

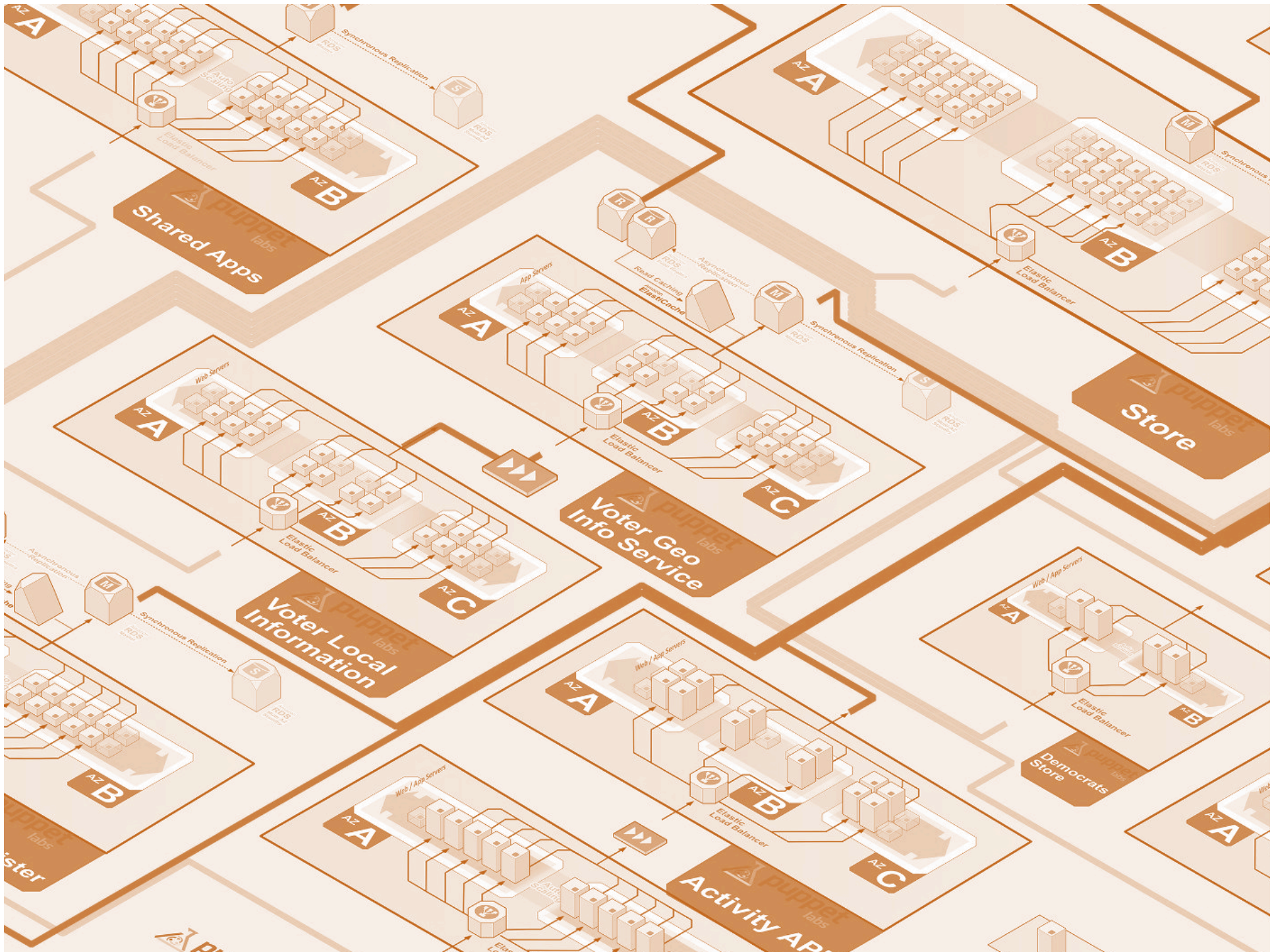
# Autonomous Application and Service Provisioning for Mobile Handsets

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*How to virtualize  
computing farms?*

*How to scale up the  
infrastructure?*

*How to deploy new  
services faster?*

*How to use the resources more  
flexibly and economically?*



## Producing Services:

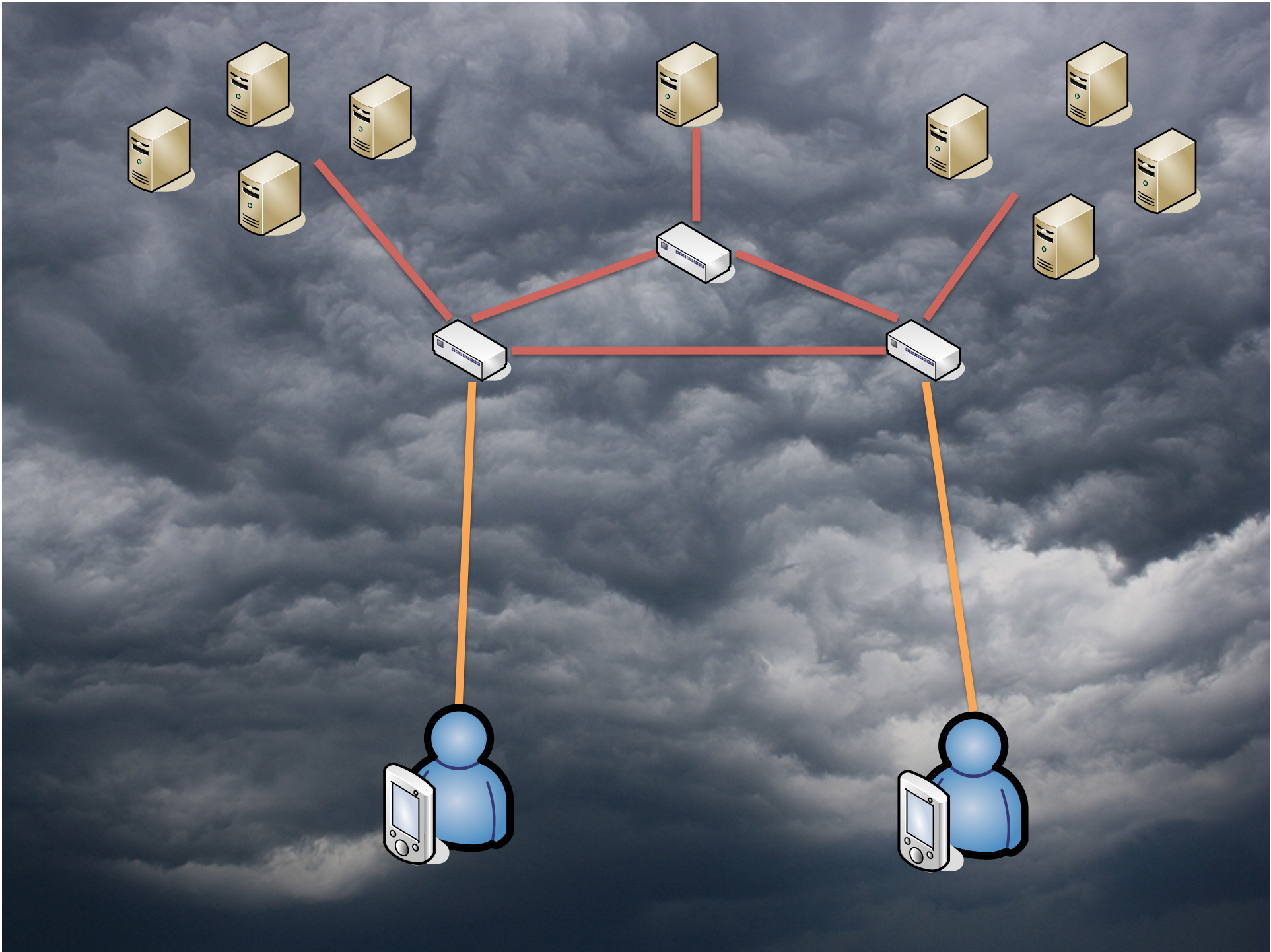
- Services require resources
  - Processing power (mobile search)
  - Large databases (mobile maps)
  - Transmission capacity (streaming video)
- Outside the reach of user's devices
  - Must be installed by service and network providers as fixed infrastructure components

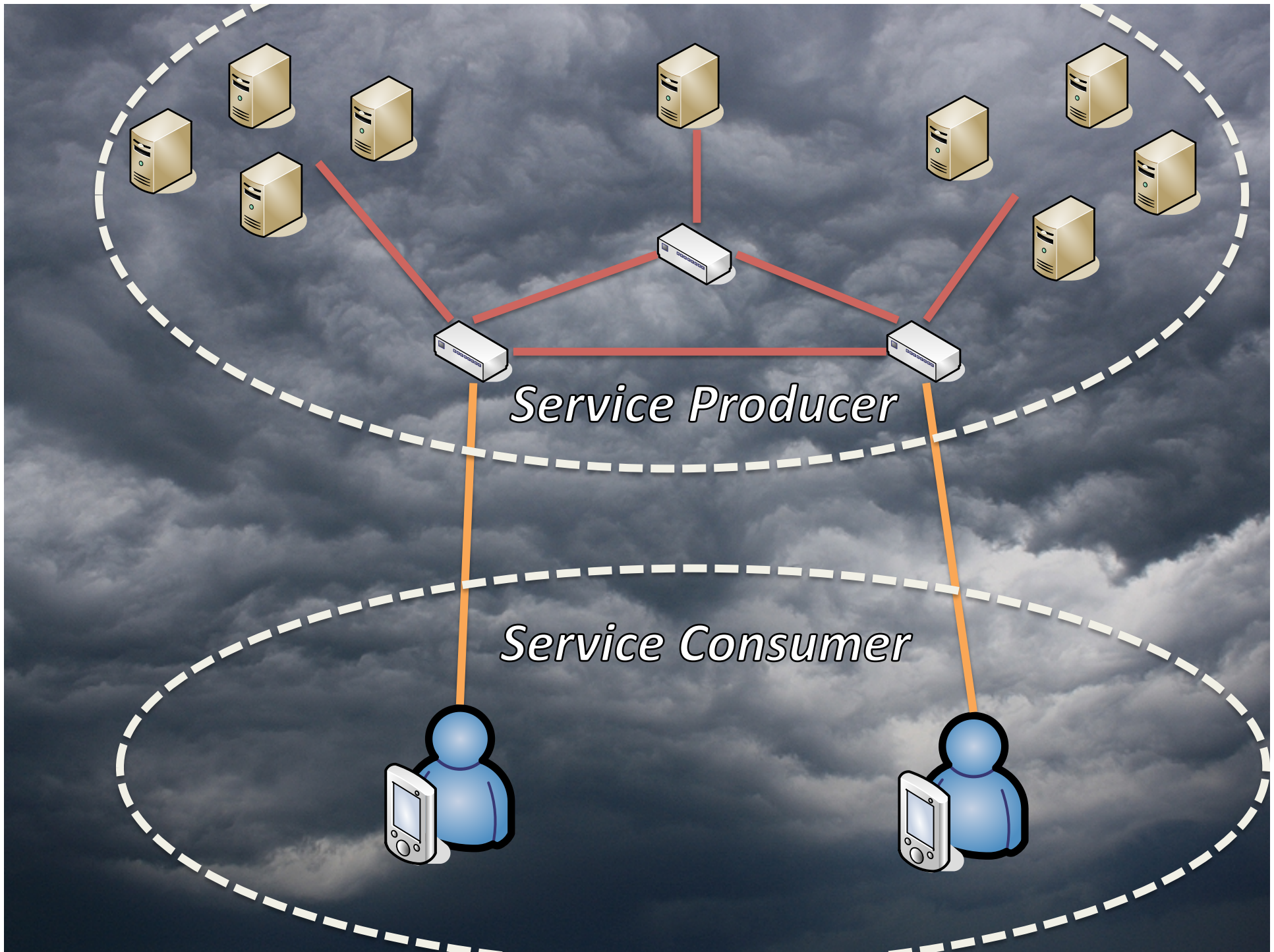


## Deploying to Services to Users:

- Web Apps (HTML5)
  - Limitations due to frameworks
  - Require always-on Internet connectivity
- App Stores (native)
  - Native apps: access to device features
  - Store operator as a gatekeeper

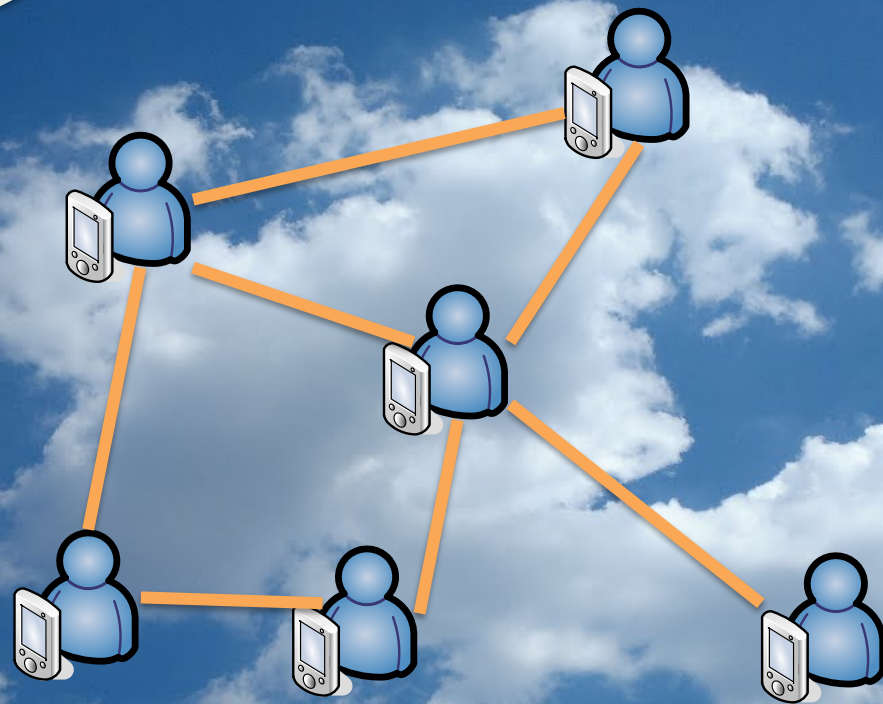












*Service  
Producer/Consumer*

## Autonomous Service Provisioning:

- Resources
  - Computing power (highly parallel)
  - Transmission capacity (short range)
  - Content stores (ephemeral)
- Role of Users:
  - Producers
  - Consumers

Person Finder: [Boston Marathon Explosions](#)

[I'm looking for someone](#)

[I have information about someone](#)

Currently tracking about 5100 records.

**Resources related to the 2013 Boston Marathon Explosions**

- Boston Mayor's Hotline for families of victims: 617-635-4500
- Boston Police line for witnesses who may have information: 800-494-8477
- [Red Cross Safe and Well](#)

PLEASE NOTE: All data entered will be available to the public and viewable and usable by anyone. Google does not review or verify the accuracy of this data.

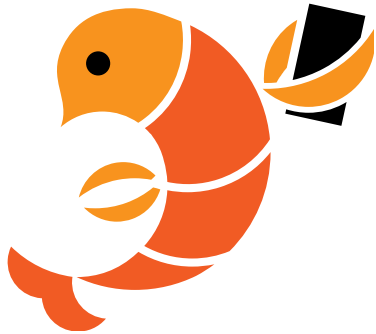
[About Google Person Finder](#) · [Developers](#) · [Terms of Service](#)

Person Finder: [Boston Marathon Explosions](#)

Identifying information	
<b>Name</b>	
Full name:	<b>hudson james</b>
Alternate names:	<b>jim jimmy</b>
<b>Physical characteristics</b>	
Sex:	<b>male</b>
Age:	<b>47</b>
<b>Home address</b>	
Street name:	
Neighborhood:	
City:	<b>runnemedede</b>
Province or state:	<b>nj</b>
Postal or zip code:	
Home country:	
<b>Source of this record</b>	
Author's name:	<b>liz hudson</b>
Author's phone number:	
Author's e-mail address:	
Original URL:	<a href="#">Link</a>
Original posting date:	<b>2013-04-15 23:53 UTC</b>
Original site name:	<b>google.org</b>
Expiry date of this record:	<b>2013-05-15 23:53 UTC</b>

[« Back to results list](#)

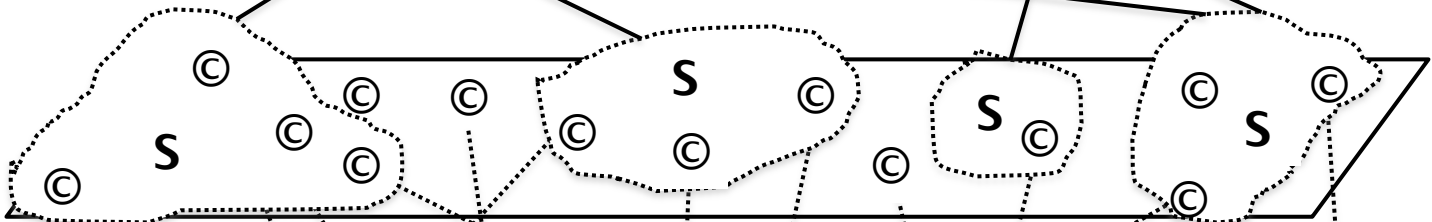
Tell us the status of this person	
<b>Status of this person</b>	
	<input type="text" value="Unspecified"/>
<b>Message (required)</b>	
A message for this person or others seeking this person	<input type="text"/>
<b>Last known location</b>	
Type an address or open the map below and indicate the location by clicking on the map.	<input type="text"/>
	<a href="#">Show Map</a>
<b>Photo</b>	
To attach a photo to this note, upload it or enter its URL.	
<input checked="" type="radio"/> URL:	<input type="text"/>
<input type="radio"/> Upload:	<input type="button" value="Choose File"/> No file chosen
<b>Have you personally talked with this person AFTER the disaster? (required)</b>	
<input type="radio"/> Yes	
<input checked="" type="radio"/> No	
<b>About you (required)</b>	
How others who are interested in this person can contact you	
Your name:	<input type="text"/>
Your phone number:	<input type="text"/>
Your e-mail address:	<input type="text"/>
Subscribe to updates about this person:	<input type="checkbox"/>



opportunistic  
service  
layer

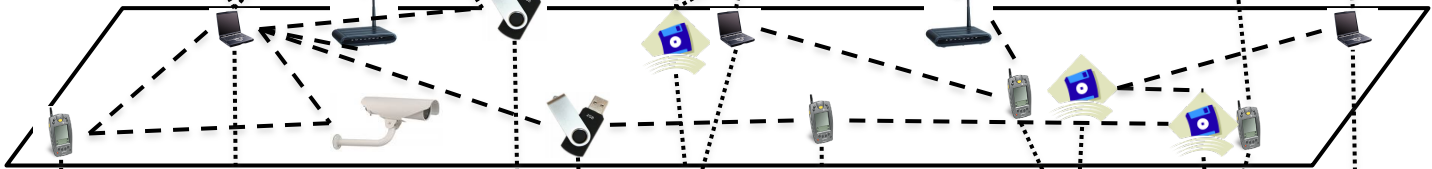
User Application

User Application

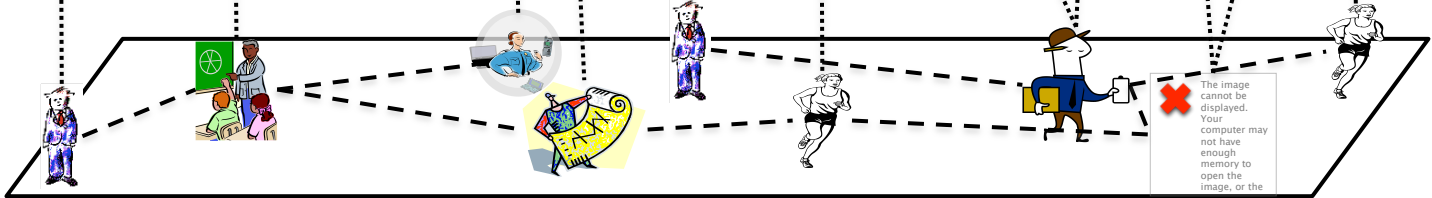


opportunistic pervasive networks

resources



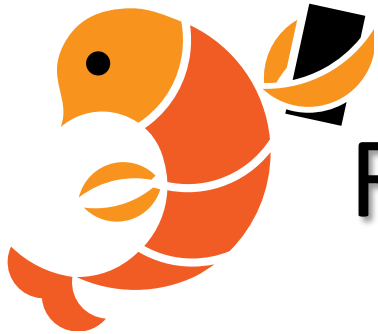
human  
social  
layer



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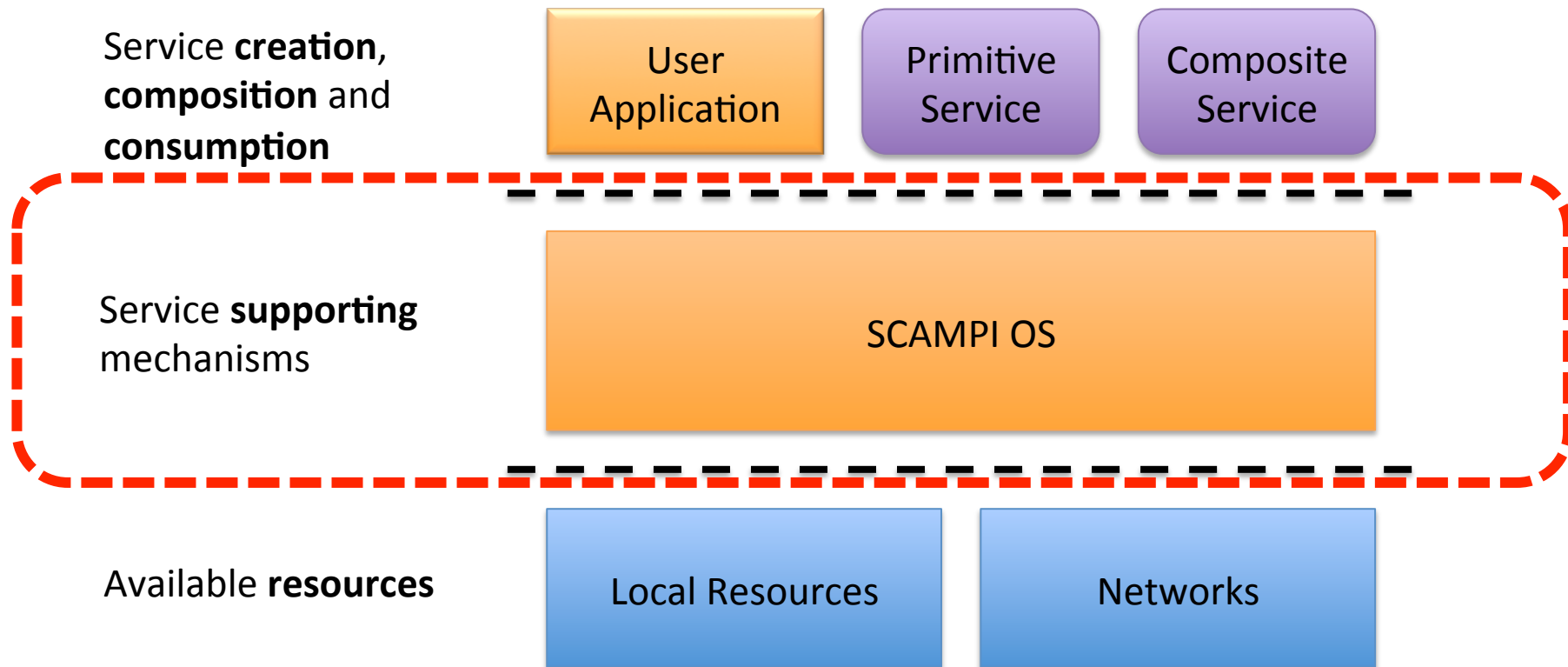
## Unique Challenges:

1. Resources are not fixed
  - Users enter and leave the surrounding area
2. Resources are not directly reachable
  - Multi-hop communication
3. Resources can be hard to discover
  - Discover – invoke can be too slow
4. Resources are on personal devices
  - Primary use is not service production

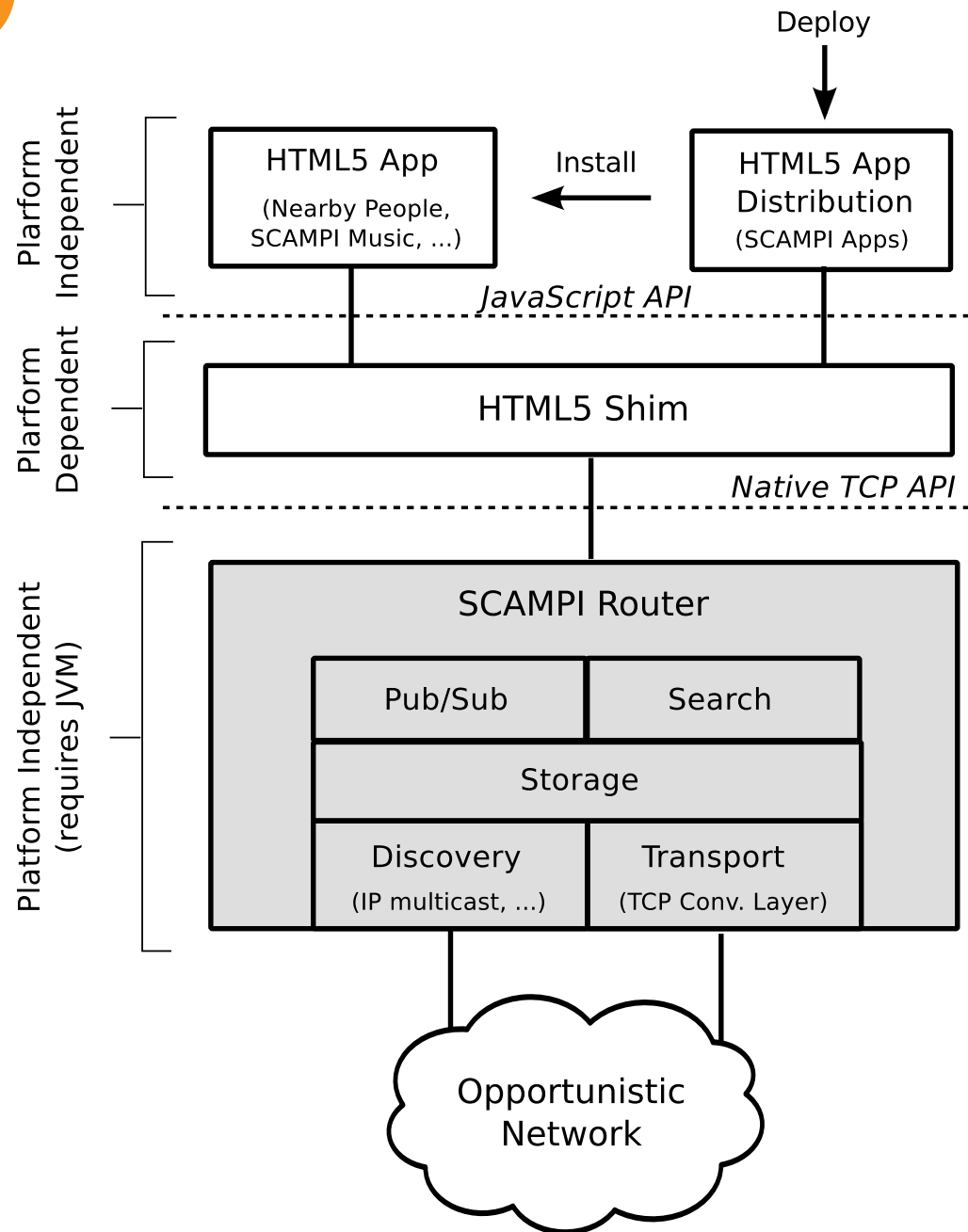
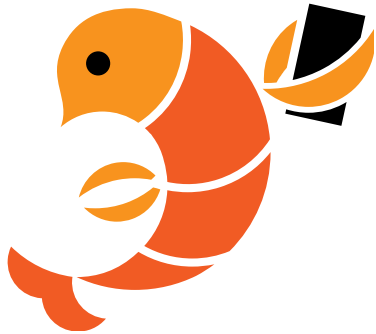


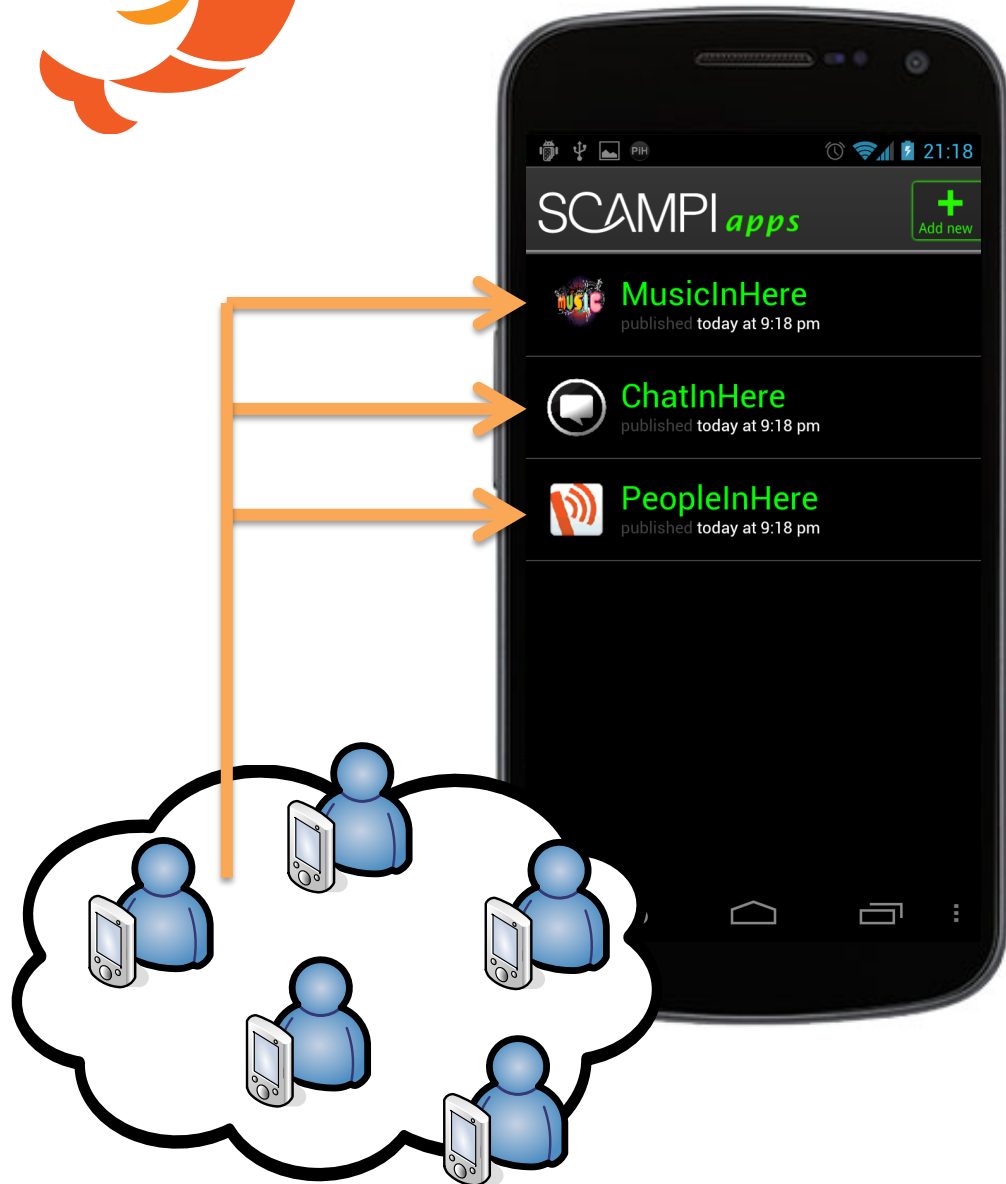
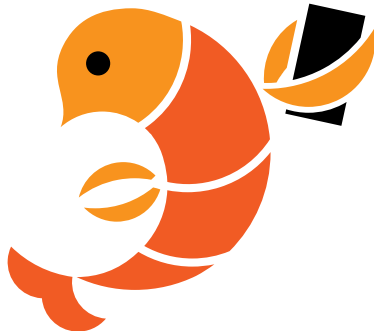
# Roles and Functions

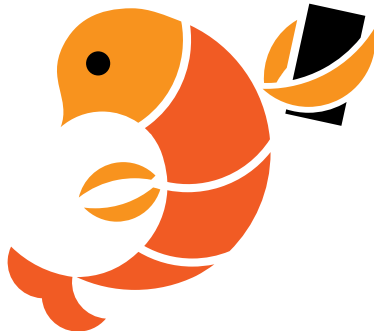
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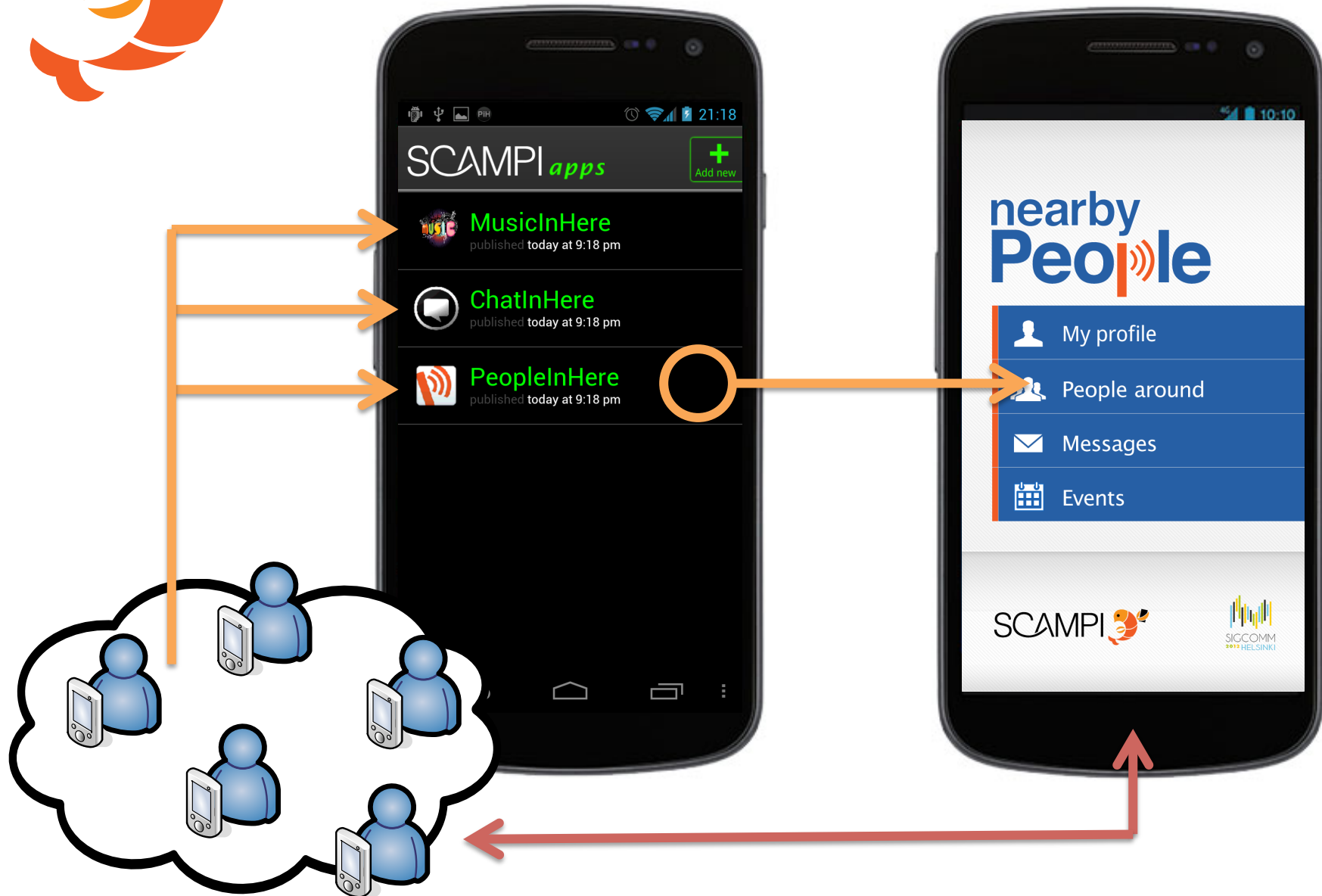
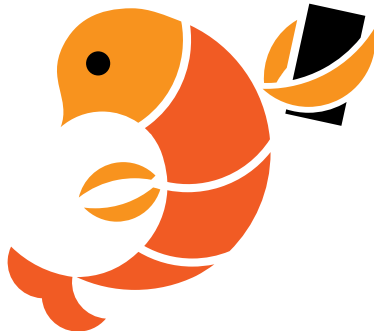










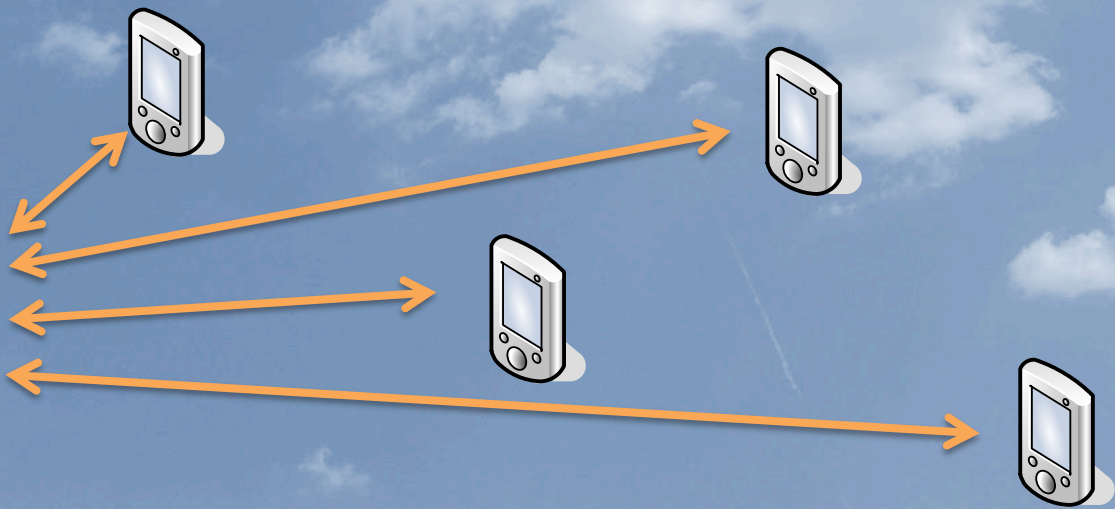
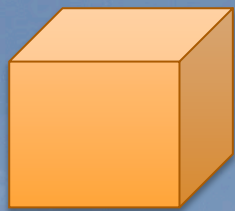
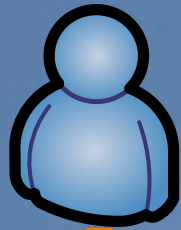




# CENSORSHIP RESISTANT MOBILE COMMUNICATION

Mobile, cheap, easy to *DIY replicate*, wireless, *guerrilla router* – online *parts* list, 3D printable *covers*, downloadable *software*.

*Android/iOS* mobile app.



### Component List

- Raspberry Pi
- USB WiFi ...

### DIY Instructions

- Building
- Configuring

### Misc

- 3D Printed Covers
- Power Options

### Software

- SCAMPI Router
- Linux Distro

**EVERYTHING ONLINE**

## Conclusions – Opportunities:

- *Should augment, not replace infrastructure*
- Possible Economic Benefits:
  - *Operators*: Offload from congested infra
  - *Manufacturers*: More value from the devices
- Enabler of Innovation:
  - New types of services
  - Rapid deployment without need for infra

## Conclusions – Challenges:

- Deep-seated Producer/Consumer model
- Lack of support in devices and OSs
- Centralization gives control and power
- Economic disincentive, fear of lost revenue



## Thank You!

- Some References:
  - “SCAMPI: Service Platform for Social Aware Mobile and Pervasive Computing”  
*SIGCOMM MCC 2012*
  - “SCAMPI Application Platform (demo)”  
*ACM MobiCom CHANTS 2012*
  - SCAMPI Project: [ict-scampi.eu](http://ict-scampi.eu)
  - Liberouter Project: [liberouter.pdp.fi](http://liberouter.pdp.fi)