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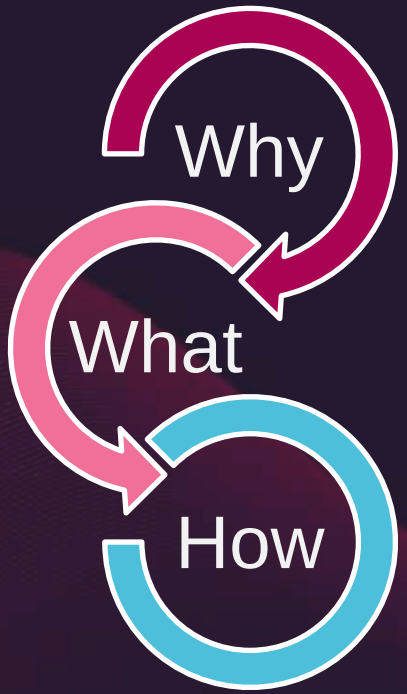
How STIR/SHAKEN Contributes to an Identity Assurance Framework

Kevin Riley, CTO & EVP of Advanced R&D

Agenda



- Motivation
- Definitions and Foundational Concepts
- Solution Components and Requirements
- Building and Identity Assurance Framework
- Call to Action

Motivation and Scoping the Solution

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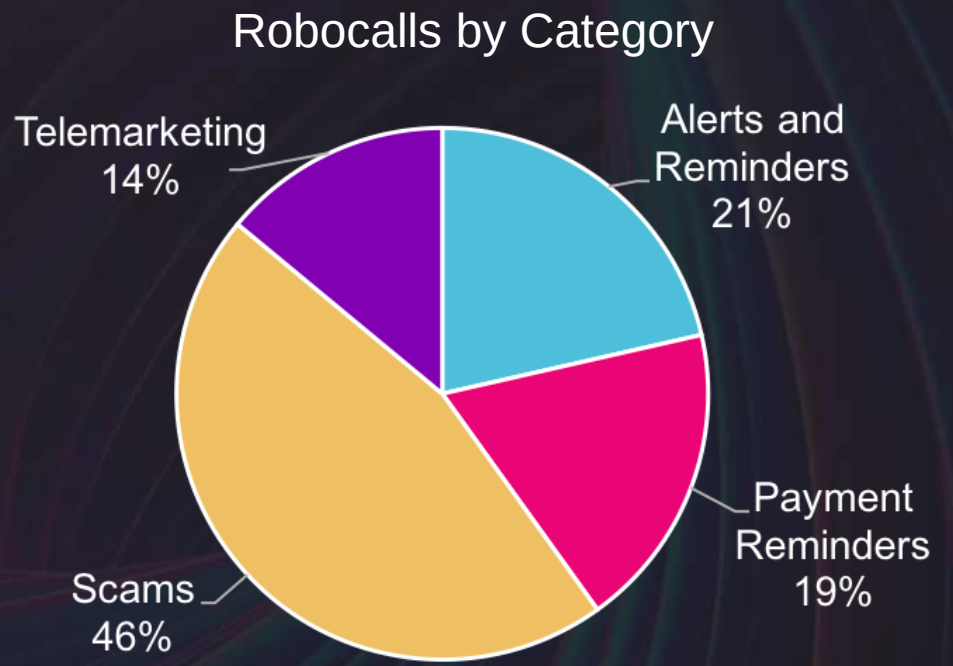
RoboCalling Statistics

Q1 2019 saw 15.3 billion robocalls, the **highest volume ever**

Making this about **15.5 robocalls** per person per month

In 2018, the FCC demanded CSPs to implement a Call Authentication solution and their message was ***"Resistance is Futile"***



Fraud By the Numbers

$29.2 billion in Toll Fraud Loss in 2017

2017 Top 5 Fraud Types

1. International Revenue Share Fraud – $6.10B
2. Interconnect Bypass (e.g. SIM Box) – $4.27B
3. Arbitrage – $3.26B
4. Theft / Stolen Goods – $3.02B
5. Premium Rate Service – $2.29B

Source: 2017 CFCA Global Fraud Loss Survey

Defining Identity Assurance

To assure identity and one must validate legitimate use of service

- Consider multiple inputs, no one piece of data can assure identity
- Policy must be invoked in real-time and adapted constantly, bad actors are moving targets

What constitutes compromised identity?

- Spoofed credentials
  - Masking identity with alternate, legitimate ID
- Stolen services
  - Bad actor takes over legitimate endpoint and uses in place

Challenges

- Mobility and multiple access modalities per user
- Legitimate actors can have common traits with Bad actors
- There is no single method to assure identity

Primary Use Cases

- Fraud
- Robocalling

Three Key Inputs

Identity

Who is the originator?

Reputation

Is this someone I want to talk to?

Trust Context

Where did the call originate and where will it terminate?

Determining Identity

Known Subscribers

Do Not Originate List (DNO)

- Numbers that never originate calls (e.g. IRS call center +1-267-941-1000)

Un-Assigned Numbers

- Unassigned NPA/NXXs (LERG 6 has most assignments)
- Unassigned extensions (per carrier lists)

Invalid E.164 Calling Numbers

- Screening functions in call processing

STIR/SHAKEN Attestation

- Signing of phone calls to attest identity of call originator
- Initially only phone companies will sign but eventually enterprises may participate
- Bad actors will eventually figure out how to sign calls

Determining Reputation

Reputation is the Internet's FICO score

- Multiple companies will be inventing their proprietary algorithms that they do not disclose

Reputation is fundamentally tied to your identity

- Get the identity of the caller wrong and reputation score is worthless

Assessing Reputation pulls from multiple Data Sources

- Proprietary algorithms
- Analytics/ML/AI
  - High volume calling parties
  - Unique signaling aspects
- 3rd Party Proprietary Reputation Data
  - Carrier and/or crowd sourced generated lists
  - Possibly distributed ledger technology

Context matters

- Location where call enters a network and where it is destined to terminate
- A known subscriber number on an internal interface is always verifiable
- A known subscriber number entering from a wholesale interface might be spoofed
- "Trust Context"

Architecting a Framework for Identity Assurance

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What Does STIR/SHAKEN Provide?

The Goal

Mitigate unwanted robocalls and bad actors who use caller ID spoofing to increase the chances of speaking to a subscriber.

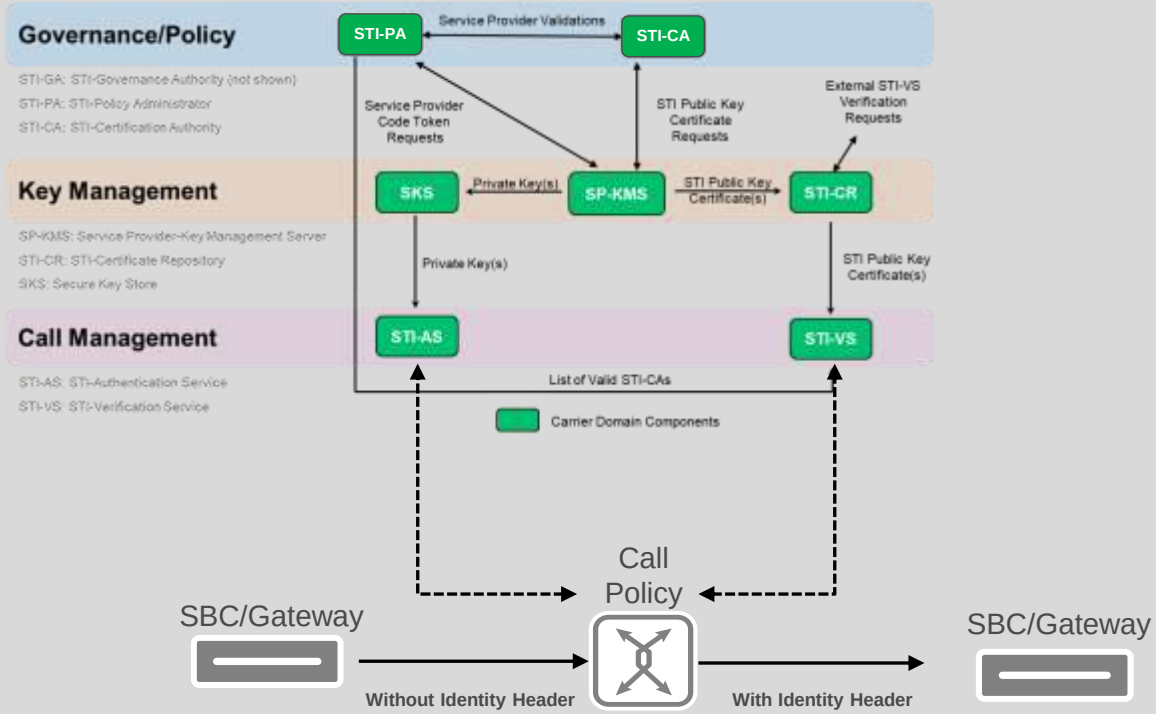
The Method

Service providers attest to the authenticity of a call originating in their network; this attestation is passed in-band with the call such that the terminating Service provider receives the attestation

ATIS/SIP Forum STIR-SHAKEN Reference Architecture

1. **STI-PA: STI Policy Administrator**
2. **STI-CA: STI Certificate Authority**
3. **SKS**: Secure Key Store
4. **SP-KMS**: Service Provider-Key Management Server
5. **STI-CR**: STI-Certificate Repository
6. **STI-AS**: STI-Authentication Service
7. **STI-VS**: STI-Verification Service

STI = Secure Telephone Identity



Where STIR/SHAKEN Come Up Short?

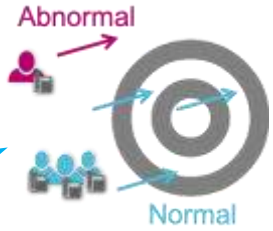
Intent and Reputation

A calling number is effectively “vouched for” as owned by the service provider but the user behind the number is not verified

Analytics is Compulsory To Mitigate Identity Abuse

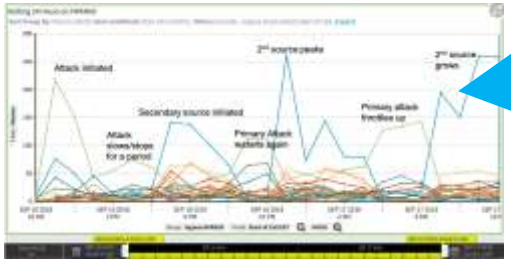
Fraud

- Track the behavior of individual subscribers and the activity of called numbers in the network
- Abnormal calls beyond selected variances are alerted



Identify repetitive calling patterns to anomalous places and flag or block them

Telephony Denial of Service



- Detect calling anomalies metrics such as Call Rate Exceeded, Long/short durations, etc.
- Automatically alert and blocks rogue calling patterns

Siphon out unwanted, disruptive calls from your RTC network

Nuisance Calling

Top Area Codes Targeted by Spammers

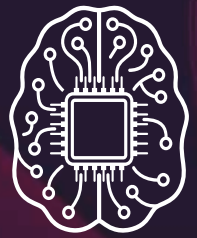
Use third party databases to identify Robo calls
Complimentary analytics for STIR-SHAKEN

- Capture and score potential spoofed calls

Multi-tiered approach to stop excessive nuisance calls affecting your customers

Digital Fingerprinting UC with Machine Learning

SIP



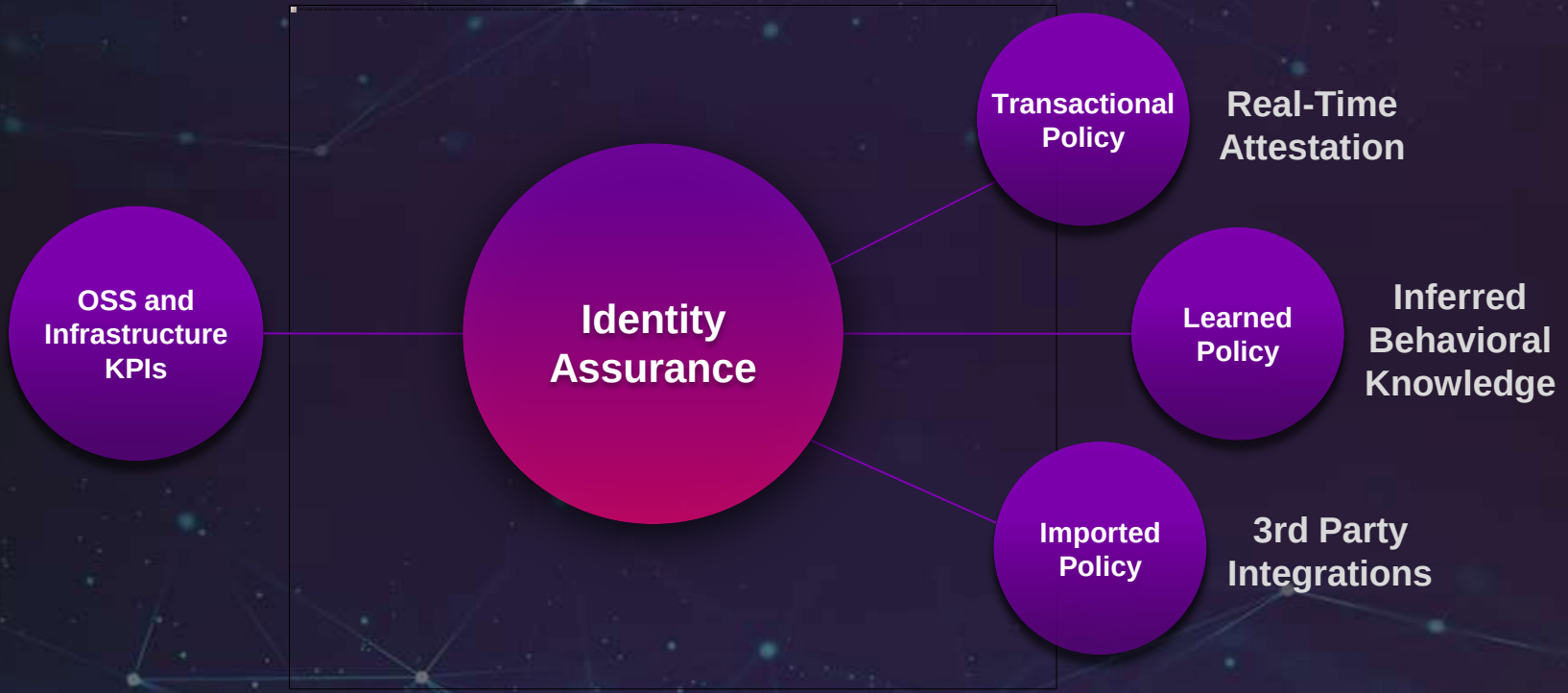
Machine Learning

Model & Classify

Digital Fingerprint

Device, User & Session Characteristics

The Foundational Pillars of an Identity Assurance Architecture



The Taxonomy of Identity Assurance Components

Producer & Consumers

Any network component that:

1. Sources data contributing to identity assertion

2. Needs to assert or verify identity

Call Adaptation Service

Call signalling aids used to influence calls without opening the internals of existing network components

Policy Service

Overall responsibility for “what to do with the call”, determines if the call should be routed, dropped etc

Assertion Service

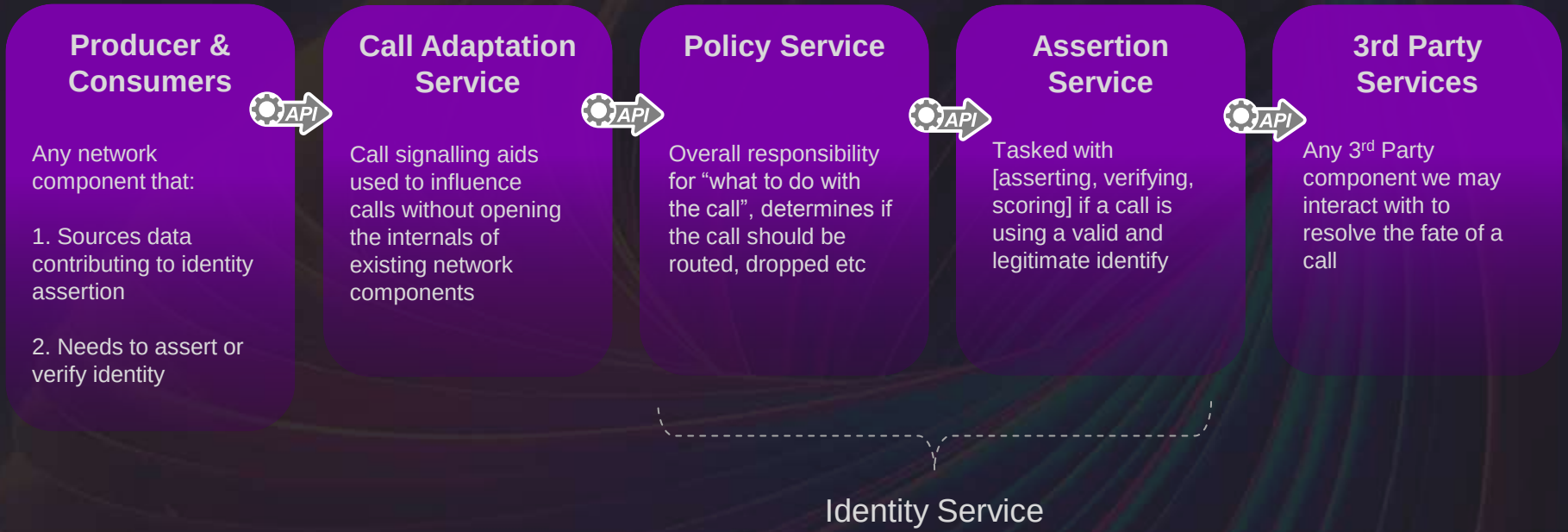
Tasked with [asserting, verifying, scoring] if a call is using a valid and legitimate identify

3rd Party Services

Any 3rd Party component we may interact with to resolve the fate of a call

Identity Service

Services loosely coupled via APIs



Flexible Cloud, Hybrid and Premise Deployment Options

Boundary between premise and cloud is flexible

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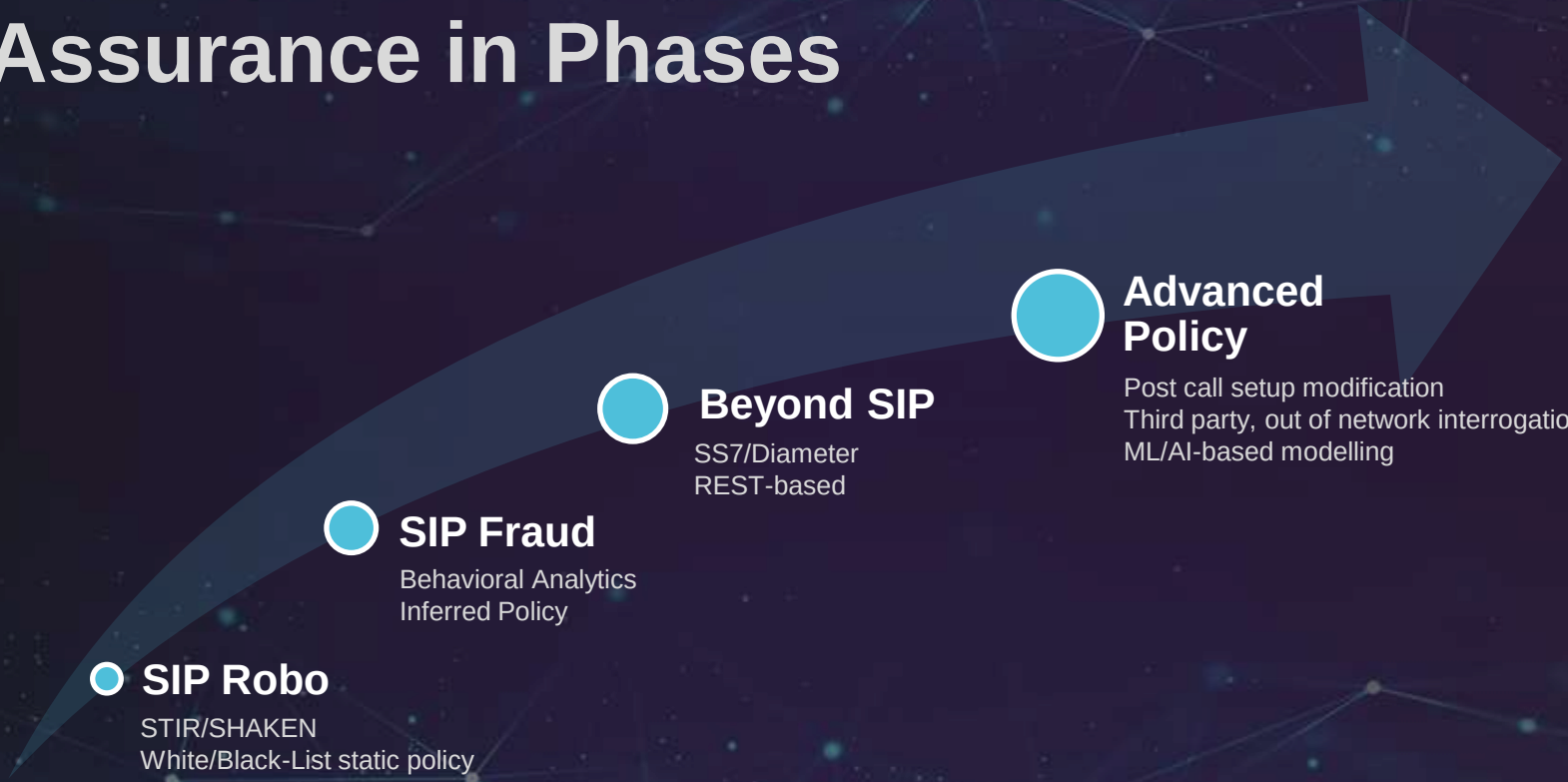
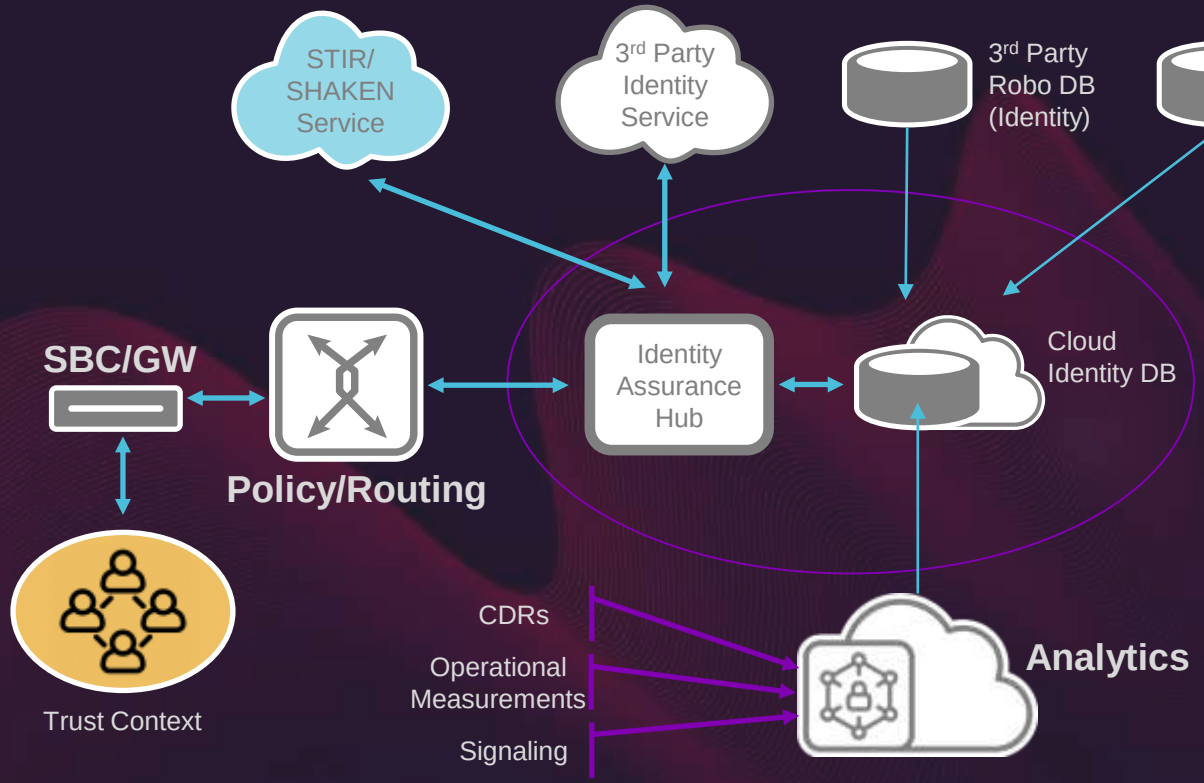
On Premise

Cloud

Delivering Increasing Levels of Identity Assurance in Phases



Componentry of a Comprehensive Identity Assurance Solution



Identity Assurance Hub

- Combines multiple identity and reputation inputs using a rule profile
- Assigns a reputation score and brokers call treatment policy

Call to Action

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Call To Action

Federal agencies and consumers have spoken

- CSPs must mitigate identity abuse

There is no single technology or standard to assure identity in your network

STIR/SHAKEN implementations need to continue and expand

Analytics must be woven into your identity assurance strategy

- Static policy cannot keep pace with evolving threat vectors
- Behavioral analytics and ML to baseline your network to then identify out bad actors

Think beyond your network

- Architect to onboard third-party databases and services
- Embracing SaaS services and federated data accelerates deployment velocity and capabilities

Thank You

Kevin Riley
kriley@rbbn.com