



Enterprise Certificates

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Agenda

1. Workflows: Delegate Certificates
2. Overview of Enterprise Certificates
3. Scenarios
4. Advantages of Enterprise Certificates

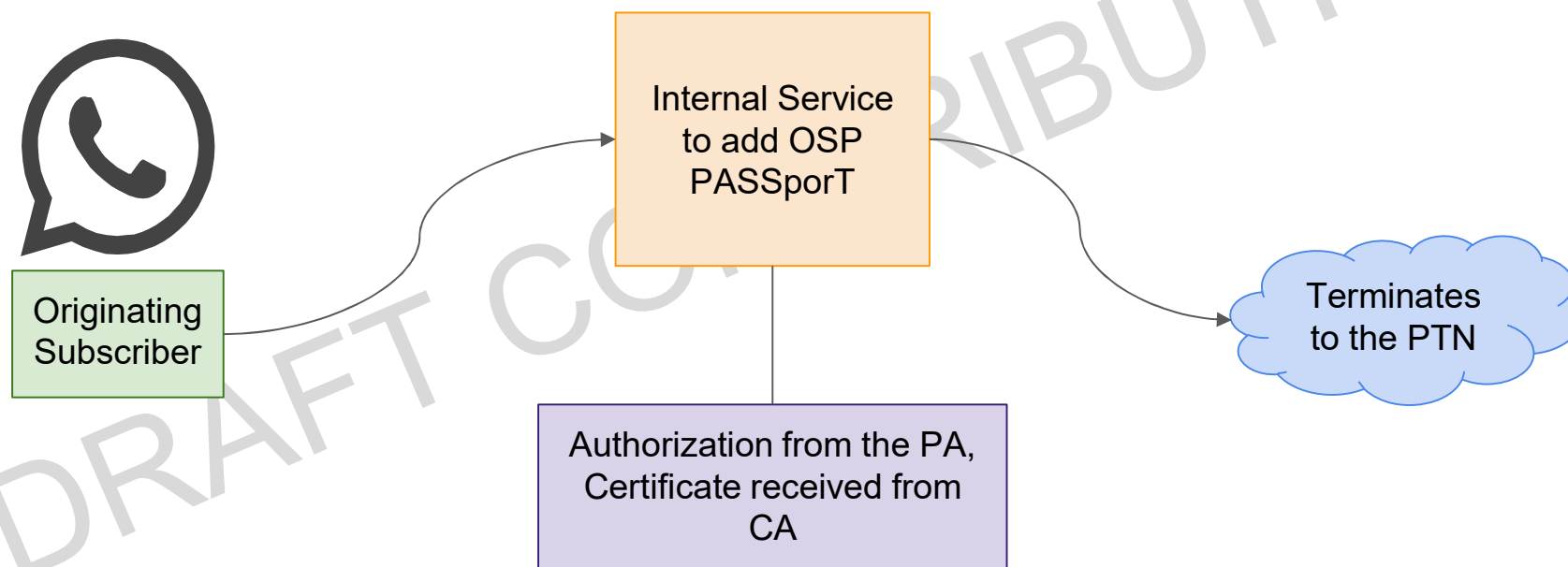


Workflows: Delegate Certificates

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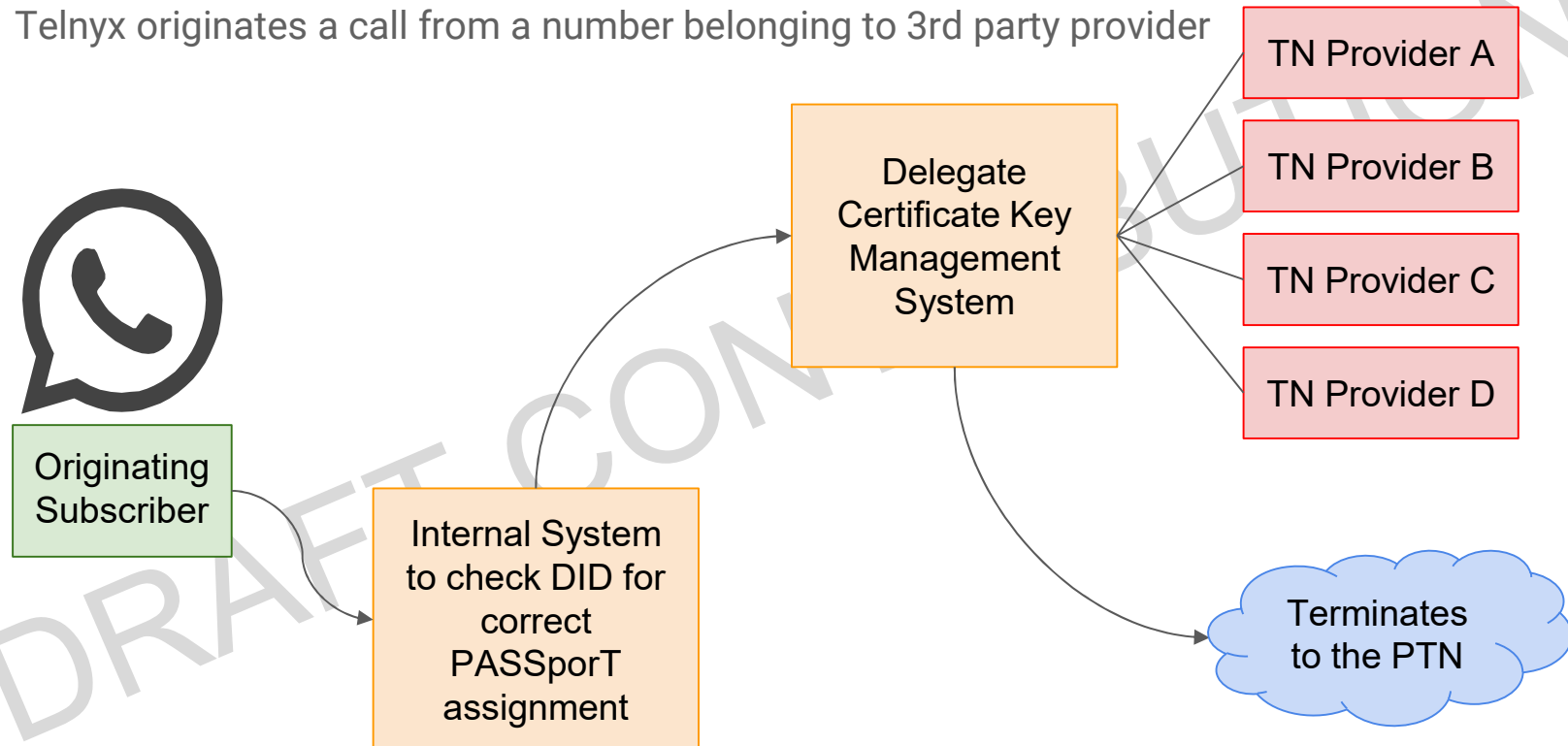
Workflows: Delegate Certificates

Telnyx originates a call from a number belonging to a Telnyx owned block



Workflows: Delegate Certificates

Telnyx originates a call from a number belonging to 3rd party provider





Overview of Enterprise Certificates

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Overview of Enterprise Certificates

Enterprise Certificates are an alternative to Delegate Certificates.

Main features of this proposal:

- Expand the range of entities that can obtain STI certificates.
 - Include entities without SPIDs (enterprises, resellers, etc.).
- Avoid delegation.
 - PA directly authorizes these entities to obtain certificates and participate in the SHAKEN framework; alternatively CAs can be delegated this authority.
 - CAs issue certificates to these entities.

Overview of Enterprise Certificates

Participants within the Enterprise Certificates framework.

TN Provider

Policy and management

- Authorized by PA.
- Certificate obtained from CA.
- Has SPID and numbering ranges.

Use of Certificate

- SP fully attests if Caller ID is authorized for use.
- SP can fully attest if caller is known and trusted.

Enterprise

Policy and management

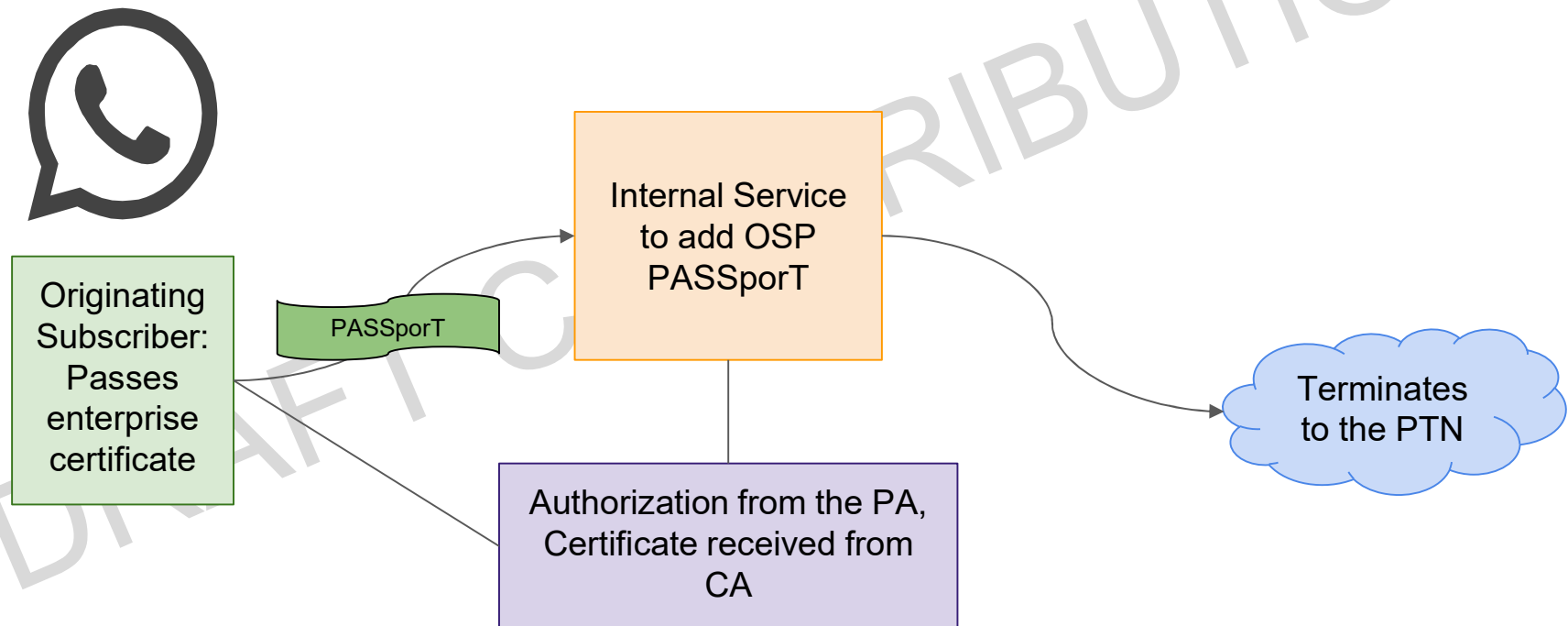
- Authorized by PA.
- Certificate obtained from CA.
- Does not necessarily have a SPID or numbering ranges, but is authorized to use some pool of numbers

Use of Certificate

- Enterprise asserts that Caller ID is authorized for use.
- Originating SP can pass enterprise PASSporT instead of adding its own PASSporT.

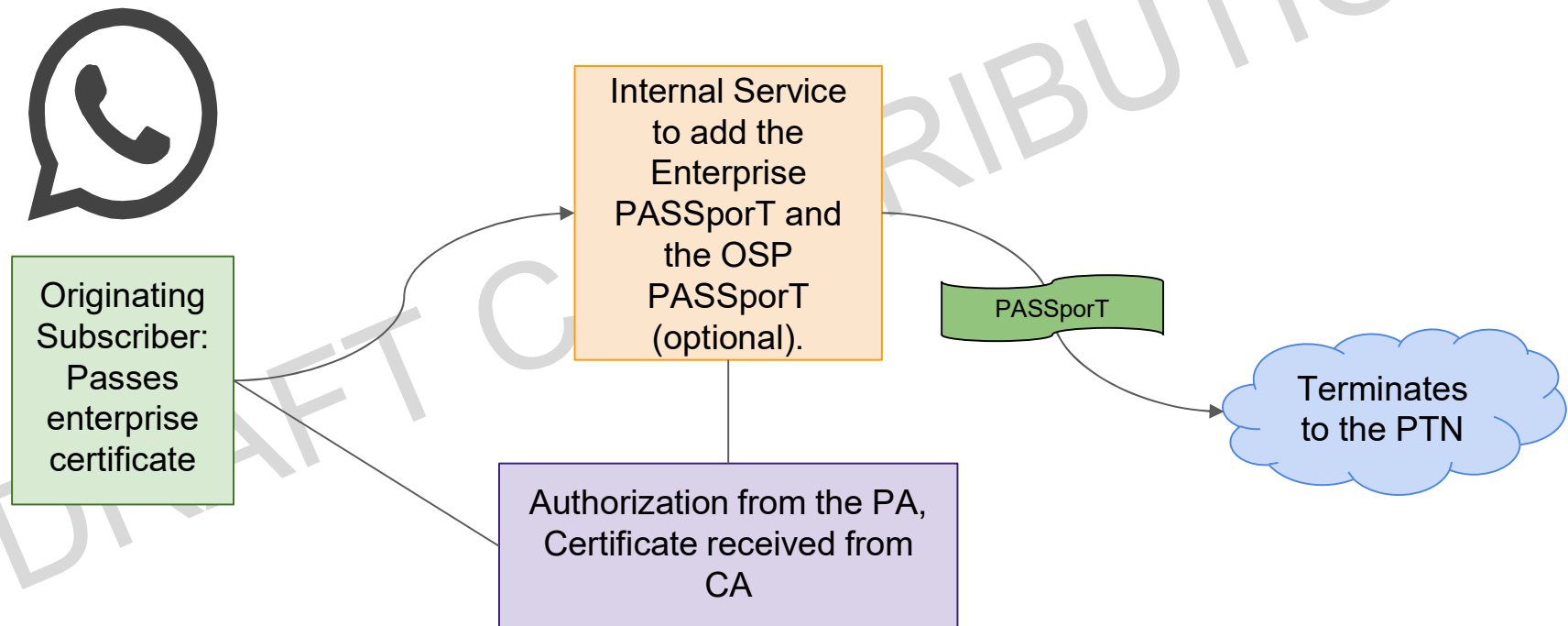
Workflows: Enterprise Certificates

Telnyx originates a call from a number belonging to a Telnyx owned block or a 3rd party provider, and an enterprise passes along their certificate.



Workflows: Enterprise Certificates

Telnyx originates a call from a number belonging to a Telnyx owned block or a 3rd party provider and the enterprise has previously loaded their PASSporT into their Telnyx portal.





Scenarios

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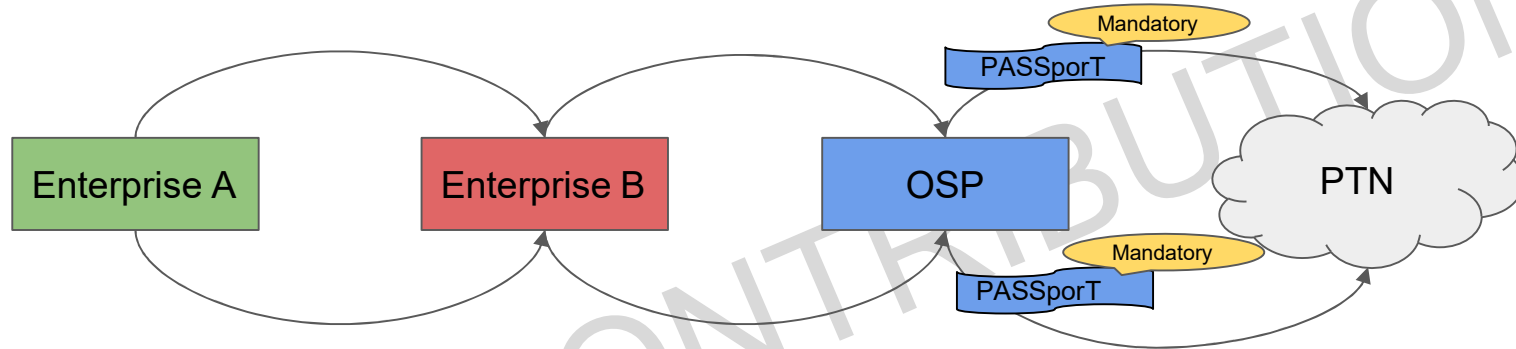
Scenarios

Scenario	Enterprise Caller PASSporT Provided?	Originating SP TN Association Verified?	Final PASSporT(s) / Attestation Level
A	Absent	Not verified	OSP PASSporT – Partial
B	Absent	Verified	OSP PASSporT – Full
C1	Present	Not verified	Enterprise PASSporT – Partial or Full
C2			Enterprise PASSporT – Partial or Full + OSP PASSporT – Partial
D1	Present	Verified	Enterprise PASSporT – Partial or Full
D2			Enterprise PASSporT – Partial or Full + OSP PASSporT – Full
D3			OSP PASSporT – Full

- Definition of OSP follows that in the Delegate Certificate proposal.
In each of the above scenarios, the OSP has a direct relationship with the Enterprise.
- There could be multiple layers: There is a possibility that the Enterprise's customer, in turn, has a certificate that could be passed along. The same matrix above would work for sub-layers. The TSP is only responsible for unpacking the furthest upstream PASSporT.
- An OSP or a TN Provider could also act as a Enterprise; they would still only have 1 certificate.

Scenarios

Plain STIR/SHAKEN

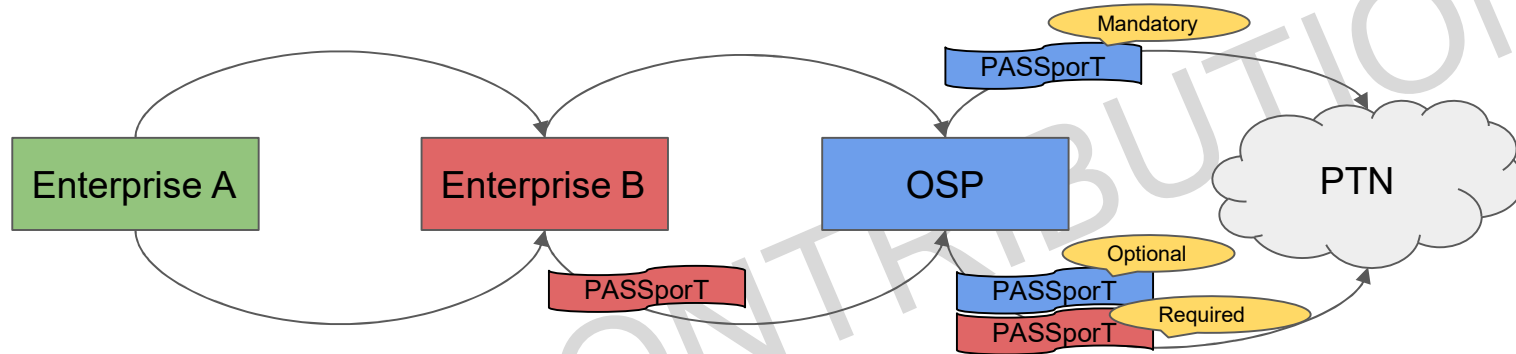


Enterprise Certificates: No upstream enterprises

- A PASSporT should be attached by the farthest upstream entity with a certificate. However, in this case no upstream entity has a certificate.
- Depending on customer information and use case, the OSP can do one of the following:
 - attach its own PASSporT, with partial attestation (A)
 - attach its own PASSporT, with full attestation (B)

Scenarios

Plain STIR/SHAKEN

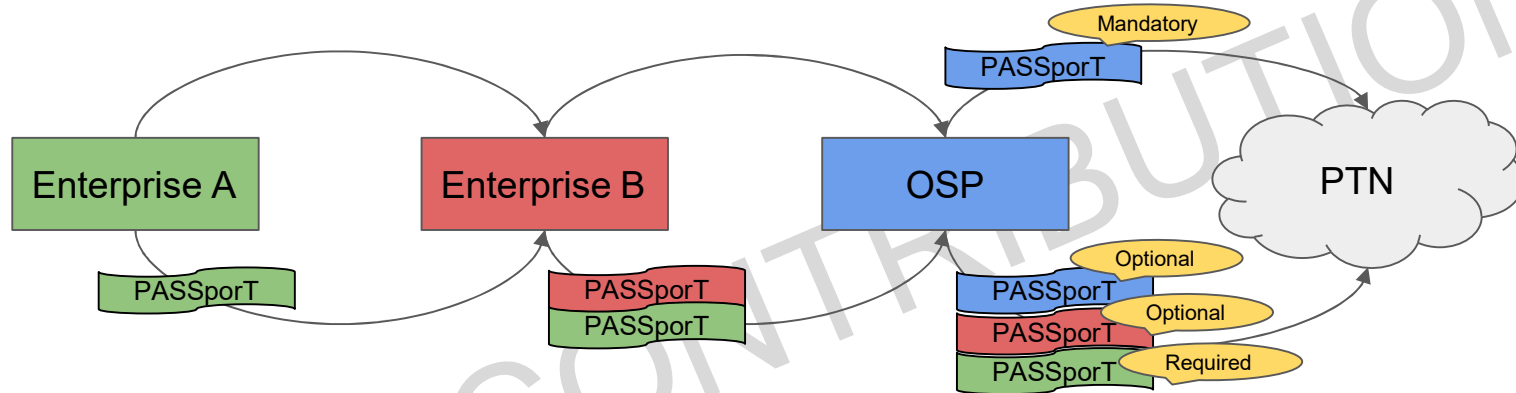


Enterprise Certificates: One upstream enterprise

- A PASSporT should be attached by the farthest upstream entity with a certificate.
- Depending on customer information and use case, the upstream provider prior to PTN origination has the following options:
 - pass along the received upstream PASSporT (C1, D1)
 - pass along its own PASSporT in addition to the received upstream PASSporT (C2, D2)
 - replace the received upstream PASSporT with its own PASSporT (D3)

Scenarios

Plain STIR/SHAKEN



Enterprise Certificates: Multiple upstream enterprises

- A PASSporT should be attached by the farthest upstream entity with a certificate.
- Depending on customer information and use case, each upstream provider prior to PTN origination has the following options:
 - pass along just the received upstream PASSporTs (C1, D1)
 - pass along its own PASSporT in addition to the received upstream PASSporTs (C2, D2)
 - replace the received upstream PASSporTs with its own PASSporT (D3)



Advantages of Enterprise Certificates

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Advantages of Enterprise Certificates

Implications of Enterprise Certificates:

Responsibility is decentralized and put closer to the actual callers.

- Trust depends on entity reputation, not TN authorization lists.
- Entities have incentive to use their certificates appropriately.
 - Certificates and authorization can be revoked by the PA.
 - Obtaining certificates has a cost.
 - Define some set of criteria for eligibility.
 - Include non-negligible fees for authorization.
 - Certificates are connected to contact information: director names and contacts.
- Simpler traceback:
 - The same enterprise caller is identified by its PASSporTs, regardless of which service providers are used.
 - It is more difficult to create multiple entities and obtain PA authorization.