Software Ecosystem

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(Our slogan is “Keep it light”)
Ecosystem

• An ecosystem is generally an area within the natural environment in which physical factors of the environment, such as rocks and soil, function together along with interdependent organisms, such as plants and animals, within the same habitat [1].
Map: Natural Ecosystems (land)
Symbiosis

• Close and often long-term interactions between different biological species [2].

The fish protects the anemone from anemone-eaters, the anemone protects the fish from fish-eaters
Different relationships

- **Mutualism**: Both systems benefit from the relation
- **Commensalism**: One system benefits, the other is unaffected
- **Parasitism**: One system benefits, the other is harmed
Relationships (cont.)

- **Amensalism**: One is harmed, the other is unaffected
- **Competition**: Both the systems are harmed by the relation
- **Neutralism**: Both are unaffected
SECO

• A software ecosystem (SECO) is defined as a set of actors functioning as a unit and interacting with a shared market for software and services, together with the relationships among them.
Relationships (Symbiosis) in the SECO

• What are the relationships apparent in software world??
Relationships (Symbiosis) in the SECO

- What are the relationships apparent in software world????
  - Mutualism
  - Neutralism
  - Commensalism
  - Competition
Relationships (Symbiosis) in the SECO (cont.)

- Possible symbiotic relationships between Linux and other software systems
In the software world

• The open source movement
  – Different pro-profit companies support open-source projects for their own benefit
In the software world (cont.)

• Adaptability and survival of the fittest (Origin of Species by Means of Natural Selection – Charles Darwin)
Challenges in Software Ecosystems
SECO Scope Levels

• The software supply network (SSN) scope level:
  ▪ The objects of study are the actors and their relationships

• The SECO scope level:
  ▪ The objects of study are the SSN’s and their different relationships.

• The SECOs scope
  ▪ The objects of study are the SECOs themselves, and the relationships among them.
SECO Scope Level

SSN

SECO

SECO’s
SSN Example
SECO Challenges

• SECOs introduce many new research challenges on both a technical and a business level.

• Software vendors are now facing the challenge of opening up their products, interfaces, their knowledge bases, and in some cases even their software.
Software Ecosystem Perspectives

Vendors establish the effects of the SECO on their product and service portfolio, knowledge management, and relationship management.

Software vendors determine strategies in regards to their immediate buyers and Suppliers.

Strategic choices must be made on how a software vendor behaves in a SECO to maximize profitability.
Software Vendor Level

- Portfolio and Product Line planning
- Knowledge Management.
- Architecting for extensibility, portability, and variability.
- Development organization system integration.
Software Supply Network (SSN)

- Establishing relationships in a SSN
- Release heartbeat and release timing
- Managing quality in the SSN.
The software ecosystem level

- Characterization and modeling of SECOs.
- Developing policies and strategies within SECOs for SECO orchestration
- Determining a strategy to thrive and make profit in an SSN
Hot Research in SECO

- Formalization 😞
- Modeling
Parallelism between software and biological world

- ‘bits’ are similar to ‘particles’, ‘primitive encoded data’ (e.g. ASCII coded data) to ‘atoms’ (e.g. H,O,N or C) and ‘non-primitive data types’ (e.g. String) to ‘molecules’ (e.g. water).
- Lists, arrays or XML structures to polymers.
- OOP platform such as Java is similar to ‘genome’, library to ‘chromosome’.
- OO executable programs are biologically equivalent to biological cells.
- Data is considered as ‘matter’.
- OO component/patterns are equivalent to biological tissues, OO frameworks to ‘organ systems’ and software applications to living organisms.
- OO e-business applications are considered as population/community and business/internet ecosystems as natural ecosystems.
References