Economic System Design Framework: Two Sides of the Same Coin

Some early work on architecture and economic design
Architecture and Business Design: Two Sides of the Same Coin

- Where to place control points?  
  - …and where not?
- How flexible is my architecture solution?
- What business does it enable?  
  - and which ones it does not (and should not)?
- What to place on what layer?
- How to enable generality?
- How to maximize utility?
- …

- How survivable is my business?
- What strategy will sustain my business?
- Where can I extract value in my offering?
- What implements (architecturally) my strategy best?
- What makes my strategy worth trying?
- Who to partner with?
- How to be better than my competition?
- …
Desired: A Framework that Tightly Combines Architectural Design and Business Modeling

• Assume we had a framework that would combine architectural design and business modeling

• Assume that we had a tool that would allow for evaluating success and failure of business models and architectural designs

RESULT: Design solutions as a duality of strategic business planning and architectural design with measures for success and failure of propositions!
Three Usages

• Evaluate the markets created
  – Technical solutions create markets
  – Markets need to be understood since they create forces that impact the viability of the technical solutions
  -> extend the pure technical evaluation

• Evaluate possible design choices
  – Crucial functions have various design choices for realization
  – While technical ability to implement might restrict the set of possible choices, other socio-economic factors will further impact their viability
  – Impacts strategies for, e.g., alliances, standard activities, impl. efforts
  -> limit set of possible choices to be implemented

• Evaluate opportunities and threats
  – Solutions create opportunities and threats for existing and new players
  – Want to understand them to
    • advise stakeholders
    • facilitate adoption
  -> understand deployment, migration and value proposition
Concepts of the Toolkit

- Use Case
- Actors
- Components
- Services
- Control Points
- Control Point Constellations
- Triggers
- System Dynamics
- Evaluation
Usage: Market Evaluation

Example for a Future Internet Proposition
The Instrument: PSIRP - Designing an Information-Centric Internet

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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
Socio-Economic Evaluation Within PSIRP

• PSIRP develops (architectural) solutions for a global-scale internetworking architecture

• Need to understand markets created, opportunities and threats created, design choices made

-> design becomes a two-sided process, i.e., a technical and a socio-economic process

-> toolkit provides combines these two views
Starting Point: A Different Internet

• Information identifiers, no endpoint identifiers
  – Stick identifiers to any piece of information (e.g., a picture)

• Information networks
  – Group information into networks (e.g., family), called scope

• Publish information
  – Only needs information identifier and scope

• Subscribe to information
  – Only needs information identifier and scope
Matching Information Availability and Interest in Large-Scale: A Strawman Proposal
Market Questions

• How many of these overlays will exist?

• How many RENEs will exist?

• To how many overlays is each RENE connected?

• How fragmented is the interconnection?

-> use the toolkit to answer these questions
No. of Interconnection Overlays

- Ubiquitous interconnect
- Commoditization
- De-valuation
- Commercialization
- Consolidation
- Dominant Search Engines
- One Dominant Player
- Market interest
- Initial deployment
- Initial deployment
- No. of Interconnection Overlays

- One Dominant Player
The number of RENE networks is indicative for the 'regional' character of resolving SId queries since it is assumed that RENE networks are formed under some 'regional' notion, such as geography, local peering relations, ... (more under the notion of 'region' following Sollins, not restricted to geography).
Causal Loops: Number of Overlay Providers

- end user concerns for competition
- incentive to interconnect
- cost pressure
- change in memory performance
- change in processing performance
- desire to not interconnect
- concerns for information visibility
- public pressure
- concern for competition
- concerns for rendezvous interconnection

Interconnection overlays

entrants

exits
Conclusions

• Architecture design without socio-economic angle is futile
  – Evaluate against technical parameters only is not desirable

• Socio-economics can helps us in crucial areas
  – Understand the markets we create
  – Understand the viability of design choices
  -> understand the viability of the design in a larger context!

• Toolkit provides a guidance towards SD models
  – First course with students show quick results

• First results promising