

# The On-boarding Experience and Software Ecosystem Health

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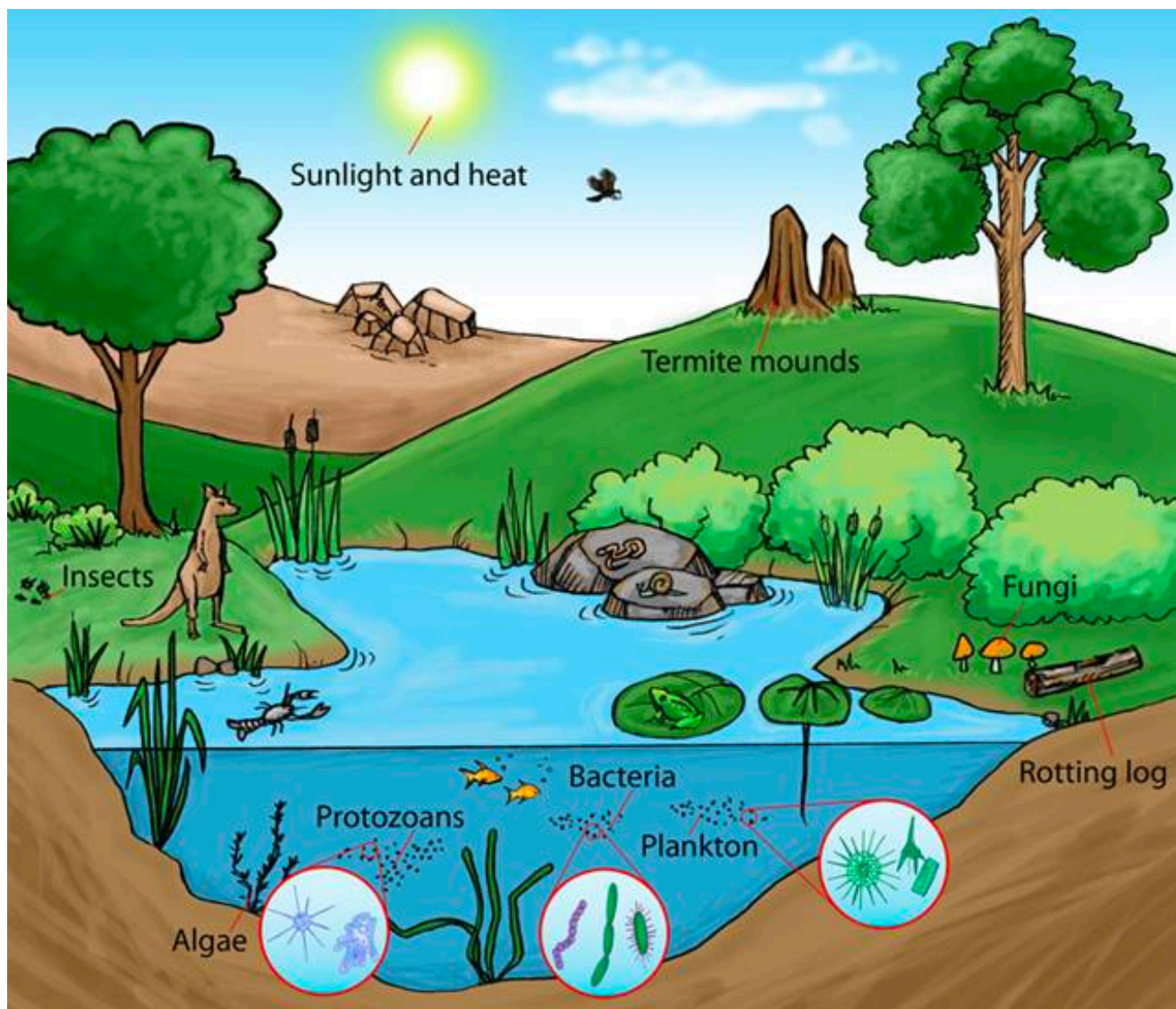
August 20,21 - 23, 2019 | Hilton San Diego Bayfront | #ossummit

# Ecology: The Natural Ecosystem

Ecology relates to the Interactions of Organisms and their Environment

SECO

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



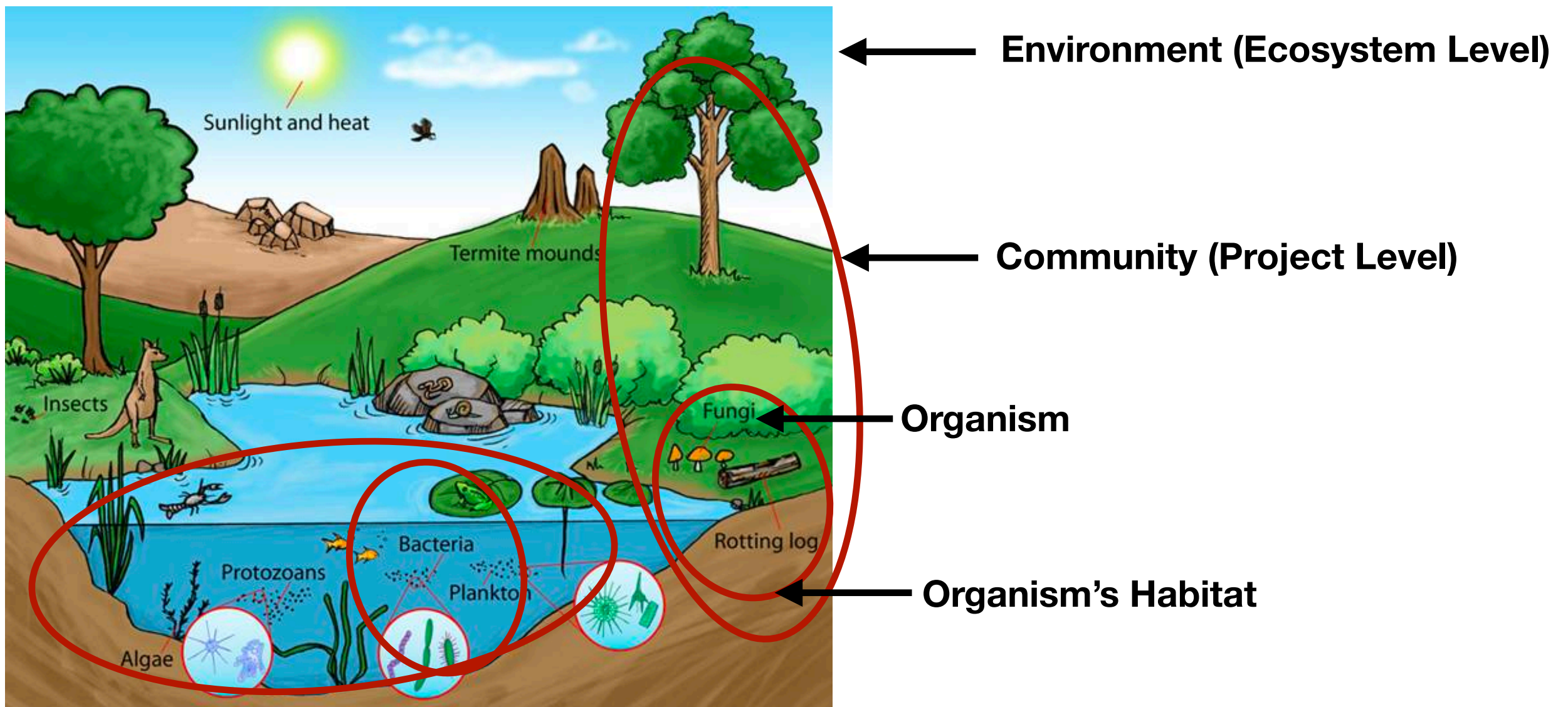
Tsilia yotova. [1]



# From Natural Ecosystem To Software Ecosystem

**Niche:**

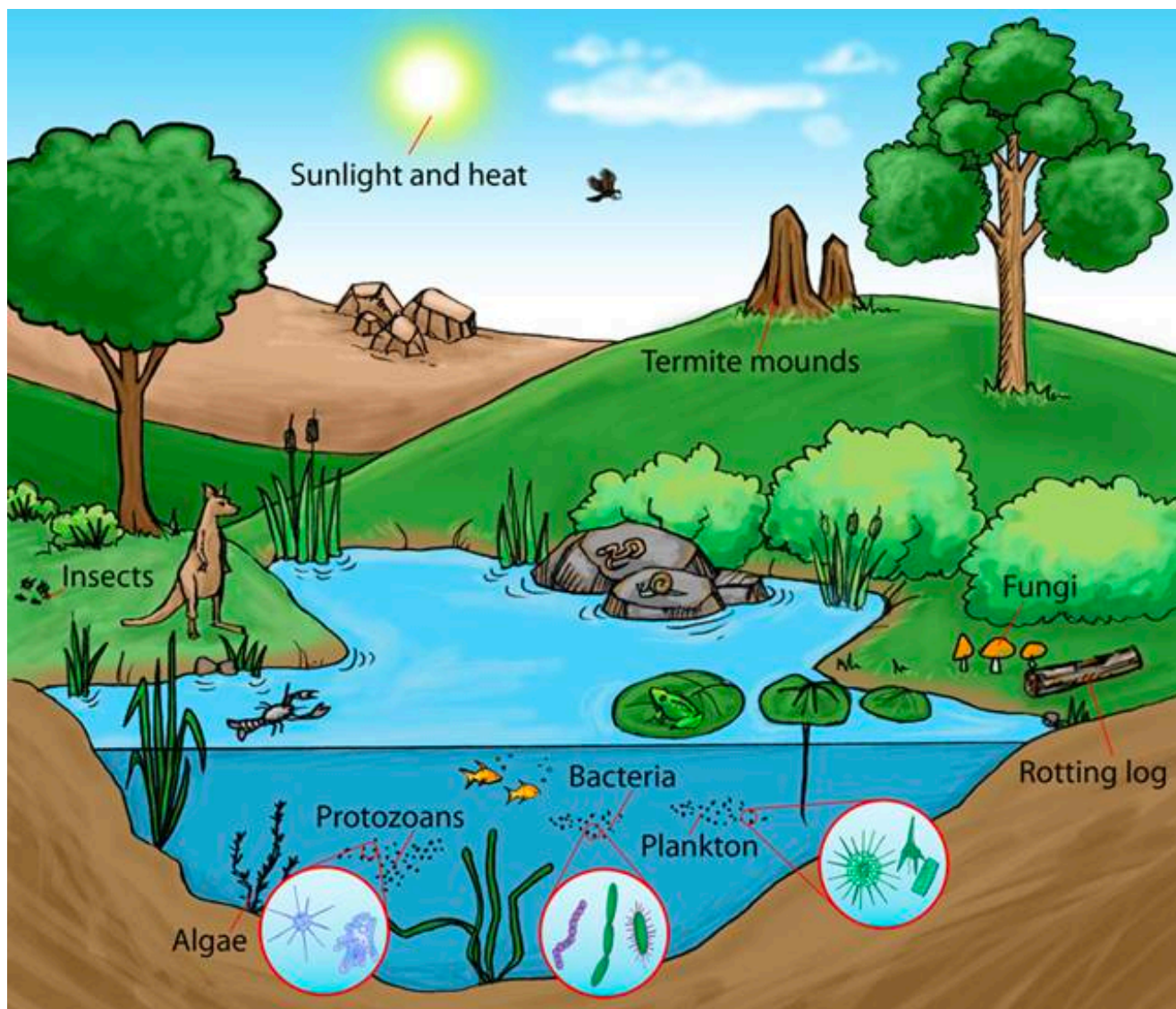
an **organism's** physiological adaptation to, and interaction with, the **environment**.



Pocheville, Arnaud (2015).  
"The Ecological Niche: History and Recent Controversies".  
Springer. pp. 547–586.

# From Natural Ecosystem To Software Ecosystem

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



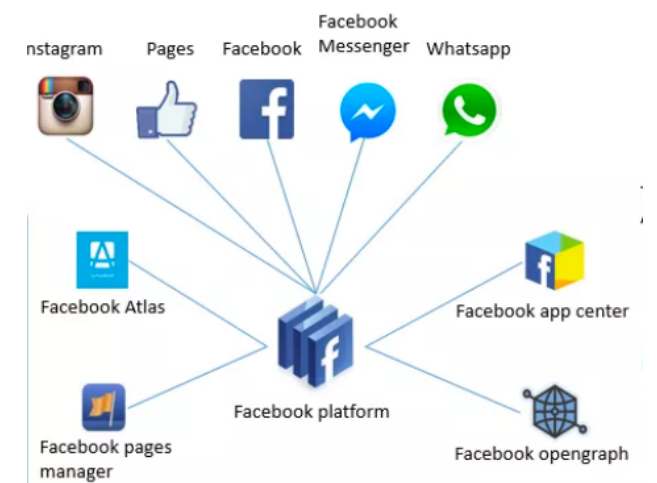
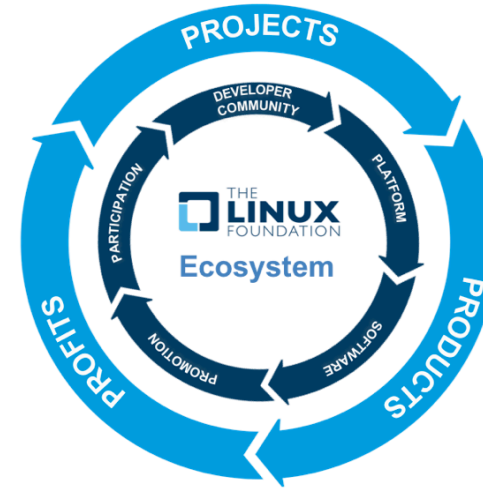
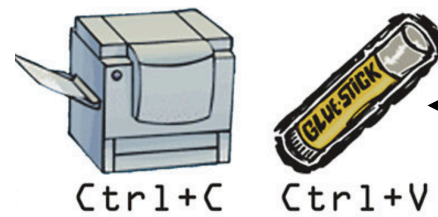
**Keystone organisms (Mentors)**

influencing the behaviours and adaptation of other organisms.

Jones C.G., Lawton J.H., Shachak M. (1994)  
Organisms as Ecosystem Engineers. In: Ecosystem Management. Springer, New York, NY



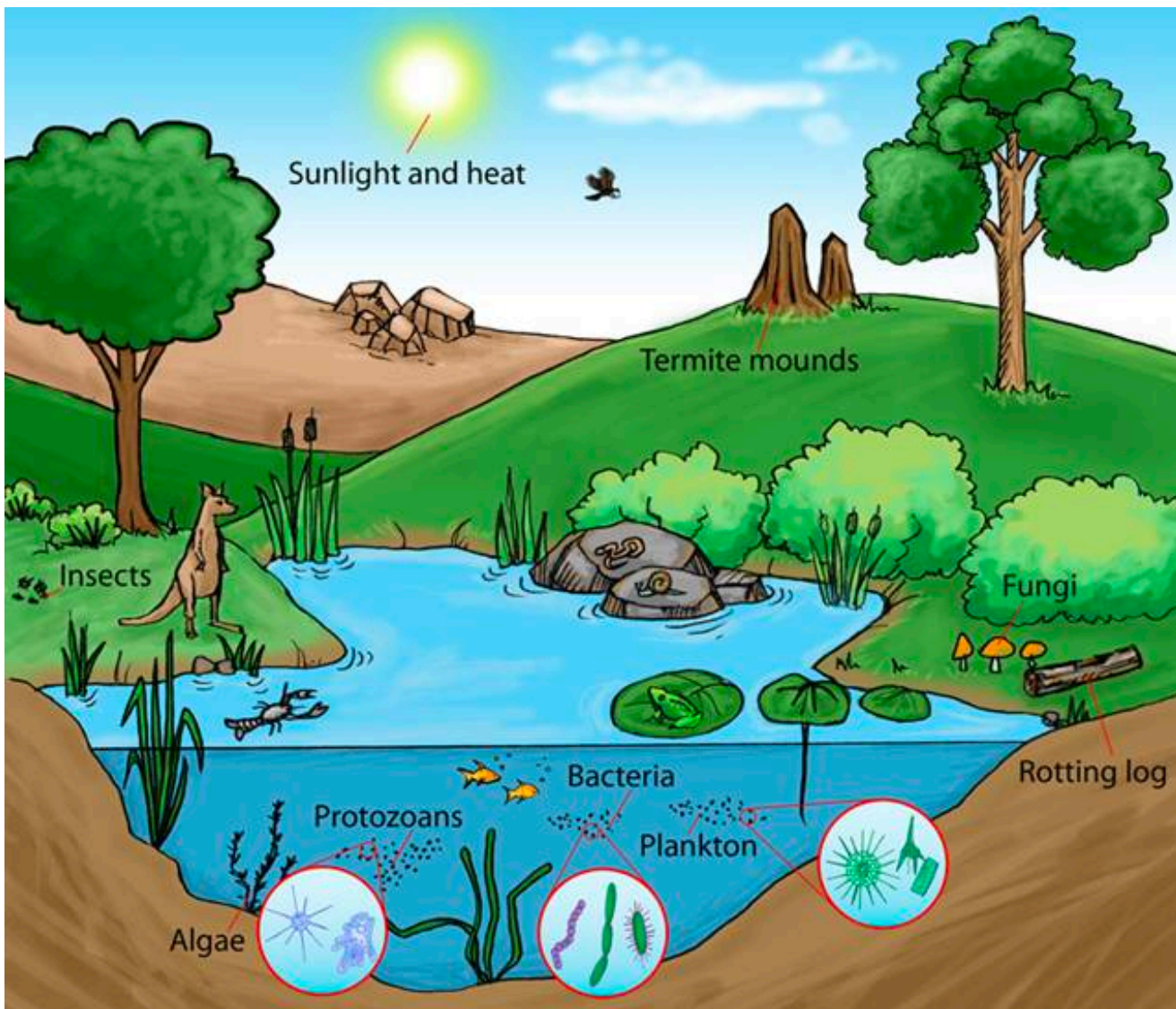
# From Natural Ecosystem To Software Ecosystems



Eclipse Working Groups



OpenPAAS

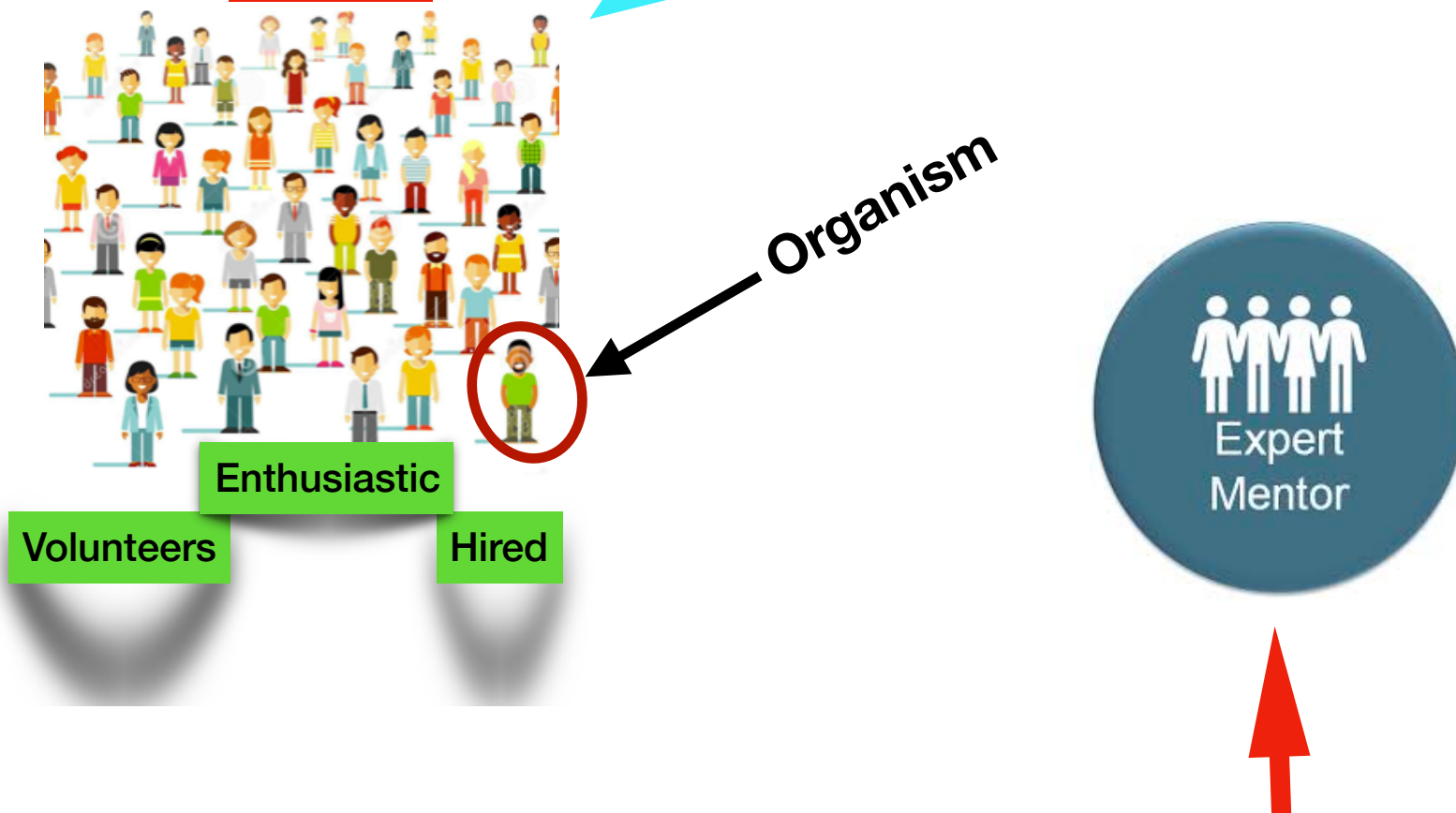


<https://www.zmescience.com/ecology/ecosystems-what-they-are-and-why-they-are-important/>

# 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.

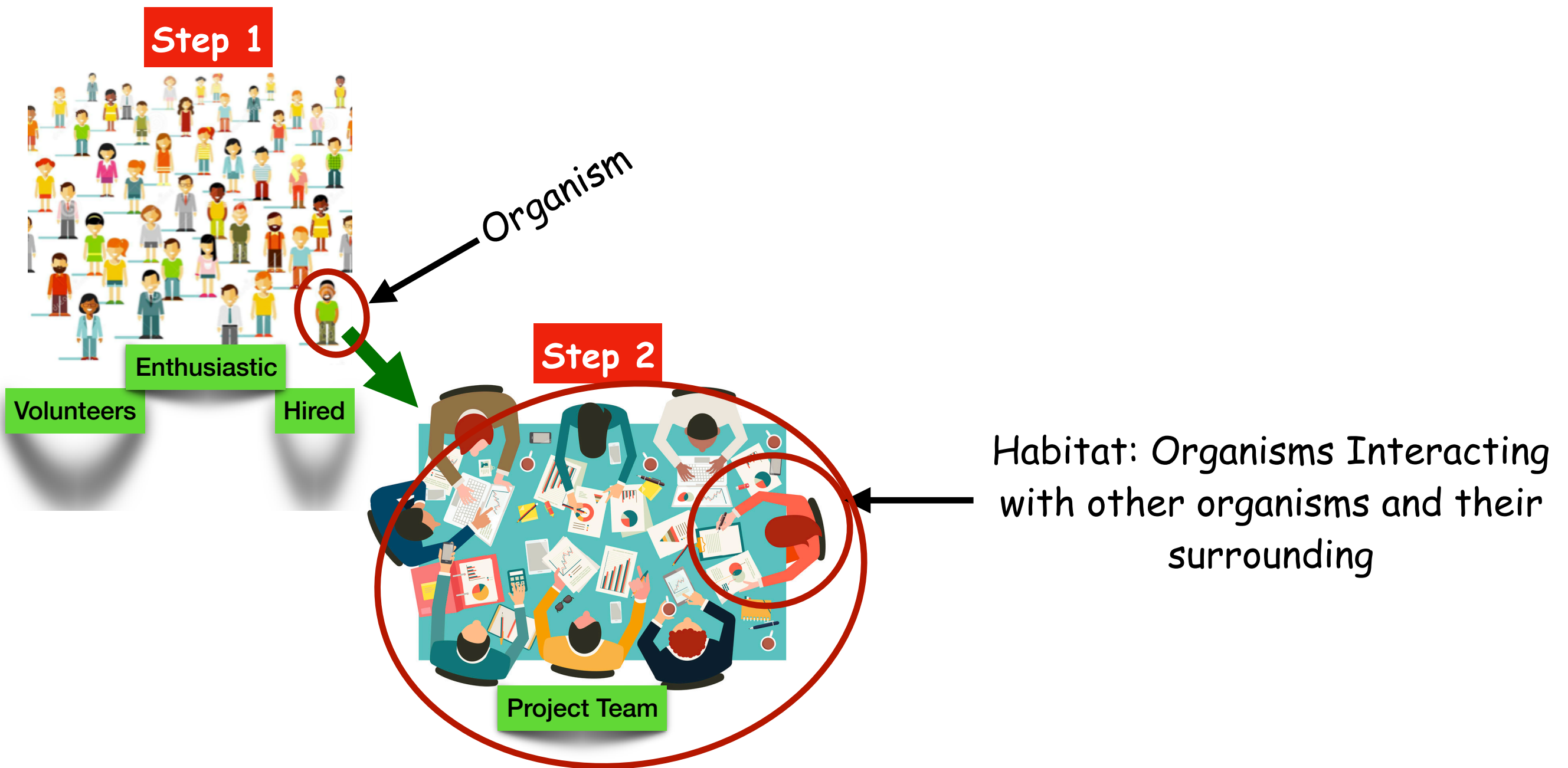
Amorim et al. (ACM, 2017)

**The Architect's Role in Software Ecosystems Health.**

In Proceedings of the 2nd Workshop on Social, Human, and Economic Aspects of Software (WASHES '17)



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# Software Ecosystems (SECO) are Human-Centric

Step 1



Enthusiastic

Volunteers

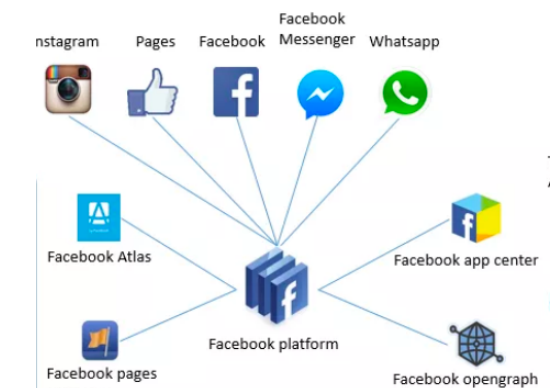
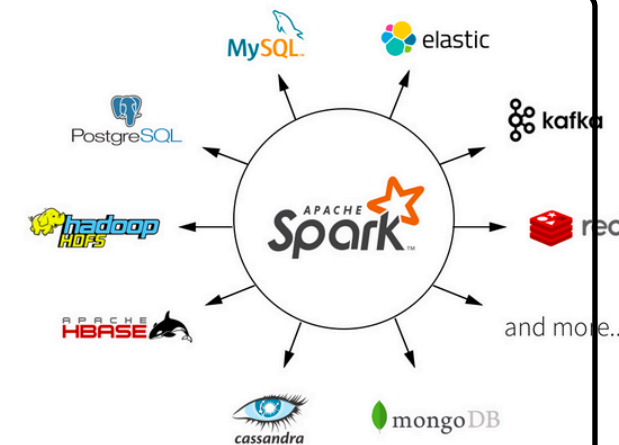
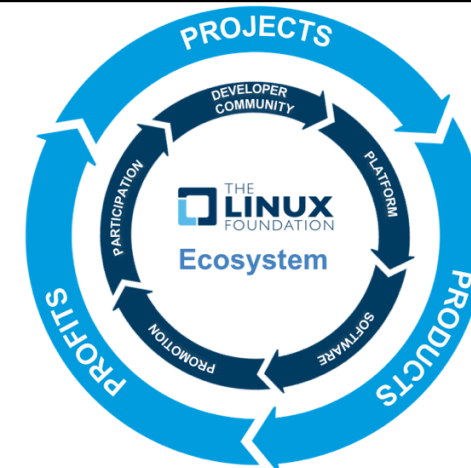
Hired

Step 2



Project Team

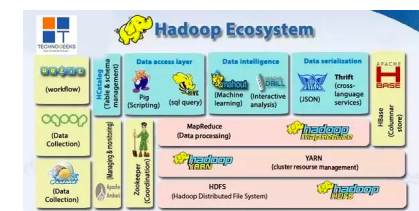
Step 3



Eclipse Working Groups



OpenPAAS



Project Teams forming an Ecosystem



# Software Ecosystems (SECO) is Human-Centric

Step 1



Enthusiastic

Volunteers

Hired

Step 2

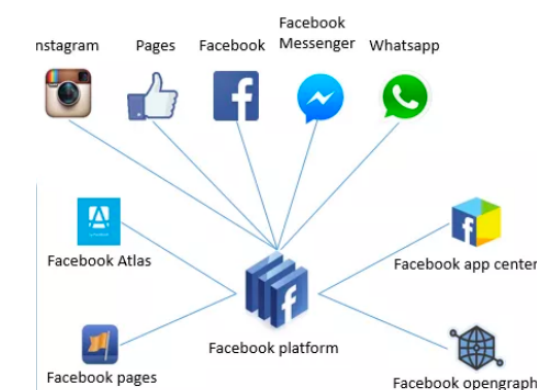
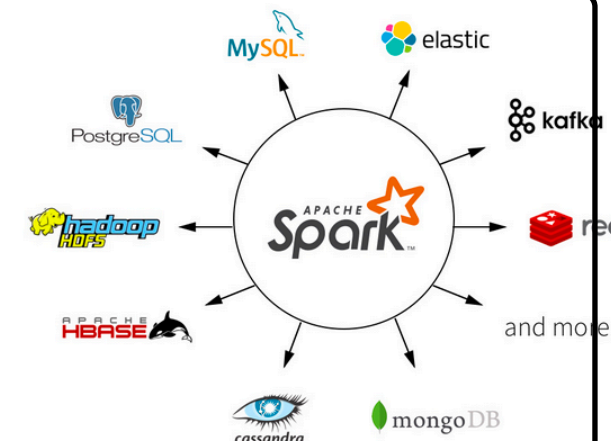
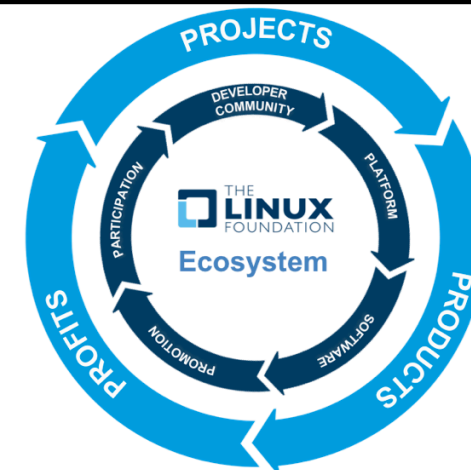


Project Team

Niche:

Adaptation occurs in every step.  
We investigate three Niches.

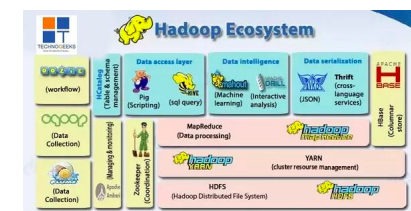
Step 3



Eclipse Working Groups



OpenPAAS



Project Teams forming an Ecosystem

# The Evolution of Niche in Software Ecosystems

Niche:

Three variants of ecological niche:  
Thomas W Schoener (2009). Princeton University Press. pp. 3 ff.



# The Evolution of Niche in Software Ecosystems

**Mostly during Onboarding**

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

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# The Evolution of Niche in Software Ecosystems

**Mostly during Onboarding**

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

**Niche:**

**Mostly during joint-collaboration**

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

**Mostly during release cycles; devs gain skills; +++ features**

**Eltonian:** encourages organism growth within its environment and also, alters the environment and its behaviour as it grows.

Three variants of ecological niche:  
Thomas W Schoener (2009). Princeton University Press. pp. 3 ff.

# What is a Healthy?



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>**

# Holistic Adaptation of Health To Ecosystem

## 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



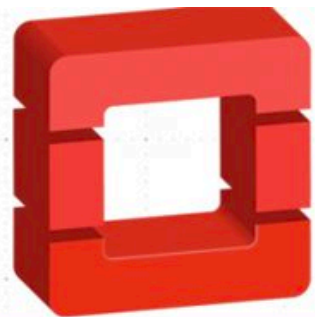




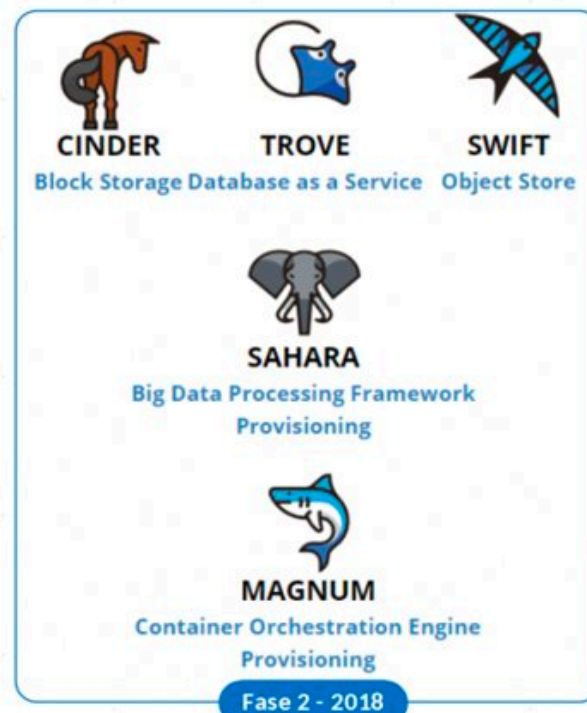
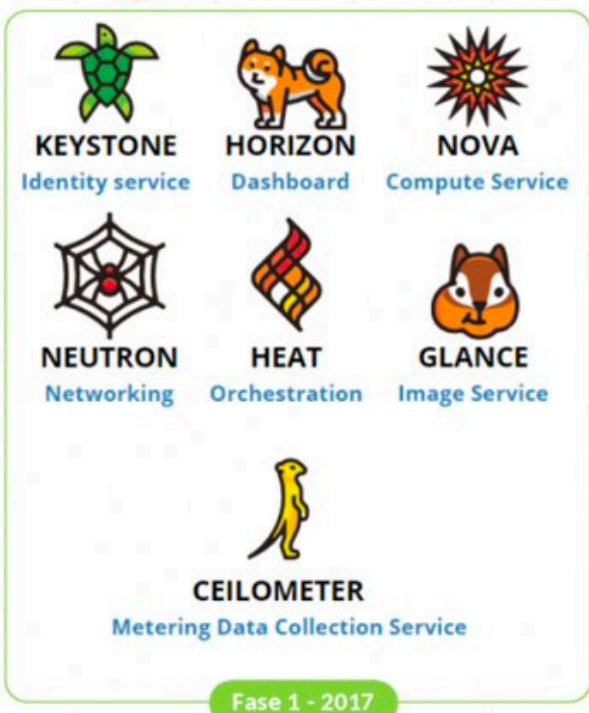
# Investigating An Open Source Software Ecosystem's Health (SECOHealth)

## SECOHealth

"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]

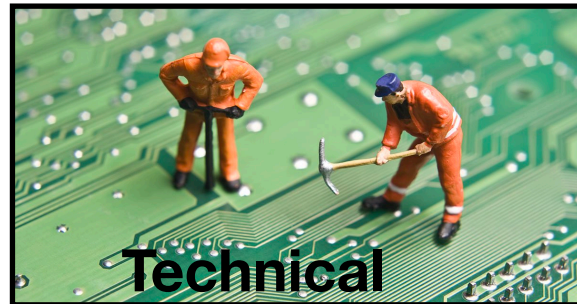


openstack™



1. T. Mens, B. Adams, and J. Marsan, "Towards an interdisciplinary, socio-technical analysis of software ecosystem health," 2017.

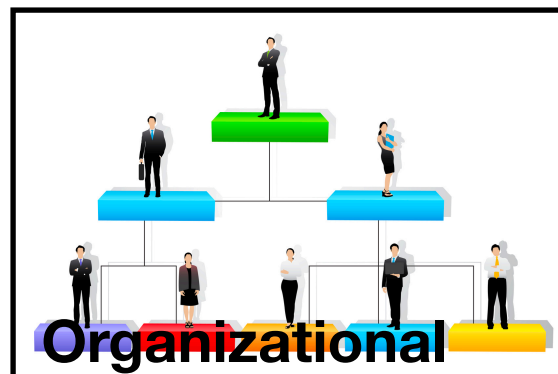
# SECO Health Issues



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

Mens, Tom & Adams, Bram & Marsan, Josianne. (2017).  
Towards an interdisciplinary, socio-technical analysis of software ecosystem health.

# Ecosystems Can Benefit From CHAOSS Metrics To Measure Its Health.



<https://chaoss.community>

Specialized Working Groups:

Common Metrics

Diversity and Inclusion

Evolution

Risk

Value





# SECO Health Through The Lens of Onboarding Experience



onboarding | ɒnˈbɔɪdɪŋ |

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.*

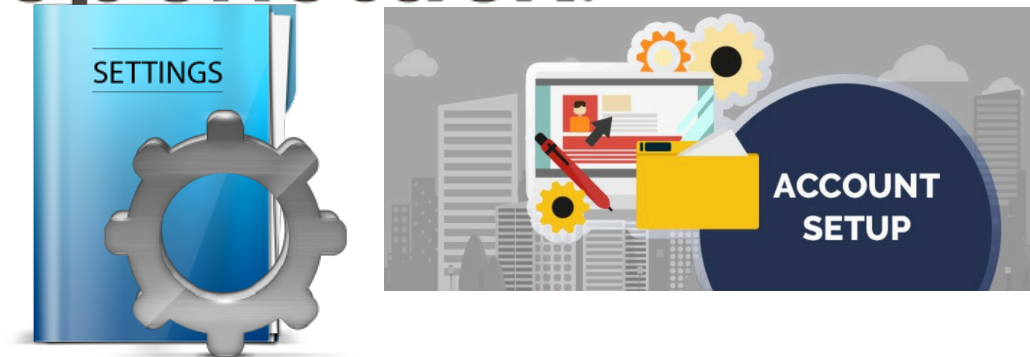
New Contributors

# Onboarding Experience: OpenStack OUI

## Promoting A Health Ecosystem.



openstack®



Participants create Accounts and configure their local system

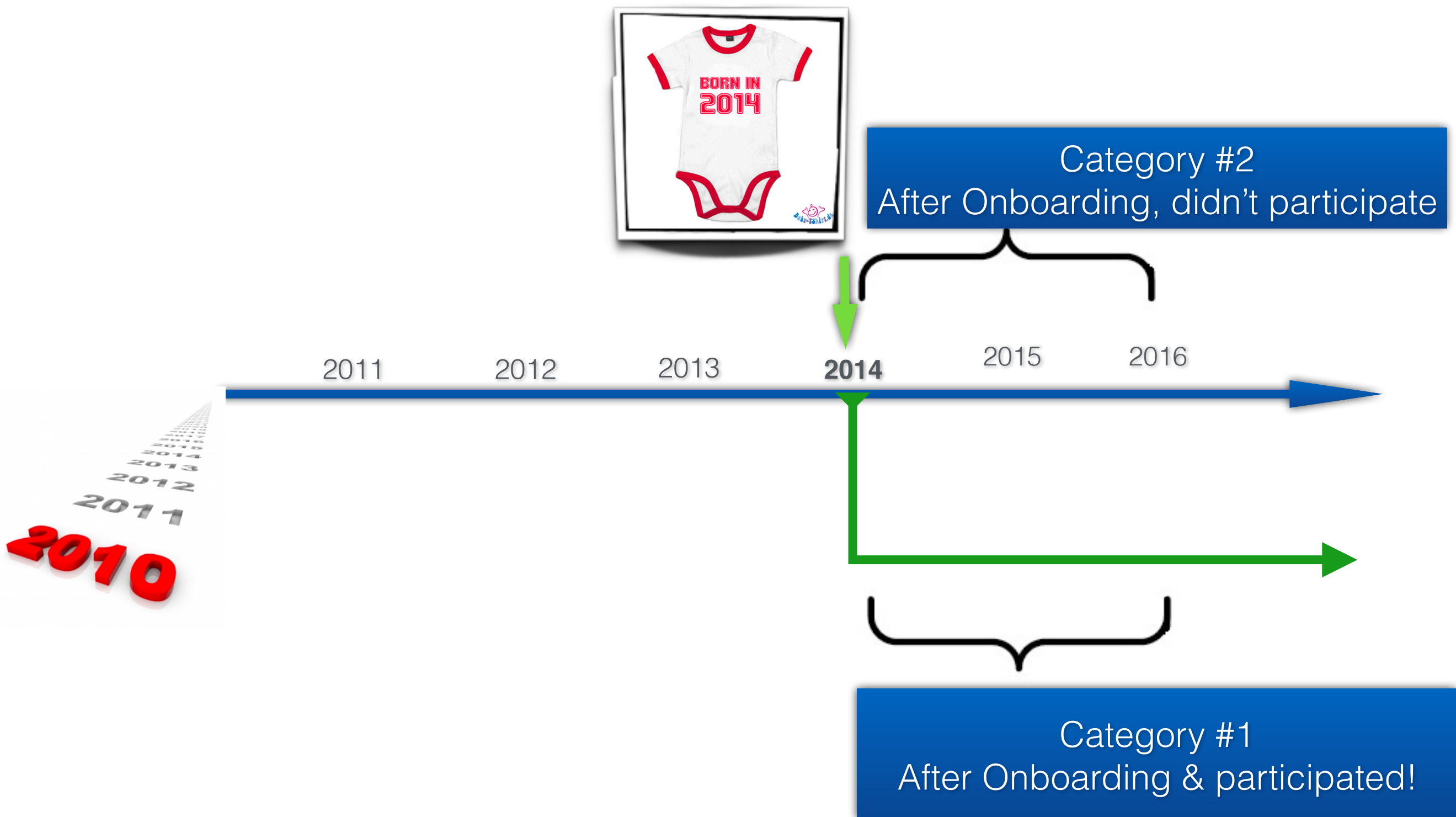


Diverse population





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





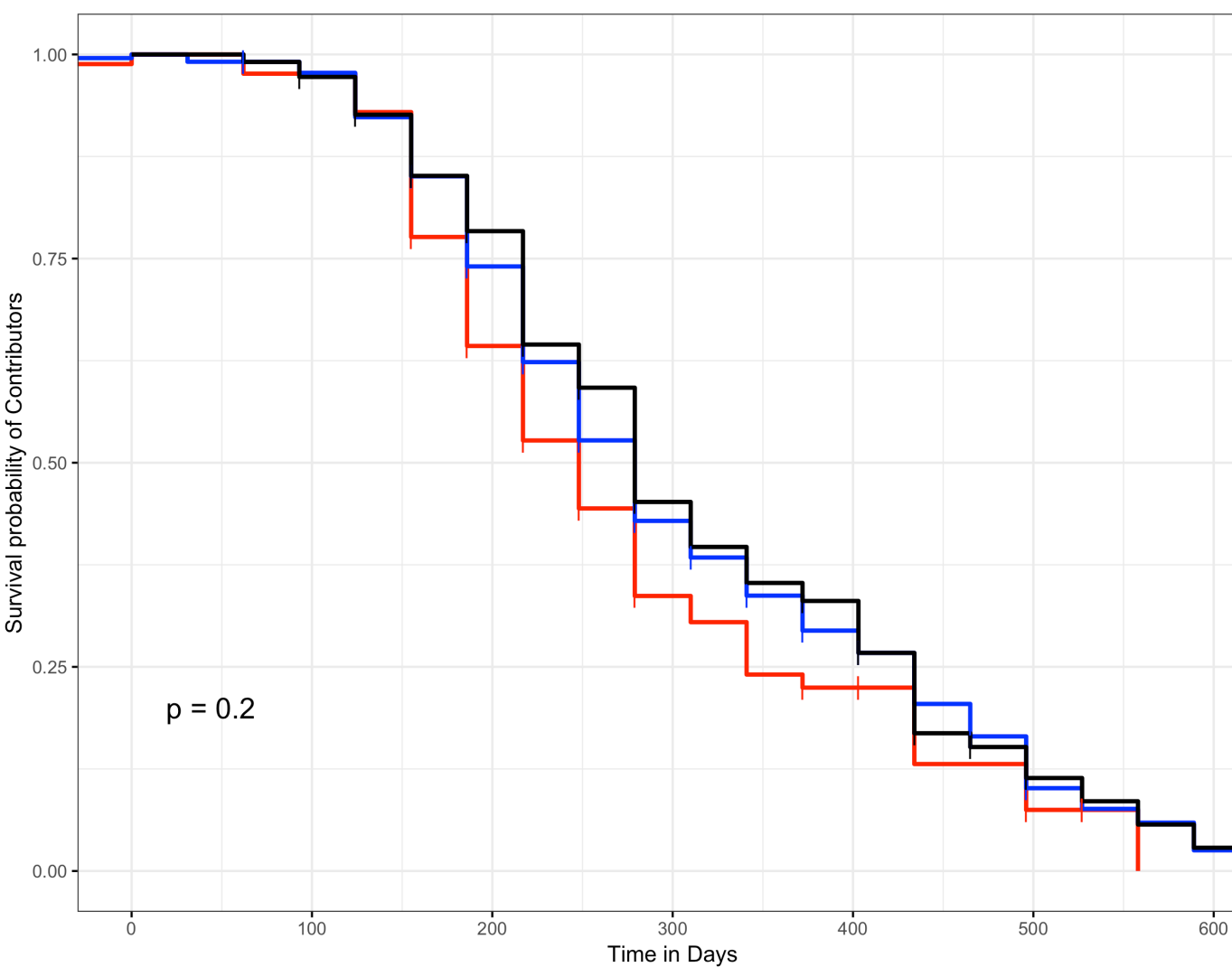
# Evolution of Contributors towards first commit



**Before**

Gender Survival Rate Towards First Commit Before Onboarding

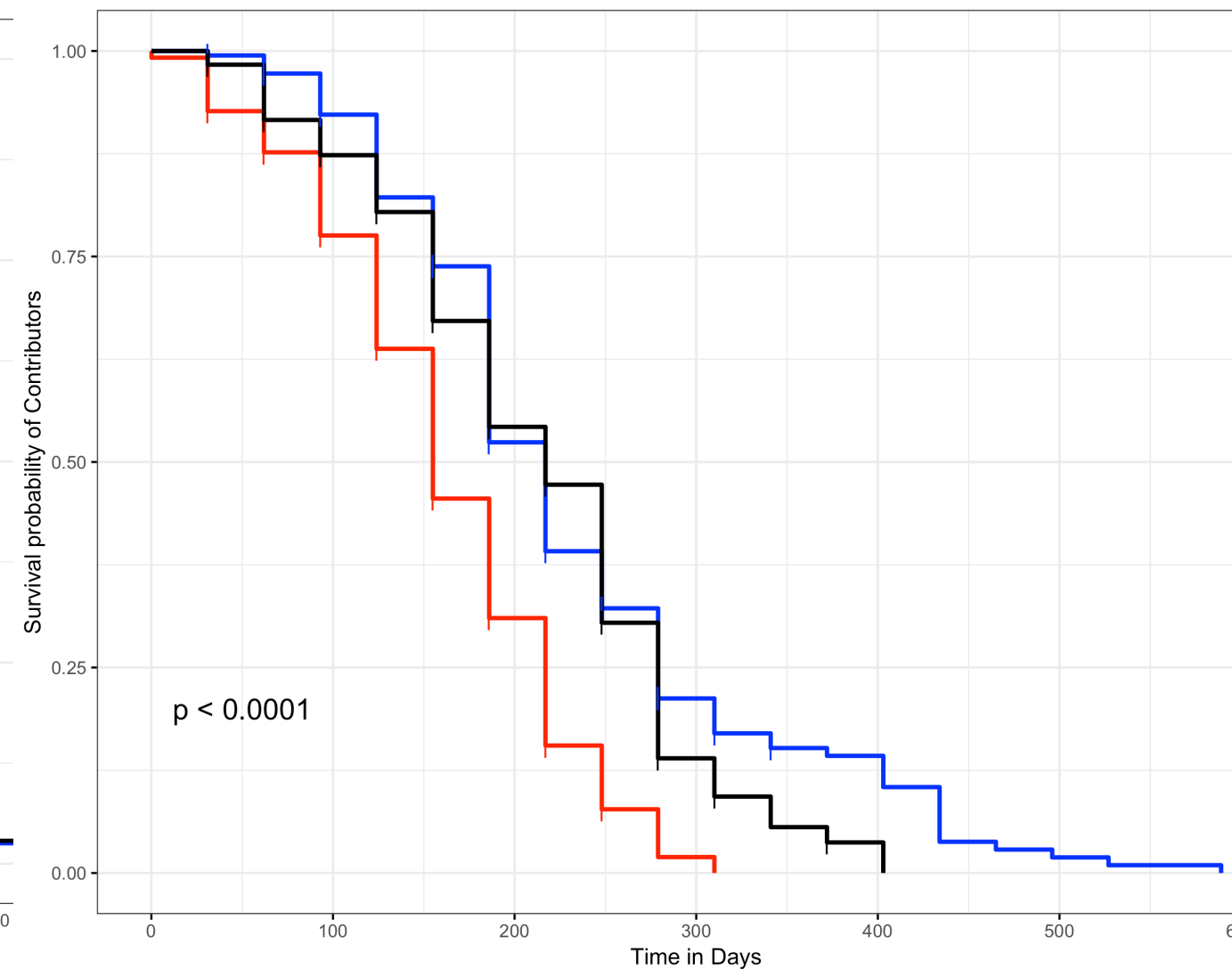
Strata + Female + Male + Neutral



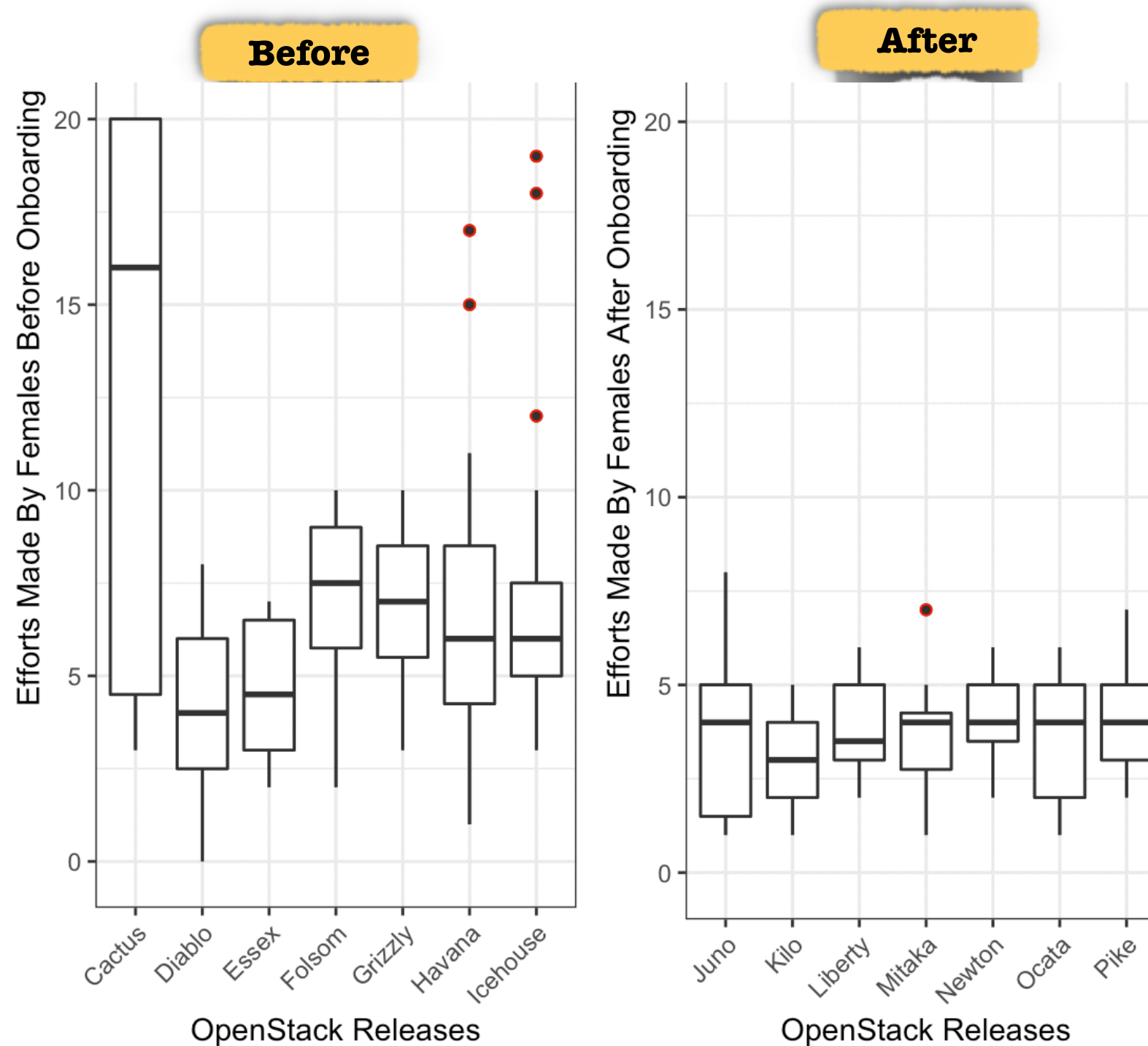
**After**

Gender Survival Rate Towards First Commit After Onboarding

Strata + Female + Male + Neutral



# Contributors Submitted Successful Patches With Less Effort After Onboarding



Effort to contribute successful patches

$$Effort = \frac{Number\_Of\_Attempts}{Actual\_Commits}$$

# 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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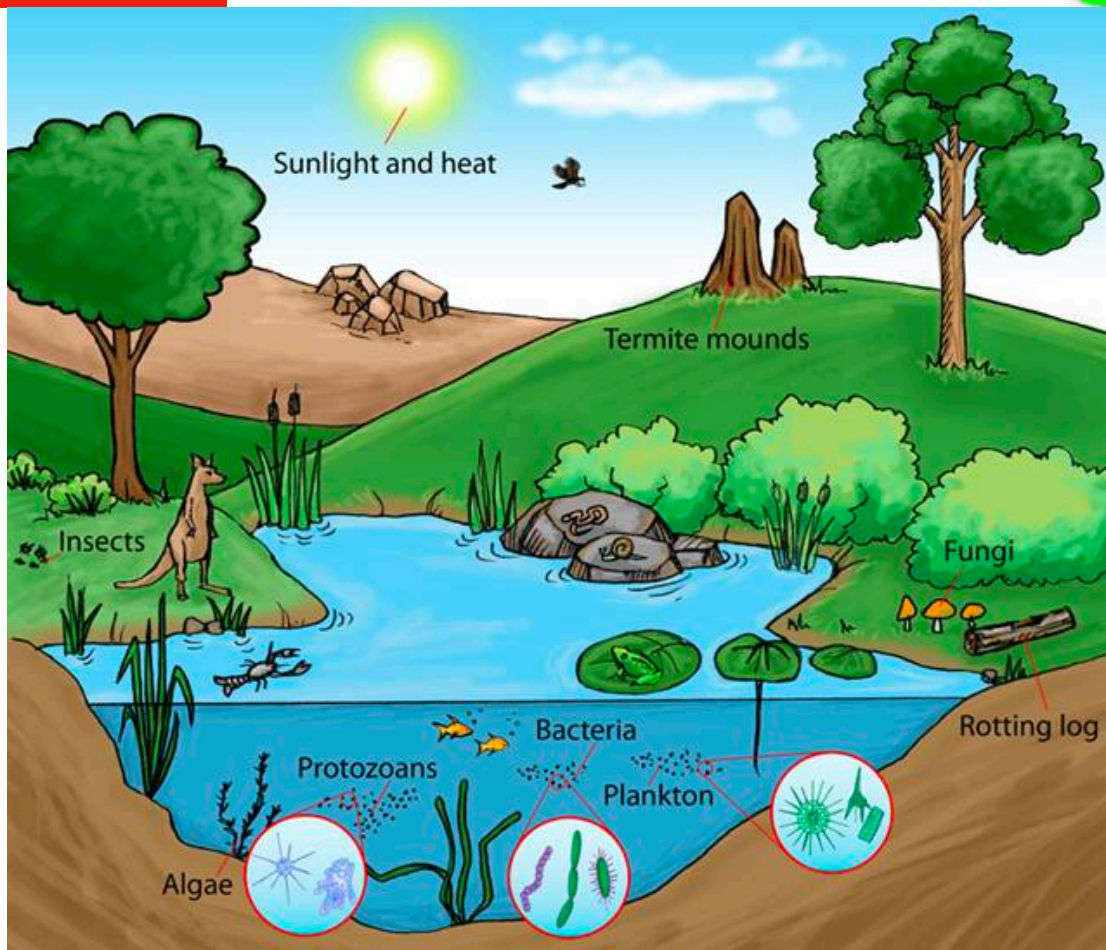
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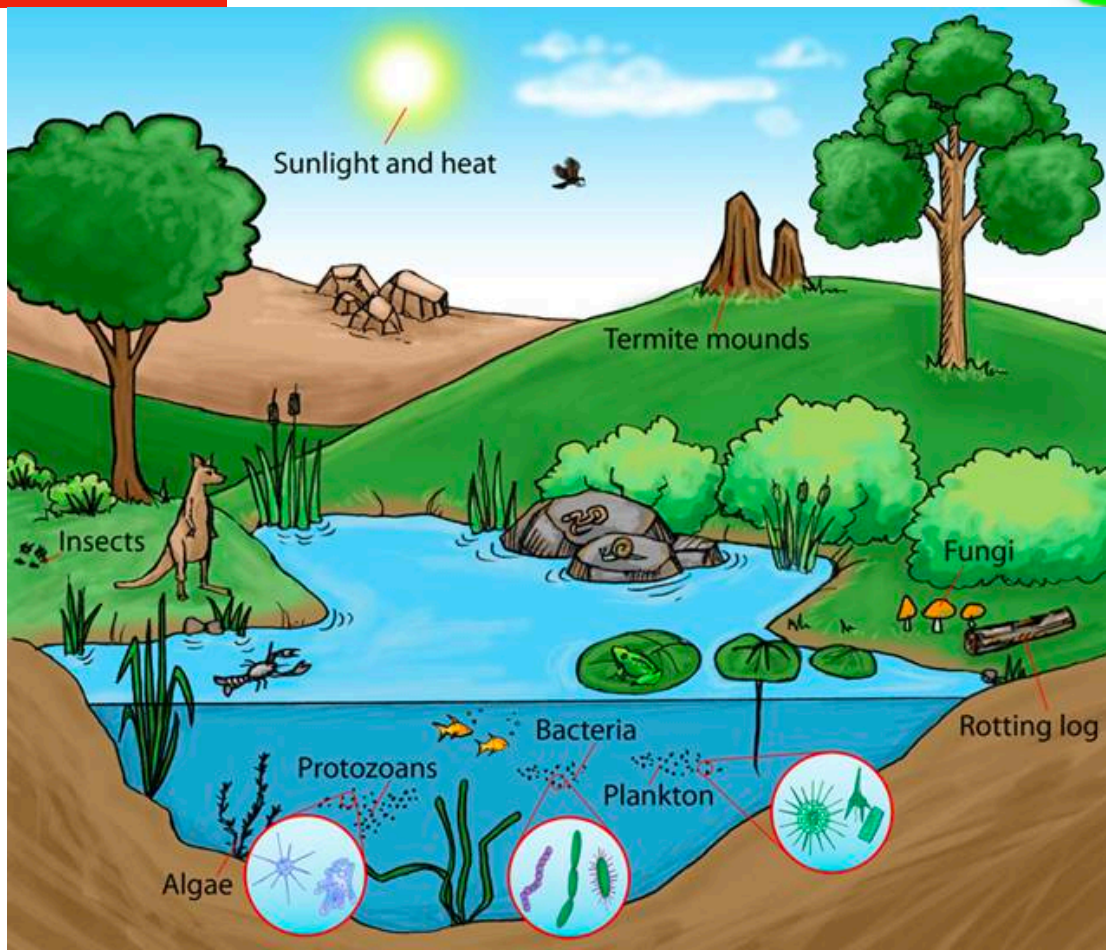
Also, findings suggest that onboarding has a positive impact on the health of OpenStack, through gender diversity and inclusion across different releases.

There are strong evidences of joint contribution among participants (Novice-Novice collaboration) and between participants and mentors (Novice-Expert collaboration).

# In Sum

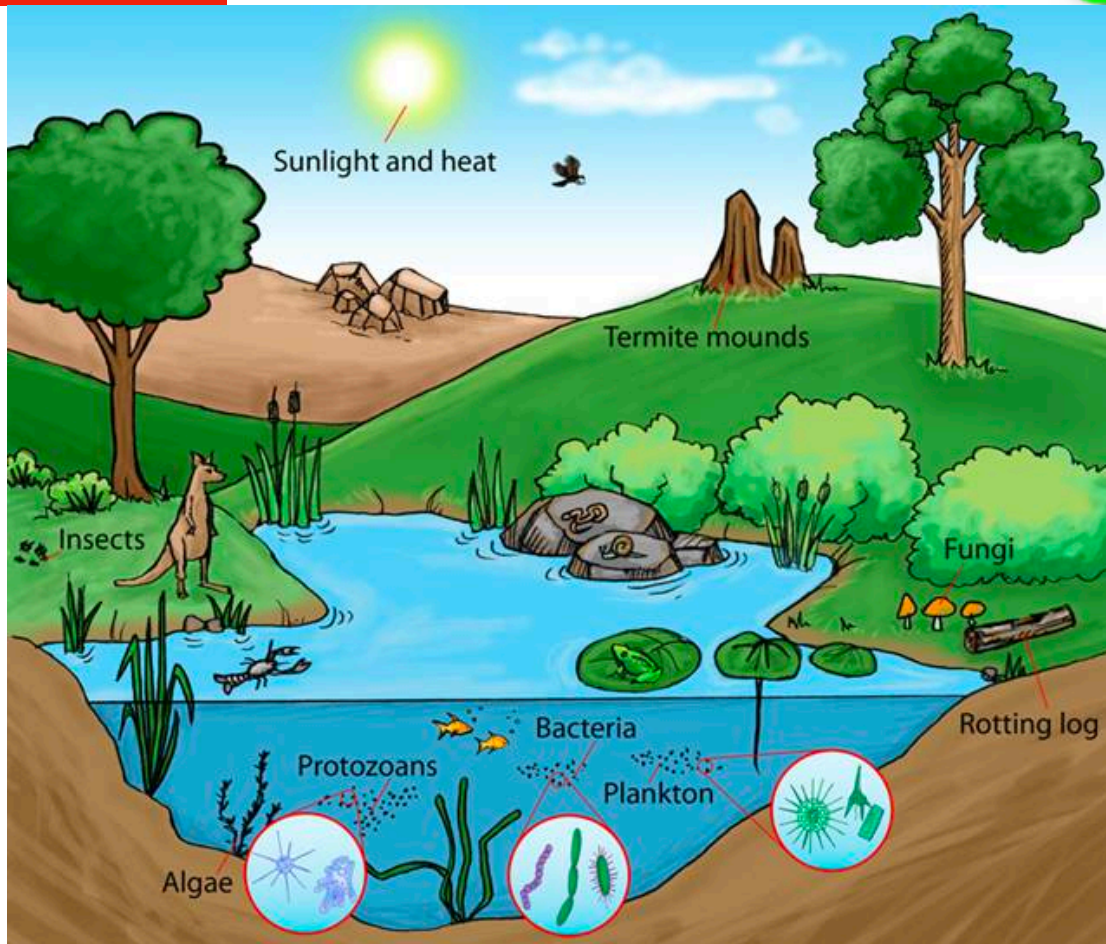




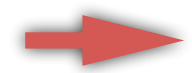




Niche: Natural Ecosystem

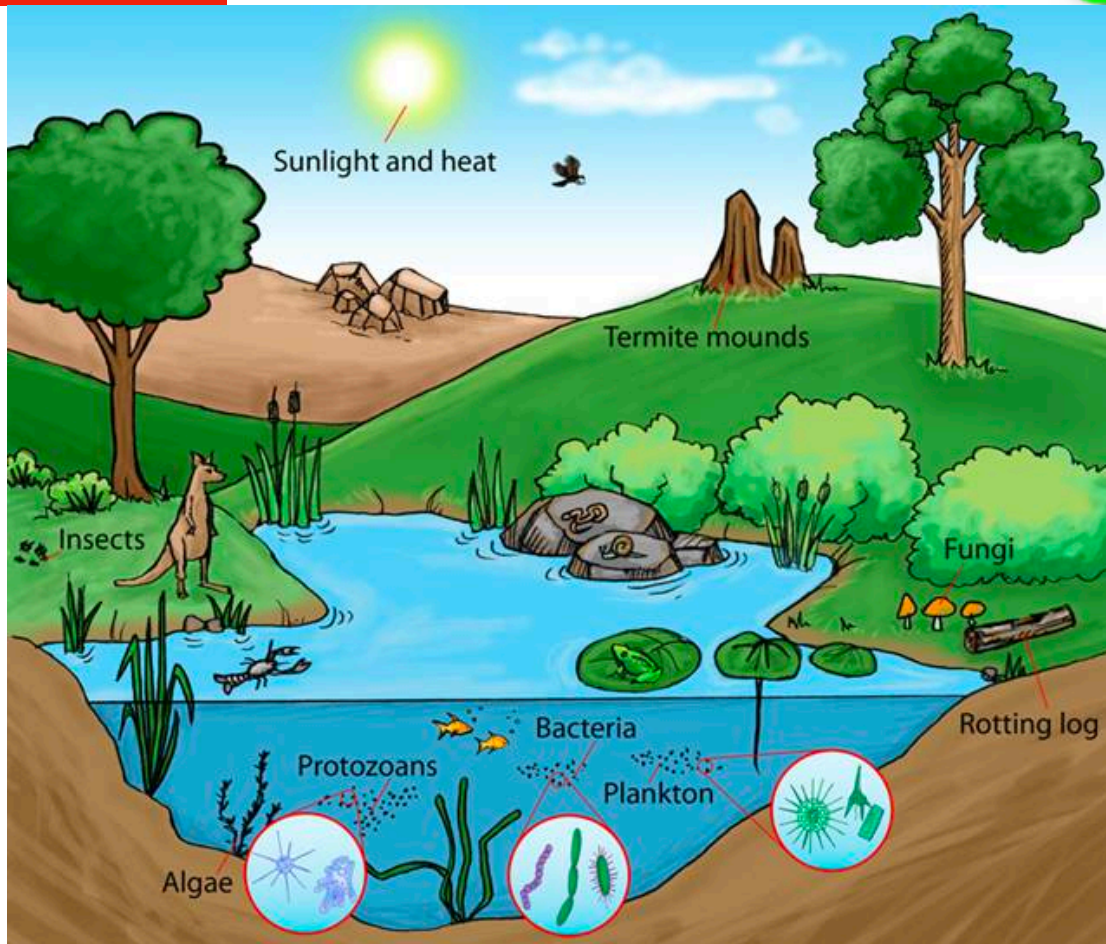


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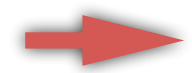




# Niche: Natural Ecosystem

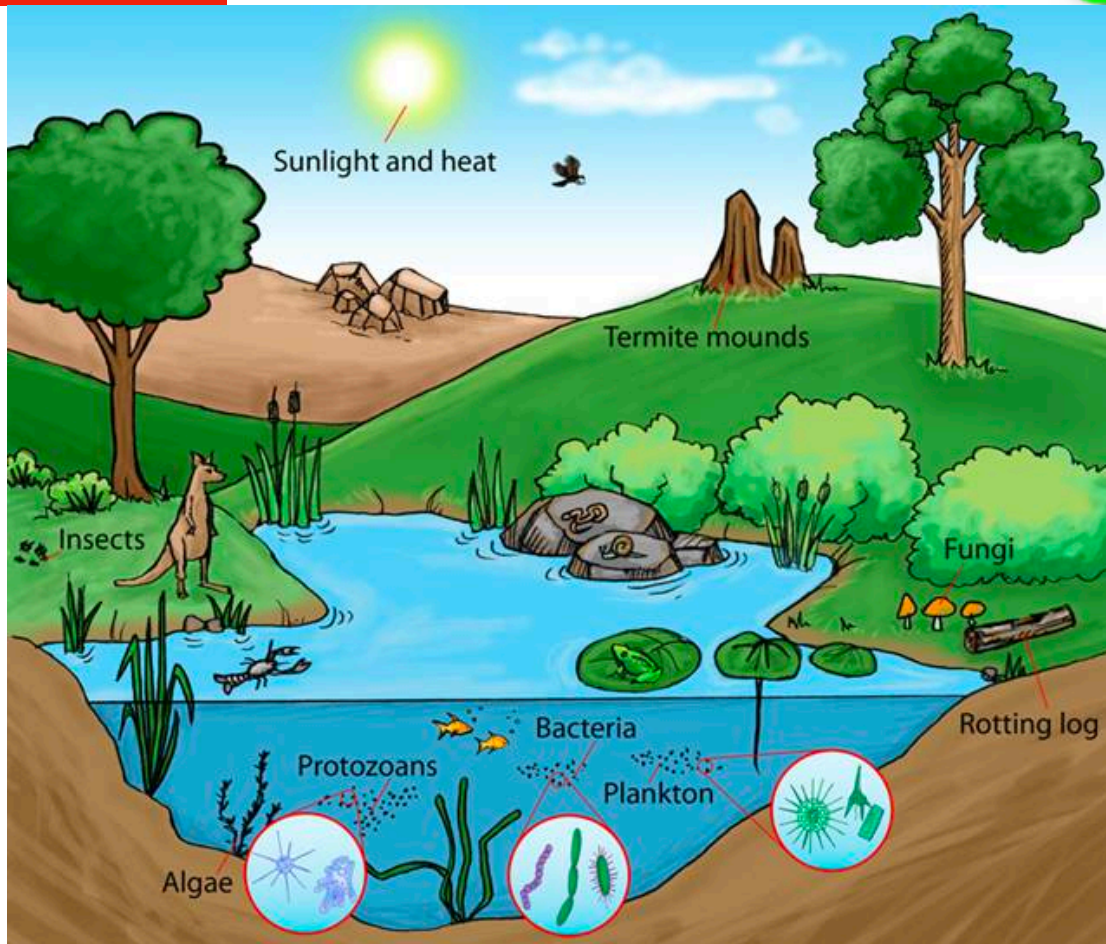


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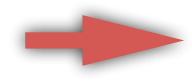




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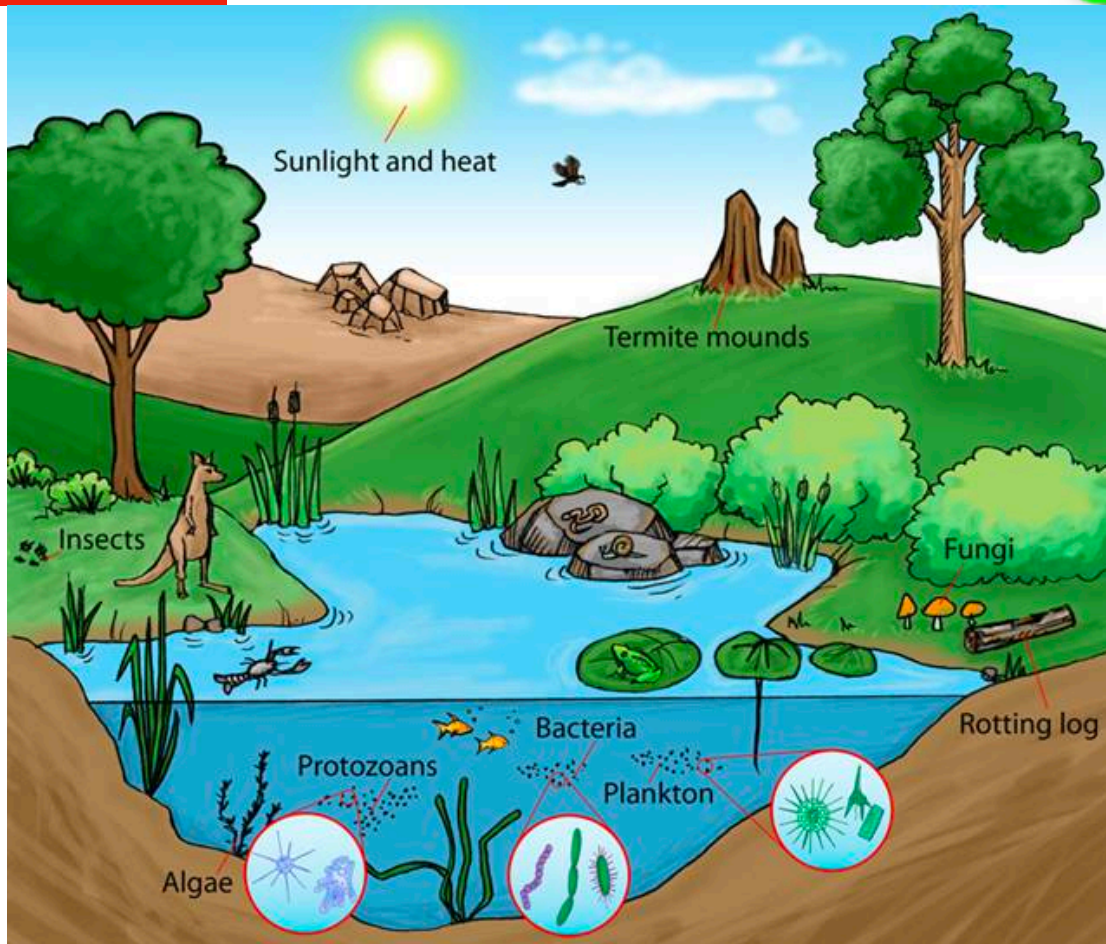


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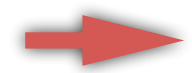




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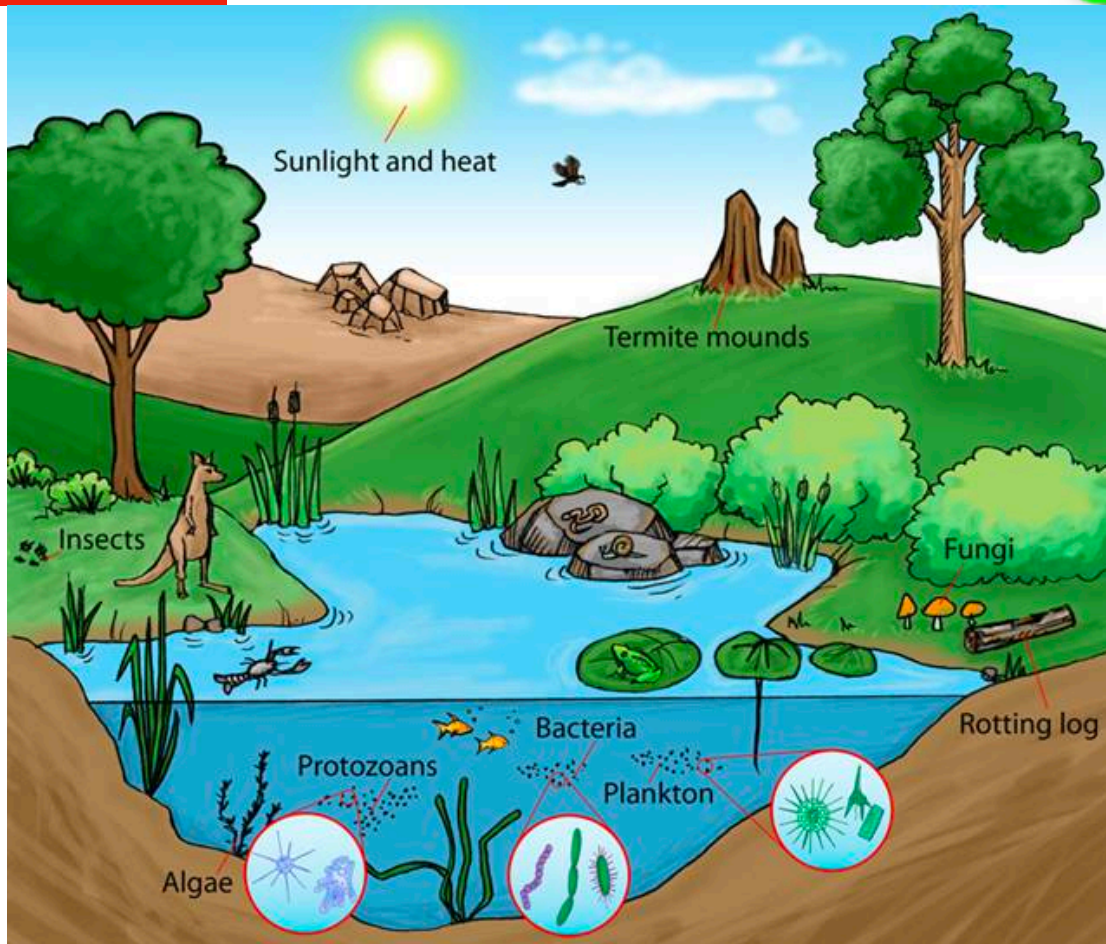


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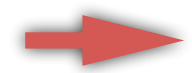




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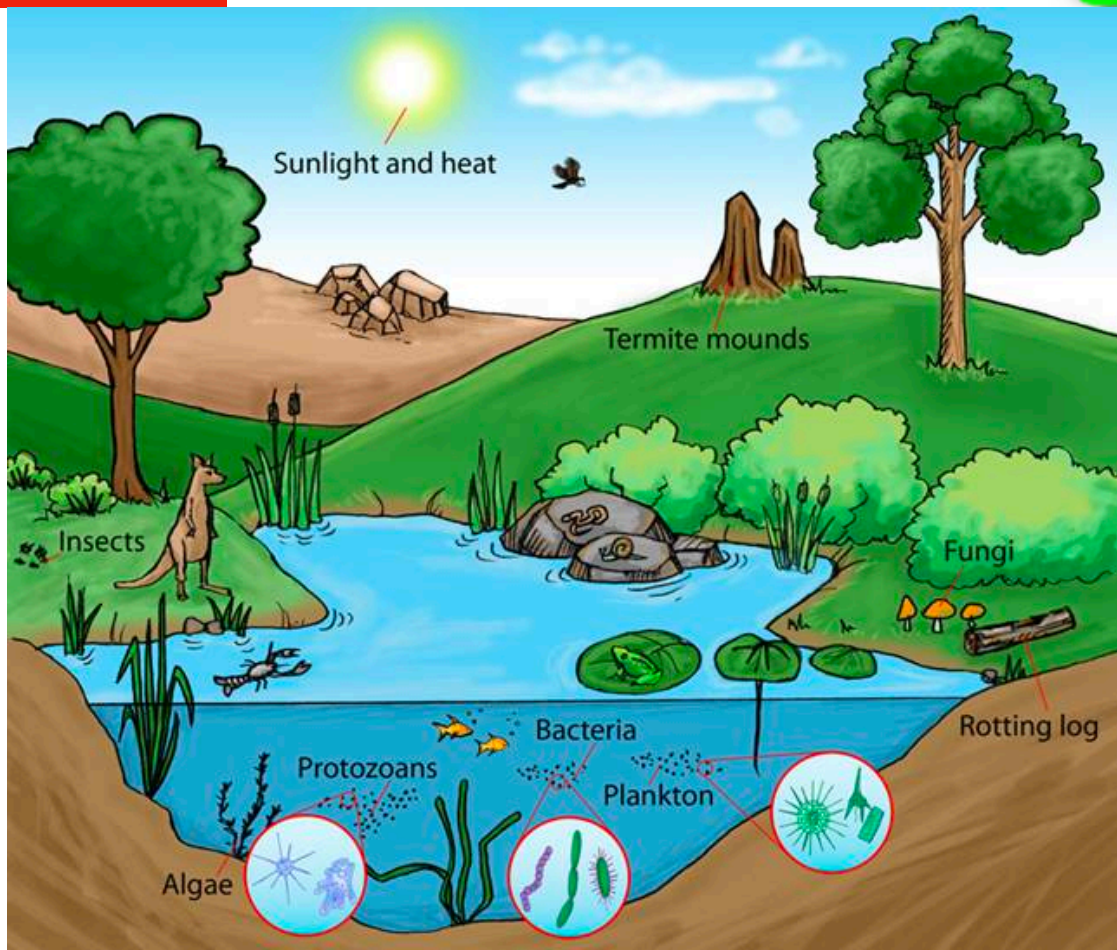
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## Niche:

## In Sum



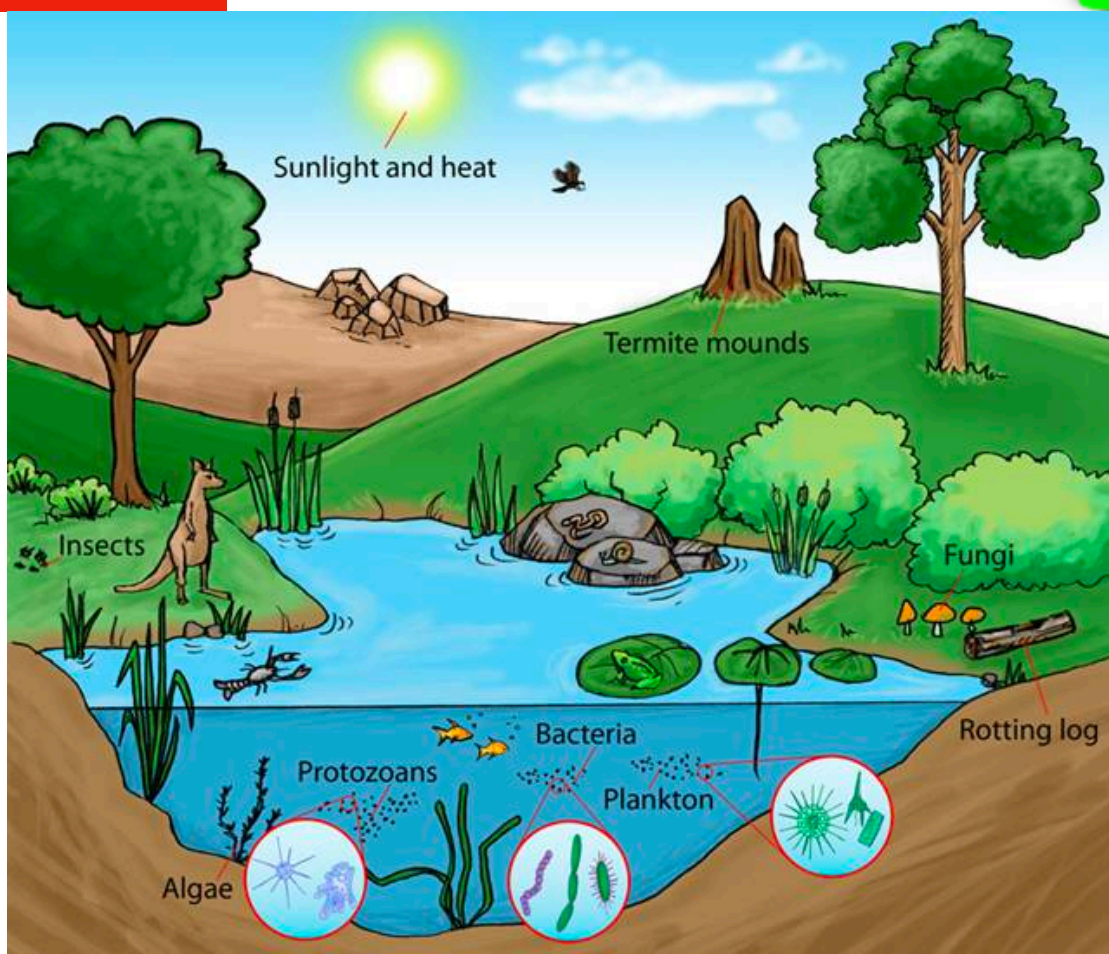
## Diversity and Inclusion

## Evolution; Survival

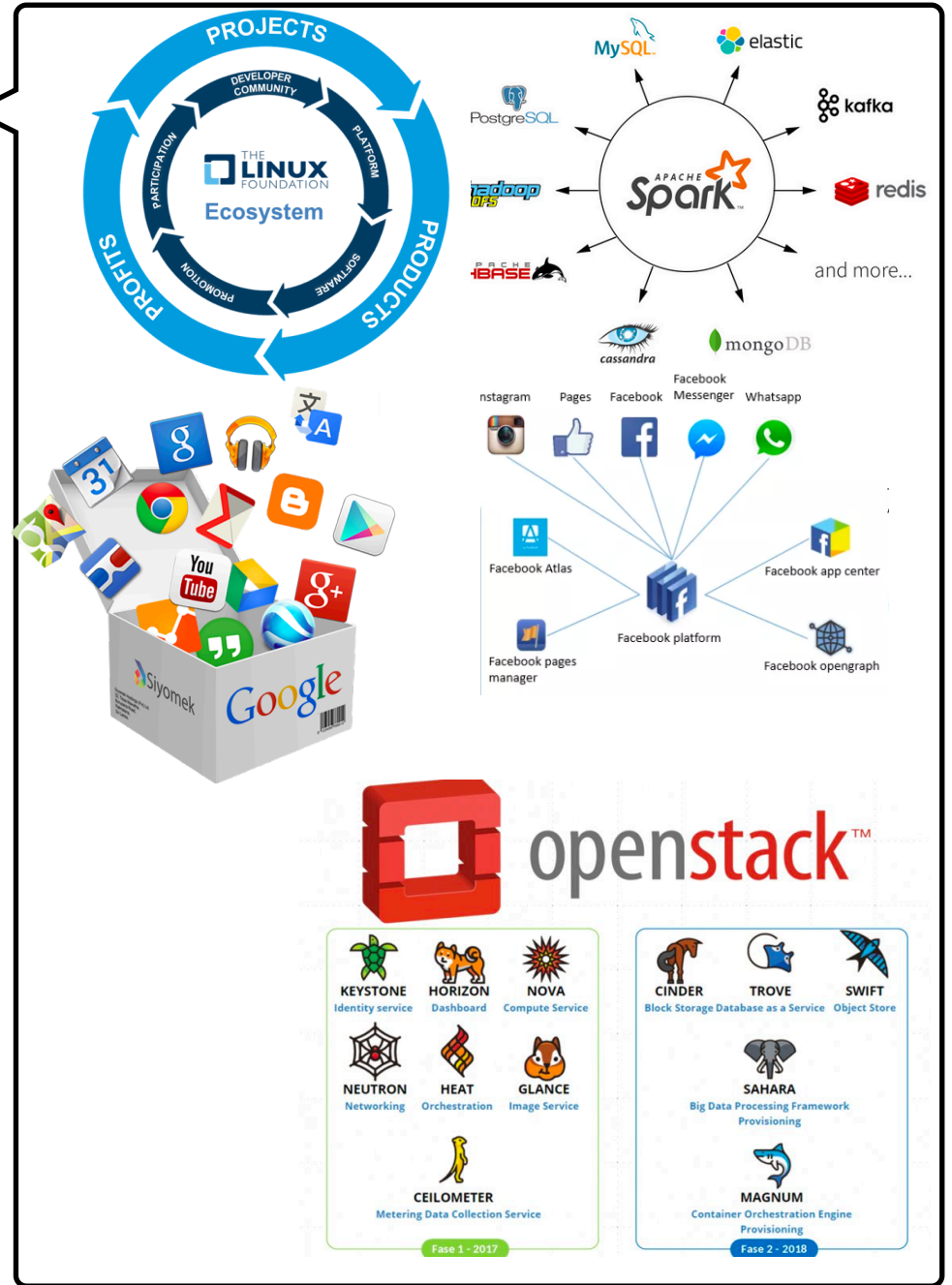
## Cross-community collaboration



# Niche: Natural Ecosystem



# In Sum



**Diversity and Inclusion**

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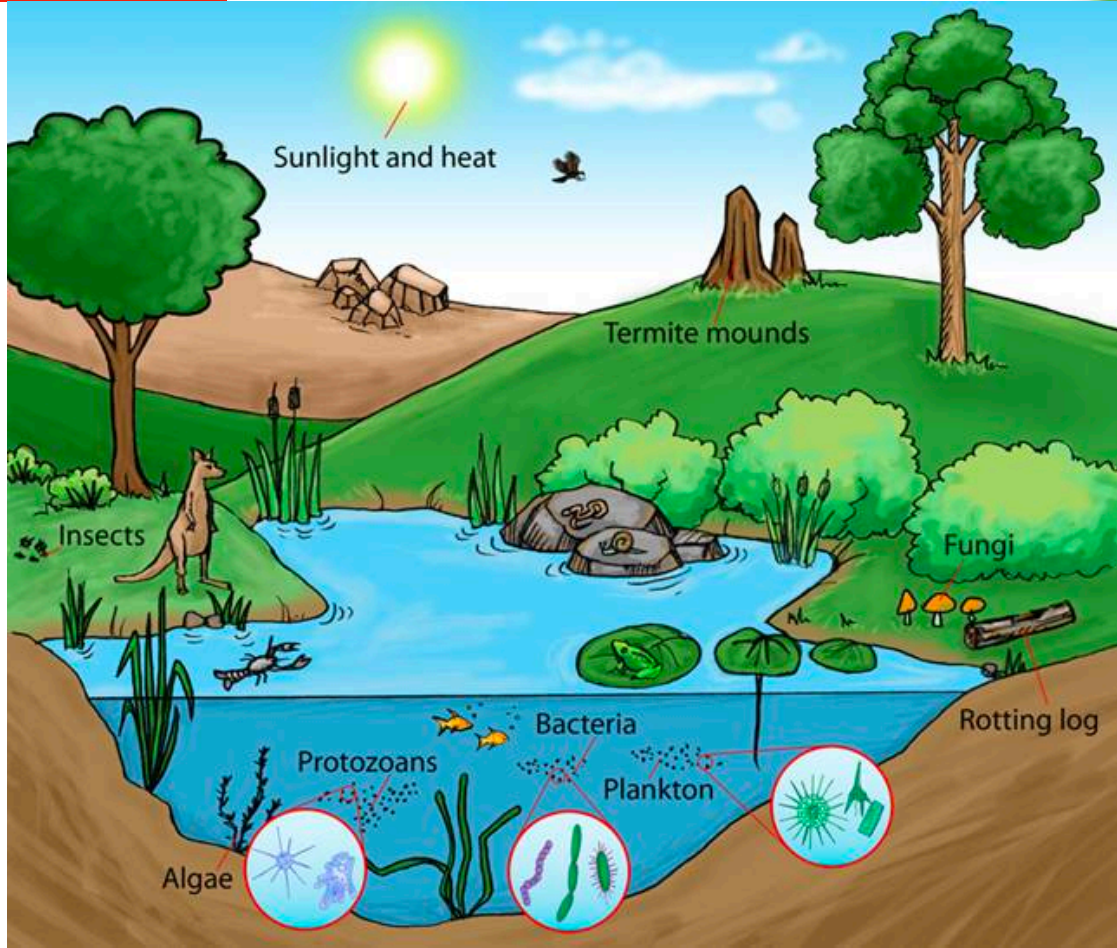
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## Niche:

## In Sum



## Diversity and Inclusion

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