Figure 1: Payload Encryption, Key Distribution and Trust Establishment
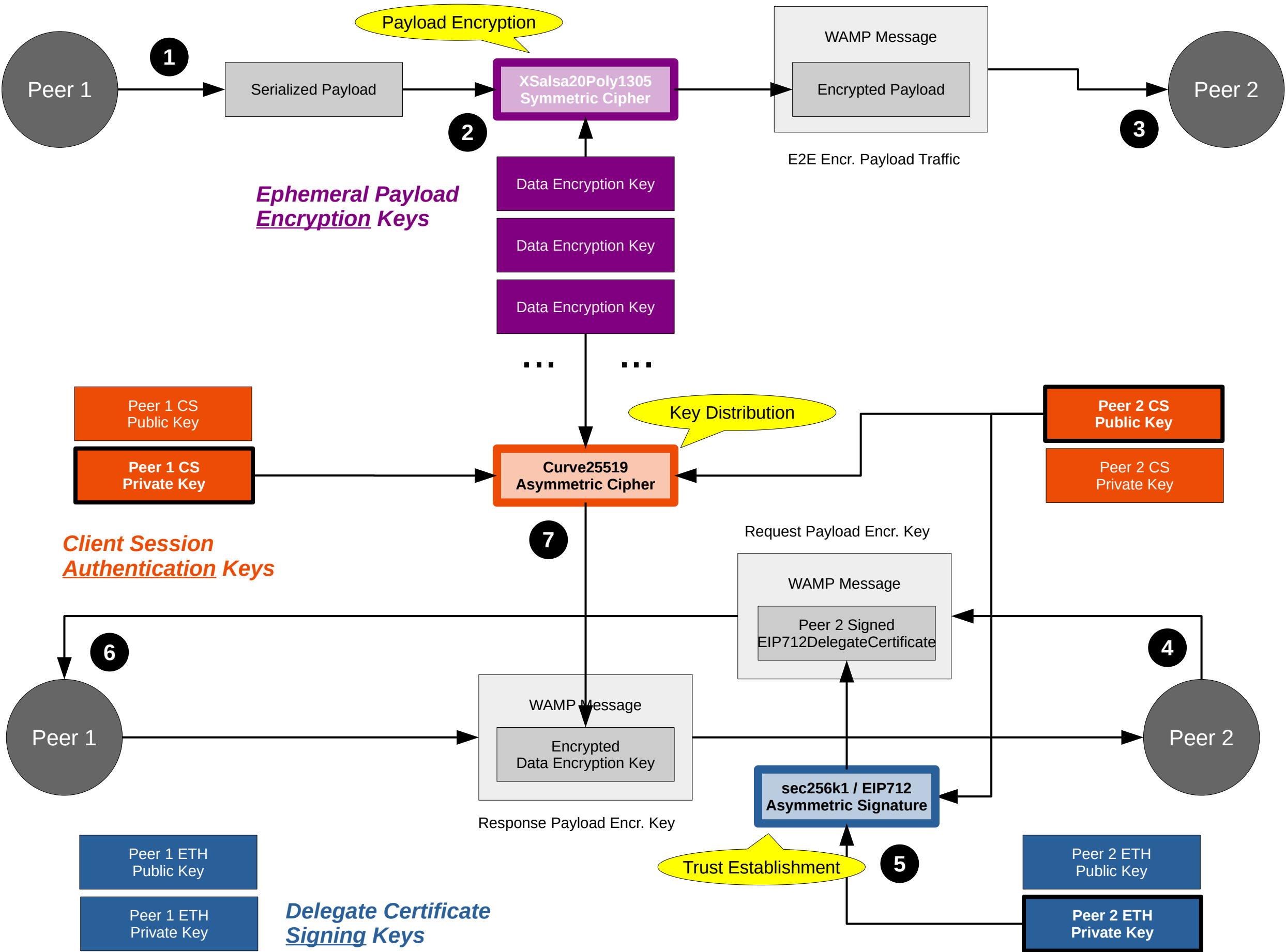
Figure 2: Certificate Hierarchies, Trustroots and Trustanchors
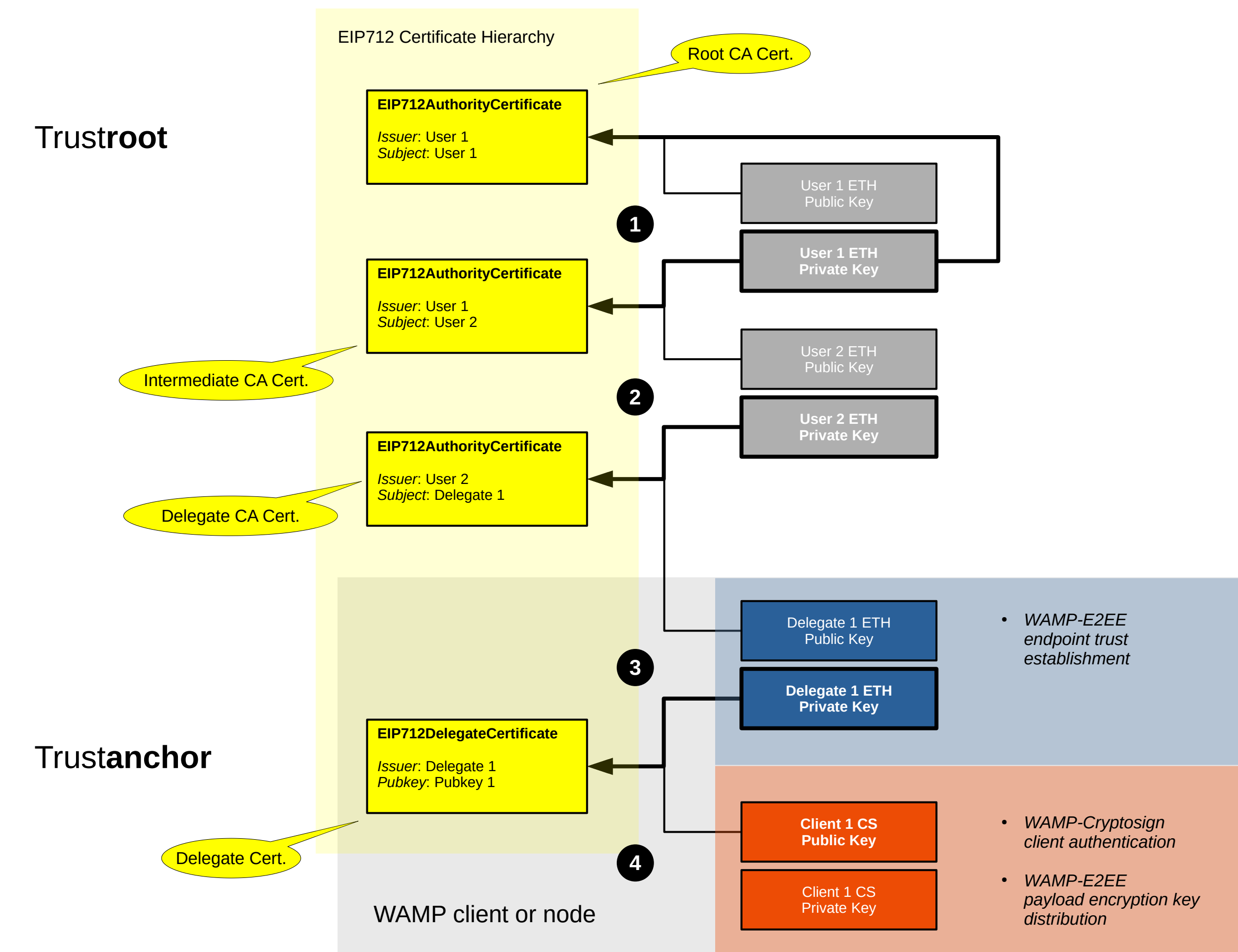
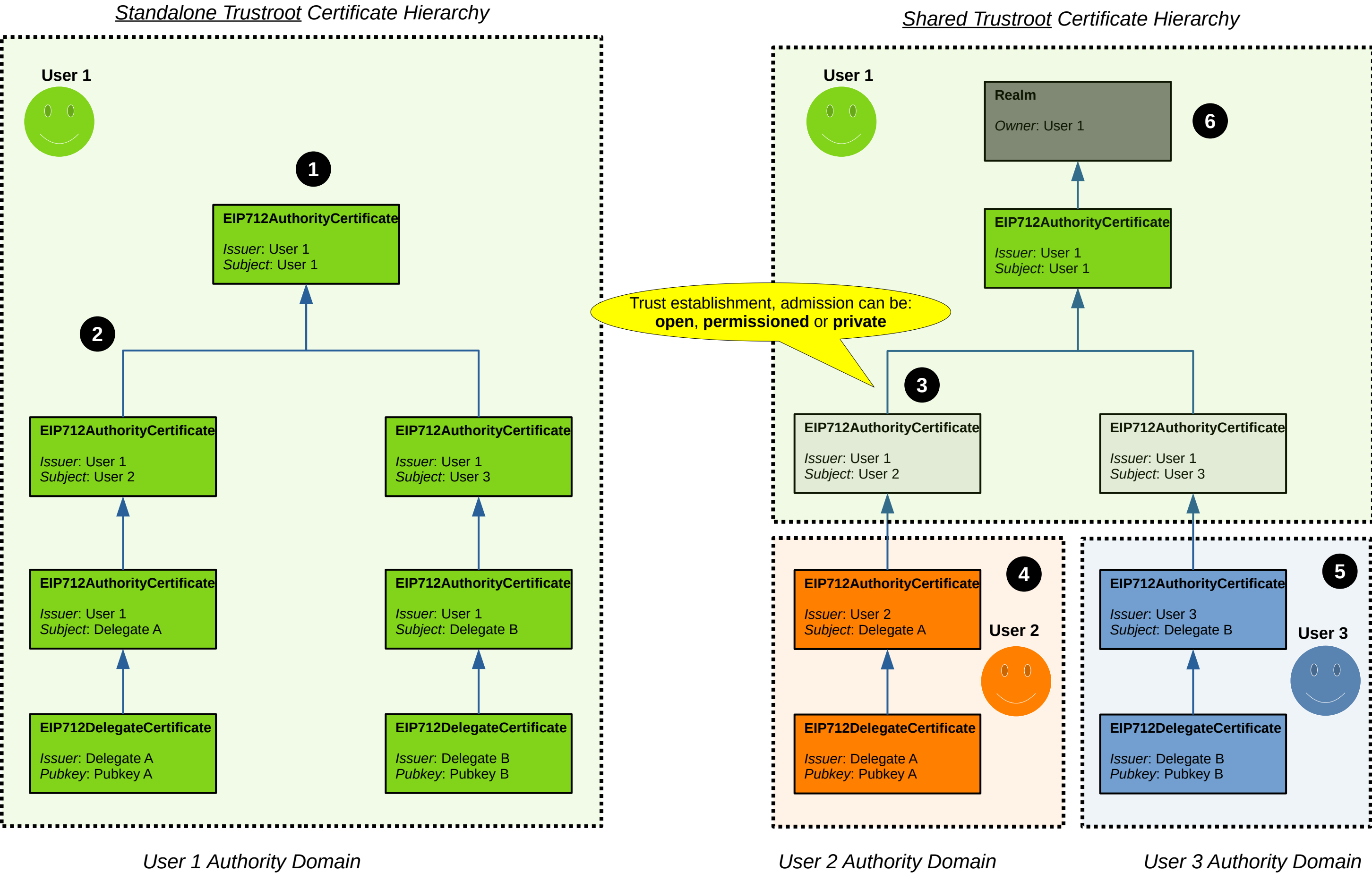# Figure 3: Standalone and Shared Trustroot Certificate Hierarchies

Standalone Trustroot Certificate Hierarchy

User 1

1

EIP712AuthorityCertificate

Issuer: User 1
Subject: User 1

2

EIP712AuthorityCertificate

Issuer: User 1
Subject: User 2

EIP712AuthorityCertificate

Issuer: User 1
Subject: User 3

EIP712AuthorityCertificate

Issuer: User 1
Subject: Delegate A

EIP712AuthorityCertificate

Issuer: User 1
Subject: Delegate B

EIP712DelegateCertificate

Issuer: Delegate A
Pubkey: Pubkey A

EIP712DelegateCertificate

Issuer: Delegate B
Pubkey: Pubkey B

User 1 Authority Domain

Shared Trustroot Certificate Hierarchy

User 1

Realm

Owner: User 1

6

EIP712AuthorityCertificate

Issuer: User 1
Subject: User 1

Trust establishment, admission can be:
open, **permissioned** or **private**

3

EIP712AuthorityCertificate

Issuer: User 1
Subject: User 2

EIP712AuthorityCertificate

Issuer: User 1
Subject: User 3

4

EIP712AuthorityCertificate

Issuer: User 2
Subject: Delegate A

User 2

EIP712DelegateCertificate

Issuer: Delegate A
Pubkey: Pubkey A

5

EIP712AuthorityCertificate

Issuer: User 3
Subject: Delegate B

User 3

EIP712DelegateCertificate

Issuer: Delegate B
Pubkey: Pubkey B

User 2 Authority Domain   *User 3 Authority Domain*

Figure 4: Standalone Realm Usage Scenario

EIP712AuthorityCertificate
Issuer: User 1
Subject: User 1
Realm: x5F0c...
Capabilities: Root CA

User 1

Off-chain Root CA
Certificate File
Centralized Trust

Cloud Server
with
WAMP Node

Cloud Server
with
WAMP Node

Public IP
Permanently Online
Router-to-Router Link Meshed

End-to-End Encrypted
Standalone Realm

Edge Device
with
WAMP Node

Edge Server
with
WAMP Node

Uplink only
Runs On-demand only
End-to-End Encryption

WAMP Client

WAMP Client

Regular WAMP

Router-to-Router Link with End-to-End
Encryption

Optional R2R Links between nodes with
private IPs

Figure 5: Private-Shared Realm Usage Scenario

User 2

EIP712AuthorityCertificate
Issuer: User 1
Subject: User 2
Realm: x5F0c...
Capabilities: Relay CA

User 3

EIP712AuthorityCertificate
Issuer: User 1
Subject: User 3
Realm: x5F0c...
Capabilities: Relay CA

Relay Server
with
WAMP.eth Relay Node

Relay Server
with
WAMP.eth Relay Node

Public IP
Permanently Online
Router-to-Router Link Meshed

EIP712AuthorityCertificate
Issuer: User 1
Subject: User 1
Realm: x5F0c...
Capabilities: Root CA

User 1

End-to-End Encrypted
Private-Shared Realm

On-chain Root CA
Logical Entity only
Decentralized Trust

On-chain User or DAO
Realm Owner

Gateway Device
with
WAMP.eth Gateway Node

Gateway Server
with
WAMP.eth Gateway Node

Uplink only
Runs On-demand only
End-to-End Encryption

WAMP Client

WAMP Client

Regular WAMP

Router-to-Router Link with End-to-End
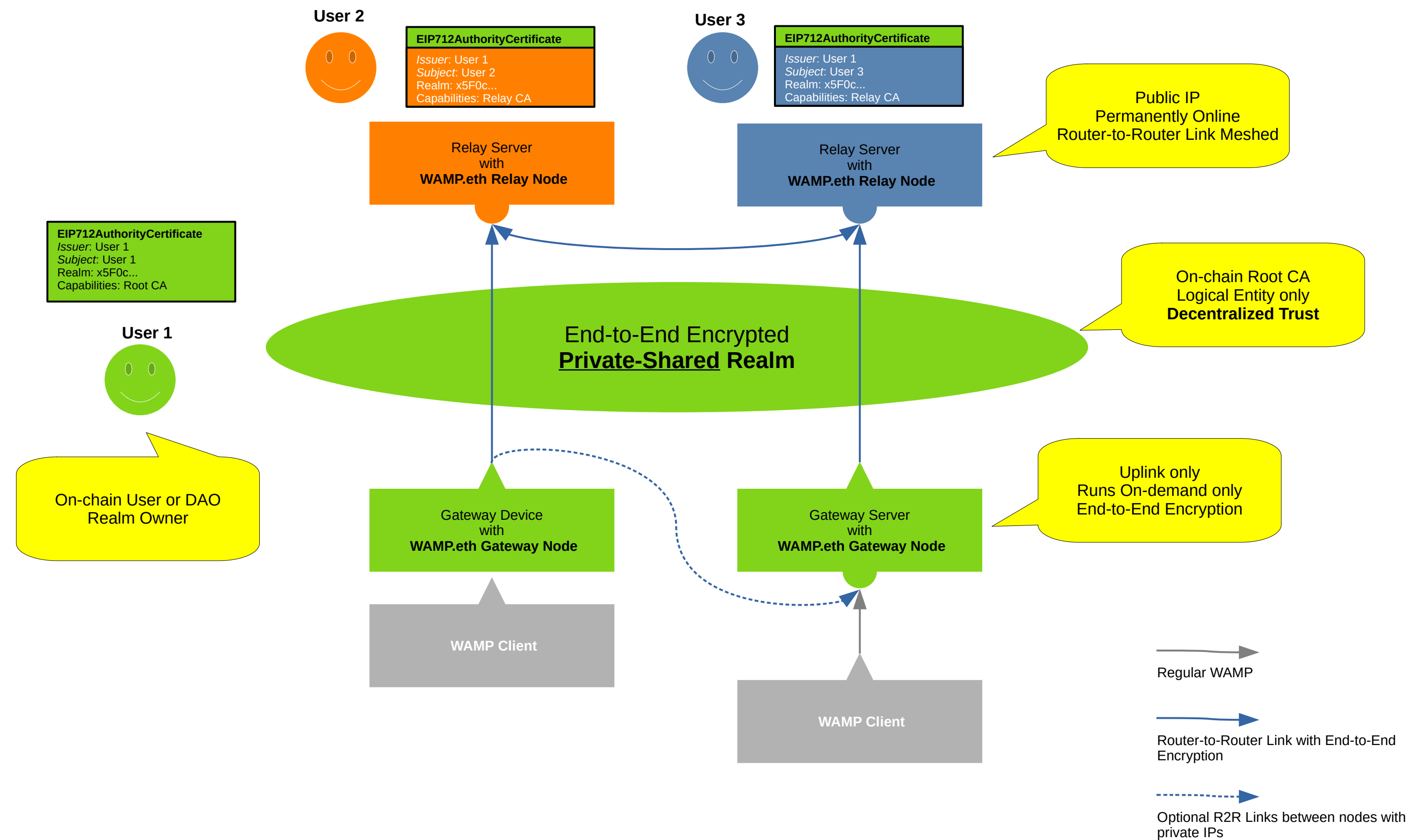Encryption

Optional R2R Links between nodes with
private IPs

Figure 6: Open-/Permissioned-Shared Realm Usage Scenario