STIR/SHAKEN for Businesses: How to Protect Against Call Fraud and Spoofing

Tuesday, October 29, 2019 | 1-2 pm ET
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The Calling Conundrum

Business calling challenges in engaging with customers

Jonjie Sena
“One Solution to One Problem Makes Two Problems”

EUGENE J. MARTIN
THE CONSUMER PROBLEM: NOBODY TRUSTS THE PHONE

2,000+
Robocalls every second\(^1\)

March 2019 saw 5.23 billion robocalls, the highest volume ever
About 15 calls per person per month

$429M
Lost to call scams in 2018\(^3\)

69%
Fraud reported as contacted by phone in 2018\(^2\)

70%
Consumers stopped answering if don’t recognize or if caller’s number is anonymous\(^4\)

Sources
1. YouMail Robocall Index
2. Federal Trade Commission Consumer Sentinel Network Data Book 2018
3. Federal Trade Commission Consumer Sentinel Network Data Book 2018
4. Consumer Reports Survey, December 2018
THE BUSINESS PROBLEMS

1. Calls you WANT ARE NOT getting through

2. Calls you DON’T WANT ARE reaching customers
ANTI-ROBOCALL LEGISLATION IS INEVITABLE

June 6, 2019
FCC allows blocking of illegal AND unwanted robocalls (without opt-in)

Aug 22, 2019
All State AG’s + 12 leading operators adopt Anti-Robocall Principles

Mar 2019
54 AG’s express support for TRACED Act (Telephone Robocall Abuse Criminal Enforcement and Deterrence)

May 23, 2019
Senate votes 97-1 to approve TRACED Act

Feb 2019
House reintroduces the Stopping Bad Robocalls Act

July 24, 2019
House votes 239-3 to pass Stopping Bad Robocalls Act
ROBOCALLING VS. SPOOFING

ROBOCALLS
- Autodial or programmatic calls
- Automation enables high-volume calls

CALL SPOOFING
- Alter “calling” phone number
- Looks like call is from someone else

- Related, but different.
- May be legal or illegal.
- Many fraud calls today are a combo: i.e., spoofed robocall
INDUSTRY RESPONSE #1: ROBOCALL ANALYTICS

Apply call analytics to compute per-call fraud score to warn consumers

But some legitimate calls are mistakenly labeled or blocked
INDUSTRY RESPONSE #2: CALL AUTHENTICATION (STIR/SHAKEN)

Aug 2019: Carriers and 51 State AGs agree to Anti-Robocall Principles

Use certificates to identity spoofing. Identify legitimate calls, flag fraud.
STIR/SHAKEN is a carrier solution.
Enterprises cannot sign their calls, and must rely on underlying service provider(s).

How to best integrate enterprises into STIR/SHAKEN?
What is your BIGGEST CHALLENGE in calling your customers?

1. Inaccurate Customer Contact Details
2. Call Agent Scheduling / Staffing
3. Caller ID Quality
4. Incorrect Spam/Fraud Labeling
5. Call Blocking
6. Call Spoofing
7. None
Standards & Technology:

Background and Considerations
Which is more secure?

The Telephone Network vs. The Internet
The Phone Network Used To Be Secure

Once, the telephone network had a clear advantage

- Closed vs. Open – only carriers could signal SS7

The Internet was initially kind of a mess

- Now we have the web PKI, better email spam prevention
- Not perfect, but cryptography and analytics help

But when the Internet connected to the PSTN, the mess followed it
The Problem

Interconnection of VoIP networks and the PSTN helped enable virtually untraceable abusive calls

so what’s the plan?
1. Bring together best of Internet & Phone Security

Big idea: Bring PKI certificate security to phone calls

- Carriers - and some newcomers - can sign calls with certs
- Recipients rely on those certs to validate callers

X.509 certificates have been extended for telephone network identifiers

- Recipients can validate the calling number
- With a valid calling number, get a valid calling name or brand
- Beyond TNs, certs attest OCNs or similar indicators (e.g., SHAKEN requirements)
WORKING WITH **INDUSTRY** ON CALL AUTHENTICATION STANDARDS

**May 2013:** Jon Peterson (Neustar) names STIR, writes STIR problem statement (RFC7340) and threat model (RFC7375)

**Feb 2017:** ATIS announces Neustar as exclusive operator of industry Robocalling Testbed for STIR/SHAKEN

**Sept 2017:** One of only two participants in SIP Forum’s SIPit 32 testing event for STIR products

**Dec 2018:** Robocalling Testbed has 37 registered participants

**Feb 2018:** Foundational RFCs issued: 8224, 8225 and 8226 co-author

**Jun 2019:** Robocalling Testbed has 57 registered participants with one-third completing interoperability testing
SIP architecture:
For **IMS** and beyond
SHAKEN Per-Call Certification Example

Service Provider A (VoIP/IMS)

Authentication Service (STI-AS)

Service Provider B (VoIP/IMS)

Verification Service (STI-VS)

Analytics

Verification Indicator Sent

Attestation/Trust Indication=“A”
WHAT DOES SHAKEN ATTESTATION MEAN?

A. Full Attestation. The signing provider:

- is responsible for the origination of the call onto the IP-based service provider voice network
- has a direct authenticated relationship with the customer and can identify the customer
- has established a verified association with the telephone number used for the call

B. Partial Attestation. The signing provider:

- is responsible for the origination of the call onto the IP-based service provider voice network
- has a direct authenticated relationship with the customer and can identify the customer
- has NOT established a verified association with the telephone number being used for the call

C. Gateway Attestation. The signing provider:

- has no relationship to the initiator of the call (e.g., international gateways).
2. First Major Calling Feature In Years; Start Simple

Effectively being mandated to address illegal robocalls

- Embrace and get involved (e.g., standards, testing, targeted implementations)
- Support industry efforts to ensure openness and interoperability
- Grow vendor support to help operators implement

It’s more than just signing and verifying phone calls

- Don’t forget analytics and its likely significance over time!
- Expect changes – we don’t want to go too fast or too slow
3. Solve For POTS (Plain Old Telephone System)

There’s more to life than SIP

Most problem calls in the PSTN start in the IP world
- Making sure they are certified on the Internet is key
- Not much prospect for updating legacy switching fabric

IETF also developing “out of band” ways to send PASSporTs
- Suitable for enterprise cases with legacy infrastructure
- Someday, apps could share PASSporTs through an intermediary
EXAMPLE SCENARIO

- How can we ensure the verification service will trust this call at a high level of attestation?

- An enterprise does business with both SP-A and SP-B, and gets number blocks from both of them.
- It can send calls from either block to either carrier.
- What happens when SP-A needs to sign a call for an SP-B number?
WHICH ENTERPRISES GET HIGHEST LEVEL OF ATTESTATION?

Enterprises that let carriers manage their numbers, with numbers from and connectivity to a single carrier, will likely get an “A” attestation.

There are gaps/questions for enterprises with complex scenarios:

- Enterprises with legacy TDM telecom infrastructure
- Enterprises who receive SIP trunks from carriers and manage their own numbers
- Enterprises that receive number blocks from multiple carriers, and use Least Cost Routing (LCR) for outbound traffic
- Enterprises that use “legitimate spoofing” to provide alternate callback numbers
- Enterprises that make outbound calls from toll-free (8XX) numbers
- Enterprises that outsource to call center providers

There is growing consensus that carriers will only trust “A” attestations. Most complex cases above will likely receive attestation of “B” or “C”.
### 4. Solve for Enterprises

**SHAKEN is carrier centric**
- Some enterprises have significant SIP infrastructure
- They want branded display for their customers

**Work is underway on “delegation” features for STIR/SHAKEN**
- Carriers can grant credentials to their enterprise customers
- Help them participate in the infrastructure and securely connect to people

**Rich call display features are also in the works**
- Render logos and other enterprise brand data to callees
- Let them feel confident when they pick up the phone!
An identity platform that brings telephone numbers into the 21st century
POLL QUESTION

What stage of PLANNING for call authentication technologies are you?

1. Complete / Near Complete
2. In Progress
3. Planning
4. Haven’t Started
5. No Plans
Commercial Solutions:

How to Build a Trusted Call Environment

Marybeth Degeorgis
It's not just about blocking calls.

Deliver identity & context to give subscribers control over their phone experience.

Restore trust in phone calls. Protect consumers. Improve customer engagement.
EVOLUTION: TRUSTED CALL SOLUTIONS FOR ENTERPRISE

- **Caller Name Optimization**
  Manage how name & brand appears on calls, and protect against blocking / mislabeling
  
  **AVAILABLE**

- **Certified Caller**
  Digitally sign outbound calls to assure customers, and battle unwanted inbound robocalls
  
  **COMING SOON**

- **Branded Call Display**
  Personalize mobile screen for contextual and branded customer call experience
  
  **IN PILOT**
CALLER NAME OPTIMIZATION: MANAGE YOUR CALLING BRAND

FEATURES

CALLER NAME MANAGEMENT
- Standardize caller name, or customize by extension

SPAM TAG REMOVAL
- Register verified business numbers to mitigate incorrect call blocking and spam-labeling
- Neustar publishes to all leading carriers & apps

DO-NOT-ORIGINATE (DNO)
- Blacklist inbound-only numbers as Do-Not-Originate to prevent spoofing

REPORTING
- Monitoring and alerts regarding your brand’s reputation

BRAND PROTECT
- Protect call brand with monitoring alerts if others attempt to register their numbers with your name
CERTIFIED CALLER: SIGN YOUR OUTBOUND CALLS

FEATURES

ENTERPRISE NETWORK INTEGRATION
- Integrate STIR/SHAKEN to authenticate outbound and verify inbound calls, even if underlying operator does not support STIR/SHAKEN

CARRIER NETWORK INTEGRATION
- Commercial, fully-compliant STIR/SHAKEN implementation

CERTIFICATE DELEGATION (PILOT)
- Neustar defining certificate delegation mechanism with carriers & enterprises
NEUSTAR CERTIFICATE DELEGATION SOLUTION

EVOLVE THE STANDARDS

• Neustar has designed, implemented and demonstrated a solution
• Proposed to IETF (oversees STIR)
• Socialized with ATIS (oversees SHAKEN)

SIMPLIFY FOR ENTERPRISES

• Hide STIR/SHAKEN complexity for enterprises to sign their calls
• Offer call-authentication-as-a-service for enterprises (and carriers)
• Extend enterprise call identity solutions to handle spoofing and certificates

INDUSTRY COOPERATION

• Host industry robocall testbed
• Establishing industry certificate delegation pilot program to validate approach
• Define industry process with carriers and enterprises to ensure only legitimate phone numbers are covered by certificates
BRANDED CALL DISPLAY: ENHANCE THE MOBILE CALL EXPERIENCE

PERSONALIZED
- Enhance caller identity with a customized brand display for an differentiated and enriched mobile call experience
- Add a targeted message to deliver a personalized branded experience

CONTEXTUAL
- Give customers a reason to answer and to engage in the conversation
- Display call authentication / verification result

RICH ENHANCED CONTENT
- Leverage the mobile screen with logos, images and e-business cards for a rich multimedia display
- Provide expanded name information, business location, title, department
MOBILE APP SDK: AUTHENTICATE ON YOUR MOBILE APP

**FEATURES**

**MOBILE APP INTEGRATION**
- Incorporate call authentication into existing mobile apps for secure calls with STIR/SHAKEN

**CAPABILITIES**
- Device-based call authentication, even if app is not running
- OAUTH2-based multi-factor authentication
- Subscriber profile and opt-in management
- Service customization

**INTEGRATION OPTIONS**
- REST API
- Mobile SDK
- Sample Code
Identity Resolution Is In Our DNA
Expertise in advanced analytics and identity resolution & verification to enable trusted communications.

Full Portfolio of Trusted Call Solutions
Set of integrated, market-leading solutions for caller ID for mobile and landline, caller name optimization, branded call display and call authentication.

Leading Customer Network Of Carriers & Enterprises
Neustar provides Caller Identification services to over 800 carriers, and identity resolution solutions to over 7,000 leading brands and businesses.

Pioneer in Call Authentication
Co-author of STIR standards, and early contributor to SHAKEN framework. Ongoing leadership role in defining industry standards with ATIS, IETF and CRTC.

Industry’s Reference Implementation of STIR/SHAKEN
As exclusive operator of the ATIS Robocalling Testbed, real-world STIR/SHAKEN implementations have and continue to be tested for interoperability with Neustar’s Testbed (and commercial) implementation.

Future-Proof Call Authentication Solution
Fully-compliant to STIR/SHAKEN specifications, including all required and emerging components: SKS, SP-KMS, STI-AS, STI-VS, and STI-CR.

More Ways to Monetize
Flexible interfaces, STIR/SHAKEN software licensing and deployment support for both vendors and carriers to expand services and features, including enterprise-specific applications.

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POLLING QUESTION

What is the MOST IMPORTANT driver to your organization for implementing call authentication?

1. Regulatory Compliance
2. Risk & Security
3. Customer Retention / Care
4. Customer Growth / Experience
Questions?

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Slides will be shared after the webinar