



Innovations in Clouds,
Internet and Networks

19th
ICIN
CONFERENCE

PARIS
MARCH 1 - 3, 2016

Global Identity and Reachability Framework for Interoperable P2P Communication Services

Ibrahim Tariq Javed, Rebecca Copeland, Noel Crespi, Marc Emmelmann, Ancuta Corici, Ahmed Bouabdallah, Felix Beierle, Sebastian Göndör, Axel Küpper, Kevin Corre, Jean-Michel Crom, Frank Oberle, Ingo Friese, Ana Caldeira, Gil Dias, Ricardo Chaves, Nuno Santos



March 2, 2016

Real time communication
platforms and services

➤ The two types of Communication service delivery models

– Old Fashioned Federated Telco

- Limited innovation, not flexible enough
- Access controlled communication services
- Reliable Service
- Well defined standards to enable universal interoperability



– Walled Garden Over The Top (OTT)

- Much more competitive and Agile
- Not constrained by Standards
- Can't interoperate with users from other domains
- No portability of Identity or User Data



➤ The reTHINK project proposes a new web centric Peer-to-Peer service architecture:

- Decentralized session control
- Empowering the endpoints to manage the flow of media
- Global **reachability** with de-perimeterised services
- Secure, **non-service-bound**, privacy enabled identities
- Cross domain **interoperable**
- QoS beyond best effort
- WebRTC real time P2P communication capabilities



- Trustworthy global identity and reachability framework is required to have the following features:
 - Cross domain interoperable
 - Communicate with user identified in other services
 - Identity portability across service providers
 - Without losing identity details or contact lists
 - Identity decoupled from service providers
 - Use of Independent Identity Provider (IdP)
 - Global searchable
 - Searchable across any domain
 - Trust-enhanced identity features
 - IdP-certified identity
 - Complemented by Trust Engine



➤ The reTHINK framework relies on:

- **Hyperty** (Hyper linked entities): a module of software logic that is dynamically deployed in an endpoint.
- **Hyperty instance** represents a ‘live’ user that can be discovered and contacted dynamically.

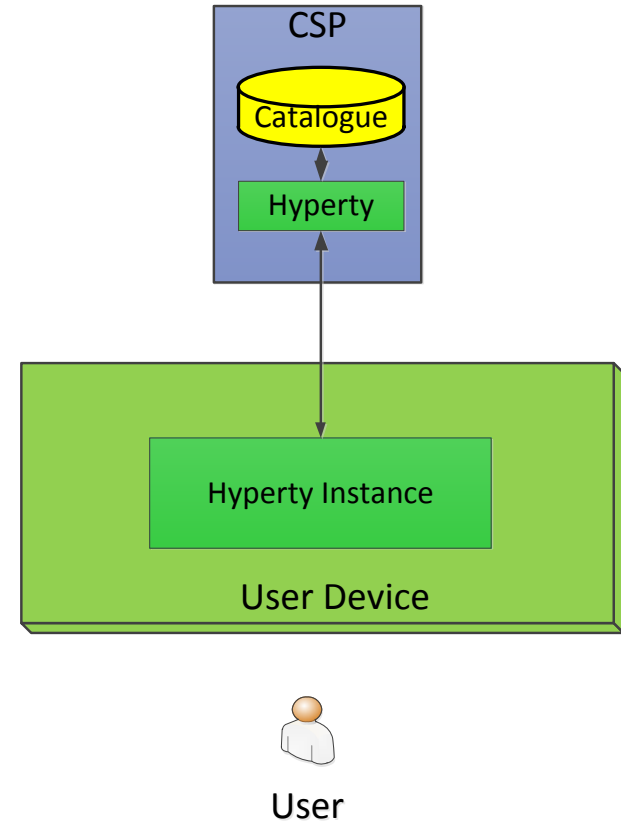


Fig 1: Hyperty Concept

Four components:

1. Identity & Trust management
2. Directories services
3. Graph Connector
4. Governance & Policy

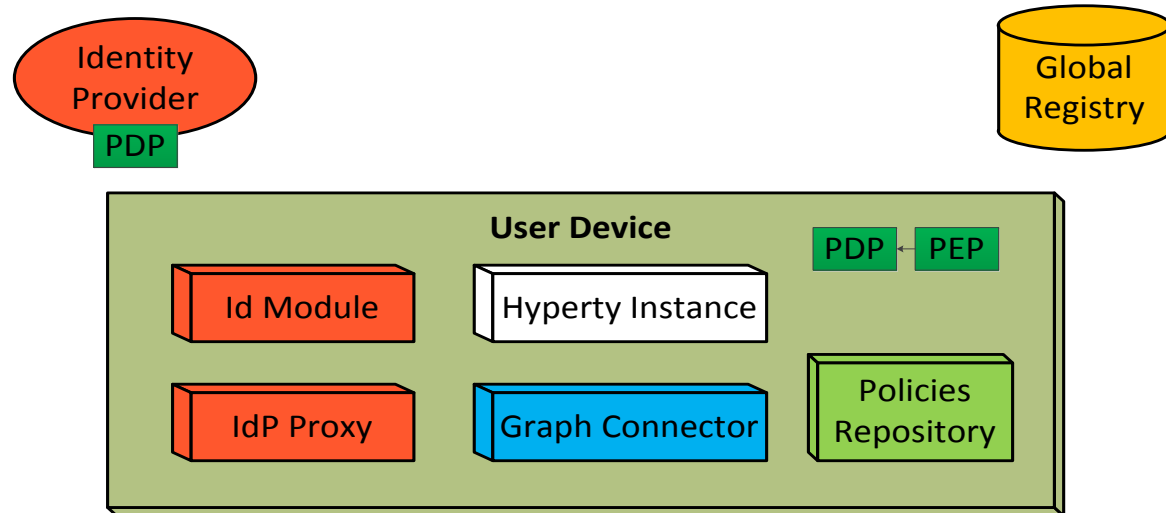
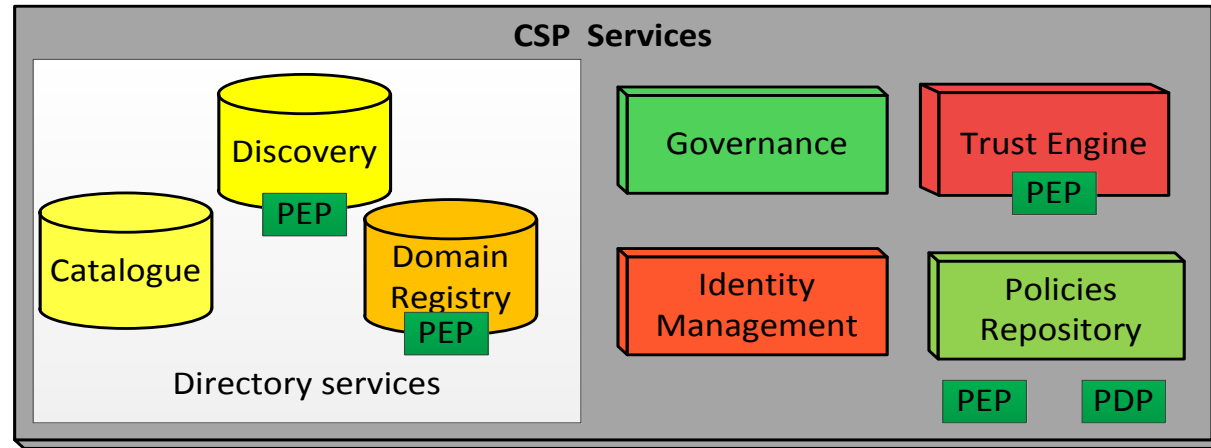


Fig 2: reTHINK functional architecture

Identity Management

- Identity Provider (IdP):
 - Provide, manage and verify user identities
- IdModule
 - Software module that preserves identity of users
 - Platform for IdP proxy execution
 - Enable users to choose the adequate identity

Trust Management

- The trust engine consists two basic modules
 - Authentication validation
 - The identity is verified from the issuing IdP
 - White and Black list:
 - Indicates whether identity is known for good or malicious behaviour
- Trust vectors can be indicated in plain text or symbols

➤ Catalogue Service

- Stores information about the Hyperties of CSP's available for use
- Provides means for the end device to obtain (download) the implementation of a Hyperty

➤ Discovery Service

- Provides services to find people across different networks or domains
- Discovery of user based on what you already know
- Each user is free to create his own entry in the discovery registry and publish data

➤ Two types of identifiers

- Global Unique Identifier (GUID)
 - Domain agnostic, remains same irrespective of CSP
- User Identifier (UserID)
 - Domain dependent identifier
 - Used to locate the actual location of user device

➤ Registry services:

- Global registry:
 - Resolves user GUID to CSP specific User ID
- Domain registry:
 - Translates UserID to Hyperty instance address of user
 - Information about running Hyperty instances are published and updated

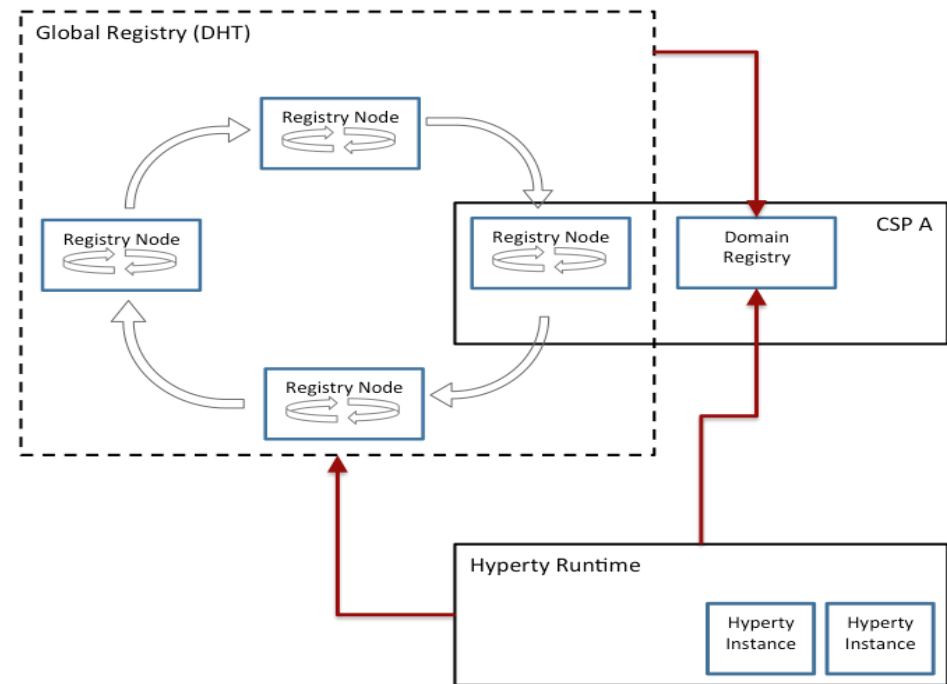


Fig 3: Global and Domain Registry

- **Graph Connector** is a local address book maintaining a list of known communication endpoints
 - A distributed, qualitative/quantitative-weighted social network
 - Estimate trust level between unknown users for Trust engine
- **Governance** involves management of defined rules expressed through **Policies**
 - Classical PDP/PEP Policy repository structure
 - Distributed among
 - End user devices:
 - Policies specific to the device local resources
 - CSP infrastructure:
 - Policies defined by the CSP and accepted by the end user

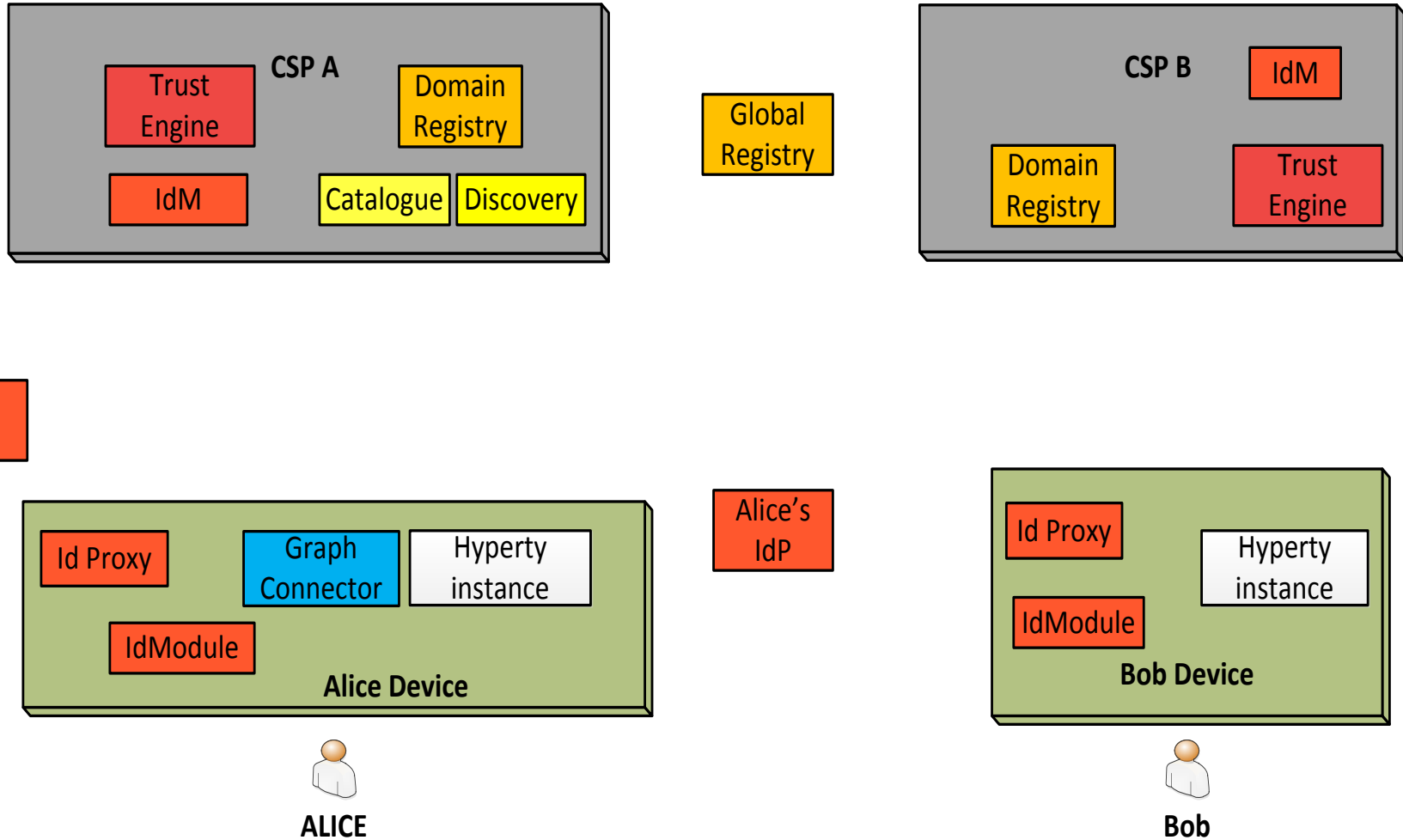


Fig 5: reTHINK call flow sequence

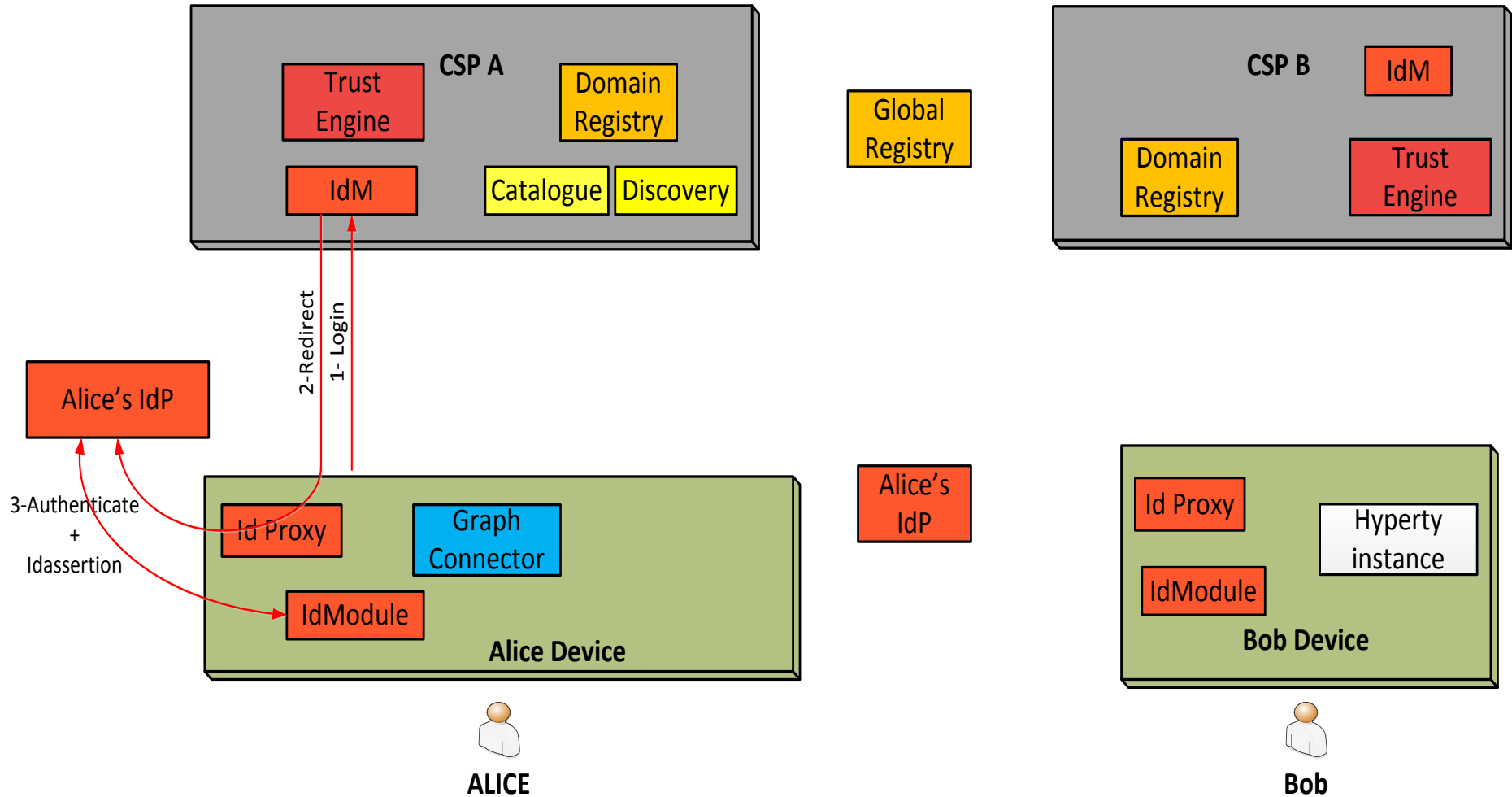


Fig 5: reTHINK call flow sequence

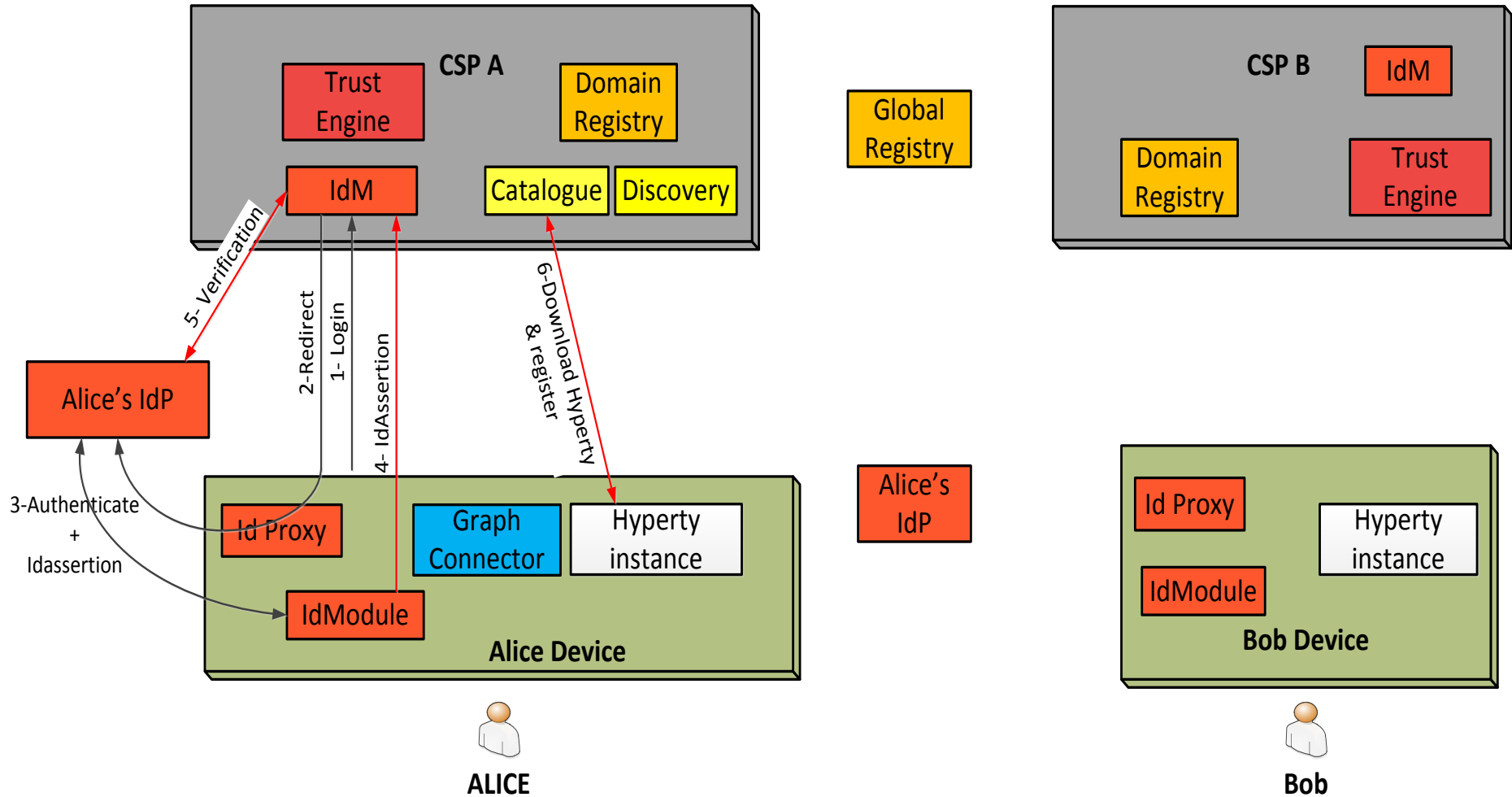


Fig 5: reTHINK call flow sequence

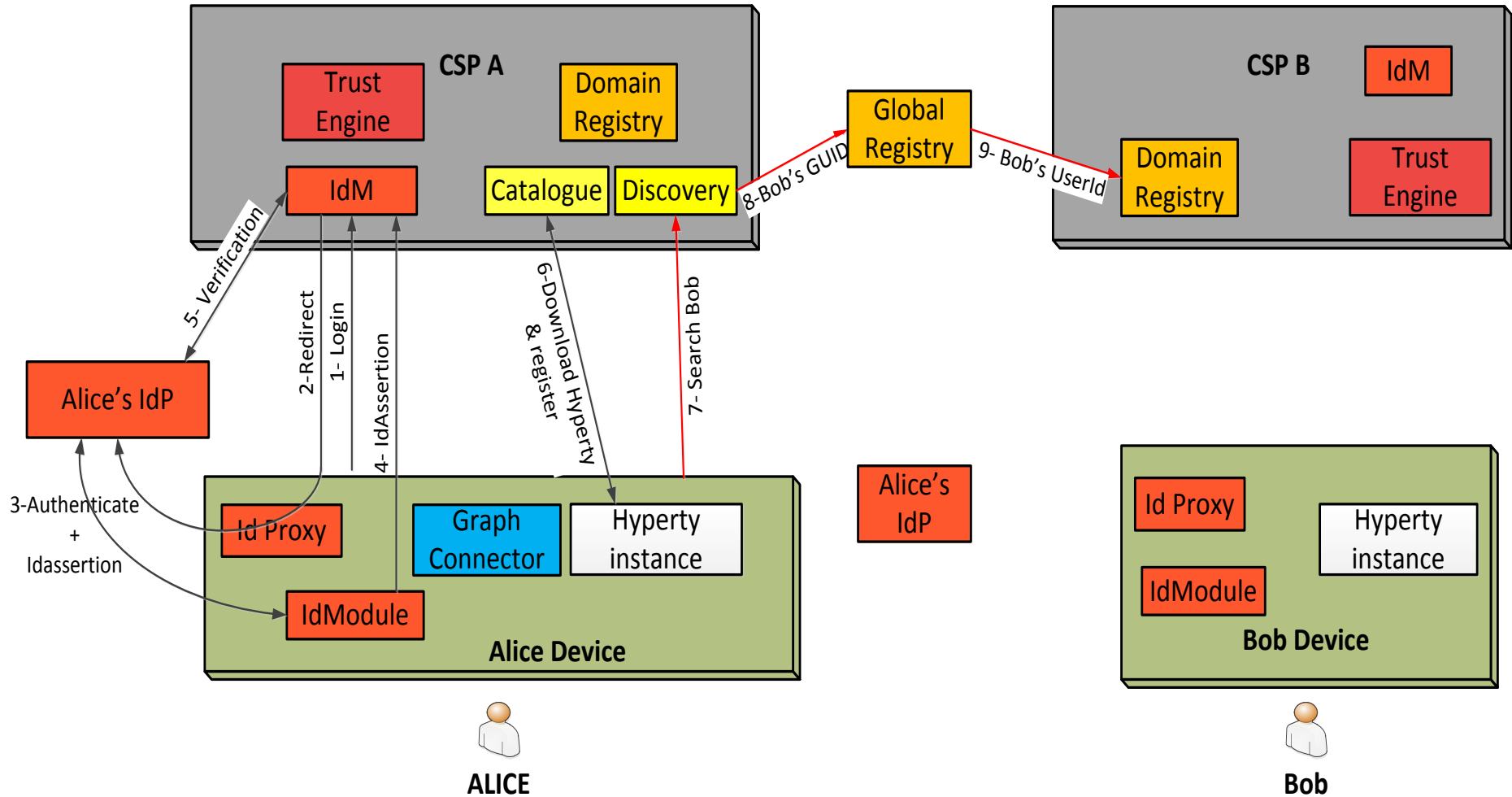


Fig 5: reTHINK call flow sequence

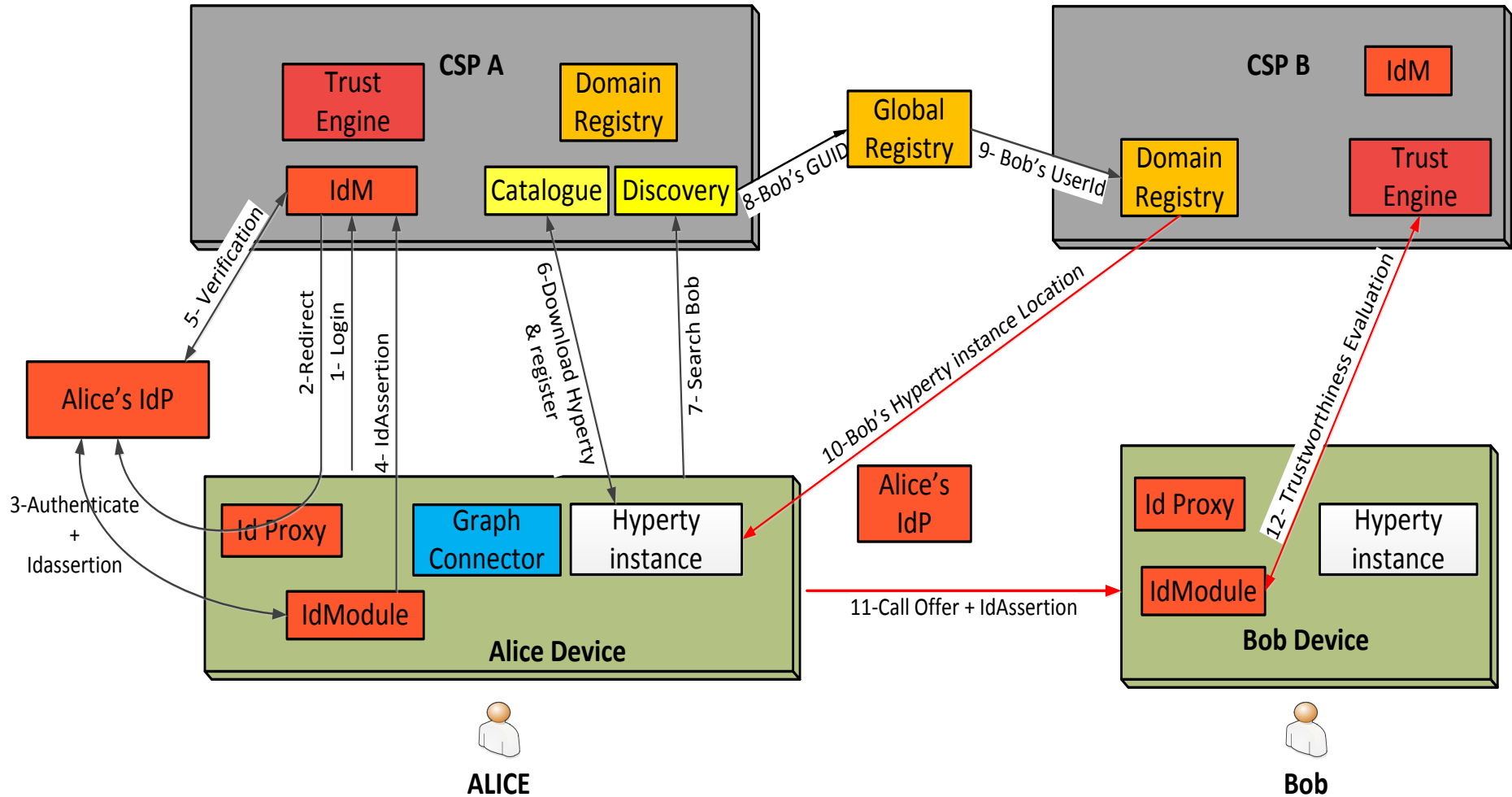


Fig 5: reTHINK call flow sequence

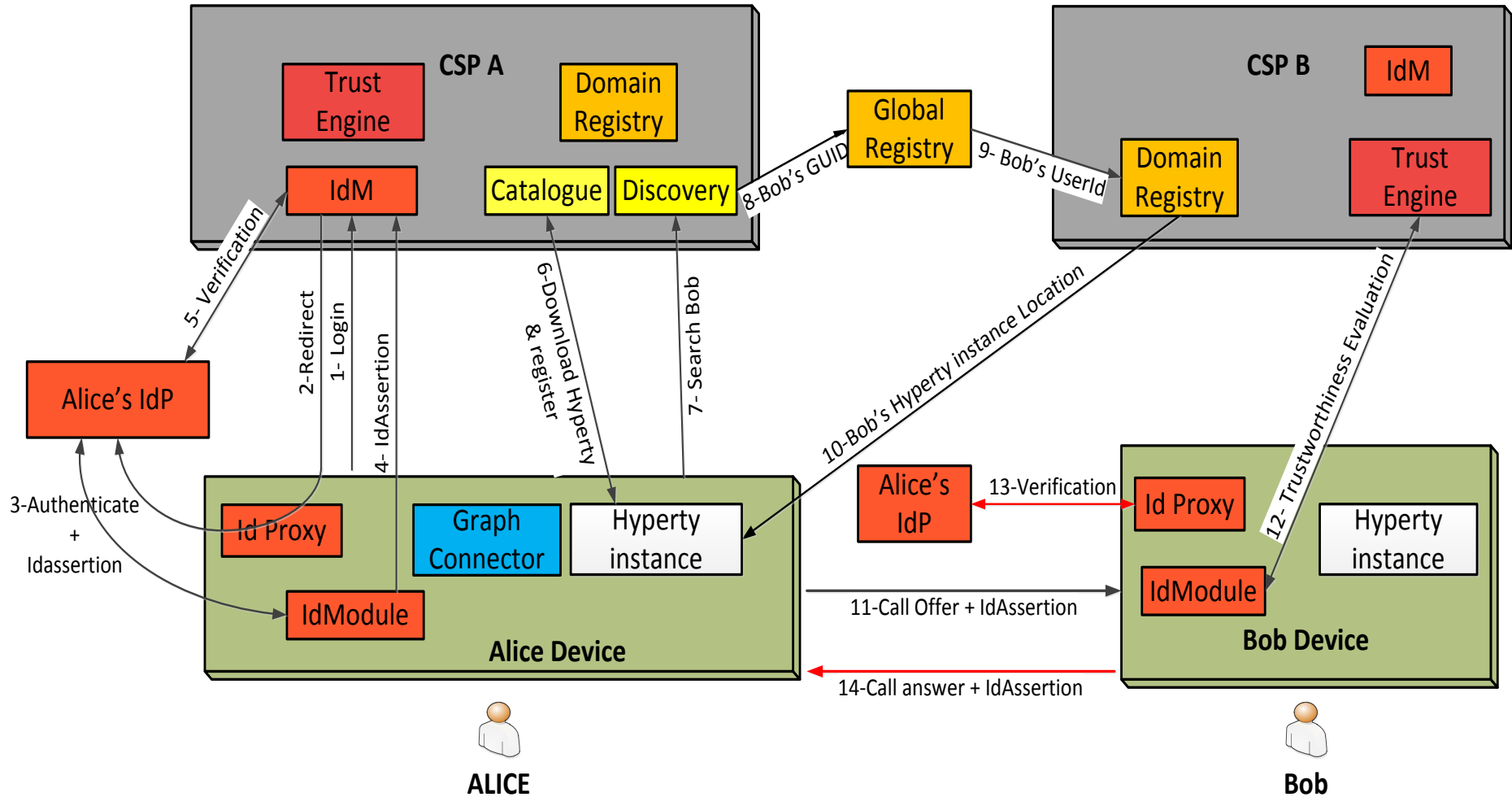


Fig 5: reTHINK call flow sequence

- reTHINK envisions to overcome the challenges of traditional Telco and OTT models by providing a new web centric P2P architecture
- The aim of reTHINK identity & reachability framework is to have
 - Non-service-bound Identities
 - Global searchable and reachable users
 - Cross domain interoperability
 - Portability
- This is achieved using four specialized components: **Identity & Trust management**, **Directory services**, **Graph connector**, **Policy & governance**

- Operators: Orange, Portugal Telecom, Deutsche Telekom
- SME : Eurescom, Quobis, APIzee
- Academics : IMT, TU Berlin, Fokus Franhofer, INESCID



This work has received funding from the European Union’s Horizon 2020 research and innovation program under grant agreement No 645342, project reTHINK



Innovations in Clouds,
Internet and Networks

19th
ICIN
CONFERENCE

PARIS
MARCH 1 - 3, 2016

Thank you!



March 2, 2016

Real time communication
platforms and services