ITU Workshop on "Developments regarding telecommunication network architectures and services"

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Socio-Economic Aware Design of Future Network Technology (Y.FNsocioeconomic)

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Outline

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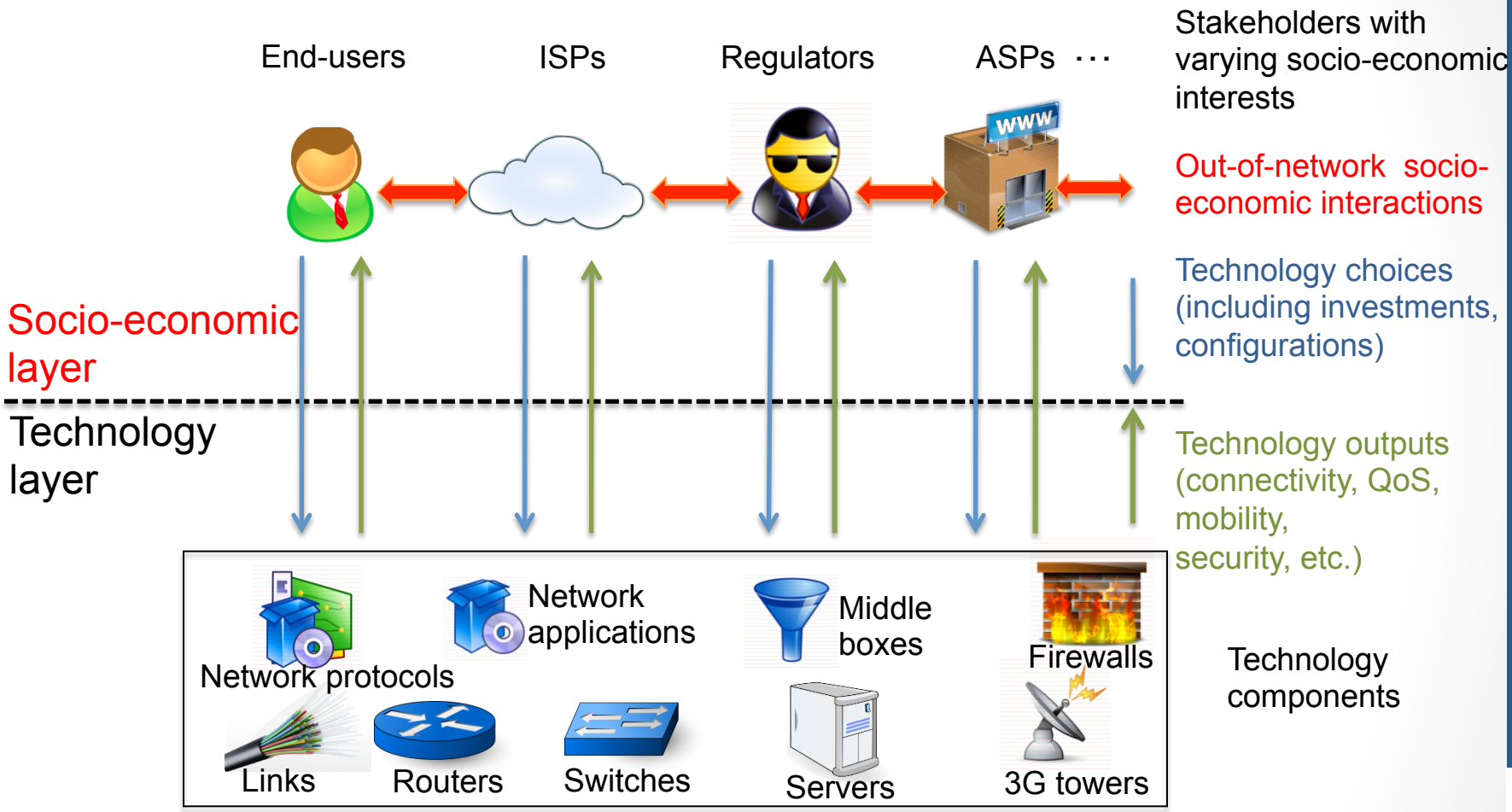
SESERV Goal

- Based on the fact that ICT contributes to social inclusion, economic development, sustainability:

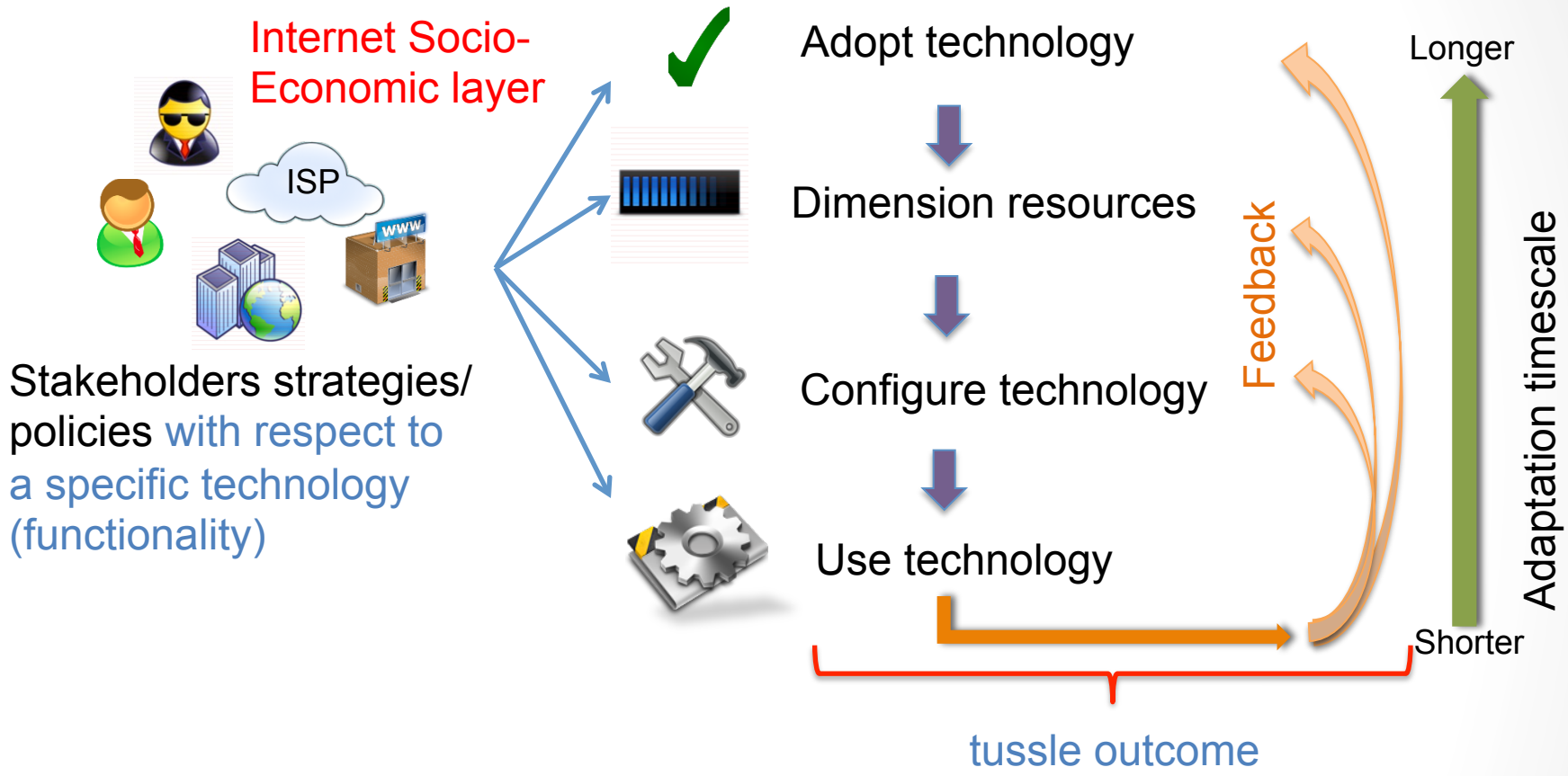
- SESERV shall bridge the gap between
  - Especially socio-economic (SE) priorities and
  - Research objectives of European ICT projects in FP7
- SESERV does offer a service that provides
  - An open access to SE and networking experts — **FISE Community**
  - Investigation methodologies for relationships between Future Internet technology, society, and the economy — **Tussle Analysis**
  - Knowledge and findings through research reports, workshops, and various research support on SE upon request — **Event Organization**

Socio-economic Awareness (1)



Socio-economic layer is governed by laws of socio-economics, while technology layer by laws of physics

Socio-economic Awareness (2)



At each stage conflicts of interest (incentives) may arise at the socio-economic layer.

The combination of actor strategies lead to a tussle outcome, characterized by stakeholders benefits.

Socio-economic Awareness (3)

- Traditional engineering goals (technology design)
  - Effectiveness
  - Efficiency
  - Modularity
  - Security
- Technology will reach multiple stakeholders
  - Different interpretations of goals
  - Different incentives
  - Different choices

tussles

- Understanding socio-economic aspects
  - Complete view on ecosystem
  - **Assess technology adoption and long-term success**

Design Goals and Objectives in Y.3001

- „Future Networks: Objectives and Design Goals“
- Objectives
  - Service awareness
  - Data awareness
  - Environmental awareness
  - Social and economic awareness
- Design goals
  - Service diversity
  - Functional flexibility
  - Virtualization of resources
  - Data access
  - Energy consumption
  - Service universalization
  - Economic incentives
  - Network management
  - Mobility
  - Optimization
  - Identification
  - Reliability

... to reduce barriers to entry for the various actors involved in the network ecosystem.
... to reduce life cycle costs in order for them to be deployable and sustainable.
... allow appropriate competition and an appropriate return for all actors

FNs are recommended to be designed to provide a sustainable competition environment for solving tussles among the range of participants in the ICT/ telecommunictaion ecosystem

Rationale: Many technologies have failed to be deployed, flourish, or be sustainable because of inadequate or inappropriate decisions of the architect, ...

Sufficient attention therefore needs to be paid to economic and social aspects such as economic incentives in designing and implementing the requirements, architecture, and protocol of FNs in order to provide a sustainable competition environment to the various participants

Scope of Y.FNsocioeconomic

- Y.3001 lists...
  - Candidate technologies
  - But no methods to achieve goals and objectives
- „Socio-Economic Aware Design of Future Network Technology“

This Recommendation lists methods to achieve socio-economic design goals and objectives for Future Networks (FNs). When a candidate FN technology is provided, the methods listed provide a structured approach

- *to anticipate at technology design time the socio-economic impact of the technology taking into account the relevant set of stakeholders, tussles emerging among them, and the range of available choices,*
- *to anticipate either a stable and incentives-compatible or an unstable outcome resulting from deploying the technology,*
- *to identify potential spillover (unwanted) effects from the technology's primary functionality to another functionality,*
- *and to help design technology for Future Networks that is in-line with the respective socio-economic design goals and objectives.*

Proposed Structure

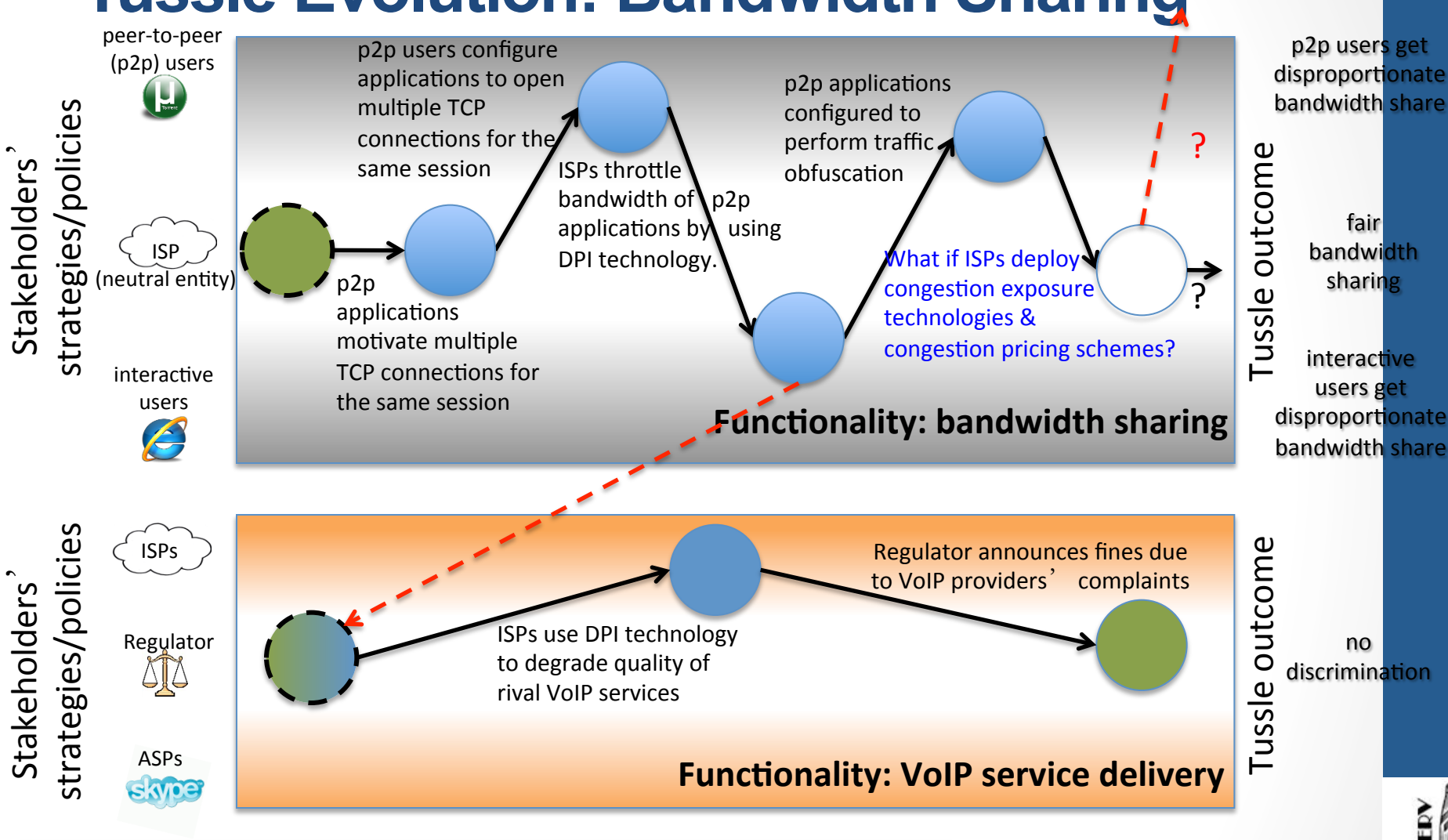
- Summary
- Scope
- References
- Definitions
- Abbreviations and acronyms
- Conventions
- Introduction
- Socio-economic Aware Deployment of Future Network Technology
  - Design for Tussle
  - Technology Deployment Cycle
  - Tussle Evolution
- Tussle Analysis
- Stakeholder Identification Methods
- Tussle Identification Methods
- Tussle Impact and Tussle Evolution Methods
- Appendix: Methods Overview

Tussle concept

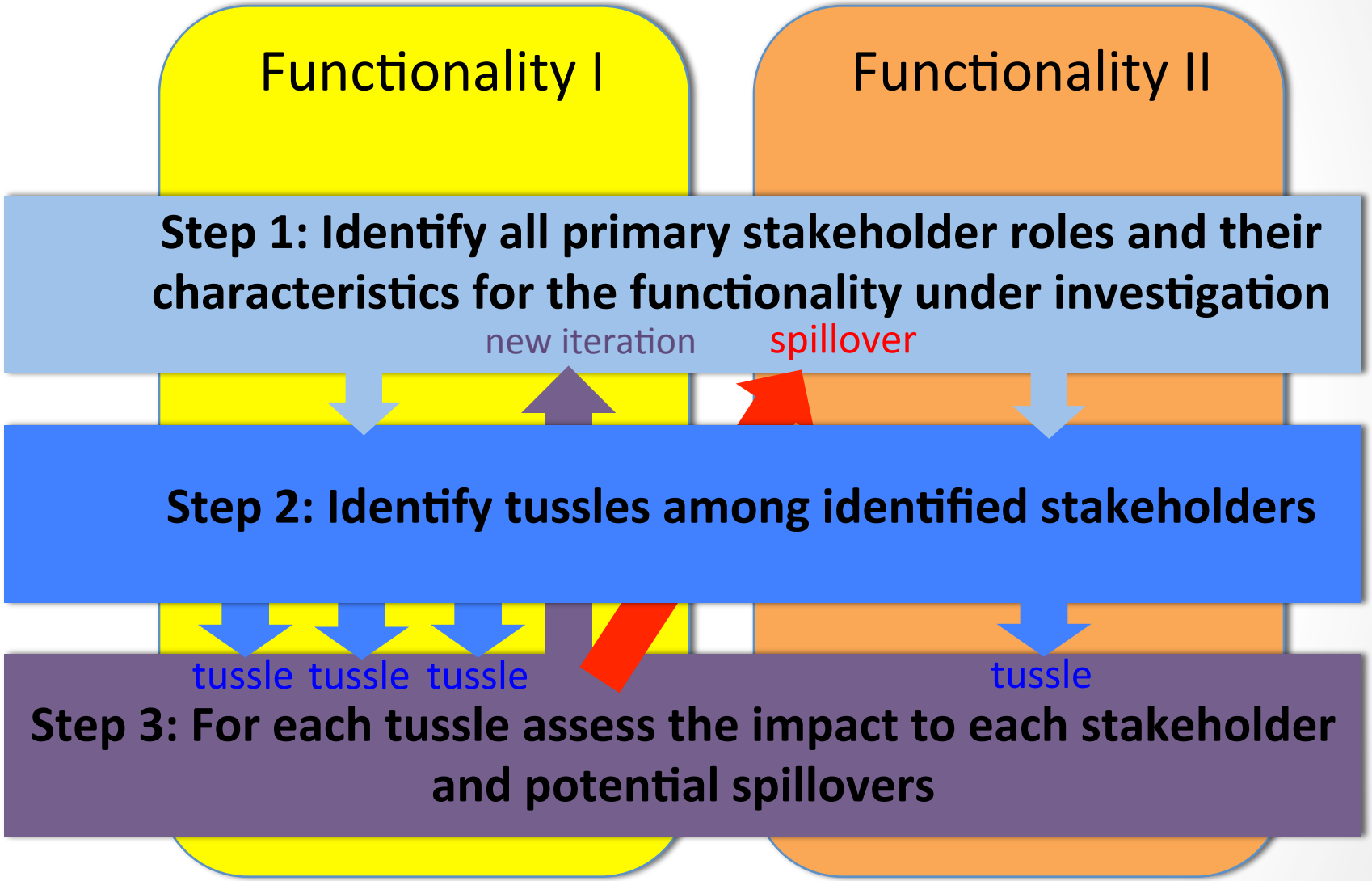
Meta-method

Methods to implement steps of tussle analysis

Tussle Evolution: Bandwidth Sharing



Tussle Analysis Meta-method



Methods Overview

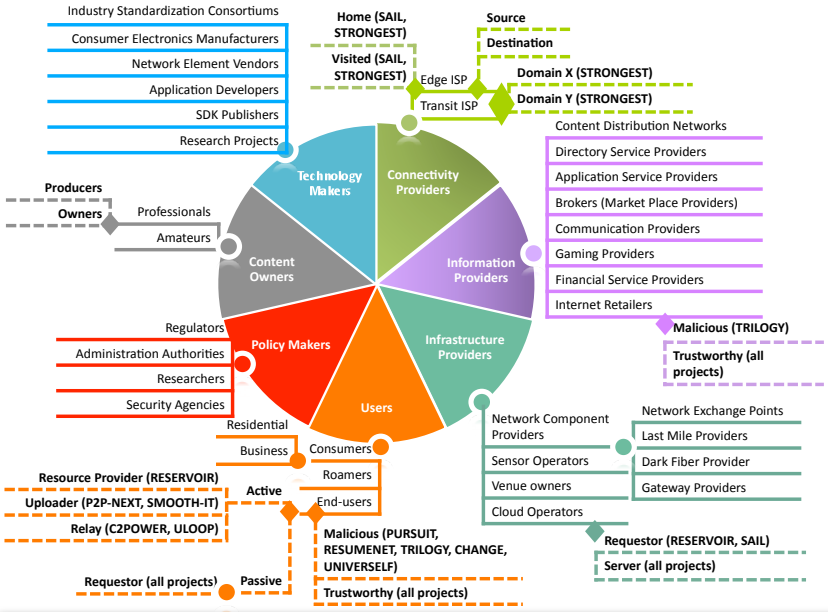
	Step 1: Stakeholder Identification	Step 2: Tussle Identification	Step 3: Tussle Impact and Tussle Evolution
Interviews	Highly relevant	Relevant	Relevant
Personal observation	Highly relevant	Highly relevant	Less relevant
Role-playing simulation	Relevant	Highly relevant	Highly relevant
MACTOR method	Prerequisite	Highly relevant	Relevant
SWOT analysis	Prerequisite	Relevant	Relevant
Game theory	Prerequisite	Prerequisite	Highly relevant
Risk management	Prerequisite	Highly relevant	Highly relevant
System dynamics	Prerequisite	Prerequisite	Highly relevant

Application Case (1)

- Focus Group
  - During SESERV workshop in early 2012
  - Case of technology developed by SAIL project

- Role-play simulation
  - Introduction into focus group format (moderator)
  - Technology presentation (project representative)
  - Stakeholder role assignment (10-15 participants)
  - Moderated tussle identification
  - Moderated tussle evolution
  - Transcription and analysis

Application Case (2)



Outcome for assessed Future Network technology: An important interface was missing in the technology design!

Stakeholders' strategies/policies

CP

Edge-ISP

Edge-ISP delivers CP's content over his localized CDN

CP identifies the degraded QoS and decides to announce IOs to other Name Resolution Servers, only

Edge-ISP is reluctant to update frequently the local caches to avoid increase of interconnection costs

What if the Edge-ISP and CP negotiate about update frequency?

Functionality: AAA (Security)

Edge-ISP inter-connection costs increase and loss of revenues out of the content delivery

CP sees degraded QoS and also may lose revenues (due to loss of customers)

Tussle outcome

Summary and Conclusions

- Engineers need to...
  - Be aware of socio-economic aspects of technology
  - Consider socio-economics in technology design
- For the goal of...
  - Long-term success by incentive compatibility
  - Assessment of adoption potential
  - Sustainable competition environment

- Recommendation Y.FNsocioeconomic
  - Methods to achieve socio-economic goals, objectives
  - Tussle analysis (meta-method)
  - Several methods to implement tussle analysis

Thank you for your attention!

Questions?