The On-boarding Experience and Software Ecosystem Health

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Ecology: The Natural Ecosystem

Ecology relates to the Interactions of Organisms and their Environment

Interactions ▶ Socio-technical Activities
Organisms ▶ Contributor/Community-member
Environment ▶ Ecosystem

Tsilia yotova. [1]

From Natural Ecosystem To Software Ecosystem

**Niche:** an organism’s physiological adaptation to, and interaction with, the environment.

From Natural Ecosystem To Software Ecosystem

Biodiversity: variety and variability of life on Earth ➜ SECO projects/skills

Keystone organisms (Mentors) influencing the behaviours and adaptation of other organisms.

Organisms as Ecosystem Engineers. In: Ecosystem Management. Springer, New York, NY
From Natural Ecosystem To Software Ecosystems


https://images.app.goo.gl/y4ahym82p64SWZEZA
Software Ecosystems (SECO) are Human-Centric

Step 1
Niche Creation in Software ecosystem

The Importance of Keystone organisms (Mentors & Experts), influencing the behaviours and adaptation of other organisms.

Amorim et al. (ACM, 2017)
The Architect's Role in Software Ecosystems Health.
In Proceedings of the 2nd Workshop on Social, Human, and Economic Aspects of Software (WASHES '17)
Software Ecosystems (SECO) are Human-Centric

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Software Ecosystems (SECO) are Human-Centric

Step 1
- Enthusiastic
- Volunteers
- Hired

Step 2
- Project Team

Step 3
- Project Teams forming an Ecosystem
Software Ecosystems (SECO) is Human-Centric

Adaptation occurs in every step. We investigate three Niches.

Niche: Volunteers

Niche: Enthusiastic

Niche: Hired

Project Teams forming an Ecosystem

Step 1

Step 2

Step 3
The Evolution of Niche in Software Ecosystems

Niche:

Three variants of ecological niche:
The Evolution of Niche in Software Ecosystems

Mostly during Onboarding

**Grinnellian**: determined by organism’s habitat and its behavioural adaptations.

Three variants of ecological niche:
The Evolution of Niche in Software Ecosystems

Niche:

**Grinnellian**: determined by organism’s habitat and its behavioural adaptations.

**Hutchinsonian**: explain how organisms coexist within a given

Mostly during Onboarding

Mostly during joint-collaboration

Three variants of ecological niche:
The Evolution of Niche in Software Ecosystems

**Niche:**

- **Eltonian:** encourages organism growth within its environment and also, alters the environment and its behaviour as it grows.
- **Hutchinsonian:** explain how organisms coexist within a given
- **Grinnellian:** determined by organism’s habitat and its behavioural adaptations.

Three variants of ecological niche:
Health is a state of *complete* physical, mental and social well-being and not merely the absence of disease

https://www.who.int/about/who-we-are/constitution
SECOHealth

Comprises a complete physical (interdependent project teams), mental (teams are intellectually capable of challenges) and social well-being (Socio-technical interactions) and not merely the absence of bugs/toxicity, code/community.
“Consider SECO as a living organism, whose constituent software projects are the vital technical systems that need to perform “normally” to have a healthy ecosystem, and whose community is healthy if all community members are functioning well within a community.” [1]

SECO Health Issues

Technical Debt & Code Smells
- Bugs, Deprecated Components
- Dependency Hell
- Security Risks & Vulnerabilities

Bus Factor & Contributor Abandonment
- Toxicity, Community Smells, Social Debt
- Contributor Diversity (Gender; Seniority; …), Popularity

Elephant Factor
- Company Involvement, Organizational Diversity,
- Organizational Structure, Distributed Structure,
- Policies, Standards

Code of Conduct
- Demographic / Ethnographic/
- Cultural Diversity

Towards an interdisciplinary, socio-technical analysis of software ecosystem health.
Ecosystems Can Benefit From CHA OSS Metrics To Measure Its Health.

https://chaoss.community

Specialized Working Groups:

Common Metrics

Diversity and Inclusion

Evolution

Risk

Value
onboarding | /ˈɒnˌbɔːrdɪŋ/

noun | [mass noun]

the action or process of integrating a new employee into an organization or familiarizing a new customer or client with one’s products or services:

after the initial onboarding is complete, continue to offer new hires relevant training and development opportunities | client onboarding is a critical time for any business | [as modifier]: a little extra effort during the onboarding period can go a long way towards improving staff retention.
Onboarding Experience; OpenStack OUI
Promoting A Health Ecosystem.

Participants create Accounts and configure their local system

Diverse population
We Study Each Period in The Timeline for three yrs and Set a Baseline

Category #1
After Onboarding & participated!

Category #2
After Onboarding, didn’t participate
Evolution of Contributors towards first commit

Before

Gender Survival Rate Towards First Commit Before Onboarding

After

Gender Survival Rate Towards First Commit After Onboarding

p = 0.2

p < 0.0001
Contributors Submitted Successful Patches With Less Effort After Onboarding

Effort to contribute successful patches

\[ \text{Effort} = \frac{\text{Number\_Of\_Attempts}}{\text{Actual\_Commits}} \]
Observations
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We observe that people who participated in an onboarding training on average took less time to have their patch set accepted.
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Also, findings suggest that onboarding has a positive impact on the health of OpenStack, through gender diversity and inclusion across different releases.
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There are strong evidences of joint contribution among participants (Novice-Novice collaboration) and between participants and mentors (Novice-Expert collaboration).
Niche: Natural Ecosystem
In Sum

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Niche: Natural Ecosystem

- Sunlight and heat
- Termite mounds
- Rotting log
- Algae
- Insects
- Protozoans
- Bacteria
- Plankton
In Sum

Niche: Natural Ecosystem

Diversity and Inclusion
Evolution; Survival
Cross-community collaboration
Niche: Natural Ecosystem

In Sum

Diversity and Inclusion
Evolution; Survival
Cross-community collaboration
In Sum

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Evolution; Survival
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