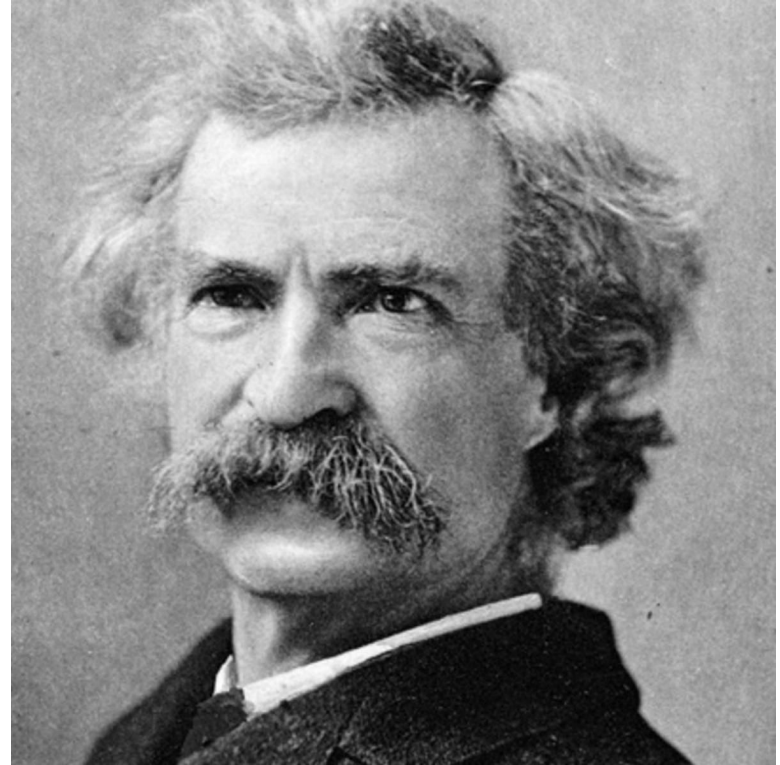


Open Source Health: A Practitioners Guide

Or how the quest for open source health has impacted the Eclipse Foundation, its projects, and its community

Mike Milinkovich, Eclipse Foundation
@mmilinkov

“Never let the facts get in the way of a good story.”





Software ate the world...





...then open source
gobbled up software

Be Careful What You Wish For....

With great power
comes great
responsibility

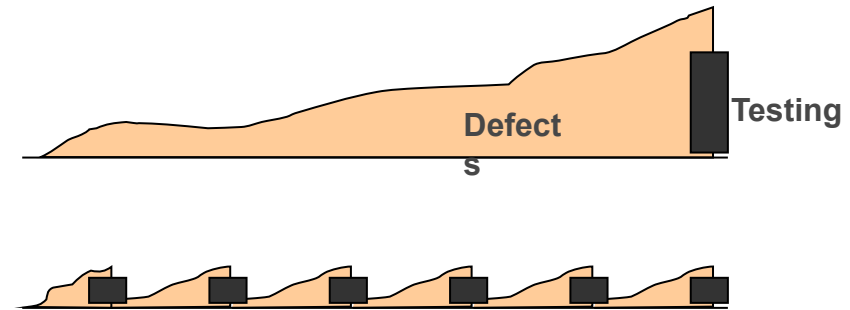


c. 2002: Getting software to work (better)



Testing

- innovate with confidence
- tests run after each build
- test kinds
 - **correctness** tests
 - assert correct behavior
 - **performance** tests
 - assert no performance regressions
 - based on a database of previous test run measurements
 - **resource** tests, leak tests
 - assert no resource consumption regressions



Kent Beck – JUnit handbook

Unit Test Report

Eclipse SDK

The Eclipse SDK includes the Eclipse Platform, Java development tools, and the Eclipse IDE. If you aren't sure which download you want... then you probably want the Eclipse SDK. **Eclipse does not include a Java runtime environment** so you will need to run Eclipse. [Click here](#) if you need help finding a Java runtime.

Status

-  Windows 98/ME/2000/XP
-  Linux (x86/Motif) ([Supported Versions](#))
-  Linux (x86/GTK 2) ([Supported Versions](#))
-  Linux (AMD 64/GTK 2) ([Supported Versions](#))
-  Solaris 8 (SPARC/Motif)
-  AIX (PPC/Motif)
-  HP-UX (HP9000/Motif)
-  Mac OSX (Mac/Carbon) ([Supported Versions](#))
-  Source Build (Source in .zip) ([instructions](#))
-  Source Build (Source fetched via CVS)

Unit Test Results

Designed for use with [JUnit 4](#)

Summary

Tests	Failures	Errors	Success rate	Time
352	1	0	99.72%	287.698

Note: *failures* are anticipated and checked for with assertions while *errors* are unanticipated.

Packages

Note: package statistics are not computed recursively, they only sum up all of its testsuites numbers.

Name	Tests	Errors	Failures	Time(s)
org.eclipse.jdt.debug.tests	352	0	1	287.698

Package org.eclipse.jdt.debug.tests

Name	Tests	Errors	Failures	Time(s)
AutomatedSuite	352	0	1	287.698

[Back to top](#)

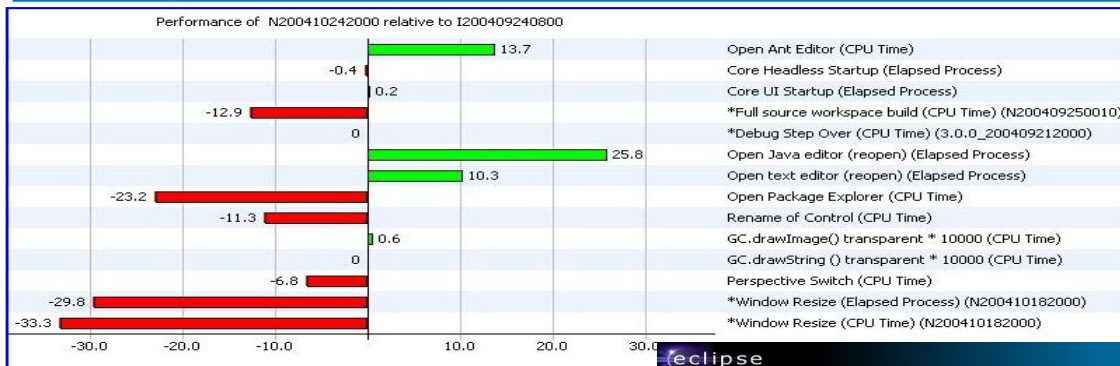
testNoPrintIn	Success	0.850
testFlood	Failure	6.554
<pre> Wrong number of lines expected:<10000> but was:<9859> junit.framework.AssertionFailedError: Wrong number of lines expected:<10000> but was:<9859> at org.eclipse.jdt.debug.tests.core.LineTrackerTests.testFlood (LineTrackerTests.java:136) at sun.reflect.NativeMethodAccessorImpl.invoke0(Native Method) at sun.reflect.NativeMethodAccessorImpl.invoke (NativeMethodAccessorImpl.java:39) at sun.reflect.DelegatingMethodAccessorImpl.invoke (DelegatingMethodAccessorImpl.java:25) at org.eclipse.jdt.debug.tests.DebugSuite1.run(DebugSuite.java:53) at java.lang.Thread.run(Thread.java:584) </pre>		
testHyperLink	Success	0.603

Performance Test Report

- home
- about us
- projects
- downloads
- articles
- newsgroups
- mailing lists
- community
- search
- bugs

Performance Results

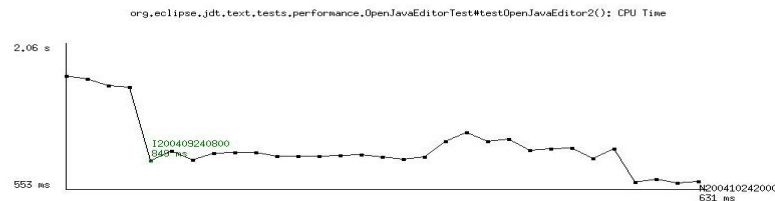
Performance fingerprint



* Missing reference data. Build used for comparison specified in ending parenthesis
 green: faster, less memory
 red: slower, more memory
 x axis: difference between current value and baseline value as percentage



- home
- about us
- projects
- downloads
- articles
- newsgroups
- mailing lists
- community
- search
- bugs



c. 2005: Is anyone using our stuff?

Early Days



Welcome

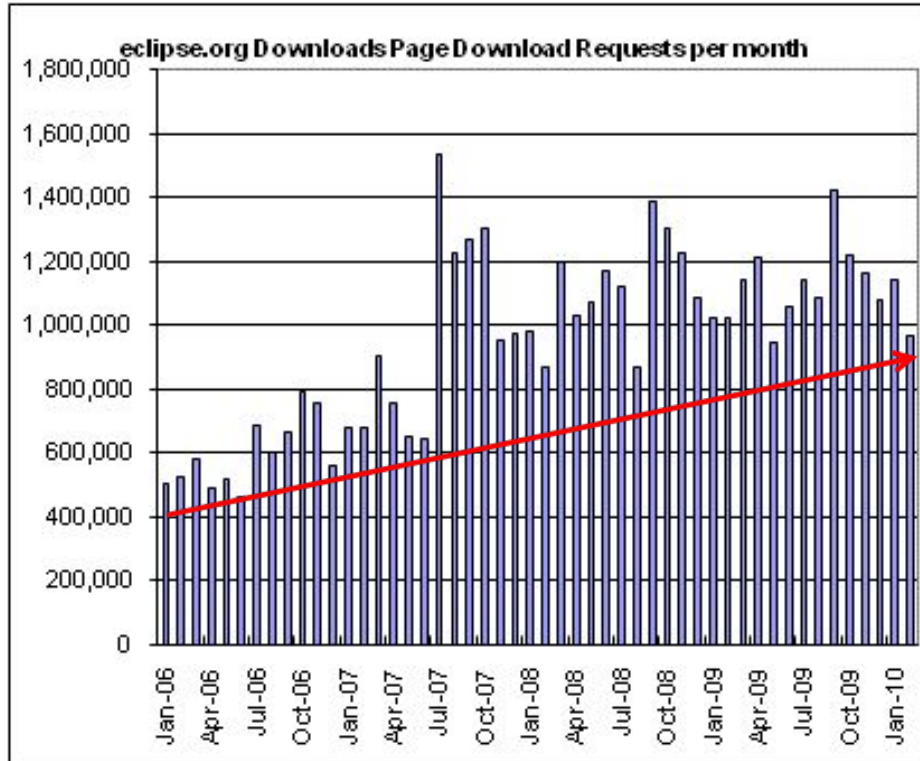


Welcome to eclipse.org

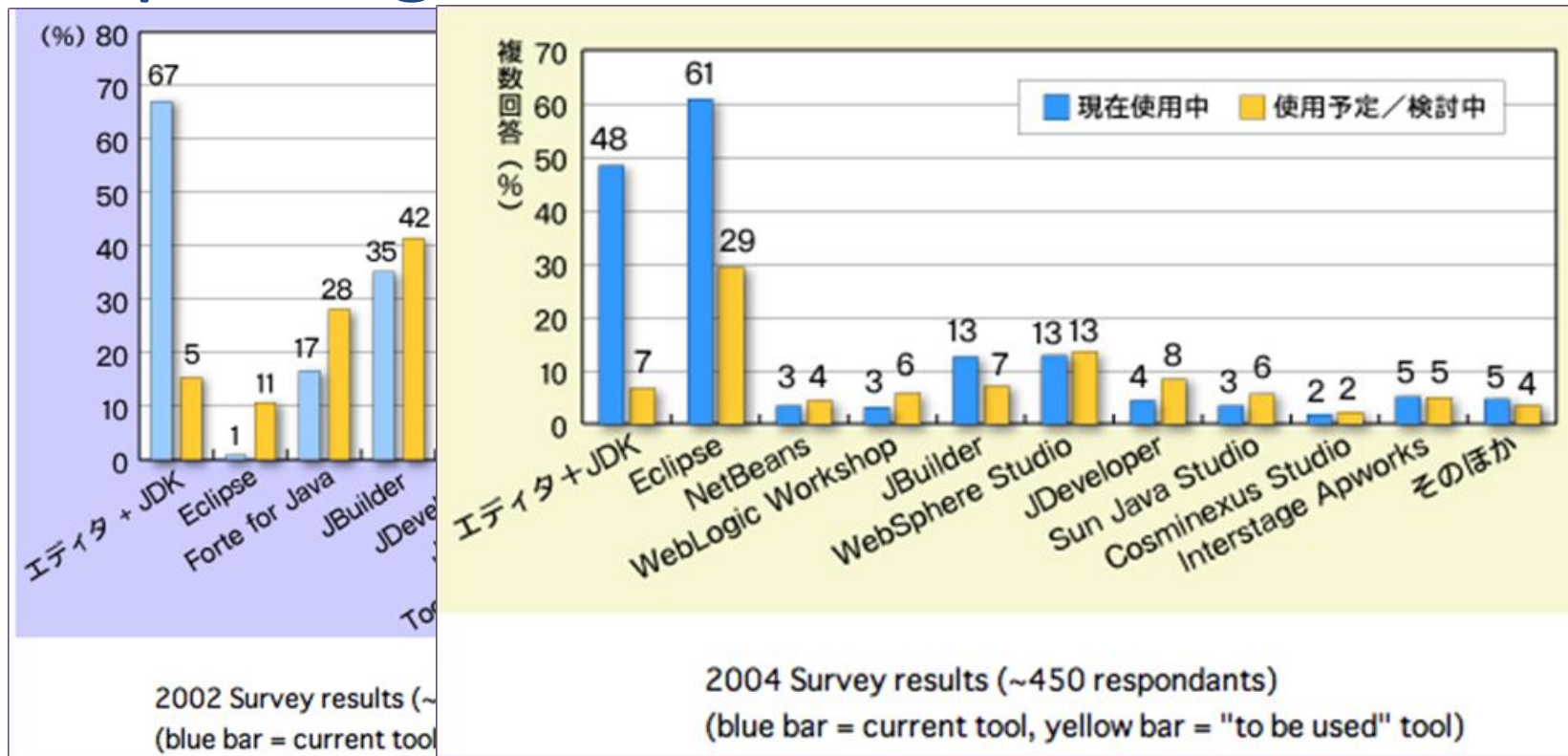
Eclipse is a kind of universal tool platform -
an open extensible IDE for anything and
nothing in particular.



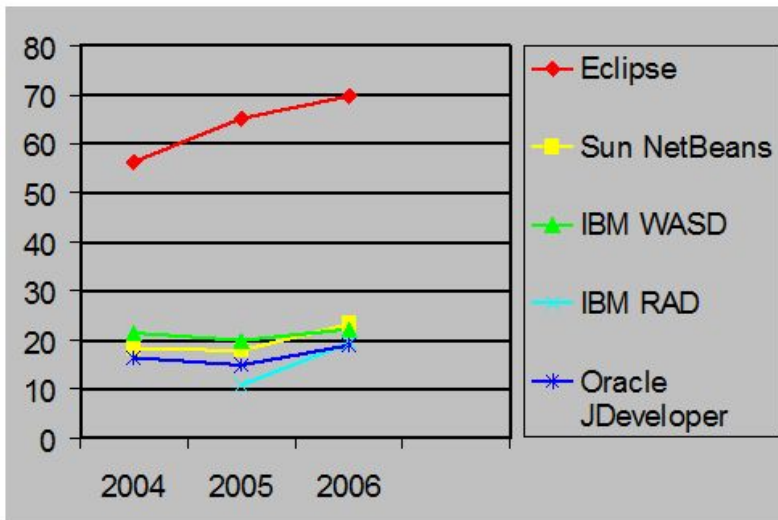
Eclipse: A Leading Community



Impacting a Market



Impacting a Market



'70% of Java developers use either Eclipse or an Eclipse-based IDE.'

IDE Usage Trends Report, Feb. 2008

c. 2005: Focus on Adopters

IP Policy

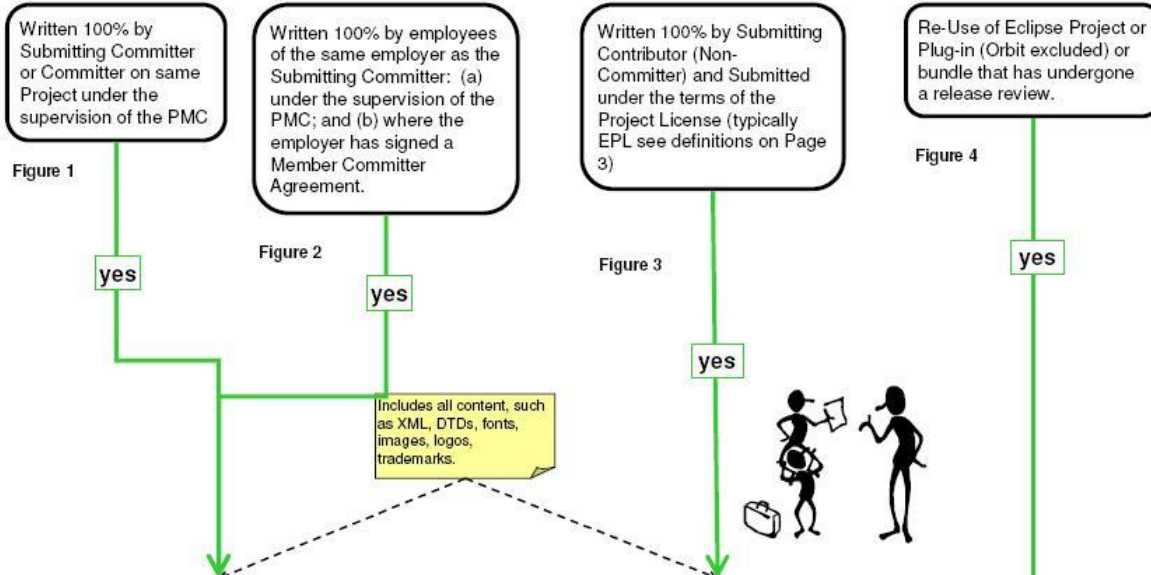


Eclipse Legal Process

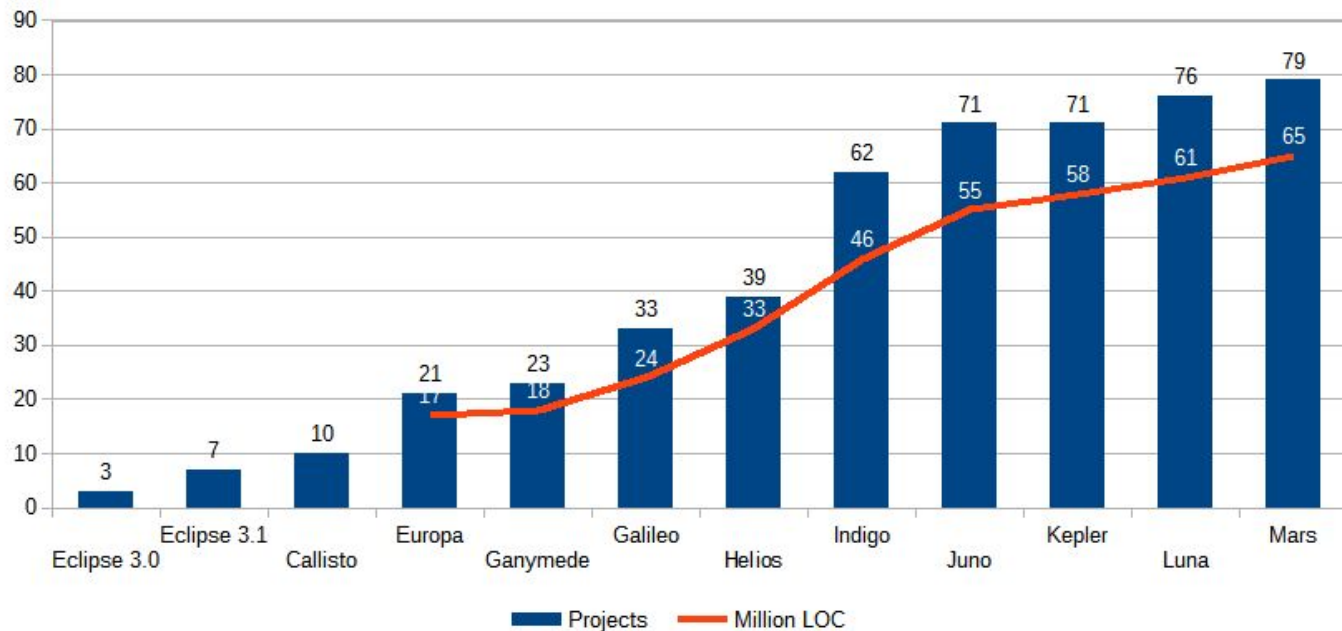
Start Here



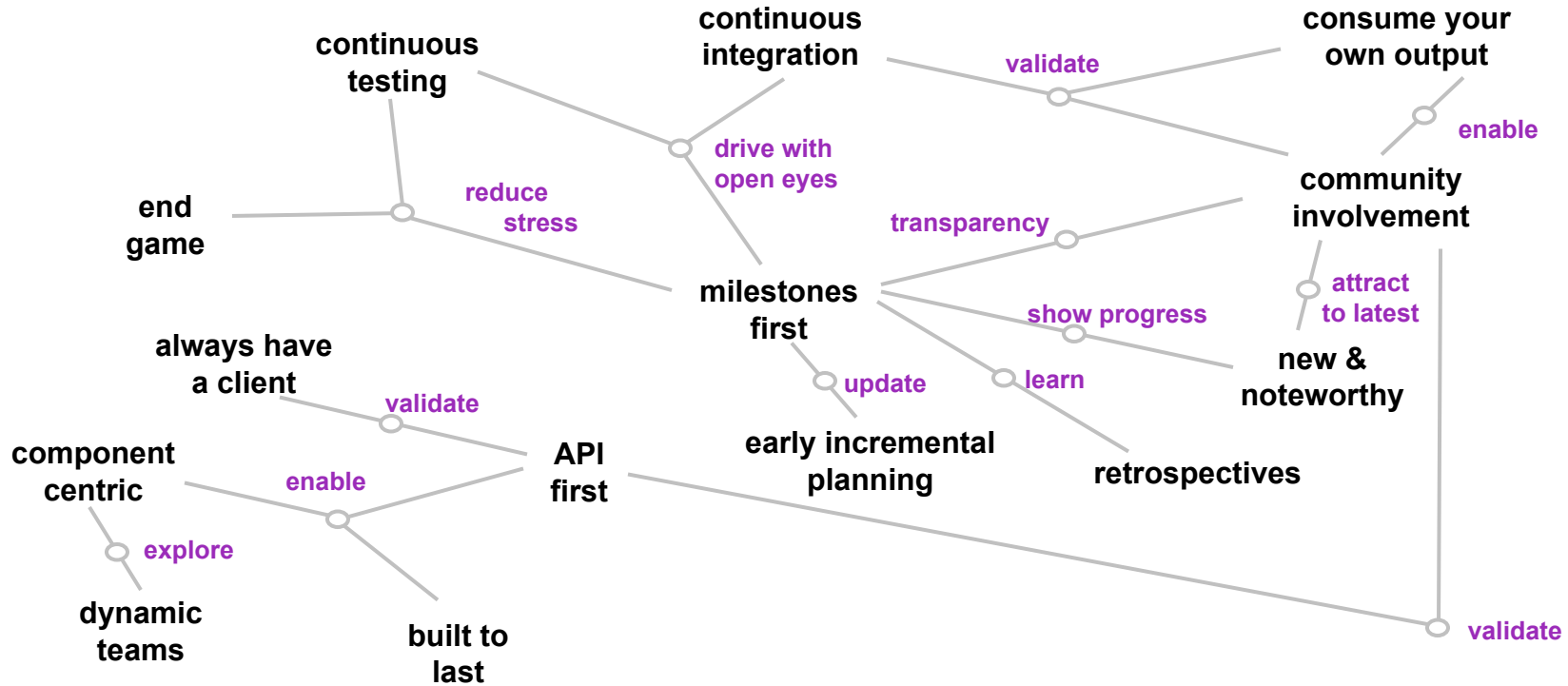
What is the origin of the code?
See Figures 1 through 6 below



Predictability



How is the Development Done?



Eclipse C/C++ Development Tools



c. 2006: Supporting an ecosystem

Platform == Architecture of Participation

BY: <http://www.flickr.com/photos/sentience/261922677/>



BY: <http://www.flickr.com/photos/ckindel/135426249/>

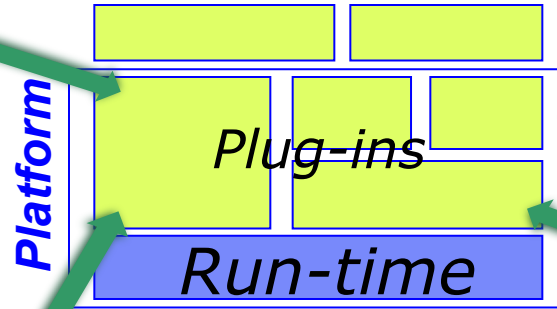
*“what really distinguishes open source is not just source, but an
"architecture of participation"”*

Tim O'Reilly

<http://www.oreillynet.com/pub/wlg/3017?wlg=yes>

The Eclipse Experience – Architecture of Participation

***Ease of Integration
and Extensibility
Spurs Innovation***



***New Plug-ins
are First Class
Citizens –
same footing
for everyone***

***Competition can take
place on implementations
– users decide winners***

***Open API and
commercially
friendly licensing –
Low barriers to
Entry***



Successful Ecosystems are built on this model!

Eclipse Marketplace



- Catalog over 1000+ solutions
- Make it easy to find Eclipse-based products
- Anyone may list their Eclipse product

The screenshot shows the Eclipse Marketplace website in a Mozilla Firefox browser window. The browser's address bar shows the URL <http://marketplace.eclipse.org/>. The website has a purple and white color scheme. At the top, there is a navigation bar with links for Home, My Marketplace, Add Content, and Login. Below this, there is a search bar with the text "1,137 Solutions and counting." and a search button. The main content area is divided into several sections:

- Markets:** A sidebar on the left lists various categories: Tools (997), RCP Applications (95), and Training & Consulting (80).
- Most Active:** A table listing popular solutions with their names and counts:

UMLet - UML Tool for Fast UML Diagrams	2264
ShellEd	630
Sysdeo Tomcat Launcher Plugin	564
Jaloo SWT/Swing GUI Builder	513
Hibernate Tools	466
AmaterasUML	460
Pydev - Python IDE for Eclipse	444
Binzo XML Editor	414
Green UML	406
Subclipse	368
more	
- Spotlight:** A section highlighting featured solutions, including "Oracle Enterprise Pack for Eclipse" and "Solution Blueprint - Community Edition".
- New and Updated Solutions:** A section listing recently added or updated solutions, such as "My Prompt 1.0.0.beta" and "Amazon S3 Browser 1.0.8".
- Top Favorites:** A sidebar on the left listing popular solutions with their names and counts:

UMLet - UML Tool for Fast UML Diagrams	68
Subclipse	45
Pydev - Python IDE for Eclipse	34
Mylyn	33
Emacs+	31
Bonita Open Solution	27
FindBugs Eclipse Plugin	23
WindowBuilder Pro	22
Pulse Download, manage and maintain Eclipse tools	20
CodePro Anabix	20

c. 2007: Focus on Contributors

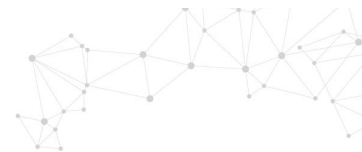
Contributions Abound



Company / Project Commit Details

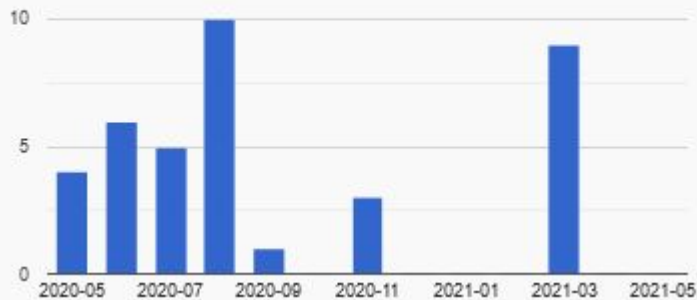
Company	Active Committers	Inactive Committers	Total Committers	Percent Active	Commits (2010)	Lines of Code (2010)
individual	104 (22.61%)	293 (39.43%)	397 (33%)	26.2%	128,579 (22.47%)	4,087,202 (15.3%)
IBM	103 (22.39%)	215 (28.94%)	318 (26.43%)	32.39%	128,279 (22.42%)	8,950,410 (33.51%)
unknown	4 (0.87%)	56 (7.54%)	60 (4.99%)	6.67%	1,742 (0.3%)	13,071 (0.05%)
ActuateCorporation	25 (5.43%)	28 (3.77%)	53 (4.41%)	47.17%	6,376 (1.11%)	198,506 (0.74%)
Oracle	35 (7.61%)	6 (0.81%)	41 (3.41%)	85.37%	51,511 (9%)	811,076 (3.04%)
IntelCorporation	9 (1.96%)	13 (1.75%)	22 (1.83%)	40.91%	2,725 (0.48%)	46,190 (0.17%)
OBEO	9 (1.96%)	5 (0.67%)	14 (1.16%)	64.29%	20,305 (3.55%)	1,071,366 (4.01%)
ZendTechnologies	4 (0.87%)	10 (1.35%)	14 (1.16%)	28.57%	700 (0.12%)	78,967 (0.3%)
SAPAG	8 (1.74%)	6 (0.81%)	14 (1.16%)	57.14%	4,114 (0.72%)	73,164 (0.27%)
itemisAG	11 (2.39%)	2 (0.27%)	13 (1.08%)	84.62%	29,300 (5.12%)	1,439,834 (5.39%)
Nokia	13 (2.83%)	0 (0%)	13 (1.08%)	100%	3,345 (0.58%)	246,289 (0.92%)
RedHatInc.	9 (1.96%)	3 (0.4%)	12 (1%)	75%	5,888 (1.03%)	214,633 (0.8%)
Innoopract	7 (1.52%)	4 (0.54%)	11 (0.91%)	63.64%	6,823 (1.19%)	204,896 (0.77%)
EclipseFoundation	11 (2.39%)	0 (0%)	11 (0.91%)	100%	2,588 (0.45%)	158,113 (0.59%)
SOPERAGmbH	5 (1.09%)	5 (0.67%)	10 (0.83%)	50%	1,050 (0.18%)	1,055 (0%)
Intaliolnc.	9 (1.96%)	1 (0.13%)	10 (0.83%)	90%	10,761 (1.88%)	3,750,097 (14.04%)
compeopleAG	6 (1.3%)	3 (0.4%)	9 (0.75%)	66.67%	5,426 (0.95%)	58,374 (0.22%)
CiscoSystemsInc.	4 (0.87%)	4 (0.54%)	8 (0.67%)	50%	379 (0.07%)	6,255 (0.02%)

Eclipse Orion



Contribution Activity:

Commits on this project (last 12 months).



Organization Contribution Activity:

Commits on this project by supporting organization over the last three months.

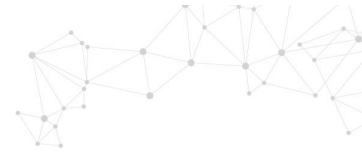


Individual Contribution Activity:

Commits on this project by individuals over the last three months.

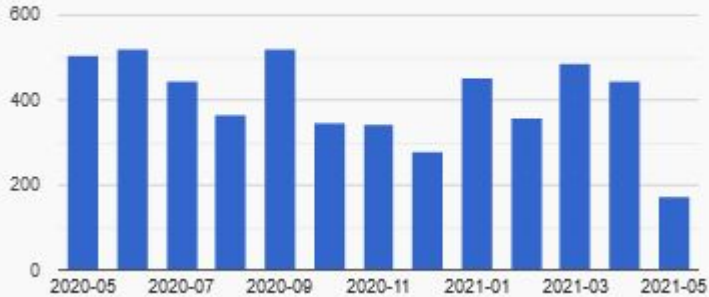


Eclipse IDE Platform



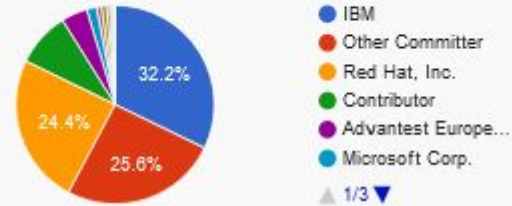
Contribution Activity:

Commits on this project (last 12 months).



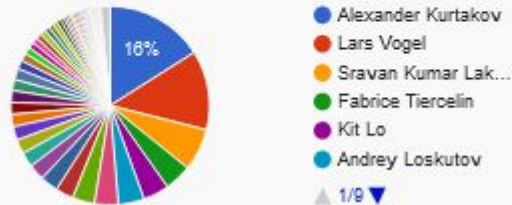
Organization Contribution Activity:

Commits on this project by supporting organization over the last three months.

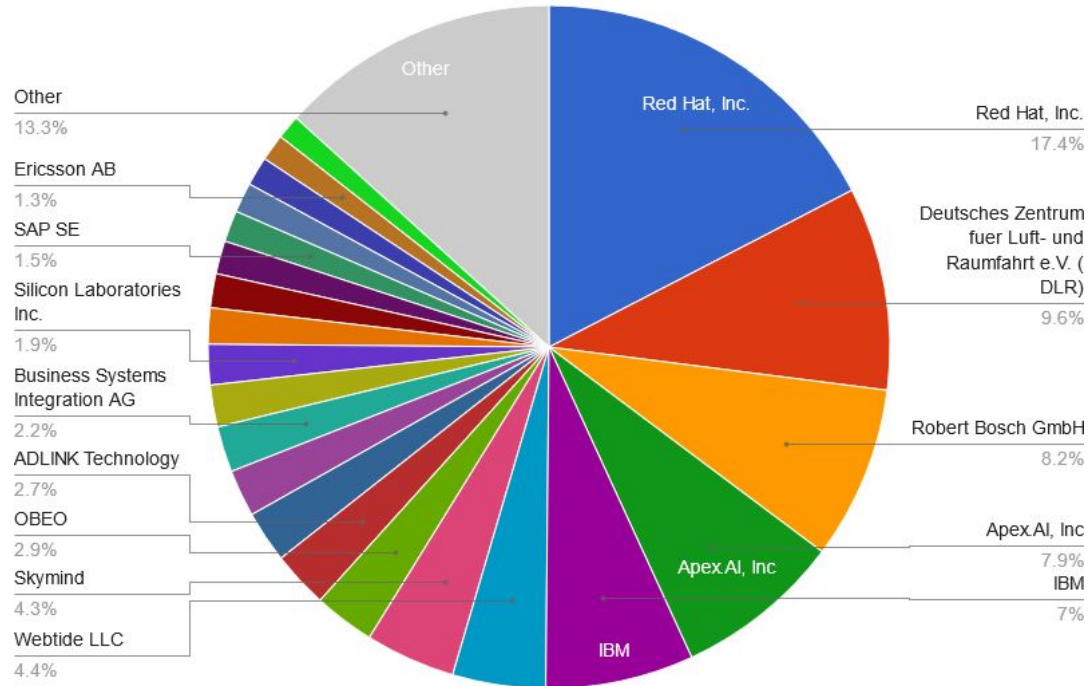


Individual Contribution Activity:

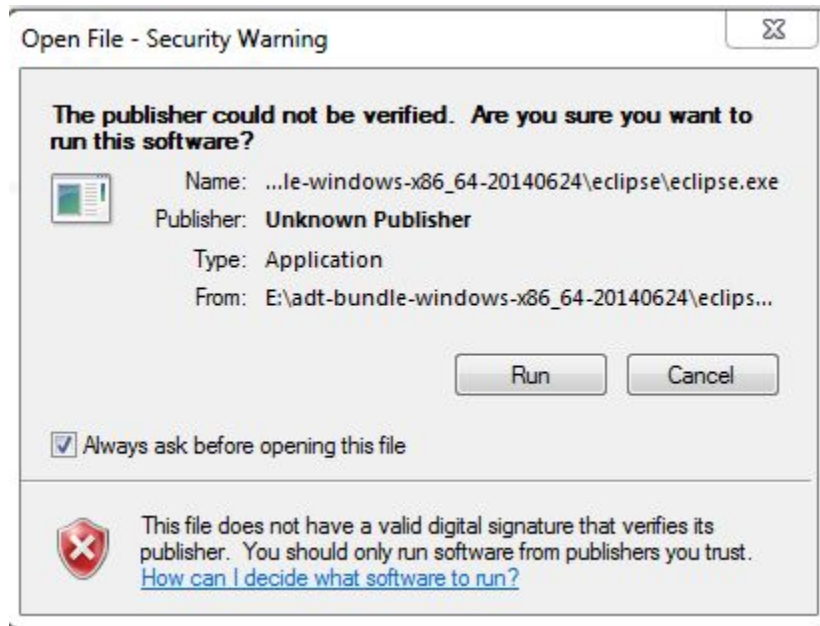
Commits on this project by individuals over the last three months.



Companies by Commits in 2021Q1



c. 2007: Basic Security



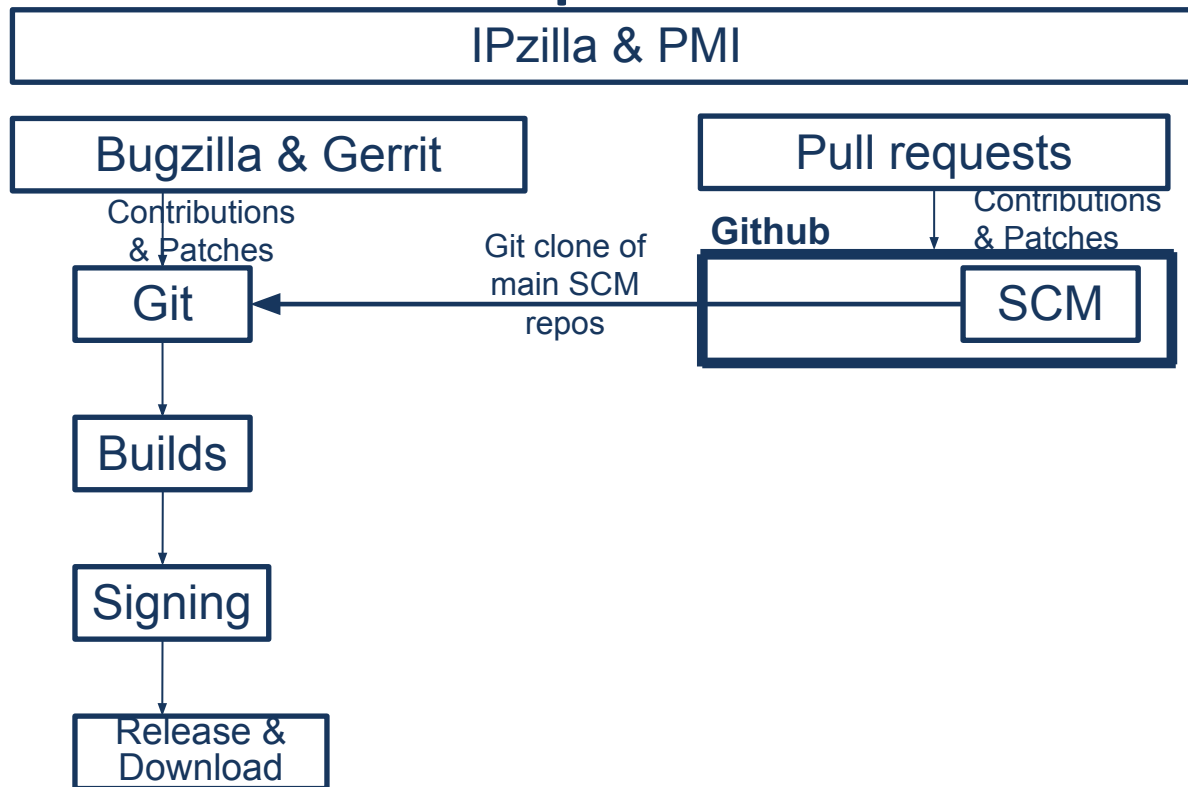
c. 2010: The emergence of Social Coding

aka The death of the self-hosted foundation forge

The impact of GitHub



Proposal



c. 2013: Social agency

Code of Conduct

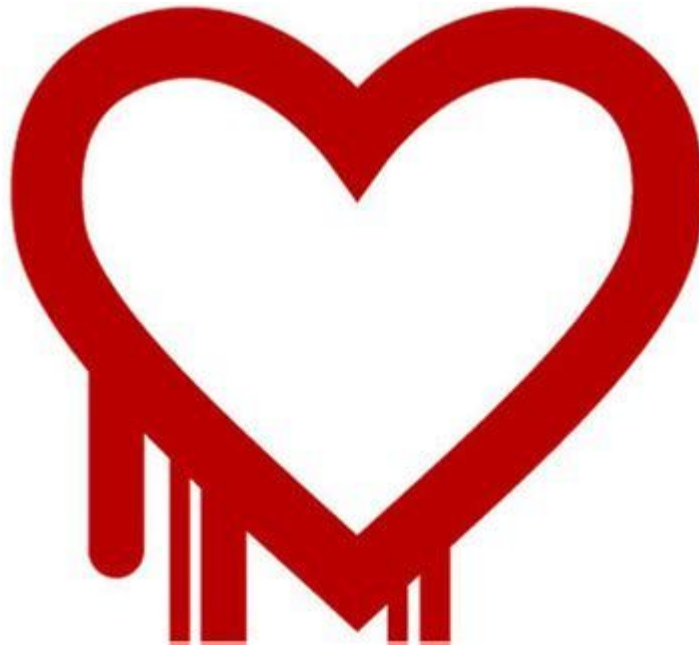


Community Code of Conduct Our Pledge

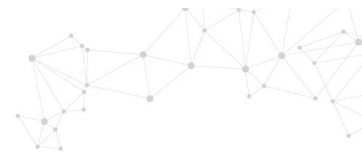
In the interest of fostering an open and welcoming environment, we as community members, contributors, committers, and project leaders pledge to make participation in our project and our community a harassment-free experience for everyone, regardless of age, body size, disability, ethnicity, sex characteristics, gender identity and expression, level of experience, education, socio-economic status, nationality, personal appearance, race, religion, or sexual identity and orientation.



c. 2014: Long Term Sustainability



Eclipse BIRT



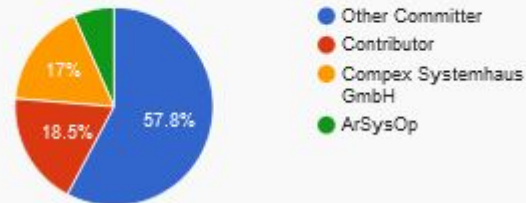
Contribution Activity:

Commits on this project (last 12 months).



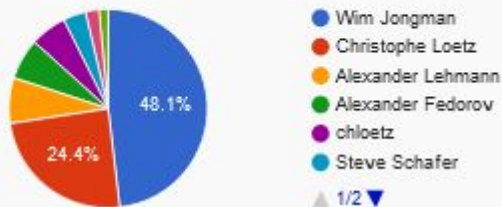
Organization Contribution Activity:

Commits on this project by supporting organization over the last three months.



Individual Contribution Activity:

Commits on this project by individuals over the last three months.



c. 2017: Securing FLOSS



The Eclipse Security Team

The Eclipse Security Team provides help and advice to Eclipse projects on vulnerability issues and is the first point of contact for handling security vulnerabilities. Members of the Security Team are committers on Eclipse Projects and members of the Eclipse Architecture Council.

Contact the [Eclipse Security Team](#).

Note that, as a matter of policy, the security team does not open attachments.

Reporting a Security Vulnerability

Vulnerabilities can be reported either via email to the Eclipse Security Team or directly with a project via the Eclipse Foundation's Bugzilla instance.



c. 2021: Supply Chain Security



FEBRUARY 14, 2021

SolarWinds hack was 'largest and most sophisticated attack' ever: Microsoft president

WIRED

BACKCHANNEL BUSINESS CULTURE GEAR IDEAS SCIENCE SECURITY

BRIAN BARRETT

SECURITY 12.19.2020 09:00 AM

Security News This Week: Russia's SolarWinds Hack Is a Historic Mess

ECLIPSE
FOUNDATION

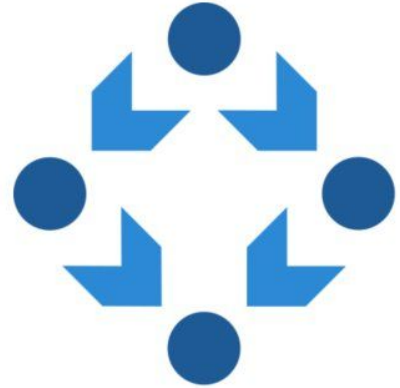


Executive Order on Improving the Nation's Cybersecurity

MAY 12, 2021 • PRESIDENTIAL ACTIONS

- (vii) providing a purchaser a Software Bill of Materials (SBOM) for each product directly or by publishing it on a public website;
- (viii) participating in a vulnerability disclosure program that includes a reporting and disclosure process;
- (ix) attesting to conformity with secure software development practices; and
- (x) ensuring and attesting, to the extent practicable, to the integrity and provenance of open source software used within any portion of a product.

Reproducible Builds, Vulnerability Scanning



Eclipse Steady



Discover, assess and mitigate known vulnerabilities

Steady supports software development organizations in regards to the secure use of open-source components during application development.

As such, Steady addresses the OWASP Top 10 security risk A9, [Using Components with Known Vulnerabilities](#), which is often the root cause of data breaches.



c. 2021: Carbon Neutral Coding



Green software development: Microsoft, Linux Foundation want to make coding carbon-free

Can the 'green software' concept take and help the ICT sector reduce its carbon footprint?



Microsoft is backing a new non-profit, The Green Software Foundation, as part of an industry-wide effort to clean up code so that it's not wasting electricity on laptops, desktops or in the cloud.

Cloud giants including [Microsoft](#), [Google](#), Amazon, [Apple](#) and Facebook are trying to reduce the carbon footprint of their cloud data centers. While it's easy to envisage [how massive data centers consume electricity](#), it's less clear how code behind an application or even certain programming languages impact the carbon footprint of the hardware it's running on.

The ever-growing and evolving definition of “Health”



Early days... software that works

2004... Is anyone using our stuff?

2005... Focus on adopters

2006... Supporting an ecosystem

2007... Focus on contributors and contributor diversity (organization)

2007... Basic security

2010... Social coding a.k.a. the death of the forge

2013... Social agency, code of conduct, diversity initiatives

2014... Long term Sustainability (Heartbleed 2014)

2017... Security v2 - CVE issuing authority, security policy

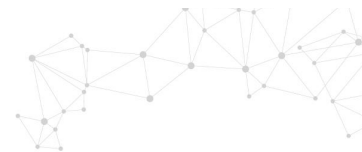
2021... Supply Chain Security and Management

OpenChain, SPDX, reproducible builds, US Executive Order, Google blog post

2021 “Green” open source



Summary



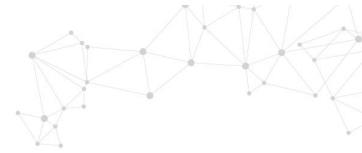
- 2001 definition of a healthy open source project:
 - It works and it solves a business or technical problem
- 2021 definition of a healthy open source project:
 - Working, secure, and carbon-neutral code, delivered on an environmentally friendly, sustainable, predictable, repeatable, and supply-chain secure basis with millions of users and thousands of GitHub stars, along with a plethora of adopters and a large, dynamic ecosystem all delivered by a diverse and welcoming community governed in an open and transparent manner with a commitment to equity and social justice.



Told you so...

With great power
comes great
responsibility



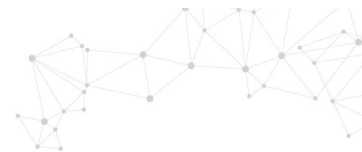


Conclusions

- The amount of resources required to have a “healthy open source project” has increased dramatically
 - Many of the tasks necessary for health fall outside the interests of most developers
- The success of open source is forcing its industrialization and professionalization
- The ever-growing definitions of “open source software health” may be unsustainable
 - At a minimum, they are changing the dynamics of how open source is created
- The ability of the “hero programmer” or small teams to significantly impact the industry has been reduced
 - Not necessarily a bad thing... open source has always been a team sport



Thoughts on the Future



- Successful, impactful, and healthy open source projects:
 - Require the (increasing) support of a foundation; or
 - Require the support of a well-funded startup; or
 - Both
- GitHub is trying
 - Actions, security scans, licensing options, code of conduct templates



Thank you!

Questions?