Streamline Security With Shift Left

A Cloud approach

LOGICBOMB

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Security Engineer by mind

A Cricket Player by heart

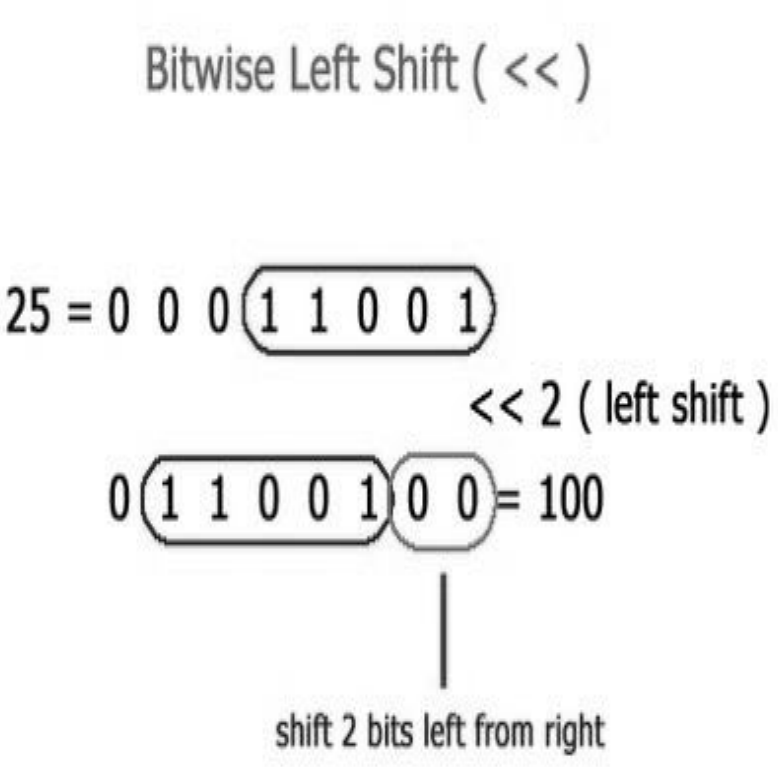
Blogger at medium @logicbomb

I break stuff to learn

What is Shift Left?

Bringing something close to the source

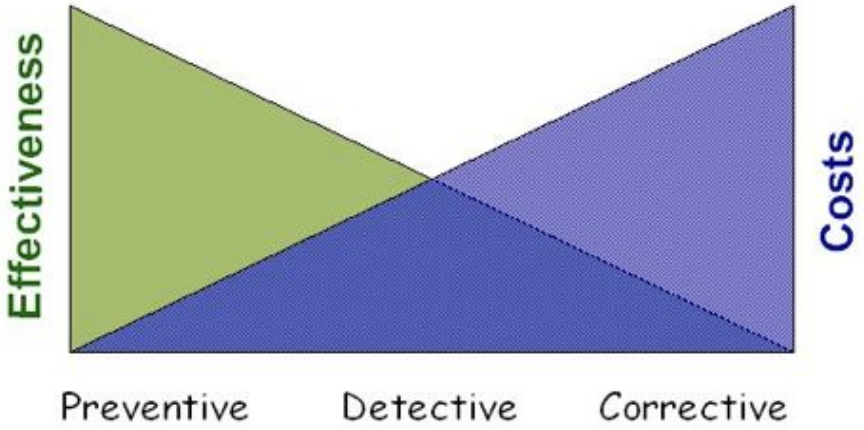
Considerable rise in the final resultant



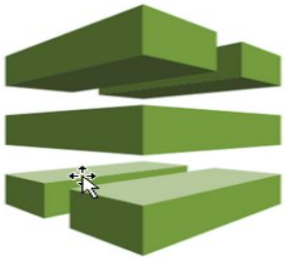
Security concerns are taken into consideration during the whole application development, rather than at the end of the process.

Security shouldn’t be treated as an after-thought.

Cost of Security increases rapidly as it moves away from the source



Scanning every single code change AWS Codepipeline



Code Pipeline

Continues deployment service. It allows to module visualise. It orchestrate all activities and automate release of software

AWS CI/CD tools

Code Commit

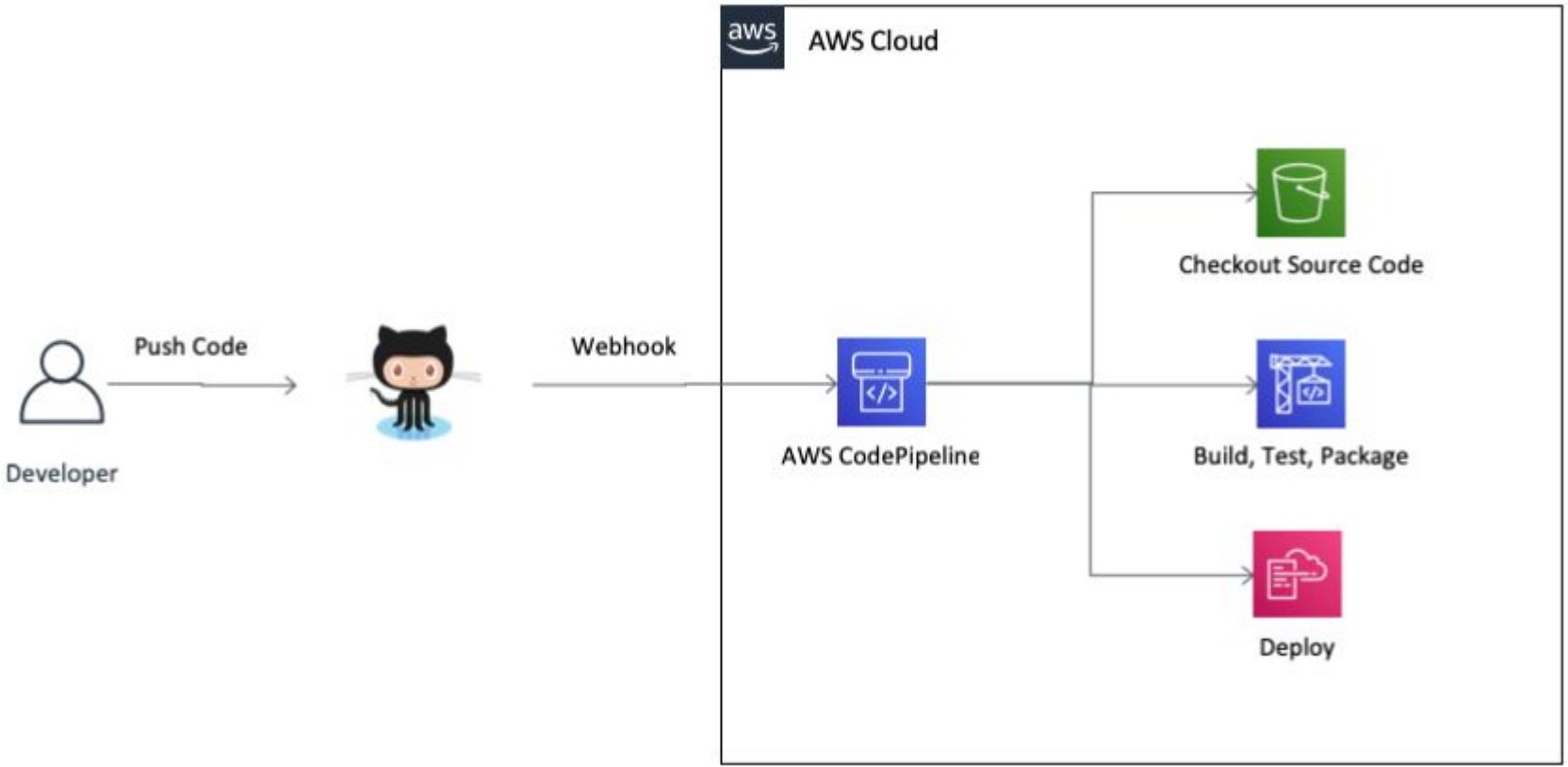
Managed source control code repository service

Code Build

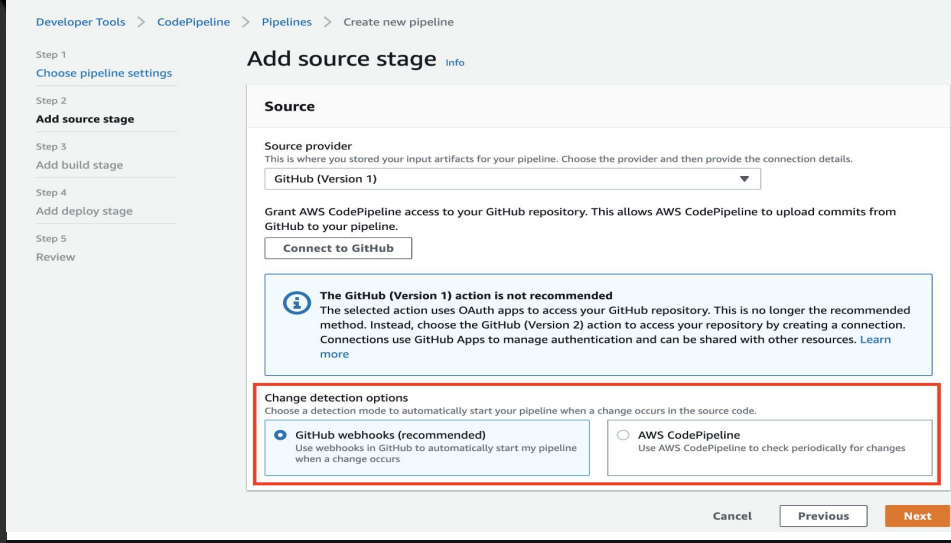
Compose code source code, runs basics tests and create software packages ready to deploy

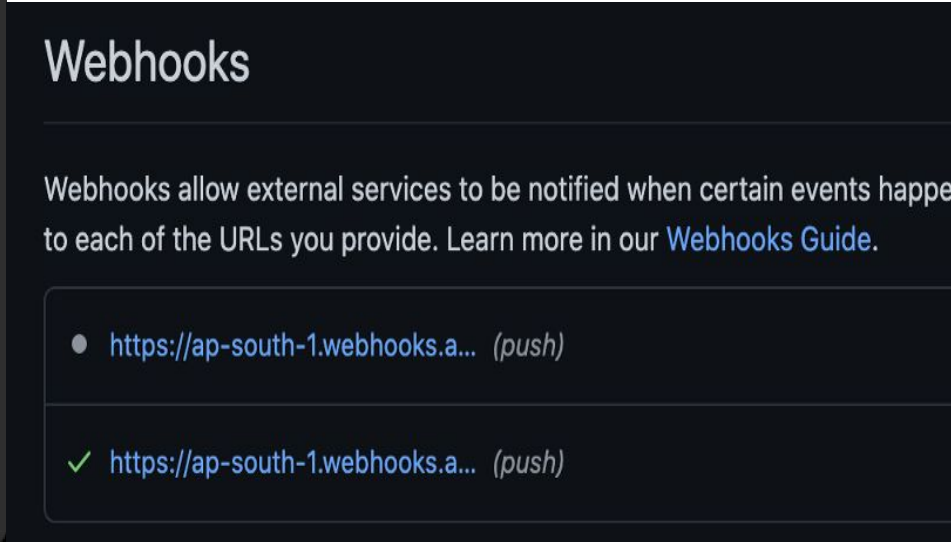
Code Deploy

Automated deployment service, deploy your code to ec2, on premise or Lambda functions

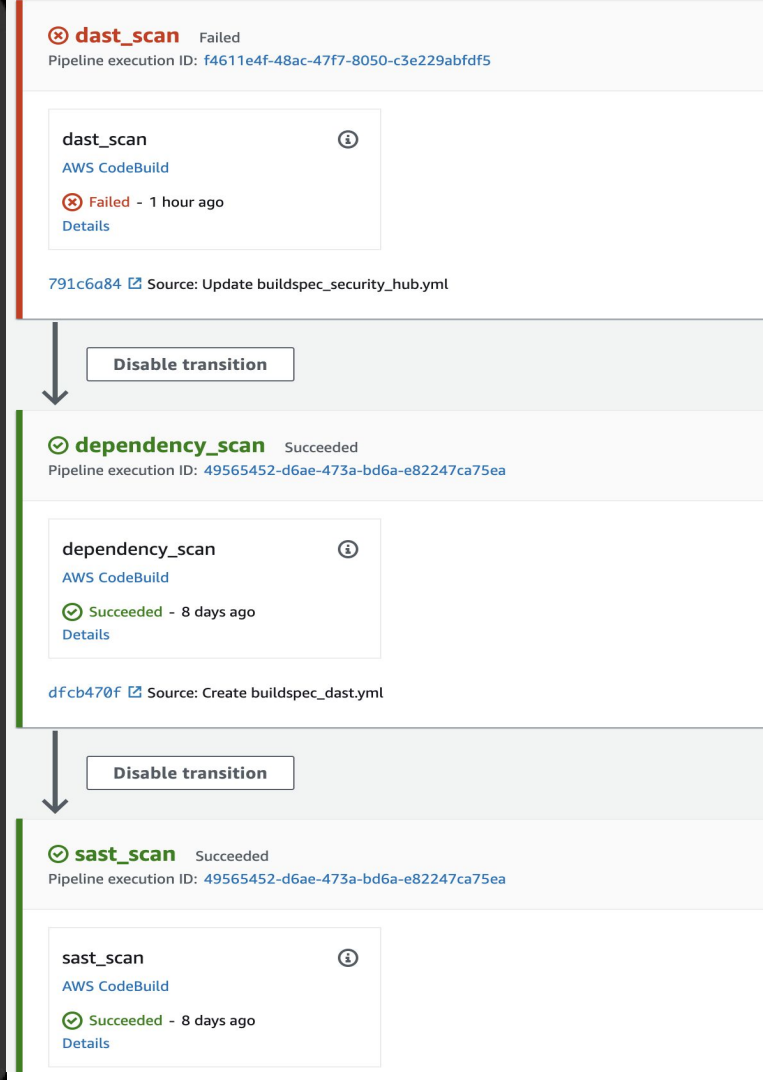

AWS Cloud
Checkout Source Code
Push Code
Webhook
AWS CodePipeline
Build, Test, Package
Developer
Deploy

This webhooks configured URL is the heart of our “Continuous Code Hacking”





Add as many build security steps as you want



How Buildspec Setup Looks like

Pre_Build
- Setup dependencies
- Pull scanners

Build
- Run scanners and scripts
- Parse result

Post_Build
- Call lambda
- Push results

Eg. Git Secret buildspec.yml

main ▾ AWS_Devsecops / Secretscanning_buildspec.yml

logicbomb-1 Create Secretscanning_buildspec.yml

1 contributor

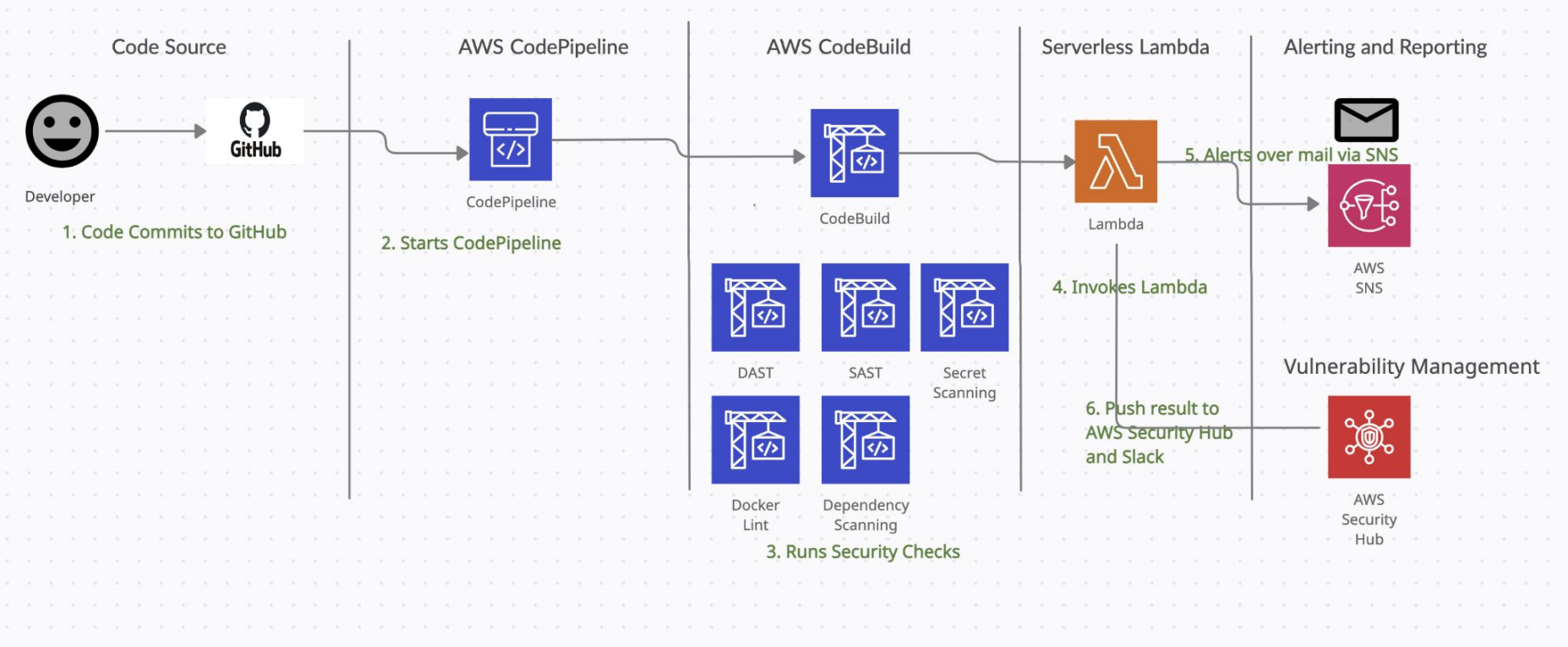
23 lines (22 sloc) | 835 Bytes

```
1  version: 0.2
2
3  phases:
4    pre_build:
5      commands:
6      - echo "Setting CodeCommit Credentials"
7      - git config --global credential.helper '!aws codecommit credential-helper
8      - git config --global credential.UseHttpPath true
9      - echo "Copying secrets_config.json to the application directory"
10     - cp secrets_config.json $CODEBUILD_SRC_DIR_AppSource/secrets_config.json
11     - echo "Switching to the application directory"
12     - echo "Installing truffleHog"
13     - which pip3 && pip3 --version
14     - which python3 && python3 --version
15     - pip3 install 'truffleHog>=2.1.0,<3.0'
16   build:
17     commands:
18     - echo "Build started on $(date)"
19     - echo "Scanning with truffleHog..."
20     - trufflehog --regex --rules secrets_config.json --entropy=False ${PROJECT}
21   post_build:
22     commands:
23     - echo "Build completed on $(date)"
```

Continuous code hacking capabilities:

1. **SAST** — Scanning source code for vulnerabilities.
2. **DAST** — Performing Dynamic Application Security Testing.
3. **Dependency Scanning** — Analyze external dependencies for known vulnerabilities.
4. **Secret Detection**— Detecting secrets in the PR.
5. **Additional Capabilities** — Dockerfile linter, Check whitelist of base images.

AWS DevSecOps Pipeline Architecture



Secret Scanning Result

```
[Container] 2021/04/18 06:56:43 Running command trufflehog --regex --entropy=False ${
[Container] 2021/04/18 06:56:49 Command did not exit successfully trufflehog --regex -
[Container] 2021/04/18 06:56:49 Phase complete: BUILD State: FAILED
[Container] 2021/04/18 06:56:49 Phase context status code: COMMAND_EXECUTION_ERROR Mes
${SOURCE_REPO_URL} > secret_result.txt. Reason: exit status 1
[Container] 2021/04/18 06:56:49 Entering phase POST_BUILD
[Container] 2021/04/18 06:56:49 Running command cat secret_result.txt
~~~~~~~~~~~~~~~~~~~~~
Reason: RSA private key
Date: 2021-04-18 06:09:34
Hash: dbad4d48682f6aa6e0548283d1baa8373214b91a
Filepath: test
Branch: origin/master
Commit: Update test
-----BEGIN RSA PRIVATE KEY-----
~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~
Reason: SSH (OPENSSH) private key
Date: 2021-04-18 06:09:34
Hash: dbad4d48682f6aa6e0548283d1baa8373214b91a
Filepath: test
Branch: origin/master
Commit: Update test
-----BEGIN OPENSSH PRIVATE KEY-----
~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~
Reason: SSH (DSA) private key
Date: 2021-04-18 06:09:34
Hash: dbad4d48682f6aa6e0548283d1baa8373214b91a
Filepath: test
Branch: origin/master
Commit: Update test
-----BEGIN DSA PRIVATE KEY-----
~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~
Reason: SSH (EC) private key
Date: 2021-04-18 06:09:34
Hash: dbad4d48682f6aa6e0548283d1baa8373214b91a
Filepath: test
Branch: origin/master
Commit: Update test
-----BEGIN EC PRIVATE KEY-----
~~~~~~~~~~~~~~~~~~~~~
~~~~~~~~~~~~~~~~~~~~~
Reason: PGP private key block
Date: 2021-04-18 06:09:34
Hash: dbad4d48682f6aa6e0548283d1baa8373214b91a
Filepath: test
Branch: origin/master
Commit: Update test
-----BEGIN PGP PRIVATE KEY BLOCK-----
~~~~~~~~~~~~~~~~~~~~~
```

Dependency Checker Result

```
[Container] 2021/04/19 16:19:13 Running command high_risk_dependency=$( cat dependency-check-r

[Container] 2021/04/19 16:19:13 Phase complete: BUILD State: SUCCEEDED
[Container] 2021/04/19 16:19:13 Phase context status code:  Message:
[Container] 2021/04/19 16:19:13 Entering phase POST_BUILD
[Container] 2021/04/19 16:19:13 Running command cat dependency-check-report.json
{
  "reportSchema" : "1.1",
  "scanInfo" : {
    "engineVersion" : "6.0.5",
    "dataSource" : [ {
      "name" : "NVD CVE Checked",
      "timestamp" : "2021-04-19T16:18:30"
    }, {
      "name" : "NVD CVE Modified",
      "timestamp" : "2021-04-19T14:01:28"
    }, {
      "name" : "VersionCheckOn",
      "timestamp" : "2021-04-19T16:18:30"
    } ]
  },
  "projectInfo" : {
    "name" : "",
    "reportDate" : "2021-04-19T16:19:11.706616Z",
    "credits" : {
      "NVD" : "This report contains data retrieved from the National Vulnerability Database: h
      "NPM" : "This report may contain data retrieved from the NPM Public Advisories: https://
      "RETIREJS" : "This report may contain data retrieved from the RetireJS community: https:
      "OSSINDEX" : "This report may contain data retrieved from the Sonatype OSS Index: https:
    }
  },
  "dependencies" : [ {
    "isVirtual" : false,
    "fileName" : "Counter.js",
    "filePath" : "/codebuild/output/src787654664/src/src/components/Root/Counter/Counter.js",
    "md5" : "ecf0b6eae8c1a2995fa00d419ea76528",
    "sha1" : "f1c7be02c19b61185606aef948a4865492af761e",
    "sha256" : "3f6cb30e19e75ced762f0164f7ea3b32890e5b71ae11350cd8d296f740e22364",
    "evidenceCollected" : {
      "vendorEvidence" : [ ],
      "productEvidence" : [ ],
      "versionEvidence" : [ ]
    }
```

Docker Linter Result

```
[Container] 2021/01/29 10:48:17 Running command echo $result | jq .
[
  {
    "line": 2,
    "code": "DL3006",
    "message": "Always tag the version of an image explicitly",
    "column": 1,
    "file": "/dev/stdin",
    "level": "warning"
  },
  {
    "line": 3,
    "code": "DL4000",
    "message": "MAINTAINER is deprecated",
    "column": 1,
    "file": "/dev/stdin",
    "level": "error"
  },
  {
    "line": 5,
    "code": "DL3009",
    "message": "Delete the apt-get lists after installing something",
    "column": 1,
    "file": "/dev/stdin",
    "level": "info"
  },
  {
    "line": 6,
    "code": "DL3008",
    "message": "Pin versions in apt get install. Instead of `apt-get install
    "column": 1,
    "file": "/dev/stdin",
    "level": "warning"
  },
```

Static Code Scanning Result

```
[Container] 2021/04/27 17:27:19 Running command echo "build stage completed"
build stage completed

[Container] 2021/04/27 17:27:19 Running command curl https://sonarcloud.io/api/issues/search?componen
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed

  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
  0     0    0     0    0     0      0      0 --:--:-- --:--:-- --:--:--     0
100  2063  100  2063    0     0   3069      0 --:--:-- --:--:-- --:--:--  3065

[Container] 2021/04/27 17:27:21 Running command cat sonarqube_scanreport.json | jq
{
  "total": 2,
  "p": 1,
  "ps": 100,
  "paging": {
    "pageIndex": 1,
    "pageSize": 100,
    "total": 2
  },
  "effortTotal": 5,
  "debtTotal": 5,
  "issues": [
    {
      "key": "AXdRUyCfxYDiaJy6JNW_",
      "rule": "javascript:S1117",
      "severity": "MAJOR",
      "component": "logicbomb-1_aws-codepipeline-demo:src/components/Root/Counter/Counter.js",
      "project": "logicbomb-1_aws-codepipeline-demo",
      "line": 38,
      "hash": "2293d372f10d104f6265ca91ff972892",
      "textRange": {
        "startLine": 38,
        "endLine": 38,
        "startOffset": 5,
        "endOffset": 12
      },
      "flows": [],
      "status": "OPEN",
      "message": "'counter' is already declared in the upper scope.",
      "effort": "5min",
      "debt": "5min",
      "tags": [],
      "creationDate": "2019-11-23T09:55:35+0100",
      "updateDate": "2021-01-30T04:25:24+0100",
      "type": "CODE_SMELL",
      "organization": "logicbomb-1"
    },
    {
      "key": "AXdRUyEGxYDiaJy6JNXA",
      "rule": "Web:S5254",
      "severity": "MAJOR",
      "component": "logicbomb-1_aws-codepipeline-demo:src/index.html",
```

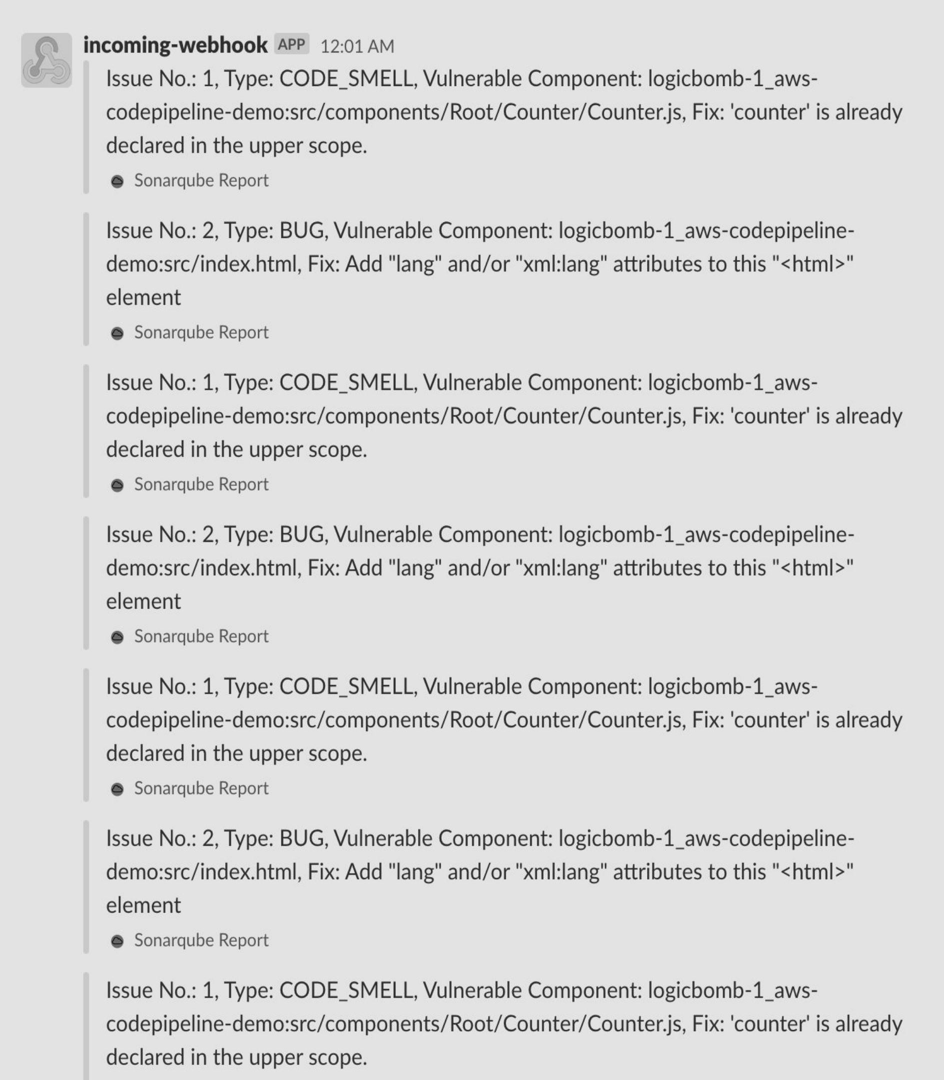
DAST Scanning Result

```
[Container] 2021/04/27 17:32:30 Phase context status code: COMMAND_EXECUTION_
quick-scan --self-contained --start-options '-config api.disablekey=true' htt
[Container] 2021/04/27 17:32:30 Entering phase POST_BUILD
[Container] 2021/04/27 17:32:30 Running command echo "DAST Results"
DAST Results

[Container] 2021/04/27 17:32:30 Running command cat result.txt
[INFO]           Starting ZAP daemon
[INFO]           Running a quick scan for http://testphp.vulnweb.com/
[INFO]           Issues found: 1
+--------------------------------+-------+---------+--------------------
-------------------------------------------------------+
| Alert                          | Risk  |  CWE ID | URL
|
+================================+=======+=========+====================
=======================================================+
| Cross Site Scripting (DOM Based) | High  |      79 | http://testphp.vulnw
)//%0D%0A%0d%0a//</stYle/</titLe/</teXtarEa/</scRipt/--!>\x3csVg/<sVg/oNloAd=
+--------------------------------+-------+---------+--------------------
-------------------------------------------------------+
[INFO]           Shutting down ZAP daemon

[Container] 2021/04/27 17:32:30 Running command echo Build completed
Build completed

[Container] 2021/04/27 17:32:30 Phase complete: POST_BUILD State: SUCCEEDED
[Container] 2021/04/27 17:32:30 Phase context status code:  Message:
```

Other Continuous code hacking capabilities:

1. **Reporting** — Sharing reports and status over slack and mailbox.
2. **Alerting** — Alerts for build success and failure.
3. **Vulnerability Management** — All findings are managed over AWS Security Hub.

Reporting Over Slack channels



Build Status Over Mailbox

AWS Codepipeline Security Notification Message

External | Inbox × | To-me × | To-respond ×

AWS Notifications

to me

{"account":"369737379577","detailType":"CodeBuild Build Phase Change","region":"ap-south-1","source":"aws.codebuild","time":"2021-04-
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47b7-bd50-dfd79b8fb492","completed-phase-context":"[]","additional-information":{"cache":{"type":"NO_CACHE"},"build-number":43.0,"tim
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image":"aws/codebuild/standard:5.0","privileged-mode":true,"image-pull-credentials-type":"CODEBUILD","compute-type":"BUILD_GENER
type":"PLAINTEXT","value":"logicbomb1"},{"name":"DOCKER_PASSWORD","type":"PLAINTEXT","value":"test1234567"}]},"project-file-sys
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AWS Notifications

to me

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mode":true,"image-pull-credentials-type":"CODEBUILD","compute-type":"BUILD_GENERAL1_SMALL","type":"LINUX_CONTAINER","envi
{"name":"DOCKER_PASSWORD","type":"PLAINTEXT","value":"test1234567"}]},"project-file-system-locations":[],"logs":{"deep-link":"https:/
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dfd79b8fb492"],"additionalAttributes":{}}

•••

AWS Notifications

to me

{"account":"369737379577","detailType":"CodeBuild Build Phase Change","region":"ap-south-1","source":"aws.codebuild","time":"2021-04-
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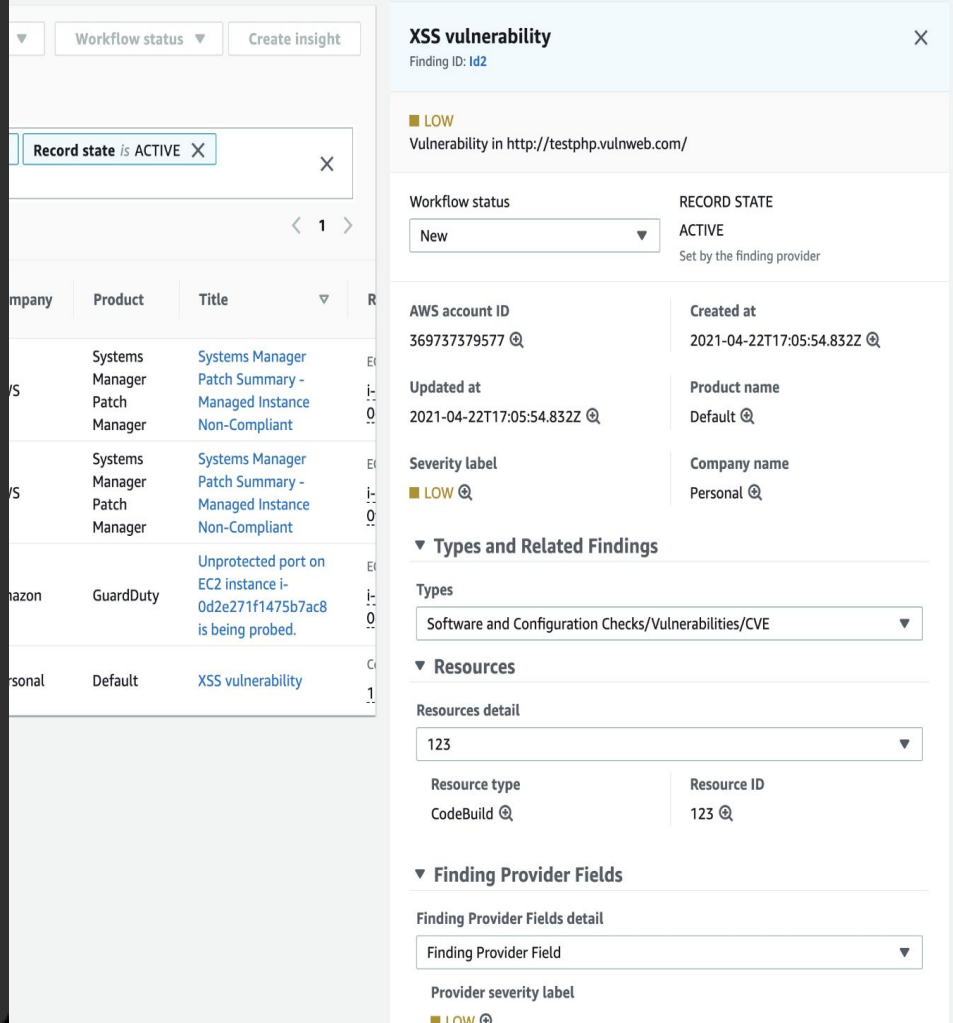
time":"Apr 27, 2021 5:30:20 PM","source":{"type":"CODEPIPELINE"},"source-version":"arn:aws:s3:::codepipeline-ap-south-1-3854717421
image":"aws/codebuild/standard:5.0","privileged-mode":true,"image-pull-credentials-type":"CODEBUILD","compute-type":"BUILD_GENER
type":"PLAINTEXT","value":"logicbomb1"},{"name":"DOCKER_PASSWORD","type":"PLAINTEXT","value":"test1234567"}]},"project-file-sys

Vulnerability Management Over AWS Security Hub



Benefits:

1. **Real time Checks** — Real time changes to the code triggers security checks
2. **Reporting** — Result and status can be shared across different communication channels.
3. **Highly Flexible** — Modularity with standardized interfaces.
4. **Completely Automated**— Automation is the key here.
5. **Vulnerability Management** — Manage vulnerabilities at single place.

SHORT DEMO


CodeBuild
EaseUS RecExperts

Thank You!

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