This detailed walkthrough demonstrates the exploitation of the MS17-010 vulnerability (EternalBlue) on a Windows Server 2008 R2 target. The process covers reconnaissance, exploitation, privilege escalation, and post-exploitation activities, providing in-depth explanations and best practices at each step.

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1. Reconnaissance and Vulnerability Scanning

Objective: Identify open ports and vulnerabilities on the target.
Command Used:

```
bash
nmap --script smb-vuln-ms17-010 -p 445 192.168.37.135
```

Explanation:

- `nmap` is a network scanning tool used to discover hosts and services.
- The `--script smb-vuln-ms17-010` option runs a script specifically designed to check for the SMBv1 vulnerability (MS17-010) on port 445.
- The output confirms that port 445 is open and the host is vulnerable to MS17-010 (CVE-2017-0143), a critical remote code execution flaw in Microsoft SMBv1 servers[1].

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2. Exploitation: Gaining Remote Access

Objective: Exploit the SMB vulnerability to gain remote code execution.
Typical Exploit Used:
Metasploit's `exploit/windows/smb/ms17_010_eternalblue` module (not explicitly shown in the output, but inferred from the use of `meterpreter` shell).
Result:

- A Meterpreter session is established on the target, indicating successful exploitation.
- Meterpreter is a powerful payload that provides an interactive shell and post-exploitation capabilities[1].

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3. System Enumeration

Objective: Gather detailed information about the compromised system.
Command Used:

```
bash
meterpreter > shell
 systeminfo
```

Key Findings:

- Hostname: `VAGRANT-2008R2`
- OS: Microsoft Windows Server 2008 R2 Standard, Service Pack 1
- Architecture: x64-based PC
- Manufacturer: VMware, Inc. (indicates a virtual environment)
- Memory: 4GB RAM

- Domain: WORKGROUP
- Hotfixes: Only two installed (KB3134760, KB976902), indicating potential for further vulnerabilities[1].

Implications:
Understanding the system configuration helps tailor further attacks, identify privilege escalation vectors, and assess the environment for lateral movement.

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4. Post-Exploitation: Credential Dumping

Objective: Extract password hashes for local users.
Command Used:
```
bash
meterpreter > hashdump
```
Extracted Hashes:
- Administrator and multiple user accounts (e.g., anakin_skywalker, ben_kenobi, darth_vader, etc.)
- Example:
  `Administrator:500:aad3b435b51404eeaad3b435b51404ee:e02bc503339d51f71d913c245d35b50b:::`

Explanation:
- These are NTLM hashes, which can be cracked offline to reveal plaintext passwords or used in pass-the-hash attacks for lateral movement within the network[1].

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5. Privilege Escalation and Lateral Movement

Objective: Use obtained credentials to escalate privileges or access other systems.
Potential Actions:
- Crack NTLM hashes using tools like Hashcat or John the Ripper.
- Use cracked passwords or pass-the-hash techniques to authenticate as privileged users (e.g., Administrator).
- Access network shares, sensitive files, or pivot to other machines in the environment.

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6. System Navigation and Persistence

Objective: Explore the file system and maintain access.
Commands Used:
```
bash
cd C:/
ls
```

Explanation:

- `cd` changes directories, while `ls` lists files and folders.
- These commands allow the attacker to browse the file system, search for sensitive data, and potentially upload or execute additional payloads[1].

Security Recommendations

- **Patch Management:** Apply MS17-010 and all relevant security updates to eliminate this vulnerability.
- **Network Segmentation:** Restrict SMB access to only trusted hosts and networks.
- **Monitoring:** Implement intrusion detection systems to alert on unusual SMB traffic or exploitation attempts.
- **Credential Hygiene:** Use strong, unique passwords and enable multi-factor authentication where possible.

Summary Table: Attack Steps and Tools

Step	Tool/Command	Purpose	Output/Result
Reconnaissance	nmap --script smb-vuln-ms17-010	Identify vulnerable SMB service	Confirms MS17-010 vulnerability
Exploitation	Metasploit (implied)	Exploit SMBv1 to gain shell	Meterpreter session
Enumeration	systeminfo	Gather OS and system details	OS version, architecture, hotfixes
Credential Dumping	hashdump	Extract NTLM password hashes	User account hashes
Navigation	cd, ls	Browse file system	List files and directories

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Conclusion

This enhanced walkthrough demonstrates a full attack chain from initial reconnaissance to post-exploitation on a vulnerable Windows Server 2008 R2 system using the EternalBlue exploit. Each step is critical in understanding the attack surface and highlights the importance of timely patching and layered security defences.