Lesson 09 Demo 04

Implementing OWASP ZAP DAST Scan in Jenkins Pipeline

Objective: To implement the ZAP DAST tool using Jenkins declarative pipeline to automate code scan using Jenkins build job

Tools required: Jenkins

Prerequisites: You need to have a Jenkins up and running.

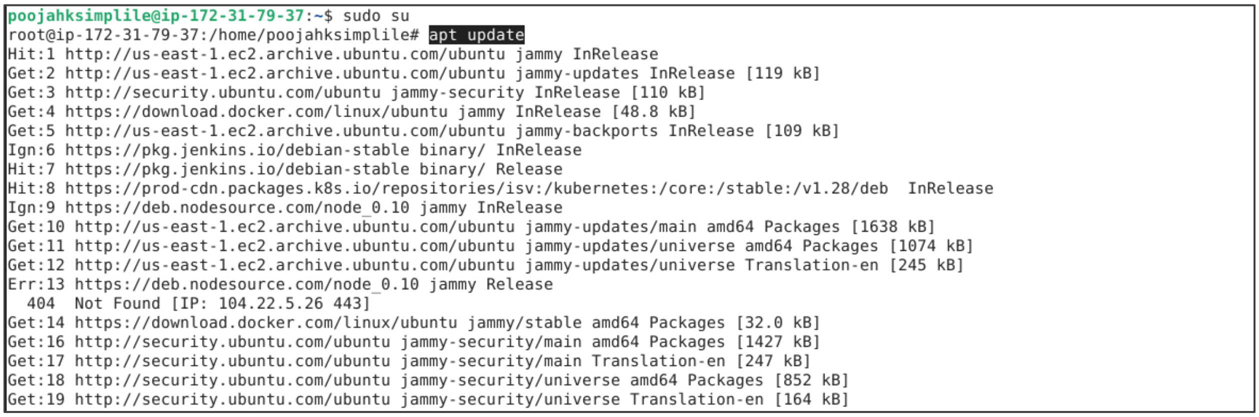
Steps to be followed:

1. Create a Jenkins pipeline job to integrate the vulnerability scan tool

Step 1: Create a Jenkins pipeline job to integrate the vulnerability scan tool

1.1 Open the terminal and execute the following commands to install container runtime and Docker tool to proceed with pipeline execution:

```
sudo su
apt update
apt install containerd docker.io
chmod 777 /var/run/docker.sock
service docker restart
```



```
poojahksimplile@ip-172-31-79-37:~$ sudo su
root@ip-172-31-79-37:/home/poojahksimplile# apt update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [119 kB]
Get:3 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:4 https://download.docker.com/linux/ubuntu jammy InRelease [48.8 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [109 kB]
Ign:6 https://pkg.jenkins.io/debian-stable binary/ InRelease
Hit:7 https://pkg.jenkins.io/debian-stable binary/ Release
Hit:8 https://prod-cdn.packages.k8s.io/repositories/isv:/kubernetes:/core:/stable:/v1.28/deb  InRelease
Ign:9 https://deb.nodesource.com/node_0.10 jammy InRelease
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1638 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1074 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe Translation-en [245 kB]
Err:13 https://deb.nodesource.com/node_0.10 jammy Release
  404  Not Found [IP: 104.22.5.26 443]
Get:14 https://download.docker.com/linux/ubuntu jammy/stable amd64 Packages [32.0 kB]
Get:16 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1427 kB]
Get:17 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [247 kB]
Get:18 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [852 kB]
Get:19 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [164 kB]
```

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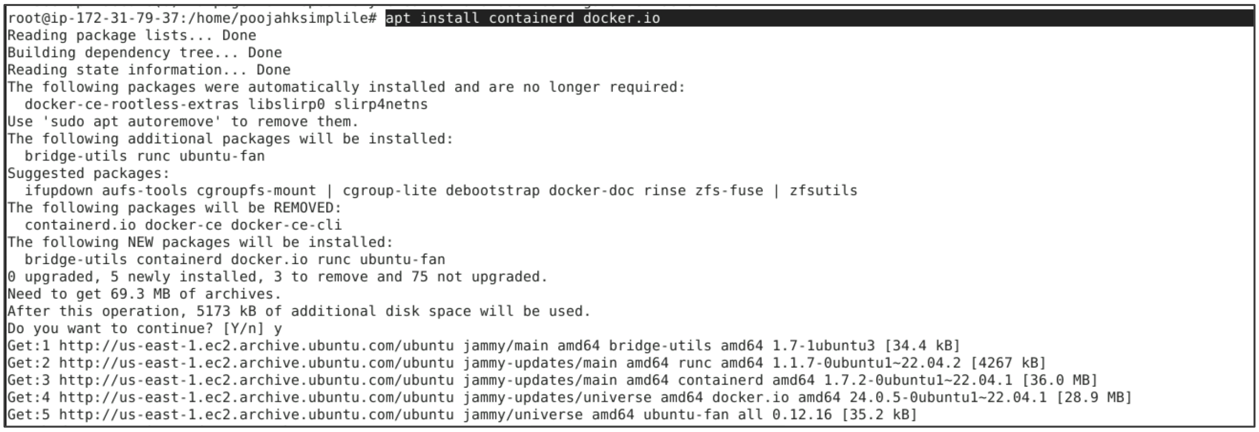
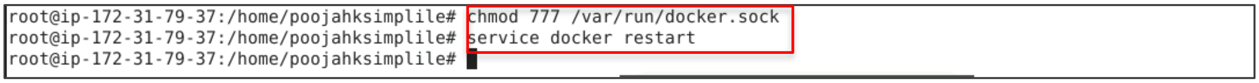
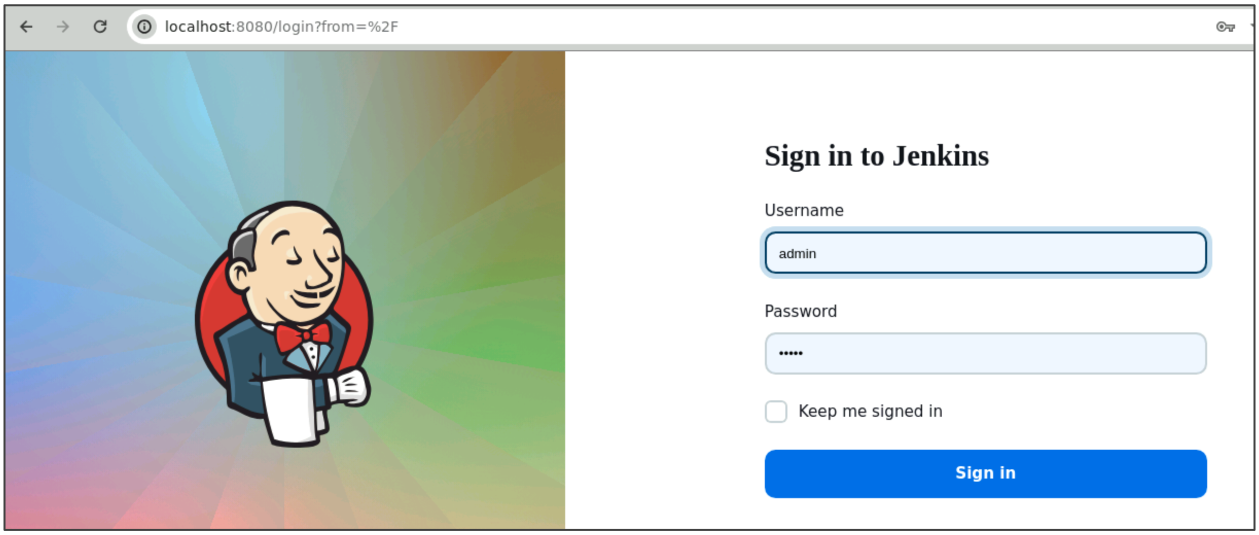


```
root@ip-172-31-79-37:/home/poojahksimplile# apt install containerd docker.io
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following packages were automatically installed and are no longer required:
  docker-ce-rootless-extras libslirp0 slirp4netns
Use 'sudo apt autoremove' to remove them.
The following additional packages will be installed:
  bridge-utils runc ubuntu-fan
Suggested packages:
  ifupdown aufs-tools cgroupfs-mount | cgroup-lite debootstrap docker-doc rinse zfs-fuse | zfsutils
The following packages will be REMOVED:
  containerd.io docker-ce docker-ce-cli
The following NEW packages will be installed:
  bridge-utils containerd docker.io runc ubuntu-fan
0 upgraded, 5 newly installed, 3 to remove and 75 not upgraded.
Need to get 69.3 MB of archives.
After this operation, 5173 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 bridge-utils amd64 1.7-1ubuntu3 [34.4 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 runc amd64 1.1.7-0ubuntu1~22.04.2 [4267 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 containerd amd64 1.7.2-0ubuntu1~22.04.1 [36.0 MB]
Get:4 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 docker.io amd64 24.0.5-0ubuntu1~22.04.1 [28.9 MB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 ubuntu-fan all 0.12.16 [35.2 kB]
```



```
root@ip-172-31-79-37:/home/poojahksimplile# chmod 777 /var/run/docker.sock
root@ip-172-31-79-37:/home/poojahksimplile# service docker restart
root@ip-172-31-79-37:/home/poojahksimplile# 
```

1.2 Log in to **Jenkins** using your credentials



localhost:8080/login?from=%2F

Sign in to Jenkins

Username

admin

Password

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Note: The credentials for accessing Jenkins in the lab are Username: **admin** and Password: **admin**.

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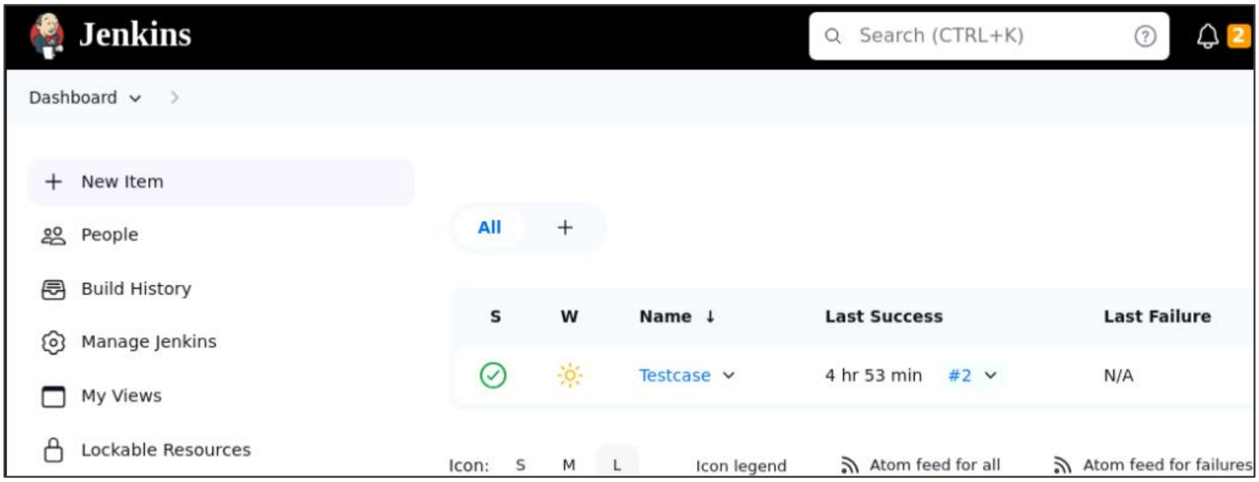
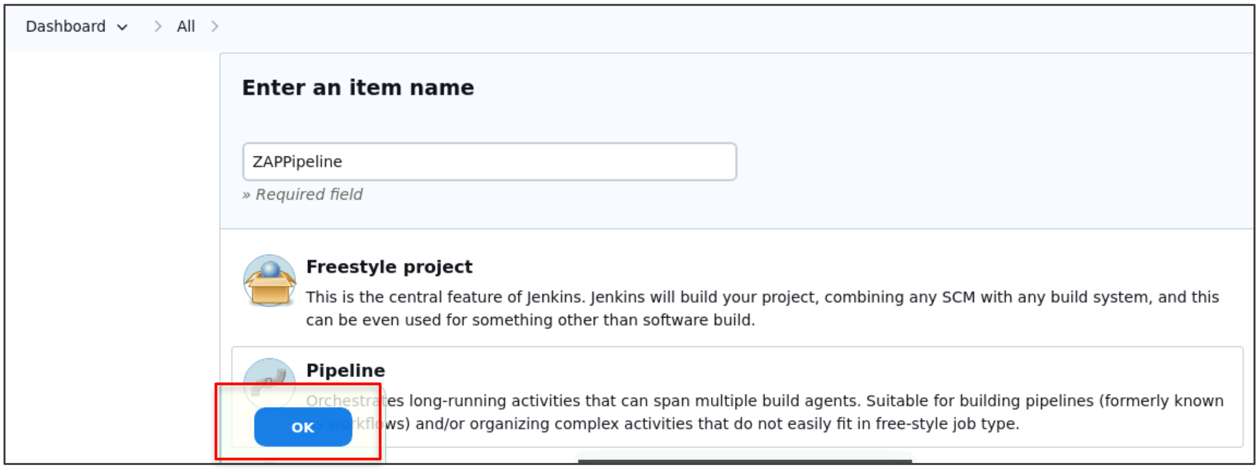
1.3 In the Jenkins dashboard, click on **New Item**



S	W	Name ↓	Last Success	Last Failure
✓	☀	Testcase	4 hr 53 min #2	N/A

1.4 Create a Jenkins pipeline job, click on **Pipeline**, put **ZAPPipeline** under **Enter an item name**, and then click on **OK**



Enter an item name

ZAPPipeline

» Required field

Freestyle project

This is the central feature of Jenkins. Jenkins will build your project, combining any SCM with any build system, and this can be even used for something other than software build.

Pipeline

Orchestrates long-running activities that can span multiple build agents. Suitable for building pipelines (formerly known as workflows) and/or organizing complex activities that do not easily fit in free-style job type.

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1.5 In the **Configure** page, click on **Pipeline** and paste the following code under Script and then click on **Save**:

```
def scan_type
def target
 pipeline {
  agent any
environment {
  zapDockerName = "ghcr.io/zaproxy/zaproxy:stable"
}
  parameters {
    choice  choices: ['Baseline', 'APIS', 'Full'],
        description: 'Type of scan that is going to perform inside the container',
        name: 'SCAN_TYPE'

    string defaultValue: 'https://medium.com/',
        description: 'Target URL to scan',
        name: 'TARGET'

    booleanParam defaultValue: true,
        description: 'Parameter to know if wanna generate report.',
        name: 'GENERATE_REPORT'
  }
  stages {
    stage('Parameter Initialization') {
      steps {
        script {
          echo """
        The current parameters are:
          Scan Type: ${params.SCAN_TYPE}
          Target: ${params.TARGET}
          Generate report: ${params.GENERATE_REPORT}
        """
    }
  }
}
stage('Setting up OWASP ZAP docker container') {
  steps {
    echo 'Pulling up last OWASP ZAP container --> Start'
    sh "docker pull ${zapDockerName}"
    echo 'Pulling up last VMS container --> End'
    echo 'Starting container --> Start'
    sh "docker run -dt --name owasp ${zapDockerName} /bin/bash "
  }
}
stage('Prepare wrk directory') {
  when {
    environment name : 'GENERATE_REPORT', value: 'true'
  }
  steps {
    script {
      sh '''
          docker exec owasp \
          mkdir /zap/wrk
        '''
        }
    }
}
stage('Scanning target on owasp container') {
    steps {
        script {
            scan_type = "${params.SCAN_TYPE}"
            echo "----> scan_type: $scan_type"
            target = "${params.TARGET}"
            if (scan_type == 'Baseline') {
                sh """
                     docker exec owasp \
                     zap-baseline.py \
                     -t $target \
                     -r report.html \
                     -I
                 """
            }
             else if (scan_type == 'APIS') {
                sh """
                     docker exec owasp \
                     zap-api-scan.py \
                     -t $target \
                     -r report.html \
                     -I
                 """
             }
        else if (scan_type == 'Full') {
          sh """
            docker exec owasp \
            zap-full-scan.py \
            -t $target \
            -r report.html \
            -I
          """
        }
        else {
          echo 'Something went wrong...'
        }
      }
    }
  }
  stage('Copy Report to Workspace') {
    steps {
      script {
        sh '''
          docker cp owasp:/zap/wrk/report.html ${WORKSPACE}/report.html
        '''
      }
    }
  }
}
post {
  always {
```

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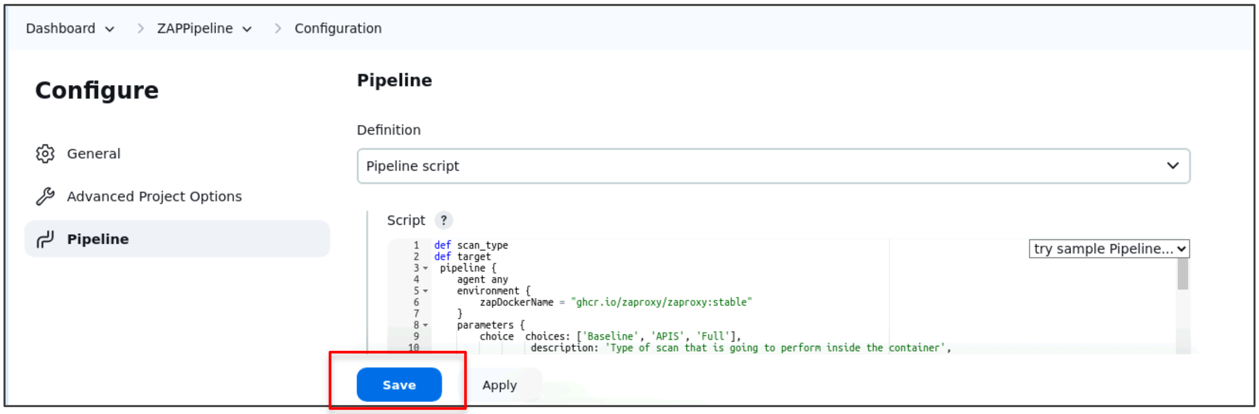
```
                echo 'Removing container'
                sh '''
                    docker stop owasp
                    docker rm owasp
                  '''
                        archiveArtifacts 'target/*.jar'
                cleanWs()
            }
          }
        }
```



Pipeline

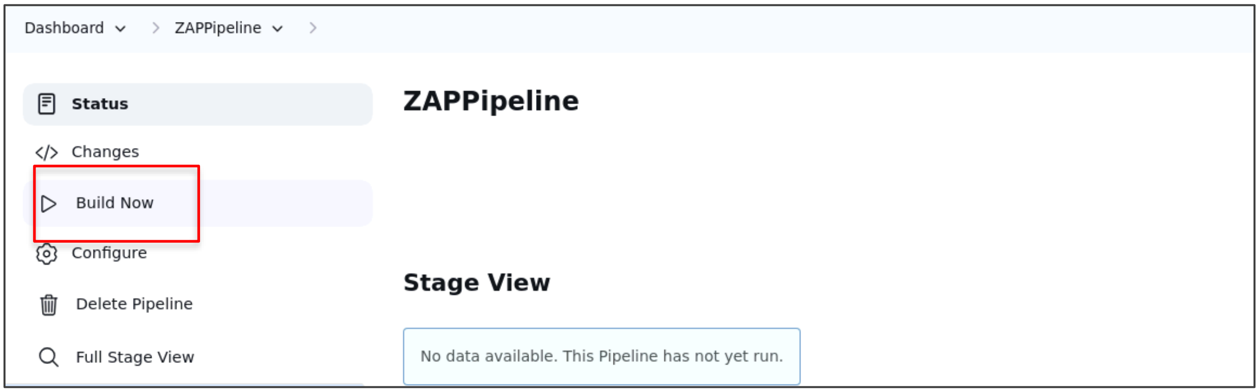
Definition

Pipeline script

Script

```
def scan_type
def target
 pipeline {
    agent any
    environment {
        zapDockerName = "ghcr.io/zaproxy/zaproxy:stable"
    }
    parameters {
        choice  choices: ['Baseline', 'APIS', 'Full'],
                 description: 'Type of scan that is going to perform inside the container',
```

1.6 Now, click on **Build Now**



ZAPPipeline

Stage View

No data available. This Pipeline has not yet run.

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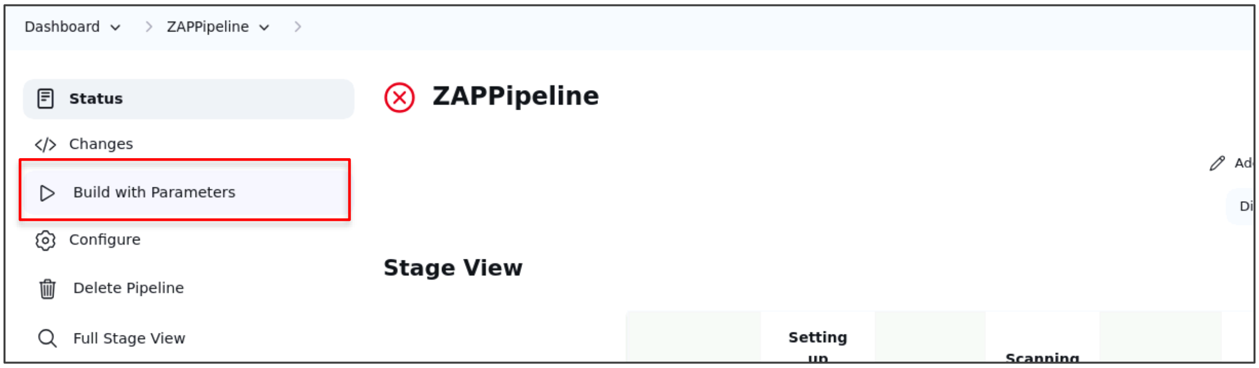
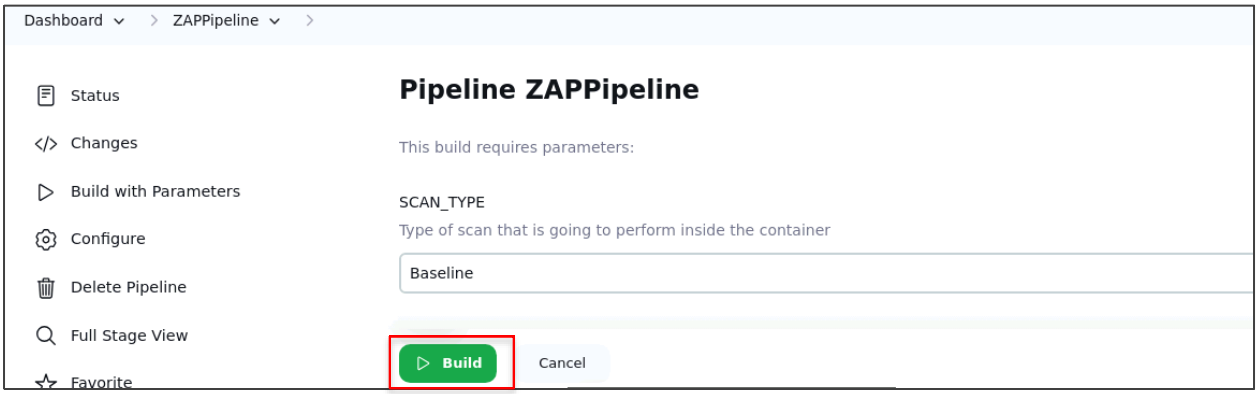
1.7 Initially, the pipeline will fail because it is a parameterized build. Then, **Build with Parameters** option appears. Click on it to initiate the pipeline with the provided parameters and click on **Build**.



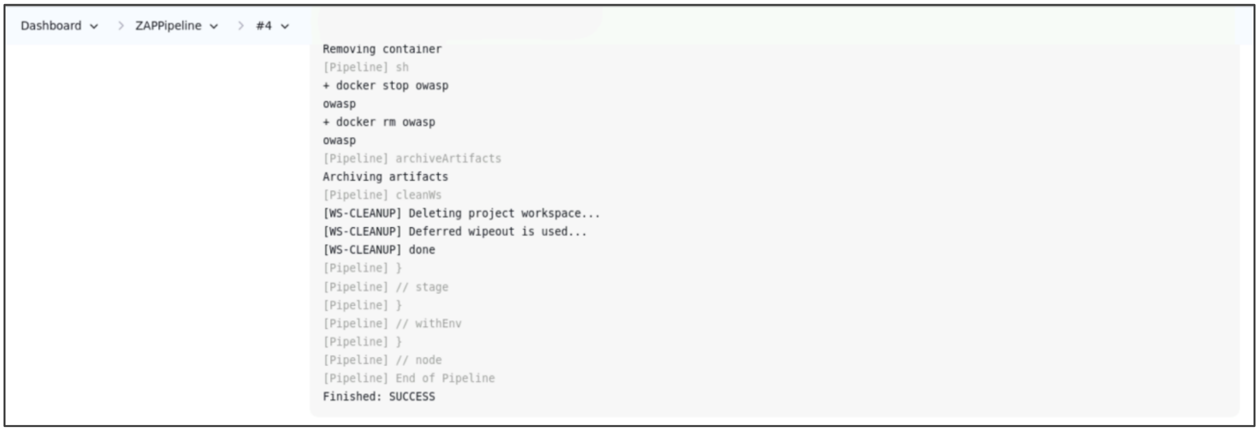


This build requires parameters:

SCAN_TYPE

Type of scan that is going to perform inside the container

Baseline



```
Removing container
[Pipeline] sh
+ docker stop owasp
owasp
+ docker rm owasp
owasp
[Pipeline] archiveArtifacts
Archiving artifacts
[Pipeline] cleanWs
[WS-CLEANUP] Deleting project workspace...
[WS-CLEANUP] Deferred wipeout is used...
[WS-CLEANUP] done
[Pipeline] }
[Pipeline] // stage
[Pipeline] }
[Pipeline] // withEnv
[Pipeline] }
[Pipeline] // node
[Pipeline] End of Pipeline
Finished: SUCCESS
```

You can see the build is successful.

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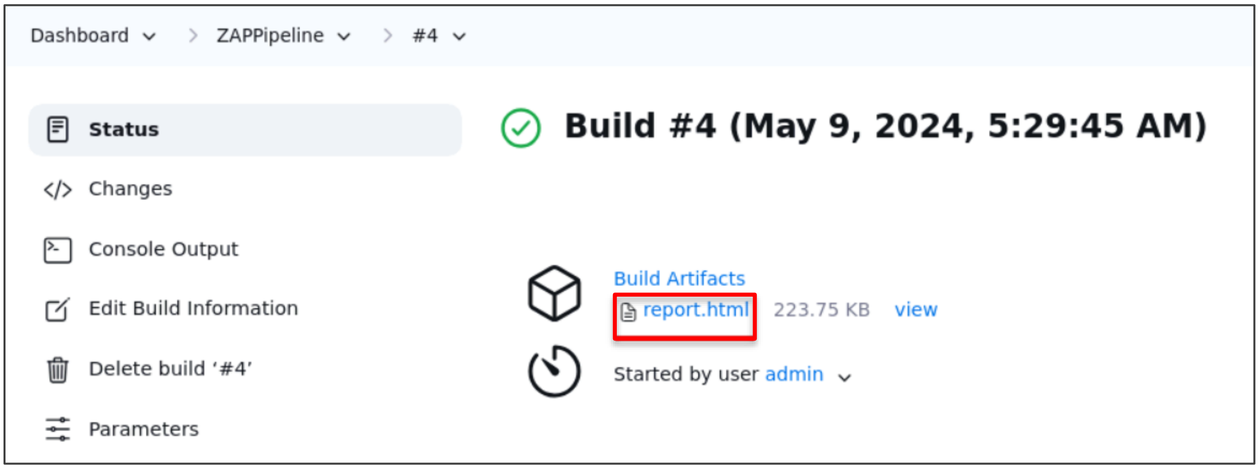
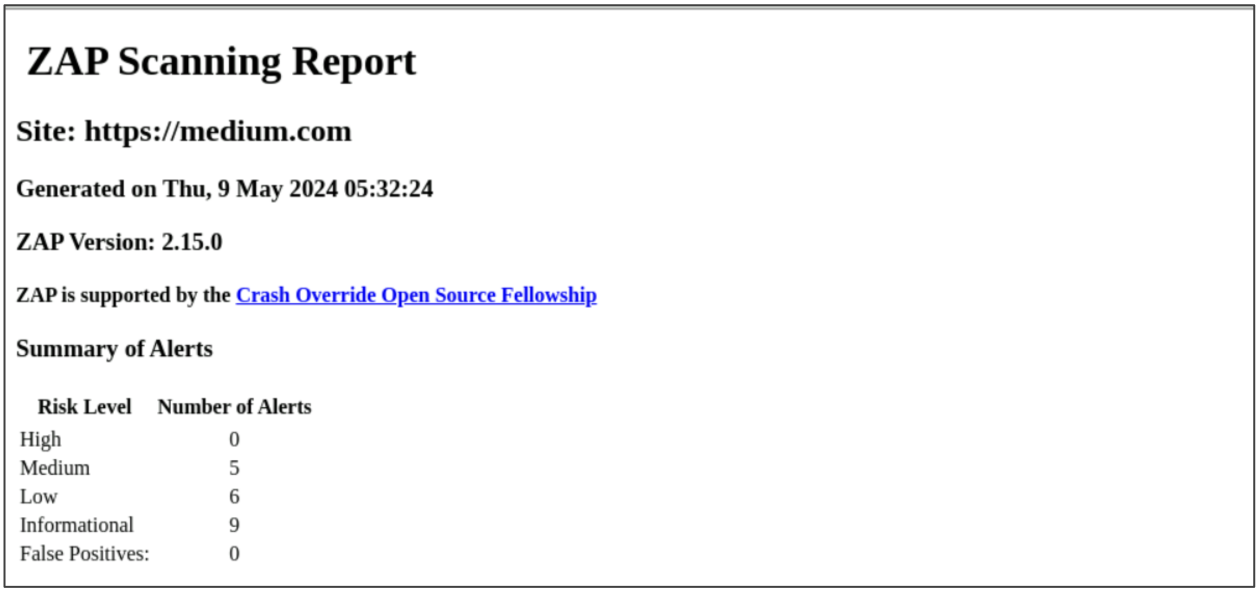
1.8 Navigate back to the **Status** of the build and click on **report.html** to see the HTML report archived in Jenkins



Build #4 (May 9, 2024, 5:29:45 AM)

Started by user admin



ZAP Scanning Report

Site: https://medium.com

Generated on Thu, 9 May 2024 05:32:24

ZAP Version: 2.15.0

ZAP is supported by the Crash Override Open Source Fellowship

Summary of Alerts

Risk Level	Number of Alerts
High	0
Medium	5
Low	6
Informational	9
False Positives:	0

You can see the HTML report.

By following these steps, you have successfully implemented the ZAP DAST tool using Jenkins declarative pipeline to automate code scan using Jenkins build job.