Secure DevOps: Application Security Principles and Practices

WorkshopPLUS

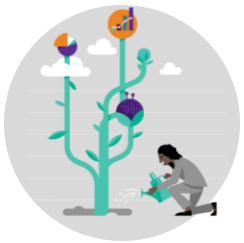
Duration: 2 Day | **Focus Area:** Security and Compliance | **Level**: 300

Secure DevOps: Application Security Principles and Practices is a two-day workshop that focuses on concepts, methodologies, and workflows that have been proven to yield more secure code. In this class, we discuss practices adopted at Microsoft (and other companies) that have facilitated improvements in application security. This workshop takes a hands-on approach to implementing secure design, secure verification, and secure implementation techniques to produce more secure software. Target audience are individuals in a technical role who are involved in building, architecting, testing, and designing secure software. People who manage software development teams and software development processes will also find much of the Security Development Lifecycle and Secure DevOps content helpful. This workshop also has a an optional 1-day add-on that discuss the OWASP Top 10.

OUTCOMES

Skills

Participants will gain essential knowledge that will aid in designing and developing secure software and improve testing for security. They will also understand top security vulnerabilities and how to protect against them.



Best Practices

The knowledge gained in this workshop will help participants understand application security and integrate security into the DevOps pipeline.

Way Forward

Apply proven code security patterns to your development pipeline to help you build more secure applications.

PREREQUISITES

Participants that have existing experience with employing software development processes will receive the most value from this course.

Recommended Qualifications

- Web application development experience preferred but not required
- Familiarity with a development process (Agile, Scrum, CMMI, Waterfall)
- Have a general understanding of your build, test, and deployment activities

Hardware Requirements

- An Intel Core-i5-based PC
- 4 GB RAM
- 128 GB HDD
- Windows 7 SP1 or later
- Office 2013 Professional Plus
- Internet access with at least 1 Mbps bandwidth per student

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AGENDA

Duration: 2 days
Secure DevOps: Application Security Principles and Practices

START

DAY 1

- *Module 1: Evolution to Secure DevOps*
- *Module 1: Lab*
- *Module 2: Secure DevOps Principles and Practices*
- *Module 3: Application Security Principles*
- *Module 3: Lab*
- *Module 4: Automating a Secure and Compliant Pipeline*
- *Module 4: Lab*

DAY 2

- *Module 5: Threat Modeling Concepts*
- *Module 5: Lab*
- *Module 6: Policies and Standards*
- *Module 7: Intro to Red and Blue Teams*
- *Module 8 Manual Security Verification*
- *Module 9: Live Site Operations*
- *Module 9: Lab*
- *Module 11: Summary and Closing*

End

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Module 1: Evolution to Secure DevOps

Lesson 1: Threat Landscape

- Credential theft
- Exploiting common and know vulnerabilities
- Compromising workstations and code

Lesson 2: Privacy and Compliance

- Data Classification
- Privacy
- Compliance
- Risk Management

Lesson 3: Microsoft's History with App Security

- Trust Worthy Computing and SDL

Lesson 4: Software Development Evolution

- Evolution of Waterfall to Agile to DevOps
- Why DevOps?
- Security challenges with DevOps practices and tools

Lesson 5: Secure DevOps Culture and Mindset Shift

- Delivering security at DevOps speeds
- Assume Breach versus Prevent Breach
- Think like a hacker

Module 2: Secure DevOps Principles and Practices

Lesson 1: Secure DevOps Principles

- Software Compliance and Governance
- Shift left and automate
- Secure the pipeline
- No false positives
- Continuous monitoring and learning

Lesson 2: Secure DevOps Practices

Assume Breach

- Red/Blue teaming
- Monitoring and Learning
- Live site penetration testing
- Block lateral movement

Prevent Breach

- Threat Modeling
- SAST
- DAST
- Stay up-to-date
- Code Reviews
- Secret management
- Secure and compliant pipeline
- Software Composition Analysis and Governance

Module 2: Secure DevOps Principles and Practices cont.

Lesson 3: Practices Alignment

- Waterfall SDL
- ISO 27034
- FedRAMP SAF
- Agile
- Establishing security requirements

Lesson 4: Organizational Considerations

- Executive Sponsorship
- Roles and responsibilities

Lesson 5: Supporting SDL Practices

- Training
- Define Security Requirements
- Define KPIs
- Incident Response Plan

Module 3: Application Security Principles

Lesson 1: Secure Application Basic Concepts

- Authentication and Authorization
- Proper handling of assets
- Input validation and handling
- Logging and auditing

Lesson 2: Understanding Organizational Threats

- Core pillars of information security
- Security effectiveness
- High Value Assets
- Threat Types

Lesson 3: Secure by Design

- Defense in depth
- Secure defaults
- Least privileged
- Attack surface minimization
- Working with services
- Avoiding security by obscurity

Module 4: Automating a Secure and Compliant Pipeline

Lesson 1: Automated Security Verification

- Static Application Security Testing (SAST)
- Dynamic Application Security Testing (DAST)
- Interactive Application Security Testing (IAST)

Lesson 2: Managing Secrets

- Keep Creds Safe
- Automate Credential Scanning
- Do not Expose Secrets in Transit

Lesson 3: Securing automated deployments

- PAWs
- Approvals
- Pipelines
- Pipeline identities
- Container Security

Module 5: Threat Modeling Concepts

Lesson 1: What is Threat Modeling

- Understand the basics of threat modeling
- Introduction to STRIDE

Lesson 2: Threat Modeling Process

- Utilize STRIDE to evaluate threat types
- Overview of elements of a threat model
- Threat model walkthrough
- Mitigation techniques

Lesson 3: Threat Modeling Tool

- Overview of the Threat Modeling Tool
- TMT usage and techniques
- Analyzing the output of the tool

Module 6: Policy and Standards

Lesson 1: Establishing Secure Standards

- OWASP Top 10
- SDL Practices to find Issues
- Internal Security Standards Policies
- Use of End-to-End Practices
- Cryptographic Standards
- Tool and Programming Standards
- Open Source Policy
- Handling Security Issues

Lesson 2: Understanding Compliance

- Compliance Programs
- Azure Compliance
- Standards you should know
    - GDPR
    - HITRUST
    - HIPAA
    - FedRAMP
    - PCI DSS 3.2.1
    - Cloud Security Alliance CCM
    - FIPS 140-2
    - NIST 800-53
    - ISO 27034
    - SOC

Lesson 3: Threat Modeling for Compliance

- Using Threat Models to help drive compliance
- Using threat models to aid compliance

Module 7: Introduction to Red and Blue Teams

Lesson 1: Defining Red/Blue Team Activities

- Microsoft's journey with Red and Blue teams
- What we learned
- Best practices when establishing teams

Lesson 2: Kill Chain Analysis

- Recon
- Exploit
- Pivoting
- Act
- Persist
- Attack Path

Lesson 3: Attack Decomposition

- Understanding Impact
- Process the output
- Bug Bars
- Track, metric, and measure
- Threat Model Review
- TTP (Tactics, Techniques, and Procedures)

Lesson 4: Monitoring and risk management

- What's your monitoring story
- Security Incident Lifecycle
- Establishing Incident response plan
- Managing risk

Module 8: Manual Security Verification

Lesson 1: Requirements and Design Verification

- Establishing a checklist
- Secure Design Reviews
- Establishing the first Security Gate

Lesson 2: Development Phase

- Secure DevOps design reviews
- Manual Security Code Reviews
- Pen Testing
- Final Security Review

Module 9: Live Site Operations

Lesson 1: Continuous monitoring, alerting, logging

- Security Information and Event Management
- OWASP Security Logging Project
- Semantic Logging Application Block
- AppInsights
- Azure Monitor

Lesson 2: Threat Detection

- Understand your threat model
- Environment Configuration Analysis
- Behavioral threat detection
- Intrusion Analysis
- Understanding Alert Fatigue
- Agile Security Patching
- Incident Response Planning

OWASP Top 10 Add On

Overview of the OWASP Top 10

Each threat will be explained, and mitigation examples will be provided. The focus will be on .NET Core, and ASP.NET applications.

- A1:2017 – Injection
- A2:2017 - Broken Authentication
- A3:2017 - Sensitive Data Exposure
- A4:2017 - XML External Entities (XXE)
- A5:2017 - Broken Access Control
- A6:2017 - Security Misconfiguration
- A7:2017 - Cross-Site Scripting (XSS)
- A8:2017 - Insecure Deserialization
- A9:2017 - Using Components with Known Vulnerabilities
- A10:2017 - Insufficient Logging & Monitoring

NEXT STEPS: If you are interested in a session for your organization, contact your Microsoft Account Representative.

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