draft-ietf-stir-oob-00 (was “fallback”)

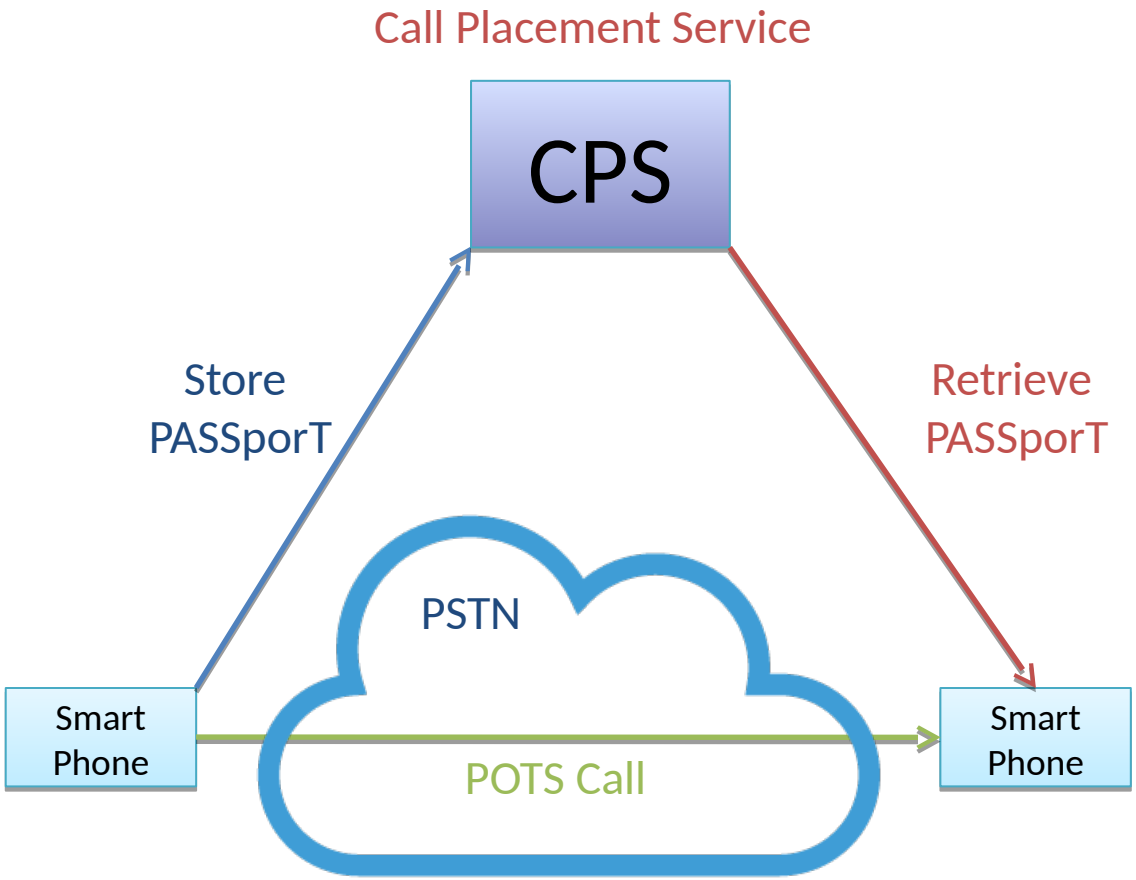
STIR Virtual Interim

June 2017

Limits of RFC4474bis

- It's in-band – end-to-end IP-IP
  - At best, it addresses the SIP-to-SIP use case
  - Not going to help with SIP-to-PSTN, PSTN-to-PSTN
    - Import for transitional adoption, legacy networks, enterprises, etc.
  - We did in-band first because existing deployments need it
    - Like the IPNNI, now the SHAKEN profile
- Even some IP-IP deployments may not pass Identity e2e
  - Difficult to anticipate what will survive administrative boundaries
    - You can understand "boundaries" pretty broadly
  - And some existing deployments might just block Identity
    - As they block all new headers; especially B2BUAs

Basic STIR Out of Band



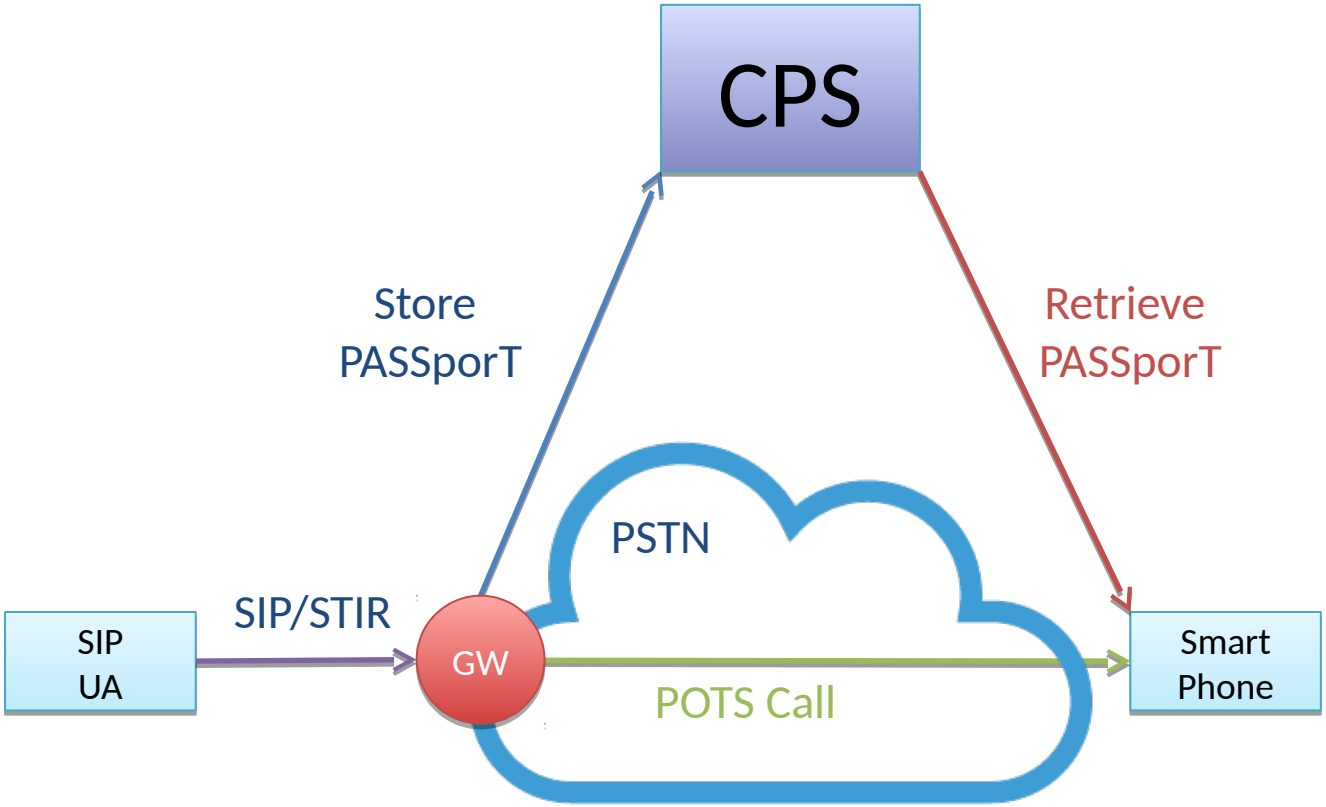
Smart Phones are not just mobile phones, and not just end-user devices

Obvious Questions

- Okay, how does the originating side know where to find a CPS?
  - And how do we make sure the terminating side comes to exactly the same conclusion?
    - Need a service discovery mechanism
    - A few initial ideas in the draft now – not the focus today
- How do we make sure the right parties store and retrieve PASSporTs from a CPS?
  - Mostly, to manage the risk that someone other than the called party will fetch them? Or just record who fetched what?
    - Significant privacy concerns

- These are the things it's time to work on

Who Gets to Store PASSporTs?



How to authorize a gateway to store it?

Do you need to authorize?

- PASSporTs are signed, so it almost doesn't matter who stores them
  - Almost – need some kind of DDoS protection from attackers storing millions of bogus PASSporTs
- Relying parties trust a PASSporT based on its signature, not based on the CPS they got it from
- The authority to store might still require a STIR credential
  - Possible to limit storage with some kind of fancy tokens based on having a valid STIR cert (Ekr?)
    - Effectively pre-associate with the CPS before storing
- Ultimately, a GW could be authorized to store as well
  - Would require the GW to have some pre-association with a CPS

The Three Retrieval Semantics

- Draft today: what question does the retrieval side ask of the CPS? Three potential semantics:
  - (a) “Give me PASSporTs for the calling number”
  - (b) “Give me PASSporTs for the called number (me?)”
  - (c) “Give me PASSporTs for with both (a) and (b)”
- Those three options have different security implications
  - For case (b), can require a STIR credential
    - Identified as the best choice
    - Has implications for service discovery
    - (b) however has some complications in call forwarding cases (divert?)

Encrypting PASSporTs

- Encrypting PASSporTs is promising
  - Hides data from a nosy CPS (a likely PERPASS target)
  - Makes retrieval authorization less of a problem
    - Need to decrypt PASSporTs to get any value from retrieval
    - Provided of course CPSs always give back an encrypted blob when a retrieval request is made, even when there are no PASSporTs
- But there are problems
  - Much harder to manage call forwarding cases
    - Divert requires linking PASSporTs in a way that might be hard to retrieve if things are encrypted blobs
  - Encrypt to whom?
    - May be multiple authorities associated with a number (carrier, reseller, enterprise, user)
    - And how to discover their keys?

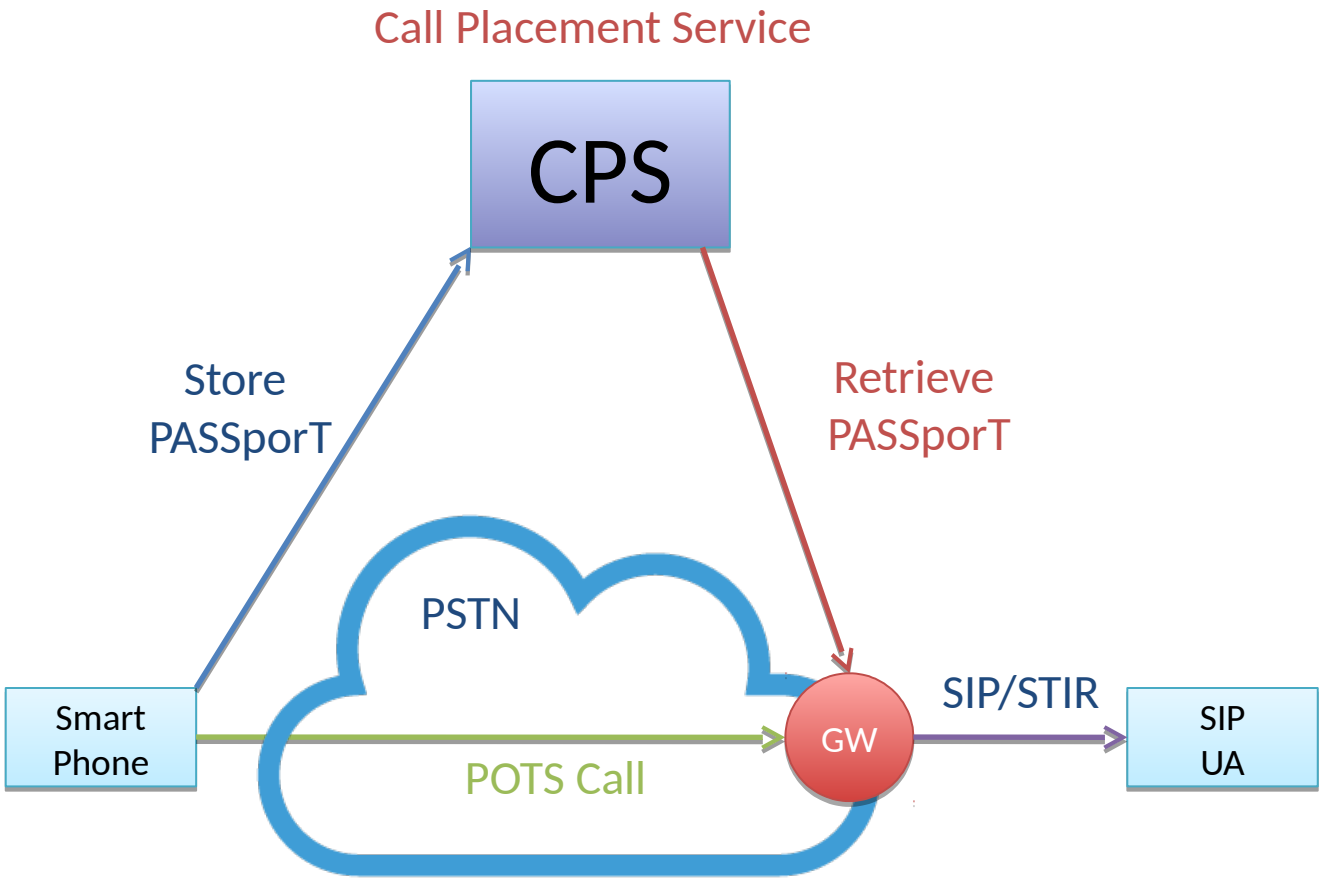
The Least Worst Way?

- Allow anyone to store encrypted PASSporTs, indexed by the public key used to encrypt
  - PASSporTs are encrypted with a key of the target
    - CPS cooperates with a cert cache, allows retrieving of public keys by target TN
      - Might give you multiple keys for the same TN: carrier, reseller, user, etc.
  - CPS can prevent abuse with some fancy Ekr way of authorizing storage
- CPS always returns at least one encrypted blob when asked for a PASSporT for a given public key
  - Whether there is a call in progress or not
  - Only the intended recipient will be able to decrypt real PASSporTs and determine that there is a legit call in progress
- Doable?

Remaining Challenges

- Divert
  - Divert is needed, but requires special OOB behavior
    - Diverting entities need to place both the original and the divert PASSporT into the CPS encrypted to the new target
- Service Discovery
  - The more we “federate” the CPS function, the more pressing this becomes
    - How can the caller and callee agree on which CPS serves both?
    - How much pre-association does a caller need to have with a CPS to place a call?
  - If a CPS requires an adjacent credential service, that adds some more complexity to the mix

What about this case?



Maybe a SIP Identity-Encrypted header? RCD might need it anyway

Next Steps

- To Do
  - Need to write up the solution more
  - Need to describe the storage/retrieval protocol
    - Pro tip: it's HTTP
  - Need to specify an OOB authentication and verification service procedure
    - Varies from RFC4474bis because that text is based on comparison to SIP fields
  - Need more on interaction with divert