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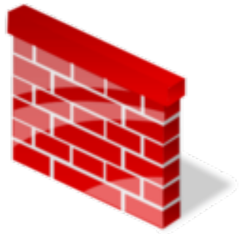
Build Security In

内建安全的软件开发

应对安全问题的传统措施



WAF

安全监控

渗透测试

规范文档

安全培训

一个漏洞引发的反思

如有雷同，说明你也踩过同样的坑...

遭遇安全事故

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发现异常

订单总价和实际商品不符合

调查结果

某个影响价格计算的参数
在等待订单支付期间可被强行修改

疑问

- 为何防火墙没有拦截或者报警

该漏洞和业务强相关，防火墙无法提供有力支持

- 为何渗透测试没有报告这个问题?

该漏洞和业务强相关，躲过了渗透测试的检查

反思

#1 太晚才做渗透测试
报告的安全问题来不及全部修复

耗时长

数量多

时间紧

#2 产品功能在**持续**迭代改进
然后渗透测试却**没办法每次发布都做**

#3 安全活动流于形式

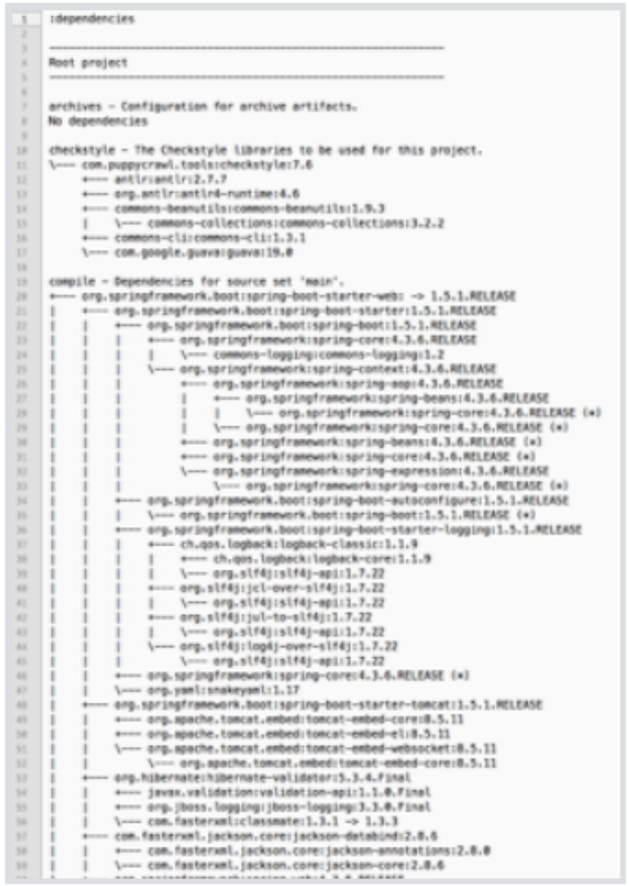
- 威胁建模，拖了很久才做
- 有安全编码规范，但是过于冗长，没人愿意用
- 理论上团队对应用进行安全自查，但是落地

#4 排查第三方组件安全漏洞工作量大

```
dependencies {
    compile 'org.springframework.boot:spring-boot-starter-web'
    compile 'org.springframework.boot:spring-boot-starter-data-jpa'
    compile 'org.postgresql:postgresql:9.4.1212'
    compile 'org.apache.poi:poi:3.15'
    compile 'org.apache.poi:poi-ooxml:3.15'
    compile 'io.springfox:springfox-swagger2:2.6.1'
    compile 'io.springfox:springfox-swagger-ui:2.6.1'
    compile 'commons-io:commons-io:2.4'
    compile 'org.apache.commons:commons-lang3:3.5'
    compile 'com.yunpian.sdk:yunpian-java-sdk:1.2.2'
    compile 'org.springframework.boot:spring-boot-starter-security:1.3.0.RC1'
    compile 'io.jsonwebtoken:jjwt:0.7.0'
    compile 'org.json:json:20160810'
    compile 'org.quartz-scheduler:quartz:2.2.3'
    compile 'org.springframework:spring-context-support:4.1.6.RELEASE'

    testCompile 'org.springframework.boot:spring-boot-starter-test'
    testCompile 'com.h2database:h2'
    testCompile 'org.springframework.security:spring-security-test'
    testCompile 'org.powermock:powermock-module-junit4:1.6.5'
    testCompile 'org.powermock:powermock-api-mockito:1.6.5'

}
```



```
:dependencies

------------------------------------------------------------
Root project
------------------------------------------------------------

archives - Configuration for archive artifacts.
No dependencies

checkstyle - The Checkstyle libraries to be used for this project.
\--- com.puppycrawl.tools:checkstyle:7.6
     +--- antlr:antlr:2.7.7
     +--- org.antlr:antlr4-runtime:4.6
     +--- commons-beanutils:commons-beanutils:1.9.3
     |    \--- commons-collections:commons-collections:3.2.2
     +--- commons-cli:commons-cli:1.3.1
     \--- com.google.guava:guava:19.0

compile - Dependencies for source set 'main'.
+--- org.springframework.boot:spring-boot-starter-web: -> 1.5.1.RELEASE
|    +--- org.springframework.boot:spring-boot-starter:1.5.1.RELEASE
|    |    +--- org.springframework.boot:spring-boot:1.5.1.RELEASE
|    |    |    +--- org.springframework:spring-core:4.3.6.RELEASE
|    |    |    |    \--- commons-logging:commons-logging:1.2
|    |    |    \--- org.springframework:spring-context:4.3.6.RELEASE
|    |    |         +--- org.springframework:spring-aop:4.3.6.RELEASE
|    |    |         |    +--- org.springframework:spring-beans:4.3.6.RELEASE
|    |    |         |    |    \--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    |         |    \--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    |         +--- org.springframework:spring-beans:4.3.6.RELEASE (*)
|    |    |         +--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    |         \--- org.springframework:spring-expression:4.3.6.RELEASE
|    |    |              \--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    +--- org.springframework.boot:spring-boot-autoconfigure:1.5.1.RELEASE
|    |    |    \--- org.springframework.boot:spring-boot:1.5.1.RELEASE (*)
|    |    +--- org.springframework.boot:spring-boot-starter-logging:1.5.1.RELEASE
|    |    |    +--- ch.qos.logback:logback-classic:1.1.9
|    |    |    |    +--- ch.qos.logback:logback-core:1.1.9
|    |    |    |    \--- org.slf4j:slf4j-api:1.7.22
|    |    |    +--- org.slf4j:jcl-over-slf4j:1.7.22
|    |    |    |    \--- org.slf4j:slf4j-api:1.7.22
|    |    |    +--- org.slf4j:jul-to-slf4j:1.7.22
|    |    |    |    \--- org.slf4j:slf4j-api:1.7.22
|    |    |    \--- org.slf4j:log4j-over-slf4j:1.7.22
|    |    |         \--- org.slf4j:slf4j-api:1.7.22
|    |    +--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    \--- org.yaml:snakeyaml:1.17
|    +--- org.springframework.boot:spring-boot-starter-tomcat:1.5.1.RELEASE
|    |    +--- org.apache.tomcat.embed:tomcat-embed-core:8.5.11
|    |    +--- org.apache.tomcat.embed:tomcat-embed-el:8.5.11
|    |    \--- org.apache.tomcat.embed:tomcat-embed-websocket:8.5.11
|    |         \--- org.apache.tomcat.embed:tomcat-embed-core:8.5.11
|    +--- org.hibernate:hibernate-validator:5.3.4.Final
|    |    +--- javax.validation:validation-api:1.1.0.Final
|    |    +--- org.jboss.logging:jboss-logging:3.3.0.Final
|    |    \--- com.fasterxml:classmate:1.3.1 -> 1.3.3
|    +--- com.fasterxml.jackson.core:jackson-databind:2.8.6
|    |    +--- com.fasterxml.jackson.core:jackson-annotations:2.8.0
|    |    \--- com.fasterxml.jackson.core:jackson-core:2.8.6
```

#4 排查第三方组件安全漏洞工作量大

```
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    compile 'io.jsonwebtoken:jjwt:0.7.0'
    compile 'org.json:json:20160810'
    compile 'org.quartz-scheduler:quartz:2.2.3'
    compile 'org.springframework:spring-context-support:4.1.6.RELEASE'

    testCompile 'org.springframework.boot:spring-boot-starter-test'
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    testCompile 'org.powermock:powermock-module-junit4:1.6.5'
    testCompile 'org.powermock:powermock-api-mockito:1.6.5'

}
```
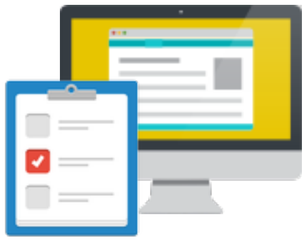
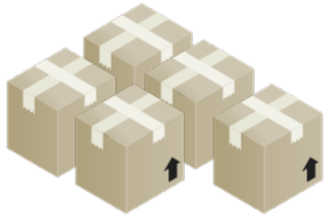

#4 相似的困境



软件测试

- 很晚才测试
- 测试执行速度慢
- 集中式的、一次性测试
- 专人负责测试



系统集成

- 很晚才集成
- 集成过程缓慢
- 一次性集成
- 专人负责集成

三大安全挑战

- 一次性的安全检查无法匹配持续性的交付
- 缺乏自动化、自助化的安全服务
- 部门墙阻碍开发和安全团队高效协作

挑战1: 一次性的安全检查无法匹配持续性的交付

传统安全控制设施

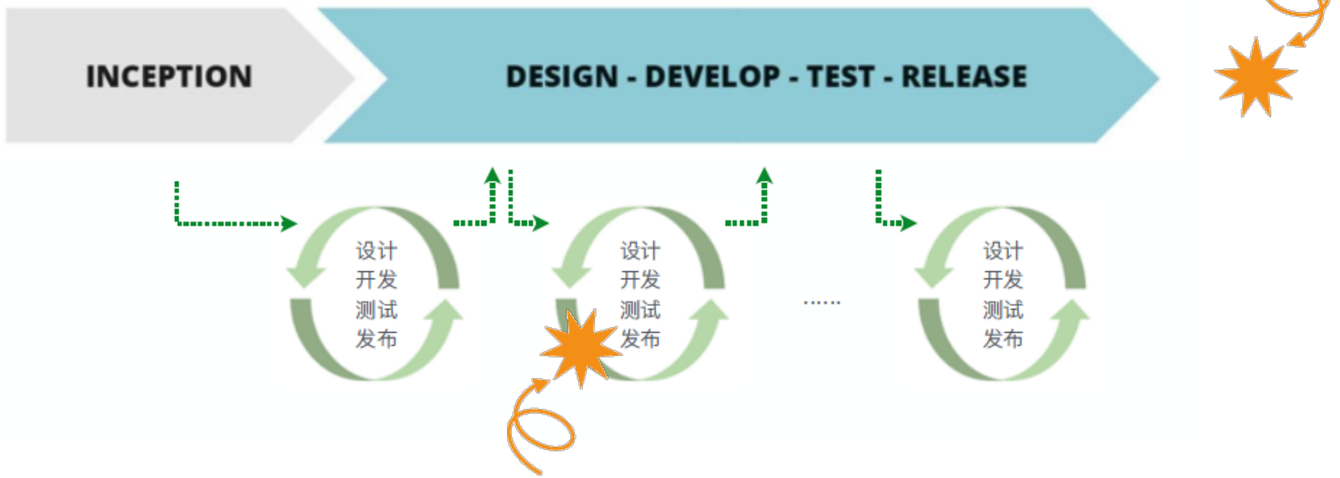
持续交付模式下，开发团队尽可能的降低 Cycle Time

挑战1: 一次性的安全检查无法匹配持续性的交付

传统安全控制设施

持续交付模式下，开发团队尽可能的降低 Cycle Time

在这里做渗透测试?



在这里做渗透测试?

核心原则

不再依赖一次性的安全检查

而是将安全实践融入持续交付流程

通过持续性的搜集安全质量反馈，及时对应用做出调整

我们作出的改变 - 实践


基础设施安全检查
轻量级威胁建模
恶意攻击场景风暴
安全功能性测试
设计
开发
测试
发布
安全架构评审
第三方依赖安全检查
安全代码评审
动态安全测试
静态安全测试

威胁建模

Threat Modeling

> Threat modeling is an approach for analysing the security of an application. It is a structured approach that enables you to identify, quantify, and address the security risks associated with an application.

我们作出的改变 - 威胁建模

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威胁建模产出物：安全故事卡

我们作出的改变 - 威胁建模

威胁建模产出物：威胁清单及应对方法

- **数据传输过程存在泄漏风险**
  - 应对办法：SSL / 敏感数据加密后传输
- **产品有多种用户角色，可能出现鉴权漏洞**
  - 应对办法：严格的权限校验 / 默认只给最小权限 / 异常访问报警 / 专门针对角色和权限的自动化测试 ...
- **可能有XSS漏洞**
  - 应对办法：前端输出编码 / 使用AngularJS的时候避免使用原始数据输出
- ……

我们作出的改变 - 安全功能性测试

通过自动化测试用例，对应用的安全功能进行测试

API	期待的安全行为
/customers	1. 必须经过身份认证后才允许访问 2. 只允许具有 CustomerManager 角色的用户访问 3. 只应该返回该 CustomerManager 所管辖的区域的客户数据 4. .....

我们作出的改变 - 安全功能性测试

通过自动化测试用例，对应用的安全功能进行测试

API	期待的安全行为
/custom	1. 必须经过身份认证后才允许访问 2. 只允许具有 CustomerManager 角色的用户访问 区域的客户

```
17      @Test
18      public void should_not_return_all_the_customers() throws Exception {
19          String token = loginAsDefaultCustomer();
20
21          given().header("Authorization", token)
22                  .when().get("/customers")
23                  .then().body(empty())
24                  .statusCode(SC_NOT_FOUND);
25      }
26
27      @Test
28      public void should_return_information_of_current_customer() throws Exception {
29          String tokenOfCustomer1 = loginAsCustomer(authData.customer1, authData.pwdOfCustomer1);
30          String customerId = given().header("Authorization", tokenOfCustomer1)
31                  .when().get(format("/customers/%s", authData.customer1))
32                  .then().statusCode(SC_OK).extract().path("customerId");
33          assertThat(customerId, is(authData.customer1));
34      }
35
36      @Test
37      public void should_not_return_information_of_other_customer() throws Exception {
38          String tokenOfCustomer1 = loginAsCustomer(authData.customer1, authData.pwdOfCustomer1);
39          given().header("Authorization", tokenOfCustomer1)
40                  .when().get(format("/customers/%s", authData.customer2))
41                  .then().statusCode(SC_UNAUTHORIZED).body("errorKey", is("authorize_failed"));
42      }
```

挑战2: 缺乏自动化、自助化的安全服务

我们知道安全很重要，但是安全实践落地难

核心原则

- 凡是能自动化的，统统自动化
- 凡是必须人工参与的，统统进行自助化改造

我们作出的改变


自助式 轻量级威胁建模
自动化 基础设施安全检查
自助式 恶意攻击场景风暴
自动化 安全功能性测试
设计
开发
测试
发布
自助式 安全架构评审
自助式 安全检查
自动化 第三方依赖安全检查
自动化
动态安全测试
自动化
静态安全测试

我们作出的改变 - 自动化第三方依赖安全扫描

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以前

1. 通过新闻报道获知组件安全漏洞
2. 手动进行排查

大量人工成本

&

一次性的检查

```
:dependencies

------------------------------------------------------------
Root project
------------------------------------------------------------

archives - Configuration for archive artifacts.
No dependencies

checkstyle - The Checkstyle libraries to be used for this project.
\--- com.puppycrawl.tools:checkstyle:7.6
     +--- antlr:antlr:2.7.7
     +--- org.antlr:antlr4-runtime:4.6
     +--- commons-beanutils:commons-beanutils:1.9.3
     |    \--- commons-collections:commons-collections:3.2.2
     +--- commons-cli:commons-cli:1.3.1
     \--- com.google.guava:guava:19.0

compile - Dependencies for source set 'main'.
+--- org.springframework.boot:spring-boot-starter-web: -> 1.5.1.RELEASE
|    +--- org.springframework.boot:spring-boot-starter:1.5.1.RELEASE
|    |    +--- org.springframework.boot:spring-boot:1.5.1.RELEASE
|    |    |    +--- org.springframework:spring-core:4.3.6.RELEASE
|    |    |    |    \--- commons-logging:commons-logging:1.2
|    |    |    \--- org.springframework:spring-context:4.3.6.RELEASE
|    |    |         +--- org.springframework:spring-aop:4.3.6.RELEASE
|    |    |         |    +--- org.springframework:spring-beans:4.3.6.RELEASE
|    |    |         |    |    \--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    |         |    \--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    |         +--- org.springframework:spring-beans:4.3.6.RELEASE (*)
|    |    |         +--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    |         \--- org.springframework:spring-expression:4.3.6.RELEASE
|    |    |              \--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    +--- org.springframework.boot:spring-boot-autoconfigure:1.5.1.RELEASE
|    |    |    \--- org.springframework.boot:spring-boot:1.5.1.RELEASE (*)
|    |    +--- org.springframework.boot:spring-boot-starter-logging:1.5.1.RELEASE
|    |    |    +--- ch.qos.logback:logback-classic:1.1.9
|    |    |    |    +--- ch.qos.logback:logback-core:1.1.9
|    |    |    |    \--- org.slf4j:slf4j-api:1.7.22
|    |    |    +--- org.slf4j:jcl-over-slf4j:1.7.22
|    |    |    |    \--- org.slf4j:slf4j-api:1.7.22
|    |    |    +--- org.slf4j:jul-to-slf4j:1.7.22
|    |    |    |    \--- org.slf4j:slf4j-api:1.7.22
|    |    |    \--- org.slf4j:log4j-over-slf4j:1.7.22
|    |    |         \--- org.slf4j:slf4j-api:1.7.22
|    |    +--- org.springframework:spring-core:4.3.6.RELEASE (*)
|    |    \--- org.yaml:snakeyaml:1.17
|    +--- org.springframework.boot:spring-boot-starter-tomcat:1.5.1.RELEASE
|    |    +--- org.apache.tomcat.embed:tomcat-embed-core:8.5.11
|    |    +--- org.apache.tomcat.embed:tomcat-embed-el:8.5.11
|    |    \--- org.apache.tomcat.embed:tomcat-embed-websocket:8.5.11
|    |         \--- org.apache.tomcat.embed:tomcat-embed-core:8.5.11
|    +--- org.hibernate:hibernate-validator:5.3.4.Final
|    |    +--- javax.validation:validation-api:1.1.0.Final
|    |    +--- org.jboss.logging:jboss-logging:3.3.0.Final
|    |    \--- com.fasterxml:classmate:1.3.1 -> 1.3.3
|    +--- com.fasterxml.jackson.core:jackson-databind:2.8.6
|    |    +--- com.fasterxml.jackson.core:jackson-annotations:2.8.0
|    |    \--- com.fasterxml.jackson.core:jackson-core:2.8.6
|    +--- org.springframework:spring-web:4.3.6.RELEASE
```

我们作出的改变 - 自动化第三方依赖安全扫描

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以前

1. 通过新闻报道获知组件安全漏洞
2. 手动进行排查

大量人工成本

&

一次性的检查

现在

全程自动化

OWASP DependencyCheck

Node Security Platform ...

分分钟获得扫描结果

&

持续监控

我们作出的改变 - 自动化第三方依赖安全扫描

OWASP DependencyCheck Report

DEPENDENCY-CHECK

How to read the report | Suppressing false positives | Getting Help: google group | github issues

Project: xxxxxxxx

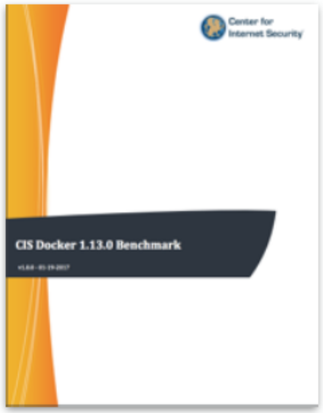
Scan Information (show all):

- *dependency-check version*: 1.4.5
- *Report Generated On*: May 9, 2017 at 11:35:22 +08:00
- *Dependencies Scanned*: 100 (100 unique)
- *Vulnerable Dependencies*: 9
- *Vulnerabilities Found*: 21
- *Vulnerabilities Suppressed*: 0
- ...

Display: Showing Vulnerable Dependencies (click to show all)

Dependency	CPE	GAV	Highest Severity	CVE Count	CPE Confidence	Evidence Count
logback-classic-1.1.9.jar	cpe:/a:logback:logback:1.1.9	ch.qos.logback:logback-classic:1.1.9	High	1	LOW	18
logback-core-1.1.9.jar	cpe:/a:logback:logback:1.1.9	ch.qos.logback:logback-core:1.1.9	High	1	LOW	18
jackson-annotations-2.8.0.jar	cpe:/a:fasterxml:jackson:2.8.0	com.fasterxml.jackson.core:jackson-annotations:2.8.0	Medium	1	LOW	25
jackson-core-2.8.6.jar	cpe:/a:fasterxml:jackson:2.8.6	com.fasterxml.jackson.core:jackson-core:2.8.6	Medium	1	LOW	25
jackson-databind-2.8.6.jar	cpe:/a:fasterxml:jackson:2.8.6	com.fasterxml.jackson.core:jackson-databind:2.8.6	Medium	1	LOW	25
jjwt-0.7.0.jar	cpe:/a:sonatype:nexus:0.7.0	io.jsonwebtoken:jjwt:0.7.0	High	1	LOW	18
tomcat-embed-core-8.5.11.jar	cpe:/a:apache:tomcat:8.5.11	org.apache.tomcat.embed:tomcat-embed-core:8.5.11	High	7	HIGHEST	16
tomcat-embed-websocket-8.5.11.jar	cpe:/a:apache:tomcat:8.5.11	org.apache.tomcat.embed:tomcat-embed-websocket:8.5.11	High	7	HIGHEST	18
spring-boot-starter-data-jpa-1.5.1.RELEASE.jar	cpe:/a:pivotal_software:spring_data_jpa:1.5.1	org.springframework.boot:spring-boot-starter-data-jpa:1.5.1.RELEASE	Medium	1	LOW	20

我们作出的改变 - 自动化基础设施安全检查



Docker 容器安全最佳实践

Host Configuration

- ☐ Keep Docker up to date
- ☐ Audit Docker files and directoires - /var/lib/docker
- ☐ Audit Docker files and directoires - /etc/docker
- ☐ Audit Docker files and directoires - docker.service

.....

Docker daemon configuration files

Container Images and Build File

Container Runtime

.....

我们作出的改变 - 自动化基础设施安全检查

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```
docker run -it --net host --pid host --cap-add
audit_control \
    -e DOCKER_CONTENT_TRUST=$DOCKER_CONTENT_TRUST \
    -v /var/lib:/var/lib \
    -v /var/run/docker.sock:/var/run/docker.sock \
    -v /usr/lib/systemd:/usr/lib/systemd \
    -v /etc:/etc --label docker_bench_security \
    docker/docker-bench-security
```

我们作出的改变 - 自动化基础设施安全检查

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Docker bench for security

```
docker run -i                                                    -cap-add
audit_control
     -e DOCKER                                                   NTENT_TRUST \
     -v /var/l
     -v /var/r                                                   ocker.sock \
     -v /usr/l                                                   nd \
     -v /etc:/                                                   security \
     docker/do
```

```
# ------------------------------------------------------------------------------
# Docker Bench for Security v1.3.0
#
# Docker, Inc. (c) 2015-
#
# Checks for dozens of common best-practices around deploying Docker containers in production.
# Inspired by the CIS Docker 1.13 Benchmark.
# ------------------------------------------------------------------------------

Initializing Thu Jan 26 08:58:33 UTC 2017

[INFO] 1 - Host Configuration
[WARN] 1.1  - Create a separate partition for containers
[INFO] 1.2  - Harden the container host
[PASS] 1.3  - Keep Docker up to date
[INFO]      * Using 1.13.0 which is current as of 2017-01-18
[INFO]      * Check with your operating system vendor for support and security maintenance for Docker
[INFO] 1.4  - Only allow trusted users to control Docker daemon
[INFO]      * docker:x:998:ubuntu
[WARN] 1.5  - Audit docker daemon - /usr/bin/docker
[WARN] 1.6  - Audit Docker files and directories - /var/lib/docker
[WARN] 1.7  - Audit Docker files and directories - /etc/docker
[WARN] 1.8  - Audit Docker files and directories - docker.service
[WARN] 1.9  - Audit Docker files and directories - docker.socket
[WARN] 1.10 - Audit Docker files and directories - /etc/default/docker
[INFO] 1.11 - Audit Docker files and directories - /etc/docker/daemon.json
[INFO]      * File not found
[WARN] 1.12 - Audit Docker files and directories - /usr/bin/docker-containerd
[WARN] 1.13 - Audit Docker files and directories - /usr/bin/docker-runc

[INFO] 2 - Docker Daemon Configuration
[WARN] 2.1  - Restrict network traffic between containers
[WARN] 2.2  - Set the logging level
[PASS] 2.3  - Allow Docker to make changes to iptables
[PASS] 2.4  - Do not use insecure registries
[WARN] 2.5  - Do not use the aufs storage driver
[WARN] 2.6  - Configure TLS authentication for Docker daemon
[WARN]      * Docker daemon currently listening on TCP with TLS, but no verification
[INFO] 2.7  - Set default ulimit as appropriate
[INFO]      * Default ulimit doesn't appear to be set
[WARN] 2.8  - Enable user namespace support
[PASS] 2.9  - Confirm default cgroup usage
[PASS] 2.10 - Do not change base device size until needed
[WARN] 2.11 - Use authorization plugin
[WARN] 2.12 - Configure centralized and remote logging
[WARN] 2.13 - Disable operations on legacy registry (v1)
[WARN] 2.14 - Enable live restore
[PASS] 2.15 - Do not enable swarm mode, if not needed
[PASS] 2.16 - Control the number of manager nodes in a swarm (Swarm mode not enabled)
[PASS] 2.17 - Bind swarm services to a specific host interface
[WARN] 2.18 - Disable Userland Proxy
[PASS] 2.19 - Encrypt data exchanged between containers on different nodes on the overlay network
[PASS] 2.20 - Apply a daemon-wide custom seccomp profile, if needed
[PASS] 2.21 - Avoid experimental features in production
```

我们作出的改变 - 和CI集成的自动化安全测试

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Build → Functional Test → **Security Test** → Deploy

```
1  apply plugin: "java"
2  apply plugin: "idea"
3
4  apply plugin: "security-zap"
5
6  buildscript {
7      repositories {
8          mavenCentral()
9      }
10     dependencies {
11         classpath(
12                 'com.thoughtworks.tools:security-zap:1.0.5'
13         )
14     }
15 }
```

```
➜ customer-api git:(master) ✗ gradle zapStart build -Dzap.proxy=localhost:7070 zapReport
:zapStop
stopping zap
Warning: failed to stop ZAP due to connection refused or ZAP already stopped.
:zapStart
Starting ZAP [apikey: 2LZ77g9YVi]
waiting ZAP
waiting ZAP
waiting ZAP
ZAP started
exclusion rules are removed
urls match following regex will be excluded:
.*/css/.*
.*/js/.*
.*/fonts/.*
.*\.css
.*\.js
```

2. Security Alerts Summary

Number of alerts in total: 541

Alerts by severity	Amount
High	2
Medium	5
Low	360
Informational	174

3. Security Alerts By Classification

Classification	Amount
Cross Site Scripting (Reflected)	1
SQL Injection	1
Session ID in URL rewrite	4

我们作出的改变 - 和CI集成的自动化安全测试

Build → Functional Test → **Security Test** → Deploy

Given an anonymous visitor
When I try to access report page without authentication
Then I was been redirected to login page

Given a user without report access permission
When I try to access report page with authentication
Then I was been redirected to error page

Given a system manager
When I try to access report page with authentication
Then I can access report page successfully

我们作出的改变 - 和CI集成的自动化安全测试

Build → Functional Test → **Security Test** → Deploy

```
public void anonymousVisitorCanNotAccessReportPage() {
    Page currentPage = accessReportPage();
    assertThat(currentPage, is(LOGIN_PAGE));
}
```

```
public void userWithoutProperPermissionCanNotAccessReportPage() {
    loginAsMember();
    Page currentPage = accessReportPage();
    assertThat(currentPage, is(PERMISSION_REQUIRED_ERROR_PAGE));
}
```

```
public void managerCanAccessReportPage() {
    loginAsManager();
    Page currentPage = accessReportPage();
    assertThat(currentPage, is(REPORT_PAGE));
}
```

我们作出的改变 - 自助式安全检查

为团队提供：自动化的工具 / 实用的检查清单

- Authentication verification
  - Verify all pages and resources by default require authentication except those specifically intended to be public
  - Verify all authentication controls are enforced on the server side.
  - Verify that account passwords are one way hashed with a salt
  - ……
- Session management
- Access control
- Malicious input handling
- Output encoding/escaping
- Cryptography as rest
- Error handling

……

我们作出的改变 - 自助式安全检查

为团队提供：自动化的工具 / 实用的检查清单

OWASP ZAP

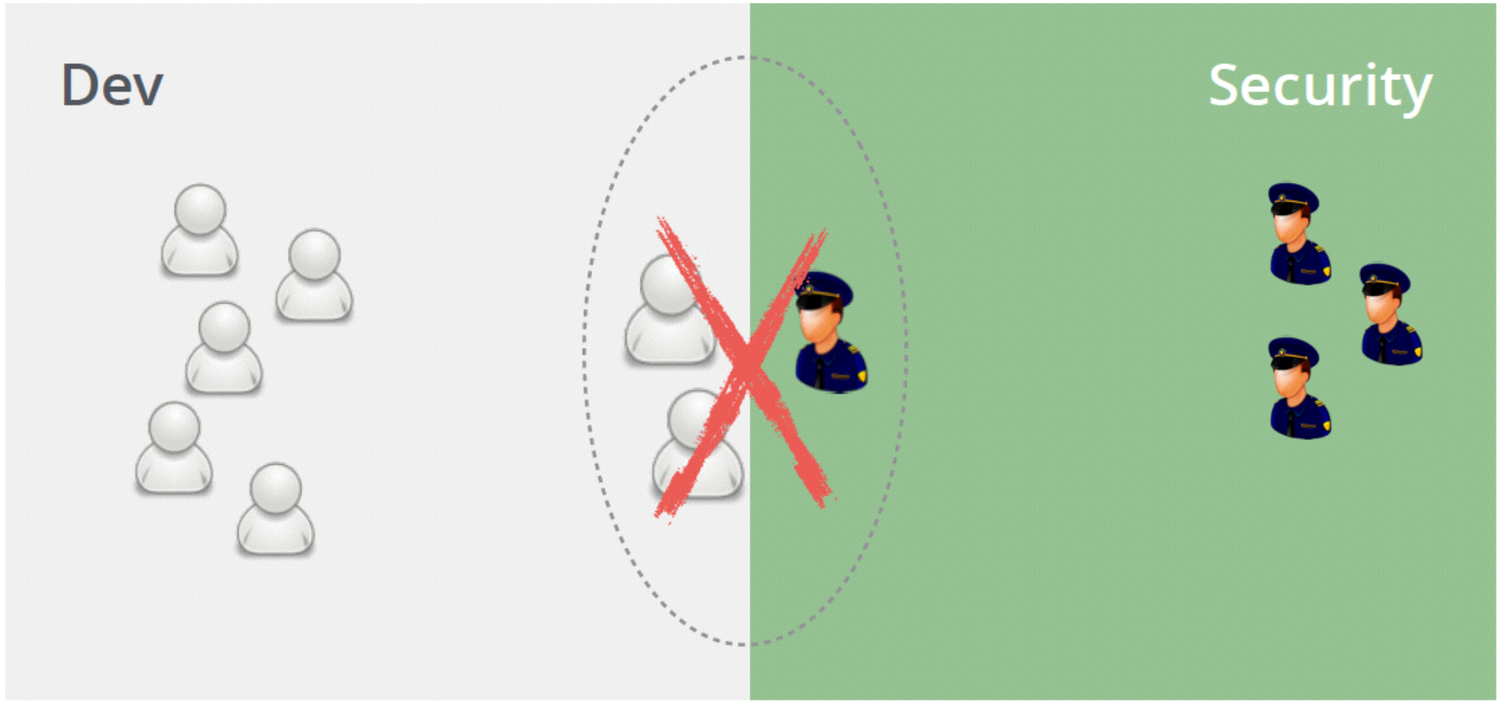
Burp Suite

SQLMap

我们作出的改变 - 总结

制定安全策略

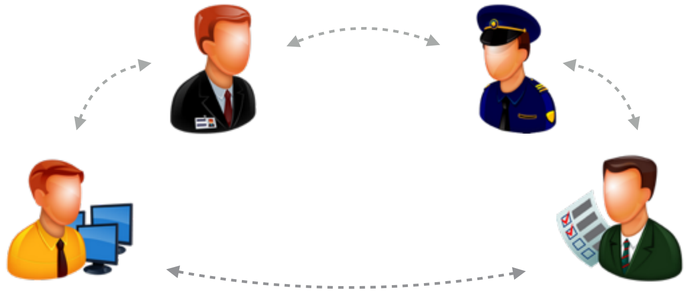
挑战3: 部门墙阻碍开发和安全团队的高效协作



核心原则

真正**高效的**沟通协作，而不是靠**强硬的**流程管控来保证应用安全质量

我们作出的改变 - 共同承担安全职责



开发团队 & 安全团队

开发团队

安全团队

我们作出的改变

不是团队有了安全专家，一切问题都迎刃而解，
关键在于**建立开发团队自己的安全能力**

Build Security In

主动发现安全漏洞 胜于 被动等待漏洞报告

前期安全威胁分析 胜于 末期安全渗透测试

持续安全扫描 胜于 单次安全审查

安全职责共担 胜于 独立安全团队

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Q & A

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谢 谢

THANK YOU

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