Open Source Software
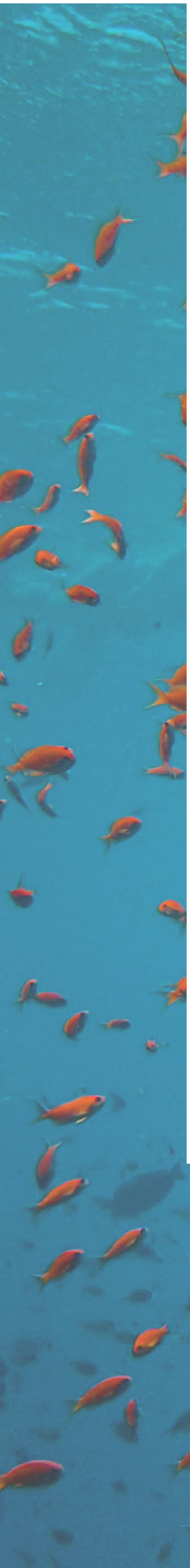# Ecosystem Report

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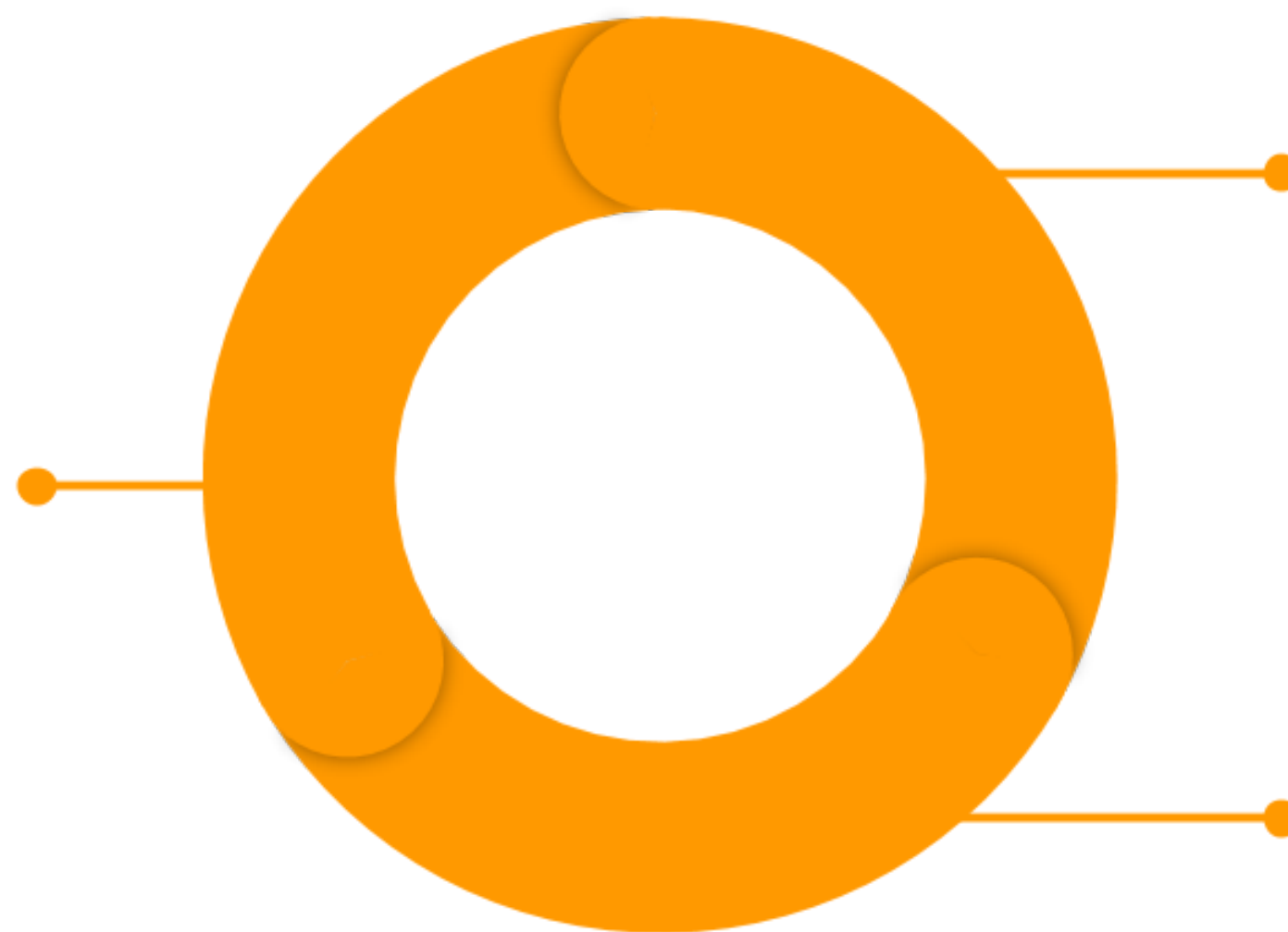
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Open Source Ecosystem Report

Company goals around using, consuming, contributing to, and maintaining open source software (OSS) projects are usually related to market positioning, upstream features development, and talent attraction or retention. Well-organized OSS efforts are managed by an Open Source Programs Office (OSPO) that can work with the following insights.

(1) OSS Ecosystem Overview
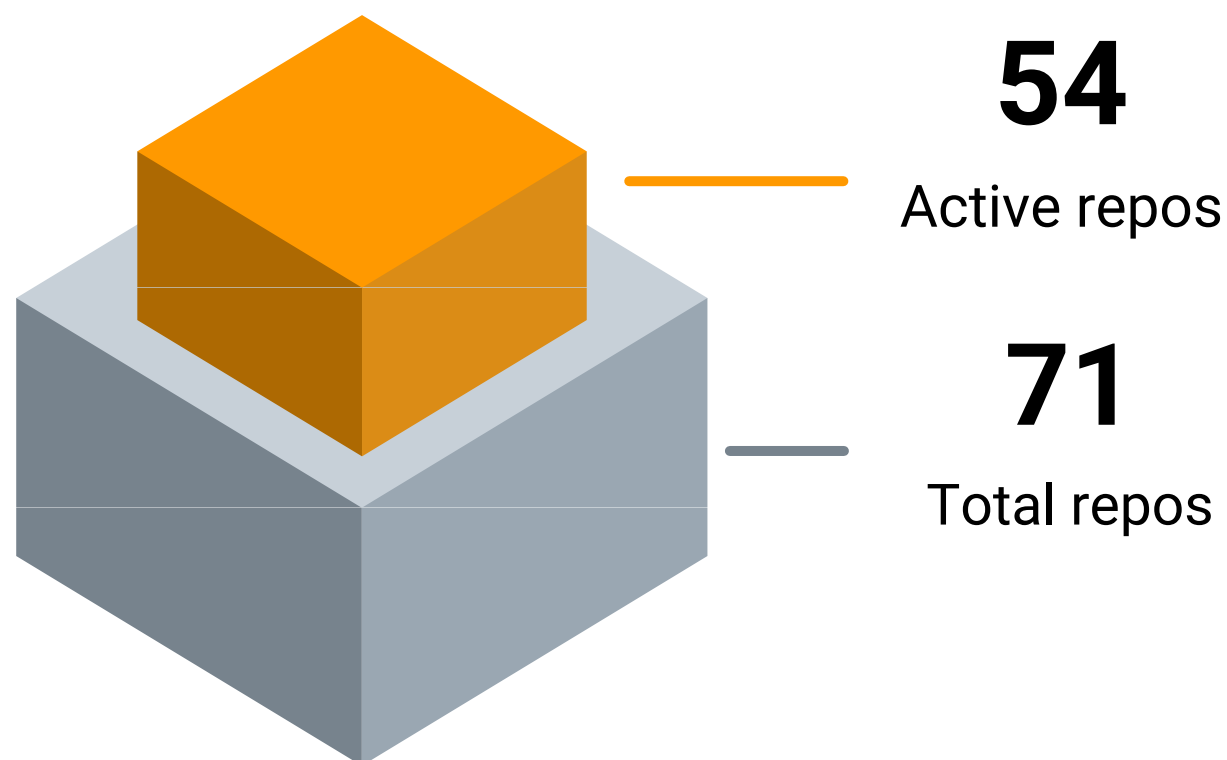
What characterizes this ecosystem?

Complexity

The complexity of an OSS ecosystem can be determined by the number of code repositories and people involved. An increasing number of repositories indicates an increasing complexity of the analyzed ecosystem.

Responsiveness

The performance of an OSS ecosystem can be determined by time to solve issues and pull requests or merge requests, as well as average commits per day. A lower average response time indicates a higher performance in the analyzed ecosystem.

Activity Diversity

The activity of an OSS ecosystem can be determined by total number of commits, issues, patches requests, and lines of code added/removed over a period of time. When and where the activity occurs indicates how it is distributed in the analyzed ecosystem.

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(1.1) Overview Analysis

54
Active repos

71
Total repos

15.2K
Total Contributors

169
Commits (Daily Average)

The activity of **Kubernetes** OSS ecosystem during **Q4** shows a general decrease: **15.2 K commits, 2.8K issues created, 1.1K change requests, and 900K edited lines of code (LOC)**.

This might be because winter holiday season, as the community had less activity in terms of code development and contributor's community.

Commits

15.2K

-21% since Q3

Issues Created

2.8K

-24% since Q3

Change request

6.1K

-14.1% since Q3

Edited LOC

8M

-26.8% since Q3

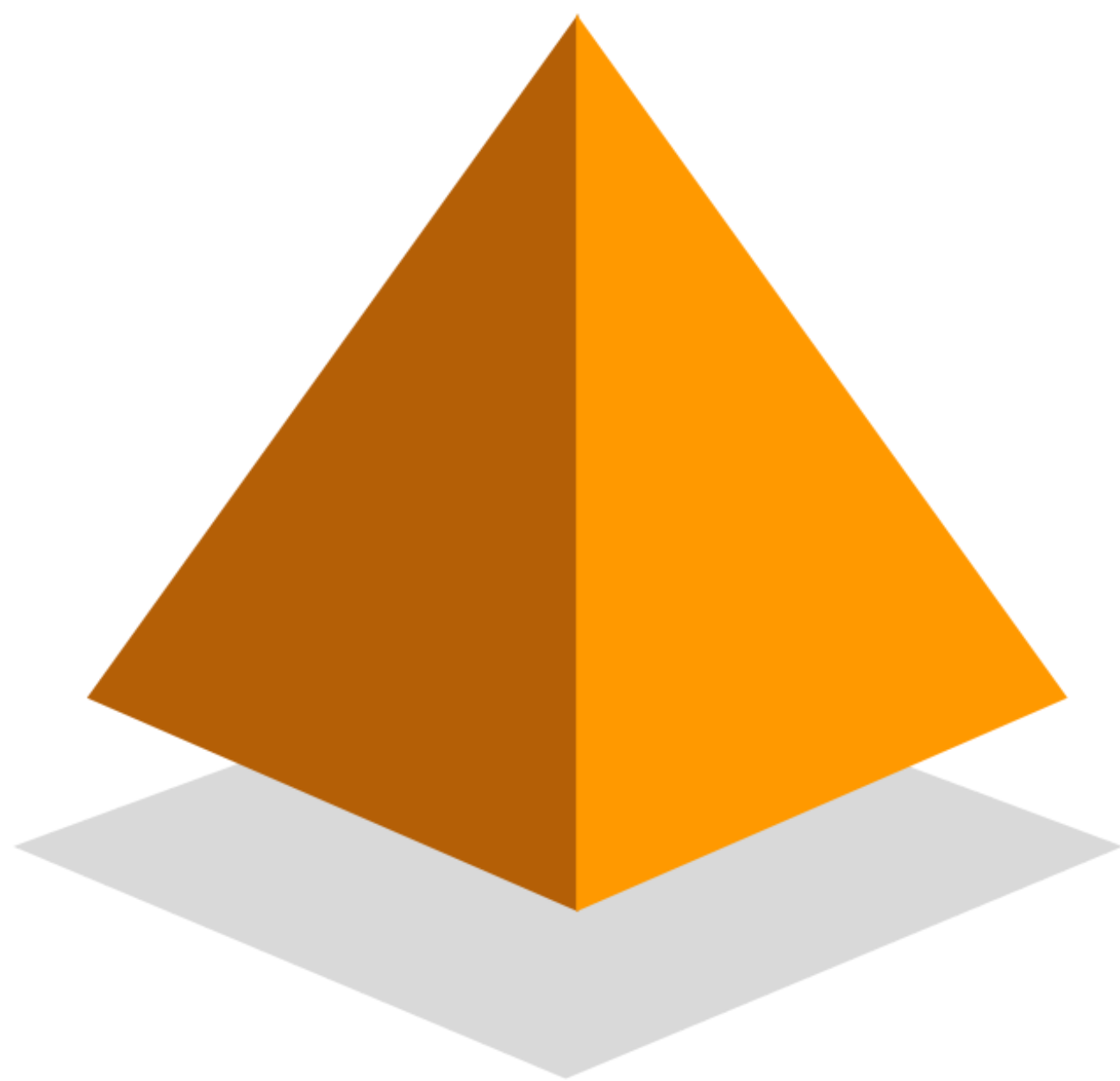**Avg. time to solve issues**

34 Days

+47.8 since Q1

Average time to solve issues takes 34 days.

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(2) Talent Management

How is talend managed within an Open Source Ecosystem?

Contributor Growth

By analyzing different aspects of code contributor growth, we can identify the contributor retention rate (contributors remaining engaged) and bounce rate (contributors leaving).
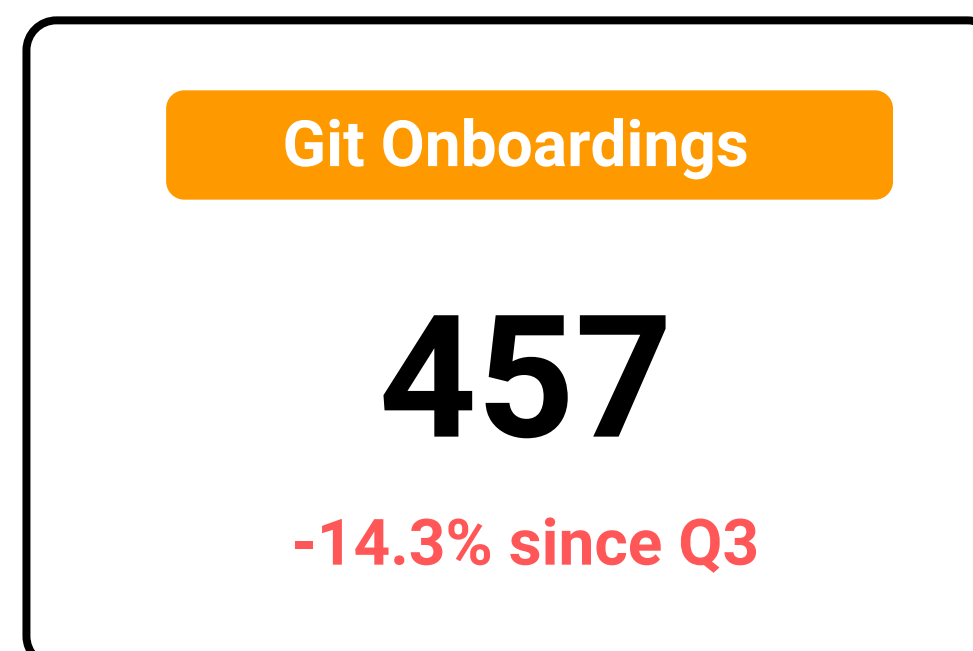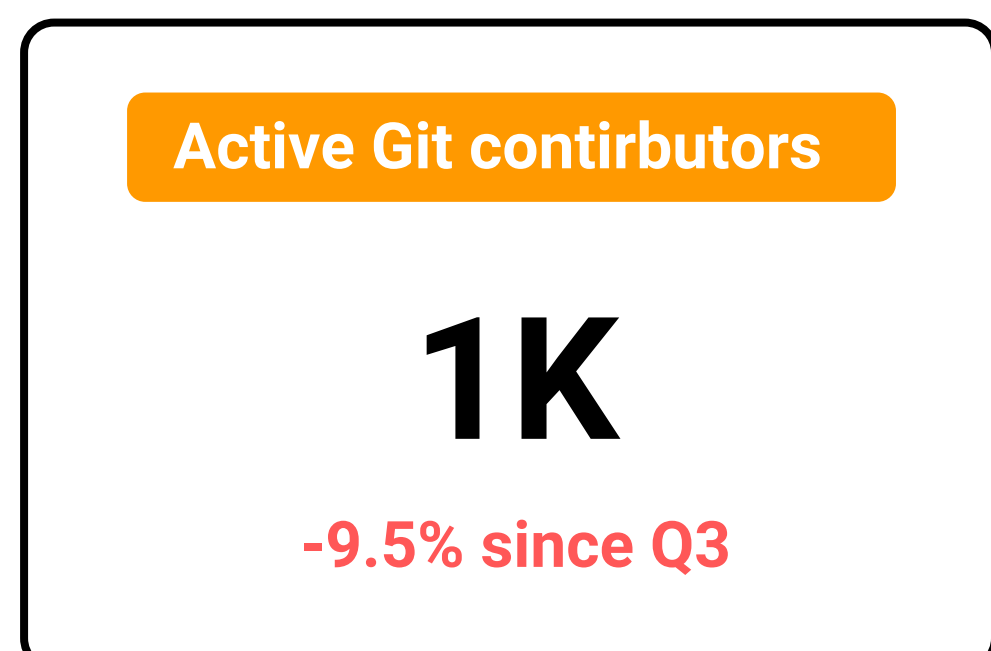
Sustainability Risk & Bus Factor

The bus factor is the minimum number of team members that have to suddenly disappear from a project before a project stalls due to lack of knowledgeable or competent contributors. A low bus factor can be a sustainability risk.

In this report, we analyze the minimum number of contributors needed to make 50% of total code contributions.
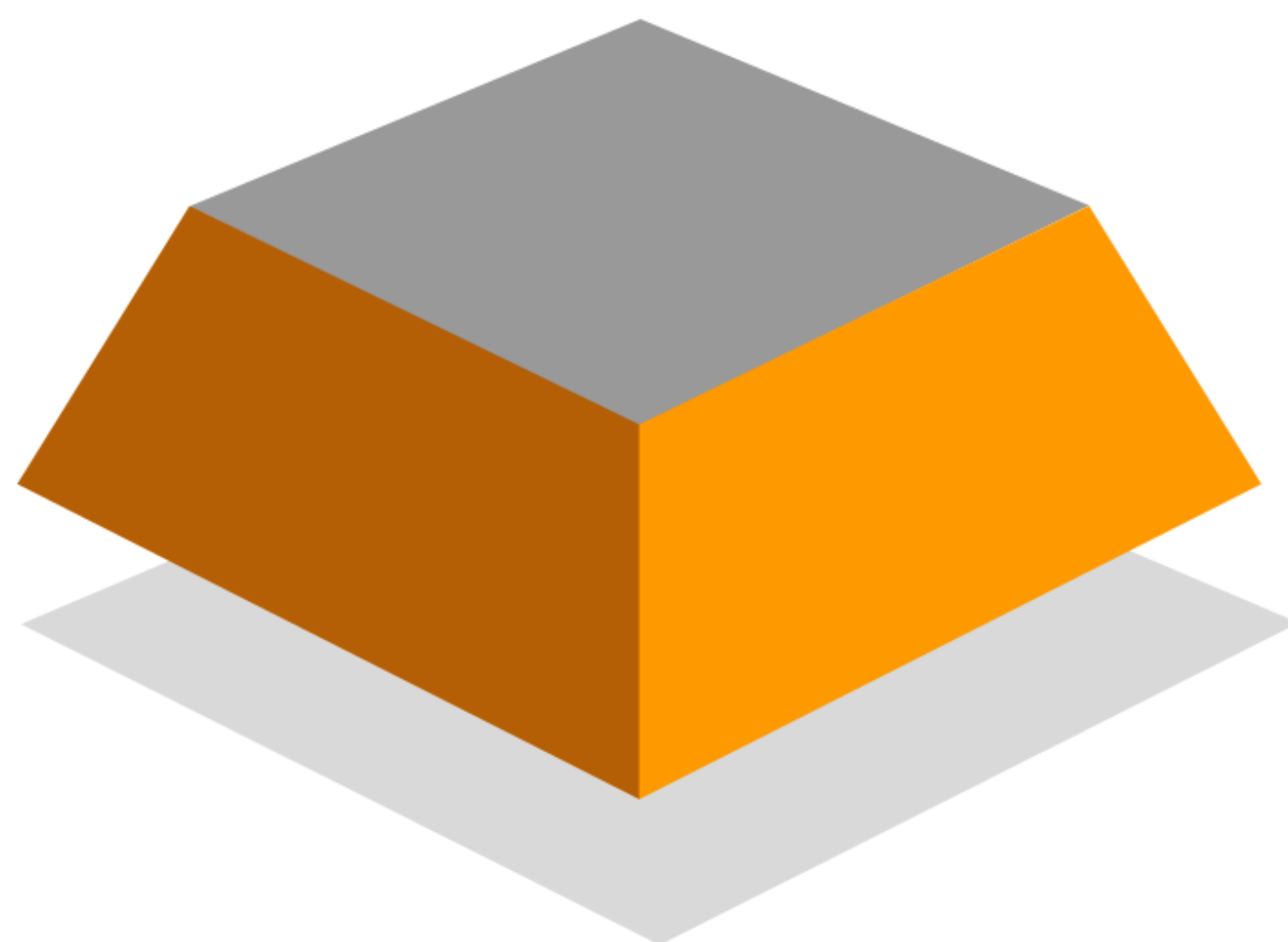
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(2.1) Talent Management Analysis

Active Git contirbutors

1K

-9.5% since Q3

Git Onboardings

457

-14.3% since Q3

Bus Factor

8

The bus factor shows the minimum number of code contributors needed to perform 50% of the total code contributions. **Kubernetes** bus factor is **8** in both quarters. This means **Kubernetes** development relies on **8 people** to make 50% of its code **during Q4.**

Core Developers

120

The onion model shows how many developers are needed to perform the 80% (core developers) the 15% (regular developers) and 5% (casual developers) of total code. **Kubernetes** project needs **120 core developers during Q4**
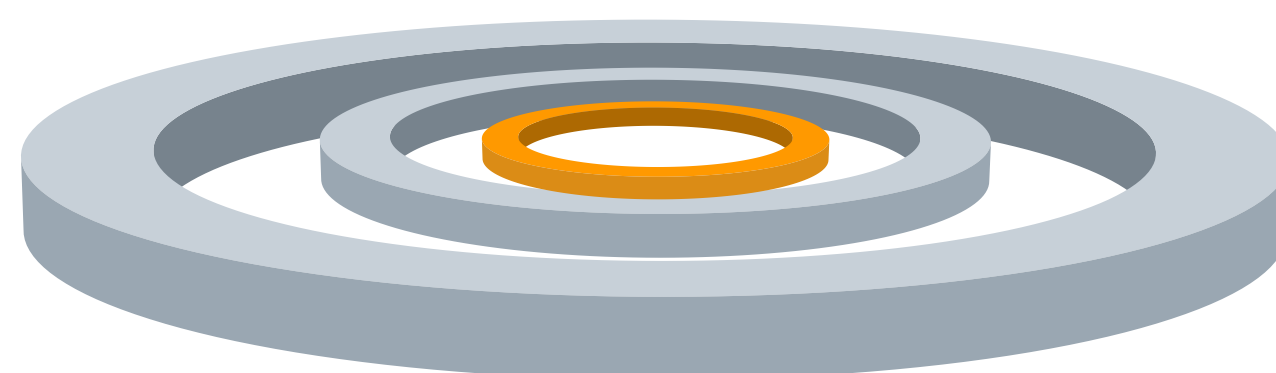
+1.7% since Q3

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(3) Community Footprint

Whats the presence and influence of organizations within the open source ecosystem?

Organizational share

Gamma Factor

Amount of code contributors using Gmail accounts for their commits, and the ratio of commits done by them. The bigger the number, the higher probability the OSS ecosystem is a non-company driven project.

Elephant Factor

Community affiliation

Minimum number of email domains whose employees perform 50% of the total contributions.

Contribution patterns

Time management

Activity during regular work hours may come from contributors who are paid by their job to participate. Activity after hours or on weekends may come from unpaid volunteer contributors. Distribution of paid and unpaid contributions may work as indicative of developer burnout.

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(3.1) Company Footprint Analysis

Gamma factor: 31.7% of code contributors made 10.9% of commits (down 16.3% from previous quarter)

Authors
333
-16.3% since Q3

Elephant factor: contributors from 2 different email domains perform 50% of total contributions (same trend from previous quarter).

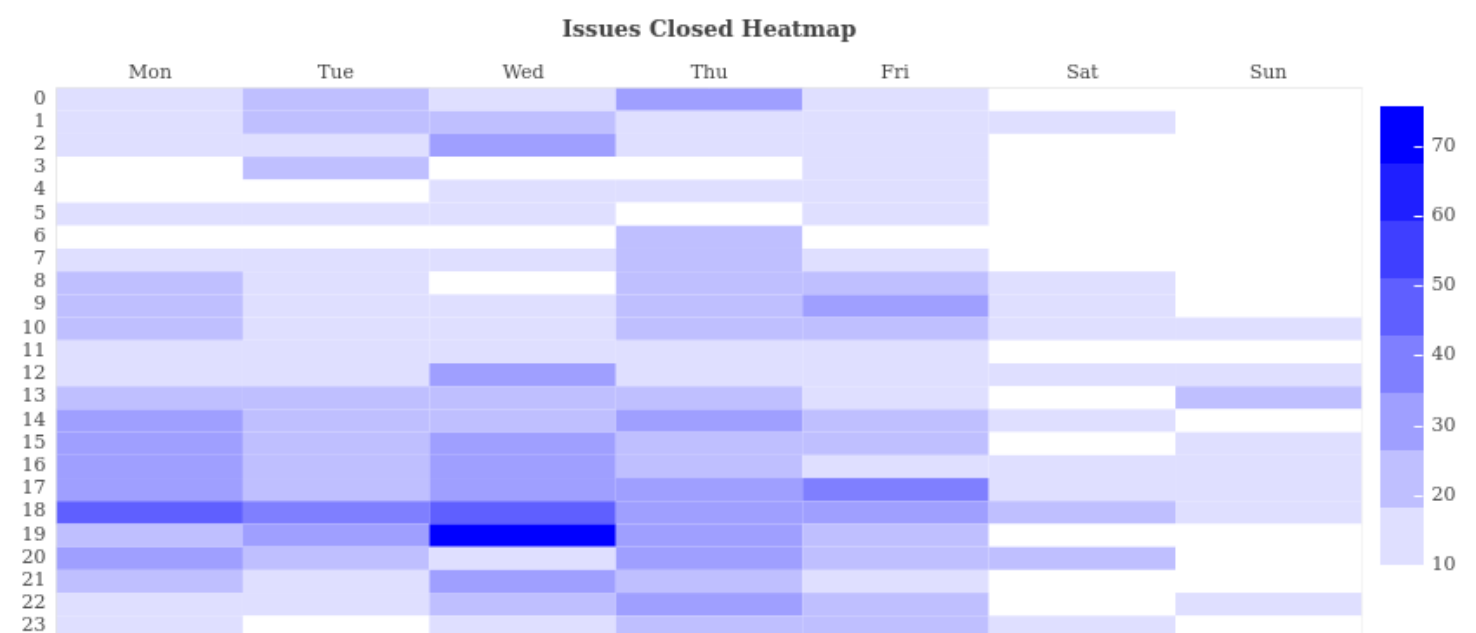| Domains |
| :---: |
| **2** |
| same trend since Q3 |

Commit contribution pattern	Issues contribution pattern

The commit contributions could be indicative of the developer community in the project. Commits committed clearly shows that most of the work is done during labor week days, but it shows some activity after regular working hours.

Closed issues are distributed across the week, with no visible pattern

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Glossary

Title	Description
Code contributions	Number of git commits (*)
Code contributors	Number of git commits authors (*)
Gmail factor	% of code contributors or code contributions done with a gmail account
Bus factor	Minimum number of contributors that contributed 50% of total contributions
Elephant factor	Minimum number of companies that contributed 50% of total contributions
Commit growth ratio	Rate of commit activity increase or decrease in size from Q1 to Q2
Issue growth ratio	Current Quarter vs previous Quarter issue creation ratio
Change request growth ratio	Rate of pull request activity increase or decrease in size from Q1 to Q2
Edited LOC growth ratio	Rate of edited lines of code activity increase or decrease in size from Q1 to Q2
Quarter	Three-month period
Q1	First one-fourth of a year (january, february, march)
Q2	Second one-fourth of a year (april, may and june)

(*) Code contirbutions does not show the entire development community activity. Software development involves much more aggregated activities like coding, issues management, code reviews and discussions activity. They can be analyzed hiring Bitergia Analytics Services.

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Methodology

Data is gathered using using Bitergia's free open source software tools like Cauldron and GrimoireLab. Cauldorn.io is a SaaS solution built on top of GrimoireLab, Free, libre, open source tools for software development analytics started by current Bitergia developers.

Analyzed data repositories are the ones under **https://github.com/kubernetes** url

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Fourth Quarter (Q4) -2020

About Bitergia

Bitergia helps companies improve the ROI of their software development projects by providing tools and knowledge to improve decision making. It specializes in analyzing software development projects and its core platform is 100% open source.

The Bitergia team has 15+ years experience in research focused on collaborative software development methodologies and software development quality models. Our specialized team has been working with a wide variety of companies and organizations that had a need for actionable insights and better understanding of software development community and processes.

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