **Consumer Education and Awareness** – Issue consumer alerts, work with consumer groups, and use social media to raise consumer awareness of best practices to protect themselves.

Base

STIR/SHAKEN

RFC8224 - defines identity header field in SIP

RFC8225 - defines PASSporT token

RFC8226 - defines STIR certificates

RFC8588 - “shaken” PASSporT extension

ATIS-1000074 - profile document for use of RFC8224 and RFC8225 for end to end SIP and STI-AS and STI-VS in SHAKEN framework

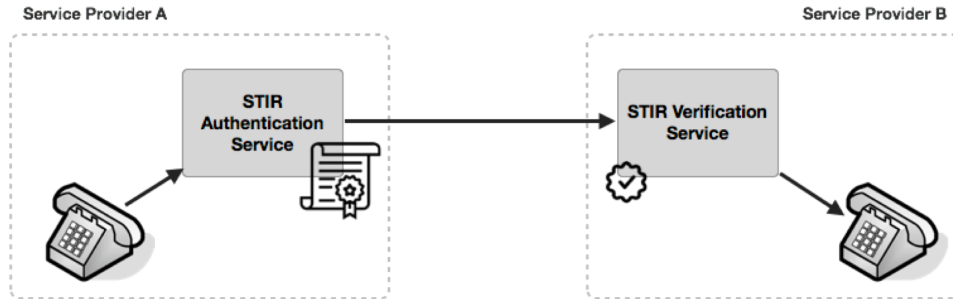
ATIS-1000080 - profile document for using RFC8226 and the definition of certificates, creation, usage in SHAKEN framework

ATIS-1000084 - profile document for establishing governance, policy administration and token/certificate framework



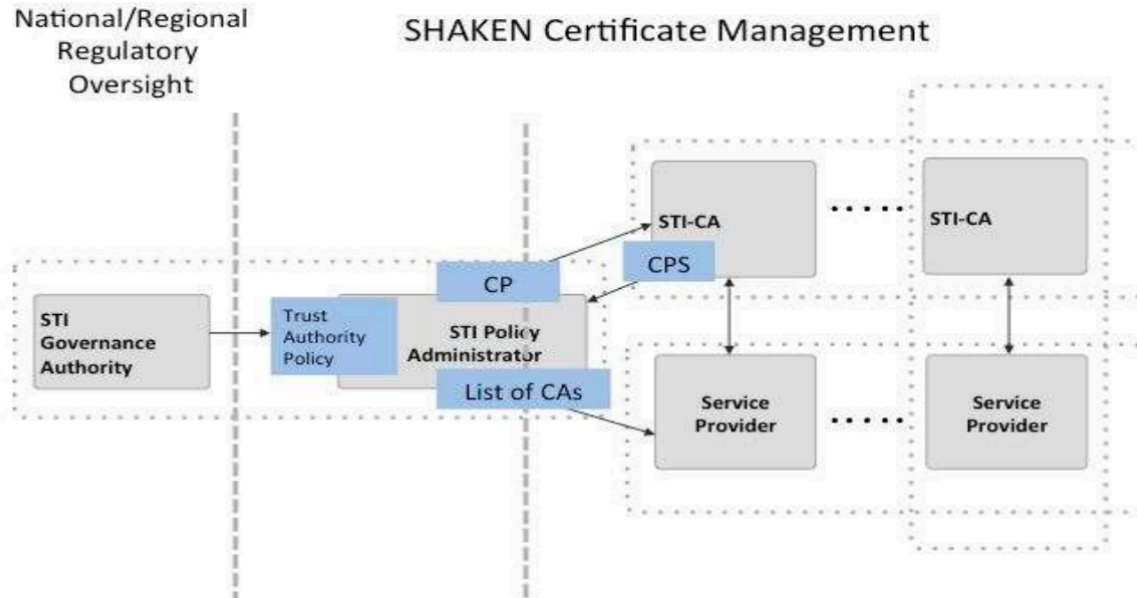
STIR/SHAKEN 101

Authentication/Verification



STIR/SHAKEN 101

Governance/Certificate/PKI Model



From ATIS-1000084

US STI-GA

Roles/Policies/Best Practices

STI-GA Policy: <https://sti-ga.atis.org/resources/>

Policy Documents

- SPC token Access Policy
- STI Participant Revocation & Reinstatement Policy
- Certificate Policy
- STI-CA Revocation policy
- SHAKEN Framework Funding Policy

756 authorized STI Participants - as of 09/30/2022

- Large, medium and small SPs, wireline, wireless and interconnected VoIP, and Resp Orgs

12 STI-CA Participants - as of 09/30/2022

- Prospective CAs must submit Certification Practice Statement (CPS) conforming with the SHAKEN specifications and in compliance with STI-GA Certificate Policy

Enforcement

- Delinquent Payers
- FCC Action against SPs

Extensions to STIR/SHAKEN

RFC8443/ATIS-1000078 - Resource Priority - “rph”
PASSporT for GETS/WPS

RFC9027/ATIS-1000098 - Resource and SIP Priority
for Emergency Services - “rph”/“sph” claims

RFC8946/ATIS-1000085 - Diversion - “div” PASSporT

RFC9060/ATIS-1000092 - Delegate Certificates

ATIS-1000093 - Toll-Free Framework using Delegate
Certificates

draft-ietf-stir-passport-rcd/ATIS-1000094 - Rich
Call Data - “rcd” PASSporT



Where are we now?

Still learning, slowly gaining acceptance

Number reputation

Because robocalling practices lead to using numbers that are assigned to others you get the problem of false reputation

Bad vs Good

We can't tell who is good or bad, truthful vs non-truthful, even within "trusted networks", attacks to trust are coming from all directions

Breaking Analytics

The fact is, random processes break data analytics, so any call analytics techniques that try to determine bad practices now are leading to blocking legitimate calls

Embracing Authentication

STIR/SHAKEN framework is intended to get us on the path to truth in the telephone network, attestation is starting point

STIR/SHAKEN 101

SHAKEN Attestation what does it represent?



STIR/SHAKEN is a journey

Trusted Calling is a journey

Where we have ended up:

Good: Retail calls, the direct from provider calls have shown very good adoption

Bad: Both

- the highest value calls, enterprise calls
- the lowest value calls, illegitimate robocalls

make up the “rest” of the calls that are either not being signed or signed with different attestations

STIR/SHAKEN 101

SHAKEN Attestation vs TN Authentication

Attestation is about the providers determination

The call signing **nonrepudiation** is with provider **responsible** for attestation determination, signature is tied to provider

TN Authentication is about delegation of responsibility to party that has been granted the right-to-use a telephone number

The call signing **nonrepudiation** should end with the **party responsible**

Certificate chain represents responsibility chain

Which liability model is preferred?

Trust / Policy / Enforcement

The goals of evolving call authentication policies and best practices should be to

ease enforcement requirements

improve trust

Moving beyond, “please trust me until you don’t”

Attestation was necessary starting point, but not intended endpoint

Vetting Policies and Best Practices

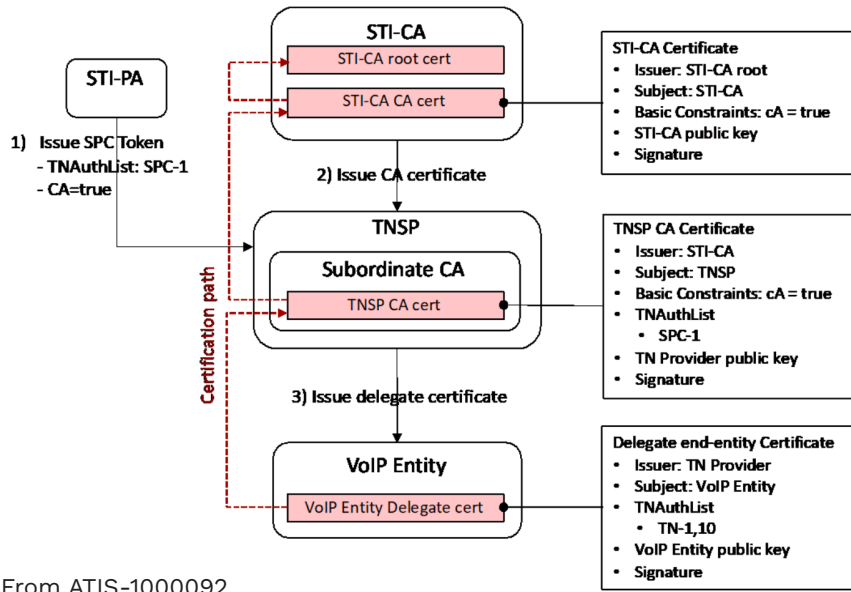
A robust **vetting policy** with
periodic vetting updates should generally
lessen enforcement required

Financial KYC, web extended validation best practices prove this

Independent **vetting agencies** with reputational incentives
favor achieving accuracy and truth

STIR/SHAKEN 101

TN-based Certificates/Delegation



From ATIS-1000092

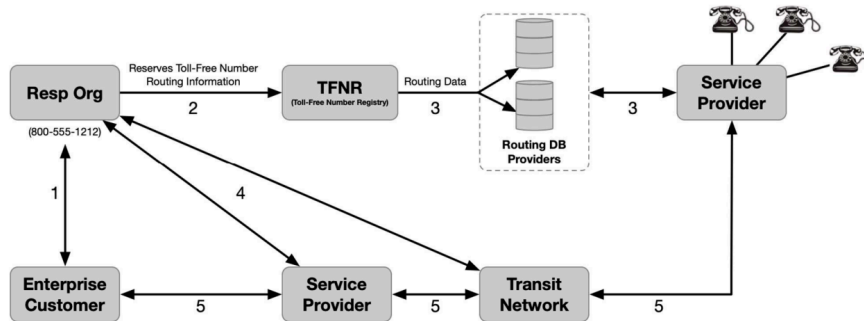
Delegation is all about extending certificate chain and narrowing scope

Just as we manage allocation and assignment of number blocks and individual numbers, the responsible parties are represented in the chain

TNSP(SPC) -> Reseller -> enterprise -> individual TN

STIR/SHAKEN 101

Toll-free framework



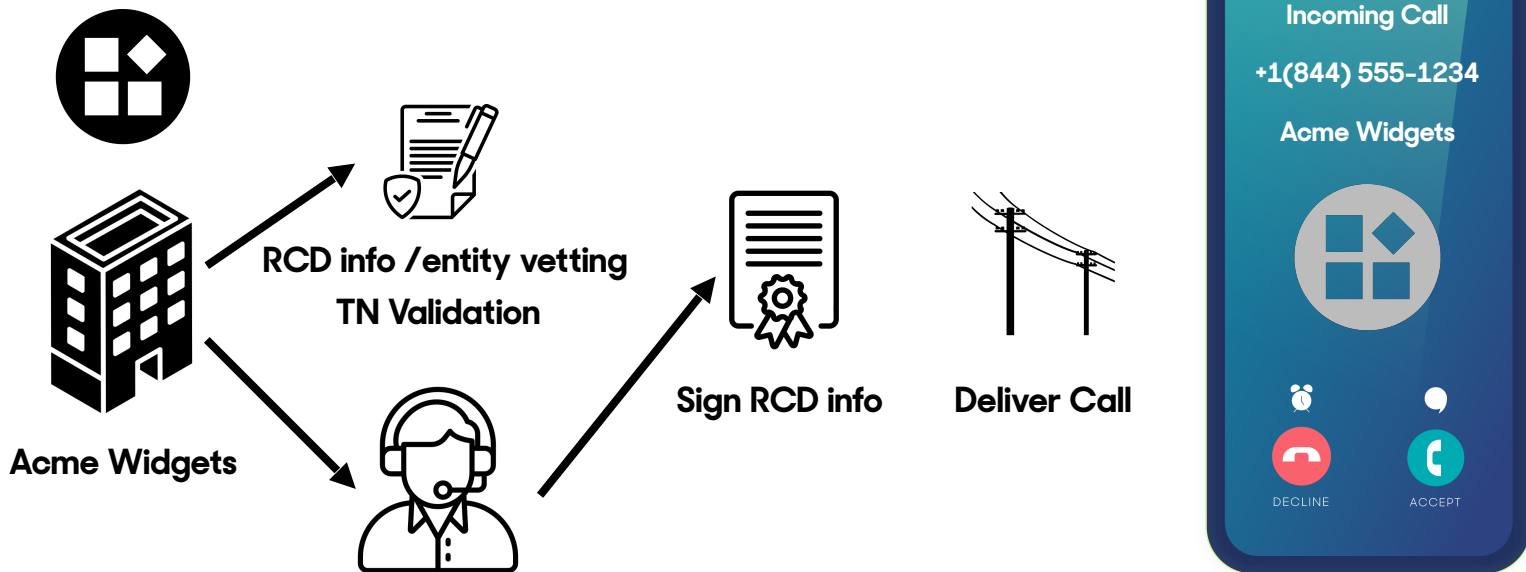
The Toll-Free framework of Responsible Organizations represents an industry formalization of a delegation model in the numbering space, where numbers are assigned through the RespOrgs.

Adopting Delegate Certificates was a clear representation of this model within the certificate chain.

From ATIS-1000093

STIR/SHAKEN 101

Rich Call Data



Impersonation



Implicit Trust ➤ Spoofing

Explicit Trust ➤ Vetting, Validation

Explicit Trust \Rightarrow Vetting, Validation

Trust by Verify

Change the incentives

Change the incentives
Push accountability
to those that bear responsibility

Change the incentives
Push accountability
to those that bear responsibility
Evolve the policies