CHAPTER 10

Post-Engagement Activities

Old Episode
5.01

Episode 10.01 – Report Writing

Objective 4.1 Compare and contrast important components of written reports

PEN TEST REPORT

- Communicate findings AND recommendations
- Primary deliverable
- Only chance to make your points
- Digest of all activities and conclusions
  - Some conclusions are drawn during tests
  - Some result from post-test analysis

SAMPLES AND TEMPLATES

- http://www.pentest-standard.org/index.php/Reporting
- https://github.com/juliocesarfort/public-pentesting-reports
- https://www.offensive-security.com/reports/sample-penetration-testing-report.pdf
- http://www.niiconsulting.com/services/security-assessment/NII_Sample_PT_Report.pdf

TIPS FOR WRITING A REPORT

- Tell your story
- Know your audience(s)
  - Executive 1-page summary
  - Technical/management
  - Motivation – audit?
- Leave the reader with a call to action
  - Include steps to fix the issues
- Your report will be your voice after you leave

TIPS FOR WRITING A REPORT

- Try to answer any questions that may arise
  - What did you do?
  - Why did you make the choices you made?
  - What did you find, and how did your findings affect your conclusions?

TIPS FOR WRITING A REPORT

- After settling on format, you need data
- Mostly presentation and summary of data
- Collect data
  - Transform as needed into a common format
  - Don’t spend too much time on this, but try to harmonize data format
    - Use tools like MS Excel
  - Easier to read and analyze

COMMON SECTIONS

- Executive summary
  - 1 page max - High level summary
  - Targeted at executives – few details
  - State the test goals and general findings

COMMON SECTIONS

- Methodology
  - Your approach to the overall test activities
  - Tools and techniques
  - Why you did what you did
    - And why you didn’t do more

COMMON SECTIONS

- Findings and remediation
  - Ranked list (more details than Executive summary)
    - What you found (important findings first)
    - What you recommend the client does – provide options as appropriate

COMMON SECTIONS

- Metrics and measures
  - Details of what you found
  - How you assessed each finding
  - Risk rating - http://www.pentest-standard.org/index.php/Reporting
- Conclusion
  - Wrap up, summary, and call to action

BEST PRACTICES

- Risk appetite
  - Amount of risk client is willing to accept
  - Tone of the entire report is based on the company's appetite for risk
  - Risk appetite statement should appear in the report introduction

BEST PRACTICES

- Report storage
  - Reports should become part of the organization's document repository
  - Used as input for future pen tests and other assessments
  - Security policy should state how long reports are kept
- Report handling and disposition
  - Security policy should state how assessment reports are stored
  - At end of life, how are reports disposed of?

QUICK REVIEW

- The Pen Test report is your best opportunity to leave a lasting message
- Start writing your report early in the testing project
- Write to your audiences (executive vs. technical)
- Provide a definite "call to action" with remediation recommendations

Episode 10.02 - Important Components of Written Reports

Objective 4.1 Compare and contrast important components of written reports

SLATE

Clip: Roll 2 Clip 23

Chapter Name: 10 Post-Engagement Activities

Proposed Episode #: 10.02

Episode Name: Important Components of Written Reports

Date: 3/9/22

IMPORTANT COMPONENTS OF WRITTEN REPORTS

- Note taking
  - Do not rely on memory for any meetings or activities
  - Ongoing documentation during tests
  - Screenshots

IMPORTANT COMPONENTS OF WRITTEN REPORTS

- Common themes/root causes
  - Vulnerabilities
    - Use common vulnerability entries
  - Observations
    - Capture environment and any noticeable conditions
  - Lack of best practices
    - Document any procedures that deviate from well-known best practices

QUICK REVIEW

- Keep careful notes of all activities
- Include screenshots in notes
- Document recurring trends
- Note lack of best practices

Old Episode
5.03

Episode 10.03 - Mitigation Strategies

Objective 4.2 Given a scenario, analyze the findings and recommend the appropriate remediation within a report

RECOMMENDED MITIGATION STRATEGIES

- Nearly every pen test will discover multiple vulnerabilities
- A pen test report should contain recommendations to mitigate each vulnerability
- Solutions vary, depending on the vulnerability

MITIGATION STRATEGY CATEGORIES

- People – behavior changes
  - Social engineering
  - Passwords
- Process – how things are done
  - Backup media handling
  - ID management
- Technology
  - Controls based on hardware and/or software

COMMON FINDINGS

- Shared local administrator credentials
  - Randomize credentials/LAPS
- Weak password complexity
  - Minimum password requirements/password filters
- Plain text passwords
  - Encrypt the passwords

COMMON FINDINGS

- No multifactor authentication
  - Implement multifactor authentication
- SQL injection
  - Sanitize user input/parameterize queries
- Unnecessary open services
  - Disable or remove unneeded services (system hardening)

QUICK REVIEW

- Recommend mitigation activities for each identified vulnerability
- Suggest different classes of mitigations (technical, administrative, etc.)
- Know common findings and mitigations for the PenTest+ exam

New Episode

Episode 10.04 – Technical and Physical Controls

Objective 4.2 Given a scenario, analyze the findings and recommend the appropriate remediation within a report

SLATE

Clip: Roll 2 Clip 24

Chapter Name: 10 Post-Engagement Activities

Proposed Episode #: 10.04

Episode Name: Technical and Physical Controls

Date: 3/9/22

TECHNICAL CONTROL RECOMMENDATIONS

- Process-level remediation
  - Recommend procedure changes to increase security
- Patch management
  - Plan, test, execute, and manage recurring patch activity
- Key rotation
  - Document key rotation cycles and validate that procedures are followed

TECHNICAL CONTROL RECOMMENDATIONS

- Certificate management
  - Ensure that certificates a managed properly and securely
- Secrets management solution
  - Document how IP and other sensitive data is handled and managed
- Network segmentation
  - Review network segmentation policy and procedures for validating compliance

PHYSICAL CONTROL RECOMMENDATIONS

- Access control vestibule
  - Inner and outer doors
  - Allows personnel or automated controls to determine authorization prior to opening inner door
  - Organization can help separate subjects during authorization

PHYSICAL CONTROL RECOMMENDATIONS

- Biometric controls
  - What you are or what you do
  - Characteristics associated with the subject
  - Harder to spoof
  - Lower requirements

PHYSICAL CONTROL RECOMMENDATIONS

- Video surveillance
  - Helps detect unusual behavior
  - Can provide valuable evidence during a post-incident investigation

QUICK REVIEW

- Recommend controls at multiple layers
- Technical controls rely on hardware, software, and settings
- Physical controls are things you can touch

New Episode

Episode 10.05 – Administrative and Operational Controls

Objective 4.2 Given a scenario, analyze the findings and recommend the appropriate remediation within a report

ADMINISTRATIVE CONTROL RECOMMENDATIONS

- Role-based access control
  - Define polices for determining roles and permissions required for each role
- Secure software development lifecycle
  - Implement SCM, SDLC, or other formal development lifecycle

ADMINISTRATIVE CONTROL RECOMMENDATIONS

- Minimum password requirements
  - Develop password policy based on best practices and organizational needs
  - Balance security and usability requirements
- Policies and procedures
  - Use best practices and popular security frameworks to validate that all necessary policies and procedures are in place

OPERATIONAL CONTROL RECOMMENDATIONS

- Job rotation
  - Helpful to identify personnel taking advantage of privilege
- Time-of-day restrictions
  - Limit resource and facility access to align with work duty hours

OPERATIONAL CONTROL RECOMMENDATIONS

- Mandatory vacations
  - Scheduled work activity pauses for audits
- User training
  - Ensure recurrent training on security awareness and procedures

QUICK REVIEW

- Administrative controls focus on policies and procedures
- Operational controls govern how day-to-day activities are managed

Old Episode
5.04

Episode 10.06 – Communication

Objective 4.3 Explain the importance of communication during the penetration testing process

IMPORTANCE OF COMMUNICATION

- Good communication is critical to the penetration test success
- Most penetration tests should be conducted openly
  - Unless discretion is a stated goal
- Cooperation is enhanced with communication

IMPORTANCE OF COMMUNICATION

- Who authorizes the project and provides funding?
  - Project sponsor
- Who should be contacted if unexpected consequences occur?
- Who will resolve conflicts?
- Who will provide required technical assistance?
- How will you escalate issues that are not resolved in a timely manner?

IMPORTANCE OF COMMUNICATION

- Communication timing and frequency
- Communication triggers
  - Critical findings – something that really can't wait
  - Stages – moving from one phase to another
  - Indicators of prior compromise – finding evidence that an attacker has already been here
  - Other defined milestones or events
    - Periodic reports
    - Critical tests started/completed
    - Obstacles put in place/removed (i.e. affect on operations)

REASONS FOR COMMUNICATION

- Situational awareness
  - Most common recurring reason
- De-escalation
  - Information or action is needed to reduce critical risk
- De-confliction
  - Resolve conflict of any type
    - Pen test team vs. operations/users
    - Pen test team vs. service provider
    - Pen test team vs. management

REASONS FOR COMMUNICATION

- Goal reprioritization
  - Changes to pen testing plan
    - Unexpected impact
    - Unexpected findings
    - Organizational changes – management change, merger, acquisition
    - Conflict with team, management, resources, etc.
- All changes must follow change procedures

QUICK REVIEW

- Good communication is critical to pen test project success
- Managing communication expectations, including frequency, reduces conflict
- Define triggers that initiate communication

New Episode

Episode 10.07 - Presentation of Findings

Objective 4.3 Explain the importance of communication during the penetration testing process

PRESENTATION OF FINDINGS

- Executive
  - High-level bullet points
  - Align every point with a strategic objective
  - Use business language, not technical

PRESENTATION OF FINDINGS

- Management
  - Focus on high-level goals to satisfy business objectives
  - Align technical recommendations with business goals

PRESENTATION OF FINDINGS

- Technical
  - Summary section focuses on actions to implement
  - Details section provides lots of technical info to carry out recommended actions

QUICK REVIEW

- Change your presentation based on the audience
- Executives only want to see summaries and how findings impact the business
- Management needs more details, but still at a high level
- Technical presentations should include details

Old Episode
5.02

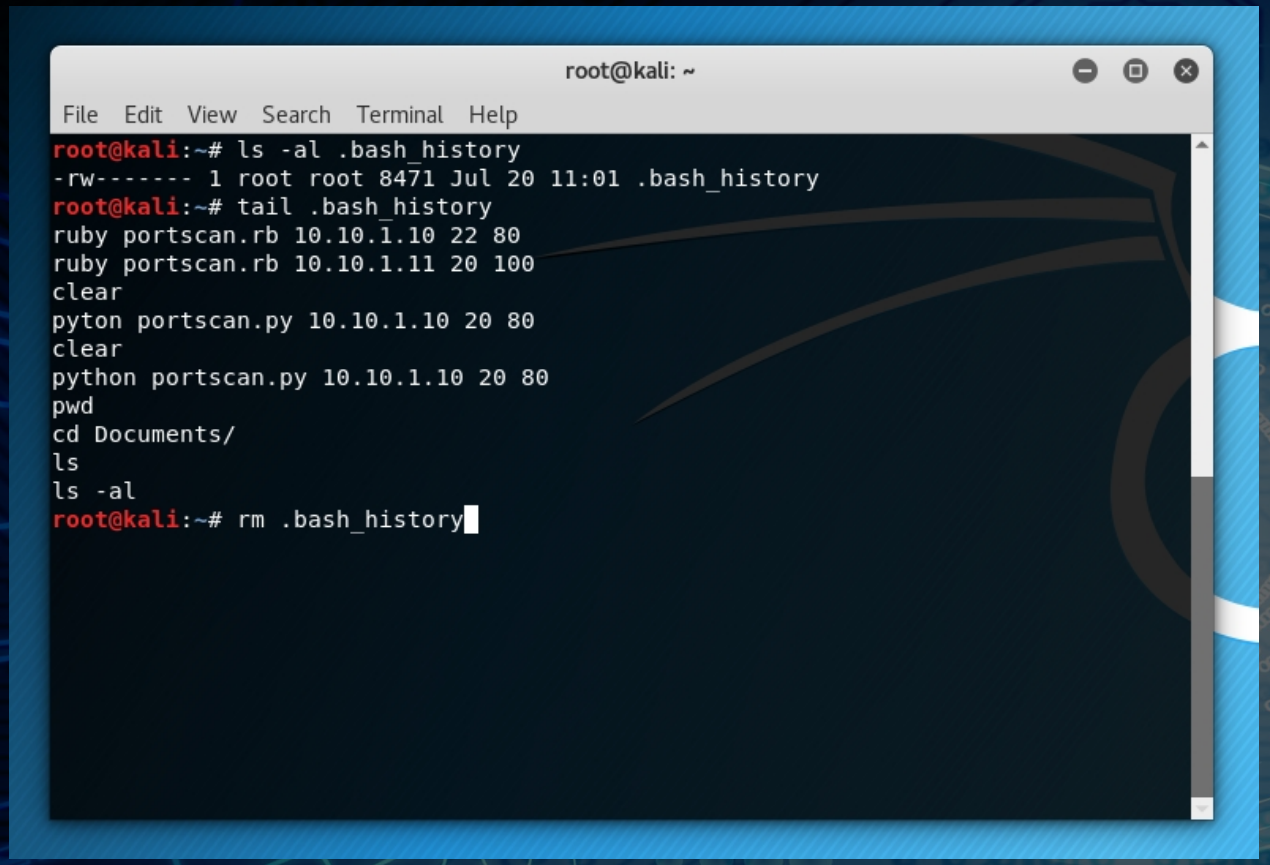
Episode 10.08 - Post-Report Activities

Objective 4.4 Explain post-report delivery activities

POST-REPORT DELIVERY ACTIVITIES

- Delivering the report isn’t the end
  - There is more work to do
  - Delivering may include presenting the report

POST-REPORT DELIVERY ACTIVITIES



This maps to the "clean up history" bullet point, as he talks about cleaning up bash history in linux. The "rm .bash_history" is the command to clean up, point that out with an arrow and text or something.

- Post-report delivery activities – clean up any changes you made
  - Removing all of these
    - Shells
    - Tester-created credentials
    - Tools
  - Clean up history
  - Leaving artifacts can weaken the client

POST-REPORT DELIVERY ACTIVITIES

- Client acceptance
  - Formal cessation of project activities and acceptance of deliverable
  - The client formally says “You’re done.”
  - Client should sign an statement of acceptance
- Lessons learned
  - Crucial step in project closure
  - Helps to continuously improve

POST-REPORT DELIVERY ACTIVITIES

- Follow-up actions/retest
  - Client may need more actions based on findings
  - Be careful to avoid extending the project scope here without a change process
- Attestation of findings
  - Independent review and assurance of findings (i.e. third party)

QUICK REVIEW

- Remove all test activity artifacts
- Get formal client acceptance
- Conduct "lessons learned" sessions with client and capture the findings
- Follow up on client add-on requests

New Episode

Episode 10.09 - Data Destruction Process

Objective 4.4 Explain post-report delivery activities

DATA DESTRUCTION PROCESS

- Testing agreements should include destruction expectations
  - Follow and document adherence with expectations
- Identify what information collected is in scope
- Document procedures followed to dispose of covered data
- Provide all data to client in a secure manner and then dispose

QUICK REVIEW

- Pentests generate a lot of data
- Define the usable lifetime of all data
- Document procedures to dispose of the data
- Deliver pentest data securely and then delete it