

# FINAL RESULTS

2014 Sonatype Open Source Development  
and Application Security Survey



## MY REFLECTIONS ON THE 2014 RESULTS

Wow! What an amazing turnout we had for our 4th annual survey: 3,353 participants this year brings us to over 11,000 in the four years we've run this survey. I would like to extend a BIG THANK YOU to all who participated!

The survey started with a bang and was quickly followed by a shock wave. Just a week after our 2014 survey kicked off this year, the tech world was thrown off kilter by the announcement of the Open SSL bug dubbed Heartbleed. In this report, we'll share how perceptions of open source components and application security changed before and after the Heartbleed announcement.

In many ways, I believe this year's survey results will mark an inflection point for open source development and application security. With 90% of a typical application now assembled using open source components, and enterprise architects teaming with application security to boost their focus on tracking and governing known component vulnerabilities, I believe we will mark post-Heartbleed 2014 as an important turning point toward trusted application development. This includes an increased vigilance toward use and maintenance of components across our software supply chain.

While we celebrated the 34 survey participants who scored those cool LEGO programmable robots or the \$100 Amazon gift cards, we also had some fun this year finding out what your pizza and drink preferences were (spoiler alert: beer edged out soda by 1%). And yes, due to popular demand, we'll be sure to add in "bacon" next year as one of the preferred pizza toppings.

As a good friend once reminded me, "it's not the stats that count". So, while the 2014 results might astound, motivate, or frustrate you, remember that the actions you take after seeing the results will be much more valuable to your organization than the stats themselves. Consider sharing these results with your colleagues over lunch or at your next staff meeting. You might even present them at your next local JUG, OWASP, or DevOps meet up to gauge perspectives or share best practices with others across the community.

Finally, I would like to thank this year's co-sponsors of the survey: NEA, Contrast Security, Rugged Software, and the Trusted Software Alliance. They all helped us refine this year's survey questions and broadened participation in this year's survey.

Now, dive into the results and let the discussions begin!

Sincerely,

Wayne Jackson  
CEO, Sonatype



Wayne Jackson, CEO  
Sonatype, Inc.



Previous 2013 Survey  
[bit.ly/sonatype13](http://bit.ly/sonatype13)



Previous 2012 Survey  
[bit.ly/sonatype12](http://bit.ly/sonatype12)

OUR WORLD RUNS ON SOFTWARE, AND **SOFTWARE RUNS ON OPEN SOURCE COMPONENTS**. FOR FOUR YEARS, WE HAVE ASKED THOSE ON THE FRONT LINES — DEVELOPERS, ARCHITECTS, AND MANAGERS, ABOUT HOW THEY'RE USING OPEN SOURCE COMPONENTS, AND HOW THEY'RE BALANCING THE NEED FOR SPEED WITH THE NEED FOR SECURITY.

THIS YEAR

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3,353

← Thank you!

PEOPLE SHARED THEIR VIEWS

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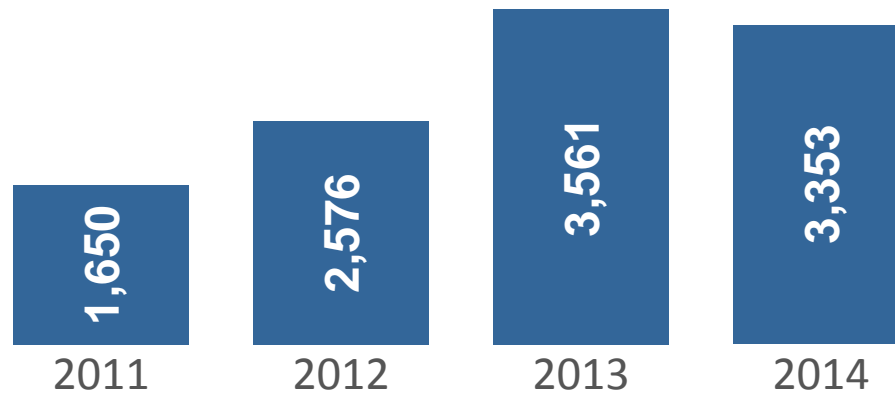
OVER THE FOUR YEAR STUDY

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11,140

PEOPLE HAVE PARTICIPATED

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# The TRUE State of Open Source Security

Source: 2014 Sonatype Open Source and Application Security Survey

## STATE OF THE INDUSTRY

Applications are the **#1** attack vector leading to breach

**13 billion** open source component requests annually

**11 million** developers worldwide

**90%** of a typical application is now open source components

**46 million** vulnerable open source components downloaded annually

## PRACTICES

**76%** don't have meaningful controls over what components are in their applications.

**21%** must prove use of secure components.

**63%** have incomplete view of license risk.

## COMPONENTS

The Central Repository is used by **83%**.

Nexus component managers used **3-to-1** over others

**84%** of developers use Maven/Jar to build applications.

## APP SECURITY

**6 in 10** don't track vulnerabilities over time.

**77%** have never banned a component.

**31%** suspected an open source breach.

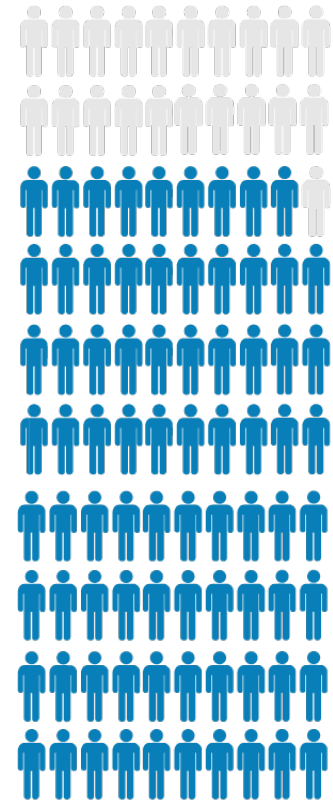
## OSS POLICIES

**56%** have a policy and **68%** follow policies.

**Top 3 challenges** no enforcement/workaround are common, no security, not clear what's expected

# Who took the survey?

Participants from companies such as...



**79%** OF THE RESPONSES  
CAME FROM DEVELOPERS,  
MANAGERS AND  
ARCHITECTS

## Who took the survey?

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*Q: In what industry is your company?*



**11%** Banking and finance

**23%** Technology/ISV

**4%** Insurance

**16%** Consulting/SI

**5%** Telecommunications

**4%** Manufacturing

**5%** Media and entertainment

**8%** Government/Military

**24%** Other

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**58%** OF THE  
RESPONDENTS HAVE  
**MORE THAN**  
25 DEVELOPERS  
IN THEIR  
ORGANIZATION

OVER **700** OF THE  
RESPONDENTS HAVE  
**MORE THAN**  
500 DEVELOPERS

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The background is a solid blue color with a faint, repeating pattern of interlocking gears and a grid. The gears are rendered in a lighter shade of blue, creating a technical or industrial aesthetic. The grid lines are also light blue and form a subtle background texture.

A LITTLE BIT OF BACKGROUND:

# OPEN SOURCE IS ON THE RISE



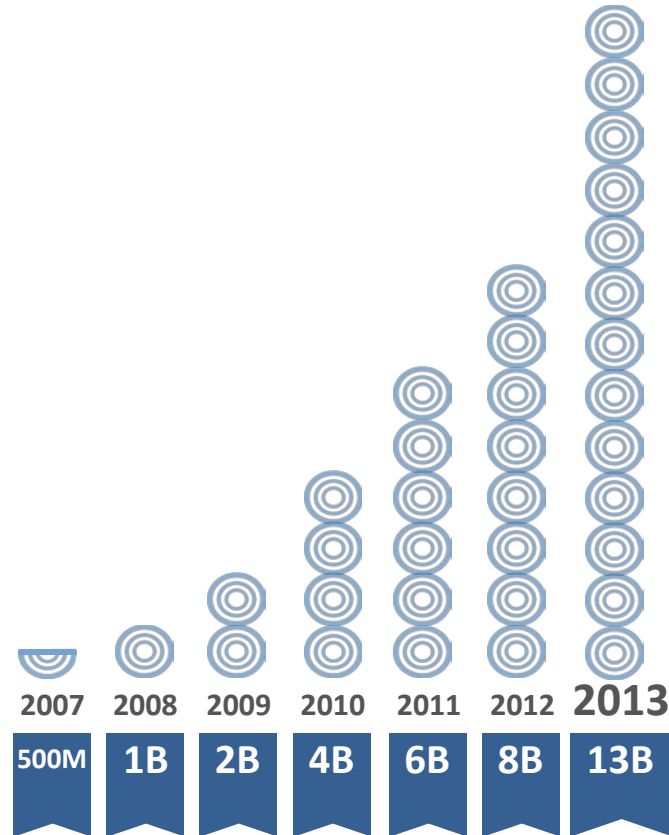
# Open source component use has exploded

**13 BILLION**<sup>1</sup>

OPEN SOURCE SOFTWARE  
COMPONENT REQUESTS

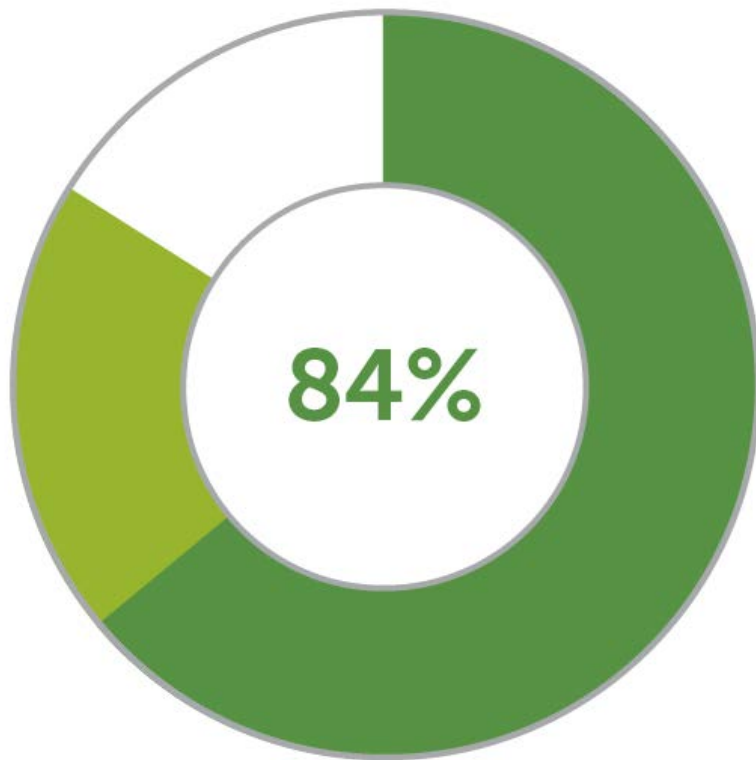
**11 MILLION**<sup>2</sup>

DEVELOPERS WORLDWIDE

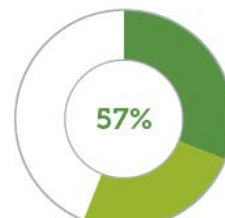


# When they need components, more organizations rely on the Central Repository

*Q: For your organization, please rate the following sources of open source components.*



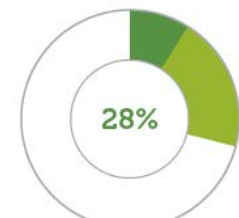
(Maven) Central Repository



Atlassian



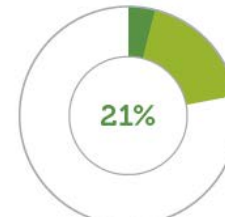
JBoss



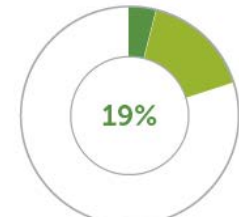
RubyGems.org



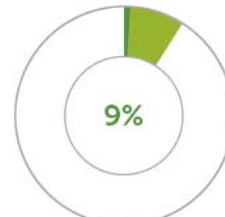
NPM



CPAN



PyPI

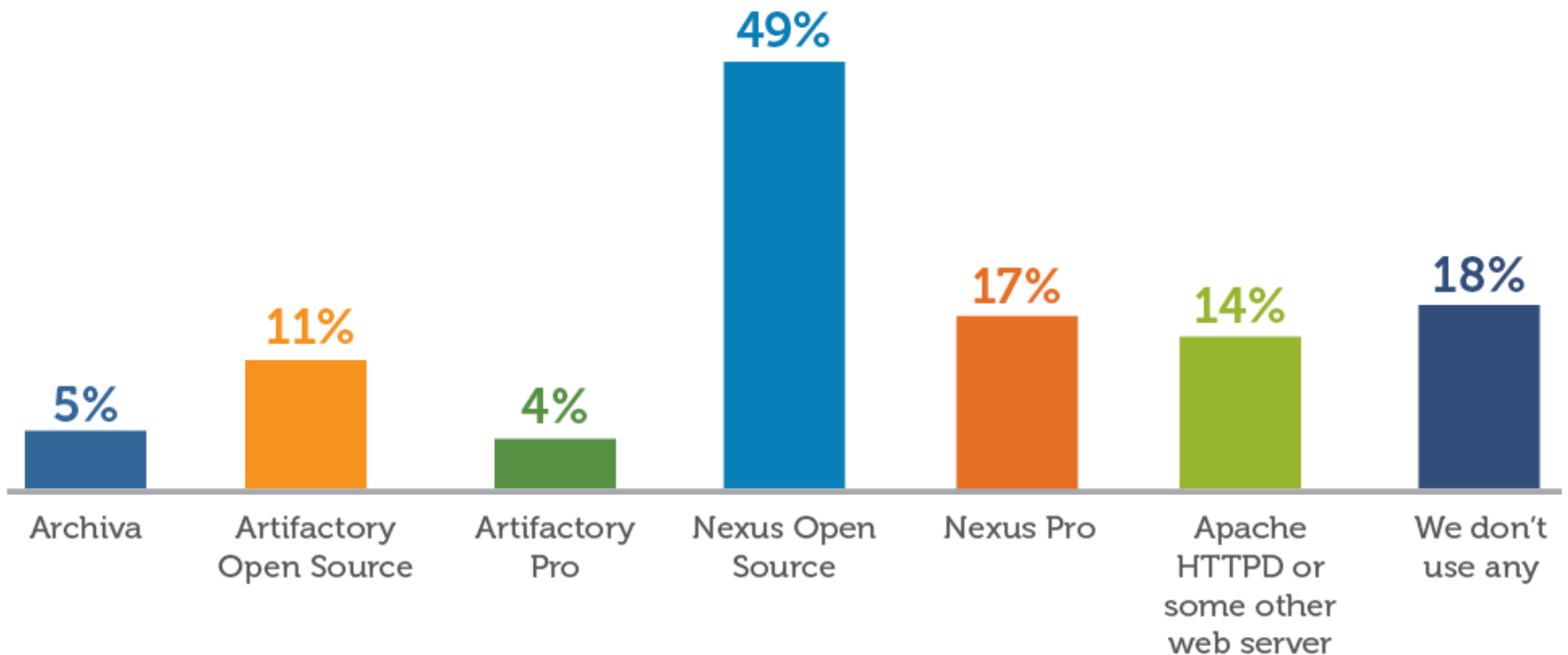


BinTray/jcenter

- Critical to our development efforts
- We use sometimes, not critical

# Local component management provides an opportunity for improved visibility and control.

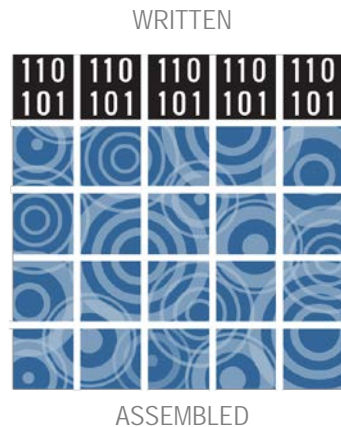
Q: Which local component repository manager does your organization use? (multiple selections possible)



*If you aren't using a repository manager...you should*

# Open source software (OSS) is essential

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MOBILE



BIG DATA



WEB APPS



INTERNET  
OF THINGS



DEV OPS



AGILE DEV

## ...to help build your applications

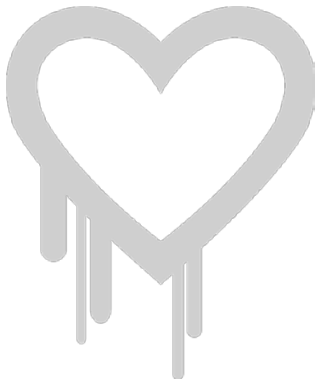
Most applications are now assembled from hundreds of open source components...often reflecting as much as 90% of an application.

## ...and satisfy demand.

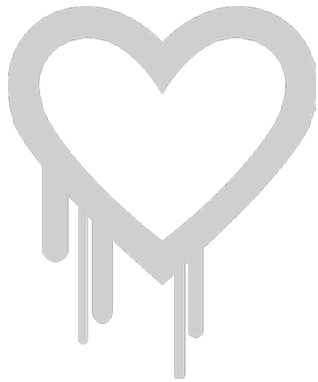
Open source helps meet accelerated development demand required for these growth drivers.

**HOW PREPARED WERE WE FOR  
HEARTBLEED?**

THE 2014 RESULTS HOLD SIGNIFICANT IMPORTANCE FOR THOSE OF US IN THE OPEN SOURCE DEVELOPMENT AND APPLICATION SECURITY COMMUNITY. WE BELIEVE THIS SURVEY REPRESENTS **THE MOST COMPREHENSIVE PERSPECTIVES ON THE STATE OF OPEN SOURCE SECURITY** AT THE TIME OF THE CATASTROPHIC HEARTBLEED BUG ANNOUNCEMENT.



APRIL 1<sup>ST</sup>  
SURVEY  
INITIATED



1,513  
PRE-HEARTBLEED  
RESPONSES



APRIL 7<sup>TH</sup>  
HEARTBLEED  
ANNOUNCED



1,839  
POST-HEARTBLEED  
RESPONSES

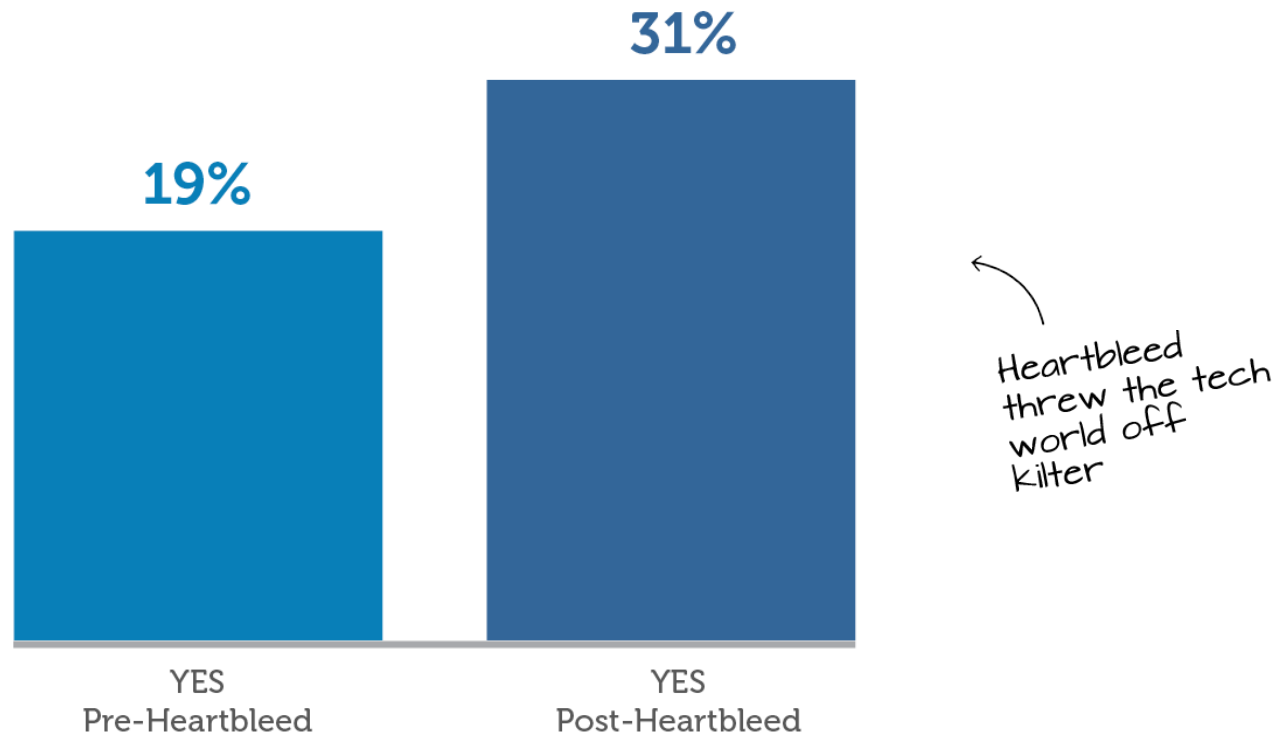


APRIL 30<sup>TH</sup>  
SURVEY  
CLOSED

# Heartbleed heightened concerns over open source-related breaches.

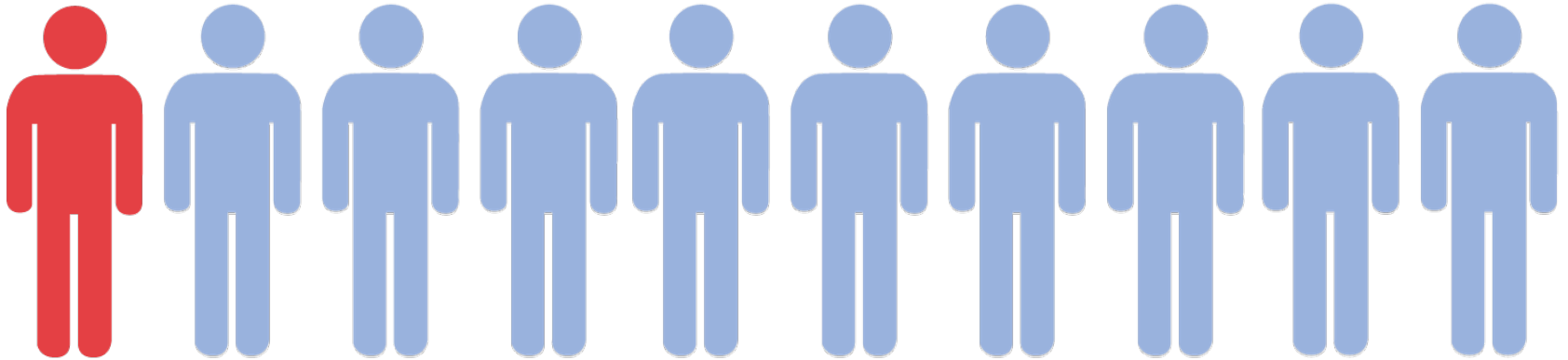
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*Q: Has your organization had a breach that can be attributed to a vulnerability in an open source component or dependency in the last 12 months?*



# 1-in-10 had or suspected an open source related breach in the past 12 months

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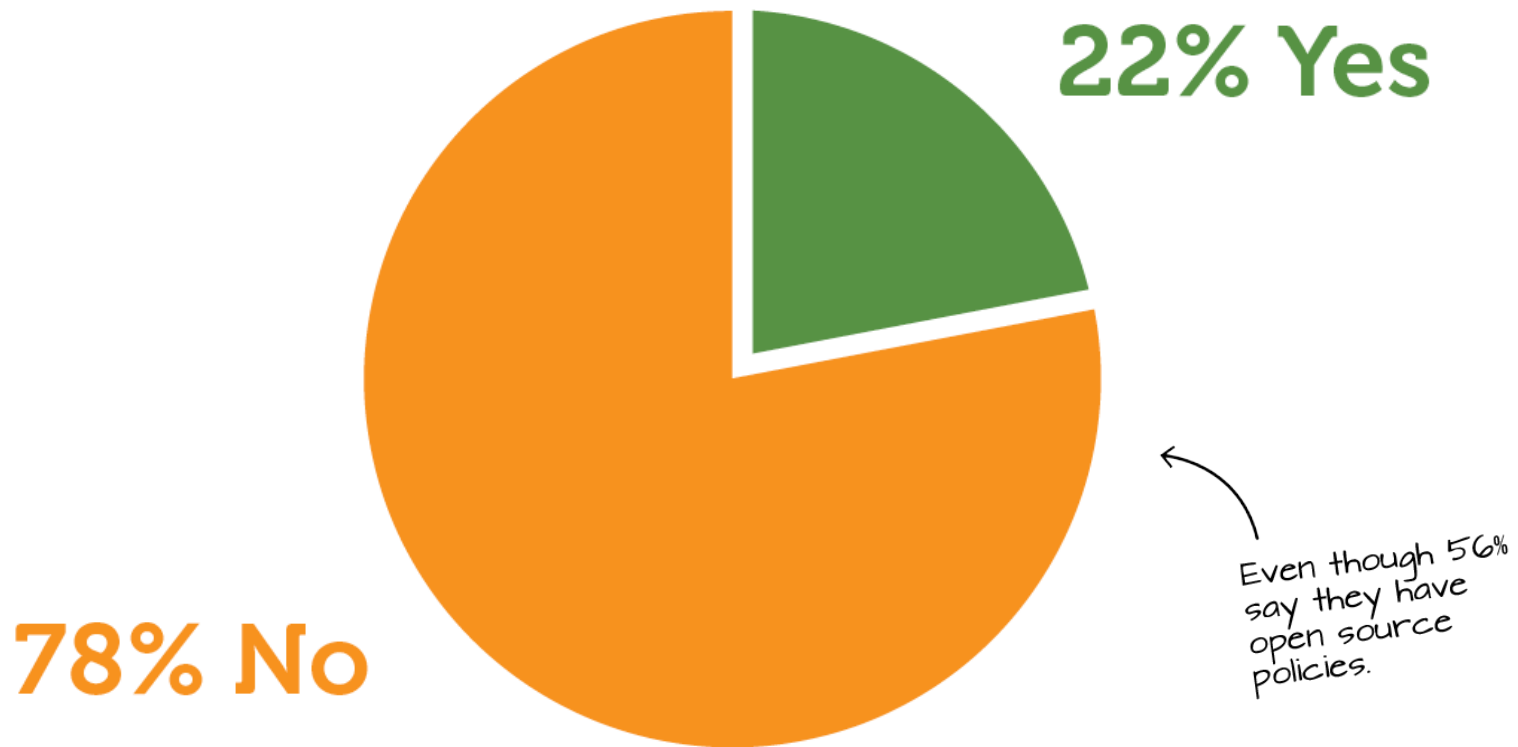




Yet, 78% have never banned an open source component, library or project.

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*Q: Has your organization ever banned use of an open source component, library or project?*

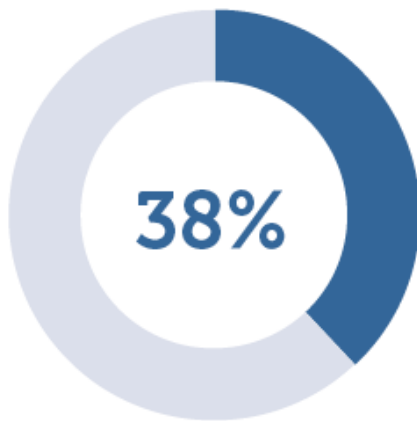


# Only 21% of organizations must prove they are using secure components.

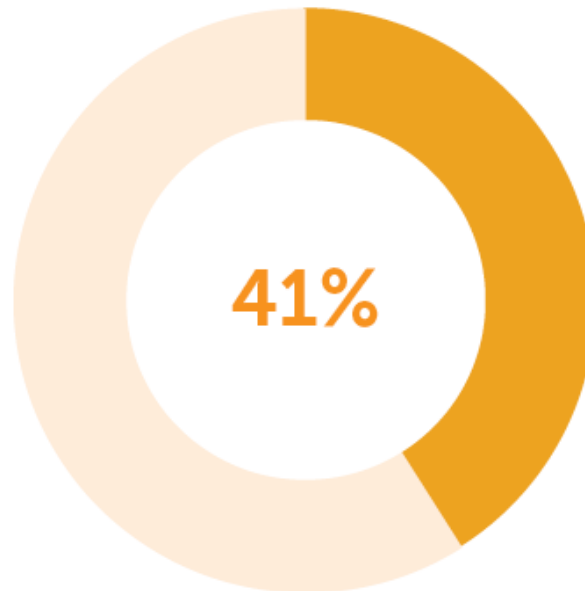
More than 1-in-3 say their open source policy doesn't cover security.

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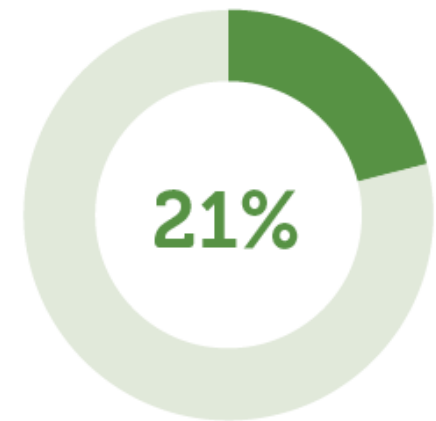
*Q: How does your open source policy address security vulnerabilities?*



It doesn't.



It says we must avoid known vulnerabilities.



We must prove we are not using components with known vulnerabilities.

## The majority of developers don't track component vulnerability over time.

Even when component versions are updated 4-5 times a year to fix known security, license or quality issues<sup>1</sup>.

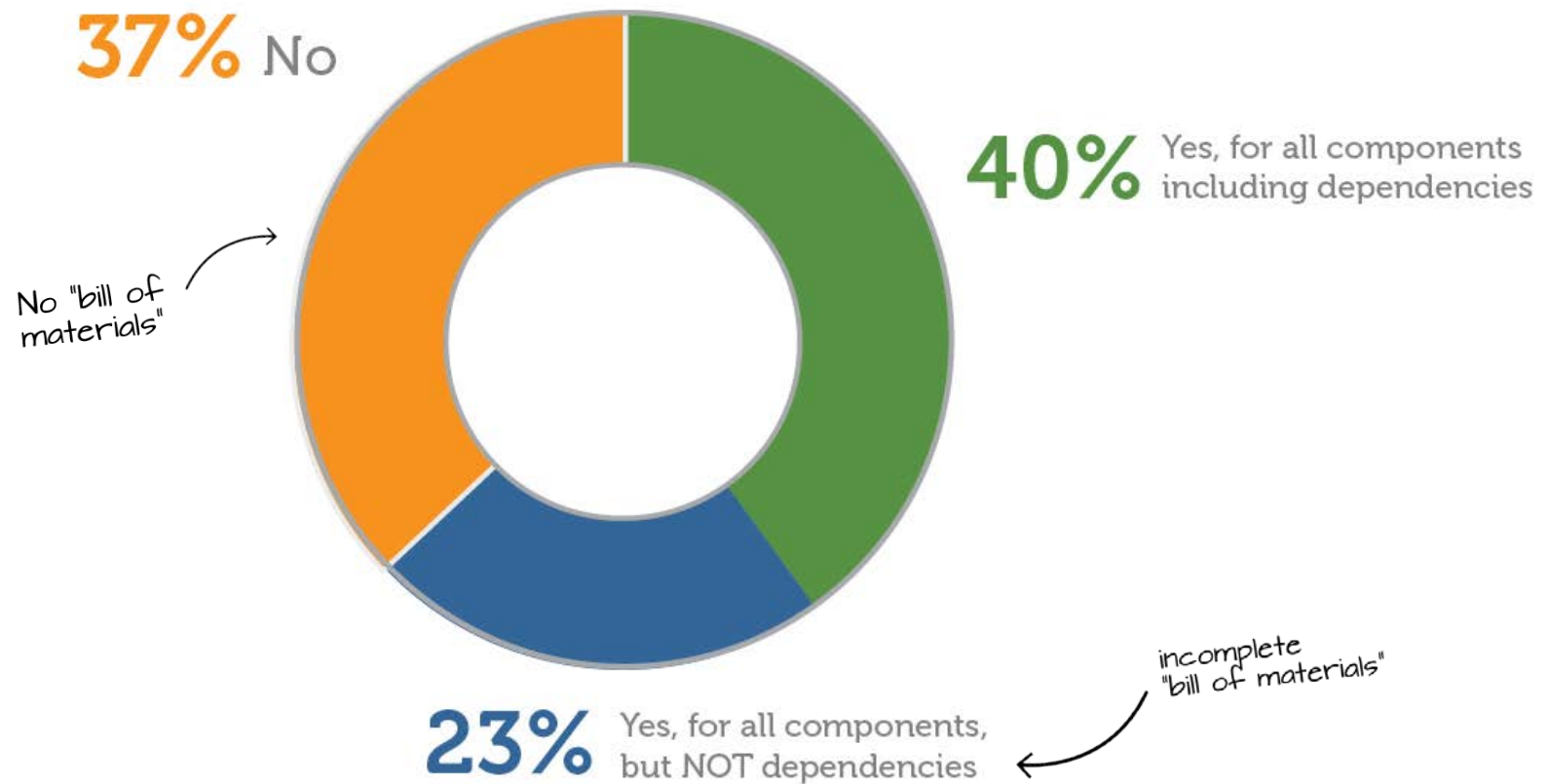
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*Q: Does someone actively monitor your components for changes in vulnerability data?*

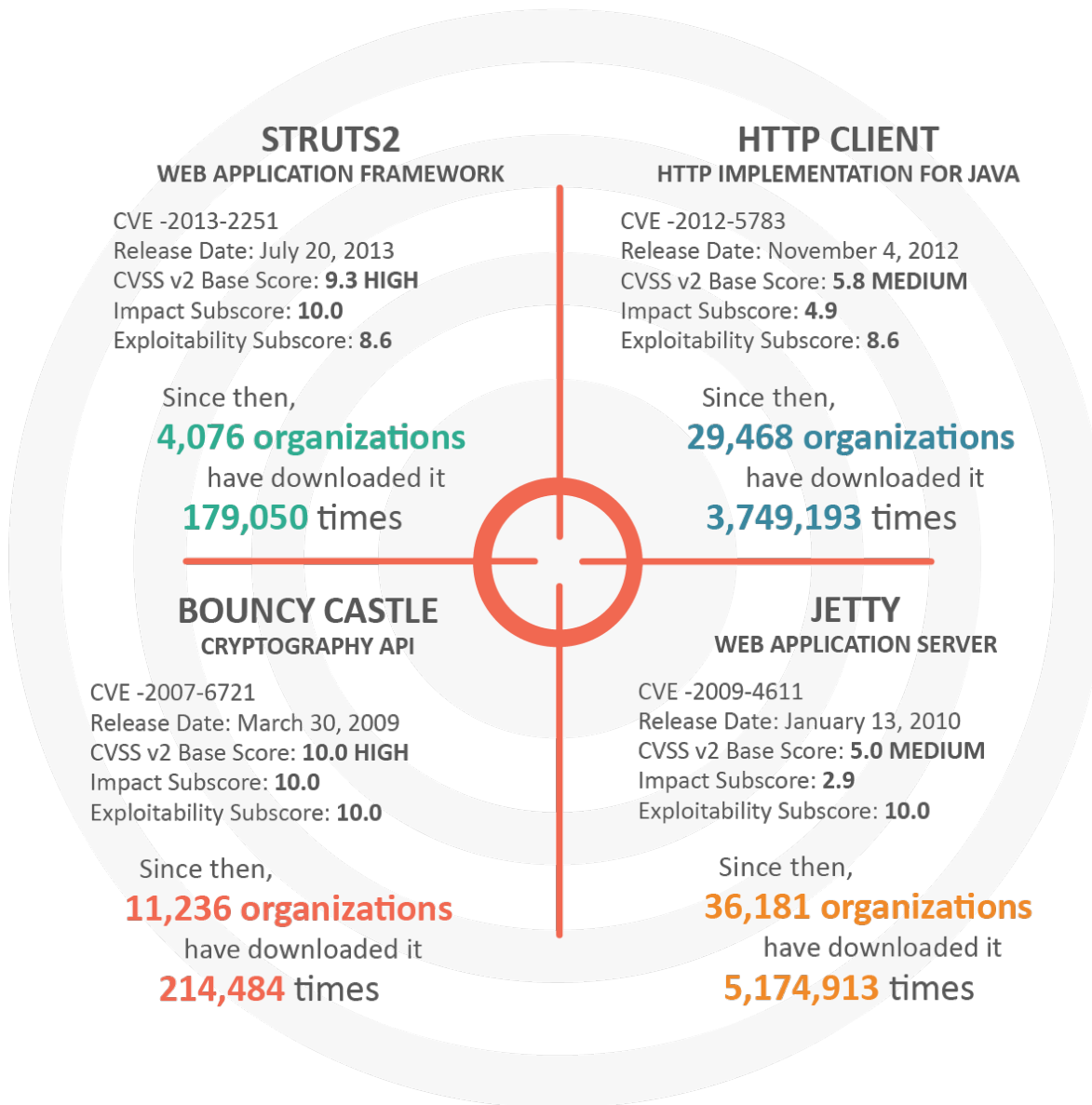


# Even if they monitored new vulnerabilities, 6-in-10 could not track them down in production applications.

Q: Does your organization maintain an inventory of open source components used in production applications?



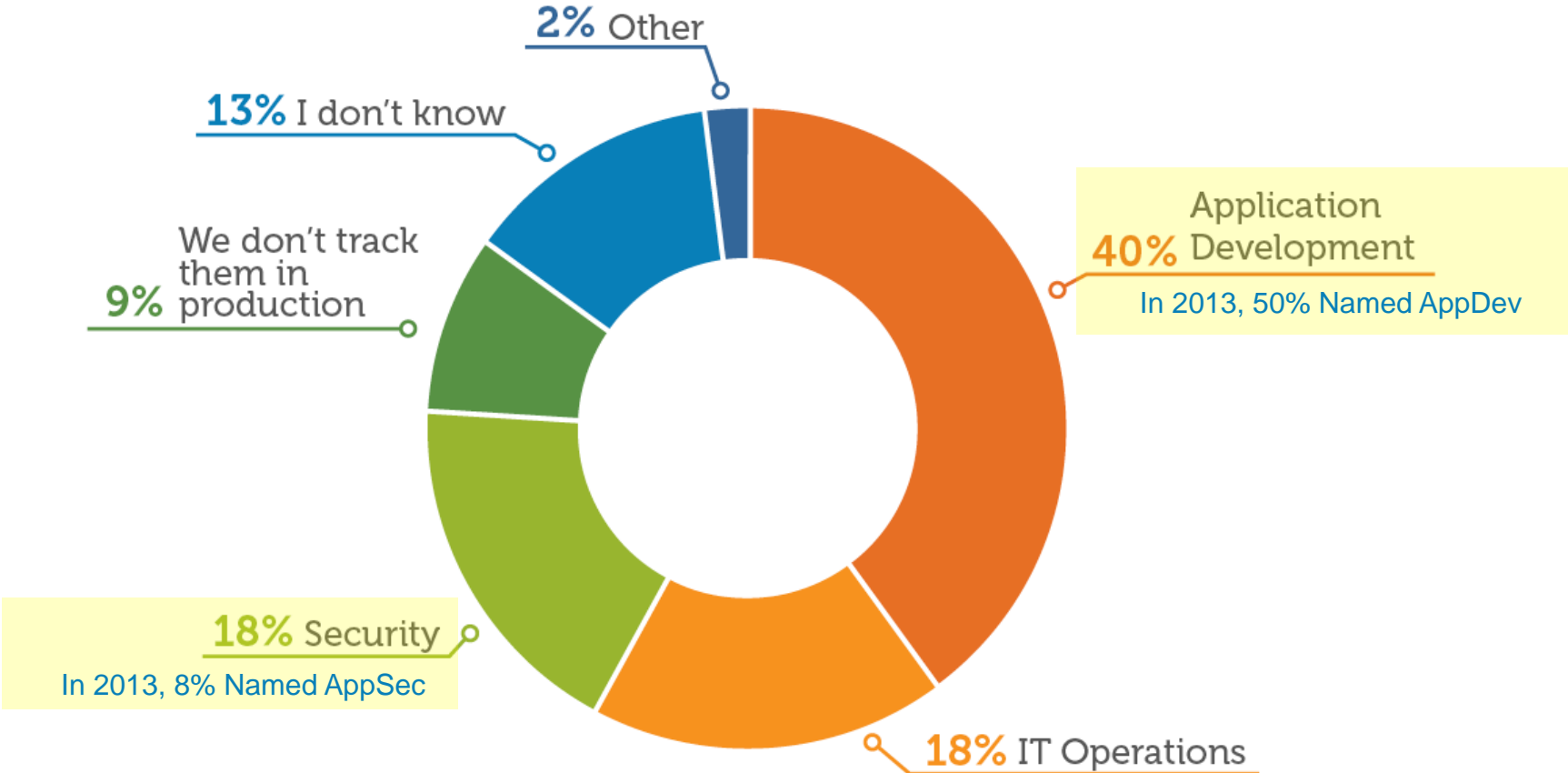
BACKGROUND: HUGE VOLUMES OF VULNERABLE OPEN SOURCE COMPONENTS CONTINUE TO GET **DOWNLOADED** **LONG AFTER PUBLIC DISCLOSURE** OF VULNERABILITIES AND AVAILABILITY OF FIXED VERSIONS.



←  
If you are not using secure components, you're not building secure applications

# Responsibility for tracking and resolving vulnerabilities is shifting from Application Development to Application Security.

Q: Who has responsibility for tracking & resolving newly discovered component vulnerabilities in \*production\* applications?



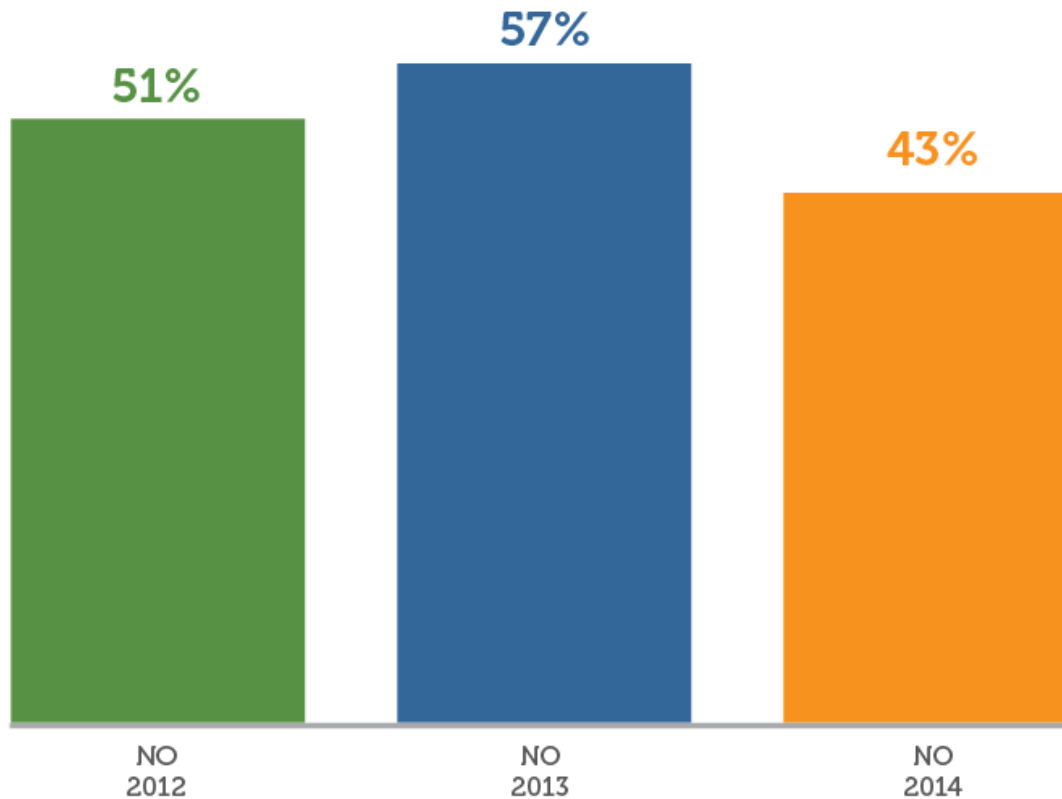
Source: 2013 and 2014 Sonatype Open Source Development and Application Security Survey

**ARE OPEN SOURCE POLICIES KEEPING  
OUR APPLICATIONS SAFE?**

# Half of organizations continue to run without an open source policy.

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*Q: Does your organization have an open source policy?*

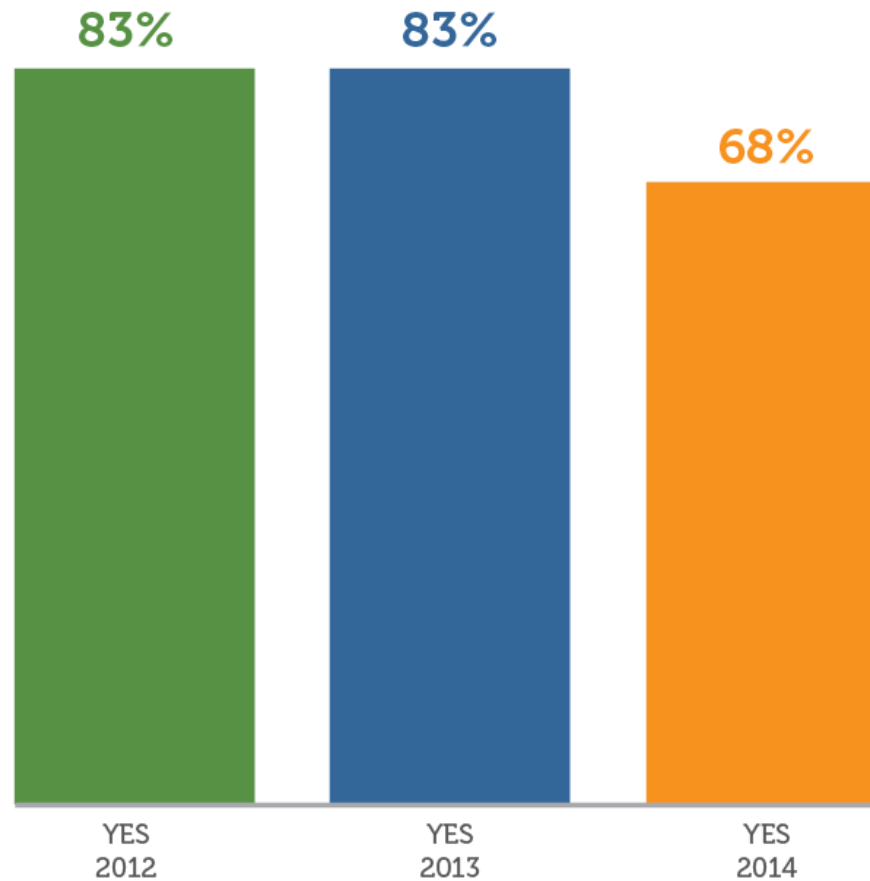




## Of those with policies, fewer are following them...

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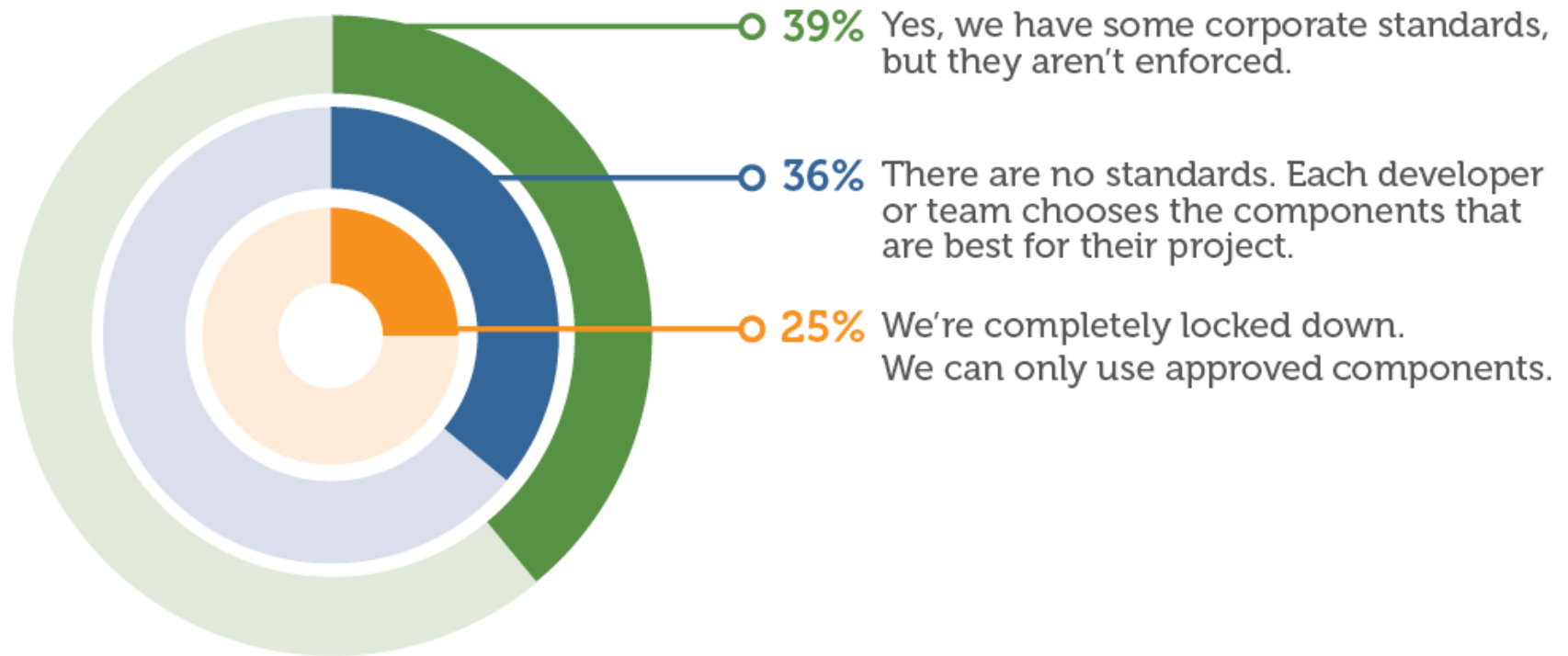
*Q: Do you actually follow your company's open source policy?*



# Even if they have a policy, 75% don't have meaningful controls over what components are in their applications.

Is an "Open Source Policy" more than just a document?

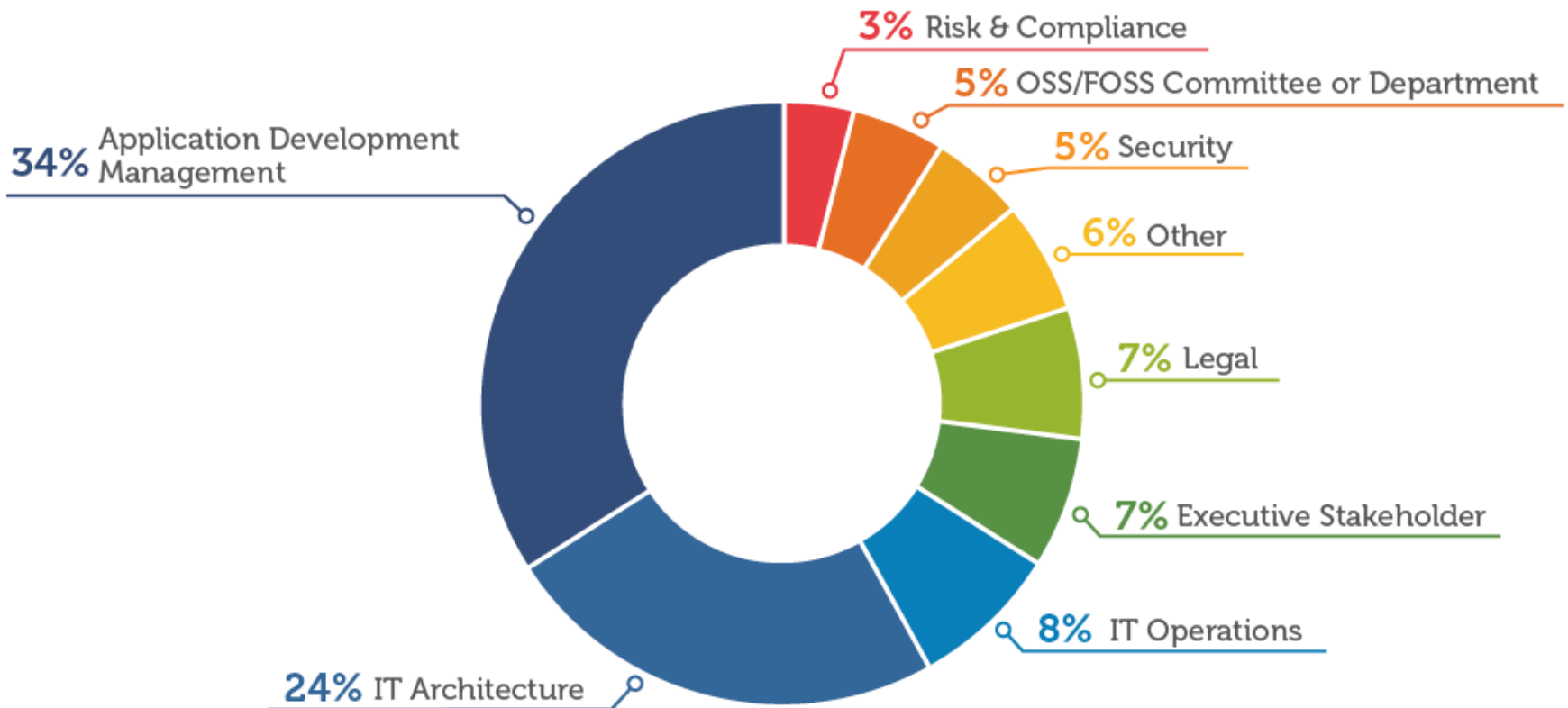
*Q: How well does your organization control which components are used in development projects?*



# AppDev and IT architects take the lead in OSS policies & governance.

But control is not unanimous.

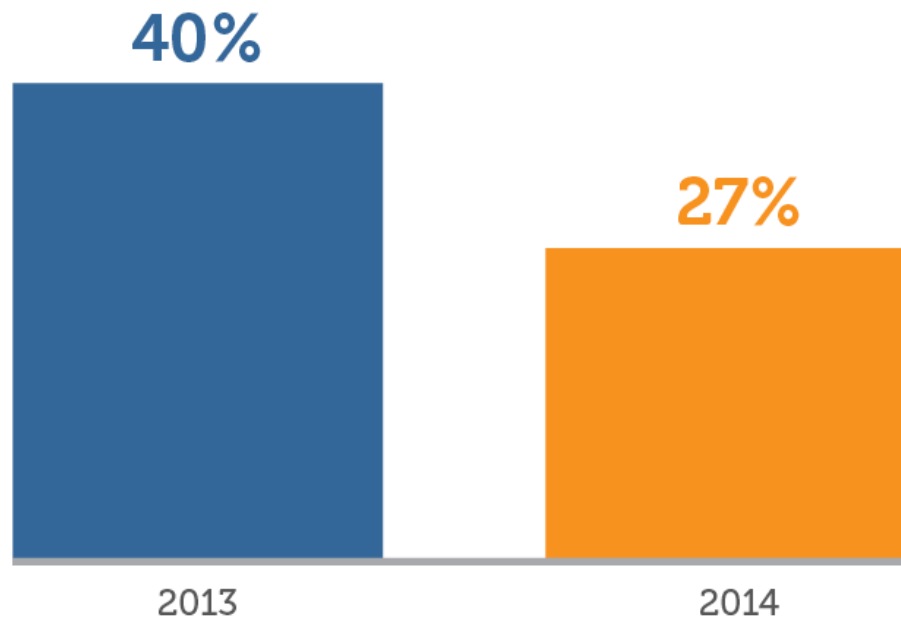
*Q: Who in your organization has PRIMARY responsibility for open source policy/governance?*



# While application development takes the lead in open source policy, only 1-in-4 developers consider it a top concern.

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*Q: How would you characterize your developers' interest in application security?*

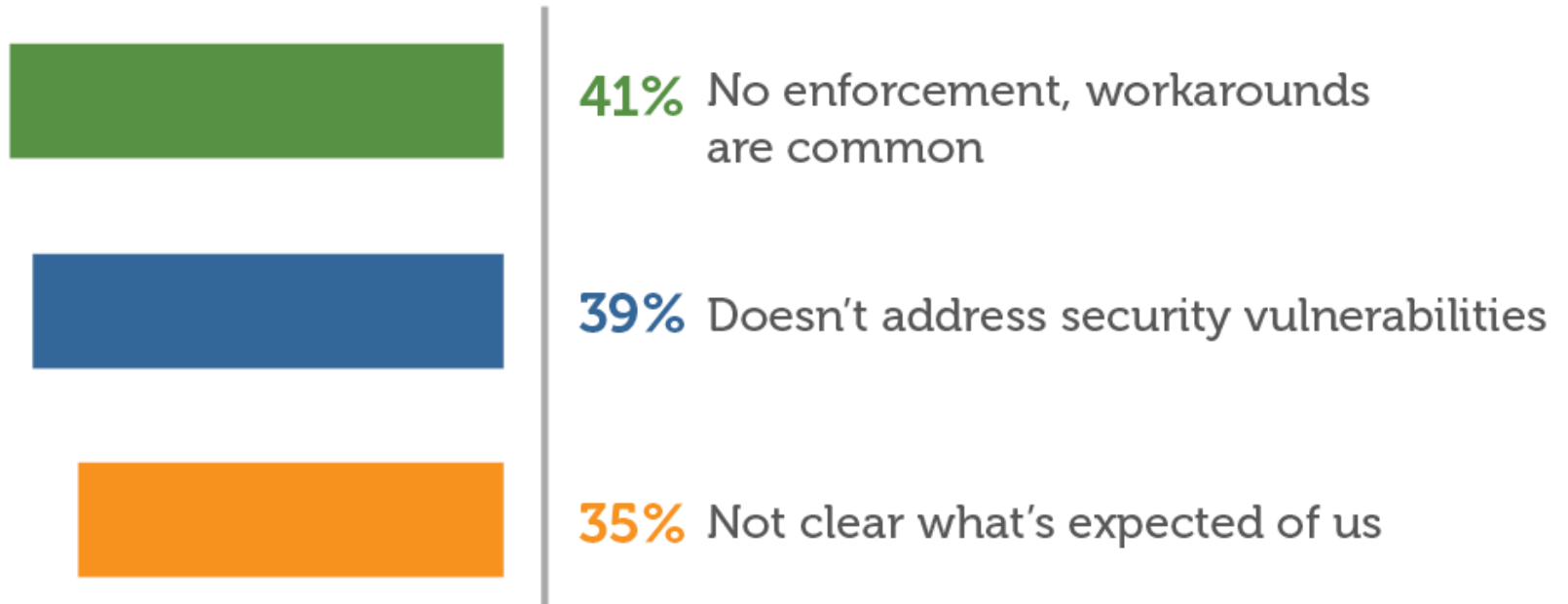


It's a top concern for our developers. They spend a lot of time here.

# If you're not enforcing policies, you're not protecting your software.

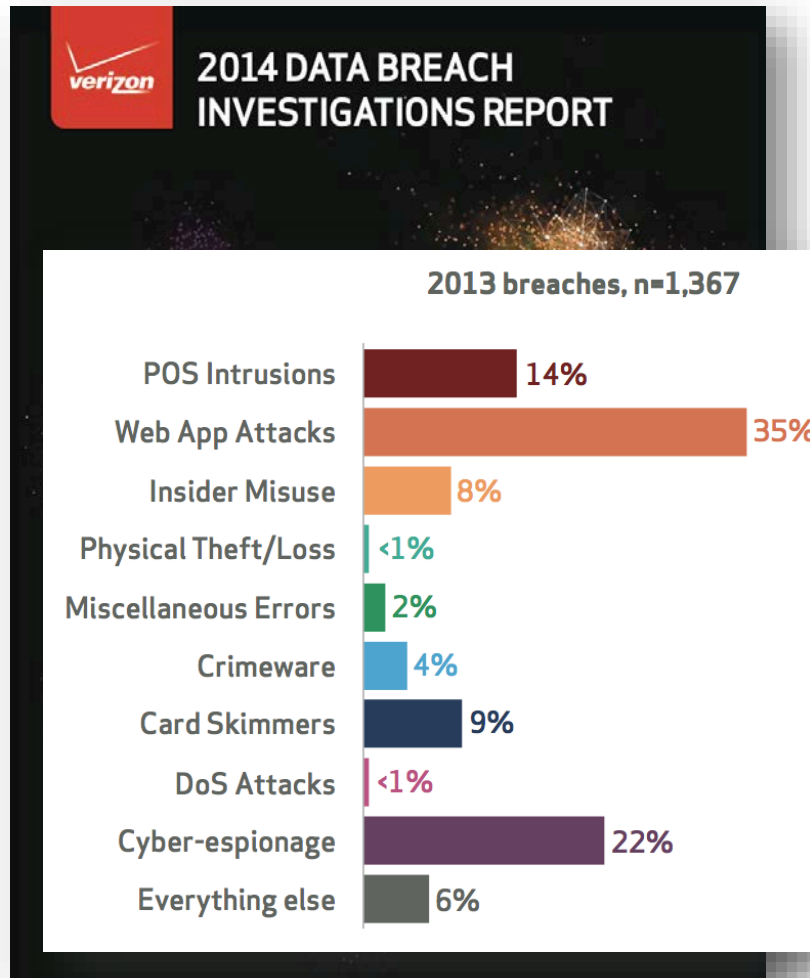
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*Q: What are the top challenges with your open source policy? (Top 3)*



**APPLICATIONS ARE THE #1 ATTACK  
VECTOR LEADING TO BREACHES**

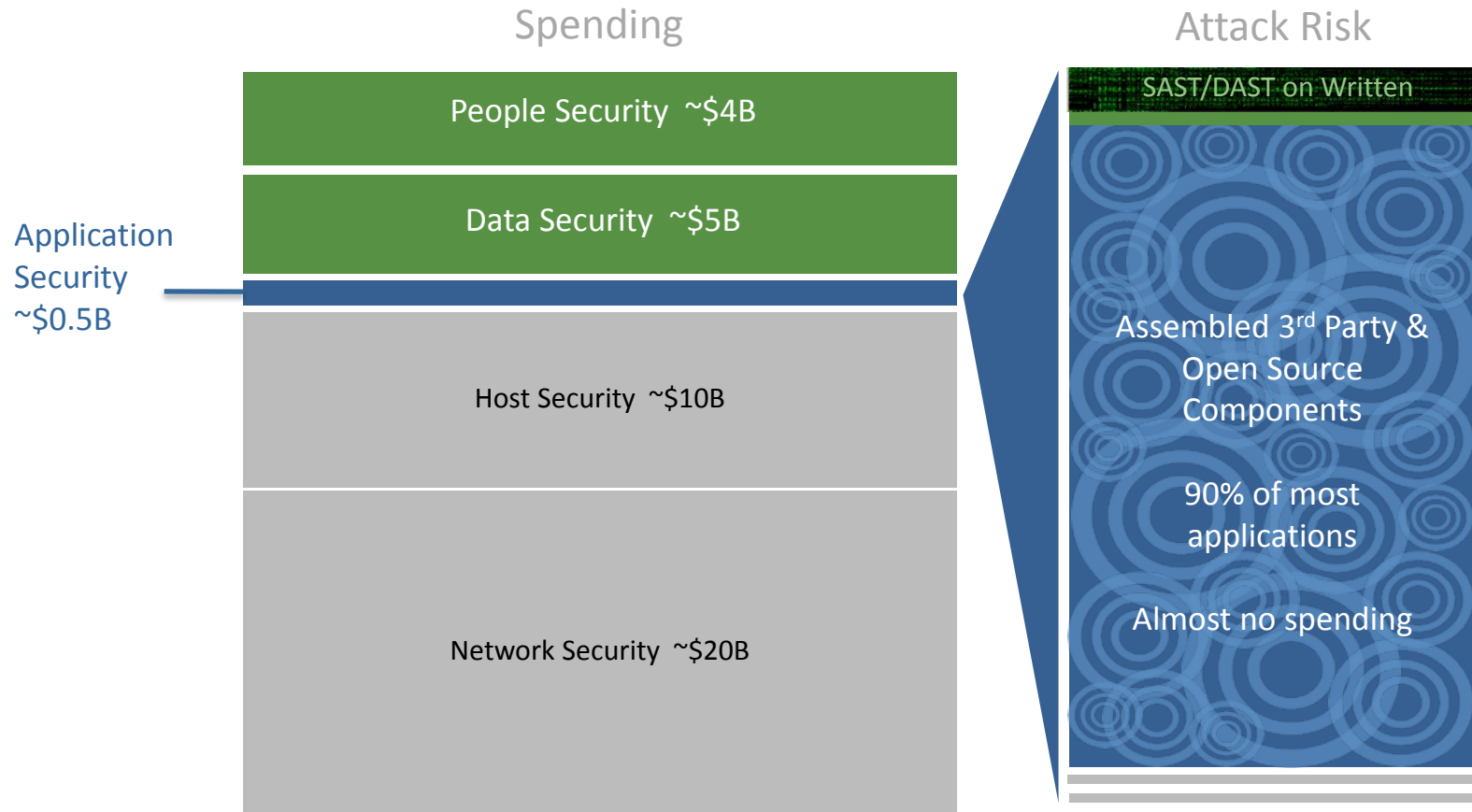
BACKGROUND: APPLICATIONS ACCOUNT FOR MORE BREACHES THAN CYBER-ESPIONAGE, CRIMEWARE, INSIDER MISUSE, AND DOS ATTACKED COMBINED.



IN APRIL 2014, THE VERIZON DATA BREACH INVESTIGATIONS REPORT NAMED APPLICATIONS AS THE #1 ATTACK VECTOR LEADING TO BREACHES, REPRESENTING ANOTHER SIGNIFICANT, YET SOMBER MILESTONE IN APPLICATION SECURITY.

WITH COMPONENTS ACCOUNTING FOR 90% OF TODAY'S TYPICAL APPLICATION, SECURE APPLICATION DEVELOPMENT PRACTICES SHOULD BE A TOP CONCERN FOR THE OPEN SOURCE COMMUNITY.

BACKGROUND: **SPENDING AND RISK ARE OUT OF SYNC**. THE LOWEST PERCENT OF SECURITY BUDGETS ARE ASSIGNED APPLICATION SECURITY. YET, ACCORDING TO THE VERIZON REPORT, APPLICATIONS REPRESENT THE HIGHEST RISK VECTOR FOR BREACHES. WORSE, WITHIN APPSEC, EXISTING BUDGETS GO TO THE 10% WRITTEN OF APPLICATIONS THAT ARE WRITTEN CODE.

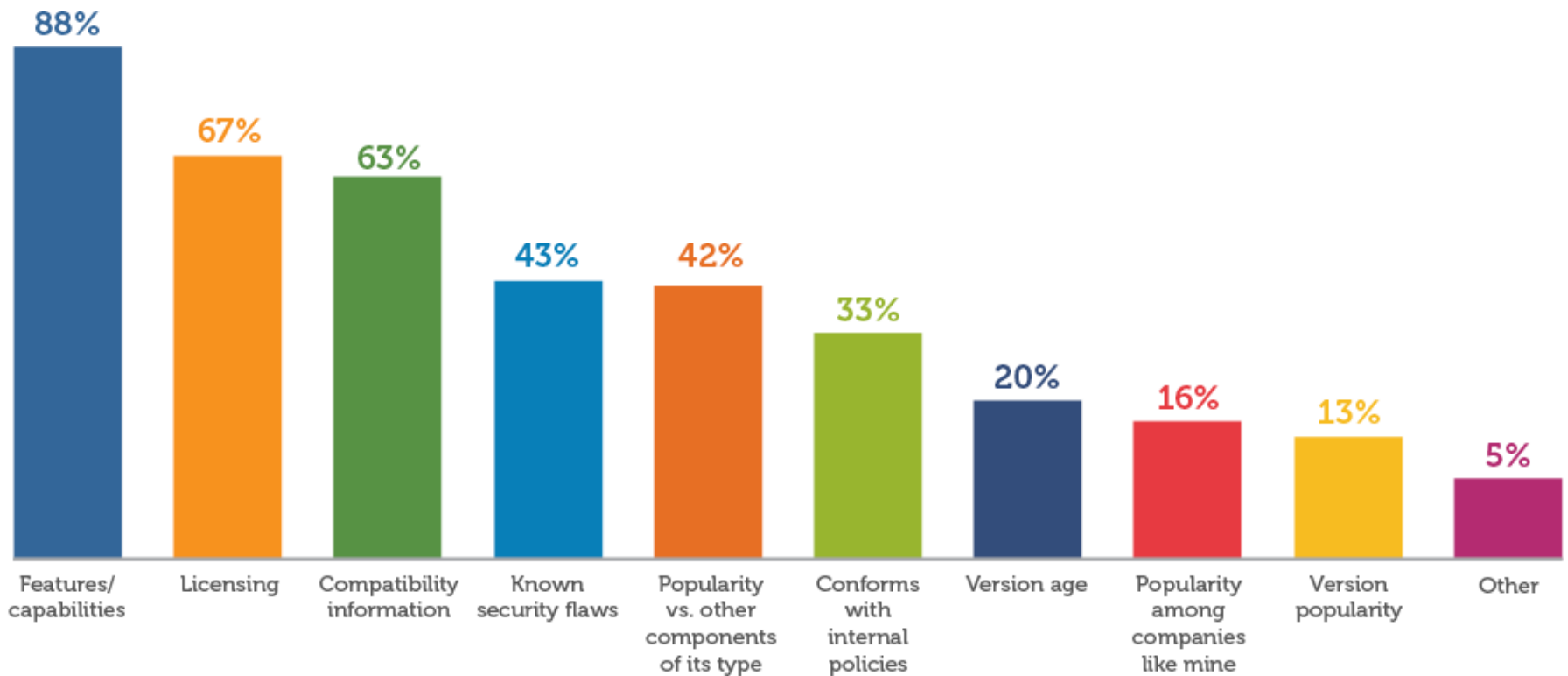


Source: Normalized spending numbers from IDC, Gartner, the 451 Group; since groupings vary



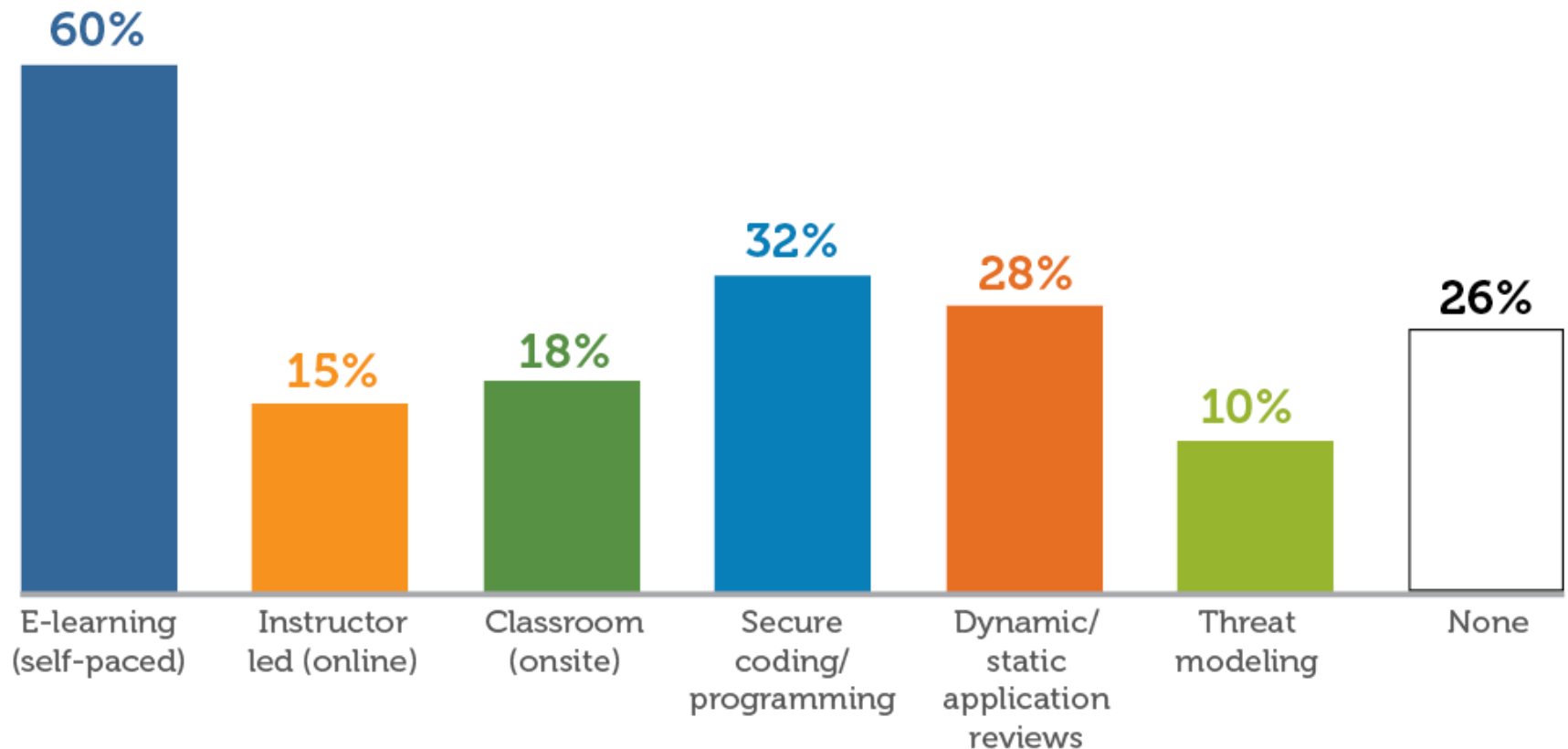
## Developers want components that work and don't add risk

*Q: When selecting components, which characteristics would be most helpful to you? (choose four)*



## While applications account for more breaches, 1-in-4 developers don't receive application security training.

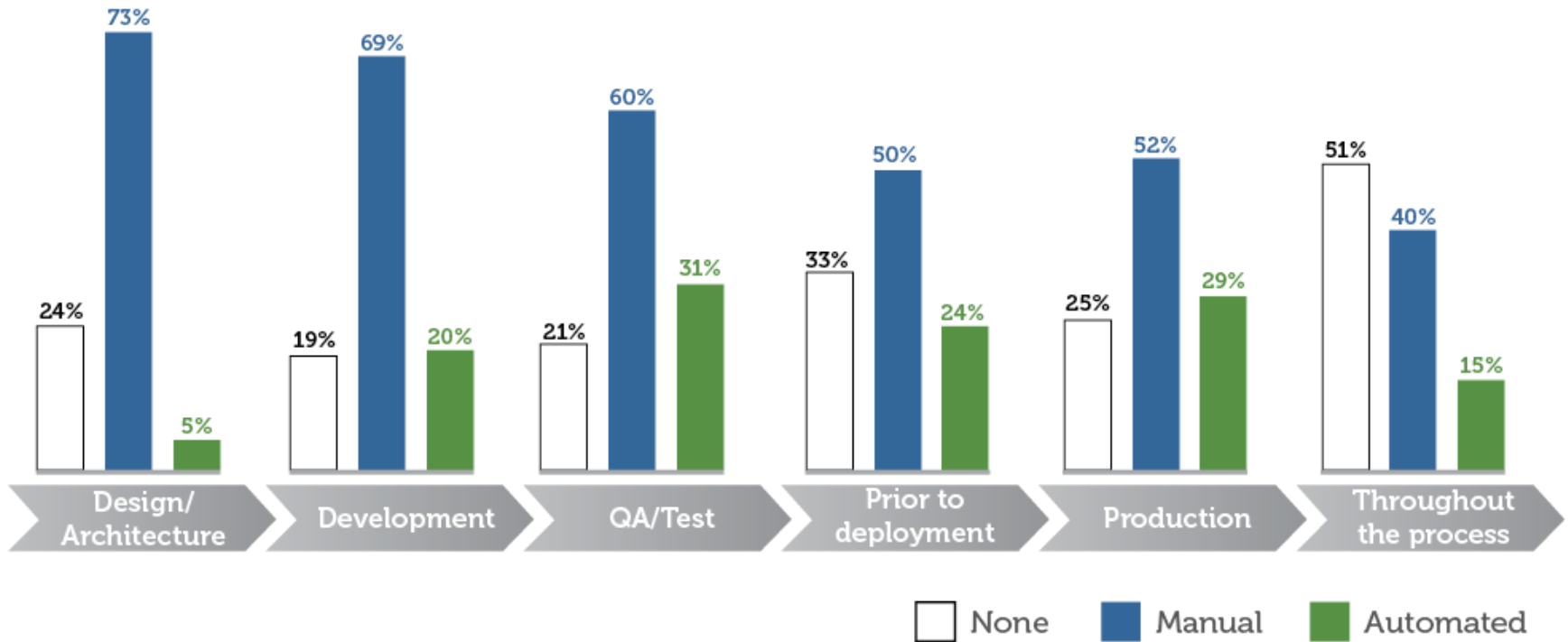
*Q: What application security training is available to you? (multiple selections possible)*



# The majority rely on manual application security analysis.

Application development runs at Agile & DevOps speed. Is security is keeping pace?

Q: At what point in the development process does your organization perform application security analysis? Q: (multiple selections possible)



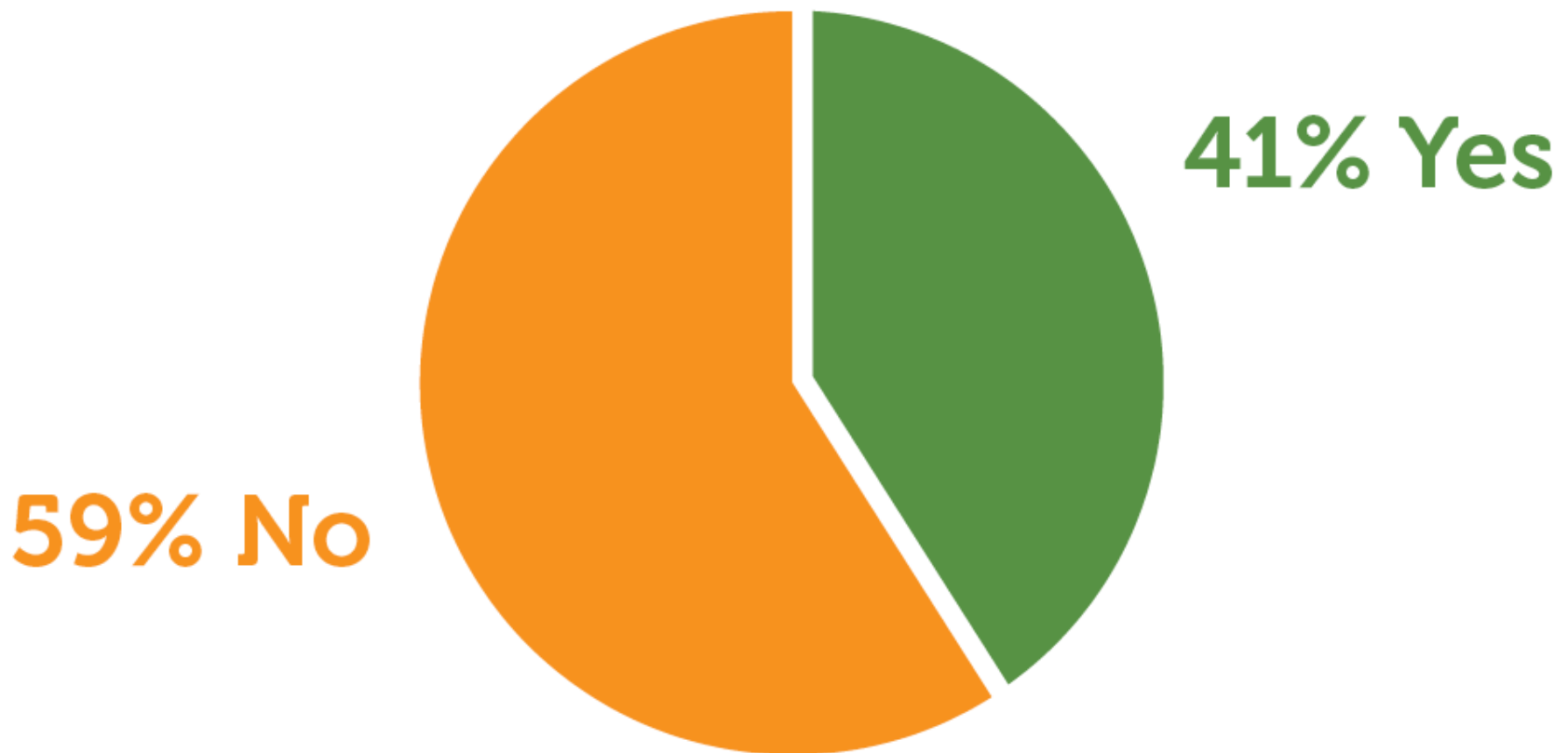
# **WITH OPEN SOURCE COMES LICENSE CONSIDERATIONS**

## The majority are not concerned about license risks.

Yet, licensing data is considered helpful to 67% of respondents when selecting open source components to use.

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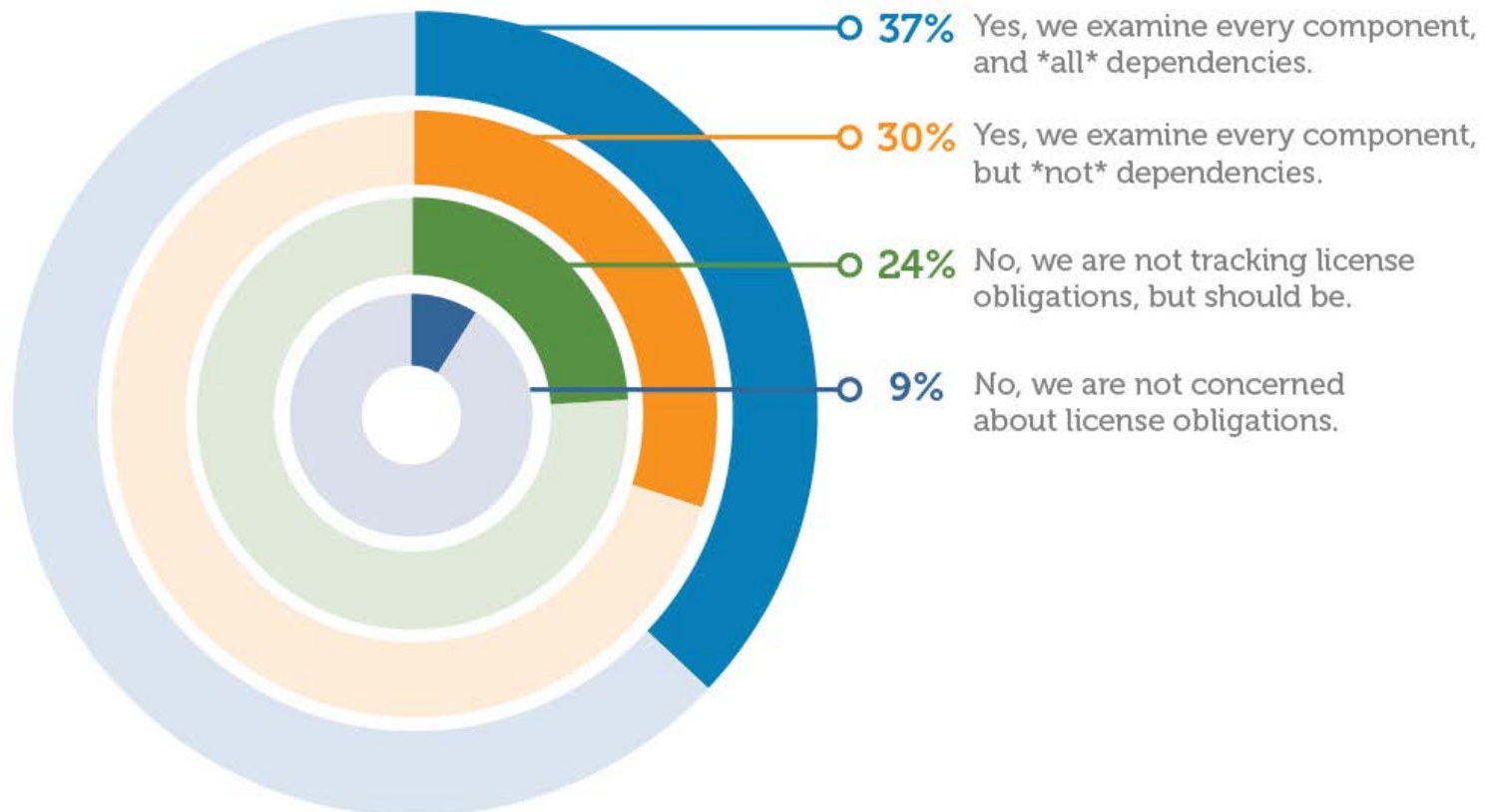
*Q: Are open source licensing risks or liabilities a top concern in your position?*



**63% have an incomplete view of license risk. 33% don't manage it at all.**

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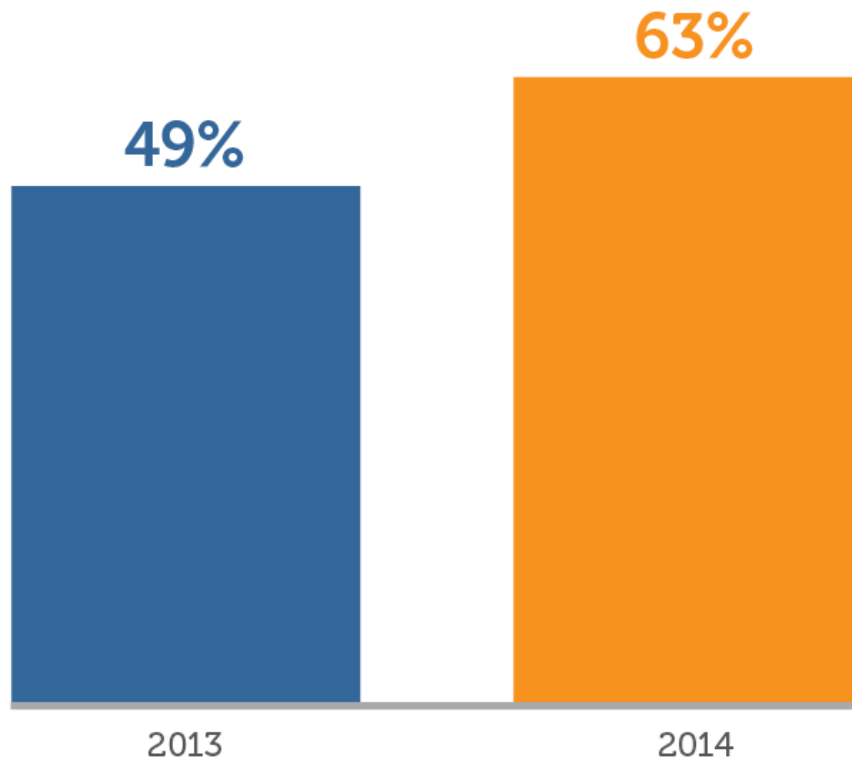
*Q: Does your organization/policy manage the use of components by license types? (e.g., GPL, copyleft)?*



## License risk on the rise

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Q: Does your organization/policy manage the use of components by license types? (e.g., GPL, copyleft)?



← If it doesn't have a license, you have no right to use it

# Executive Summary

## 2014 Sonatype Open Source and Application Security Survey

### BACKGROUND

- 90% of a typical application is assembled with open source components
- Open source component requests have grown to 13 billion annually
- Applications are the #1 attack vector leading to breaches
- Applications receive the lowest percentage of security investments

Yet

### SURVEY RESULTS

- *75% don't enforce or don't have an OSS policy*
- *58% are not concerned about license risk*
- *63% don't actively monitor for changes in vulnerability data*
- *77% have never banned an open source component*
- *The majority of organizations rely on manual application security analysis*
- *31% had or suspect a breach due to an open source (OSS) component*





# 5

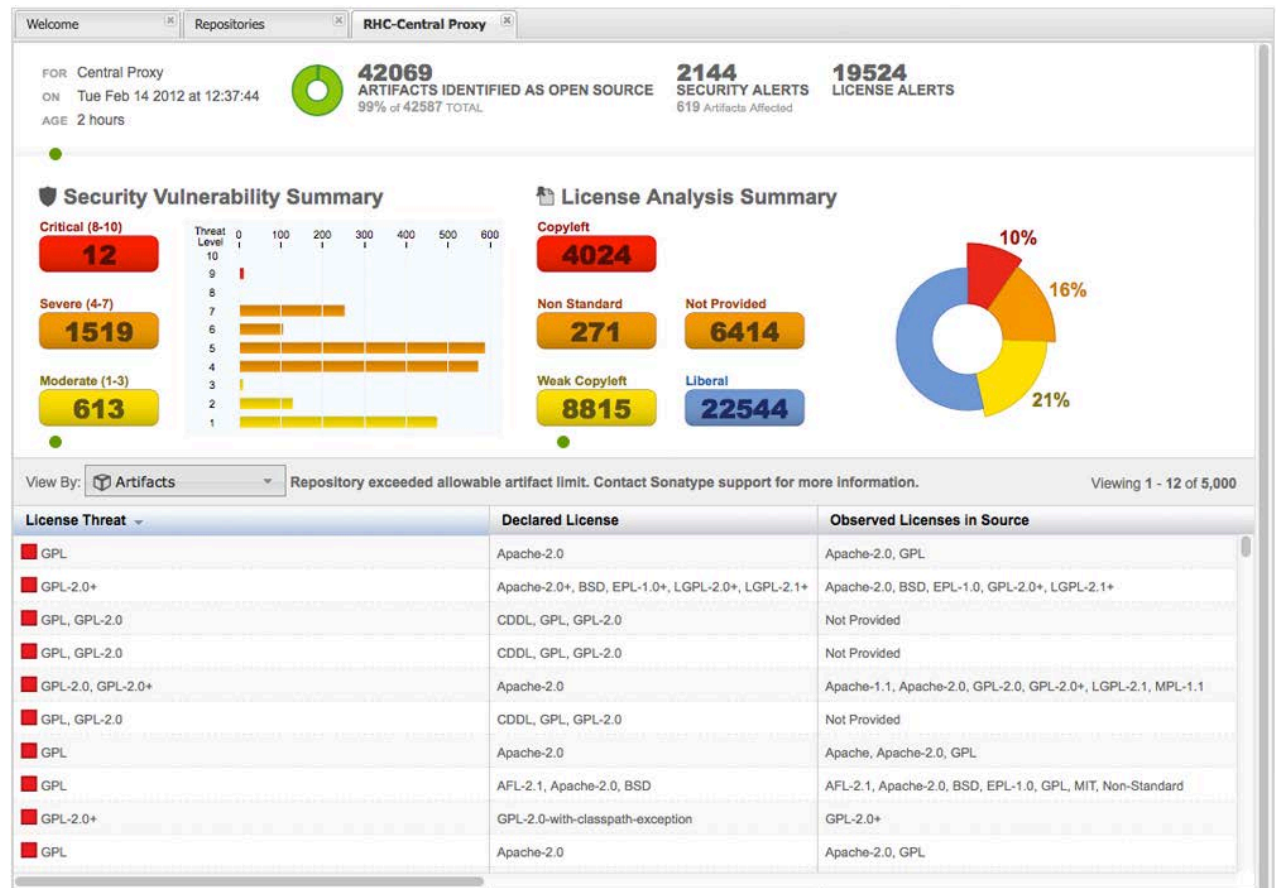
## GOOD COMPONENT PRACTICES

# 1. Understand what components are available to your developers

Use a “repository health check” to identify the artifacts in in your component managers.

The report will list all components available to your developers inside instances of your local component managers.

The report also details known vulnerabilities, license risks, or quality concerns.



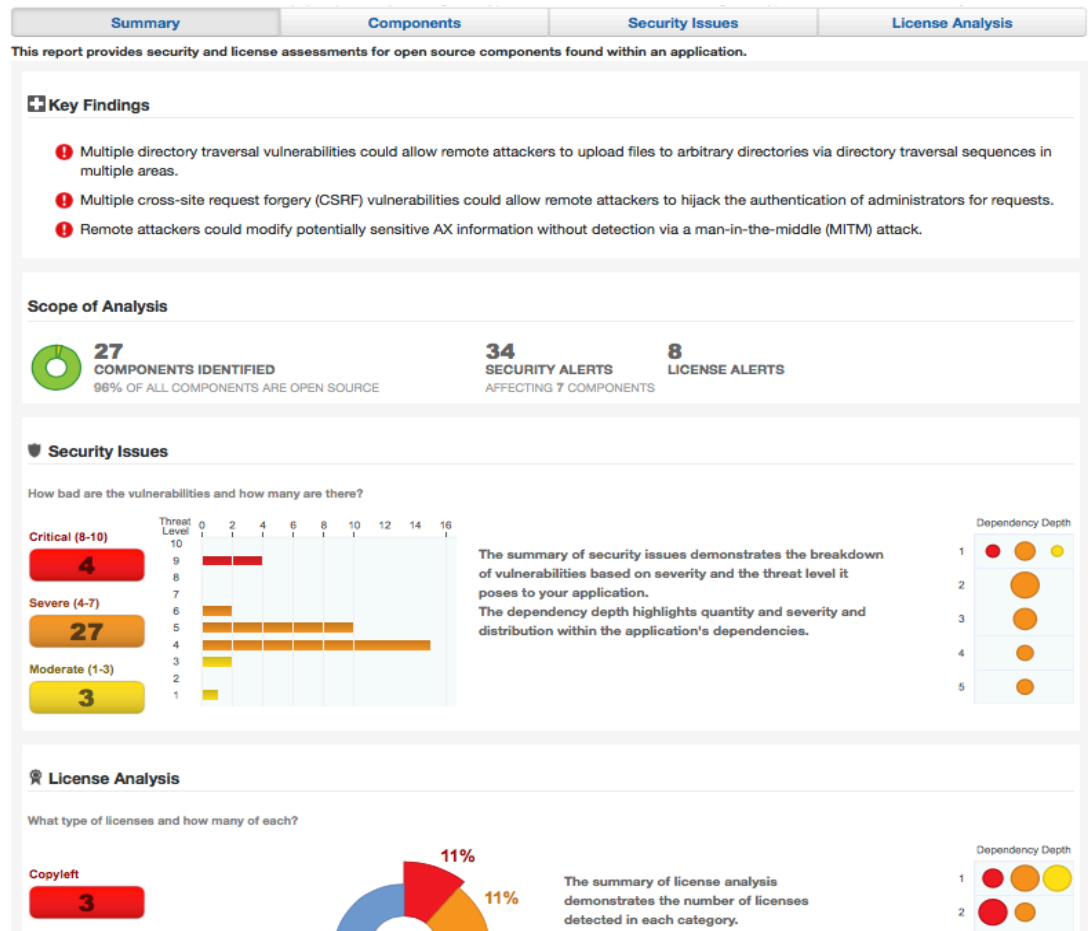
Repository Health Check reports are free feature of Nexus OSS, Nexus Pro, and Nexus Pro CLM component managers. Sonatype runs over 25,000 repository health checks for its customers daily.

## 2. Understand your component usage in your applications

Produce a “bill of materials” to identify the components used within your applications, before they go into production.

The report will list all components you have used along with any known vulnerabilities, risks, and quality issues.

In the future, if new vulnerabilities are announced, the information collected here can help you determine where the risky components were used.



Application Health Checks are provided as a free service from Sonatype. For your assessment, please visit <http://bit.ly/SonatypeAHC>

### 3. Design your open source software governance to be frictionless, scalable, and automated

Once you understand what components are being used in your organization and applications, you can begin to define and manage policies supporting their use.

Policies must be agile enough to keep pace with modern development.

Strive to automate policy enforcement and minimize drag on developers.

The screenshot shows the configuration interface for a policy named "PCI 30 day". The interface is divided into several sections:

- Application Matching:** A dropdown menu shows "PCI 30 day". Below it, a question asks "Which applications should this policy apply to?". Two radio buttons are present: "All Applications in MyOrg" (unselected) and "Applications with one or more of these tags" (selected). A tag selection dropdown is open, showing "credit card" (selected), "Distributed" (unselected), and "Services" (unselected).
- Constraints:** A text input field contains "CVSS Score".
- Actions:** A table defines enforcement points for different stages. The table has columns for "Stage", "Warn", "Fail", and "Notifications".
- Monitoring Notifications:** A question asks "If you have enabled monitoring, who should be notified?". A dropdown menu is open, showing a selection.

At the bottom right, there are "Cancel" and "Save" buttons.

Stage	Enforcement Points		Notifications
	Warn	Fail	
Develop	⚠		✉
Build	⚠		✉
Stage Release	⚠		✉
Release		!	✉
Operate		!	✉

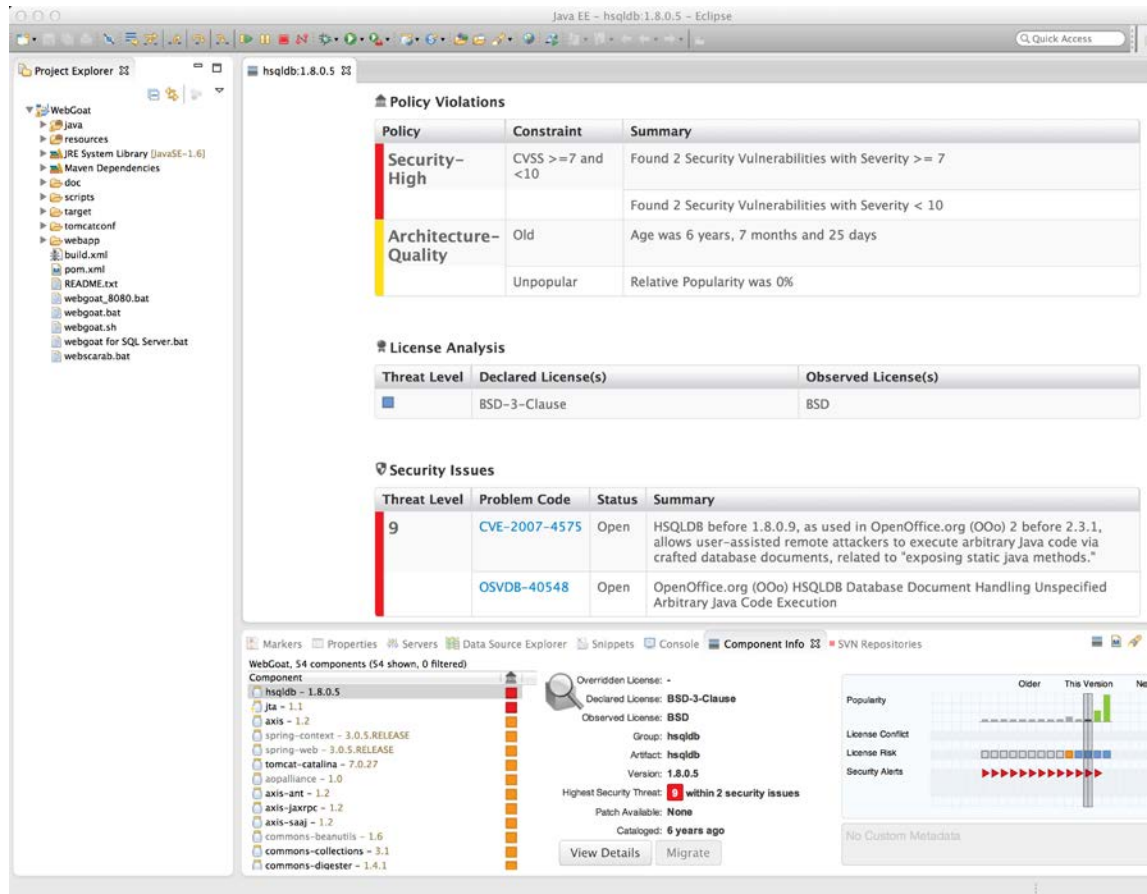
*Sonatype's CLM solutions enable organizations to define, monitor and report on open source component use and potential risks. Policy violations can trigger notifications, warnings, or even stop an application build or release.*

# 4. Enable developer decision support

Provide information on component vulnerabilities (and licensing risk) within the IDE to make it easy for developers to pick the best components from the start.

When security vulnerabilities, license risks, and quality issues are presented to developers, decisions can be made quickly about their use.

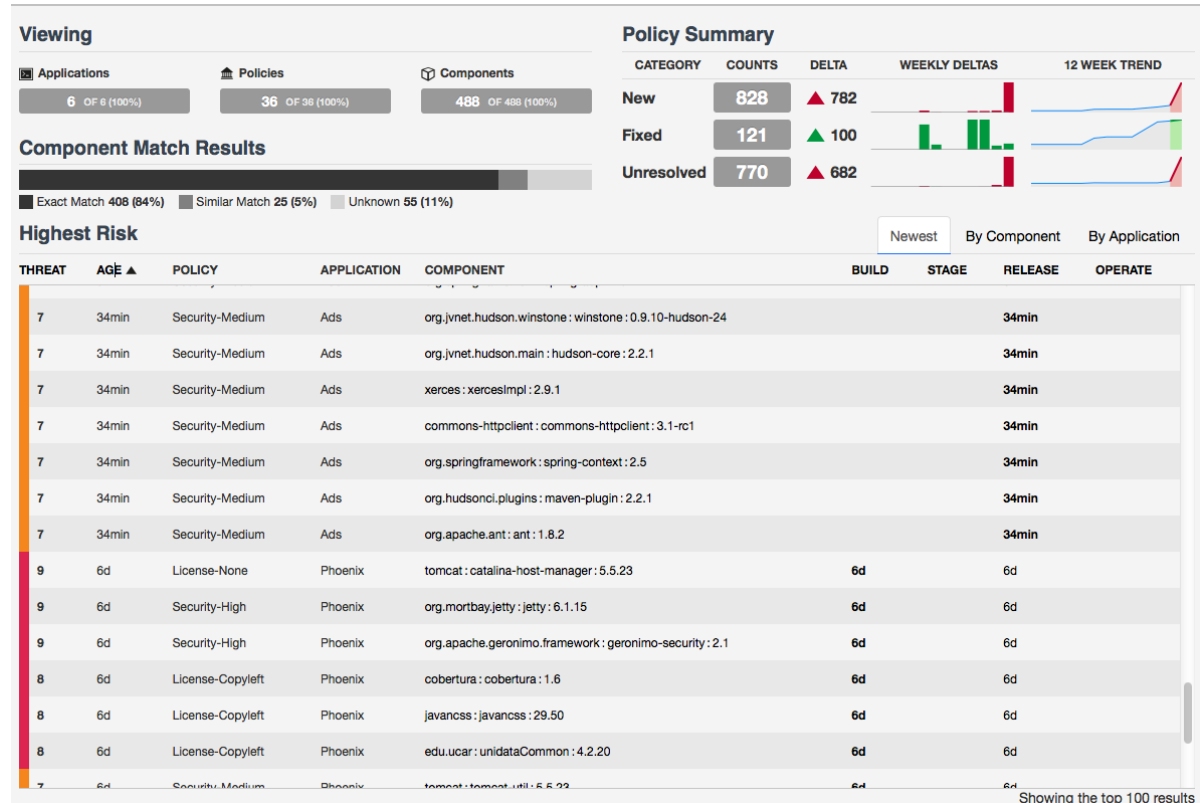
Information within the IDE should not simply reveal risks, but point to alternative component versions that meet the organizations policies and represent the least risk.



*Developers don't have time to be slowed down by security policies. With plug-ins to the developer's IDE, component policy information and potential risks are available immediately. If violations are found, developers can easily see what alternative and safe versions of components are available without leaving the IDE.*

# 5. Continuously govern your risks throughout the software lifecycle

Since security isn't a point-in-time event, continuous monitoring should be used to alert you when you are about to use a vulnerable component and as new vulnerabilities are discovered in components you've already used.



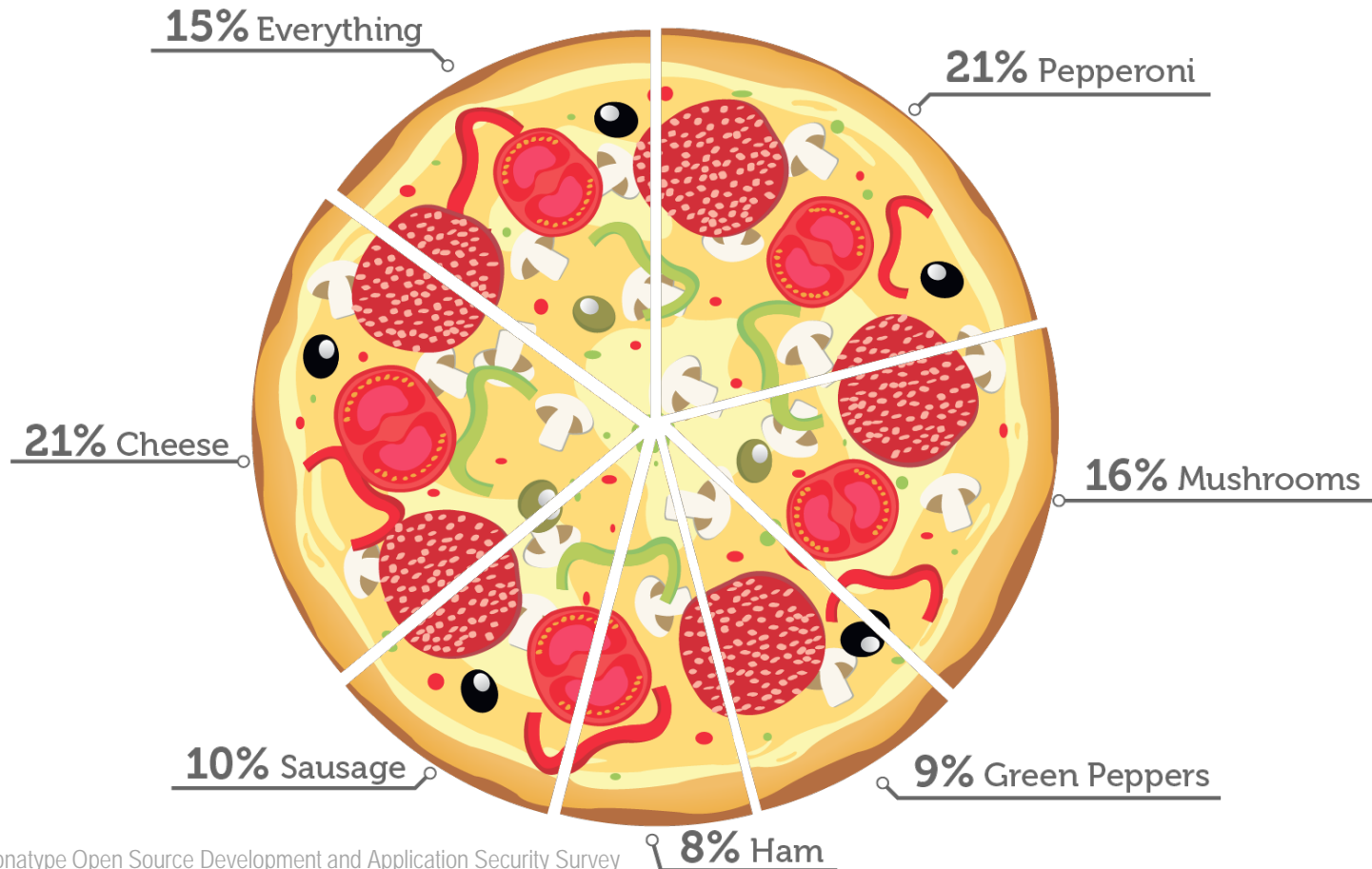
Sonatype CLM dashboards provide a real time view of component use across the software development lifecycle. Dashboards provide views by application, development stage, and policy alert levels. If new vulnerabilities are announced, instant searches can reveal if, where and when those components were used in your applications.

**ON THE LIGHTER SIDE...**

# We know open source developers care about more than open source. They also eat pizza and now we've got the data to prove it ...

(Many were upset that bacon was not an option)

*Q: What is your favorite pizza topping?*



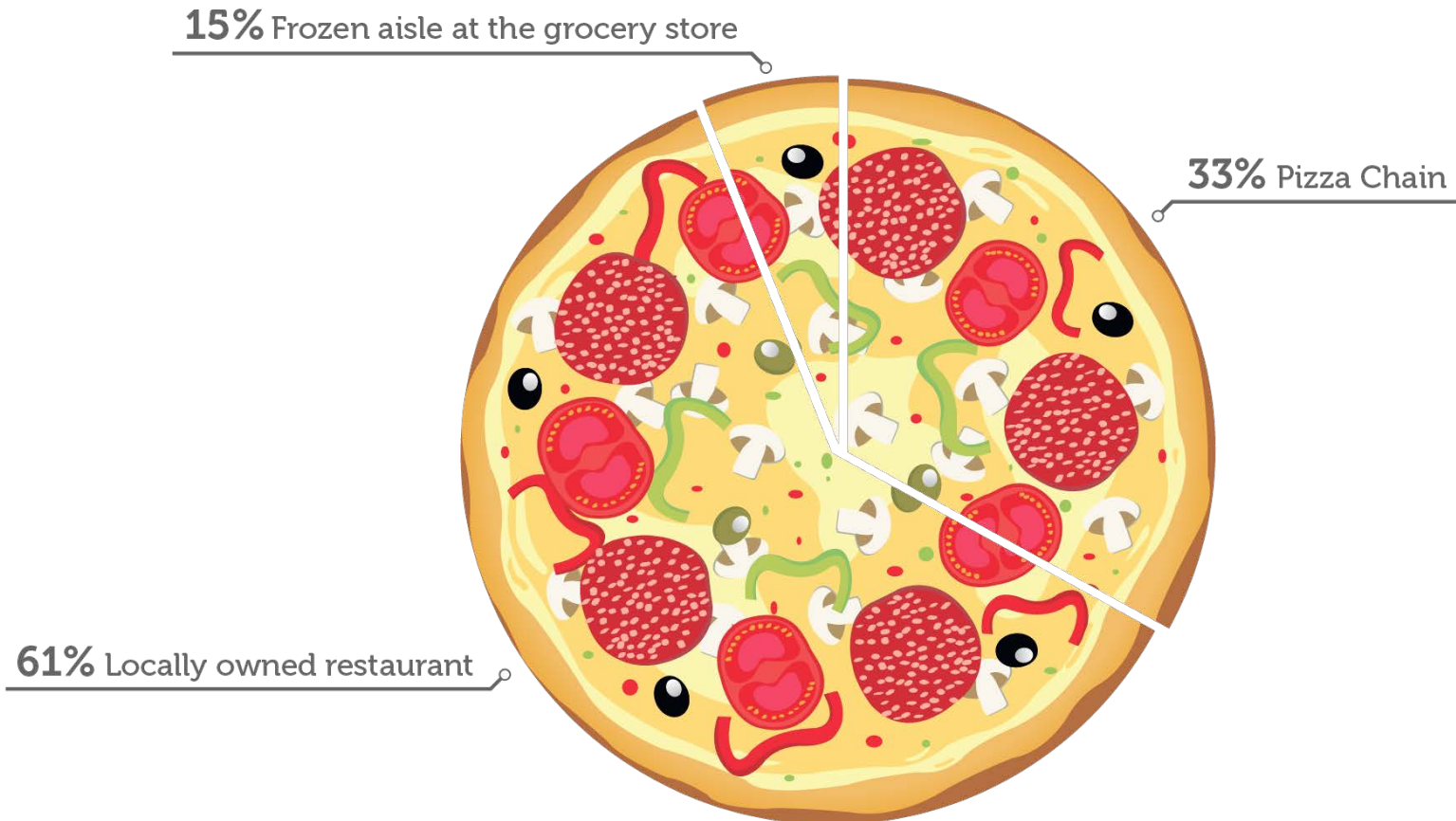
Source: 2014 Sonatype Open Source Development and Application Security Survey



## They also prefer local pizza places ...

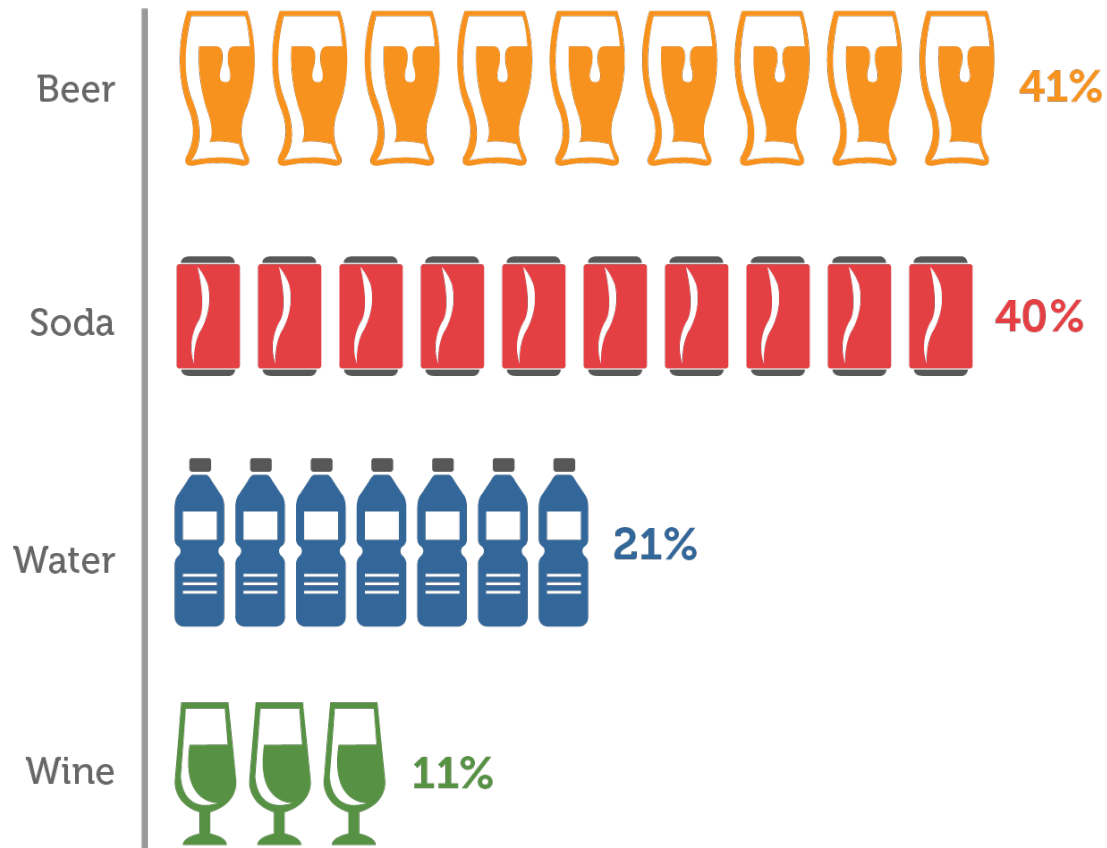
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*Q: Where do you get your pizza?*



...and prefer beer 4-to-1 over wine.

*Q: What do you like to drink with your pizza?*



## About our sponsors



Every day, developers rely on millions of third party and open source building blocks – known as components – to build the software that runs our world. Sonatype ensures that only the best components are used throughout the software development lifecycle so that organizations don't have to make the tradeoff between going fast and being secure. Policy automation, ongoing monitoring and proactive alerts makes it easy to have full visibility and control of components throughout the software supply chain so that applications start secure and remain that way over time. Sonatype is privately held with investments from New Enterprise Associates (NEA), Accel Partners, Bay Partners, Hummer Winblad Venture Partners and Morgenthaler Ventures. Visit: [www.sonatype.com](http://www.sonatype.com)



The Trusted Software Alliance was founded in May of 2013 to raise public and professional awareness of application security as a major risk in application development. We capture the thoughts, ideas and trends as seen by the most important voices in the appsec industry. This includes a series of "50 in 50 Interviews", working with OWASP on a best practices series for managing open source component risks, and promoting major industry surveys and reports.



Contrast automatically identifies vulnerabilities and offers a continuous, real time, application security dashboard for every application. The advanced instrumentation-based vulnerability engine is not an external scanner, but an internal monitor which requires no scheduling, onboarding, or security expertise. The Contrast leadership team members are founding members of the Open Web Application Security Project (OWASP), and have made vast industry contributions including the OWASP Top Ten, Enterprise Security API (ESAPI), Application Security Verification Standard (ASVS), AntiSamy, and WebGoat. For more information, please visit [www.contrastsecurity.com](http://www.contrastsecurity.com) or follow @contrastsec.



New Enterprise Associates, Inc. (NEA) is a leading venture capital firm focused on helping entrepreneurs build transformational businesses across multiple stages, sectors and geographies. With approximately \$13 billion in committed capital, NEA invests in information technology, healthcare and energy technology companies at all stages in a company's lifecycle, from seed stage through IPO. The firm's long track record of successful investing includes more than 175 portfolio company IPOs and more than 300 acquisitions. In the U.S., NEA has offices in Menlo Park, CA; Boston, MA; New York, NY; Chicago, IL; and the Washington, D.C. metropolitan area. In addition, New Enterprise Associates (India) Pvt. Ltd. has offices in Bangalore and Mumbai, India and New Enterprise Associates (Beijing), Ltd. has offices in Beijing and Shanghai, China. For additional information, visit [www.nea.com](http://www.nea.com).



We believe that the key to producing secure code is to change your software development culture. We have to get beyond looking at the technology and look at the software development organization that created it. We believe this evolution has to start with the people, process, technology, and culture of that organization. Rugged is not a process model – it doesn't require any particular practices or activities. Instead, Rugged is about outcomes – you decide the who, how, and when. We believe this evolution is a natural outcome of attempts to simplify and strengthen security stories. Learn more at <https://www.ruggedsoftware.org>

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for the complete analysis, blogs, and the infographic  
detailing the 2014 Sonatype Open Source Development  
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