

Deploying STIR/SHAKEN as a Service

- A back-of-the-envelope assessment of NetNumber’s “Guaranteed Caller” product shows why telcos should be buying STIR/SHAKEN ‘as a Service’ from specialist vendors rather than building their own end-to-end solution.
- International carriers that terminate calls in North America need to support STIR/SHAKEN as well as North American carriers themselves. The standard is likely to become applicable to national telco networks in other markets too.
- As STIR/SHAKEN rolls out, telcos should be turning their attention to supporting legitimate automated voice calls and the opportunity to monetise that.

In an era of increasingly intensive, software-based, innovation, decisions to ‘build or buy’ new infrastructures and services are getting more complex for telecom operators. Whereas the call of tradition implores them to build themselves, the benefits of cloud and SaaS models beckon telcos to offload or outsource to specialized third parties.

One market space that HardenStance identifies as having ‘don’t go building this yourself’ written all over it is the new STIR/SHAKEN standard. This uses digital certificates based on common public key cryptography techniques to filter and block scam calls and unwanted robocalls driven by Caller ID spoofing. In North America, this has escalated into a major problem, with Americans now being plagued by tens of billions of these calls a year. US and Canadian regulators have intervened on behalf of consumers to mandate STIR/SHAKEN implementation by their domestic carriers.

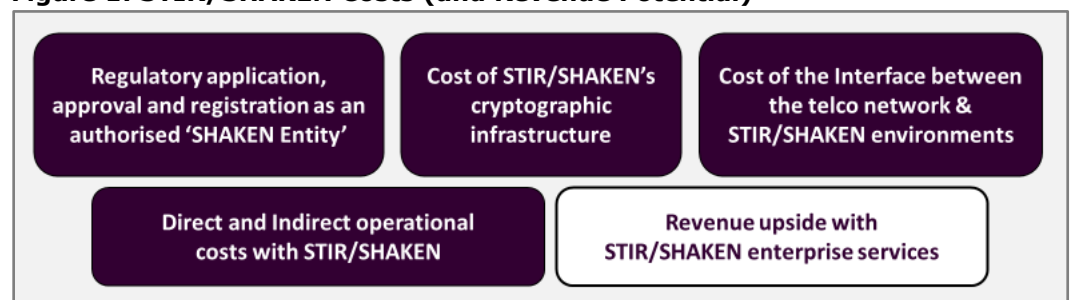
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Carriers outside North America are affected too

While this effort is currently concentrated on North America, it affects other carriers too. International carriers delivering calls in to North America are going to have to support STIR/SHAKEN to avoid legitimate calls being blocked. And while not at US levels, the growth of scam calls and unwanted robocalls in other markets like the UK is likely to require deployment of STIR/SHAKEN - or regional variants of it - elsewhere as well.

The big-ticket cost and revenue items associated with deploying STIR/SHAKEN are shown in **Figure 1**. HardenStance recently spoke with NetNumber about its new “Guaranteed Caller” solution. While NetNumber will sell telcos all the individual hardware and software components to deploy STIR/SHAKEN themselves in their own environment,

Figure 1: STIR/SHAKEN Costs (and Revenue Potential)



Source: HardenStance

HardenStance is overwhelmingly drawn to the cloud services variant of Guaranteed Caller in which NetNumber operates and manages a full suite of STIR/Shaken components in its own AWS cloud and sells the service to telcos for a monthly fee. This cloud-based model of delivering STIR/SHAKEN isn't unique to NetNumber. Variants of it are also offered by established competitors such as Neustar, Ribbon Communications and a partnership of Transaction Network Services (TNS) and Metaswitch.

For a telco, STIR/SHAKEN isn't a capability that's typically worth building up internally. It's complex, it's primarily a cost (albeit with a potential revenue upside, as will be shown). It's not a capability that can be leveraged to materially grow revenues or reduce costs in other parts of the business either. Provided a vendor is trusted to have the expertise and commitment to the STIR/SHAKEN standard, and provided the price is right, HardenStance believes a cloud-based service model should be the default option for all but the very largest telcos.

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The full STIR/SHAKEN architecture is depicted in **Figure 2**. Doesn't look very familiar does it? Well, there's a clue as to the merits of outsourcing it right there. Telcos have many more important new technologies and working practices to embrace, adapt to and master than this. 5G, Kubernetes and Agile Development spring immediately to mind.

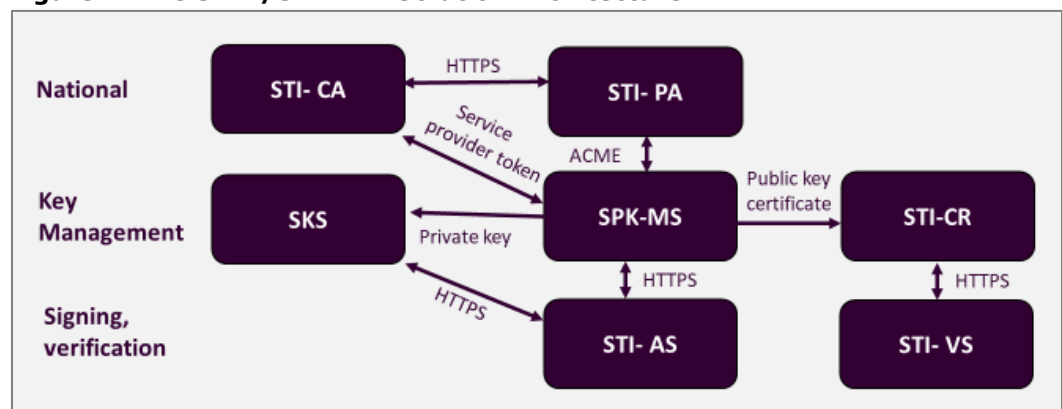
In conversation with NetNumber, HardenStance has mapped the value proposition of the Guaranteed Caller cloud service to STIR/SHAKEN's big-ticket cost items and revenue opportunities shown in **Figure 1**. Compared with the alternative of adding headcount to buy, build, operate and maintain all the 'Guaranteed Caller' components in their own environment, the cloud service model looks by far the most compelling. In terms of the five main cost and revenue line-items, the way the Guaranteed Caller cloud service stacks-up is outlined below.

1. Registration as a STIR/SHAKEN Certificate Authority

Carriers need to establish themselves as a standards-compliant 'SHAKEN Entity'. As specified by the STIR/SHAKEN standard, this is done by obtaining the necessary approval from a country's Secure Telephone Identity - Policy Administrator (STI-PA) and registering with one of its Secure Telephone Identity - Certificate Authorities (STI - CA).

This registration process authorizes a carrier to serve as a provider of STIR/SHAKEN certificate lifecycle management for IP voice services. NetNumber is itself an STI-CA in the US and Canada and can leverage that experience to help carriers navigate and complete the process. The telco certainly has to do some of the work itself but NetNumber can take on a substantial part of it as a professional services engagement.

Figure 2: The STIR/SHAKEN Solution Architecture



Source: HardenStance/NetNumber/ATIS

2. Investment in STIR/SHAKEN's Cryptographic Infrastructure

The individual components of the STIR/SHAKEN standard are depicted in **Figure 2**. A telco can leverage NetNumber's own investment in a complete, highly scalable, solution in the AWS cloud that's built for high reliability including with geographic redundancy. The alternative is that a telco finds and dedicates capex as well as new, specialized, IT headcount to build all this itself. Importantly, **Figure 2** only depicts STIR/SHAKEN requirements as regards IP-based voice services. With North American regulators also looking at extending the STIR/SHAKEN mandate to include TDM-based voice services, carriers should consider from the outset how they would elegantly support that as well.

There should be no material concerns about the security of the AWS cloud for hosting Guaranteed Caller. It's only a subset of calls that need to be signed and verified (intra-network calls between a telco's own customers typically don't need to be). Also, it's only a small subset of control traffic that needs to go into the Guaranteed Caller cloud. In the worst-case scenario of a system failure, the successful filtering of unwanted calls would simply be suspended for a few minutes or hours.

With Guaranteed Caller, the interface is enabled by a highly optimized, dedicated device or self-installed VM, branded 'Cloud Connect'.

3. Cost of the Interface into the STIR/SHAKEN Environment

The interface between the telco environment and the STIR/SHAKEN environment can be implemented in a number of ways via pretty much any network device that supports both SIP and HTTP, such as a Session Border Controller, for example. In the case of Guaranteed Caller, this interface is enabled by a highly optimized, dedicated device or self-installed Virtual Machine (VM), branded 'Cloud Connect'. According to NetNumber, this is the only piece of equipment a telco needs to install in its own environment to access the Guaranteed Caller cloud – all the rest is hosted and managed by NetNumber.

To wire this in line with the network, the operator needs to populate a small configuration file with a subset of basic information relating to things like its point code addressing scheme, where its IP gateways are, and how DNS is done. According to NetNumber, it will often be possible to provide at least initial set-up of Cloud Connect in just one maintenance window. NetNumber is pricing Cloud Connect very aggressively, including with a zero-capex model. Assuming a carrier customer with around 100,000 customers on a three-year Guaranteed Caller service contract, NetNumber says that this adds no more than around 10-12% to this customer's monthly fee.

4. Operational Requirements and OPEX Impacts

There are some indirect opex costs that an operator has no choice but to swallow to support STIR/SHAKEN. Costs will be incurred from advising customers of the new STIR/SHAKEN trust-related notifications that they will see on their handsets and explaining what they mean. How effectively that's done will in turn affect the OPEX impact of incoming calls to customer care centers from consumers that still have questions about these notifications.

When it comes to direct costs associated with managing the STIR/SHAKEN environment, there are also some things a telco can't just throw over the wall entirely at a partner vendor. It's in the operator's own interest to prescribe rules around exactly which calls need to be validated and signed in the STIR/SHAKEN environment, and which don't. There's a cost associated with submitting calls for signing and verification so there's no sense in processing any unnecessarily.

Also, it's only the telco itself that can set its own criteria for what class of STIR/SHAKEN attestation should be attributed to different types of call. Telcos don't just need to do this, they need to do it very well. That's because a lot of errors can lead to their "SHAKEN Entity" status with their STI-CA being suspended or withdrawn. Both these rule sets will typically need reviewing from time to time as well. But these are the two primary types of ongoing operational engagement required of a Guaranteed Caller customer using the cloud service – NetNumber commits to managing everything else.

With the deluge of unwanted and fraudulent calls that North American users are subjected to, it's easy to forget that many automated robocalls are not only legitimate but essential to running a modern-day digital business.

The pricing of the Guaranteed Caller cloud service comprises three primary components:

- a one-time initial customer on-boarding fee.
- a fixed fee per certificate (typically in the \$4 - \$5 range).
- a price per call signing/verification transaction in units of 1 million Transactions Per Month (TPMs).

5. Revenue Upside with Enterprise Services

It doesn't speak well of the North American telecom market that it's the regulators that have had to mandate action on behalf of customers rather than the telcos getting there of their own accord. If they've been reluctant to incur the cost of STIR/SHAKEN, telcos should at least be encouraged by the opportunity to recoup some of these costs by charging enterprises for access to their STIR/SHAKEN service.

With the deluge of unwanted and fraudulent calls that North American users are subjected to, it's easy to forget that many automated calls are not just legitimate but essential to running a modern-day digital business. For example, the robocall from your doctor to advise you that your test results are in. Or from a furniture store to let you know that they'll be delivering your wardrobe tomorrow afternoon. Once consumers start getting used to STIR/SHAKEN icons on their phones that indicate the level of trust they should have in a calling party, they're liable to start ignoring those among their calls that aren't verified by their service provider.

NetNumber commits to providing complete support for enterprise call signing and verification. This enables a telco to charge its business customers for integrating them into the Guaranteed Caller cloud and then signing and verifying their outgoing calls on their behalf. NetNumber takes care of the substantial load of manual effort needed to thoroughly investigate and verify that each individual business customer - and any of the intermediary parties in the freephone, premium and other numbering services ecosystem - has legitimate access to a given range of phone numbers as the basis for signing and verifying their calls. If a telco wants to build its own infrastructure, as well as tap the business market revenue opportunity of STIR/SHAKEN, it needs to commit sizeable resources to navigating that whole environment themselves. ■

More Information

- <https://www.netnumber.com/services/guaranteed-caller/>
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