

Software Testing AMPlification for the DevOps Team

WP 6 Dissemination, Exploitation and Communication

Cedric Thomas, Olivier Bouzereau - OW2
STAMP Project Final Review
Brussels, 6 February, 2020



The STAMP project received funding from European Union's Horizon 2020 research and innovation programme under grant agreement 731529.

Agenda

- WP6 Overview
- Objective and Achievements
- Dissemination Activities
- Exploitation Models
- Business Plan
- WP6 KPIs
- Lessons Learned



2019



European
Commission |

WP6 Overview

- Overview
 - Duration: M1-M36
 - WP Lead: OW2
 - Partners: INRIA, KTH, SINTEF, TUD, ENG, TellU, ATOS, Aeon
- Structure
 - Task 6.1: Communication infrastructure and material
 - Task 6.2: Dissemination (scientific publications, OSS & industry conferences)
 - Task 6.3: Exploitation
 - Task 6.4: Market analysis and business modeling



2019



European
Commission

WP6 Deliverables

D6.1	Dissemination and Communication Plan	OW2	M3
D6.2	Communication Material	OW2	M4
D6.3	Market Analysis	AEon, Atos, OW2	M18
D6.4	Exploitation Plan	AEon, Atos, OW2	M30
D6.5	Business Plan	AEon, Atos, OW2	M36



2019

European
Commission |

WP6 Objectives

Generate awareness by developing appropriate communication messages, material and initiatives targeting our key audiences: IT industry, Research communities, EU-projects and developers.

Ensure the sustainability of the project's results beyond the actual duration of the project through pragmatic exploitation plans and commercialization strategies.

Grow a community of early adopters around the project's concepts and tools by positioning STAMP as a recognized solution for software quality and testing in relevant industry media including websites, events and conferences.

- +1,000 Devs Devoxx, Fosdem, EclipseCon
- 7 Publications in top Research journals
- 195 actions (publications, events, workshops, etc., 1.35 per week) and 600 tweets
- Commercially exploitable results and commercial business model identified
- Elaborated and quantified potential business plan
- 320 followers on tweeter
- 15 industry talks, incl. Orange, Ericsson, Saab
- 300 workshop participants



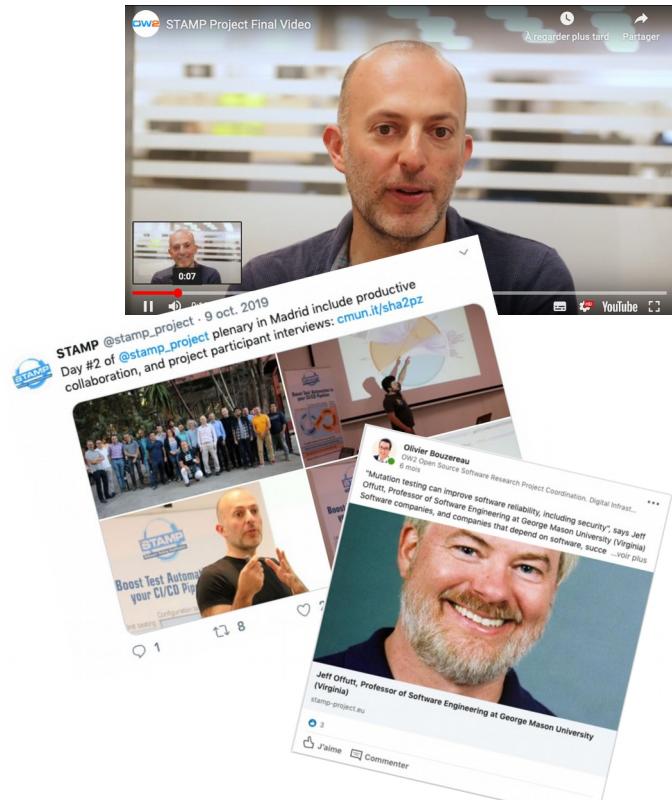
2019



European
Commission

Dissemination Exploitation Summary

- Implementation and maintenance of a full fledged **collaborative infrastructure**
 - Public website, private wiki, mailing lists, CI/CD
- Production of a full range of **communication material**
 - Roll-up totem, poster, leaflets, flyers, USB keys, strip, newsletters, web curation, social networks, stickers
- Fast-paced **communication initiatives**
 - Industry and academic event, scientific publications, workshops, social media, videos,
- Comprehensive coverage of **exploitation potential**
 - Market analysis, beta-testing campaign, partner exploitation plans and SaaS start-up business plan



2019

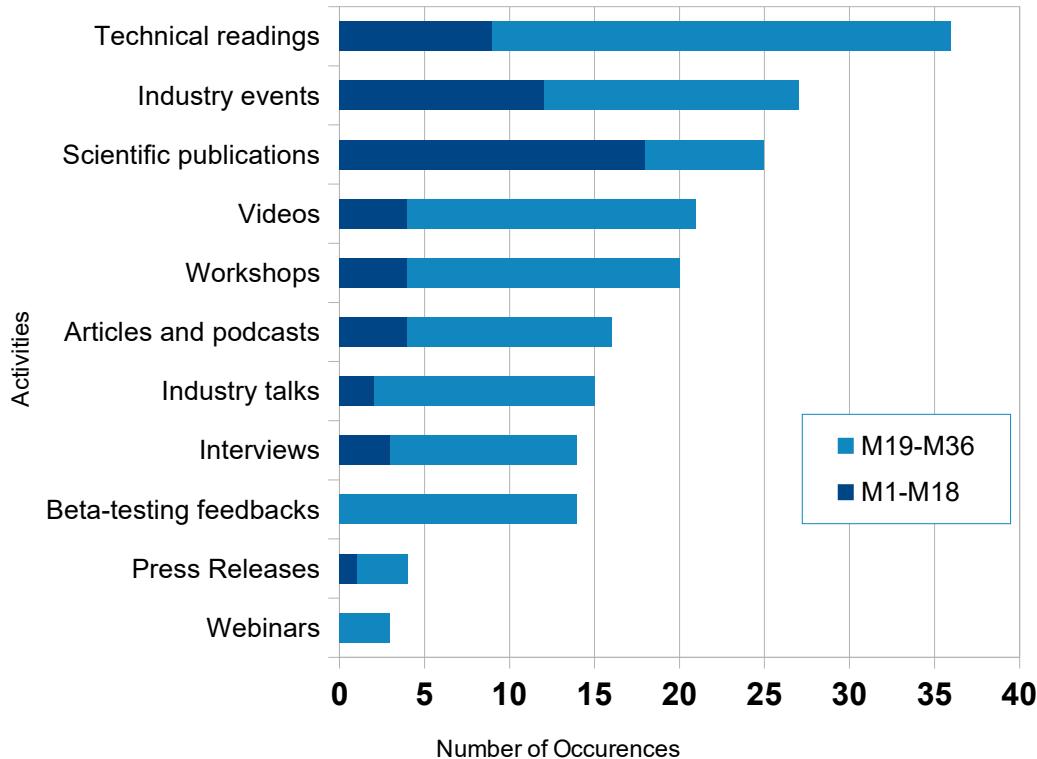


European
Commission |

Summary of Dissemination Initiatives

	M1-M18	M19-M36	Total
Webinars	0	3	3
Press Releases	1	3	4
Beta-tester feedbacks	0	14	14
Interviews	3	11	14
Industry talks	2	13	15
Articles, podcast	4	12	16
Workshops	4	16	20
Videos	4	17	21
Industry events	12	15	27
Scientific publ. [°]	18	7	25
Tech readings	9	27	36
Total	57	138	195

STAMP Dissemination Activities



2019

Public Website: 25 Editorial Sections

The screenshot shows the top navigation bar of the STAMP website. The bar is blue with white text. On the left is the STAMP logo, which includes a stylized orange 'S' and the word 'STAMP'. To the right of the logo are six menu items, each with a small downward arrow indicating a dropdown menu: 'Discover', 'Software', 'Follow', 'Share', 'About', and 'Workspace'.

Discover	Software	Follow	Share	About	Workspace
Introduction	Download	Calendar	Collateral	STAMP at a Glance	Private wiki
Project Overview	Beta Testing	Events	Presentations	Consortium	Login issue?
Project Use Cases		Press	Scientific Publications	Contributors	Git Repository
Project Videos		Interviews	Publications in OpenAIRE	Related Projects	
		Community	Deliverables	Code of Conduct	
		Technical News		Contacts	

25 editorial sections, 111 documents, 65 Events, 36 technical readings, 24 publications, 21 videos, 18 press mentions, 14 collateral, 14 interviews.



BY
SA

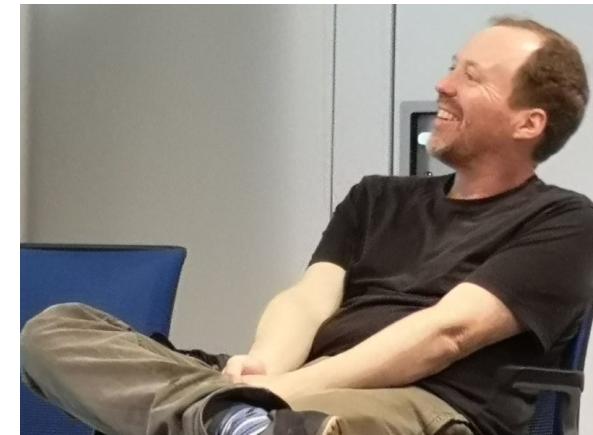
2019



European
Commission

“I would love to be involved in the STAMP project and its partners”

Henry Coles
Pitest developer,
STAMP Advisory Board



2019



European
Commission

Private Wiki: 23 Collaboration Sections

Menu
Interactions
Collaborative infrastructure
Collaborative documents
Conference Calls
Meetings - Calendar
Event Plan
Mailing Lists
Beta Testing Campaign
Final Video
Public Website

Menu
Work Packages
WP1: Unit Test Amplification
WP2: Config. Test Amplification
WP3: Runtime Test Amplification
WP4: Integration
WP5: Use Cases and Validation
WP6: Dissemination and Exploitation
WP7: Management and Coordination

Menu
References
Git Repository
Deliverables
Templates
Reference Documents
XWiki Syntax Guide
All Documents



4 OSS and 4 SaaS



39 contributors, 87 pages, 1 456 files

36 calls minutes, 13 meetings

5 mailing lists, 5 reference documents

STAMP team collaboration entry point

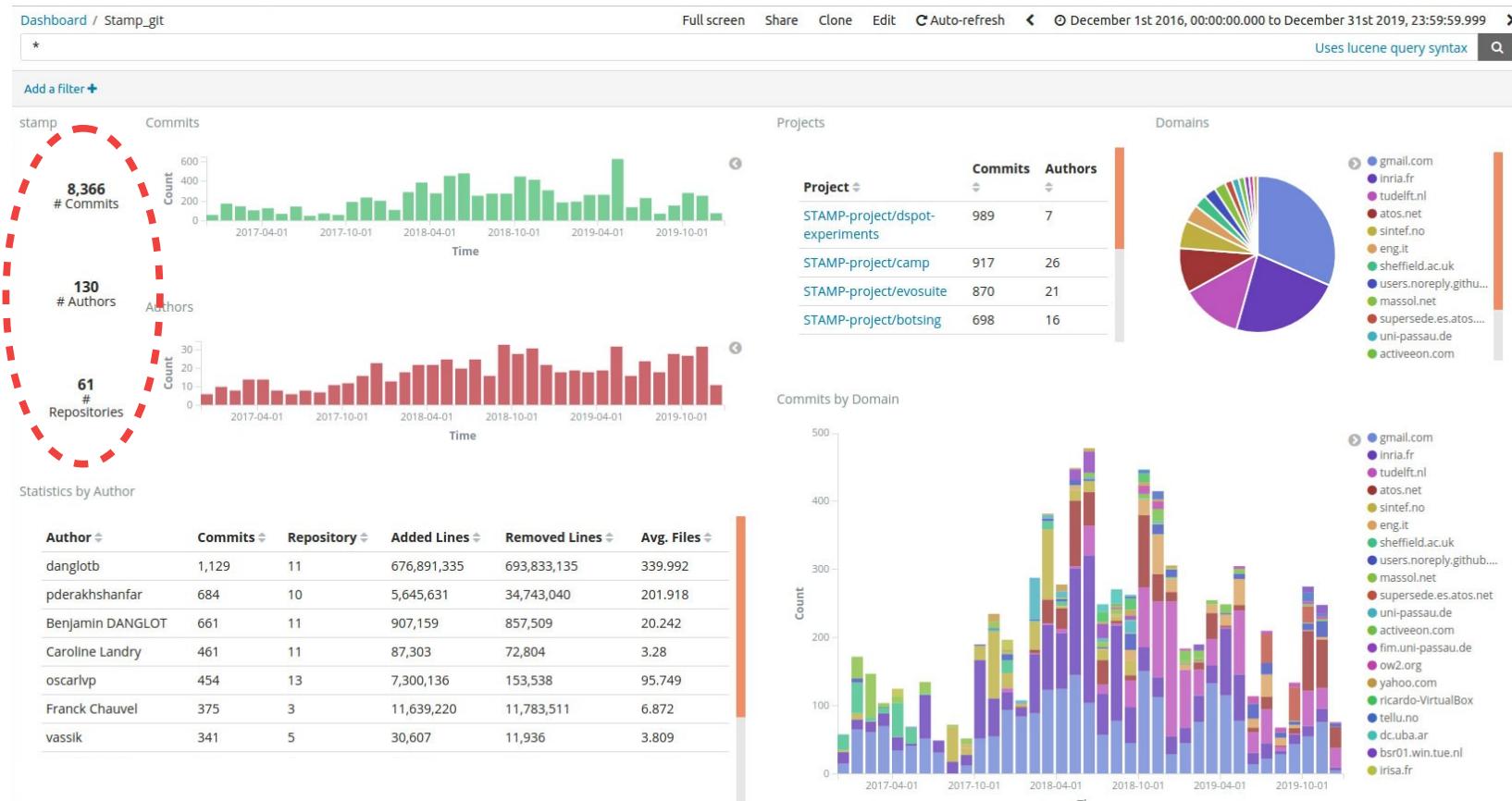


2019



European
Commission

Collaboration Stats Dec 2016 – Dec 2019



2019



European
Commission

STAMP Collateral



Test Automation in Cloud Application Development

- Detect more regression bugs in the continuous integration phase
- Index configuration and scalability bugs before application deployment
- Identify more operation bugs in edge cases thanks to semantic logging

Unit testing **Configuration testing** **Online testing**



More automation. Leveraging advanced research in automatic test generation, STAMP aims at pushing automation in DevOps one step further through the use of machine learning methods to automatically generate test cases, API descriptions, dependency models. STAMP can generate more test cases and test configurations each time the application is updated.

Less bugs. STAMP techniques aim at reducing the number and cost of regression bugs at unit level, configuration level and production stage. STAMP raises confidence and fosters adoption of DevOps by the European IT industry.

Industry-near, open source. Our industry-near research addresses concrete, business-oriented objectives. All results are open source and developed as micro-services to facilitate exploitation.

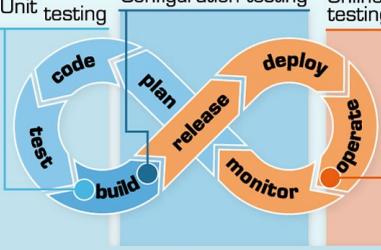
STAMP is developed by a consortium of nine partners bringing together excellence in research, innovation, education and industrial partnerships. Project Partners: Atos, Engineering, INRIA, KTH, SINTEF, TU Delft, Tell.U, XWIKI. Project Dates: December 2014 - November 2019

 STAMP has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 731029.



Boost Test Automation in your CI/CD pipeline

Unit testing Configuration testing Online testing



Amplify testing efforts automatically

Detect more configuration-specific bugs

Generate tests from production logs

Reduce flaky test performance overhead

Partners: INRIA, SINTEF, TU Delft, COW, Atos, tell.u, KTH, ACTIVEON, XWIKI

stamp-project.eu 

 STAMP has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement 731029.

ECLIPSECON EUROPE 2017

24 OCTOBER **#9** **OW2 BOOTH** **LUDWIGSBURG, GERMANY**

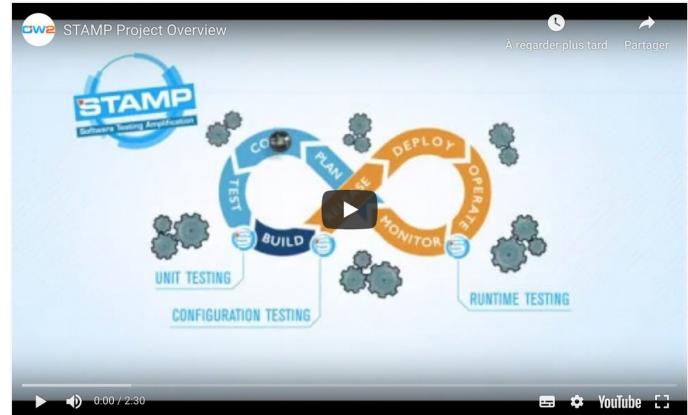
Forum am Schlosspark, Stuttgarter Strasse 33 71638 Ludwigsburg

Benoit BAUDRY **KTH**




OW2 STAMP Project Overview

A regarder plus tard Partager



STAMP Software Testing Amplification




2019



European
Commission

Online Presence



- Twitter
 - **600** Tweets
 - **370** Followers
 - **350** Following



- LinkedIn
 - **27** members
 - **22** discussions
- SlideShare
 - **12** Presentations
 - **313** views in Y3



- Website
 - **1 429** unique visitors
 - **22 488** unique pageviews
 - Most visited pages
 - Download / Beta-testing
 - Events
 - Countries
 - France,
 - Italy,
 - Spain,
 - Norway,
 - Netherlands,
 - USA, Sweden, Germany, Belgium, India



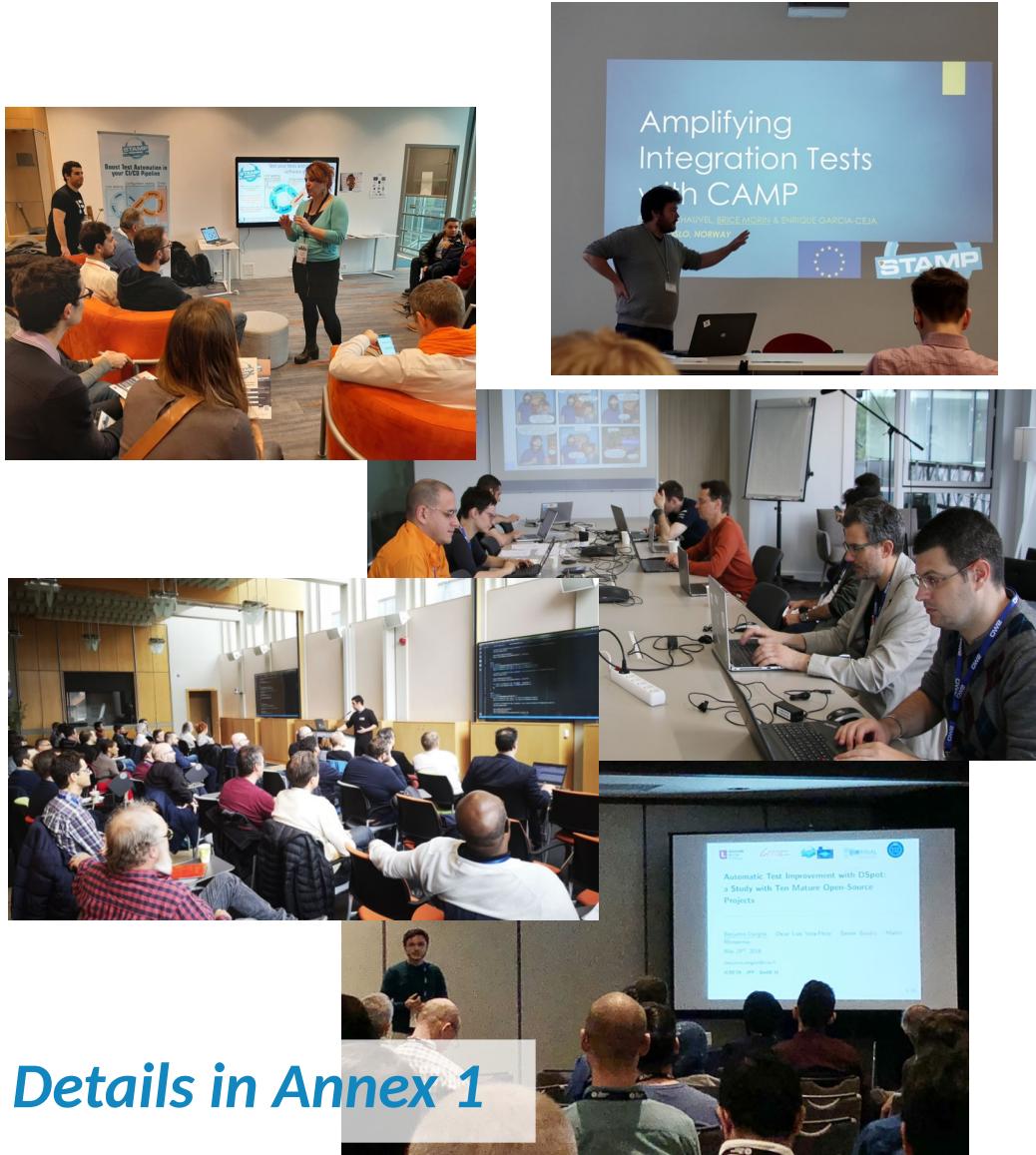
2019



European
Commission |

Physical Presence

- Scientific dissemination
 - **12** conferences including:
ISSRE, ISSTA, ICSE, ICST
 - **20** workshops
- Industry & OSS events
 - **27** conferences including:
OpenStack, Fosdem, Devoxx, POSS, OW2con
- Industry outreach
 - **15** meetings including: EC-DGIT, Station-F, Orange, CGI, Spotify, etc.



Details in Annex 1



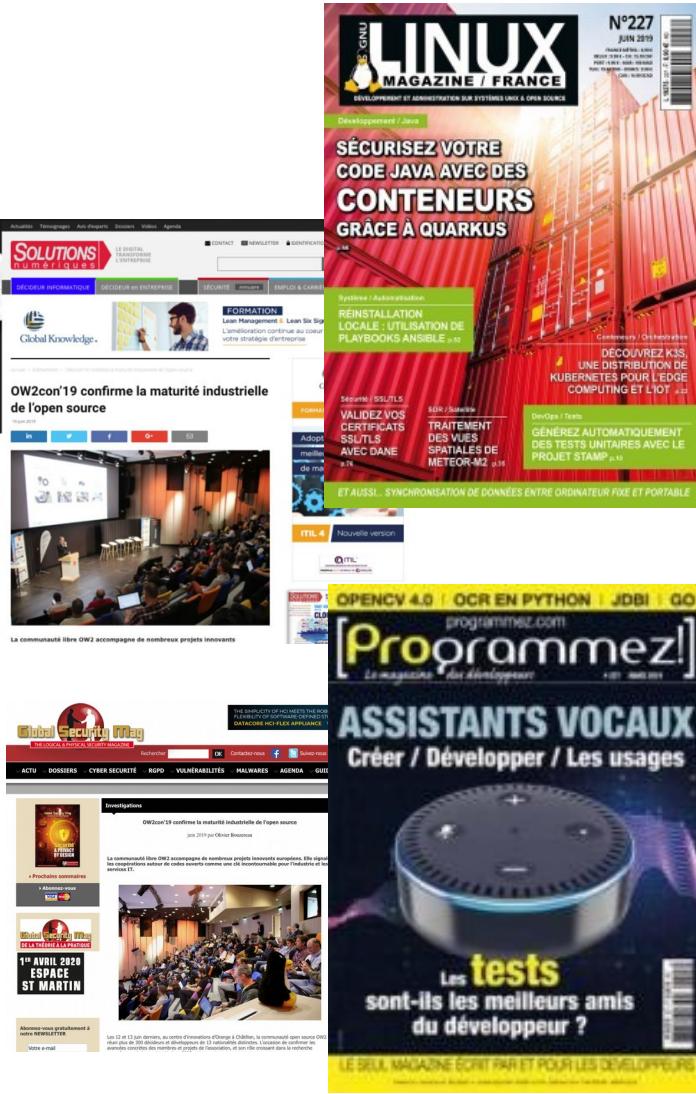
2019



European
Commission |

Press Releases and Mentions

- 4 Press Releases about STAMP
 - 12/3/2018 STAMP at Cloud World Expo
 - 15/11/2018 STAMP Beta-testing campaign
 - 13/2/2019 STAMP at Paris Station-F
 - 12/6/2019 STAMP Tools at OW2con'19
 - 12 Press Mentions including
 - Programmez, Linux Magazine, CastCodeurs,
 - Global Security Mag, Solutions Numériques
 - 2 Online News
 - Inria, Wikipedia



“Very interest presentation.
We will these tools to
improve the quality of our
code.”

Grégoire Boulet
Head of Sector SW Development
European Commission



2019



European
Commission

Beta-Testing Campaign

- Short link: <https://ow2.org/stpbeta>
- Video Primer
- Sign-up to stamp-users Mailing List
- Download and Try 1-to-4 tools
- Feedback Questionnaire
- Use STAMP tools on Github
- Support Contact

Phase 1, October 2018: Unit testing tools (DSpot, Descartes)

Phase 2, April 2019: Configuration testing tools (+ CAMP)

Phase 3, July 2019: Production testing tools (+ Botsing)

Details in Annex 2



2019



European
Commission

STAMP

Discover · Software · Follow · Share · About · Workspace ·

BETA TEST
TRY THE STAMP TOOLSET

Change Your View About Software Tests

The innovative STAMP software helps detect more bugs in your java applications. STAMP works along your CI/CD pipeline, reducing errors and eliminating failures while you deploy new services to production. For an overview of STAMP technologies, please watch this short video primer.

Join the beta testing campaign

Trying the open source toolset is a free initiative that will amplify your testing efforts automatically. Experiment DSpot, Descartes, CAMP or Botsing now:

1) Don't be shy, join the beta testing campaign to interact with STAMP developers:

join

2) Now, please read our guides and download your selection of STAMP software:

- Unit test amplification with **Descartes & DSpot**
- **DSpot** hands-on example
- Configuration test amplification with **CAMP**
- Crash Reproduction Demo with **Botsing**
- **Descartes and DSpot** demo applied to OW2 Joram

Try DSpot **Try Descartes** **Try CAMP** **Try Botsing**

3) Share your **Ideas and Suggestions**

What are the beta-tester benefits?

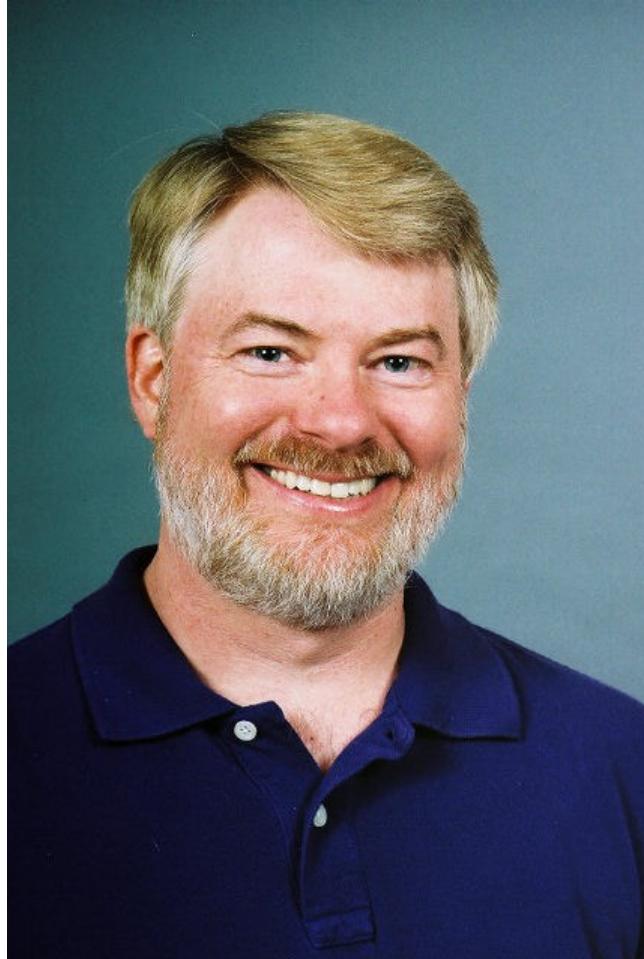
You'll have nothing to lose and everything to win, including time and quality in your software releases! Moreover, you'll be among the first to experiment with the most advanced Java software testing tools.

And, as a recognition for your efforts and useful feedback, you will receive a limited edition "STAMP Software Test Pilot" gift and be added as a STAMP contributor. This offer is limited to the beta testers interacting with the team. You will be contacted individually for a customized gift and for contribution opportunities. Please, provide a valid contact email.

“Mutation can help develop excellent tests. I am hoping for the day when fully automated testing integrates directly with compiling inside IDEs.”

Jeff Offutt

Professor of Software
Engineering at George Mason
University (Virginia)



2019



European
Commission |

WP6 KPIs

KPI	Planned	Achieved	Ratio
#13 External contributions	15 from 3 org.	59 from 23 org.	✓
#14 Twitter followers	200	322	✓
#15 Website visitors	2 250	1 420	✗
#16 STAMP technologies at important OSS forums	5	27	✓
#17 Scientific papers accepted in conf. & journals	10	31	✓



2019

European
Commission |

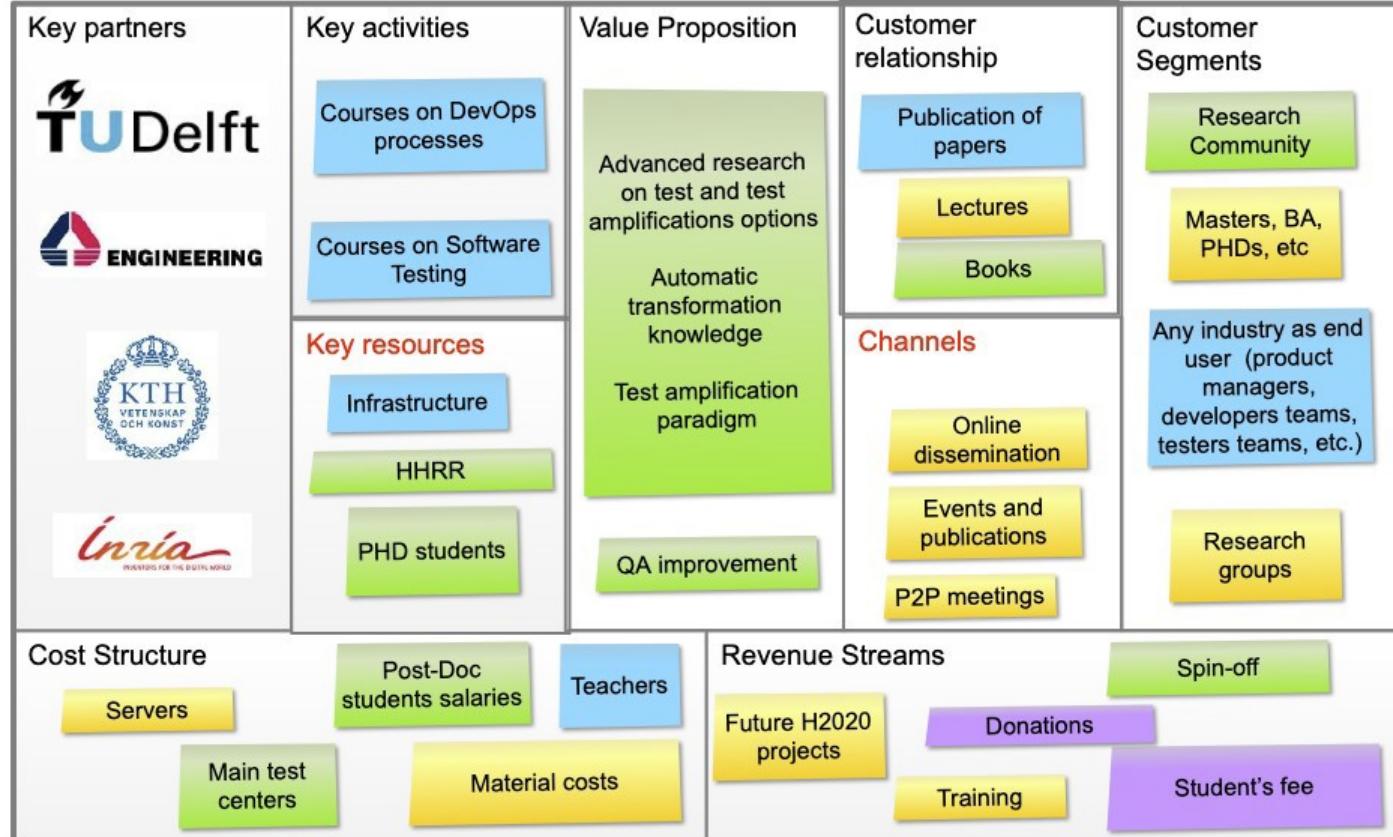
Knowledge Transfer Exploitation Model

KTH plans to offer courses based on DevOps and advanced techniques.

The DiverSE team in Inria/Rennes offers training based on software testing considering the two tools DSpot and Descartes.

TUDelft aims at offering courses based on advanced software testing (Bosting) and mutation testing (Descartes).

And for the industrial partners, Engineering plans to provide courses in their “Engineering Academy”. These courses are offered to Engineering’s customers.



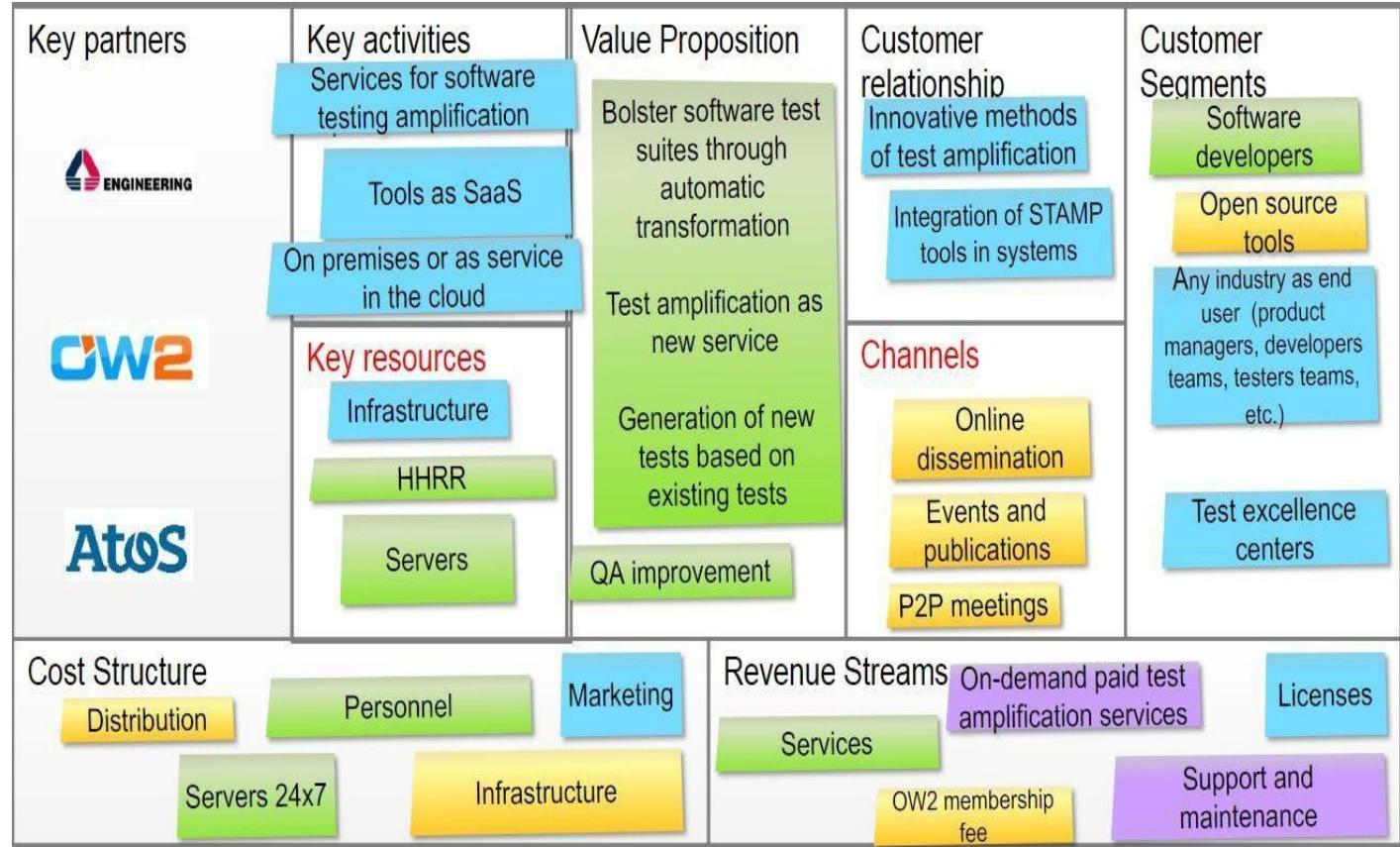
2019



European
Commission

SaaS Exploitation Model

Most adequate partners to drive the SaaS business model are the service and consulting companies such as Atos and Engineering and the OW2 consortium.

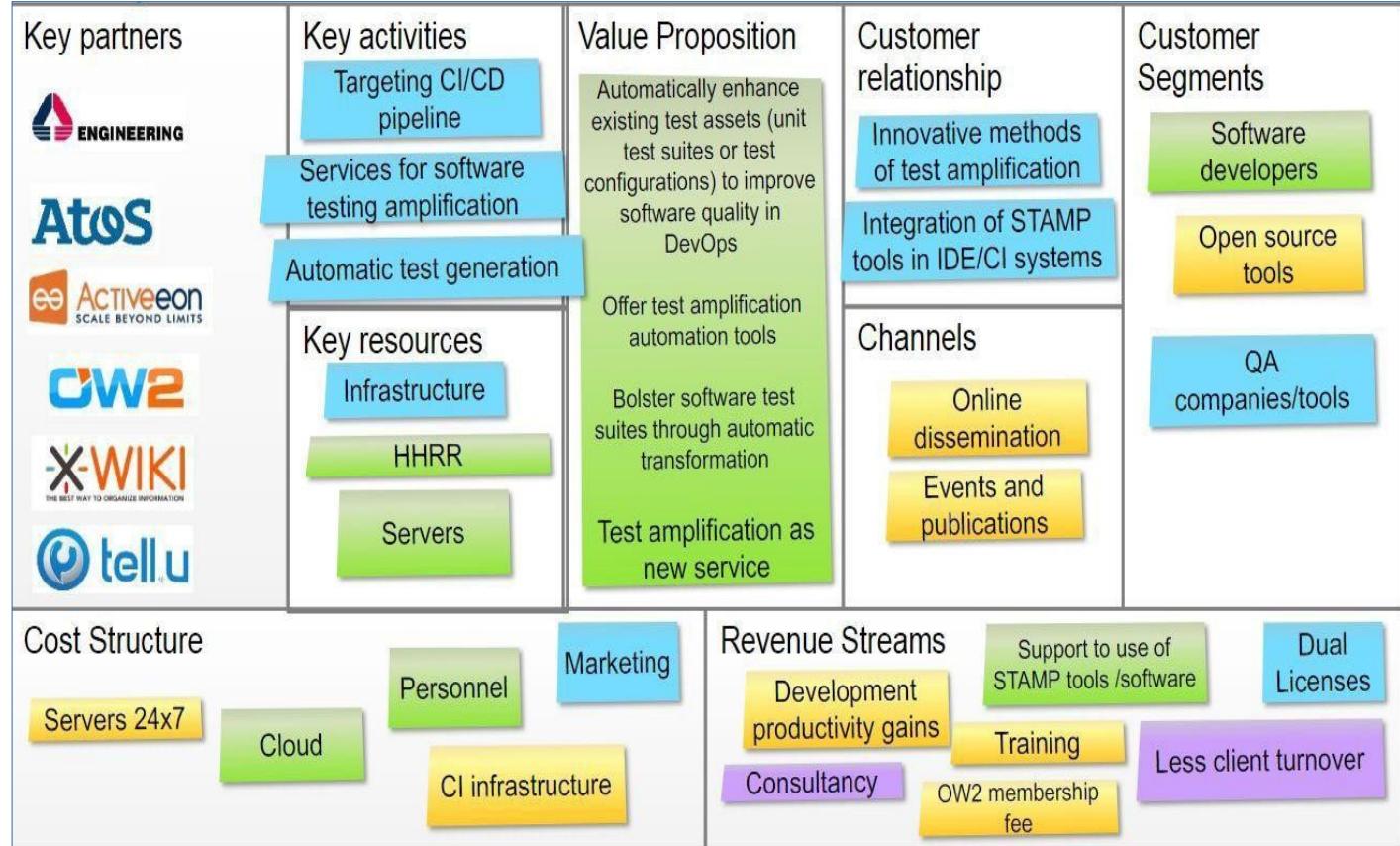


2019

European
Commission |

Open Source Exploitation Model

Propositions based on integration or service and support are well suited for service and consulting company (Atos and Engineering).



2019

European
Commission |

Market Opportunity

Market trends

Digital transformation calls for testing everywhere.
DevOps and resource shortage call for automation.

Specific Context

Testing automation only beginning to mature.
STAMP is for companies with testing assets.
GitHub and Java are well established dominant players in software engineering.

Market triggers

GitHub offers third-party software engineering tools on its marketplace.
One in four software developers could pay for using STAMP.

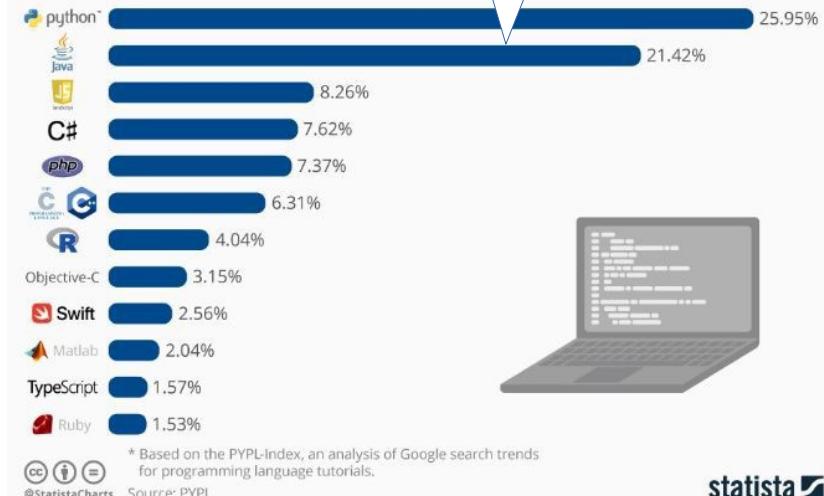
Market sweet spot

GitHub users X Java developers
Companies having already invested in QA
Looking to improve quality of current tests
Wanting to generate new test automatically

Java comes second with >21%

The Most Popular Programming Languages

Share of the most popular programming languages in the world*



statista

Yes

No

Maybe

One in four would pay for STAMP

39%

29%

32%

66 votes · Final results



2019



European
Commission

Mission and Value Proposal

Unique technology

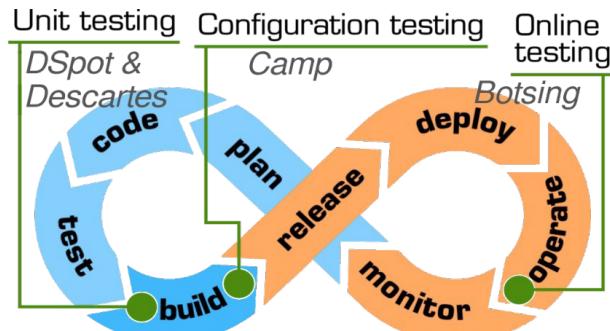
Test amplification

Set of complementary tools

Unit testing: *DSpot, Descartes*

Configuration testing: *CAMP*

Production testing: *Botsing*



Mission

Improve the quality
of testing in DevOps
environments

And do it cost efficiently:

- High ROI of fixing defaulting tests
- Close to 10x less expensive with STAMP than manually



2019



European
Commission

Key Exploitable Results

Tool	TRL	License	IP Lead	Unique selling point	Resources
DSpot	<div style="width: 60%;">6</div>	LGPL v3.0	Inria	Automatic generation of missing test assertions for better test coverage within CI/CD.	Inria, KTH, TellU, Eng.
Descartes	<div style="width: 80%;">8</div>	LGPL v3.0	Inria	Computes a mutation score faster than comparable tools, and finds pseudo-tested and partially-tested methods	Inria, KTH, TellU, Eng. XWiki, OW2
CAMP	<div style="width: 60%;">6</div>	MIT	SINTEF	Allows test of a maximum of possible configurations for exhaustive system testing.	SINTEF, Inria, KTH, TellU, Eng. Atos
Botsing	<div style="width: 60%;">6</div>	APL 2.0	TUDelft	Finds root-cause of in-production crash and automatically generates relevant test cases.	TU Delft, XWiki

Plugins

- Integrated development environment
- Build tools
- CI system
- Issue tracking

Eclipse IDE plugin
Maven and Gradle plugins
Jenkins plugin,
Jira plugin for Botsing,

EPL
Same license as tool
MIT
APL 2.0



2019



European
Commission

Go-to-Market: the GitHub Marketplace

GitHub Apps

- Add functionalities to GitHub
- SaaS delivery model

Revenue model

- App provider: 75%
- GitHub: 25%
- Pricing: per user, per repository or per organization

Process

- Publication and verification.
- Verified apps are showcased on the market place and can propose paid plans.

Advantages

- For developers: additional functionalities well integrated with GitHub
- For app providers:
 - immediate access to millions of developers
 - limited integration effort.



Extend GitHub

Find tools to improve your workflow

[Explore free apps](#)



2019



European
Commission

Competition

Market competition

DSPOT	Selenium, CABlazeMeter, Ranorex, Testplant, Taurus, IBM Rational Test Workbench, Silk Test, Xamarin, Parasoft SOAtest, Smart Bear, Tricentis Tosca
Descartes	
CAMP	Tox: Python version; Testen: NodeJS Chef: decrire configuration; Mobile test: e.g. Xamarin CI: Travis (diff conf) wercker IBM, Accenture, Capgemini, Wipro, TCS, Computer Sciences Corporation (CSC), Cigniti Technologies, Gallop Solutions, Infosys, NTT Data, Steria, Tech Machindra, UST Global
Botsing	Root Cause Analysis : OverOps Stack trace analysis - STAT CRAY EvoSuite, Sapientz, log analysis tools ?

GitHub competition

Closest competitors on GitHub.

App categories: Code Quality, Code Review, Testing

Codacy

Coveralls

LGTM

TestQuality

They do not support testing tests.
Tests can show 100% coverage and still do nothing.
Same positioning as STAMP for code quality

Not in the same domain as STAMP.
They focus on test plans and test execution



2019



European Commission

Pricing

GitHub pricing plans

- Monthly subscriptions
- Plans represent levels of consumption: number of repositories covered by contract.
- Usually three pricing levels
- Plus one free for open source projects.

	Plan 0 Open source	Plan 1 Individual	Plan 2 Team	Plan 3 Corporate
Average number	1	1	5-10	100 - Unlimited
Average monthly €	0	11	38	71.4

Descartes pricing plans

- Aggressive pricing.
- To be adapted depending on market reaction

	Plan 0 Open source	Plan 1 Individual	Plan 2 Team	Plan 3 Corporate
Average	1	1	10	Unlimited
STAMP	0	5	15	50



2019

European
Commission |

SaaS Start-Up

Reference plan for a stand alone start-up

Initial offering: Descartes tool in SaaS mode.

Baseline = Pure play model with no additional service

STAMP partners available for support

Use case partners help with marketing (testimonials)

Go-to-market 100% through GitHub marketplace

Key Partners Inria SINTEF TUDelft	Key Activities SaaS infra. Web site	Value Proposition Improve the quality of testing in DevOps environments	Customer Relationship Automated GitHub service	Customer Segments Java x GitHub developers
	Key Resources Servers		Channels GitHub marketplace	Organisations and projecs with test assets
Cost Structure GitHub share Personnel Computing resources Marketing		Revenue Stream Pure play model: GitHub revenue sharing. Extended model: Training, Support, Consulting		



2019



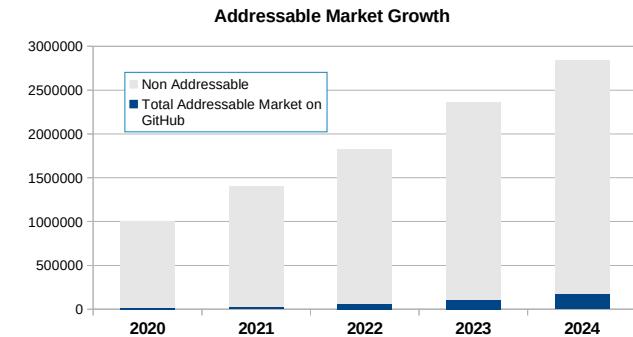
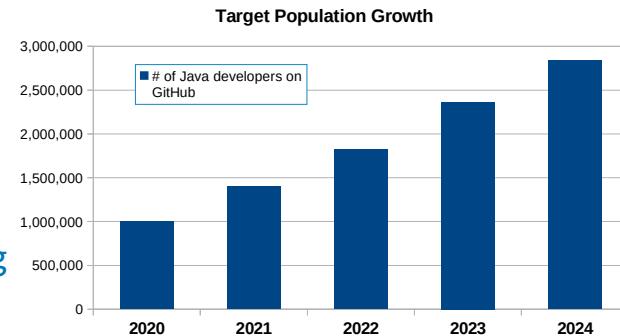
European
Commission

Addressable Market

Java project population on GitHub
→ grows from 1m to 2.8m

Of which concerned by QA and testing
→ grows from 15% to 30%

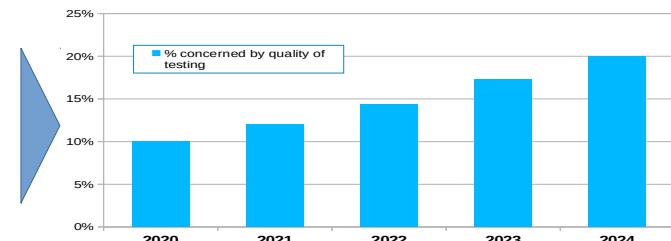
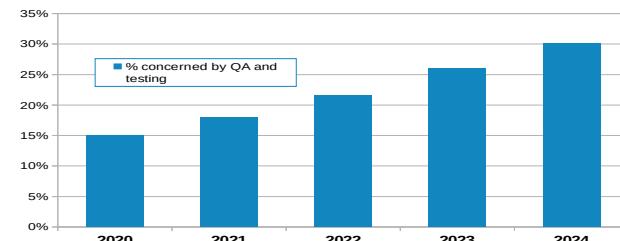
Of which concerned by quality of testing
→ grows from 10% to 20%



Total addressable market on GitHub (# of projects)

2020 = 15,000

2024 = 170,000



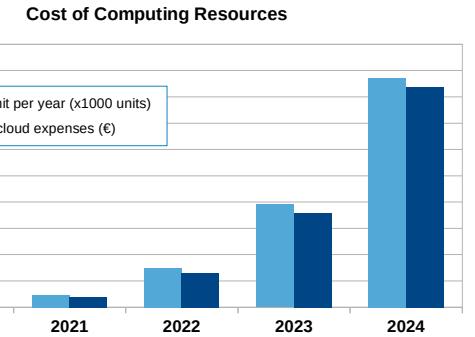
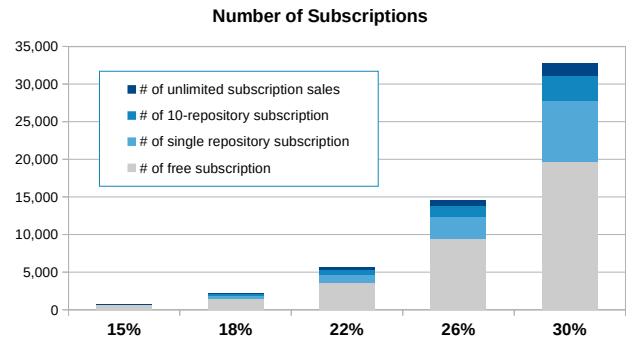
2019



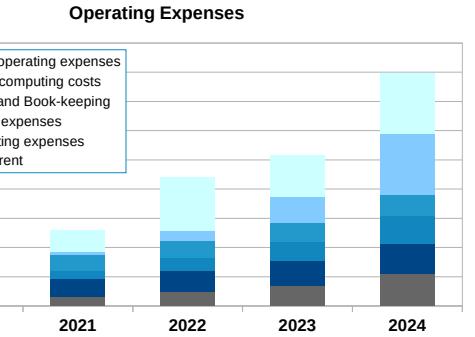
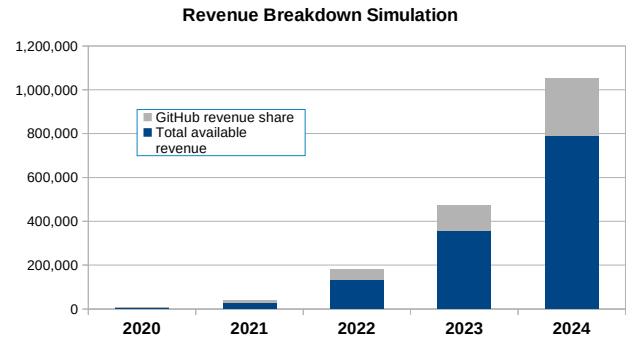
European
Commission

Key Figures

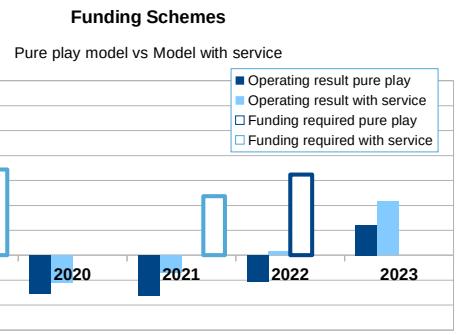
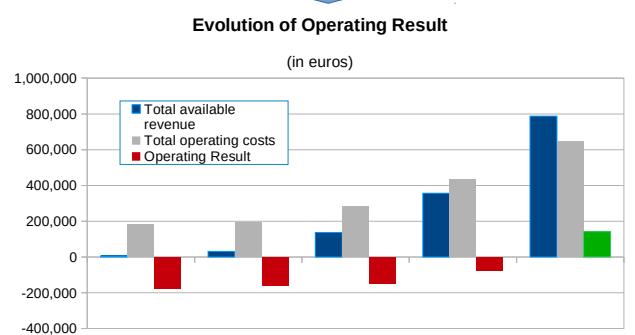
Number of subscriptions



Operating costs



Available revenue



Funding needs



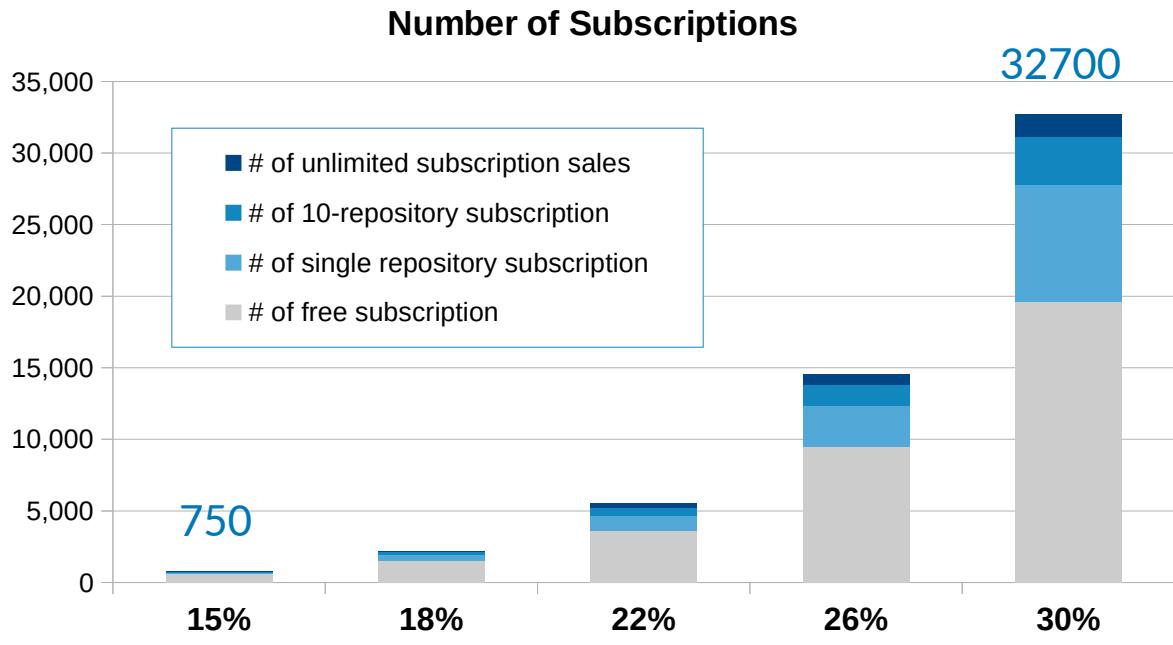
2019



European
Commission

Activity Volumes

- Subscriptions grow from 750 to 32700.
- Number of Java projects on GitHub grow 40% per year from 1m in 2020.
- Expect an increase in interest in QA, testing and quality of testing of 20% per year (especially in new projects).
- More than half will be free open-source subscriptions.



2019

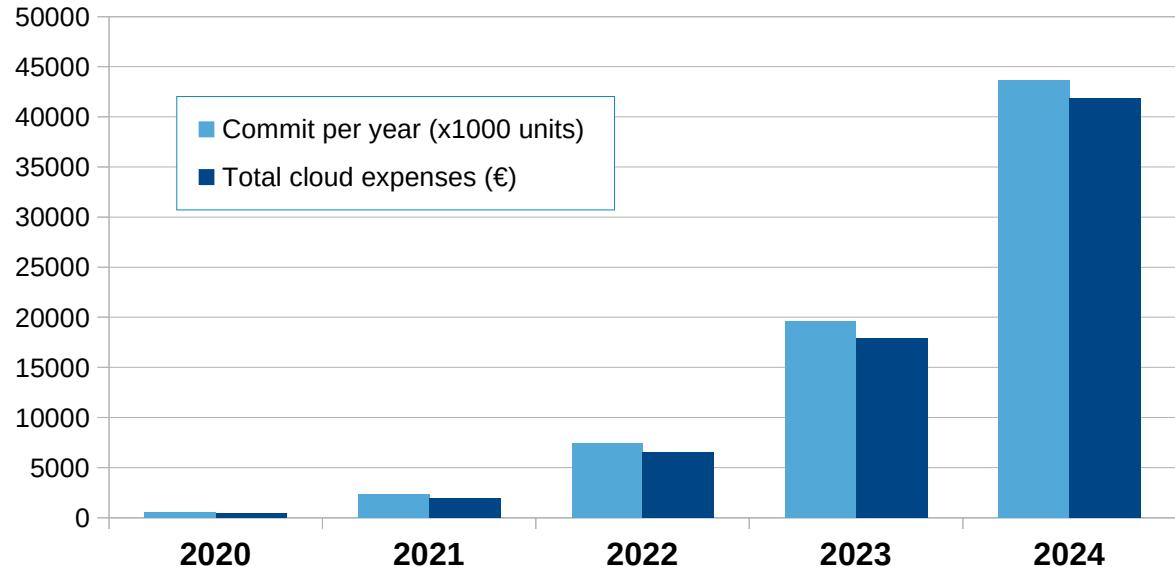


European
Commission

Production costs

- Annual cost grows from <1k€ to 50k€
- Amazon AWS cost taken as reference cost.
- Activity level determines required computing resources.
- Activity level and related necessary computing resources evaluated from XWiki experience.

Cost of Computing Resources



2019

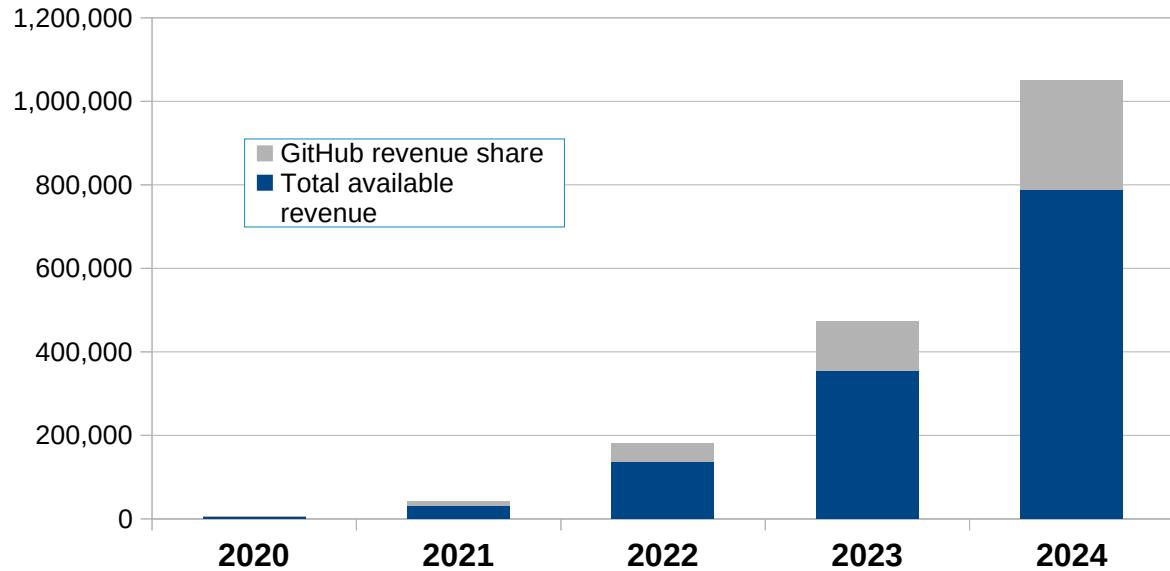


European
Commission

Available Revenue

- Available revenue grows from ±7k€ to 767k€
- After 25/75% revenue sharing with GitHub
- Considering subscriptions signed evenly along the year.
- Pure play SaaS model without services as reference baseline.

Revenue Breakdown Simulation



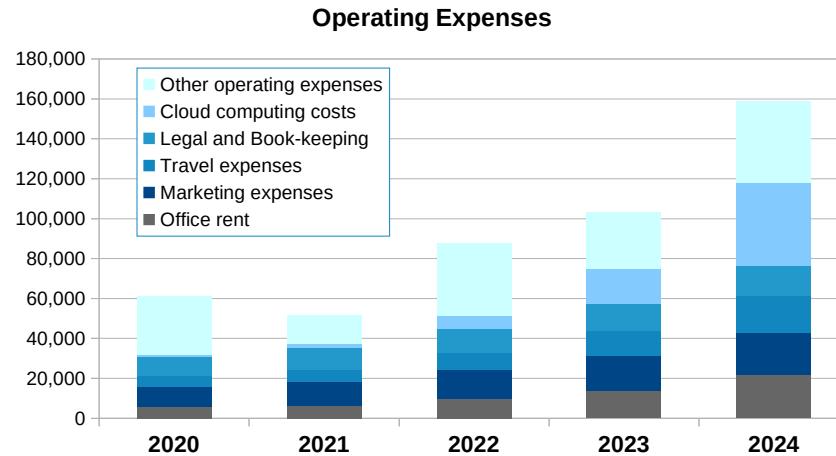
2019



European
Commission

Operating Expenses

- Personnel grows from 150k€ to 527K€
- Start-up personnel exclusively technical.
- Marketing and general in third year only.
- Technical staff growth as from year four.
- Operating expenses grow from 31k€ to 120k€
- Year one higher because of set-up costs.
- Marketing includes PR and analyst endorsement



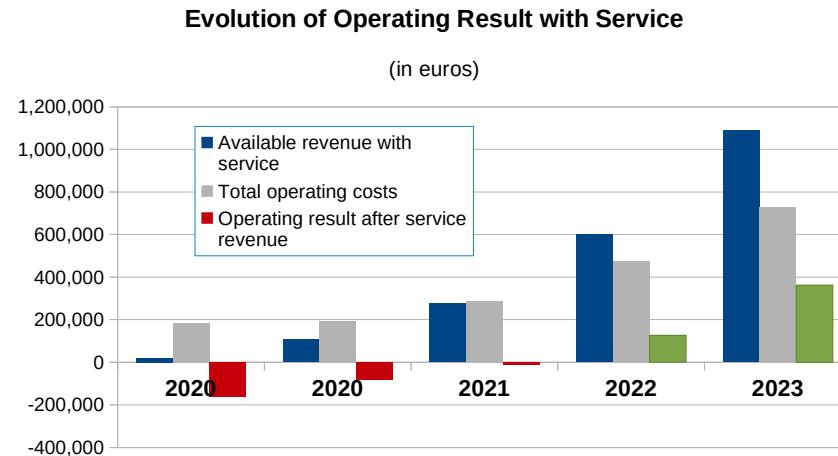
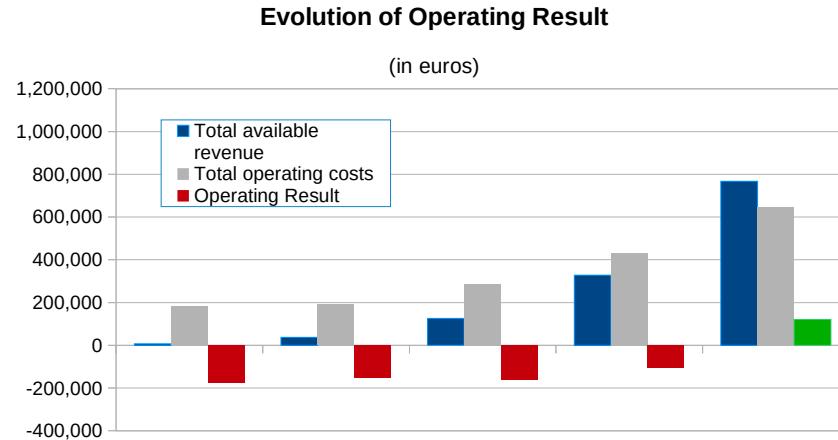
2019



European
Commission

Operating Result

- Four years of negative results for the pure play SaaS model.
- Model with most leverage at profitable fifth year.
- Adding service revenue brings profitability earlier.
- Additional service revenue based on .5 to 1 FTE per year.
- Shows revenue with service is preferable.



2019

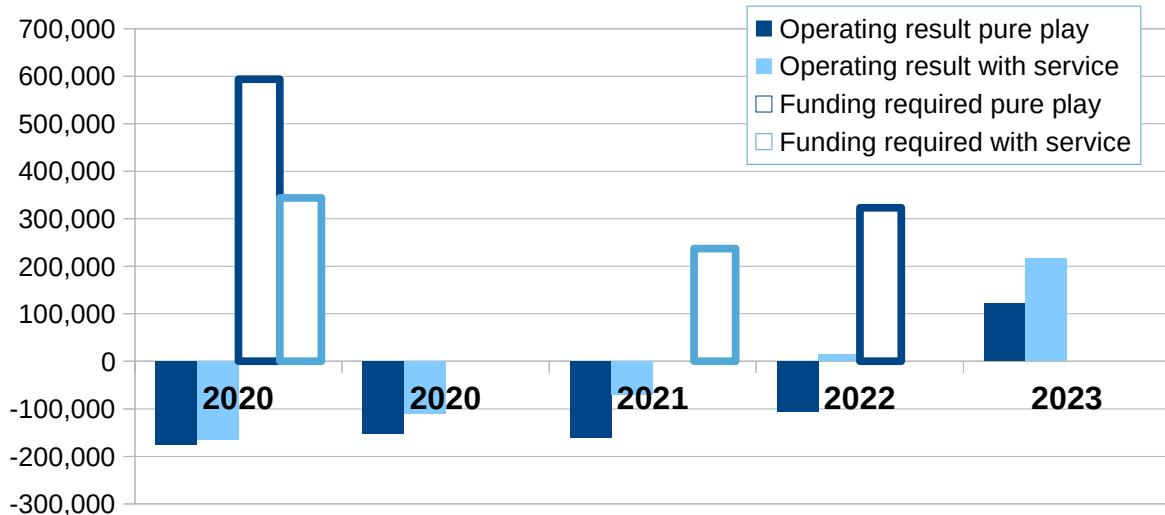
European
Commission |

Financing

- Required funding to profitability:
 - Pureplay: 900k€
 - With service: 600k€
- Strategies
 - Bootstrapping on a shoe string unlikely.
 - A team of academics with financial support could do it.

Funding Schemes

Pure play model vs Model with service



(euros)	Pure Play	With Service
Cumulated five-year result	-472,200	-113,200
1st round: bootstrapping.	594,000	344,000
2nd round: bridging to profitability.	323,000	237,000
Total required funding	917,000	581,000



2019



European
Commission

The STAMP project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731529.

More information: <https://www.stamp-project.eu>

The opinions expressed in this document reflects only the author's view and in no way reflect the European Commission's opinions.
The European Commission is not responsible for any use that may be made of the information it contains.



2019



European
Commission |

ANNEX 1: STAMP Workshops, Publications, Conferences and Industry Meetings



2019



European
Commission |

STAMP Workshops

28-31/10/2019 - Berlin, Germany - ISSRE'19
14-16/10/2019 - Stockholm, Sweden - Castor Software Days
2/10/2019 - Grenoble, France - STAMP Webinar with Orange
2/10/2019 - Stockholm, Sweden - Descartes at SAST
1/10/2019 - Rennes, France - STAMP Meeting with Harmonic
26/9/2019 - Rennes, France - STAMP Meeting with Veonum
3/9/2019 - Madrid, Spain - ElasTest-STAMP Collaboration
27/8/2019 - Tallinn, Estonia - MaLTeSQuE'19 Workshop
26/8/2019 - Tallinn, Estonia - A-Test'19 Workshop
26/8/2019 - Tallinn, Estonia - EASEAI'19 Workshop
31/7/2019 - India (remotely) - Descartes Webinar with Sopra-Steria
3/7/2019 - Chessy, France - STAMP at Eastern Paris Dev Meetup
29-30/5/2019 - Montreal, Canada - ICSE'19
17/5/2019 - Brussels, Belgium - EC DGIT Workshop
13/5/2019 - Cesson-Sévigné, France - Hands-on Workshop at OrangeLabs
12/4/2019 - Stockholm, Sweden - STAMP Mutation Testing Workshop
28/3/2019 - Rennes, France - STAMP Meeting with Solocal and Kereval
12/3/2019 - Paris, France - STAMP Webinar with CGI
27/2/2019 - Paris, France - Station F STAMP Workshop
30/1/2019 - Sophia-Antipolis, France - STAMP Workshop in Sophia-Antipolis

6/11/2018 - Delft, Netherlands - Dutch Testing Day
24/10/2018 - Paris, France - STAMP Workshop with Henry Coles
17/9/2018 - Leide, Netherlands - In-Vivo Analytics Workshop
8/9/2018 - Montpellier, France - SSBSE'18
3/9/2018 - Montpellier, France - MASES'18
28/5/2018 - Göteborg, Sweden - ICSE'18
17/5/2018 - Stockholm, Sweden - Spotify Talks
13/4/2018 - Västerås, Sweden - A-MOST ICST'18
19/3/2018 - Schloss Dagstuhl, Wadern, Germany - Dagstuhl'18
8/2/2018 - Remotely with OW2 project leaders - STAMP OW2 Workshop

14/12/2017 - Madrid, Spain - STAMP Workshop



2019

European
Commission |

Scientific Publications in OpenAire (1/2)

#	Title
1	An Investigation of Compression Techniques to Speed up Mutation Testing
2	A Journey Among Java Neutral Program Variants
3	Correctness Attraction: A Study of Stability of Software Behavior Under Runtime Perturbation
4	The Maven Dependency Graph: a Temporal Graph-based Representation of Maven Central
5	A Comprehensive Study of Pseudo-tested Methods
6	Test them all, is it worth it? Assessing configuration sampling on the JHipster Web development stack
7	A Tale of CI Build Failures: An Open Source and a Financial Organization Perspective
8	Descartes: a PITest engine to detect pseudo-tested methods - Tool Demonstration
9	Uniform Sampling of SAT Solutions for Configurable Systems: Are We There Yet?
10	TravisTorrent: Synthesizing Travis CI and GitHub for Full-Stack Research on Continuous Integration
11	Does Refactoring of Test Smells Induce Fixing Flaky Tests?
12	A systematic literature review of how mutation testing supports quality assurance processes
13	A Test-Suite Diagnosability Metric for Spectrum-Based Fault Localization Approaches



2019

European
Commission |

Scientific Publications in OpenAire (2/2)

#	Title
14	Exhaustive Exploration of the Failure-oblivious Computing Search Space
15	Detection and analysis of behavioral T-patterns in debugging activities
16	A spoonful of DevOps helps the GI go down
17	Correctness Attraction: A Study of Stability of Software Behavior Under Runtime Perturbation
18	A Guided Genetic Algorithm for Automated Crash Reproduction
19	The Emergence of Software Diversity in Maven Central
20	Search-based test data generation for SQL queries
21	Deep customization of multi-tenant SaaS using intrusive microservices
22	Oops, My Tests Broke the Build: An Explorative Analysis of Travis CI with GitHub
23	Model-based mutant equivalence detection using automata language equivalence and simulations
24	Single-objective Versus Multi-objectivized Optimization for Evolutionary Crash Reproduction

+ 3 PhD defenses



2019



European
Commission

STAMP Conferences

19/11/2019 - Grenoble, France - Orange Test and Dev Day
10-11/12/2019 - Paris, France - POSS'19
23-25/10/2019 - Ludwigsburg, Germany - EclipseCon Europe'19
7/10/2019 - Madrid, Spain - Madrid JUG Meetup'19
12-13/06/2019 - Paris, France - OW2con'19
6/5/2019 - Stockholm - STAMP DSpot Meetup'19
17-19/04/2019 - Paris, France - DeVoxx Paris'19
11/4/2019 - Stockholm, Sweden - Test Automation Research for Industry
20/3/2019 - Rennes, France - BreizhCamp'19
2-3/2/2019 - Brussels, Belgium - FOSDEM'19

6/12/2018 - Sophia-Antipolis, France - Telecom Valley'18
5-6/12/2018 - Paris, France - POSS'18
27-28/11/2018 - Paris, France - CloudExpoEurope'18
24/10/2018 - Paris, France - Paris JUG Mutation Testing'18
4/7/2018 - Sophia-Antipolis, France - SophiaConf'18

21/6/2018 - Rennes, France - BreizhJUG'18
13-14/6/2018 - Toulouse, France - EclipseCon France'18
7-8/6/2018 - Paris, France - OW2con'18
18-20/4/2018 - Paris, France - Devoxx Paris'18
21-22/3/2018 - Paris, France - Cloud World Expo'18
3-4/2/2018 - Brussels, Belgium - Fosdem'18

6-7/12/2017 - Paris, France - POSS'17
24-26/10/2017 - Ludwigsburg, Germany - EclipseCon Europe'17
20-21/9/2017 - Amsterdam, Netherlands - CloudWatchHub_Summit
19/9/2017 - Amsterdam, Netherlands - CloudWatch Europe
28-29/6/2017 - Brussels, Belgium - Net_Futures'17
26-27/6/2017 - Paris, France - OW2con'17
8-11/5/2017 - Boston, Mass. - OpenStack Summit'17
8-11/5/2017 - Austin, Texas - OSCON'17
22-23/3/2017 - Paris, France - Cloud World Expo'17
4-5/2/2017 - Brussels, Belgium - Fosdem'17



2019



European
Commission

15 Industry talks

1. **SPOTIFY** HQ, Stockholm, Sweden, 17 May 2018 (KTH)
2. **ParisJUG** Mutation Testing meeting, 24 Oct. 2018 (ALL)
3. Sophia-Antipolis Workshop with 9 external dev. 30 Jan 2019 (ALL)
4. Paris **Station-F**, Start-ups dev, 29 Febr 2019 (Inria)
5. **CGI** Webinar with 25 DevOps from CGI, 12 March 19 (OW2, Inria)
6. Test Automation Research for Industry Workshop in Stockholm, 11 April 2019 (KTH)
7. **Ericsson** Mutation Testing Workshop, Kista, with **Saab**. 12 April 2019 (Inria)
8. Dspot: Improved software testing using AI, 6 May 2019 (KTH)
9. **EC-DGIT** Workshop for 70+ DevOps, 17 May 2019 (KTH/Inria)
10. STAMP breakout Session at OW2Con'19, 12/06/2019 (KTH, Inria)
11. **Sopra-Steria** Descartes Webinar 31 July 2019 (Inria)
12. Orange Grenoble on Descartes & Dspot 02/10/2019 (KTH)
13. Swedish Association for Software Testing (SAST) Descartes talk 03/10/2019 (KTH)
14. Castor Software Day, Stockholm, 14/10/2019 (KTH)
15. **Orange** Test & Dev Day, Grenoble, 19/11/2019 (Inria, OW2)



2019



European
Commission |

ANNEX 2: STAMP Beta-testing campaign



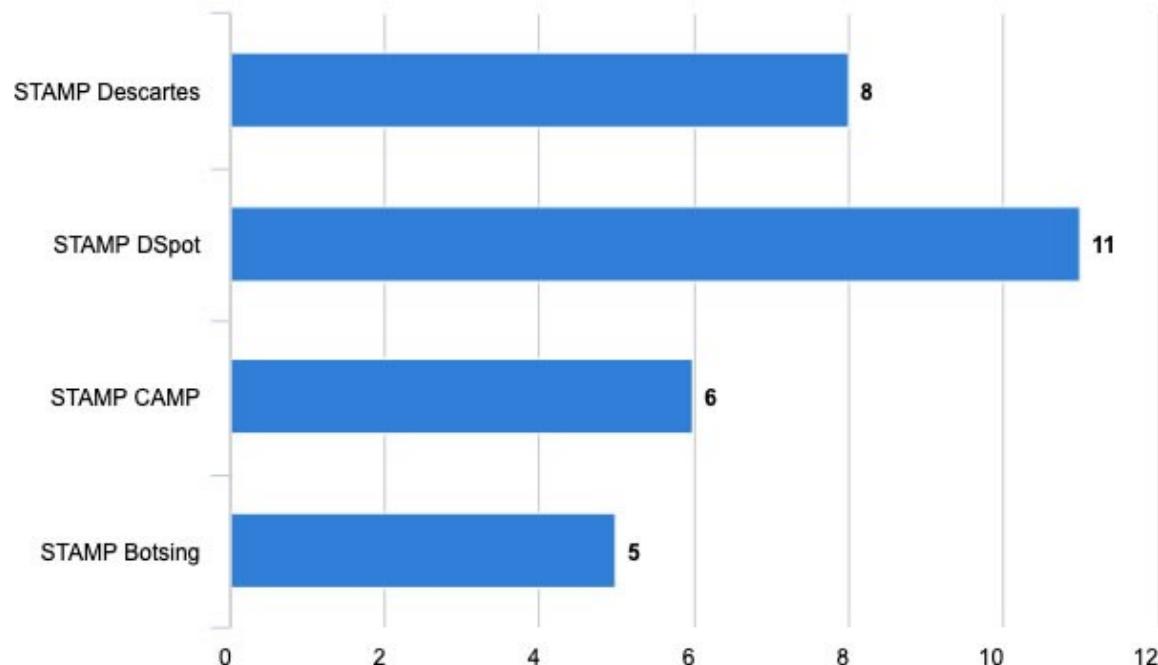
2019



European
Commission |

STAMP Beta Tester Feedbacks (14 answers)

1. Which STAMP software did you try to test?



2019

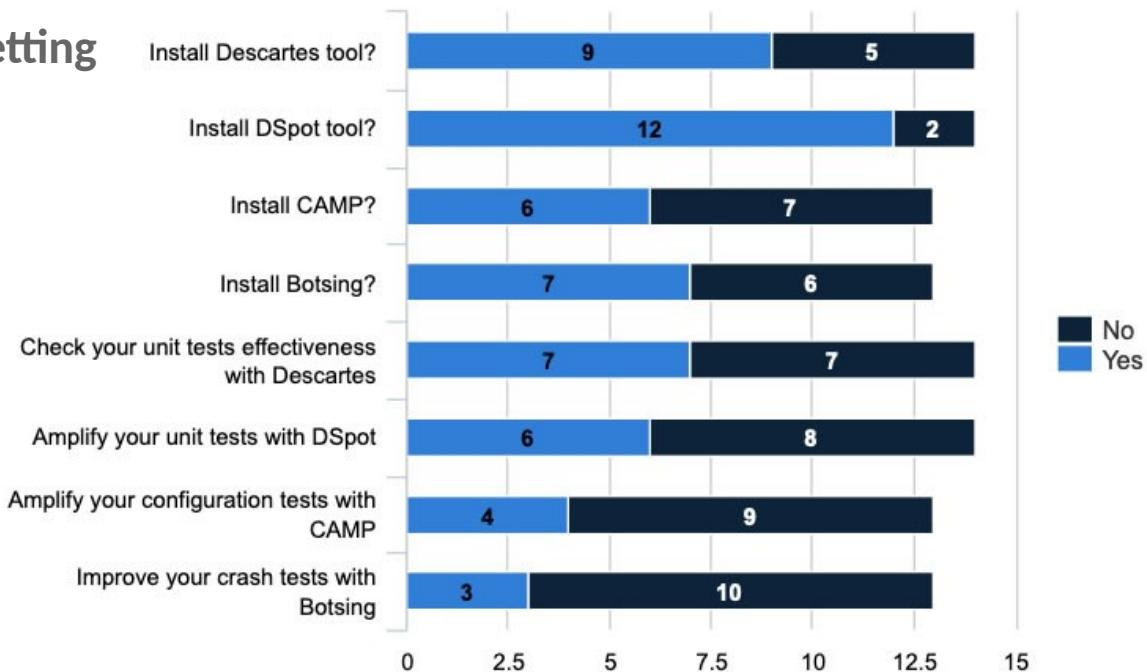


European
Commission

STAMP Beta Tester Feedbacks (14 answers)

Using the software guides, DSpot and Descartes were simple to install according to the beta-testers. Descartes allowed 88% of beta testers to check their unit tests effectiveness. DSpot allowed 55% of beta testers to amplify their unit tests. 67% of testers could amplify their configuration tests with CAMP and 60% of beta testers could improve their crash tests with Botsing.

2. Following the steps provided in the Getting Started guide, were you able to:



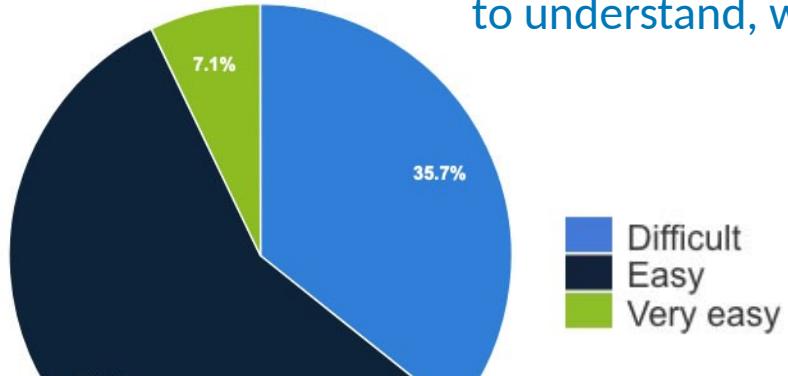
2019

European
Commission

Beta Tester Feedbacks on User Experience

3. How easy to understand is the user interface of the STAMP Toolbox?

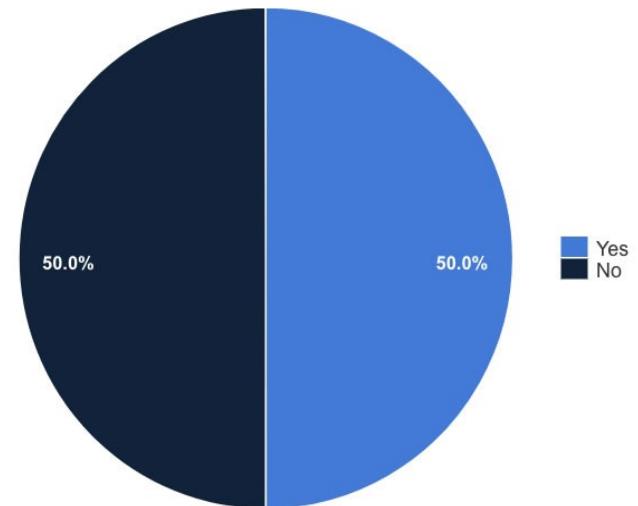
A total of 64.2% of beta testers found the STAMP toolbox easy to understand, while 35.7% found it difficult to understand.



Difficult
Easy
Very easy

Yes, I want to
know more
about STAMP:
100% Yes

4. Would you be interested in exploring further STAMP with one of the developers or in a personalised demonstration?



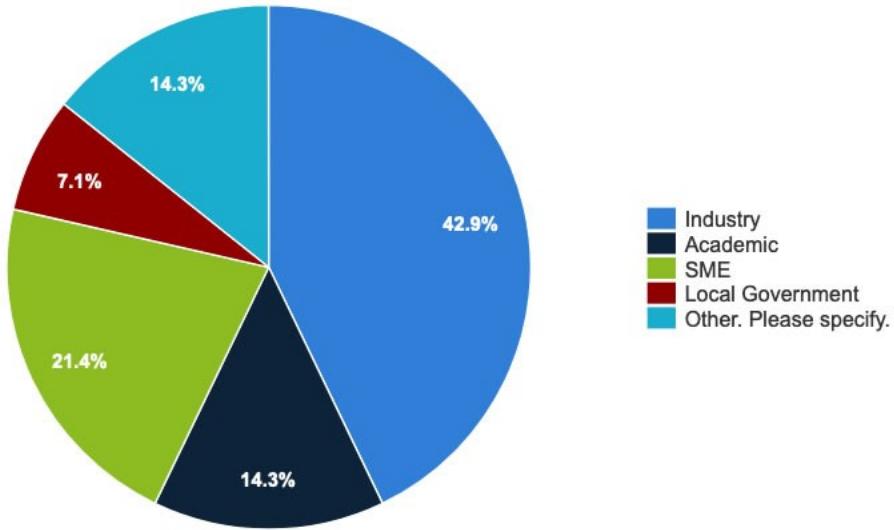
2019



European
Commission

Beta Tester Origin

7. What kind of organisation do you represent?



Beta testers working in an industrial company represent the largest group of early users (43.9%). They are followed SME IT professionals (21.4%), Academic testers (14.3%), and local government (7.1%).



2019



European
Commission |