UMOBILE
… in a nutshell

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Tutorial Overview

- UMOBILE in a nutshell - ATHENA, Christos-Alexandros Sarros

- The UMOBILE Lab - AFA, Angela D'Angelo

- NDN-DTN integration - ATHENA, Christos-Alexandros Sarros

Coffee Break

- Opportunistic wireless aspects in NDN - COPELABS - Paulo Mendes, Omar Aponte

- Social-aware metrics derived from contextualization - Senception/COPELABS – Rute Sofia, Paulo Mendes, Igor dos Santos

- Applications - COPELABS, Omar Aponte

- Closure - ATHENA

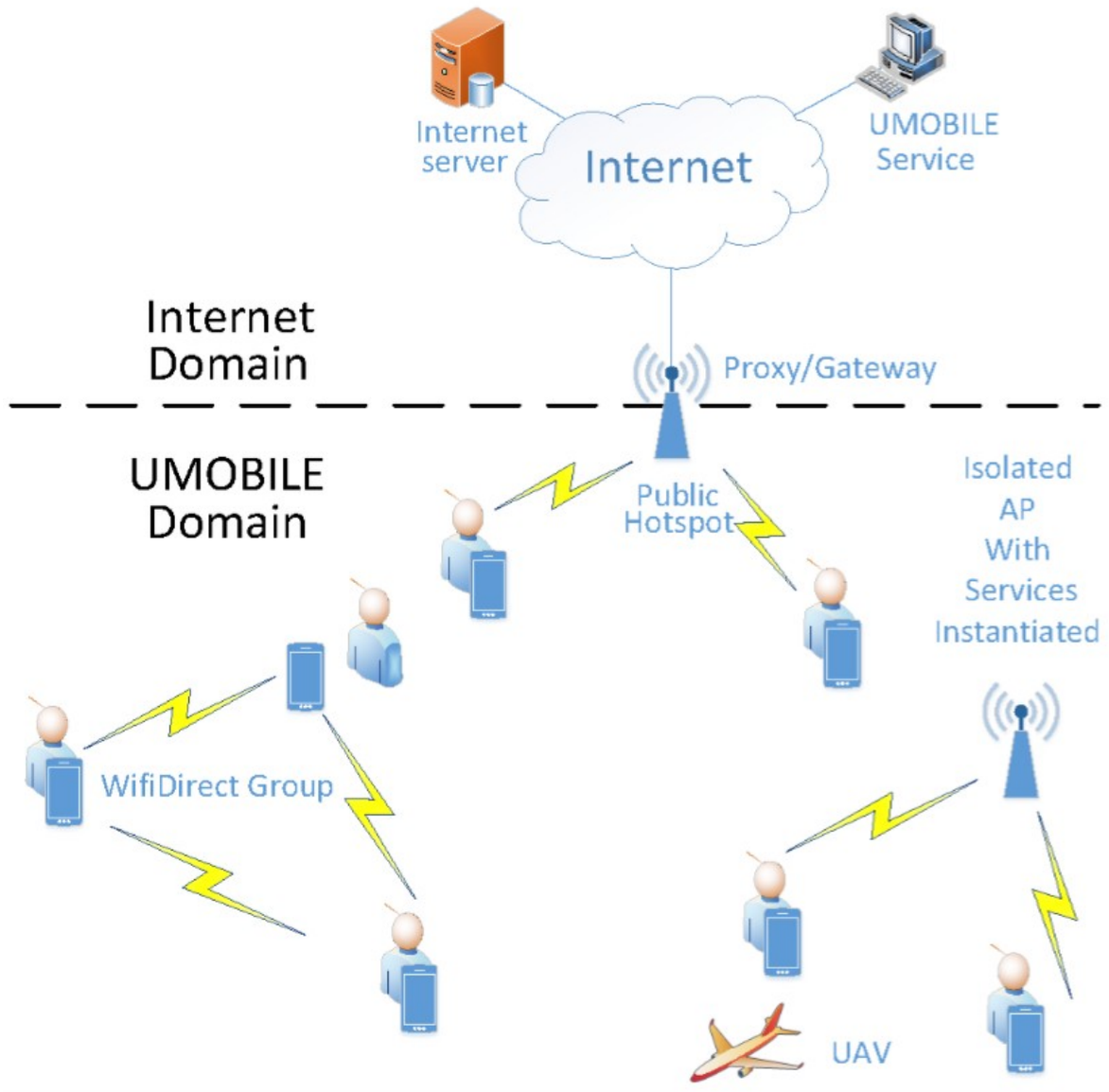
Main objectives

- Develop a consolidated information-centric and delay-tolerant communication platform
- Provide architectural support for the network edge, where mobility and connectivity disruptions are the norm
- Enable a tighter integration of opportunistic communications with the Internet
- Drive the Internet towards a communication platform for universal coverage
- Drive new application and services

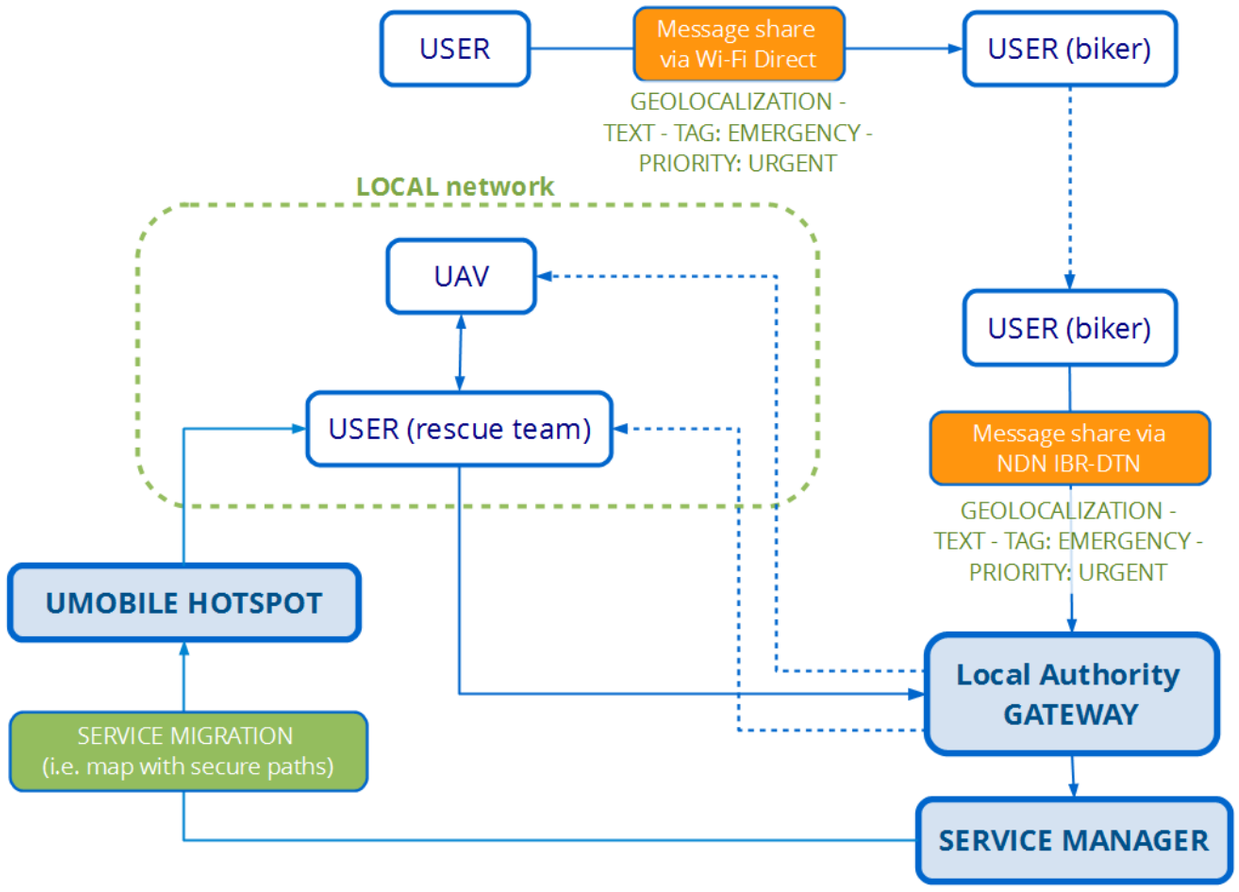
UMOBILE

High-level perspective and novelty

- Exploitation of all communication opportunities and intelligent management of network capacity
- Inherent support of disruptive communications, even between devices that are disconnected in space at any point in time
- Facilitation of user and service mobility
- User, usage and network contextualization
- Social-based routing
- Application/computation sharing

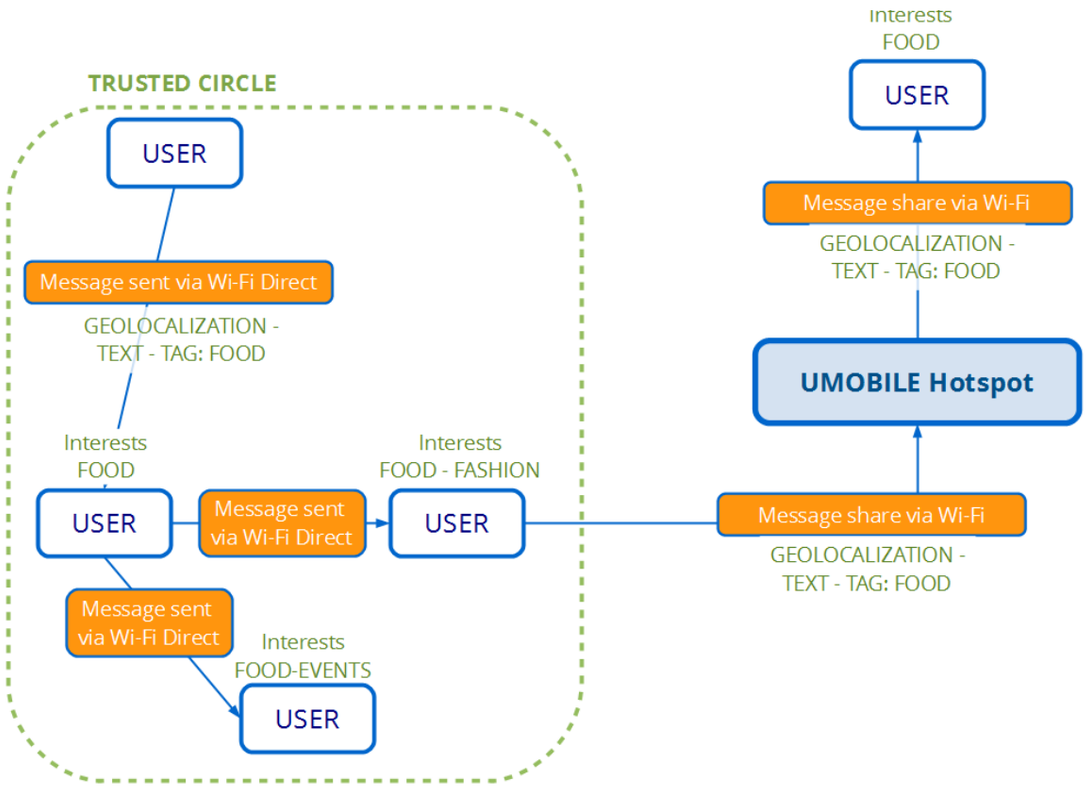


UMOBILE proof-of-concept 1 (PoC1)
Emergency and Civil protection scenario



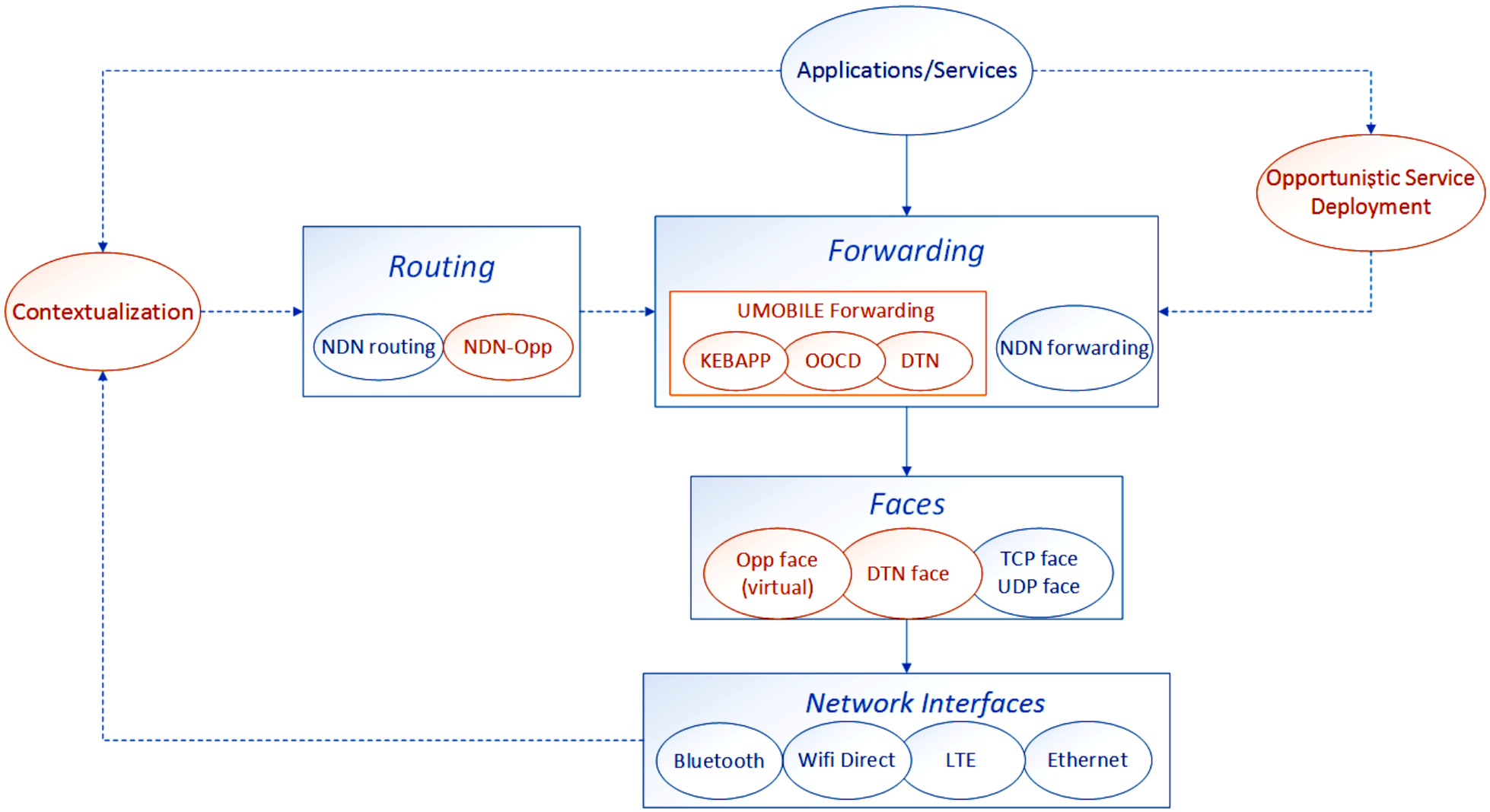
- Opportunistic communications
- Service migration
- Delay-tolerant forwarding
- ICN forwarding

UMOBILE proof-of-concept 2 (PoC2)
Service announcement and social-routine



- Opportunistic communications
- Data collection and contextual inference
- Social-aware routing metrics validation

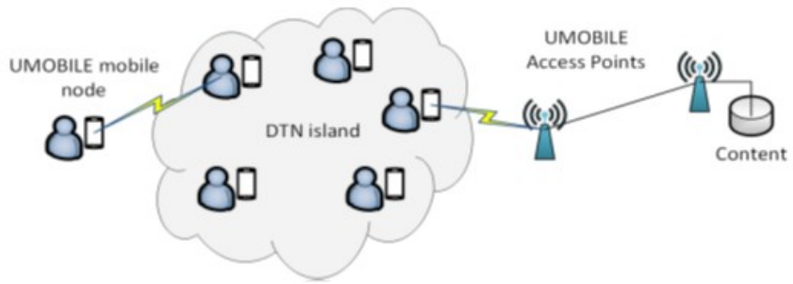
UMOBILE architecture

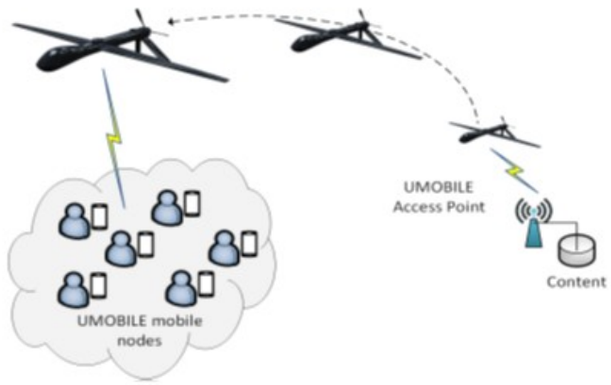


- Extending/modifying NDN for opportunistic and edge communications

Forwarding

- DTN tunneling
  - Reachability
  - Reliability





- Opportunistic off-path content discovery (OOCD)
  - Introduces a new routing table (D-FIB)
    - Points Interests towards the edge of the network, if Interests for same content recently received (=Data cached)
    - Cache hit increase through the discovery of locally available content

- NREP:
  - Introduces name-based push services with priorities (for disaster recovery)
  - Messages spread through the network of mobile devices, based on their name, related priorities TTL and the geographic area of dissemination

Routing

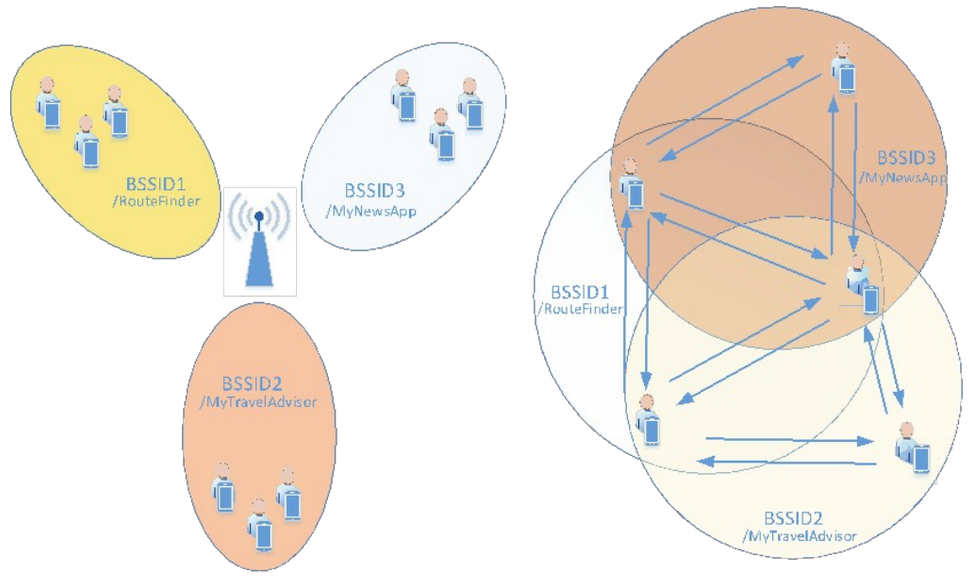
- NDN-Opp
  - Opportunistic communications (e.g. over Wi-Fi Direct)

Contextualization

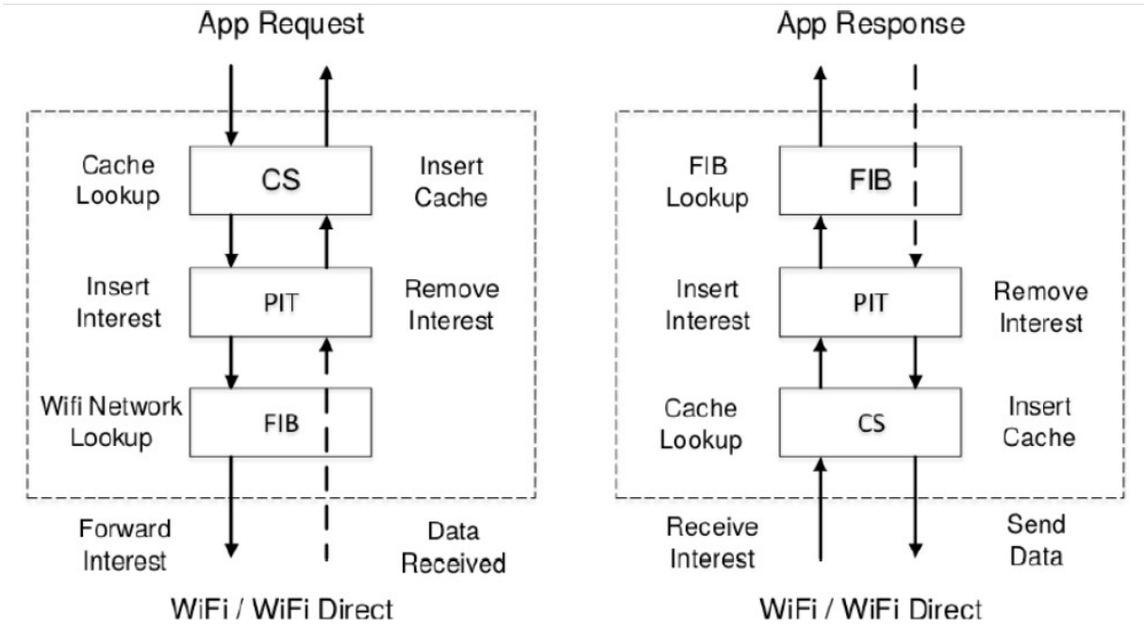
- Improves data dissemination through social awareness
- Passes information to other modules/apps

Northbound APIs

- Keyword-based mobile application sharing (KEBAPP)
- Application-centric computation and communication model
- Information discovery through application-driven and application-defined, hierarchical namespaces

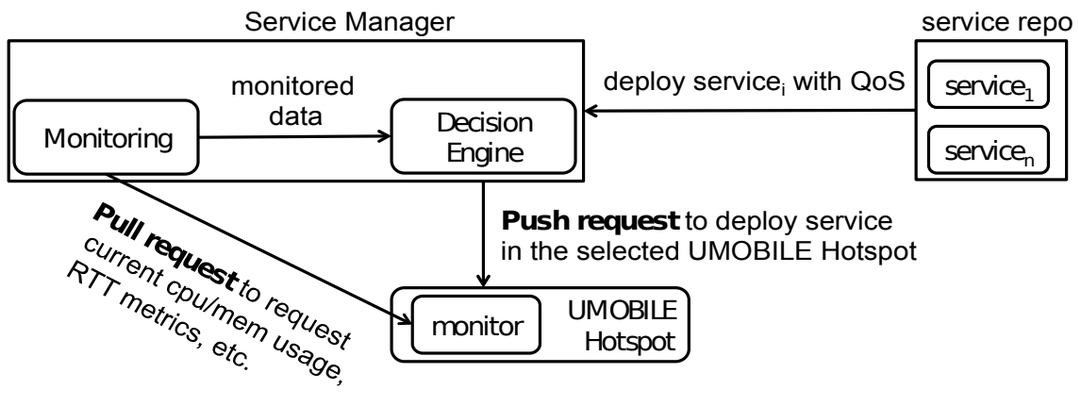


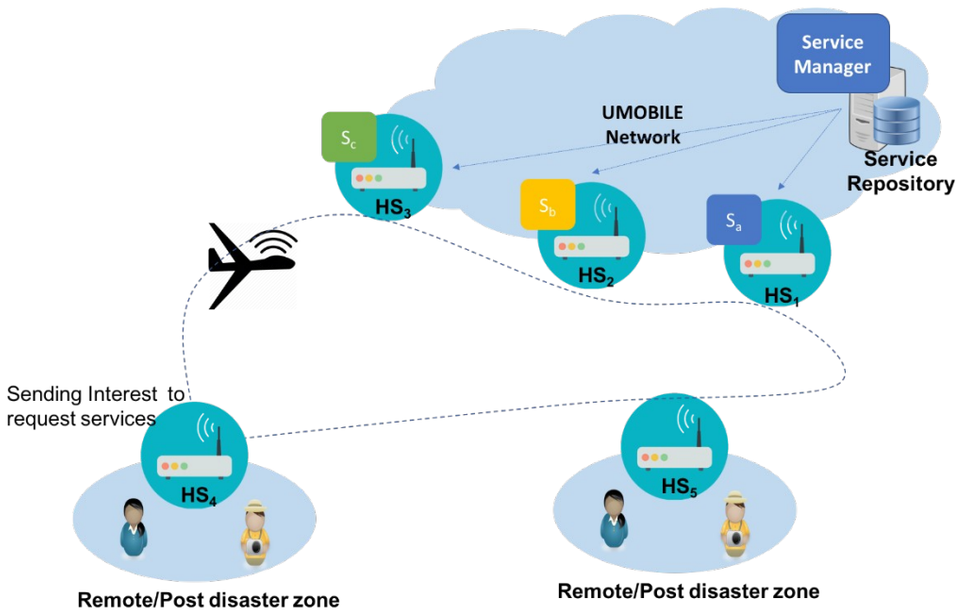
(a) AP-assisted scenario (b) WiFi Direct scenario



Quality of Service

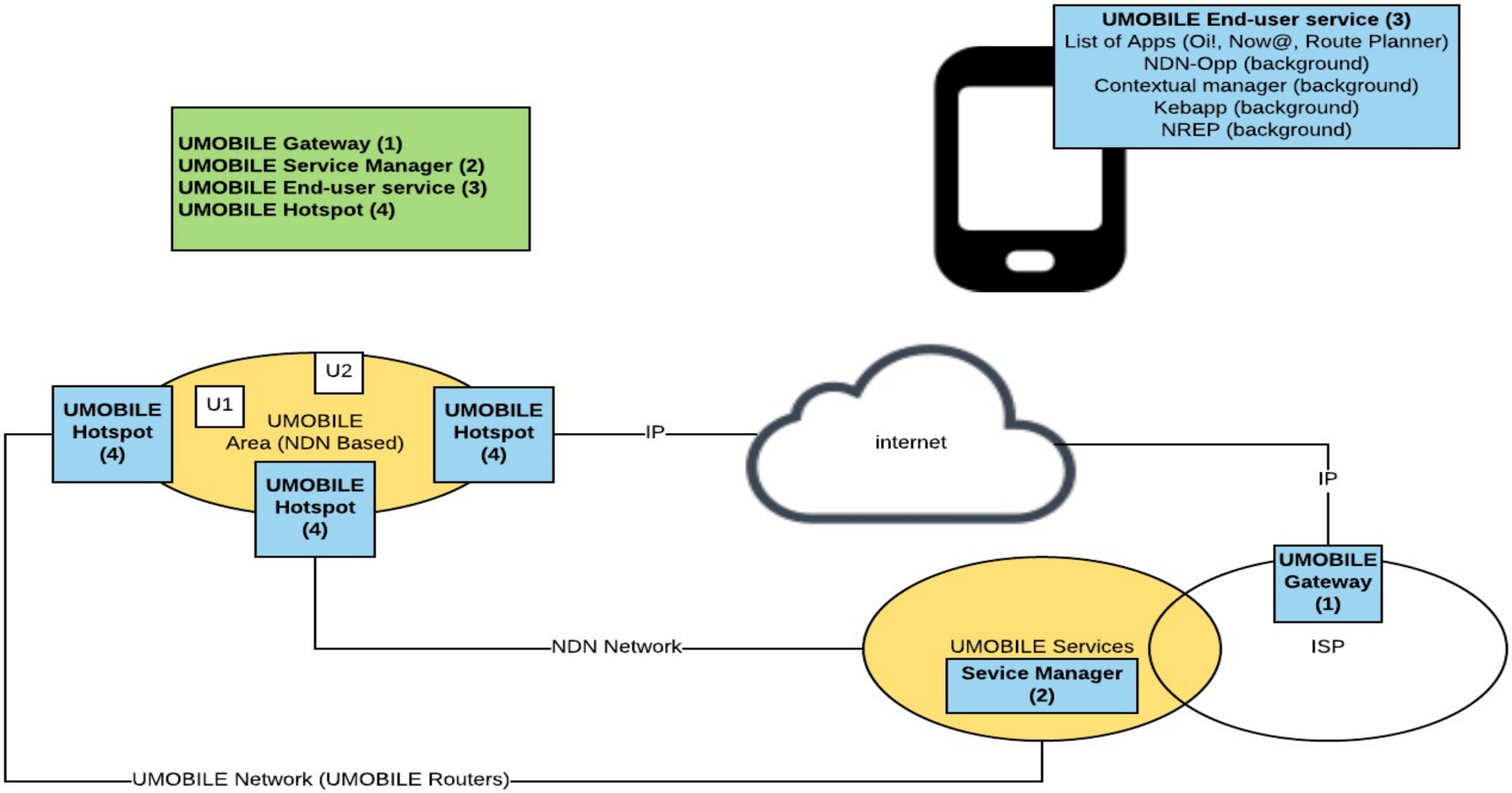
- Edge service deployment
  - Application-level mechanism to overcome latency and availability constraints
  - UMOBILE hotspots
  - Core network, isolated nodes





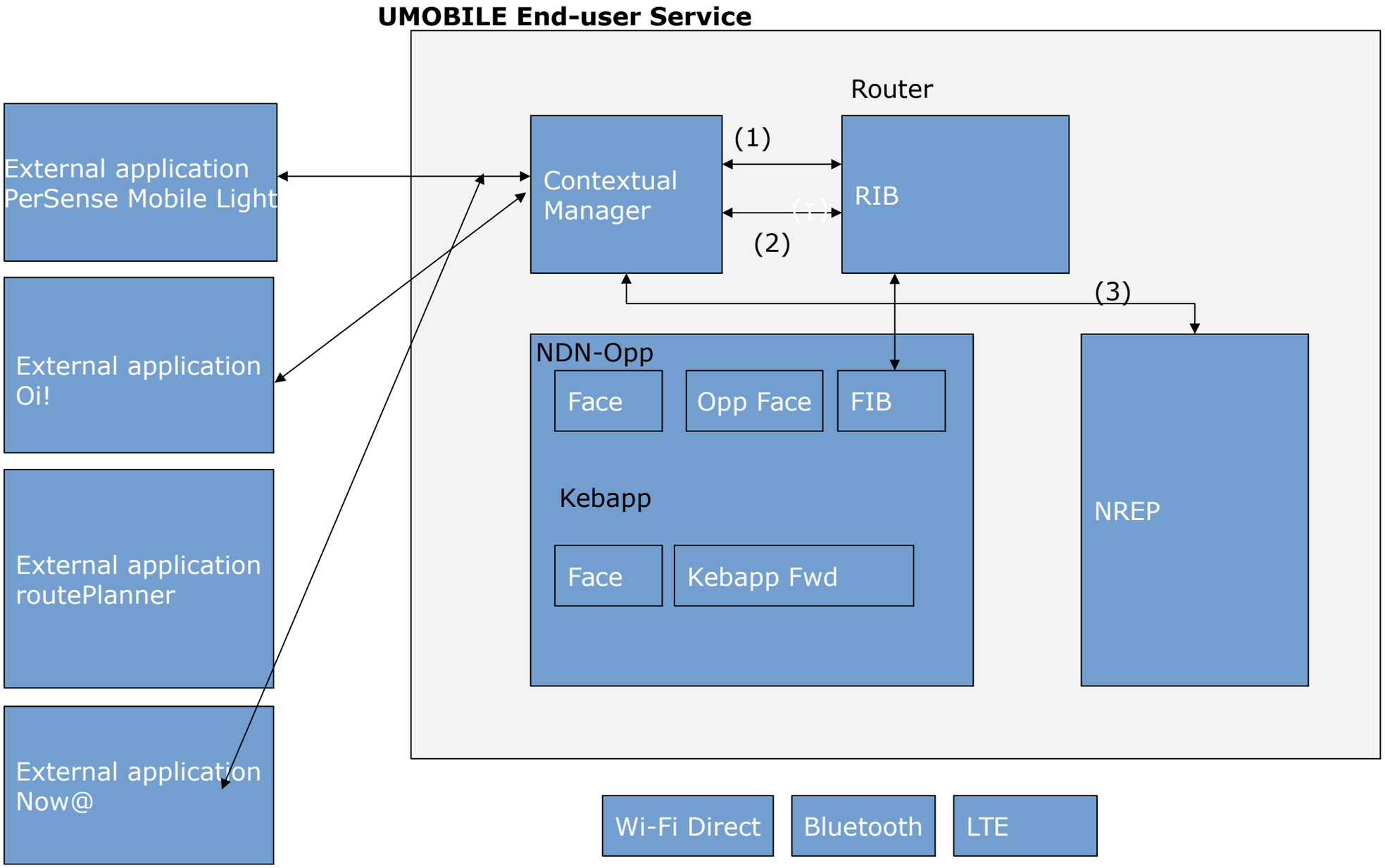
UMOBILE as a Whole

Main Elements, End-to-End Perspective



UMOBILE as a Whole

End-user Service



UMOBILE as a Whole

Hotspot

- Interface between service/content providers and end-users
- Supports service migration
- Supports service execution
- Supports KEBAPP
- Supports NDN-Opp
- Supports DTN forwarding

UMOBILE as a Whole

Gateway

- Interface between the UMOBILE part of the network and IP
- Usually part of the service/content providers' infrastructure
- Supports service migration
- Supports DTN forwarding

UMOBILE as a Whole

Service Manager

- Interface between the Service provider and the UMOBILE hotspots
- Usually part of the service/content providers' infrastructure
- Supports service migration

UMOBILE Wholesale Model

- **Services**
  - Emergency
  - Civil protection
  - Commerce
- **Applications**
  - Local communications
  - News
  - Maps/schedules/routes

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