

The On-boarding Experience and Software Ecosystem Health

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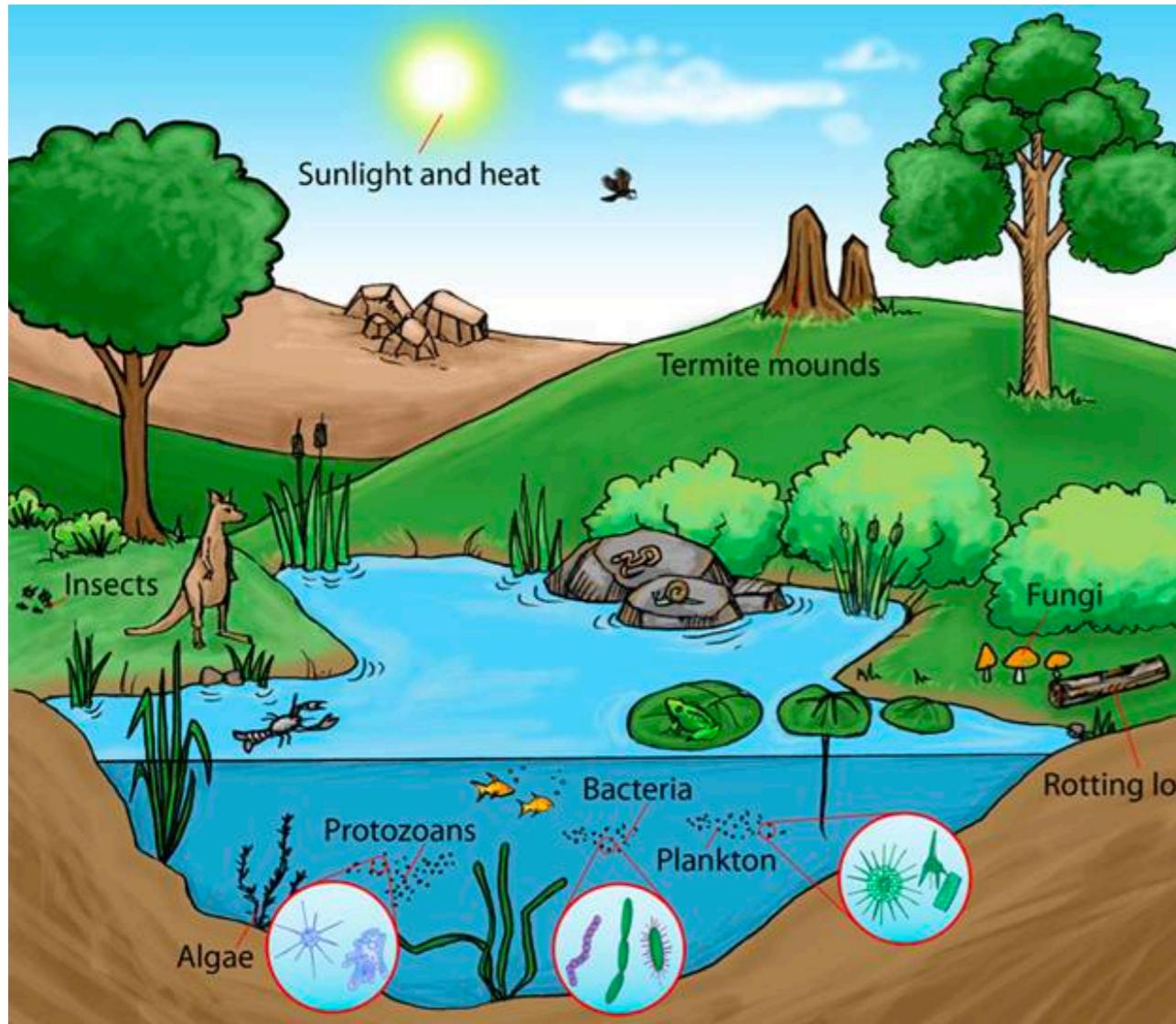
August 20, 21 - 23, 2019 | Hilton San Diego Bayfront | #ossummit

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



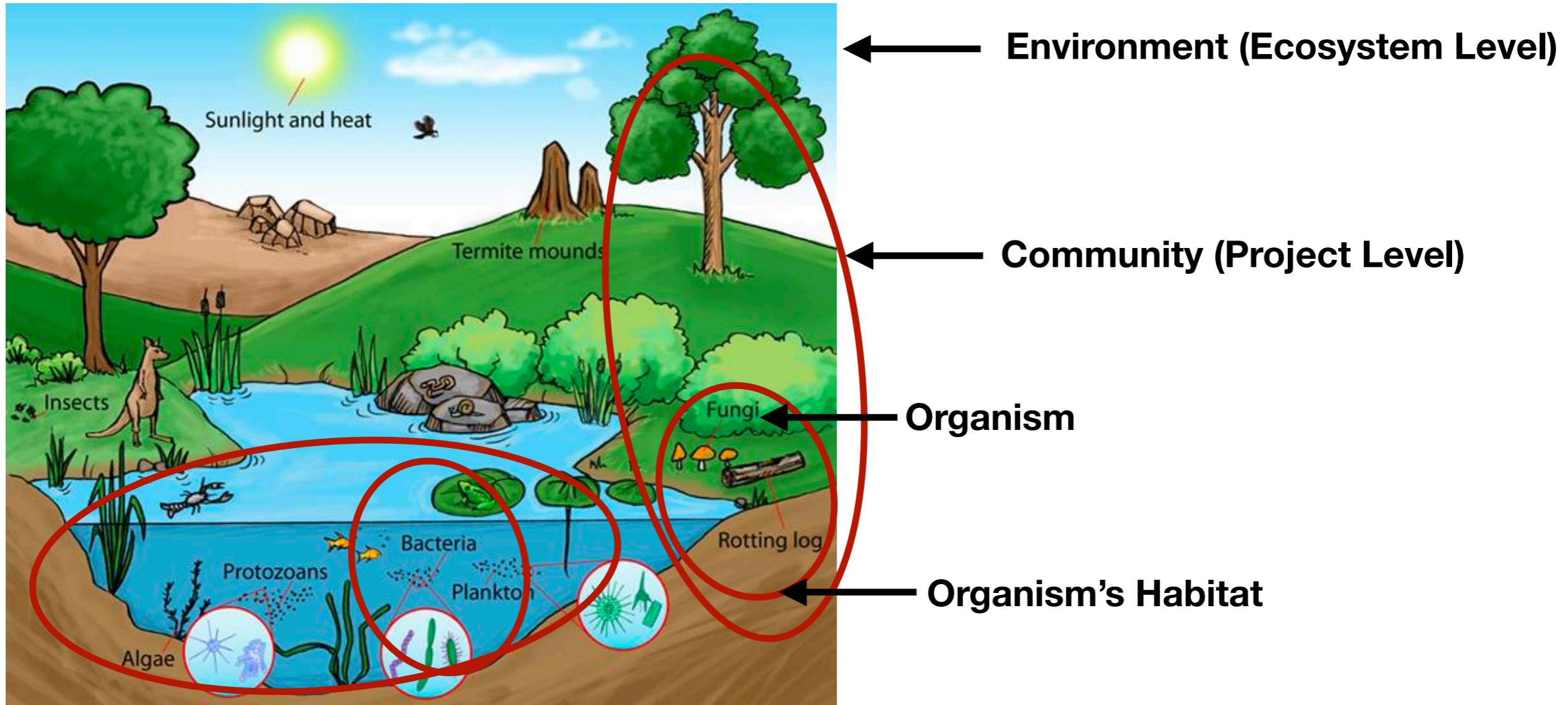
Tsilia yotova. [1]

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

From Natural Ecosystem To Software Ecosystem

Niche:

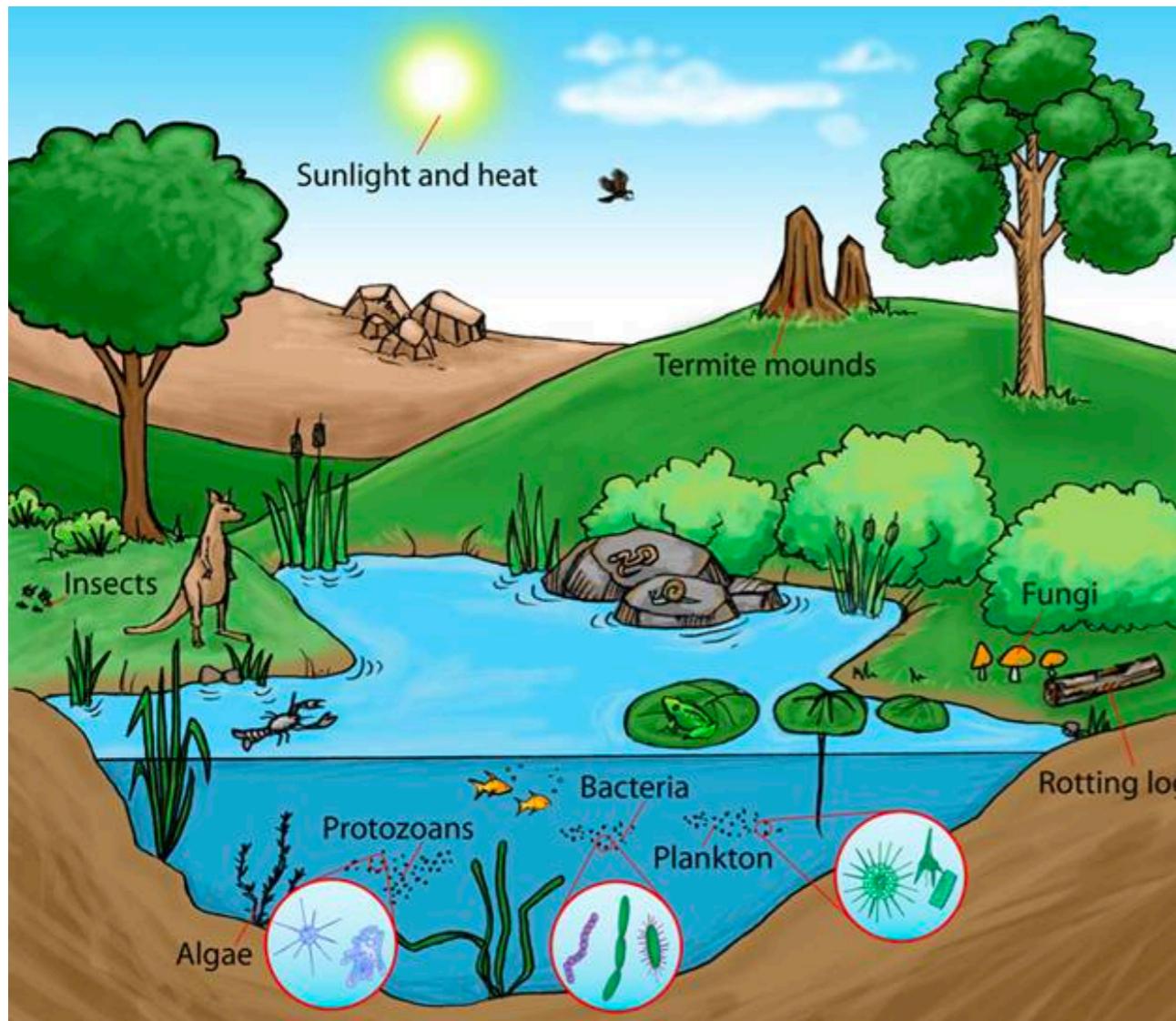
an organism's physiological adaptation to, and interaction with, the environment.



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

From Natural Ecosystem To Software Ecosystem

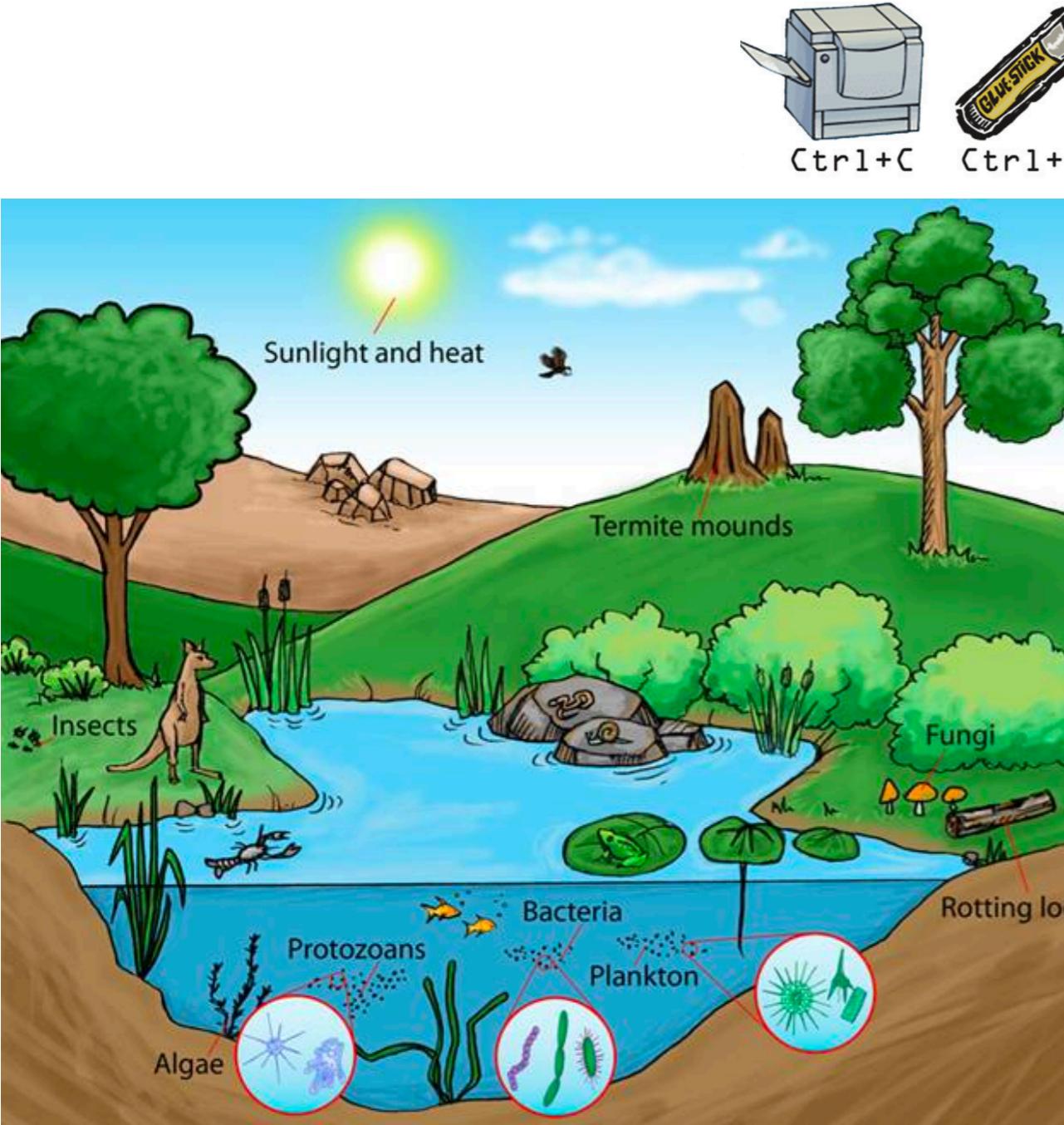
Biodiversity: variety and variability of life on Earth ➤ **SECO** projects/skills



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



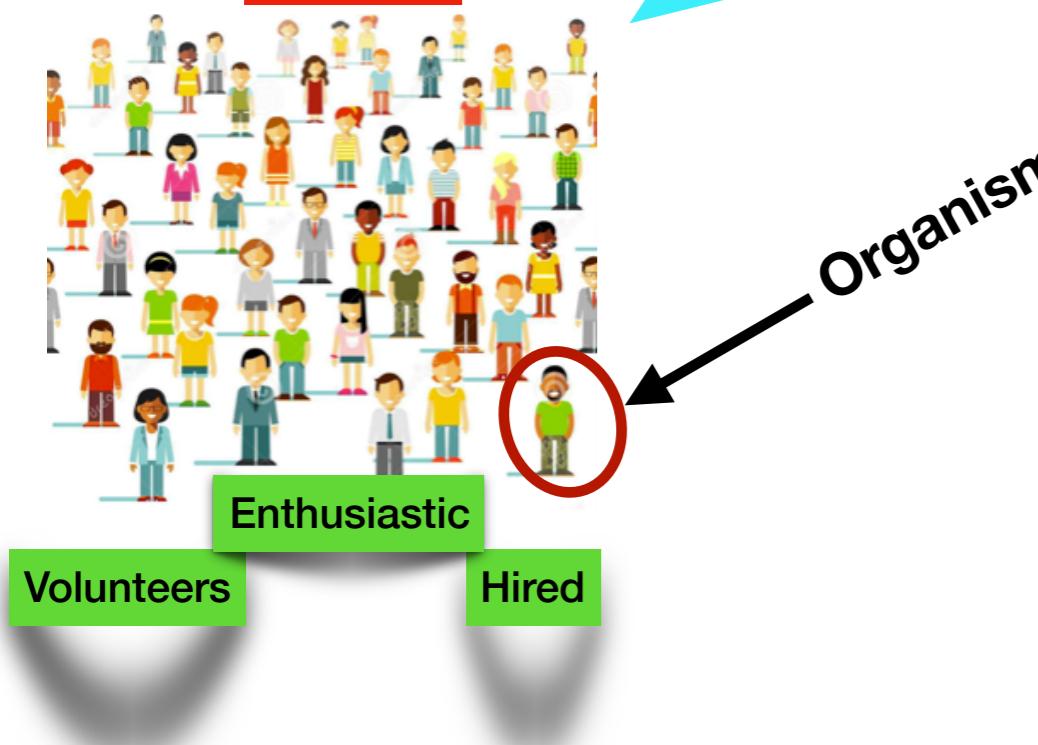
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Software Ecosystems (SECO) are Human-Centric

Step 1

Niche Creation in Software ecosystem



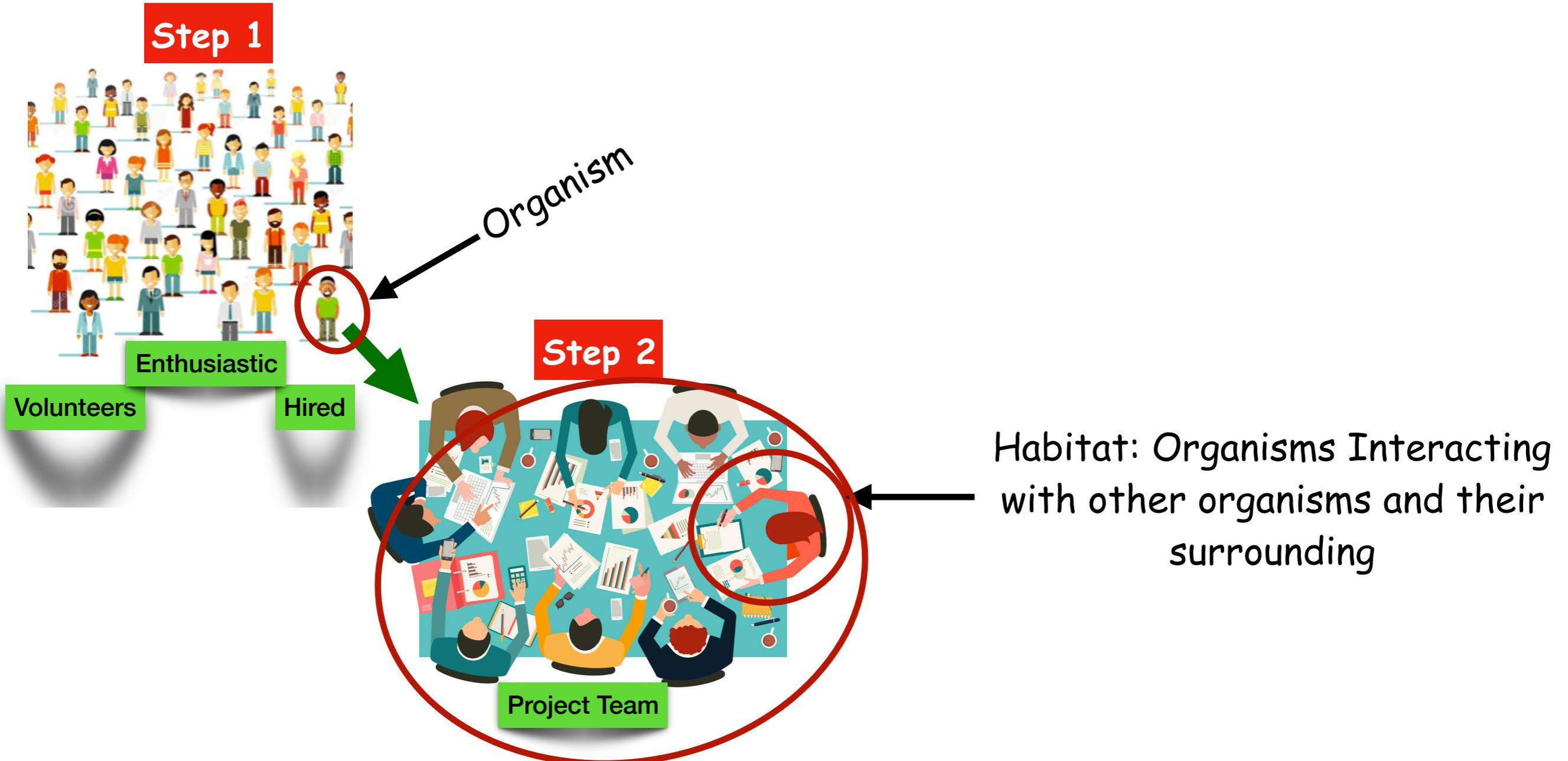
The Importance of **Keystone organisms** (Mentors & Experts), influencing the behaviours and adaptation of other organisms.

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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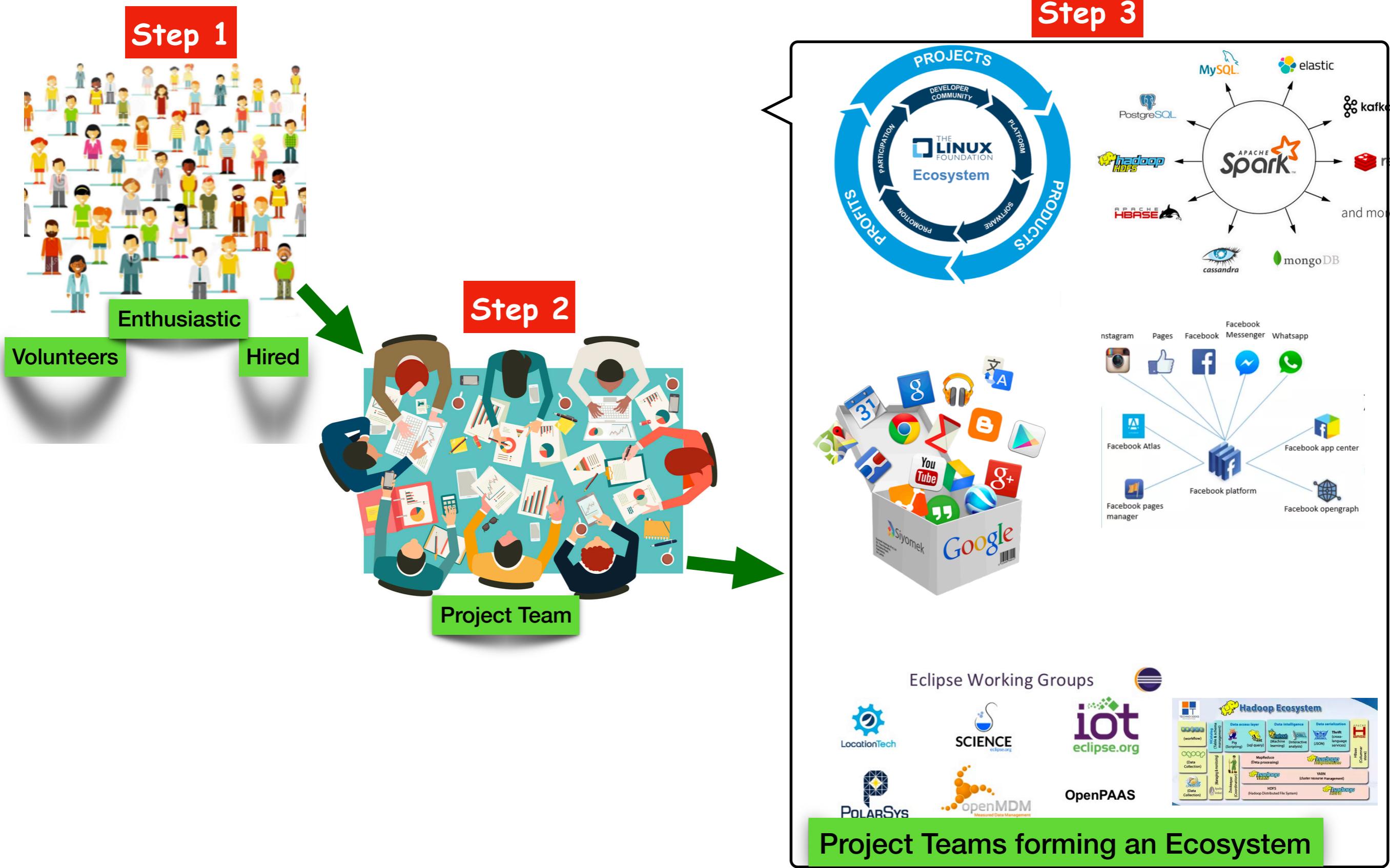


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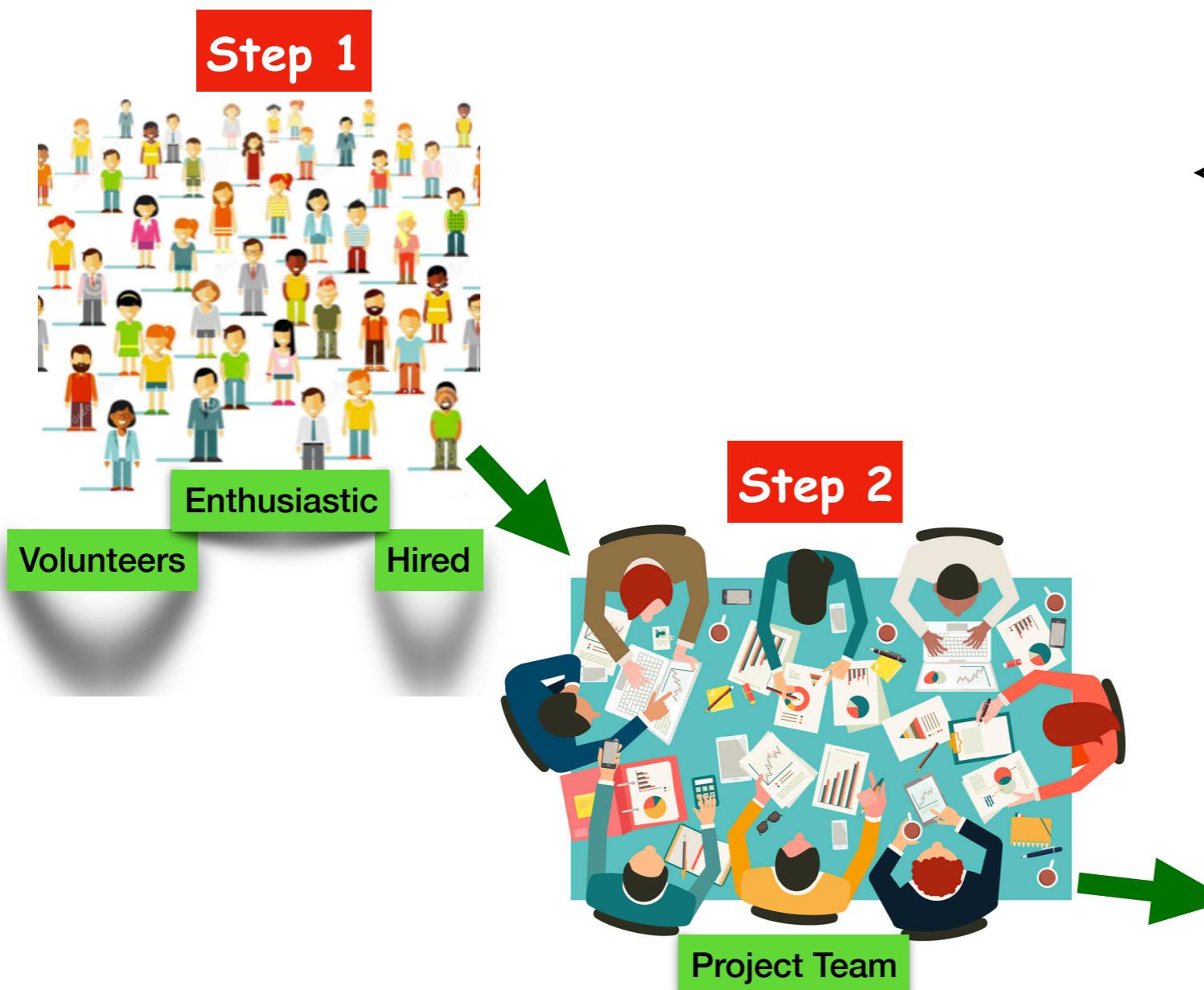
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Software Ecosystems (SECO) is Human-Centric



Niche:

Adaptation occurs in every step.
We investigate three Niches.



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

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Hutchinsonian: explain how organisms coexist within a given

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The Evolution of Niche in Software Ecosystems

Niche:

Mostly during Onboarding

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

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

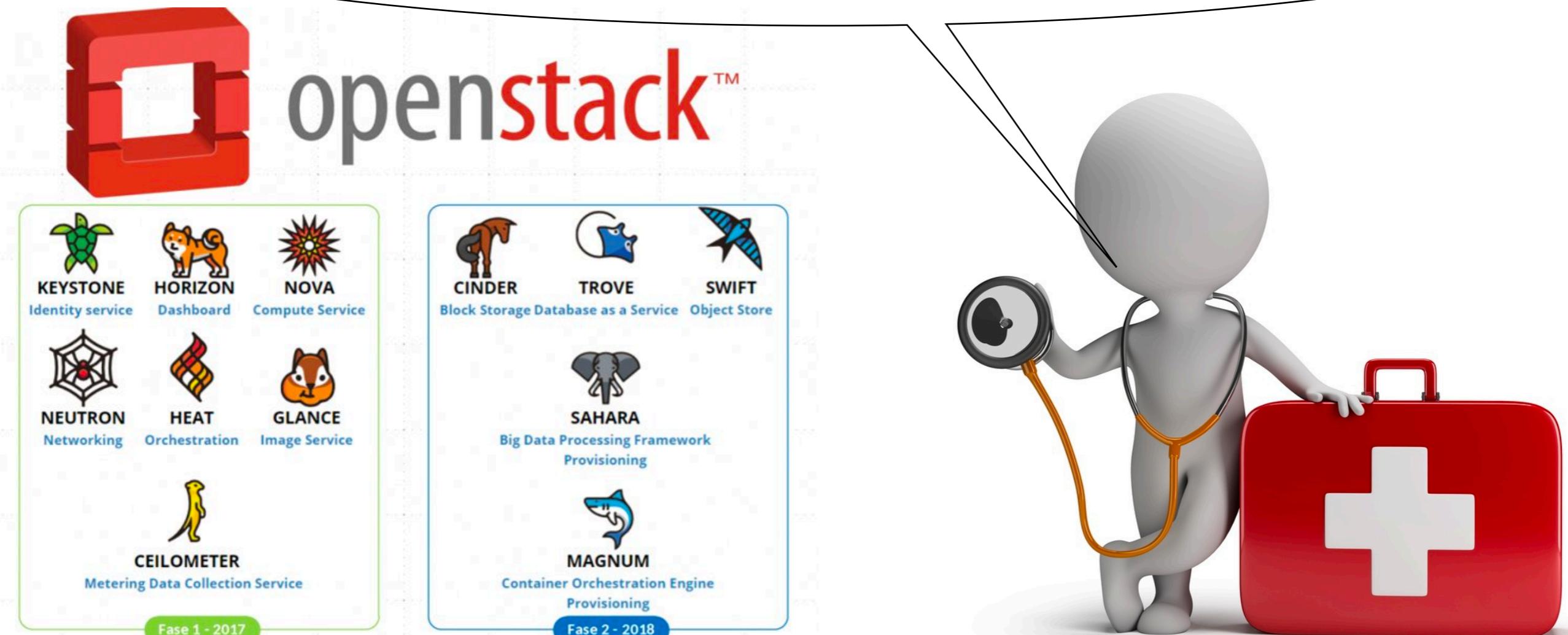




Investigating An Open Source Software Ecosystem's Health (SECOHealth)

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]



[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

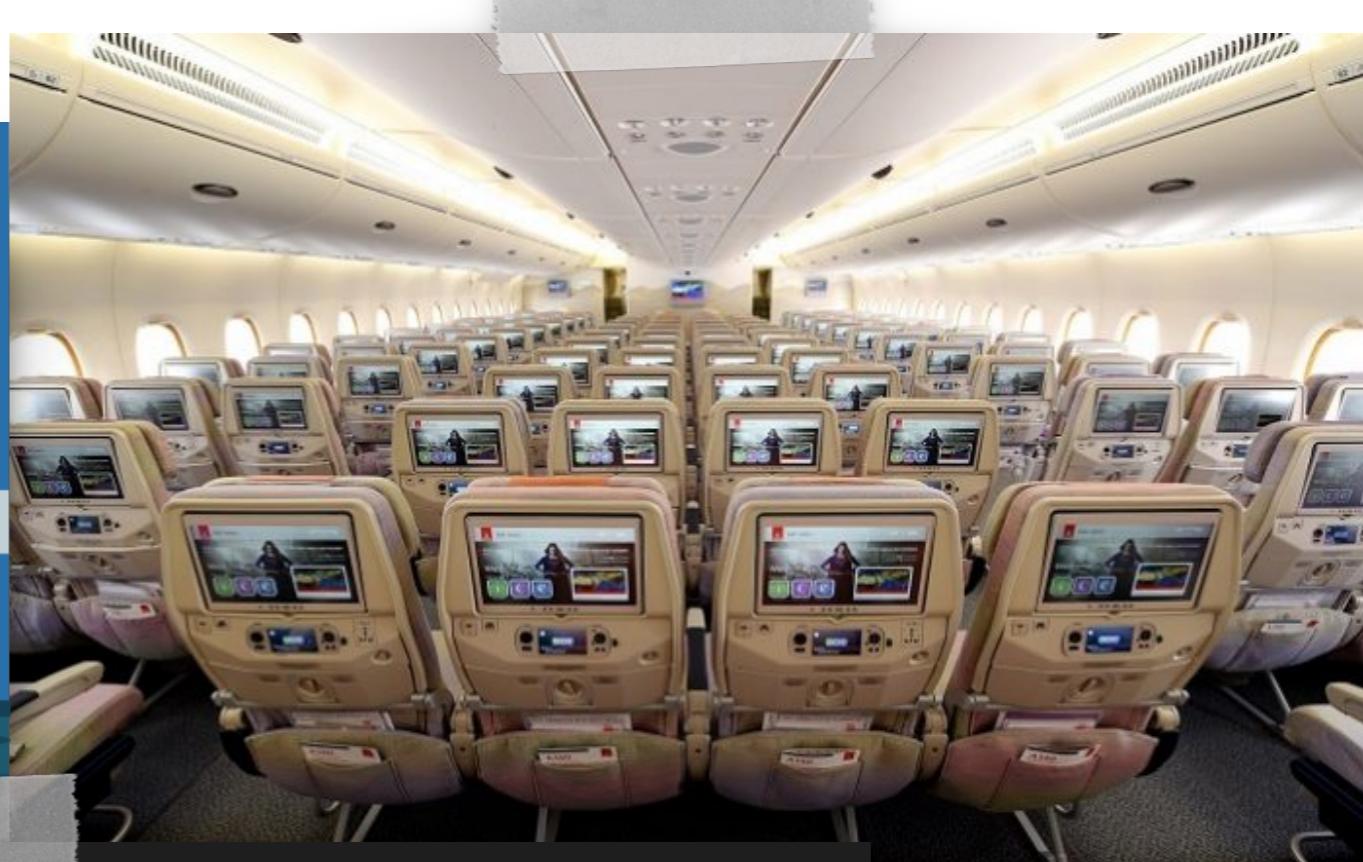
Evolution

Risk

Value



SECO Health Through The Lens of Onboarding Experience



onboarding | ən'bɔ:dɪŋ |

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.*

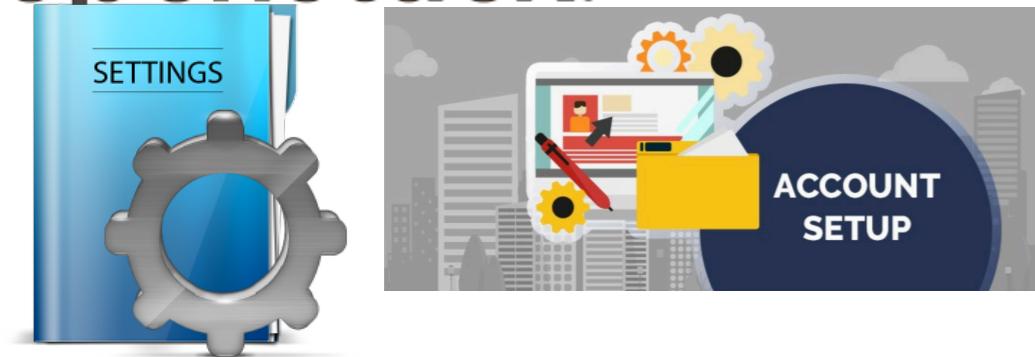
New Contributors

Onboarding Experience; OpenStack OUI

Promoting A Health Ecosystem.



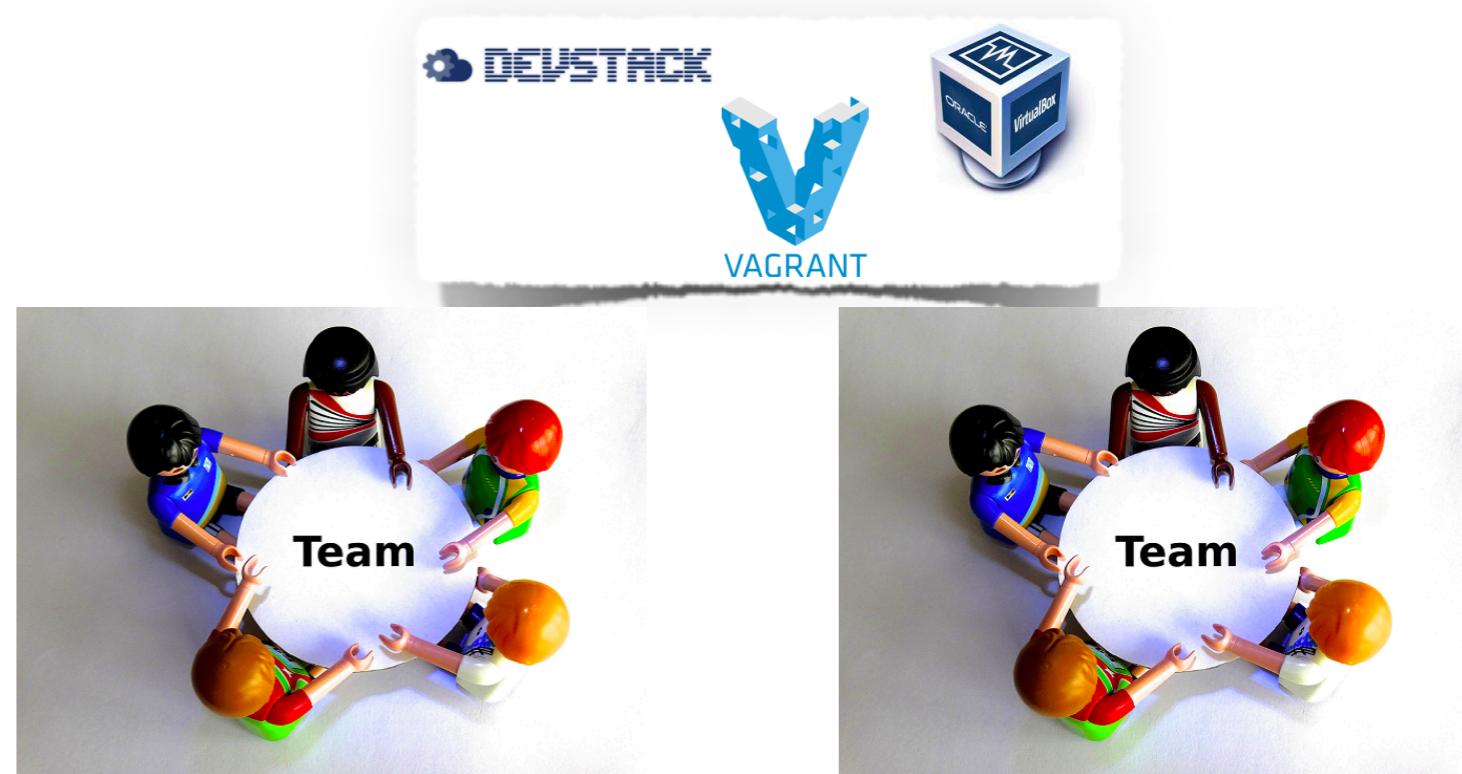
openstack®



Participants create Accounts and configure their local system



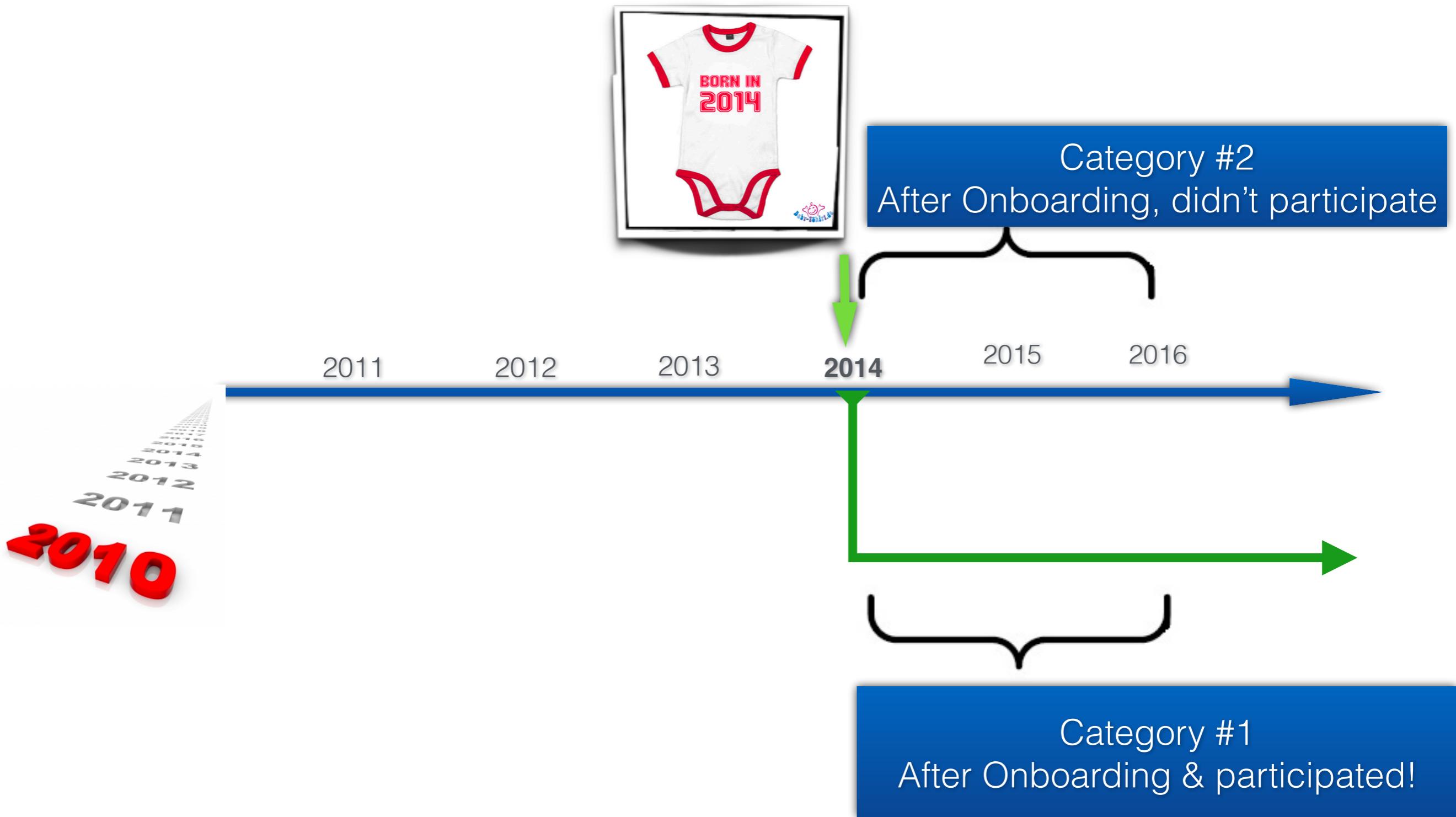
Diverse population





openstack®

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



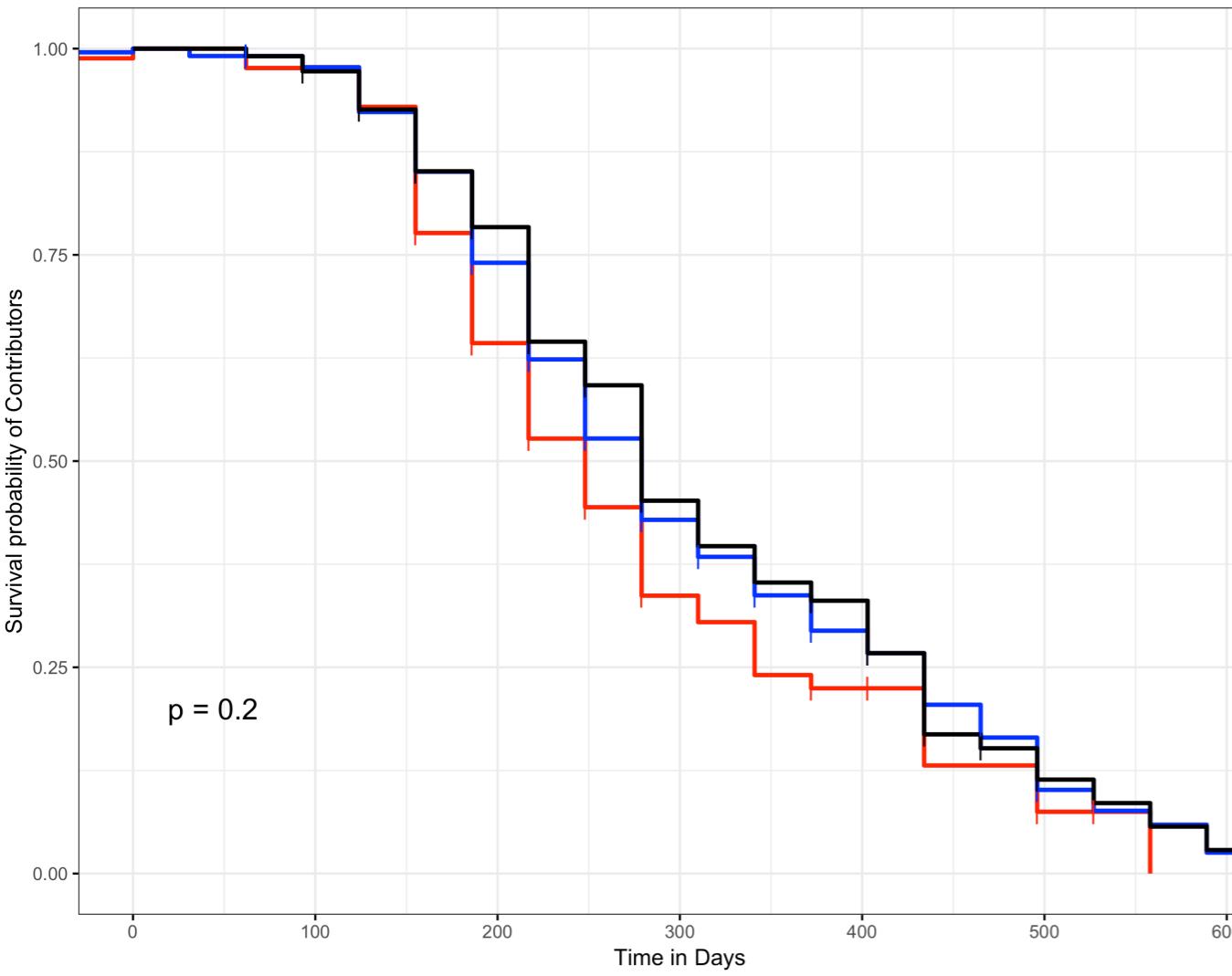
Evolution of Contributors towards first commit



Before

Gender Survival Rate Towards First Commit Before Onboarding

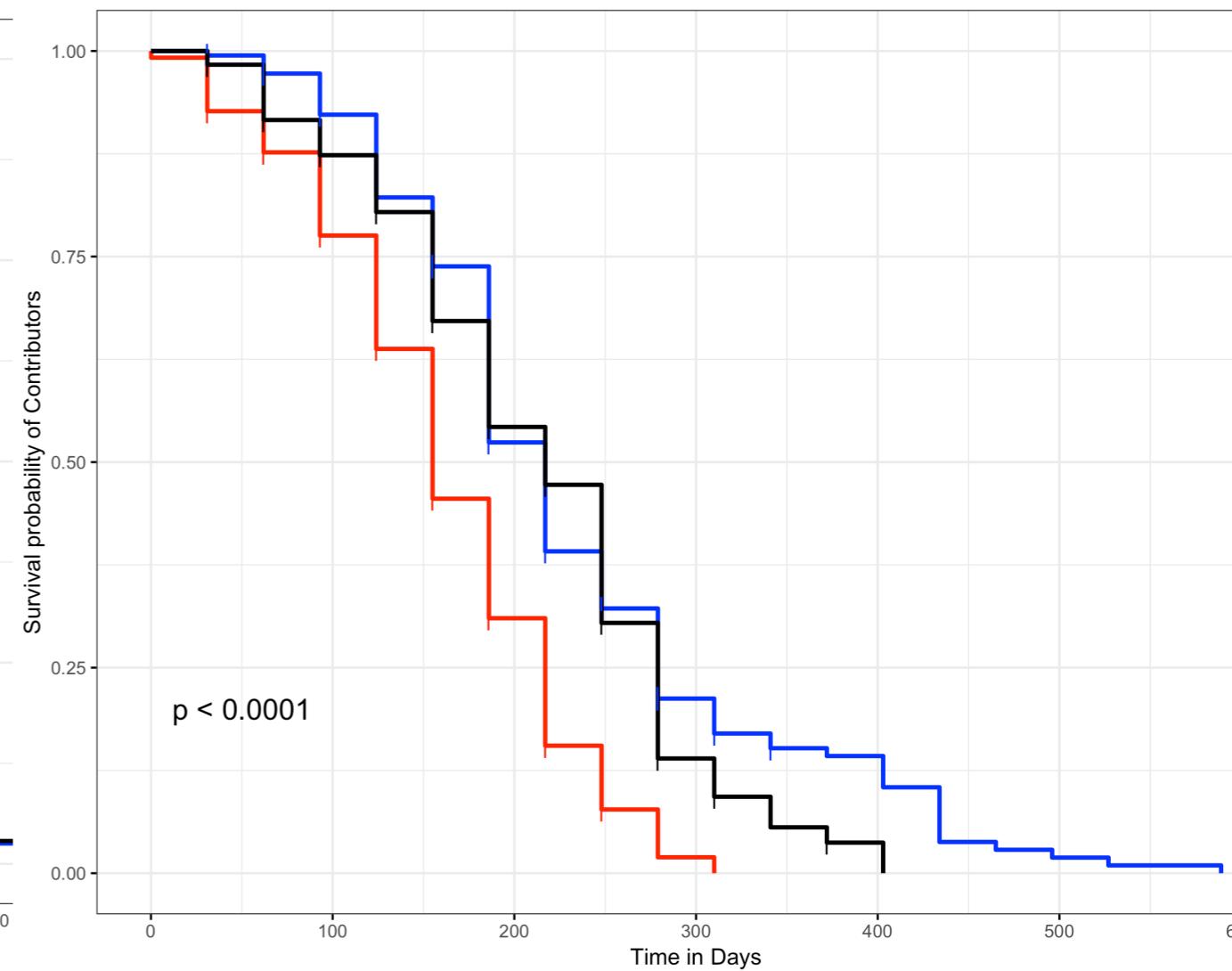
Strata + Female + Male + Neutral



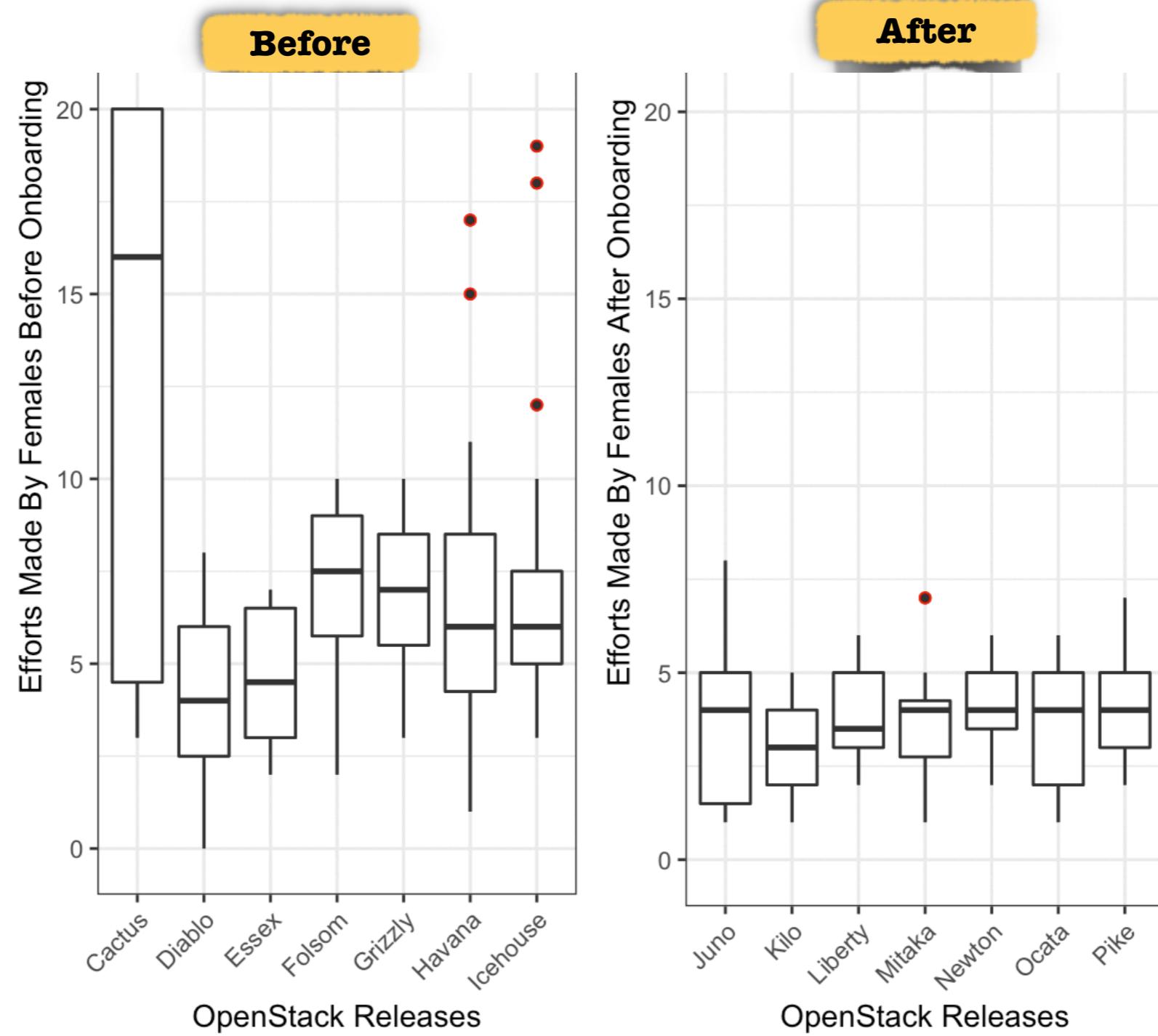
After

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.

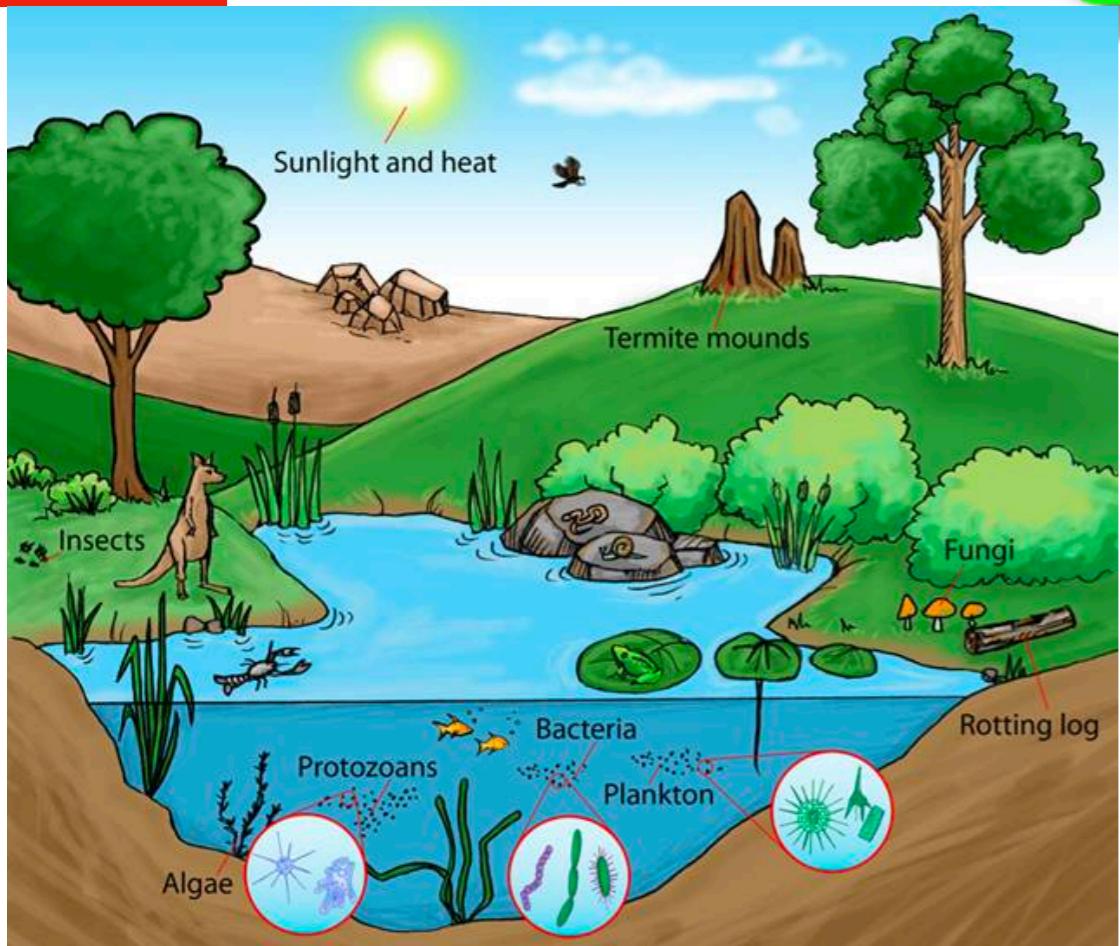
Observations

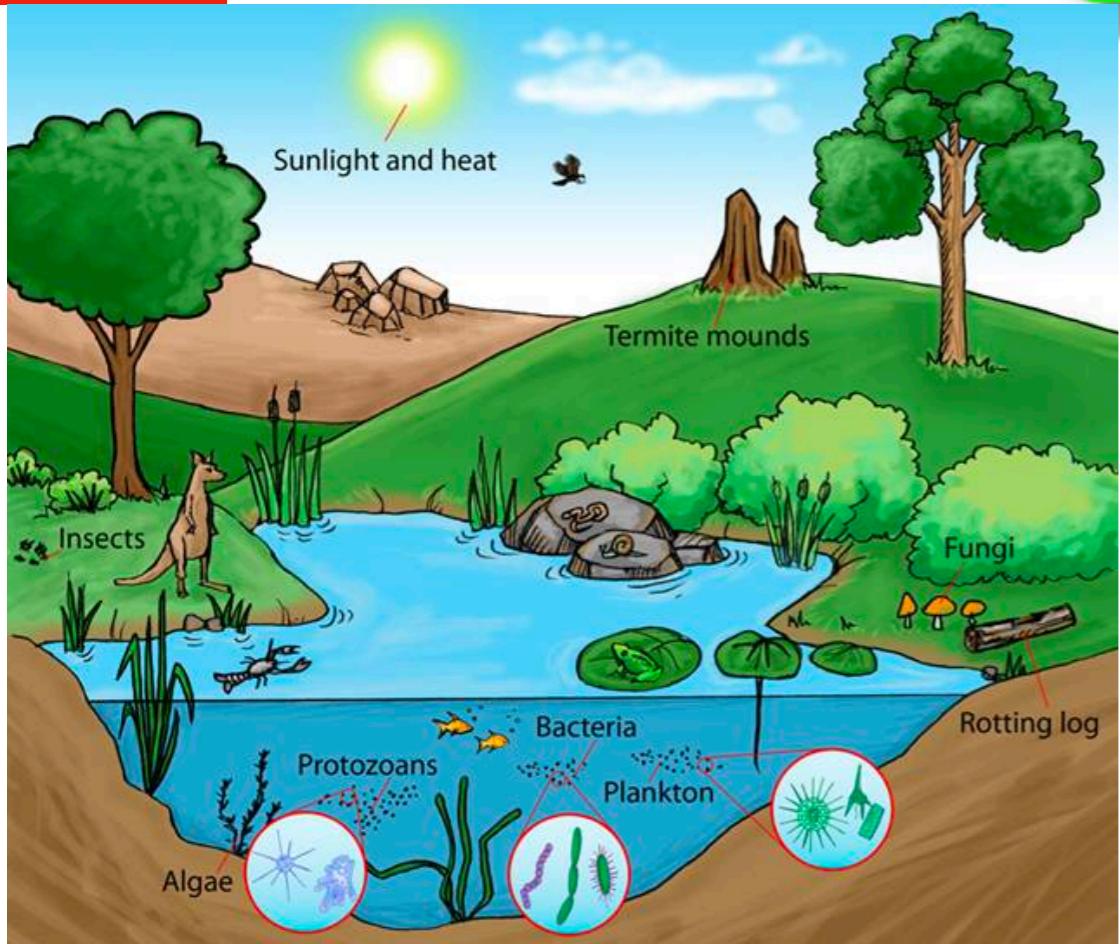
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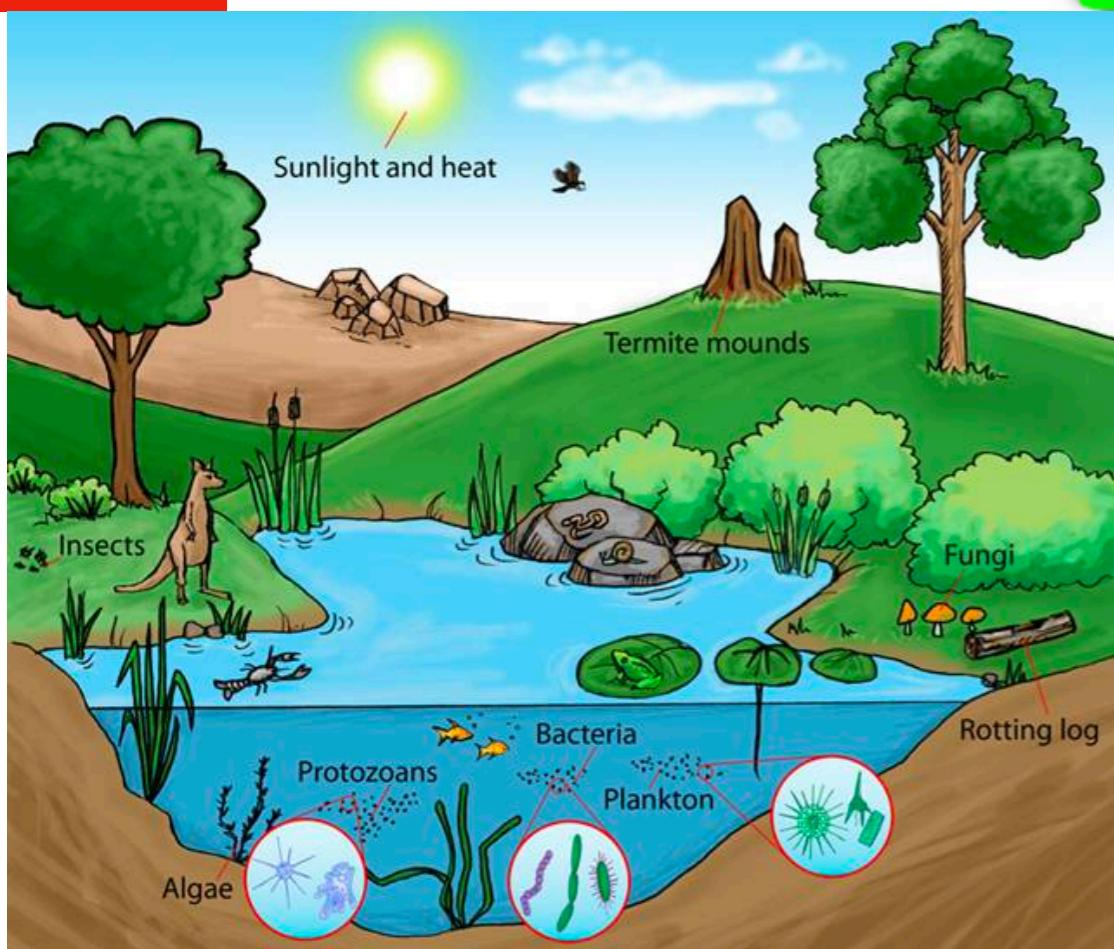
There are strong evidences of joint contribution among participants (Novice-Novice collaboration) and between participants and mentors (Novice-Expert collaboration).

In Sum

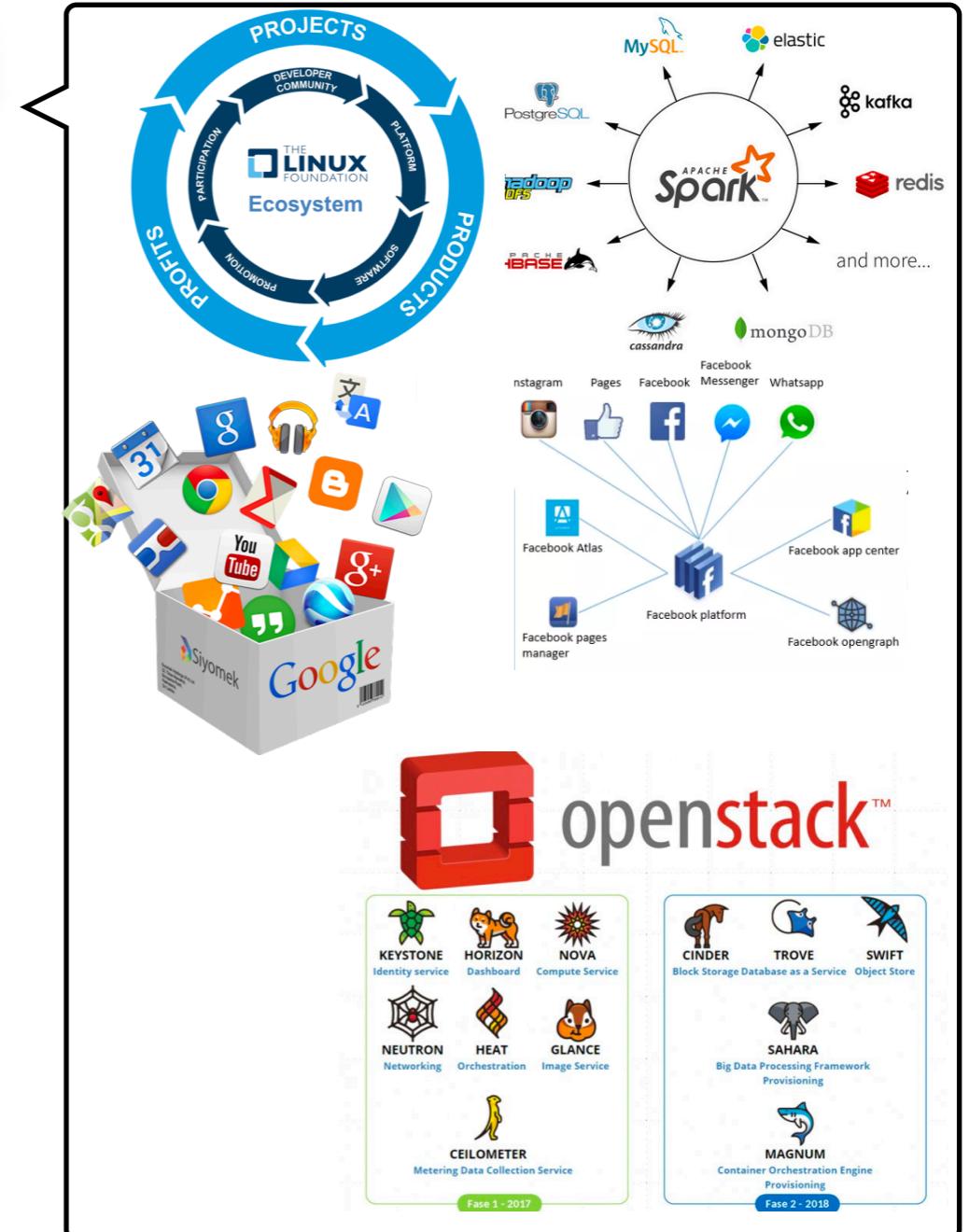




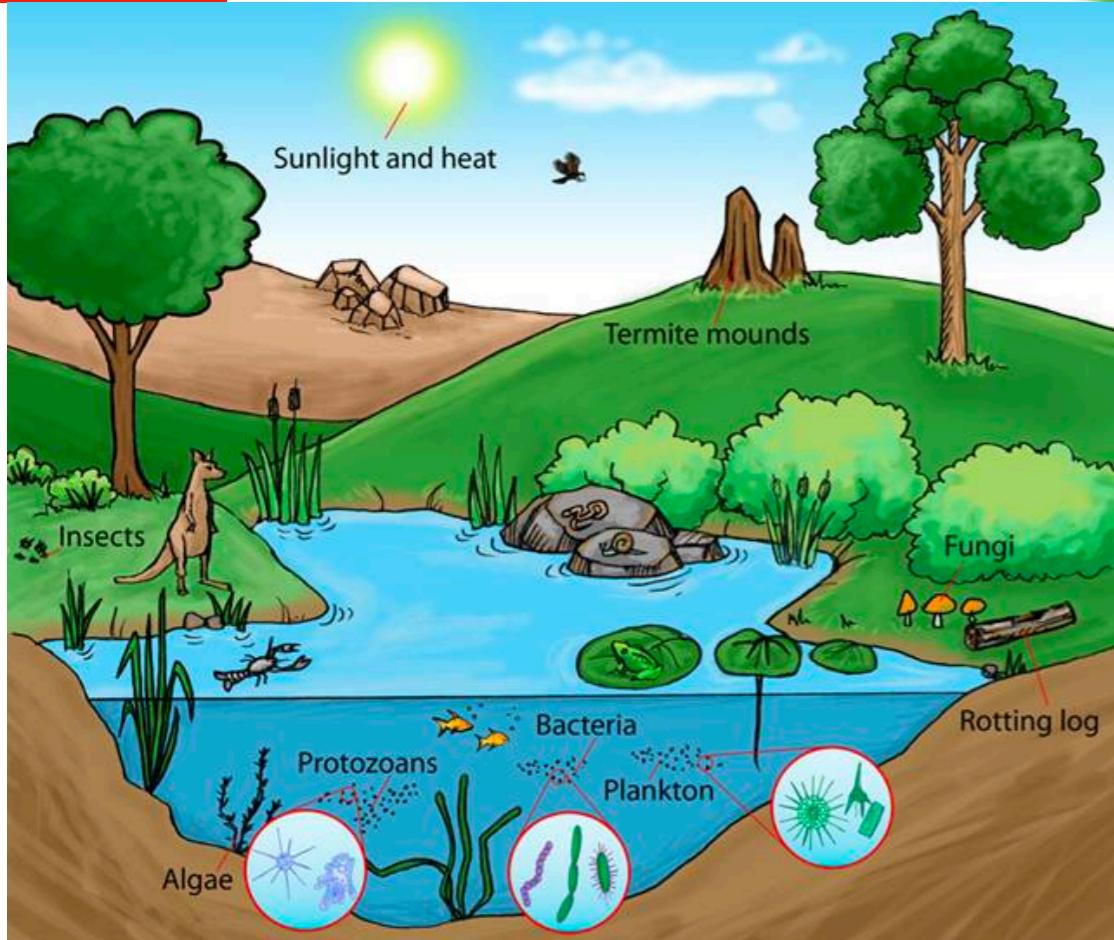
Niche: Natural Ecosystem



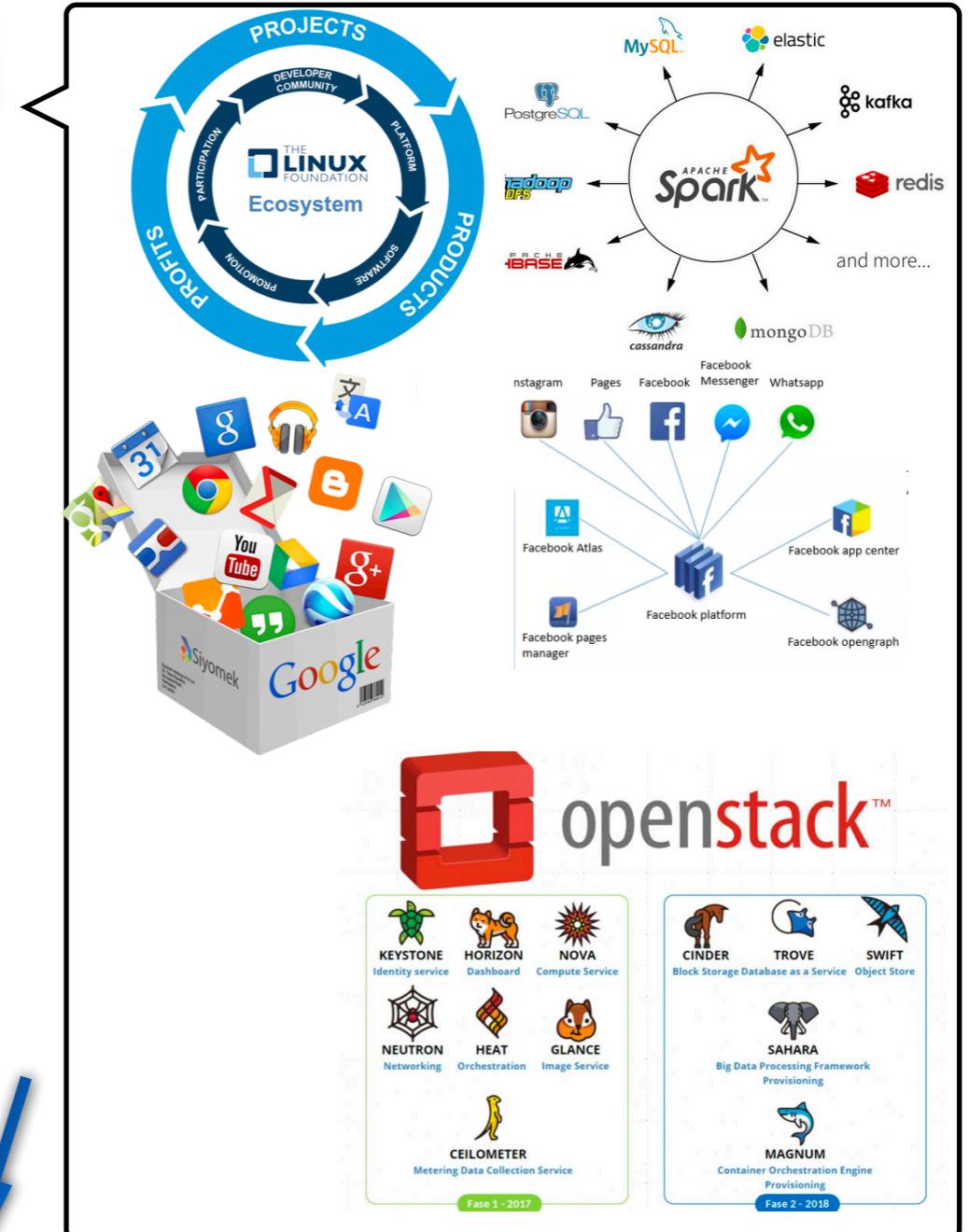
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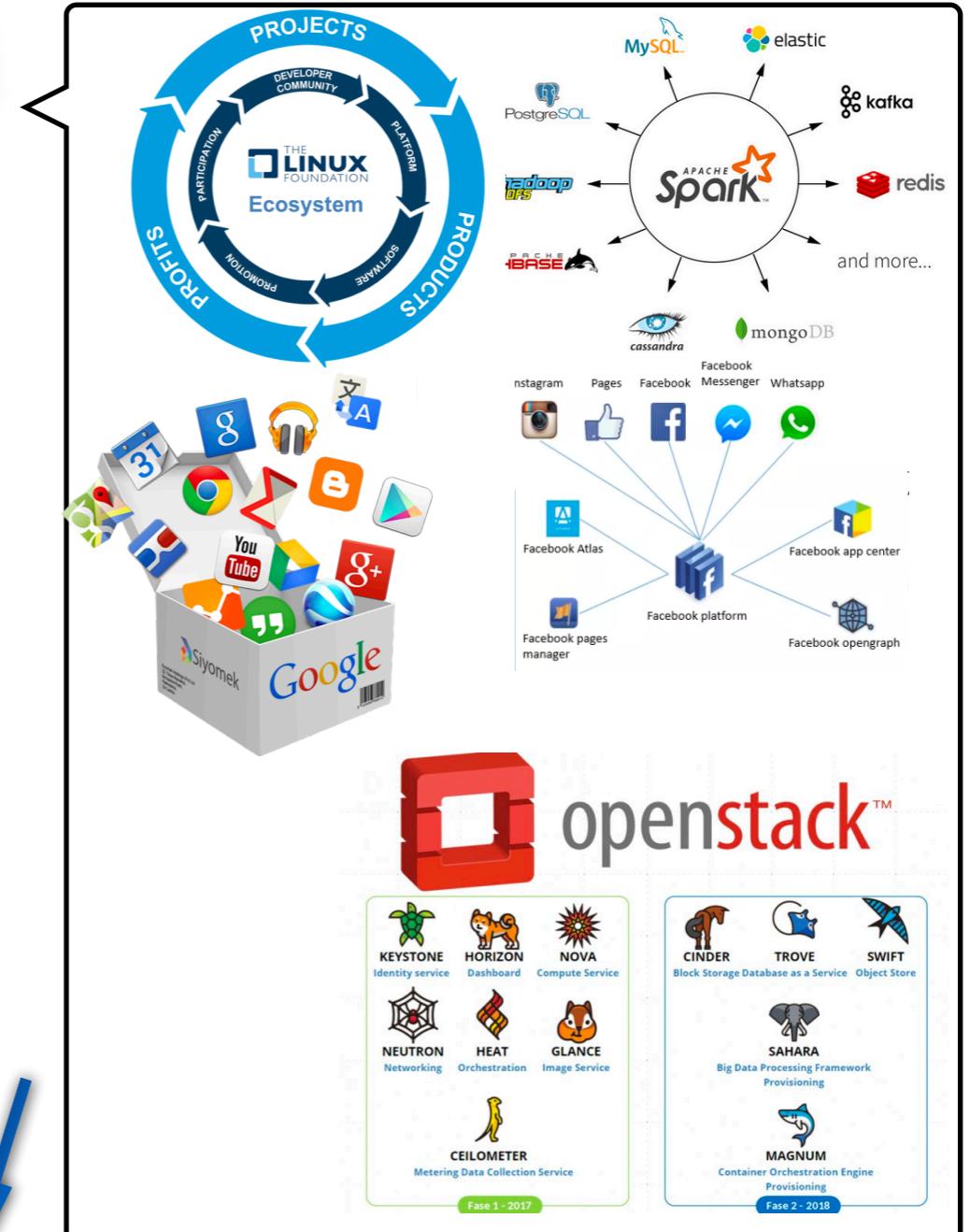
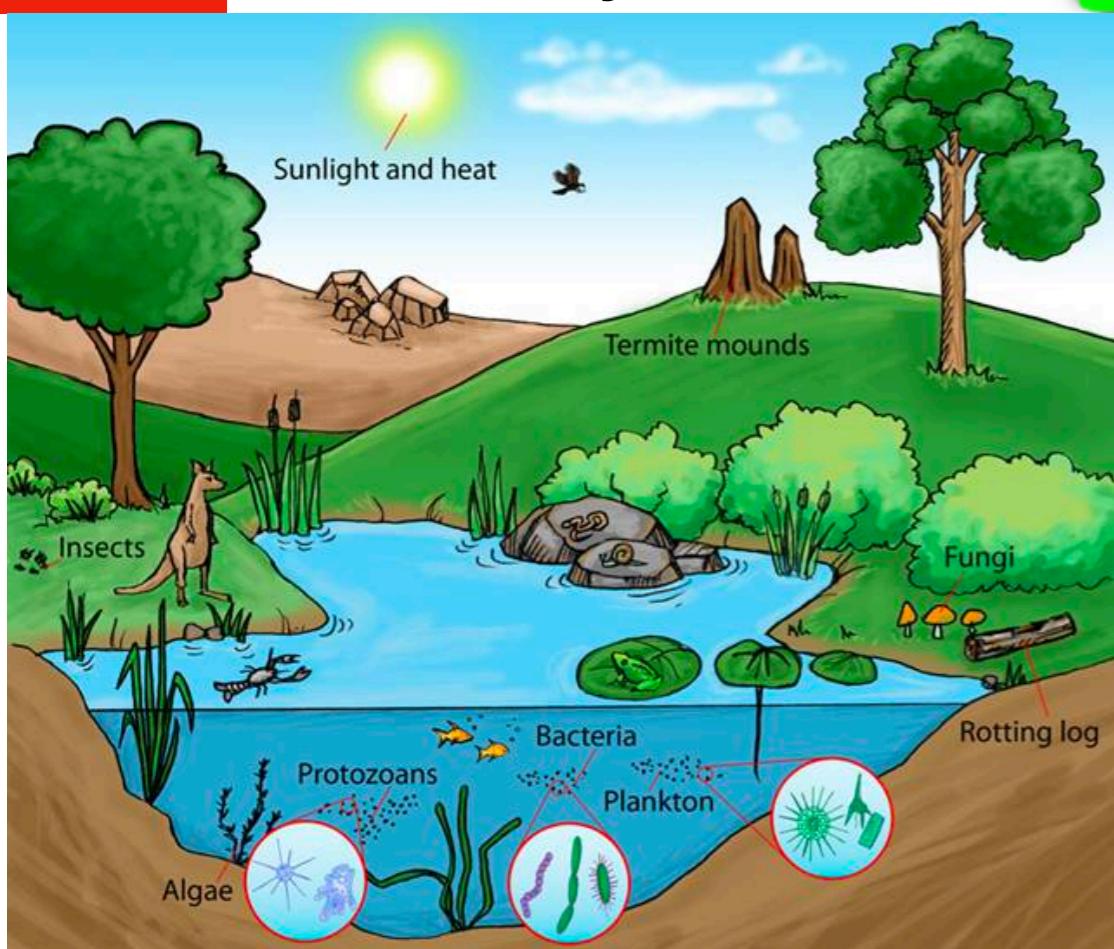


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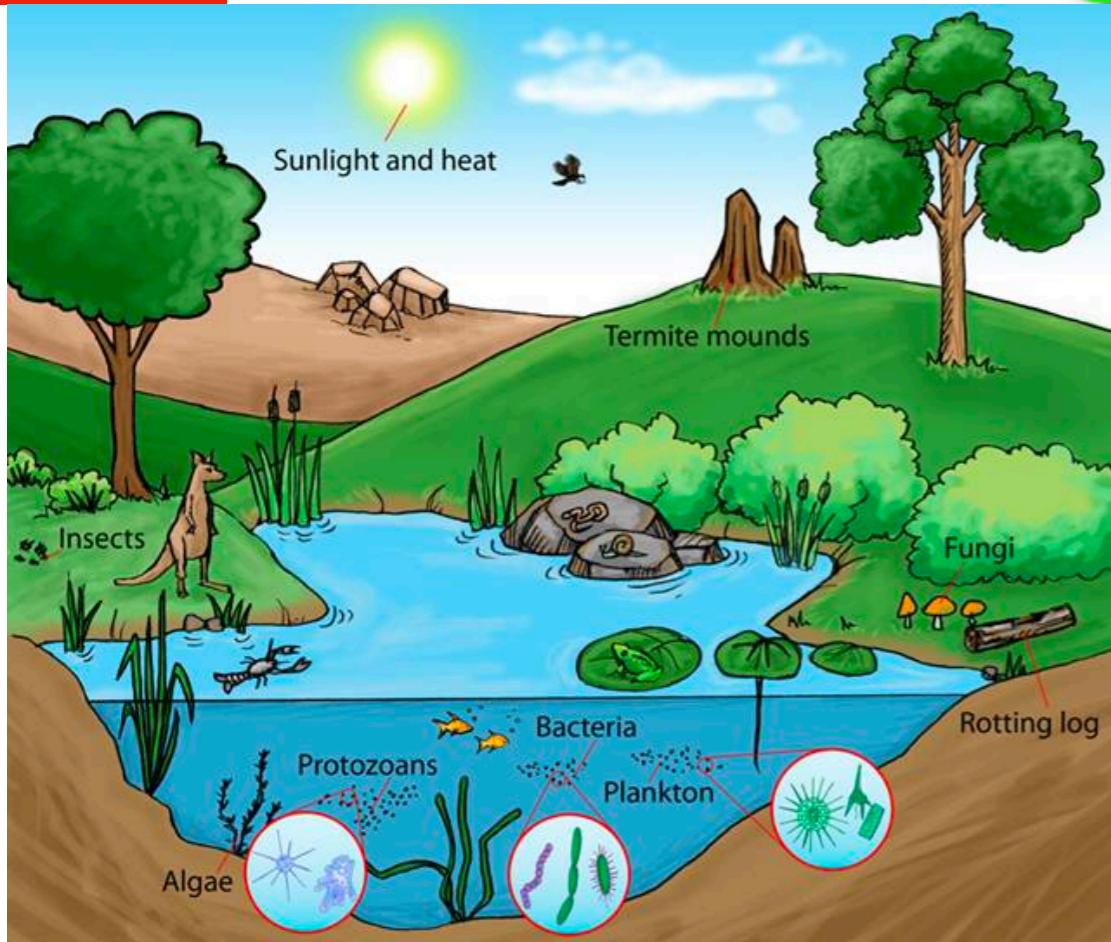


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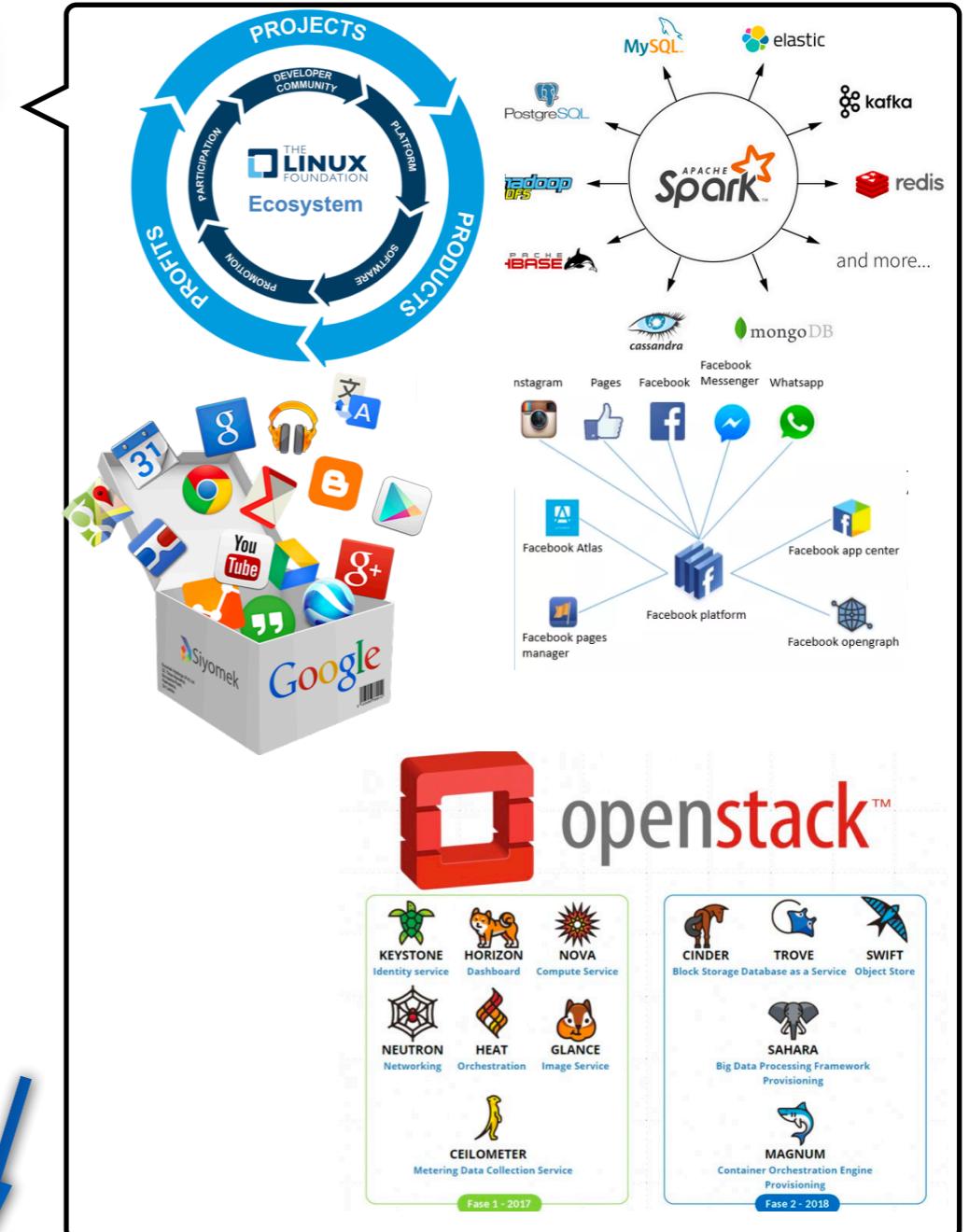
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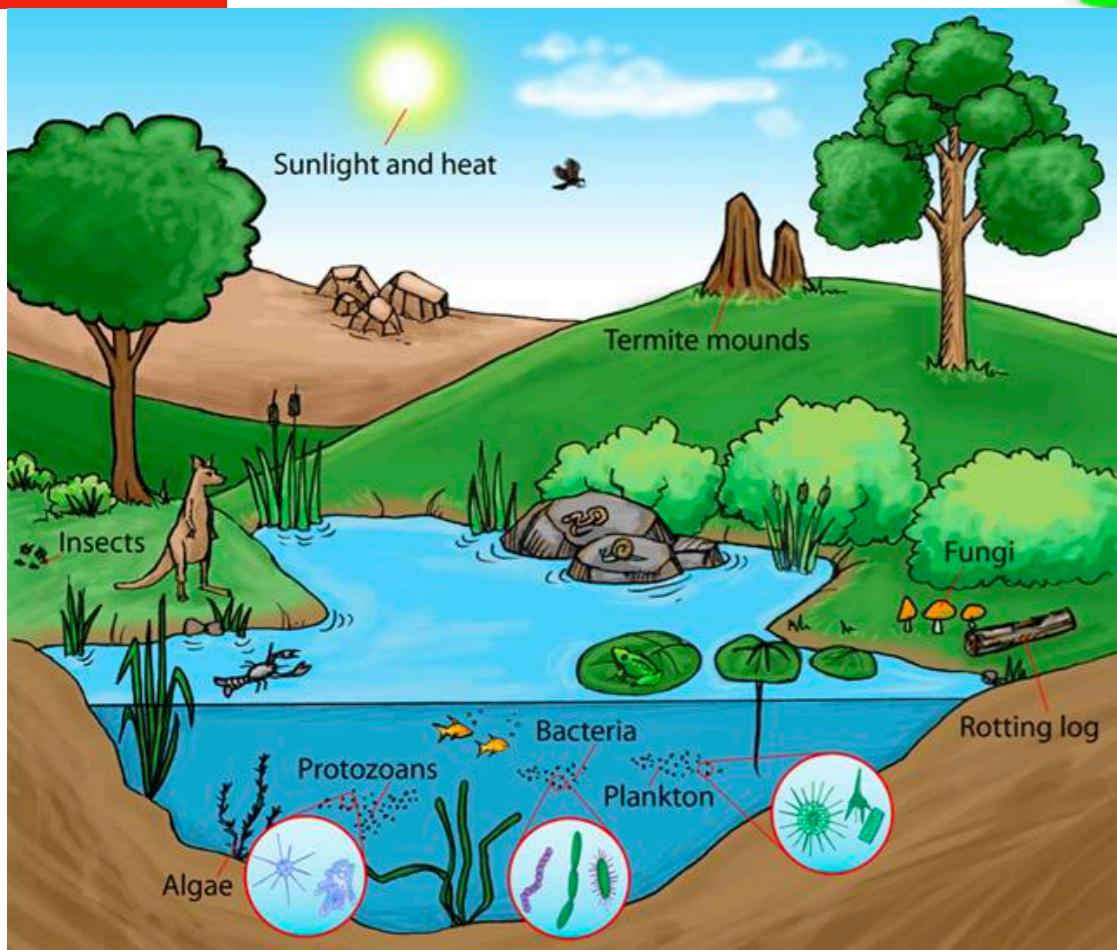
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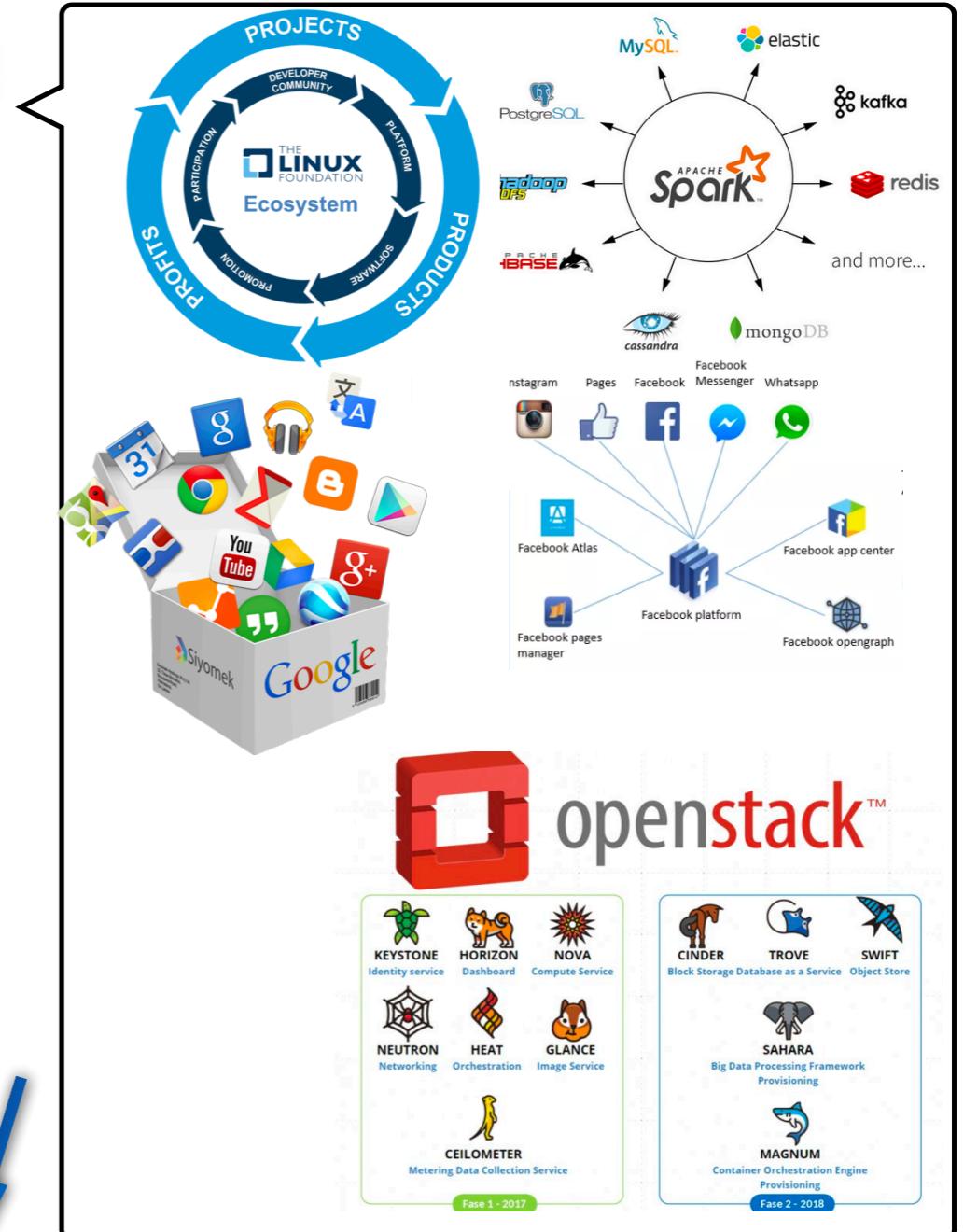
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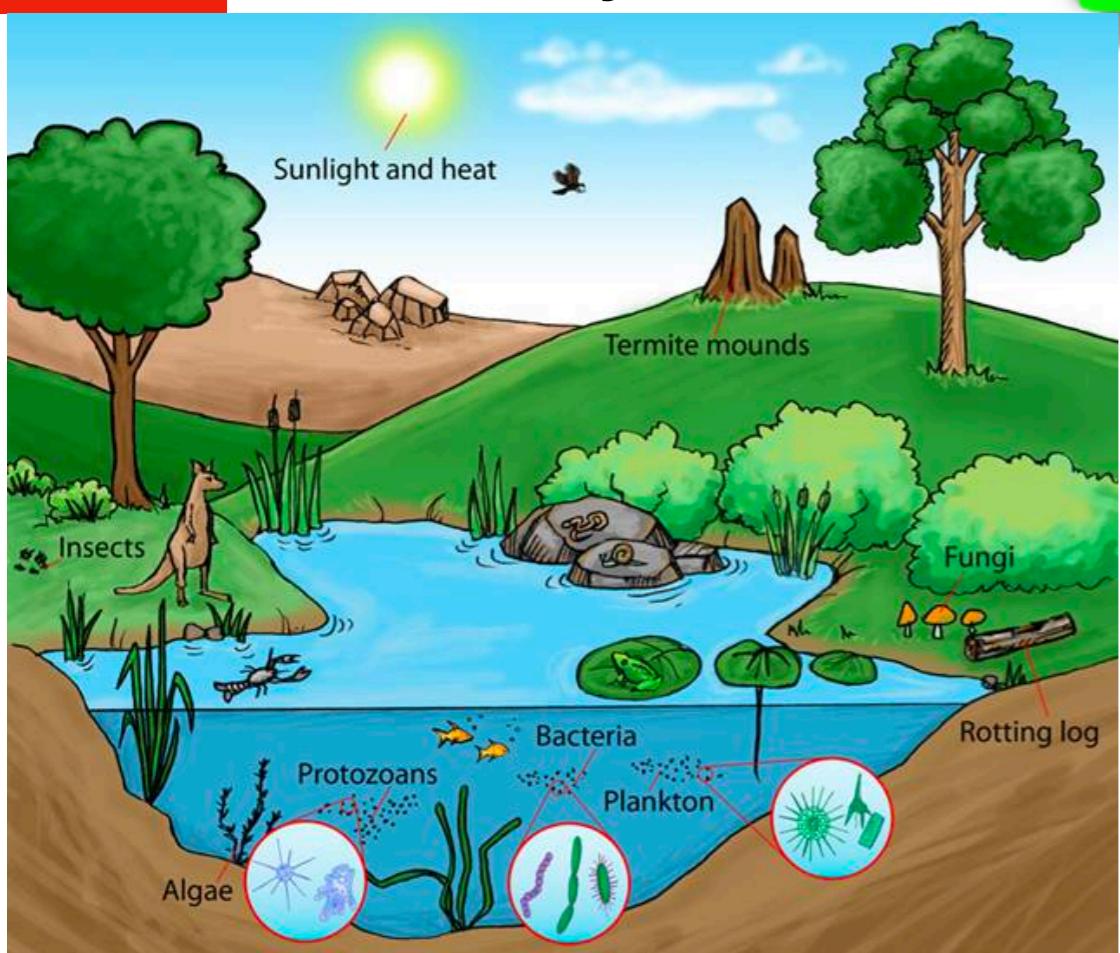
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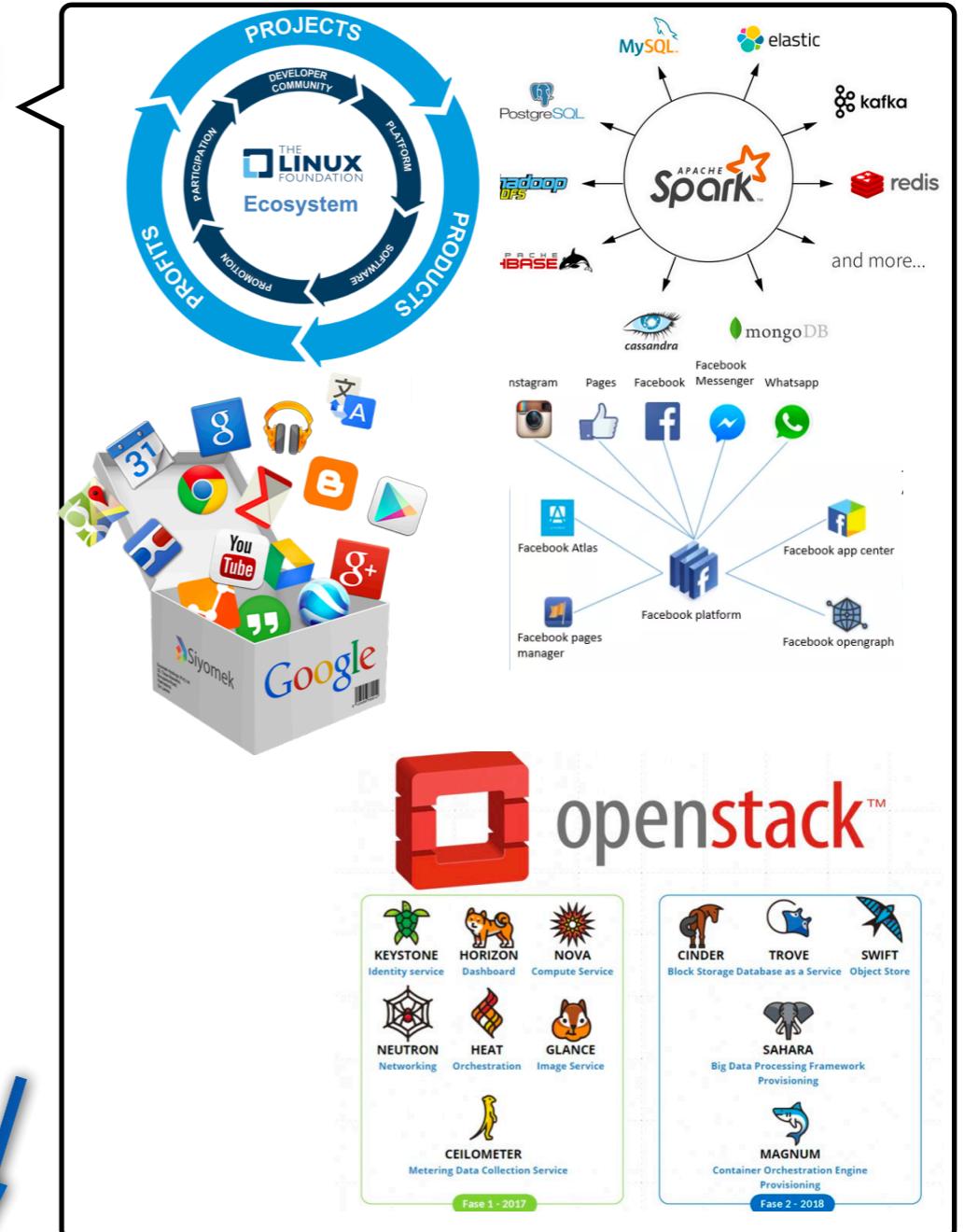
In Sum



Niche: Natural Ecosystem



In Sum



Diversity and Inclusion
Evolution; Survival
Cross-community collaboration

METRICS

PERFORMANCE

CRITERIA

LEVELS

STATISTICS

COST

MEASURES

PROCESS

QUALITY

SCOPE

ASSESSMENT

CONTROLS

IMPROVEMENT

STRATEGY

DIRECTION

LEADERSHIP

INFORMATION

MEANINGFUL

RELEVANT

HIGH-VALUE

TIME

ANALYSIS

SAFETY

DATA

MEASURABLE

ACTIONABLE

STEP

DEFINITION

PHASED

CRITICAL

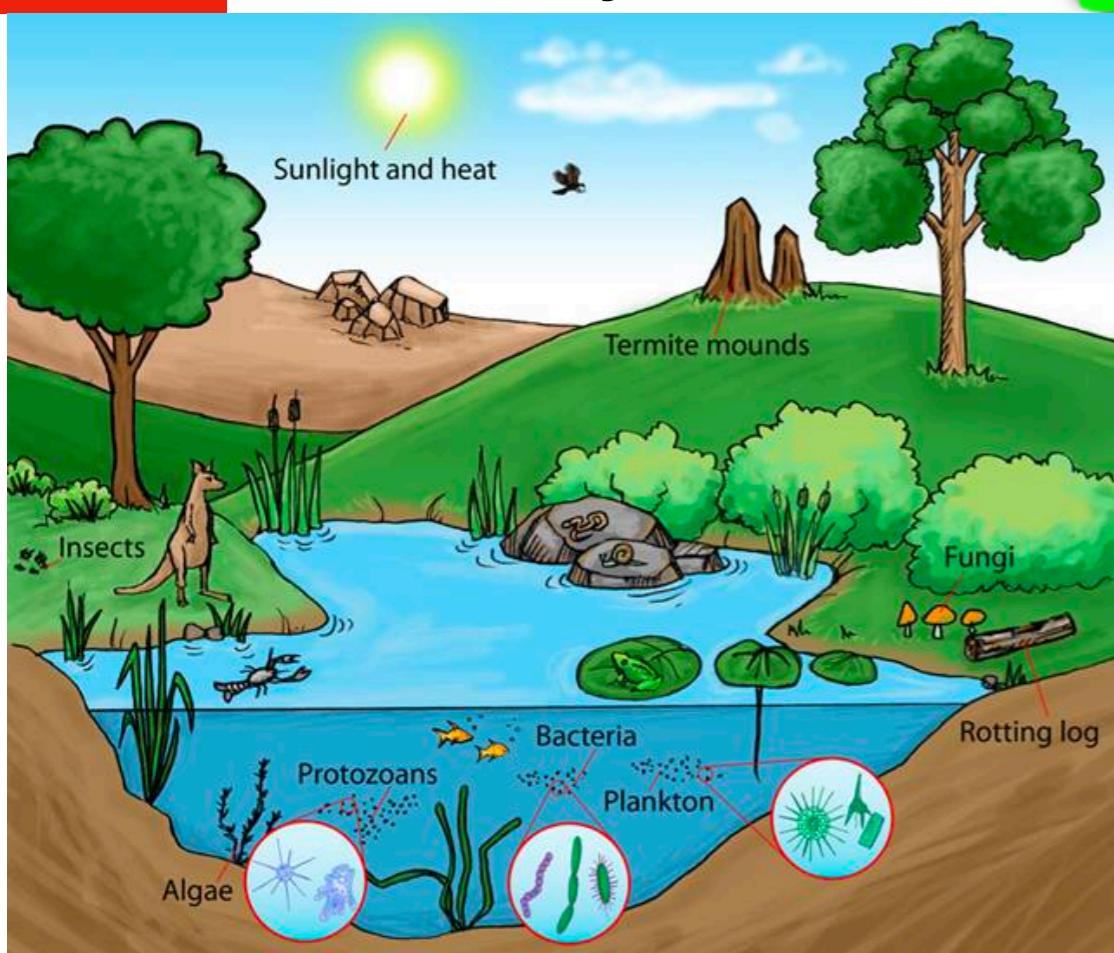
TRUE-PHASED

INDICATOR

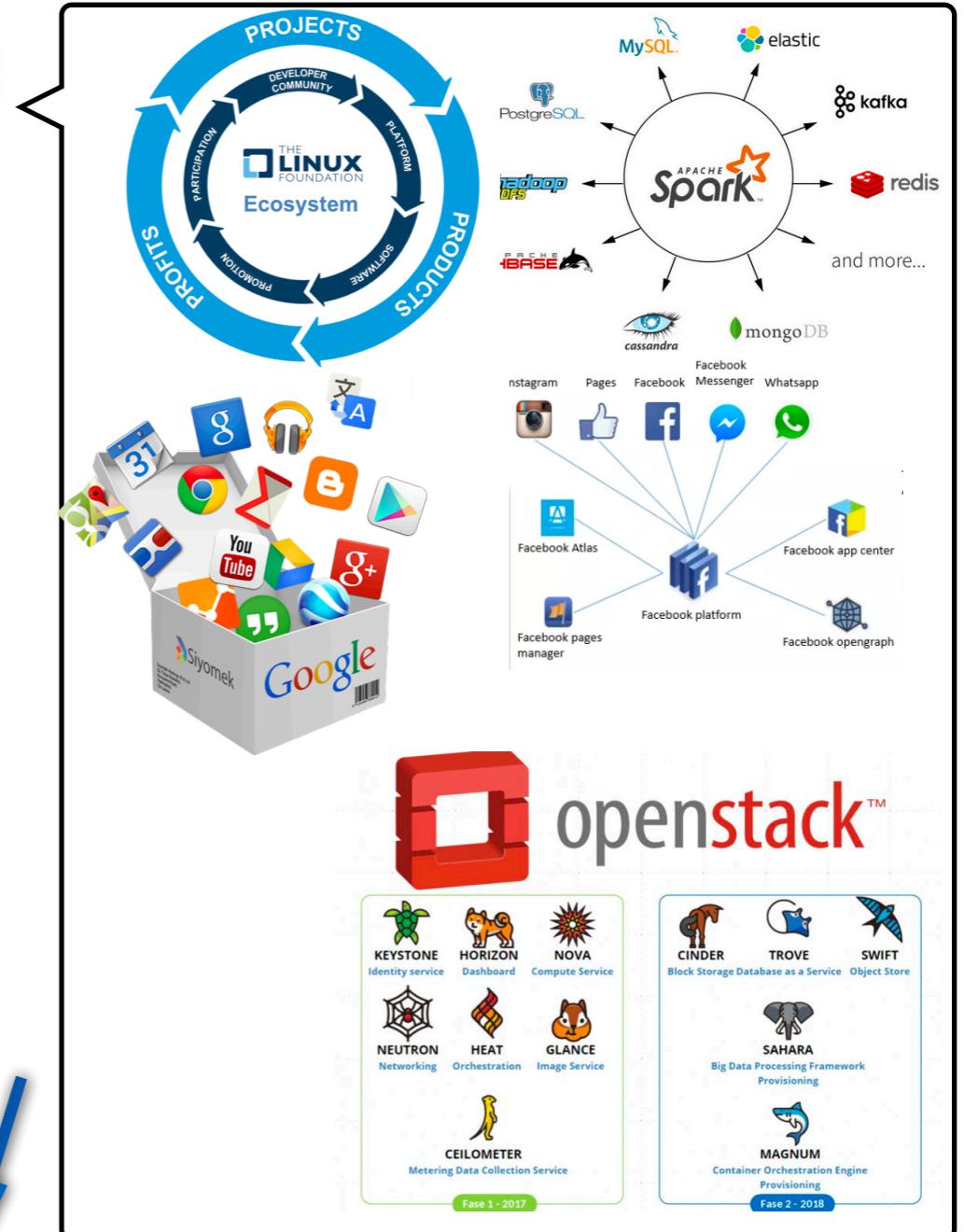
EFFECTIVENESS

SEVEN

Niche: Natural Ecosystem



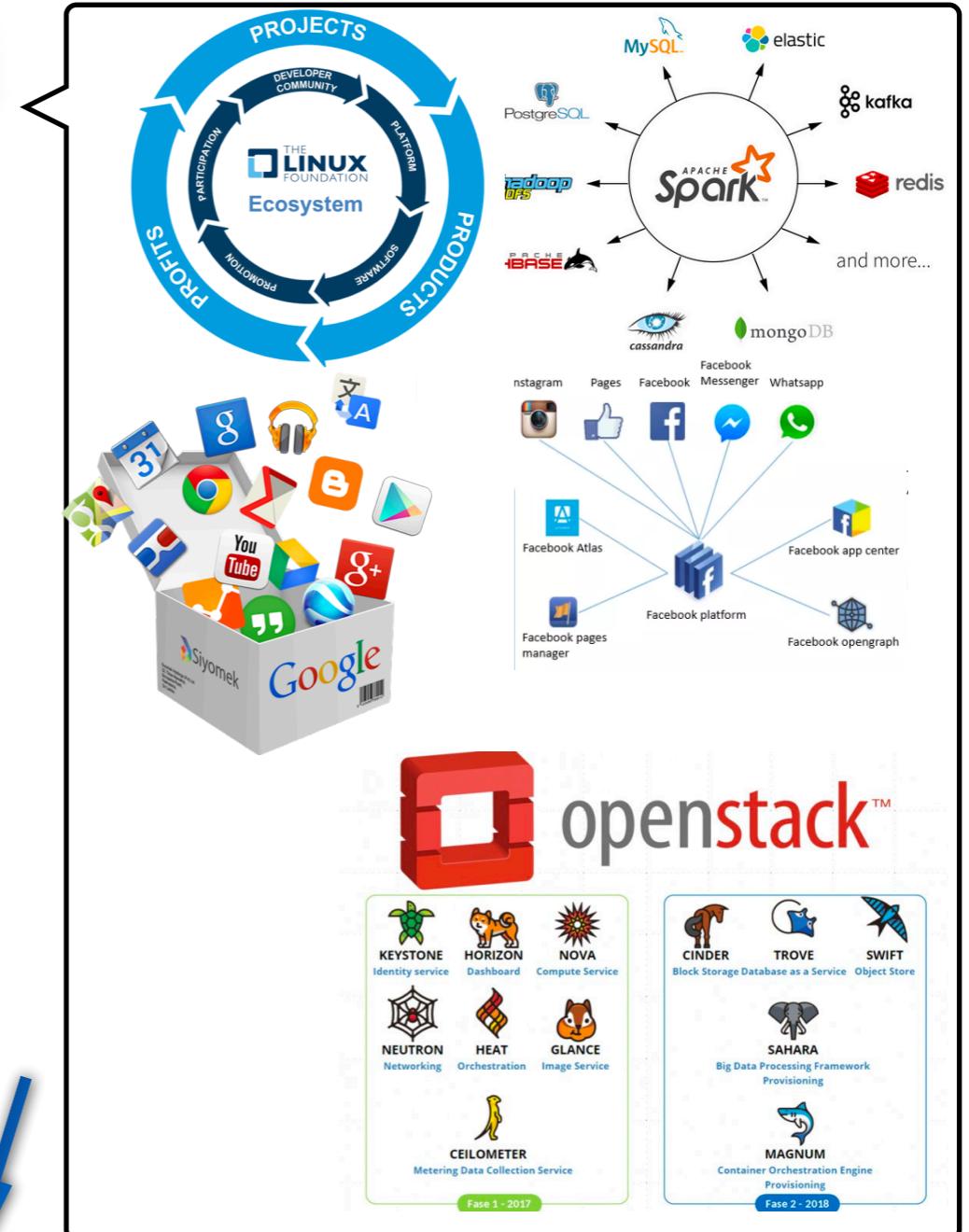
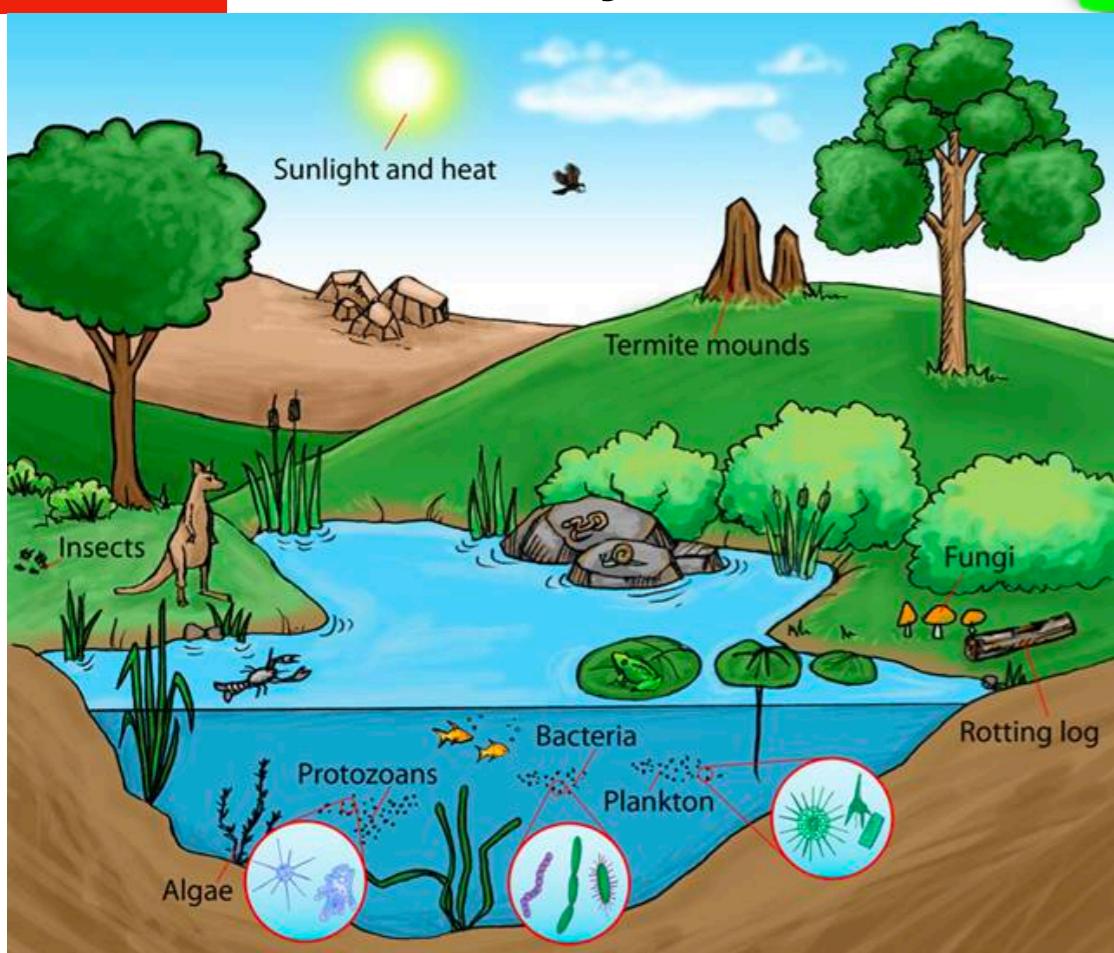
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Diversity and Inclusion
Evolution; Survival
Cross-community collaboration

Niche: Natural Ecosystem

In Sum



Diversity and Inclusion

Evolution; Survival

Cross-community collaboration

