



A Case for Research with and on Community Networks

Leandro Navarro, and many more
(leandro@ac.upc.edu)
UPC



Topics

- Confine – Community-lab.net
 - Ongoing work, opportunities for collaboration
 - Discussion about open call
- Community Clouds (Clommunity)
 - Concept, ongoing work
 - Discussion about directions and contributions



Ongoing work

- Software ... (equivalent to Planet-Lab)
 - redmine.confine-project.eu, wiki.confine-project.eu
- Virtualization:
 - LXC, libvirt, slices/slivers, software defined nets (OpenFlow)
- Monitoring:
 - Collection and aggregation of monitoring info about nodes and slices (local agent, monitor)
- Self-management:
 - Node centric policy enforcement, Lua-based domain specific language
 - Aggregation centric (nodes, slices)



Open call 1

LU	Confidentiality in the open “CONFINE world” (CONFINET)	Thomas Engel	University of Luxembourg
DE	Anonymous communication with unobservability (when submitting disclosures, AdLeaks)	Volker Roth	FU Berlin
PT	Wi-Fi network Infrastructure eXtension (WiFIX)	Rui Campos	Research institute (INESC TEC)
IT	Exploitation of information Centric network principles in wireLess cOmmunity NEtworks (CLONE)	Andrea Detti	Consorzio Nazionale Interuniversitario per le Telecomunicazioni (CNIT)
IT	Open Source P2P Streaming for Community Networks- OSPS	Renato Lo Cigno	University of Trento



Open call 2

- Open in 9/2013, 45 days (10/2013), evaluation, 1 year of work
- 750K €: 50K€-200K€ each (15-4 projs)
- Experiments with Community-Lab.net in call 1 (*after prototype*, covers experimentation, realistic validation)

Other models of participation

- Simplified application process to promote wider selection of participants



Questions, discussion

- Interest?
- Proposals: text
- Starting point (risk), ending with experimental evaluation
- Results



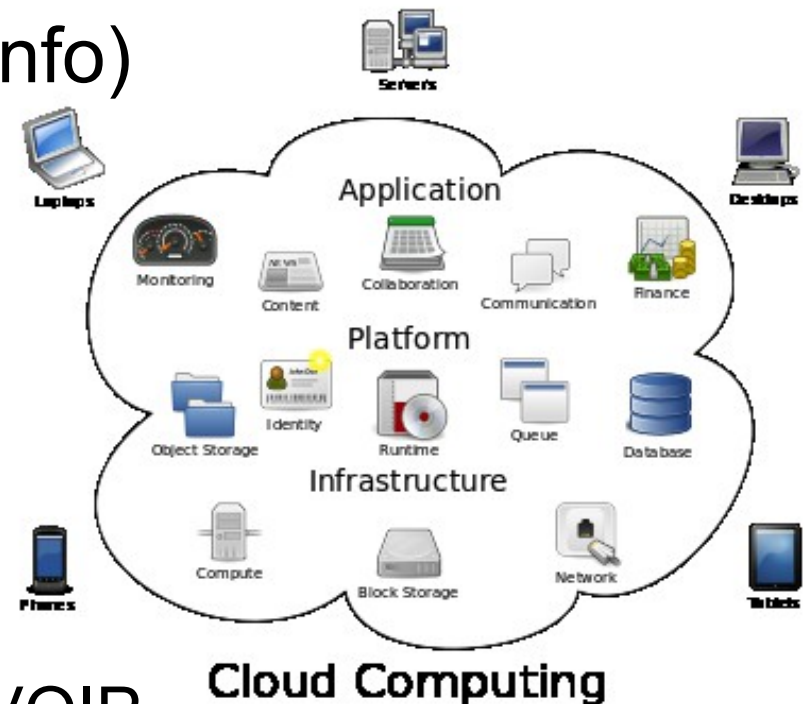
Community clouds

- Above IP networks, users contributed “servers”
- “Don't buy the services, be the services”
- Separation of:
 - Resource infra (nodes, links) management: slices, slivers
 - Platform services
 - Application services



Clouds

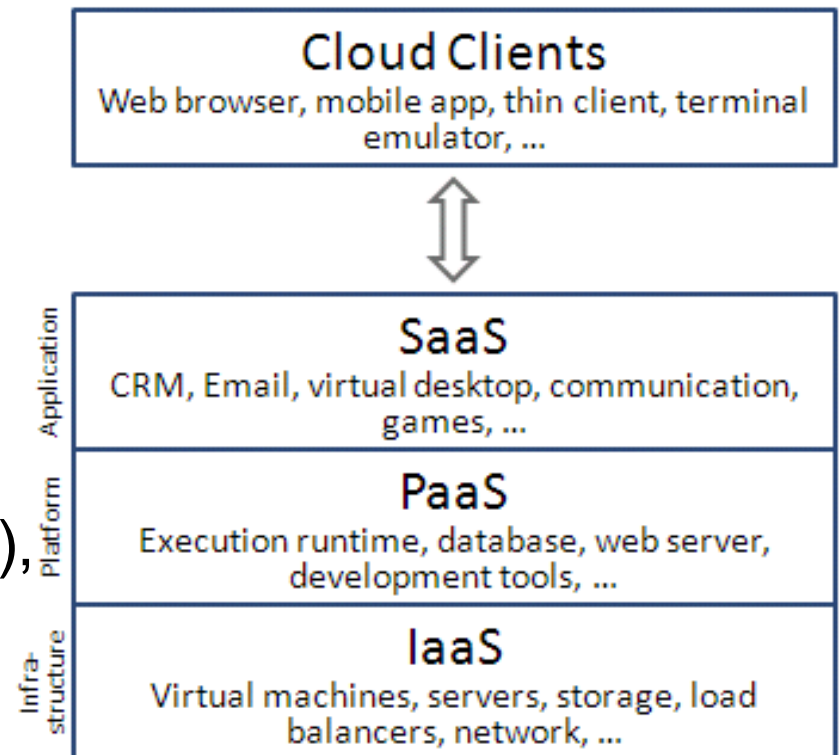
- Vertical (service=servers,local info)
- Horizontal (on top of, reuse)
- Community networks:
contribution of:
 - Nodes, links
 - Services: web proxies, trackers, VOIP
 - But also: storage, user info, node info, monitoring, configuration, etc.





Can we design this?

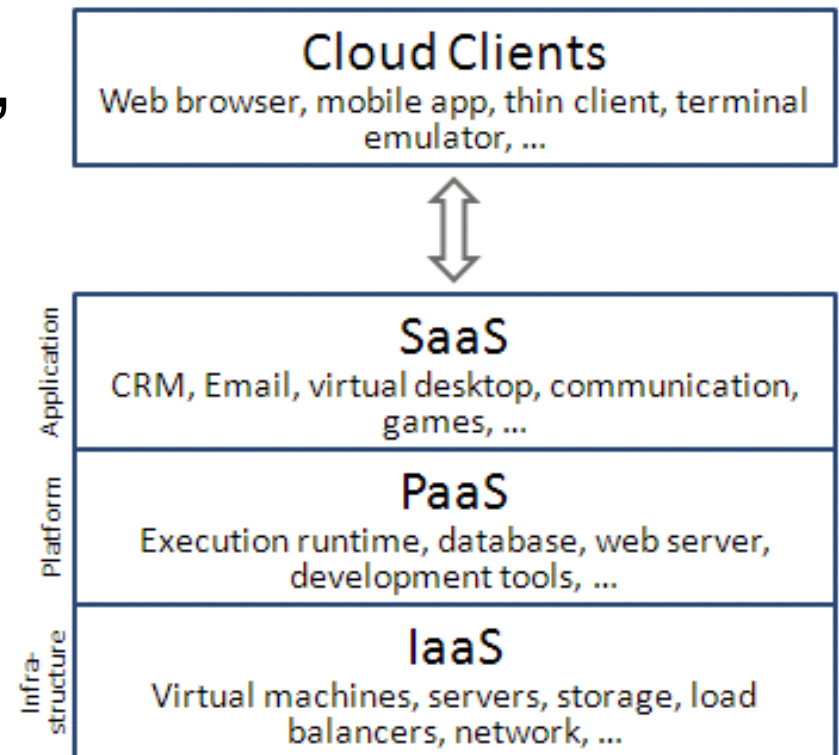
- Not really OpenStack like ... *CommunityStack*?
- IaaS: Community-Lab among other
- PaaS ideas:
- Storage, overlay streaming, locality, selection: balancing, self-man, elasticity, databases, directory, identity, ...
- App services:
- Interactive services (e.g. IM, VOIP), content distribution (e.g. Web, video), batch (sw updates, email), ...





For instance ...

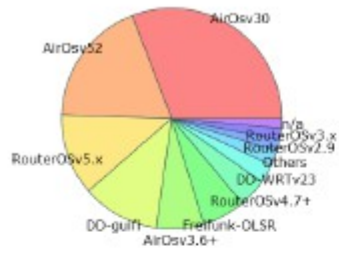
- Client: web browser, Android app
- SaaS: wiki, file service, video streaming, VOIP, web proxy
- PaaS: user db, object db, web server, other APIs
- IaaS: VM, storage, SDN, service discovery, load balancing



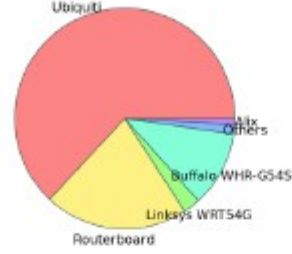


Challenges

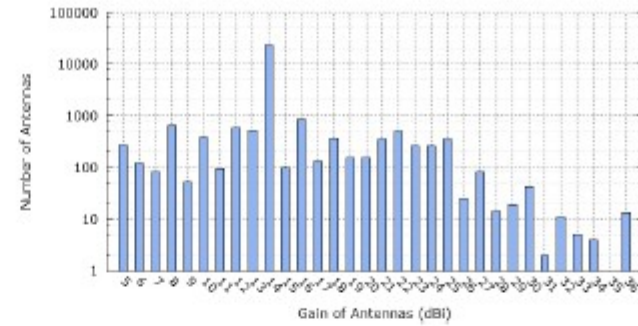
- Development ...
- Integration (segmentation to layers)
 - Use Infra, Platform services
- Federation (across community networks)
- Self-management, adaptiveness to change
- Lightness: no data-center like clouds but very many small “resources” (scalability)
- Participation model: you contribute net, processing, storage, operation



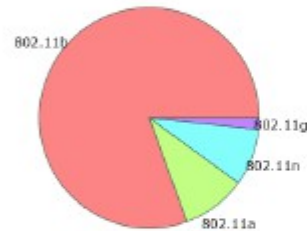
(a) Firmware



(b) Hardware



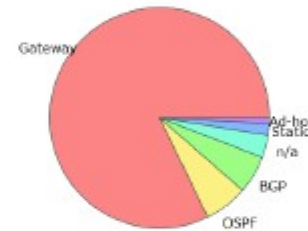
(c) Antenna



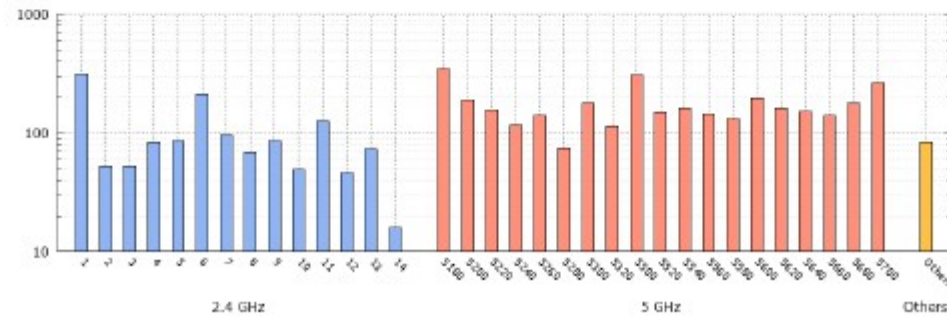
(d) 802.11 protocol



(e) Modes



(f) Routing



(g) Channels