PSIRP
Publish-Subscribe Internet Routing Paradigm
FP7-INFSO-IST-216173

DELIVERABLE D5.1

Project presentation

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Observation

Fundamentals of the Internet

- Collaboration
  - Reflected in forwarding and routing
- Cooperation
  - Reflected in trust among participants
- Endpoint-centric services
  (mail, FTP, even web)
  - Reflected in E2E principle

⇒ **IP, full end-to-end reachability**

vs.

Reality in the Internet Today

- Phishing, spam, viruses
  - There is no trust any more!
- Current economics favor senders
  - Receivers are forced to carry the cost of unwanted traffic
- Information-centric services
  - Do endpoints really matter?
  - Endpoint-centric services move towards information retrieval through, e.g., CDNs

⇒ **IP with middleboxes & significant decline in trust in the Internet**

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Hypothesis: Clean-Slate Design Required

- What stood at the beginning
  - Collaboration
  - Cooperation
  - Endpoint-centric services

  does not seem enough
- What about:
  - Trust?
  - Information centrism?
  - Legitimacy of E2E?
  - Role of overlays?

Clean-slate design…

- Question ALL fundamentals
- Challenge our thinking
- Take nothing for granted, including industry structures
- Clear vision

…with late binding (to reality)

- Consider migration and evolvability in separate work items
  - How to get our design into real deployments, e.g., overlay vs. IP replacement?
- Consider necessary evolution of industry (and regulatory) structures
  - How do industries need to evolve in certain scenarios?

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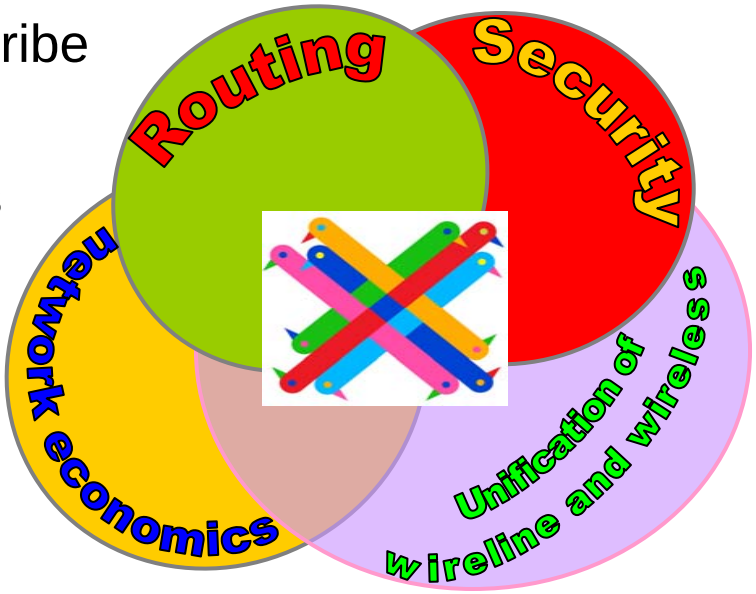
Vision

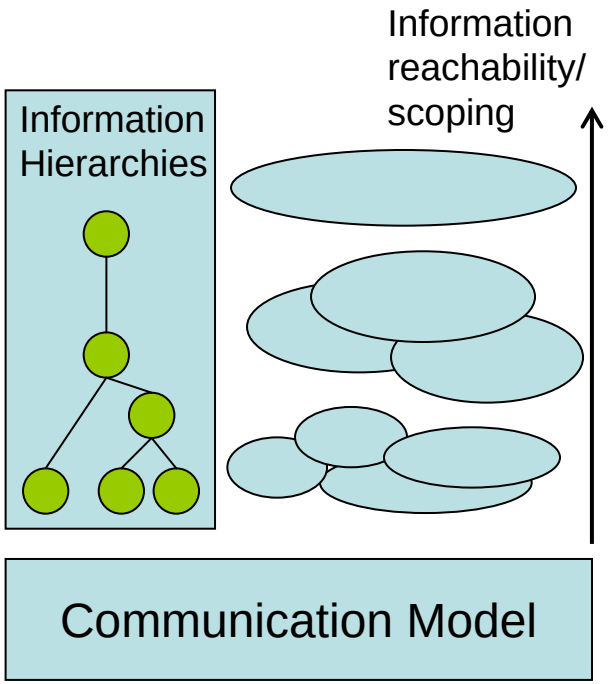
Envision a system that dynamically adapts to evolving concerns and needs of their participating users

- Publish–subscribe based internetworking architecture restores the balance of network economics incentives between the sender and the receiver
- Recursive use of publish-subscribe paradigm enables dynamic change of roles between actors



Main PSIRP design principles

- Information is multi-hierarchically organised
  - Higher-level information semantics are constructed in the form of directed acyclic graphs (DAGs), starting with meaningless forwarding labels towards higher level concepts (e.g., ontologies).
- Information scoping
  - Mechanisms are provided that allow for limiting the reachability of information to the parties having access to the particular mechanism that implements the scoping.
- Scoped information neutrality
  - Within each scope of information, data is only forwarded based on the given (scoped) identifier.
- The architecture is receiver-driven
  - No entity shall be delivered data unless it has agreed to receive those beforehand, through appropriate signalling methods.



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Potential Impact of our Work

User

- Relevant Information at your fingertips
  - Wherever, from whoever, through whatever access, on whatever device
- More natural form of communication
  - Emulates sensing, processing, actuation
- Ability to avoid information overload
  - Tackle attention scarcity problem
- Increased security & privacy
  - Only relevant information gathered & provided to user

Industry

- Entry of new players, e.g., information brokers & bankers, information processing providers
- Content providers likely to become more powerful
- New technology means potential for new business
- Increase in (information-centric) communication needs will increase need in solutions
- Enable cross-value chain scenarios
  - retail, health, finance, …

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Project Objectives

- Specify, implement and test an internetworked pubsub architecture
  - follow **clean-slate design** approach
- Perform qualitative and quantitative evaluation
  - Security and socio-economics important!
  - Migration and incentive scenarios important (e.g., overlay)!
- The results will be widely published
  - Open source code for the Future Internet
  - Targets specifically SMEs opportunities in Future Internet
- Engage with FI community
  - Cooperate with FIRE (Onelab2) to test on large scale
  - Engage openly through public Wikis

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Project Overview

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- Athens University of Economics and Business (GR)
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Contract Number: INFSO-ICT-216173

WP1 Management (TKK-HIIT)

WP2 Architecture Design (TKK-HIIT)

WP3 Implementation, Prototyping & Testing (LMF)

WP4 Validation and Tools (BT)

WP5 Dissemination and Exploitation (NSNF)

Project website: **www.psirp.org**