



Draft Standard
MEF 162 Draft (R1)

**Security Service Edge Certification Test Cases and
Requirements**

September 2023

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1 List of Contributing Members

The following members of the MEF participated in the development of this document and have requested to be included in this list.

Editor Note 1: This list will be finalized before Letter Ballot. Any member that comments in at least one CfC is eligible to be included by opting in before the Letter Ballot is initiated. Note it is the MEF member that is listed here (typically a company or organization), not their individual representatives.

2 Abstract

Per Gartner, Security Service Edge (SSE) secures access to the web, cloud services, and private applications. Capabilities include access control, threat protection, data security, security monitoring, and acceptable-use control enforced by network-based and API-based integration. SSE is primarily delivered as a cloud-based service and may include on-premises or agent-based components.

The focus of this document is on the Test Cases and Requirements that are used to provide MEF Certification and Ratings. The certification of SSE implementation are seen as key for enterprise customers to have the knowledge about different offerings and solutions so that they can make informed decisions when purchasing SSE.

Note: MEF has no official SSE document but does describe many of the requirements for SSE in MEF 88 [8] and MEF 117 [10]. For the purposes of this document requirements are taken from those documents to be included in the SSE certification.

3 Release Notes

This document is the result of CfC #1 and is currently undergoing CfC #2. The contents of this document are subject to change based on the comments received as a part of CfC #2. In addition, there are several comments received as a part of CfC #1 that were resolved by postponing work on them until after the completion of Beta testing. These and two unresolved comments are shown in the following table.

| Release Note Topic | Section(s) Impacted | Comments |
|---|---------------------|---|
| Too much information public for Threat Actors | 7.2.2 | Is too much information being provided to Threat Actors |
| Apart from validating ciphers, I think it's important to cover some associated cases like OCSP Stapling, Session Ticket based resumption and Session renegotiation | 9 | Unresolved comment from CfC #1 |
| Additional Authentication methods to be added after completion of the Beta test. | 10.1 | |
| Logs should also contain flow logs on the actual data traffic. For example, when was a threat detected, which traffic Flow was it and so on. There is no mention of logs on the actual data traffic here. | 11.1 | Unresolved comment from CfC #1 |
| Additional SENS that cover other aspects of system availability and performance will be added after the beta testing is completed. | 11.2.1 | |
| The lists of evasions are updated as they are detected. The list of current evasions is provided to the SSE implementation Vendor prior to testing. | 13 | |
| The test methodology is still being discussed for rows that have a test methodology of Needs Test Methodology. Once finalized, the test methodology will be updated | 14 and 15 | These requirements are not included in MEF certification calculations |

Table 1 – Release Notes

4 Terminology and Abbreviations

This section defines the terms used in this document. In many cases, the normative definitions to terms are found in other documents. In these cases, the third column is used to provide the reference that is controlling, in other MEF or external documents.

In addition, terms defined in MEF 88 [8], MEF 117 [10], MEF 118 [11], and MEF W138 [12] are included in this document by reference and are not repeated in the table below.

| Term | Definition | Reference |
|---|--|------------------|
| Access Control | A security technique that regulates who or what can view or use resources in a computing environment. | This document |
| Anti-Malware | A type of software program created to protect information technology (IT) systems and individual computers from malicious software, or malware. | This document |
| Authentication | The process or action of verifying the identity of a user or process. | This document |
| Cloud Access | A method that provides access to cloud-based resources | This document |
| Cloud Access/Application Control | Controls users' access to specific Cloud applications | This document |
| Compressors | A method of reducing data file size | This document |
| Data Loss Prevention | A security solution that identifies and helps prevent unsafe or inappropriate sharing, transfer, or use of sensitive data. | This document |
| Data Protection | A set of strategies and processes you can use to secure the privacy, availability, and integrity of your data. | This document |
| Decryption | The transformation of data that has been encrypted and rendered unreadable back to its unencrypted form | This document |
| Digital Experience Monitoring | The ability to view application performance issues from a user experience vantage point, isolate service performance problems across the delivery chain, speed up root cause determination and resolution and optimize digital transactions and customer journeys. | This document |
| DNS Protection | The concept of protecting the DNS service as a whole, sometimes with an emphasis on security. | This document |
| Encryption | The process of protecting information or data by using mathematical models to scramble it in such a way that only the parties who have the key to unscramble it can access it. | This document |
| Encrypted Traffic Inspection | The process of checking encrypted traffic by using the same technique as an on-path attack on the network connection | This document |
| Evasions | Attacks in which the attacker aims to manipulate the input data to produce an error in the machine learning system. | This document |



| Term | Definition | Reference |
|---|---|------------------|
| Exploit | A piece of software, data or sequence of commands that takes advantage of a vulnerability to cause unintended behavior or to gain unauthorized access to sensitive data. | This document |
| Exploit Detection and Prevention | Detects program code that takes advantage of vulnerabilities on the computer to exploit administrator privileges or to perform malicious activities. | This document |
| Firewall as a Service | A firewall solution delivered as a cloud-based service | This document |
| HTML Obfuscation | A means to encrypt or hide strings of characters which are likely email addresses and other source code within the code page. | This document |
| Identity | The fact of being the same person or thing as claimed | This document |
| Malicious Traffic | Traffic that represents incoming requests or a suspicious file's attempt to connect to an untrusted resource. | This document |
| Packers | Software that unpacks itself in memory when the "packed file" is executed. | This document |
| Policy Enforcement | The process of ensuring that the security policies and procedures implemented by an organization are followed consistently by its employees, partners, and stakeholders. | This document |
| Sandbox Protection | A cybersecurity practice where you run code, observe and analyze and code in a safe, isolated environment on a network that mimics end-user operating environments. | This document |
| Security Service Edge | Secures access to the web, cloud services and private applications. | This document |
| Threat Prevention | The ability to block specific threats before they penetrate the environment or before they do damage. | This document |
| Traffic Onboarding Methods | | This document |
| Validation | Checking the accuracy and quality of source data before using, importing or otherwise processing data. | This document |
| Zero Trust | A security framework requiring all users, whether in or outside the organization's network, to be authenticated, authorized, and continuously validated for security configuration and posture before being granted or keeping access to applications and data. | This document |

Table 2 – Terminology

| Abbreviation | Definition | Reference |
|---------------------|--|------------------|
| CASB | Cloud Access Security Broker | |
| CI/CD | Continuous Integration/Continuous Delivery | |
| DLP | Data Loss Prevention | |

| Abbreviation | Definition | Reference |
|---------------------|---|------------------|
| FWaaS | Firewall as a Service | |
| IMAP | Internet Message Access Protocol | |
| IoT | Internet of Things | |
| MAPI | Messaging Application Programming Interface | |
| POP3 | Post Office Protocol | |
| SFTP | Secure File Transfer Protocol | |
| SIEM/XDR | Security Information and Event Management/Extended Detection Response | |
| SMTP | Simple Mail Transfer Protocol | |
| SSE | Security Service Edge | |
| SSL/TLS | Secure Sockets Layer/Transport Layer Security | |
| SWG | Secure Web Gateway | |

Table 3 – Abbreviations

5 Compliance Levels

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 (RFC 2119 [1], RFC 8174 [7]) when, and only when, they appear in all capitals, as shown here. All key words must be in bold text.

Items that are **REQUIRED** (contain the words **MUST** or **MUST NOT**) are labeled as [R_x] for required. Items that are **RECOMMENDED** (contain the words **SHOULD** or **SHOULD NOT**) are labeled as [D_x] for desirable. Items that are **OPTIONAL** (contain the words **MAY** or **OPTIONAL**) are labeled as [O_x] for optional.

Editor Note 3: The following paragraph will be deleted if no conditional requirements are used in the document.

A paragraph preceded by [CR_a]< specifies a conditional mandatory requirement that **MUST** be followed if the condition(s) following the "<" have been met. For example, "[CR1]<[D38]" indicates that Conditional Mandatory Requirement 1 must be followed if Desirable Requirement 38 has been met. A paragraph preceded by [CD_b]< specifies a Conditional Desirable Requirement that **SHOULD** be followed if the condition(s) following the "<" have been met. A paragraph preceded by [CO_c]< specifies a Conditional Optional Requirement that **MAY** be followed if the condition(s) following the "<" have been met.

6 Numerical Prefix Conventions

Editor Note 4: This section will be deleted if no numerical prefixes are used in the document.

This document uses the prefix notation to indicate multiplier values as shown in Table 4.

| Decimal | | Binary | |
|---------|------------------|--------|-----------------|
| Symbol | Value | Symbol | Value |
| k | 10 ³ | Ki | 2 ¹⁰ |
| M | 10 ⁶ | Mi | 2 ²⁰ |
| G | 10 ⁹ | Gi | 2 ³⁰ |
| T | 10 ¹² | Ti | 2 ⁴⁰ |
| P | 10 ¹⁵ | Pi | 2 ⁵⁰ |
| E | 10 ¹⁸ | Ei | 2 ⁶⁰ |
| Z | 10 ²¹ | Zi | 2 ⁷⁰ |
| Y | 10 ²⁴ | Yi | 2 ⁸⁰ |

Table 4 – Numerical Prefix Conventions

7 Introduction

Per Gartner, Security Service Edge (SSE) secures access for people, places and things to the web, cloud services, and private applications. Capabilities include access control, threat protection, data security, security monitoring, acceptable-use control enforced by network-based and API-based integration and Protecting Users, workloads and devices. SSE is primarily delivered as a cloud-based service and may include on-premises or agent-based components.

The focus of this document is on the Test Cases and Requirements that are used to provide MEF Certification and Ratings. The certification of SSE implementations is seen as key for enterprise customers to have the knowledge about different offerings and solutions so that they can make informed decisions when purchasing SSE.

The certification testing defined within this document is intended to provide a rating, from D (lowest) to AAA (highest). Ratings are determined based on the results of the test cases defined in this document. Examples of these test cases would include the types of consumers (users, IoT devices etc.), inspection capability options (SWG, DLP, Anti-Malware etc.), and aspects of performance (digital experience monitoring). Ratings are based on weighting that is applied to each section of the test requirements in this document. See section 16 for more details on the rating methodology for SSE implementation.

After the completion of testing an overall rating is provided. This overall rating of an SSE implementation can be used to compare different SSE Vendor's ability to meet the test requirements, and therefore the requirements of Service Providers and enterprise customers. In the same manner, Service Provider's offerings can be compared to determine how different offerings address the end customer's requirements.

In addition to providing an overall rating, a MEF Certification is provided. This MEF Certification is based on compliance with MEF standards that are tested using the test methodologies defined in sections 14 and 15.

The testing defined within this document is intended to be repeatable to cover new software releases, service configurations, and updates to the way an SSE implementation is managed. The use of Continuous Integration/Continuous Deployment (CI/CD) strategies for MEF certification is being defined in the same manner as in MEF W90.2 [9]. Repeating the certification conformance and ratings process allows ratings to increase or decrease based on the performance of an implementation or service during continued testing. If a new software release breaks a critical function, this can be identified during repeated certification testing and the rating adjusted accordingly. In the same way, if a new software release provides fixes for shortfalls identified in previous certification testing, the rating can be increased accordingly.

7.1 Security Service Edge

The convergence of cloud computing, omnipresent and ubiquitous high-speed Internet, and tools that enable remote mobile workforces are changing how modern enterprises operate. This new paradigm is driving the need for scalable, flexible security architectures. SSE solutions leverage the cloud's scalability, flexibility, and operational benefits to deliver security functions such as – Zero Trust enforced Access Control, Authentication and Identity, Data Loss Prevention (DLP), DNS Protocol Filtering (DPF), Encrypted Traffic Inspection (SSL/TLS), Exploit detection and

prevention, Malware Detection and Removal (MD+R), and Cloud Access/Application control (CASB).

This document has categorized these SSE capabilities into the following:

- **Traffic onboarding methods:** client and clientless / proxy-based connectivity and IPsec / edge connectivity options.
- **Authentication and posture controls** and options
- **Firewall as a Service:** Identity-based Access Control, segmentation, decryption (TLS/SSL), ZTNA (per MEF 88 [8]).
- **Threat Prevention:** Exploit and Malware Prevention, Evasions
- **Data Protection:** Data Loss Prevention, Cloud Access / Application control (CASB)
- **Additional policy-based controls for applications [Recommended]**
- **Digital Experience Monitoring**
- **External integrations (logging, SIEM / XDR support etc.) [Recommended]**

7.2 What will be tested?

The certification described in this document is designed to address the challenges faced by security and IT professionals in selecting and managing security products. The scope of the test methodologies in this document includes the following capabilities which are considered essential in any SSE offering:

- Test traffic onboarding methods
 - How traffic is onboarded
- Segmentation, Policy Enforcement and Access Control
 - How access is segmented, security policies are enforced, and how access to computing resources is controlled
- Decryption Validation and Bypass Exceptions
 - The decryption of traffic based on specific encryption methods and the ability to bypass decryption for certain traffic
- Threat Efficacy Testing
 - Testing to determine if threats can be detected
- Data Protection Validation
 - Ensuring that data can be encrypted, decrypted, and inspected
- Performance Impact, Redundancy & Monitoring Capabilities
 - The impact on the performance of a solution when the SSE implementation is stressed

Editor Note 5: Comments on the applicability of a test methodology to a specific SSE implementation are requested.

7.2.1 Test Configuration

The test configuration used to perform testing of SSE implementation is shown in Figure 1.

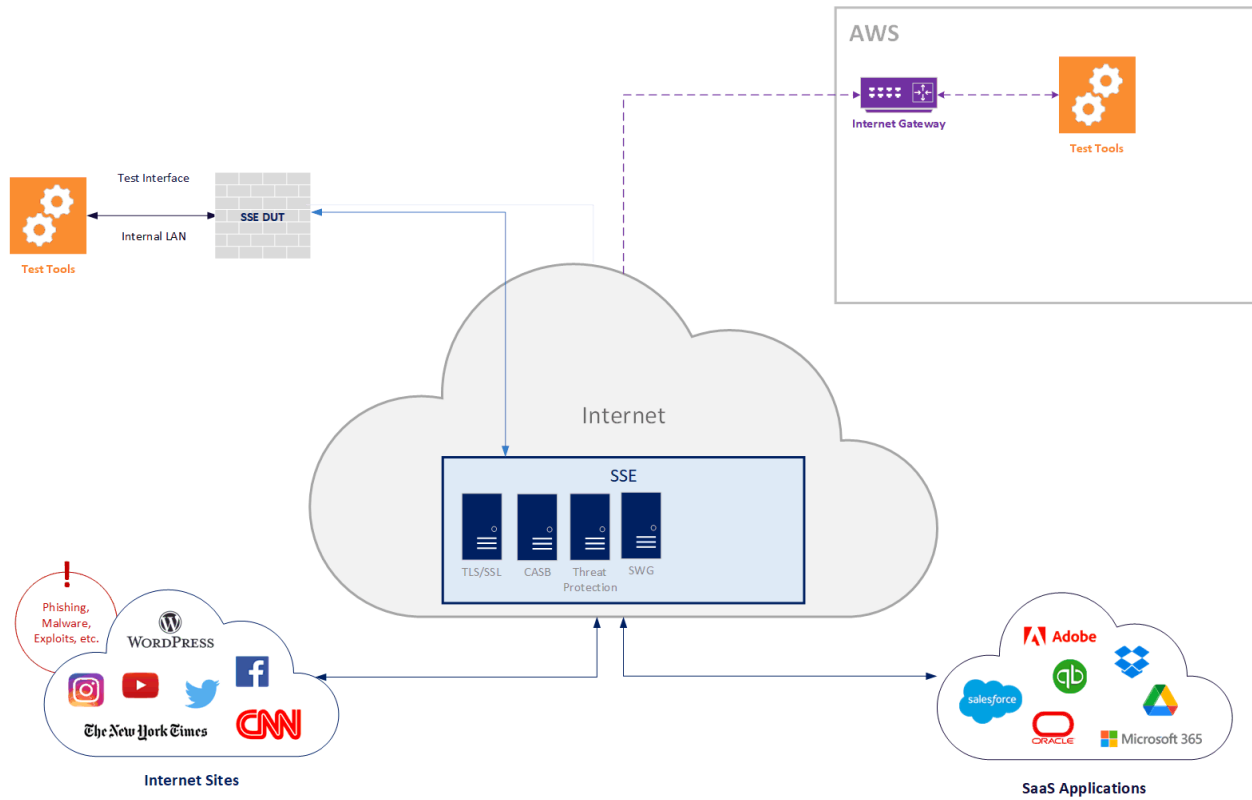


Figure 1 – Example Test Configuration for SSE

Figure 1 reflects the SSE functions within a single device that is providing security. The tests outlined in the remainder of this document use this basic configuration. The fact that security functions can be provided by different devices or cloud services is not reflected in the figure.

Note: There may be slight modifications to this test configuration for specific tests.

7.2.2 Testing Conventions

There are several conventions that are used for all test cases within this document. Every test case shows the Test Objective and Test Process to be used to perform the testing.

Where lists of protocols, evasions, applications, etc. are shown, this list is not intended to be a final list used for testing, instead, it provides samples of what will be tested. The test agreement contains the final list of what will be tested. This may include items that do not appear within this document.

Editor Note 6: The lists discussed above may be reduced in a future revision of this document so that Threat Actors cannot easily identify what is being tested or is not being tested. Your comments on this are requested.

8 Performance

The tests in this section measure the performance of a device using traffic scenarios that allow the inference of real-world performance. The SSE is the focus of this testing. Each test is performed concurrently without the SSE implementation to provide a baseline control. Results are reported both as measured, relative to the baseline, and in context with other measurable attributes and confounding variables.

There is no scoring penalty for any tests in section 8. These tests are performed to gather benchmarks for other tests in this document.

8.1 HTTP Traffic Analysis

The purpose of HTTP traffic analysis is to stress the detection engine in the SSE implementation to see how it copes with HTTP network loads of varying average packet size and varying connections per second. By creating session-based traffic with varying session lengths, the SSE implementation is forced to track valid TCP sessions, ensuring a higher workload than simple packet-based background traffic. The HTTP test traffic characteristics communicating directly over the Internet (i.e., no SSE implementation in the middle) are shown in Table 5.

| Connections per Second per Gigabit | HTML Response Size in Bytes | Total Response Size in Bytes |
|------------------------------------|-----------------------------|------------------------------|
| 1,000 | 115,570 | 129,738 |
| 2,000 | 57,388 | 64,824 |
| 4,000 | 28,048 | 32,136 |
| 8,000 | 13,512 | 15,920 |
| 16,000 | 6,353 | 7,916 |
| 32,000 | 2,667 | 3,903 |

Table 5 – HTTP Example Test Traffic Characteristics

8.1.1 HTTP Capacity (without transaction delays)

Test Objective: The purpose of these tests is to determine the performance delta for HTTP connections.

Test Process: Each transaction consists of a single HTTP GET request with no transaction delays (i.e., the web server responds immediately to all requests) with one TCP session being opened per session. All packets contain valid payloads. The tested Connections Per Second values are shown in Table 5.

- [R1]** The test **MUST** measure a benchmark for the number of HTTP connections per second per Gigabit that the SSE implementation supports.

Note: the measured benchmarks will be used in comparison to other measurements that are specified in this document.

8.1.2 HTTP Capacity (with transaction delays)

Test Objective: The purpose of these tests is to determine the performance delta for HTTP connections when introducing delays that more closely simulate actual activity. The ten second delay represents “looking time” for a web site by a user.

Test Process: Each transaction consists of a single HTTP GET request with delays (i.e., the web server responds immediately to all requests, but the client waits for 10 seconds before closing the connection). All packets contain valid payloads. The tested CPS values are shown in Table 5.

- [R2] The test **MUST** measure the number of HTTP connections per second per Gigabit with transaction delays present as described above that the SSE implementation supports.

8.2 HTTPS Traffic Analysis

The purpose of these tests is to determine the performance curve and identify potential bottlenecks. The HTTPS detection engine is stressed to see how the device copes with network loads of varying average packet size and varying connections per second. By creating session-based traffic with varying session lengths, the device is forced to track valid TCP sessions, ensuring a higher workload for simple packet-based background traffic. This provides a test environment that simulates real-world behavior.

| Protocol | Cipher Suite Description | Value | Frequency Ranking | Security Classification |
|----------|---------------------------------------|--------------|-------------------|-------------------------|
| TLS 1.3 | TLS_AES_256_GCM_SHA384 | (0x13, 0x02) | 1 | Recommended |
| TLS 1.2 | TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 | (0xC0, 0x30) | 2 | Secure |

Table 6 – Cipher Suites for HTTPS Performance Tests

Table 6 shows the cipher suites that are used for testing of HTTPS. These are selected since they are currently the most used. In the future, the cipher suites are subject to change as these are replaced with more secure alternatives.

8.2.1 HTTPS Performance Delta TLS 1.3 (TLS_AES_256_GCM_SHA384 (0x13, 0x02))

Test Objective: The purpose of these tests is to determine the performance delta for HTTPS connections. The impact, if any, on performance when traffic is encrypted using the selected cipher suite (TLS_AES_256_GCM_SHA384 (0x13, 0x02)) is determined.

Test Process: Each transaction consists of a single HTTPS GET request with no transaction delays (i.e., the web server responds immediately to all requests). All traffic contains valid payloads. The HTTP test traffic characteristics using this cipher suite and communicating directly over the Internet (i.e., no SSE in the middle) are shown in Table 7.

Note: This test operates on the outer encryption. Support for TLS 1.3 is optional. This test is not performed if TLS 1.3 is not supported.

| TLS_AES_256_GCM_SHA384 (0x13, 0x02) | | |
|-------------------------------------|-----------------------------|------------------------------|
| Connections per Second per Gigabit | HTML Response Size in Bytes | Total Response Size in Bytes |
| 1,000 | 113,430 | 127,666 |
| 2,000 | 54,917 | 62,455 |
| 4,000 | 25,700 | 29,170 |
| 8,000 | 11,170 | 13,483 |
| 16,000 | 3,870 | 5,358 |
| 32,000 | 150 | 1,227 |

Table 7 – Cipher Suite Test Traffic Characteristics (0x13, 0x02)

[R3] The test **MUST** measure a benchmark for the number of HTTPS connections per second per Gigabit that the SSE, ZT, SASE implementation supports when using cipher suite TLS_AES_256_GCM_SHA384.

8.2.2 HTTPS Performance Delta TLS 1.2 (TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xC0, 0x30))

Test Objective: The purpose of these tests is to determine the performance delta for HTTPS connections. The impact, if any, is determined when traffic is encrypted using the selected cipher suite (TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xC0, 0x30)).

Test Process: Each transaction consists of a single HTTPS GET request with no transaction delays (i.e., the web server responds immediately to all requests). All traffic contains valid payloads. The HTTP test traffic characteristics using this cipher suite and communicating directly over the Internet (i.e., no SSE in the middle) are shown in Table 6.

| TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 (0xC0, 0x30) | | |
|--|-----------------------------|------------------------------|
| Connections per Second per Gigabit | HTML Response Size in Bytes | Total Response Size in Bytes |
| 1,000 | 115,000 | 129,360 |
| 2,000 | 56,257 | 63,945 |
| 4,000 | 26,970 | 31,047 |
| 8,000 | 12,394 | 14,808 |
| 16,000 | 5,047 | 6,738 |
| 32,000 | 1,365 | 2,605 |

Table 8 – Cipher Suite Test Traffic Characteristics (0xC0, 0x30)

Note: This test operates on the outer encryption. Support for TLS 1.2 is mandatory. This test is always performed.

[R4] The test **MUST** measure a benchmark for the number of HTTPS connections per second per Gigabit that the SSE implementation supports when using cipher suite TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384.

8.3 Delta in Average Time to Transfer Data with and without SSE

Test Objective: Determine if the SSE under test has any impact on the time it takes to download files (e.g., PDFs, data files, zipped files, documents, etc).

Test Process: The same cipher selection methodology outlined in Section 8.2 will be used to determine testing targets under this section. The top two ciphers listed in Table 6 will be used. The same configuration established for testing under Section 8.2 of this methodology will be used to ensure that the device is not bypassing the decryption or inspection functionality within the SSE implementation. Tests using files in a variety of formats are performed with and without the SSE implementation offering to determine the impact of the test. Results are calculated relative to the baseline (i.e., the time difference between downloading files without SSE implementation and with the SSE implementation). To ensure a fair comparison, measurements are performed with and without the SSE implementation simultaneously, outliers are discarded, and the average time to download the files is calculated. The delta is calculated and recorded. See section 16 for details on any impact of the delta. File sizes and sources include the following sections.

To eliminate any issues with performing these tests to the Internet, two paths, the Control path and the Path Under Test are used simultaneously to perform measurements.

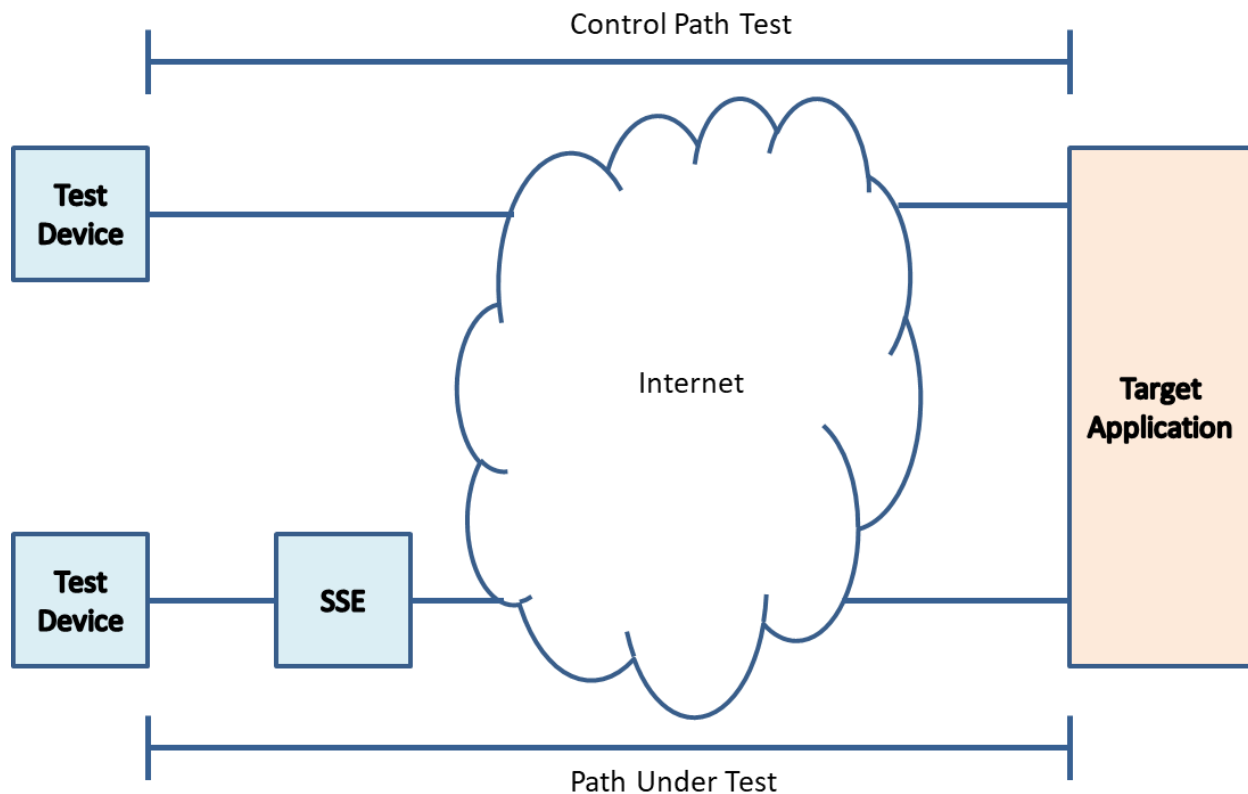


Figure 2 – Control Path and Path Under Test

Figure 2 shows that when tests of SSE file downloads are run to applications on the internet (Path Under Test), there is also a Control test (baseline) that is underway for the same application at the same time. The results of the tests on the Path Under Test are then compared to the results of the Control Path. The baseline is done without an SSE. Deltas between the measurements indicates the contribution of the SSE to the test device results. Outliers are removed from the results, and the target application. The path under test includes an SSE between the test device and the target application. The delta in performance between the Baseline and path under test is measured. Outliers [if any] are ignored.

Note: the SSE decrypts and reencrypts the outermost encryption layer.

8.3.1 File Size – 1MB

8.3.1.1 *Microsoft OneDrive*

8.3.1.2 *Dropbox*

8.3.1.3 *Google Drive*

8.3.1.4 *HTTP web server*

8.3.1.5 *HTTPS web server (SSL/TLS)*

8.3.2 File Size – 10MB

8.3.2.1 *Microsoft OneDrive*

8.3.2.2 *Dropbox*

8.3.2.3 *Google Drive*

8.3.2.4 *HTTP web server*

8.3.2.5 *HTTPS web server (SSL/TLS)*

8.3.3 File Size – 100MB

8.3.3.1 *Microsoft OneDrive*

8.3.3.2 *Dropbox*

8.3.3.3 *Google Drive*

8.3.3.4 *HTTP web server*

8.3.3.5 *HTTPS web server (SSL/TLS)*

8.3.4 File Size – 1,000MB

8.3.4.1 *Microsoft OneDrive*

8.3.4.2 *Dropbox*

8.3.4.3 *Google Drive*

8.3.4.4 *HTTP web server*

8.3.4.5 *HTTPS web server (SSL/TLS)*

9 SSL/TLS Support

To address the growing threat of focused attacks using the most common web protocols and applications, the capabilities of SSE to support a range of cipher suites and provide visibility into the encrypted payloads to detect attacks concealed by encryption as well as attacks against the encryption protocols themselves is verified. The cipher suites indicated within this section of the document are subject to change as the industry moves to new cipher suites.

9.1 Cipher Suite Support

To provide visibility into potential threats that are encrypted using SSL/TLS, the implementation being tested is expected to support a wide range of commonly used cipher suites. Cipher suites are selected based on the published current frequency of use¹ and security status². The cipher suite used in testing will be specified as a part of the test agreement. The top 10 ciphers are expected to be included in the testing.

¹ Published international daily cipher suite usage can be found at <https://crawler.ninja/files/ciphers.txt>

² A list of cipher suites and associated attributes including security ratings can be found at <https://ciphersuite.info/cs/>

| Protocol | Cipher Suite Description | Value | Frequency Ranking | Security Classification |
|----------|---|--------------|-------------------|-------------------------|
| TLS 1.3 | TLS_AES_256_GCM_SHA384 | (0x13, 0x02) | 1 | Recommended |
| TLS 1.2 | TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA384 | (0xC0, 0x30) | 2 | Secure |
| TLS 1.2 | TLS_ECDHE_RSA_WITH_AES_256_GCM_SHA256 | (0xC0, 0x2F) | 3 | Secure |
| TLS 1.3 | TLS_AES_128_GCM_SHA256 | (0x13, 0x01) | 4 | Recommended |
| TLS 1.2 | TLS_ECDHE_RSA_WITH_AES_256_CBC_SHA384 | (0xC0, 0x28) | 5 | Weak |
| TLS 1.2 | TLS_ECDHE_RSA_WITH_CHACHA20_POLY1305_SHA256 | (0xCC, 0xA8) | 6 | Secure |
| TLS 1.3 | TLS__CHACHA20_POLY1305_SHA256 | (0x13, 0x03) | 7 | Recommended |
| TLS 1.2 | TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 | (0xC0, 0x2C) | 8 | Recommended |
| TLS 1.2 | TLS_ECDHE_ECDSA_WITH_CHACHA20_POLY1305_SHA256 | (0xCC, 0xA9) | 9 | Recommended |
| TLS 1.2 | TLS_DHE_RSA_WITH_AES_256_GCM_SHA384 | (0x00, 0x9F) | 10 | Secure |
| TLS 1.2 | TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 | (0xC0, 0x2B) | 11 | Recommended |
| TLS 1.0 | TLS_DHE_RSA_WITH_AES_256_CBC_SHA | (0x00, 0x39) | 12 | Weak |
| TLS 1.2 | TLS_DHE_DSS_WITH_AES_128_GCM_SHA256 | (0x00, 0xA2) | N/A | Recommended |
| TLS 1.2 | TLS_ECDHE_ECDSA_WITH_ARIA_128_GCM_SHA256 | (0xC0, 0x5C) | N/A | Recommended |
| TLS 1.2 | TLS_DHE_DSS_WITH_ARIA_128_GCM_SHA256 | (0xC0, 0x56) | N/A | Recommended |
| TLS 1.2 | TLS_ECDHE_ECDSA_WITH_ARIA_256_GCM_SHA384 | (0xC0, 0x5D) | N/A | Recommended |
| TLS 1.2 | TLS_DHE_DSS_WITH_ARIA_256_GCM_SHA384 | (0xC0, 0x57) | N/A | Recommended |
| TLS 1.2 | TLS_DHE_DSS_WITH_AES_256_GCM_SHA384 | (0x00, 0xA3) | N/A | Recommended |

Table 9 – Cipher Suites

9.1.1 Current Cipher Suites

Based on the different cipher suites that exist, the SSE implementation support for current cipher suites is determined using this test. The purpose of this test is to determine which cipher suites are supported. Tested cipher suites are selected based on frequency of use and security recommendations from reputable sources. The cipher suites available for this test include those listed in Table 9. Since this test is minimally invasive, it will be randomly repeated during the test period with multiple SSE implementation instances to confirm standard availability.

[R5] The test **MUST** verify which cipher suites described in Table 9 are supported by the SSE implementation.

Note: If a cipher suite is not supported, there must be a method to block that cipher suite.

9.1.2 Insecure Cipher Suites

Some cipher suites do not provide secure encryption. These are indicated as WEAK in Table 9. The purpose of the testing is to determine how the SSE implementation handles cipher suites known to be insecure including the following:

- Null cipher suites (no Encrypted Traffic Inspection of data provided)
- Anonymous cipher suites (no key authentication provided)

The insecure cipher suites are expected to be blocked.

[R6] The test **MUST** verify how the SSE implementation handles cipher suites are considered by this document to be insecure.

9.1.3 Scoring Penalty

The scoring penalty for sections 9.1.1 and 9.1.2 is 100%.

9.2 Decryption Validation

The ability of an SSE implementation to correctly decrypt and inspect SSL/TLS traffic prior to the associated performance testing described in this document is verified by this testing. The SSE implementation is expected to support all test cases with a single configuration. The purpose of this test is to use content which has been successfully blocked by the SSE implementation during testing. The content is then embedded in encrypted traffic to determine the capabilities of the SSE implementation to enforce policy for encrypted streams.

[R7] This test **MUST** verify the ability of the SSE implementation to determine if the implementation can enforce Policy for encrypted streams.

9.2.1 Scoring Penalty

The scoring penalty for section 9.2 is 100%.

9.3 Decryption Bypass Exceptions

The SSE implementation is expected to support the configuration of policies that permit conditional bypass of decryption to preserve privacy, either for regulatory or other reasons (examples could be related to banking or medical data). The purpose of this test is to verify that the SSE implementation maintains decryption capabilities concurrently with inspection exception rules. The test will verify that specific traffic, ciphers, or IP Addresses are excluded from decryption. (Turning off all decryption on the SSE implementation would not be an acceptable method for meeting this requirement.)

[R8] This test **MUST** verify the ability of the SSE implementation to perform decryption concurrently with inspection exception rules.

9.3.1 Scoring Penalty

The scoring penalty for section 9.3 is 100%.

10 Management Capabilities

It is important that an SSE implementation provide comprehensive management control to accomplish the expected functionality. Further best practices in user experience should be fundamental to the associated interface.

10.1 Authentication

Editor Note 7: Additional options will be added to this section after the completion of the Beta testing.

10.1.1 Role-Based Access Control

Test Objective: This test verifies that RBAC is supported by the SSE. Role Based Access Control (RBAC) is defined in MEF 118 as “A collection of access Authorizations a Subject or Target Entity receives based on a given set of Roles.”

Test Process: This test is performed by creating Roles for Subject and Target Entities and ensuring that authentication is done correctly.

[R9] The test **MUST** verify that RBAC is supported for Subject and Target Entities.

10.1.1.1 Scoring Penalty

The scoring penalty for section 10.1.1 is 100%.

10.2 Policy

10.2.1 Policy Definition

Test Objective: This test verifies that the SSE implementation allows the creation of policies that are used to control access, functionality, and behavior of an SSE implementation.

Test Process: The policies will be tested to encrypt all, decrypt all, and pass selected without decrypting. This is performed by creating policies within the SSE implementation that allows the Encrypt all, Decrypt all and do not Decrypt specific protocols.

Note: The protocols shown in this section are shown as examples. The specific list of protocols included in the testing will be defined in the Testing Agreement.

10.2.1.1 Protocols

- Encrypt, and Decrypt (Encrypt all, Decrypt all, do not Decrypt individual protocols) basic Internet services using at least 3 of the following protocols
 - HTTPS
 - SMTP
 - IMAP
 - POP3

- Exchange/MAPI
- SFTP

10.2.1.1.1 Scoring Penalty

The scoring penalty for section 10.2.1.1 is 100% for the applications defined in the Test Agreement.

10.2.1.2 Applications

- Encrypt and Decrypt (Encrypt all, Decrypt all, do not Decrypt individual applications) Subject Entities (internal and remote) connectivity to trusted 3rd party Target Entities using at least 3 of the following applications
 - Office 365
 - Salesforce
 - NetSuite
 - Google Workspace
 - Dropbox

10.2.1.2.1 Scoring Penalty

The scoring penalty for section 10.2.1.2 is 100% for the applications defined in the Test Agreement.

10.2.1.3 Locations

- Encrypt and Decrypt (Encrypt all, Decrypt all, do not Decrypt individual locations) Subject Entities at one location access to the Target Entities at another location
 - Enterprise Site secure connectivity
 - Enterprise Site to Cloud resources

Editor Note 8: Cloud-to-cloud will be added here after the Beta is completed.

10.2.1.3.1 Scoring Penalty

The scoring penalty for section 10.2.1.3 is 100% for the applications defined in the Test Agreement.

10.2.1.4 Social Media

- Encrypt and Decrypt (Encrypt all, Decrypt all, do not Decrypt individual social media applications and websites) popular social networking applications and websites

- Top 10 social media applications including Facebook, Twitter, LinkedIn, Glassdoor, or other Web applications

Note: The top 10 social media applications will be updated every six months. This list will be updated, with social media applications added or deleted from the list as appropriate.

10.2.1.4.1 Scoring Penalty

The scoring penalty for section 10.2.1.4 is 100% for the applications defined in the Test Agreement.

10.2.1.5 Video and Voice

- Encrypt and Decrypt (Encrypt all, Decrypt all, do not Decrypt individual teleconferencing applications) Video and Voice teleconferencing at least 3 of the following applications are tested
 - Microsoft Teams
 - Zoom
 - Cisco WebEx
 - Google Meet

10.2.1.5.1 Scoring Penalty

The scoring penalty for section 10.2.1.5 is 100% for the applications defined in the Test Agreement.

10.2.1.6 Applications and Websites

- Encrypt, and Decrypt (Encrypt all, Decrypt all, do not Decrypt individual applications and websites) streaming media applications and websites at least 3 of the following applications and websites are tested
 - Netflix
 - Prime Video
 - Hulu
 - YouTube
 - TikTok
 - Max/HBO Max
 - Disney+
 - AppleTV

- [R10] The test **MUST** verify that policies that describe the behavior of SSE implementations can be created.

10.2.1.6.1 Scoring Penalty

The scoring penalty for section 10.2.1.6 is 100% for the applications defined in the Test Agreement.

10.2.2 Policy Validation

Testing in this section validates that policy has passed or blocked traffic as appropriate.

10.2.2.1 Protocols

Test Objective: Determine if the SSE implementation provides the ability to identify whether a policy has blocked or passed a specific protocol.

Test Process: The selected protocols are introduced at an SSE and the test verifies that they are passed to the appropriate end device or blocked by the policy.

- [R11] The test **MUST** verify that when an alert is generated, that the policy that has been violated is identified.

10.2.2.1.1 Scoring Penalty

The scoring penalty for section 10.2.2.1 is 100%.

10.2.2.2 Applications

Test Objective: Determine if the SSE implementation provides the ability to identify whether a policy has blocked or passed a specific application.

Test Process: The selected applications are introduced at an SSE and the test verifies that they are passed to the appropriate end device or blocked by the policy.

- [R12] The test **MUST** verify that when an alert is generated, that the policy that has been violated is identified.

10.2.2.2.1 Scoring Penalty

The scoring penalty for section 10.2.2.2 is 100%.

10.2.2.3 Locations

Test Objective: Determine if the SSE implementation provides the ability to identify whether a policy has blocked or passed a specific location.

Test Process: The selected locations pass traffic, and the test verifies that they are passed to the appropriate SD-WAN UNI or blocked by the policy.

- [R13] The test **MUST** verify that when an alert is generated, that the policy that has been violated is identified.

10.2.2.3.1 Scoring Penalty

The scoring penalty for section 10.2.2.3 is 100%.

10.2.2.4 Social Media

Test Objective: Determine if the SSE implementation provides the ability to identify whether a policy has blocked or passed a specific social media application.

Test Process: The selected social media applications are introduced at an SSE and the test verifies that they are passed to the appropriate end device or blocked by the policy.

[R14] The test **MUST** verify that when an alert is generated, that the policy that has been violated is identified.

10.2.2.4.1 Scoring Penalty

The scoring penalty for section 10.2.2.4 is 100%.

10.2.2.5 Video and Voice

Test Objective: Determine if the SSE implementation provides the ability to identify whether a policy has blocked or passed a video or voice.

Test Process: The video and voice traffic are introduced at an SSE and the test verifies that they are passed to the appropriate end device or blocked by the policy.

[R15] The test **MUST** verify that when an alert is generated, that the policy that has been violated is identified.

10.2.2.5.1 Scoring Penalty

The scoring penalty for section 10.2.2.5 is 100%.

10.2.2.6 Applications and Web Sites

Test Objective: Determine if the SSE implementation provides the ability to identify whether a policy has blocked or passed a specific application or web site.

Test Process: The selected applications or web sites are introduced at an SSE and the test verifies that they are passed to the appropriate end device or blocked by the policy.

[R16] The test **MUST** verify that when an alert is generated, that the policy that has been violated is identified.

10.2.2.6.1 Scoring Penalty

The scoring penalty for section 10.2.2.6 is 100%.

10.2.3 Policy Versioning

Test Objective: Determine if the SSE implementation provides the ability to secure Policies through the use of versioning.

Test Process: A policy is created to Decrypt all applications as shown above. This policy is then saved. Once saved, the policy is updated to not decrypt Google Workspace. Updating of this policy must require the appropriate permissions to make this update.

[R17] The test **MUST** verify that the SSE implementation manages versioning of Policies.

10.2.3.1 Scoring Penalty

The scoring penalty for section 10.2.3 is 25%.

11 Reporting Capabilities

Logging, alerting, and reporting are critical functions that inform the security posture and facilitate incident response actions. Reporting capabilities will be assessed to determine the ability of the SSE implementation to support these requirements.

11.1 Logs

Test Objective: Verify that the SSE implementation allows generation and exportation of reports, logs, and alerts into industry-standard formats in support of incident response. (Aspects like log time normalization, log file maintenance options, and forensic traffic-capture will also be factored in the assessment.)

Test Process: The events shown below are caused to occur and the SSE capability to generate the appropriate logs is determined.

[R18] The test **MUST** verify that Logs contain the following information:

- Date of occurrence
- Device event occurred on
- Subcomponent involved
- Detailed message

The SSE implementation collects and stores information about the following events:

- Malicious Traffic
- Administrator Login/Logout
- Successful Authentication
- Unsuccessful Authentication
- Policy Changes
- Policy Deployment
- Disk quota is close to being exceeded
- CPU utilization exceeds a specific threshold

The SSE implementation is checked to ensure that it creates a log for each of these events and that the log includes a date/time stamp.

[R19] The test **MUST** verify that a SSE implementation collects and stores information about the events shown in section 11.1.

11.1.1 Scoring Penalty

The scoring penalty for section 11.1 is 50%.

11.2 Security Event Notification

This section addresses Security Event Notifications

11.2.1 Security Event Notification Generation

Test Objective: The objective of this test is to determine if the SSE implementation generates Security Event Notifications (SENs) when specified events occur. SENs are to be provided, at a minimum, when malicious traffic is received or when authentications are unsuccessful.

Test Process: Known malicious traffic that the SSE implementation has previously blocked are sent and it is ensured that a SEN is generated.

[R20] The test **MUST** verify that an SSE implementation generates SENs as described in section 11.2.1.

Editor Note 9: Additional SENs that cover other aspects of system availability and performance will be added after the beta testing is completed.

11.2.1.1 Scoring Penalty

The scoring penalty for section 11.2.1 is 100%.

11.2.2 SEN Filtering

Test Objective: The objective of this test is to determine if SSE implementations support filtering of SEN contents and summaries for selected attributes (e.g., view all SENs for a selected source IP).

Test Process: SENs are filtered on malicious traffic received and the receipt of malicious traffic performed previously is verified to be included in the SEN.

[R21] The test **MUST** verify that a SSE implementation allows SEN filtering.

11.2.2.1 Scoring Penalty

The scoring penalty for section 11.2.2 is 10%.

11.2.3 View SEN Detail

Test Objective: This test verifies if SSE implementations provide capabilities for in-depth information about SENs.

Test Process: The detail includes information about a specific SEN. The filtered SEN is reviewed to determine additional information beyond the date/time stamp that is included.

[R22] The test **MUST** verify that a SSE implementation allows the retrieval of SEN detail.

11.2.3.1 Scoring Penalty

The scoring penalty for section 11.2.3 is 10%.

11.2.4 SEN Suppression

Test Objective: This test verifies that SSE implementations provide the functionality to create exception filters based on SEN data to eliminate further SENs that match the specified criteria (e.g., same SEN ID from the same source IP).

Note: This does not disable detection, logging, or blocking but merely excludes SENs from the console display.

Test Process: A policy is changed which creates a log file entry but does not generate an SEN.

- [R23] The test **MUST** verify that a SSE implementation allow SENs to be suppressed from the console display without impacting the detection, logging, or blocking of threats.

11.2.4.1 Scoring Penalty

The scoring penalty for section 11.2.4 is 5%.

11.3 Change Control

It is essential for the system to track, retain, and report changes to policies and rules.

Test Objective: The test verifies if Subject and Target Entities are monitored and logged, and, if possible, change management controls are implemented. These items fall under compliance process controls for change management, onboard and off-board, segregation of duties, and access control.

Test Process: Policies are created to Encrypt all applications as shown above. That policy is saved. The policy is then changed to also Decrypt all applications. The Change Control log is checked to verify an update. The ability to Roll-Back to the previous revision of the policy is verified. The Revision History is checked to ensure that each revision is included in the history.

Change Control functionality and capabilities include support for each of the following:

- Change Control Logging
- Roll-Back
- Revision History

- [R24] The test **MUST** verify that change control is supported by the SSE implementation.

11.3.1 Scoring Penalty

The scoring penalty for section 11.3 is 15%.

12 Threat Prevention

Threat prevention tests assess how accurately the SSE implementation blocks and logs threats while remaining resistant to false positives. To accomplish this goal, the SSE implementation will be deployed using vendor-recommended settings. Protection being tested must be available to Subscribers at the time of testing. If Browser Isolation is available, vendors may choose to have their SSE implementation tested both with and without Browser Isolation.

12.1 False Positives

False positives are any legitimate, non-malicious traffic that the SSE implementation perceives as malicious and blocks. The ability to correctly identify and allow legitimate traffic while maintaining protection against attacks is a key to effective protection. False positive tests examine the ability of the SSE implementation to block attacks while permitting legitimate traffic. Implementations that block legitimate traffic will have the sensitivity of those protections turned down or disabled in order to allow legitimate traffic. Testing will determine which protections (e.g., signatures) trigger false positives. Signatures that trigger false positives must be disabled before the security testing begins. Consequently, the false positive test is repeated until no false positive signatures are detected, and all legitimate traffic passes.

12.1.1 Initial check – legitimate traffic, documents, and files

Test Objective: This test verifies if the SSE implementation can decrypt and pass specific file formats.

Test Process: This test transmits a varied sample of legitimate application traffic, documents, and files which should be identified and allowed verifying that the SSE implementation can decrypt and recognize these file types. Testing includes some of the following file formats:

- HTML
- .exe
- .jar
- .xlsm
- .css
- .pdf
- .ppt
- .pptx
- .doc
- .docx
- .zip

- 7zip
- Gzip
- .DLL
- .js
- .xls
- .xlsx
- .chm
- .rar
- .Ink
- .cur
- .tar
- .xrc

[R25] The test **MUST** verify that legitimate traffic as shown in section 12.1.1 are passed.

12.1.1.1 Scoring Penalty

The scoring penalty for section 12.1.1 is 100%.

12.1.2 Ongoing check – legitimate traffic, documents, and files

Test Objective: The objective of this test is to generate legitimate traffic and verify that it can be decrypted and passed as described in sections 12.2, 12.3, 12.4, and 13.

Test Process: Testing will introduce legitimate traffic, documents, and files into in sections 12.2, 12.3, 12.4, and 13. Testing includes the following file formats:

- HTML
- .exe
- .jar
- .xlsm
- .css
- .pdf

- .ppt
- .pptx
- .doc
- .docx
- .zip
- 7zip
- Gzip
- .DLL
- .js
- .xls
- .xlsx
- .chm
- .rar
- .Ink
- .cur
- .tar
- .xrc

[R26] The testing performed in later sections of this document **MUST** include legitimate traffic as shown in section 12.1.2.

12.1.2.1 Scoring Penalty

The scoring penalty for section 12.1.2 is 100%.

12.2 Exploits

An exploit is an attack that takes advantage of a vulnerability in a protocol, product, operating system, or application.

Test Objective: Testing verifies that the SSE implementation is capable of detecting and blocking exploits while remaining resistant to false positives by attempting to send exploits through the product under test; and verifying that the malicious traffic is blocked, and all appropriate logging and notifications are performed.

Test Process: The exploit repository used for testing contains thousands of exploits over a wide range of protocols and applications. Exploit sets for individual tests are selected based on Common Vulnerability Scoring System (CVSS) score, use case, and relevance to customers.³ Testing will determine if exploit traffic is blocked by the SSE implementation, and if the event is recorded in the log. All tests are performed with varying levels and mixes of background network load.

The exploits that are currently used for testing will be communicated to the SSE implementation Vendor before testing is performed. This list is subject to change as new exploits detected.

[R27] The test **MUST** verify that exploits are blocked while legitimate traffic is passed.

12.2.1 Scoring Penalty

The scoring penalty for section 12.2 is 100%.

12.3 Malware (Wild) Delivered over the HTTP/HTTPS

Users may be deceived into clicking on a malicious link (on, for example, a web page or a banner advertisement) to download and execute malware. In cases where an attacker is aiming for a large number of victims, the attacker may hijack widely used reputable websites to distribute the malware. This malware may be passed via clear text and SSL/TLS encrypted traffic while also passing legitimate (clear text and SSL/TLS encrypted) traffic.

Test Objective: Testing will determine if malware traffic is blocked by the SSE implementation, and if the event is recorded in the log. All tests are performed with varying levels and mixes of background network load. A test environment to assess the protection capabilities of SSE implementations under the most real-world conditions possible has been created. Testing uses a proprietary live testing harness that is scalable and capable of running thousands of concurrent endpoints.

³ Vendors will be provided with a baseline set of malicious traffic prior to testing. These baseline samples will be used to verify basic protection capabilities and will not be part of the actual test.

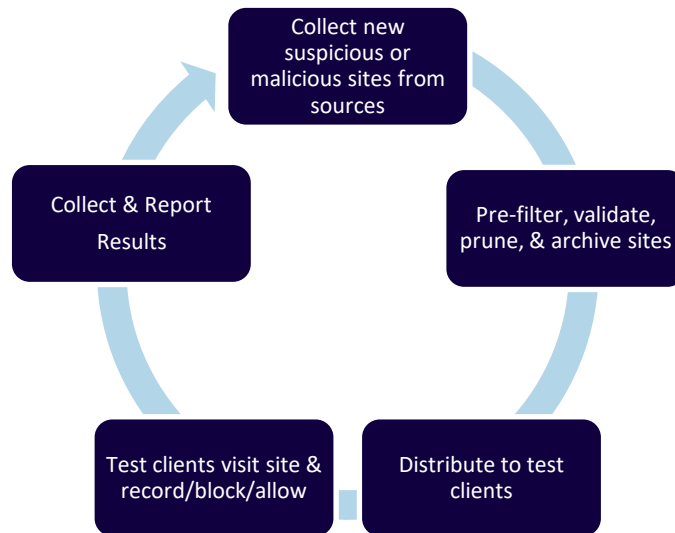


Figure 3 – Malware Test Workflow

Test Process: Figure 3 reflects the steps in this Malware testing. It starts at the top of the figure with collecting new or suspicious or malicious sites from sources. These are then included in test traffic. The test traffic is distributed to clients who are being certified. The client is able to perform testing using this malware and the results are collected and reported. These steps repeat as new malware is detected.

- [R28] The test **MUST** verify that Malware is blocked while legitimate traffic is passed.
- [R29] Testing of new Malware **MUST** be tested by SSE implementations using traffic obtained as described in sections 12.3.2, 12.3.5, 12.3.3, and 12.3.4.

Editor Note 10: The testing for Malware uses the sample methods described in the following sections. The scoring for this testing is for all types of Malware. If any are not blocked the testing is considered failed. Comments on this are requested.

12.3.1 Scoring Penalty

The scoring penalty for section 12.3 is 10% per missing exploit.

Editor Note 11: This has been changed from a 100% failure if any exploit fails to a penalty per exploit that fails. Comments are requested on this.

12.3.2 URL / Malware Sample Sets

To keep the Malware sample sets up to date, the test house maintain relationships with other independent security researchers, professional networks, and security companies from which they harvest live malware URLs. Throughout the test, new URLs are added as they are discovered. Sample sets contain malware URLs distributed via email, messaging, social networks, and websites. In addition, the test house operates a network of spam traps and honeypots yielding unique samples.

12.3.3 URL Status Confirmation

Given the nature of the feeds and the rate of change, it is not possible to validate each site in depth before the test, since many sites quickly disappear. However, each URL receives an initial review to verify that it meets basic test criteria and is accessible on the Internet at the time of testing. To be included in the test set, URLs must be live during each iteration of the test. At the beginning of each iteration, the availability of the URL is confirmed by ensuring that the site can be reached and is active (for example, a non-404 web page is returned). The active URL content is downloaded and saved to an archive server with a unique test ID number. This enables the test house to preserve the URL content for control and validation purposes. Note: every sample is validated after the test, and URLs are reclassified and/or removed accordingly.

12.3.4 Pruning and Validation

Throughout the test, the test house engineers review and remove non-conforming URLs and content from the test set. For example, a URL that initially was classified as phishing but that has since been replaced with a generic splash page will be removed and will not be included in future calculations. The test house continually verifies that each phishing and malware site is accessible and serving malicious content. Sites that are not available are not included in calculations of success or failure; however, if they become available during the test, those iterations will be included in calculations. Post-test validation enables the test house to reclassify and even remove phishing / malware sites that are not malicious or that were not available during the test.

12.3.5 URL Cataloging

All URLs under consideration are cataloged with a unique ID, regardless of their validity. Prompt and accurate URL cataloging enables the test house engineers to monitor the quality of sample sources and simplifies investigation and analysis. New sites are added to the URL test set as soon as possible following initial discovery. The date and time that each URL is introduced is recorded. Most sources are automatically and immediately inserted, while some methods require manual handling and can be processed in a timely manner. URLs that are either no longer reachable or hosting malware are removed from the test (but are maintained in the URL catalog).

12.4 Handcrafted Malware (Sandbox Protection)

The goal of this test is to determine which SSE implementations are able to protect customers while under adverse conditions dictated by the attacker. For the purposes of this test, handcrafted (targeted) malware is created by modifying the source code of keyloggers, ransomware, destructoware, etc. We then recompile the binary so that it is new to the SSE being tested. The test then attempts to infect a host (e.g., a laptop) with the malware and recorded whether or not the SSE implementation blocked the attack. Because creating samples in this manner is a painstaking and time-consuming exercise, only 1010 targeted samples will be tested; results should be viewed with this in mind.

12.4.1 Scoring Penalty

The scoring penalty for section 12.4 is 50%.

13 Evasions

Attackers use evasion techniques to disguise and modify attacks at the point of delivery to avoid detection by security products. Passing evasion tests is very important since just one successful evasion technique can enable an attacker to exploit systems undetected. Previously blocked exploits will be rerun using evasion techniques.

Testing verifies that the SSE implementation is capable of detecting and blocking exploits and malware when subjected to varying common evasion techniques. Wherever possible, the implementation is expected to successfully decode the obfuscated traffic to provide an accurate alert relating to the original attack, rather than alerting purely on anomalous traffic detected as a result of the evasion technique itself.

Editor Note 12: The below evasions are updated as they are detected. The list of current evasions is provided to the SSE implementation Vendor prior to testing.

13.1 HTTP Obfuscation

Web browsers request content from servers over HTTP using the ASCII character-set. HTTP encoding replaces unsafe non-ASCII characters with a "%" followed by two hexadecimal digits. Web servers and clients understand how to decode the request and responses. However, this mechanism can be abused to circumvent protection that is looking to match specific strings of characters.

Chunked encoding allows the server to break a document into smaller chunks and transmit them individually. The server needs only to specify the size of each chunk before it is transmitted and then indicate when the last chunk has been transmitted. Since chunked encoding intersperses arbitrary numbers (chunk sizes) with the elements of the original document, it can be used to greatly change the appearance of the content as observed "on the wire" during transmission. In addition, the server can choose to break the document into chunks at arbitrary points. This makes it difficult to reliably identify the original HTML content from the raw data on the network.

Test Objective: This test is to verify that evasions within HTTP can be detected.

Test Process: Evasions including manipulation using the the following techniques will be tested:

- Declared HTTP/0.9 response; but includes response headers; chunking declared but served without chunking
- HTTP/1.1 chunked response with chunk sizes preceded by multiple zeros (hex '30')
- HTTP/1.1 chunked response with chunk sizes followed by backspace (hex '08')
- HTTP/1.1 chunked response with chunk sizes followed by end of text (hex '03')
- HTTP/1.1 chunked response with chunk sizes followed by escape (hex '1b')
- HTTP/1.1 chunked response with chunk sizes followed by null (hex '00')
- HTTP/1.1 chunked response with chunk sizes followed by a space (hex '20') then a zero (hex '30')

- HTTP/1.1 response with status code 403; with message-body; chunked
- HTTP/1.1 response with status code 406; with message-body; chunked
- HTTP/1.1 response with status code 505; with message-body; chunked
- HTTP/1.1 chunked response with no status indicated
- No status line; chunking indicated; served unchunked
- HTTP/1.1 response with invalid content-length header size declaration followed by space and null (hex '20 00')
- HTTP/1.01 declared; served chunked
- HTTP/01.1 declared; served chunked
- HTTP/2.B declared; served chunked
- HTTP/9.-1 declared; served chunked
- Double Transfer-Encoding: first empty; last chunked. Served with invalid content-length; not chunked.
- Relevant headers padded by preceding with hundreds of random custom headers

Note: Not all of these will be tested. The test house will provide a list of those being tested at the time of the testing agreement.

[R30] The test **MUST** verify that HTTP evasions as described in section 13.1 are detected.

13.1.1 Scoring Penalty

The scoring penalty for section 13.1 is 3% per missing evasion.

13.2 HTML Obfuscation

Whereas HTTP obfuscations evade detection by misusing the transmission, HTML obfuscations are contained within the content itself.

Since the following are subject to change, this should not be considered a comprehensive list but is intended to illustrate the kinds of obfuscation the test house will employ during testing.

Test Objective: This test is to determine if the SSE implementation can detect HTML obfuscations.

Test Process: The obfuscations shown below are included in HTML content and are passed to the SSE implementation under test. SSE implementations should protect against these obfuscations and others like them.

- js-binary-obfuscation
- babel-minify
- closure
- code-protect
- confusion
- jfogs
- jfogs-reverse
- jjencode
- jsbeautifier
- jsmin
- js-obfuscator
- qzx-obfuscator
- chunked and gzip compressed js-binary-obfuscation
- chunked and deflate compressed js-binary-obfuscation
- UTF-8 encoding
- UTF-8 encoding with BOM
- UTF-16 encoding with BOM
- UTF-8 encoding; no http or html declarations
- UTF-8 encoding with BOM; no http or html declarations
- UTF-16 encoding with BOM; no http or html declarations
- UTF-16-LE encoding without BOM
- UTF-16-BE encoding without BOM
- UTF-16-LE encoding without BOM; no http or html declarations
- UTF-16-BE encoding without BOM; no http or html declarations
- UTF-7 encoding
- UTF-8 encoding
- UTF-8 encoding

- EICAR string included at top of HTML
- Hex encoded script decoded using JavaScript unescape
- Unicode encoded script decoded using JavaScript unescape
- Hex encoded script as variable decoded using JavaScript unescape
- Unicode encoded script as variable decoded using JavaScript unescape
- padded with <=5MB
- padded with <=25MB
- padded with >25MB

[R31] The test **MUST** verify that HTML Obfuscation are detected.

13.2.1 Scoring Penalty

The scoring penalty for section 13.2 is 3% per missing obfuscation.

13.3 Packers

Packers are primarily used to obfuscate and “protect” compiled binaries. Along with the compressed/obfuscated data (the original binary in obfuscated form), they contain a “stub,” which, upon execution, de-obfuscates the binary and jumps to its restored entry point. Malware authors typically use packing techniques to obfuscate binaries so they cannot be easily analyzed.

Test Objective: The objective of this test is for the SSE implementation to detect Packers.

Test Process: The test process is to introduce Packets and determine if they are detected by the SSE implementation. Packers including manipulation of the following attributes will be tested:

- Anskaya
- excalibur
- exefog
- Exestealth
- fearzpacker
- fishPE
- hidepx
- kkrunchy

- Krypton
- mew
- petite24
- telock
- upx
- Winkrypt
- Winupack
- Yc

Since the preceding are subject to change, this should not be considered a comprehensive list but is intended to illustrate the kinds of Packers the test house will employ during testing. Vendors should protect against these Packers and others like them.

[R32] The test **MUST** verify that Malware within Packers as described in section 13.3 are detected.

13.3.1 Scoring Penalty

The scoring penalty for section 13.3 is 3% per missing Packer.

13.4 Compressors

Compressors are primarily used to reduce the size of a file. They are also used by attackers to obfuscate malware since compressed files do not look the same to pattern matching engines. As such a security product must have the matching compression algorithm in order to detect malware that has been compressed. Malware authors typically use compression techniques to obfuscate binaries so they cannot be easily analyzed.

Test Objective: This test is performed to see if the SSE implementation can detect common Compressors.

Test Process: Compressors are passed to the SSE implementation and it is determined if they are detected. Compressors including manipulation of the following attributes will be tested:

- 7zip\7zip
- 7zip\bzip2
- 7zip\gzip
- 7zip\xz
- ALZIP
- AshampooZip
- AverZip
- Bandizip
- FilZip
- Gzip
- KuaiZip
- MuZip
- PicoZip
- PowerArchiver
- QuickZip
- SimplyZip
- WinZip

- ZipitFast

Since the preceding are subject to change, this should not be considered a comprehensive list but is intended to illustrate the kinds of compressors the test house will employ during testing. Vendors should protect against these compressors and others like them. A number of the Compressors shown will be selected for the testing.

[R33] The test **MUST** verify that Malware within Compressors as described in section 13.4 are detected.

13.4.1 Scoring Penalty

The scoring penalty for section 13.4 is 3% per missing Compressor.

13.5 Layered Evasions

Test Objective: These tests determine the effectiveness of the SSE implementation when subjected to combinations of evasion techniques. This test attempts to bypass the SSE implementation by performing any legitimate combination of the previous evasion techniques.

Test Process: Multiple evasions are included in test packets delivered to the SSE Implementation. The ability of the SSE implementation to detect them is recorded.

Note: A set of 10 evasions are selected by the test house and these are used for all SSE implementations. If new evasions are determined to be applicable, the list of 10 is modified and used for all future tests. Missed Packers or Compressors will not be used here.

[R34] The test **MUST** verify that when a combination of evasion methods is used to ensure that all evasions are detected.

13.5.1 Scoring Penalty

The scoring penalty for section 13.5 is 3% for each missing evasion.

14 Testing of MEF 88 Requirements

The requirements from MEF 88 [8] that are referenced in MEF 117 are included in the following table. This is not a list of all requirements in MEF 88, only those that are seen as included in MEF 117. These requirements are tested by using the test methodologies defined in sections 8, 9, 10, 11, and 12.

Requirements are either Mandatory, meaning that they must be tested as a part of certification, Optional, meaning that they may be tested as a part of certification, or Deferred, meaning that they are requirements focused on Service Providers who are not included in the scope of this certification test.

| MEF 88 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology from this document | Comments |
|--------------------|----------------------------------|--|--|----------------|
| R1 | N | | | SP requirement |
| R2 | N | | | |
| R3 | N | | | |
| R4 | N | | | |
| R5 | T | D | | SP requirement |
| R6 | T | D | | SP requirement |
| R7 | T | D | | SP requirement |
| R8 | T | D | | SP requirement |
| R9 | T | D | | SP requirement |
| R10 | T | D | | SP requirement |
| R11 | T | D | | SP requirement |
| R12 | T | D | | SP requirement |
| R13 | T | D | | SP requirement |
| R14 | T | D | | SP requirement |
| R15 | T | D | | SP requirement |
| R16 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R17 | T | D | | SP requirement |
| R18 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R19 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| D1 | T | O | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R20 | T | D | | SP requirement |
| R21 | N | D | | SP requirement |
| R22 | N | D | | SP requirement |
| R23 | N | D | | SP requirement |
| R24 | T | D | | SP requirement |
| R25 | T | D | | SP requirement |
| R26 | T | D | | SP requirement |
| R27 | T | D | | SP requirement |
| R28 | T | D | | SP requirement |
| R29 | T | D | | SP requirement |
| R30 | T | M | 12.1, 12.2, 12.3, 12.4 | |



| MEF 88 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology from this document | Comments |
|--------------------|----------------------------------|--|-------------------------------------|----------------|
| R31 | T | M | 12.1, 12.2, 12.3, 12.4 | |
| R32 | T | M | 12.1, 12.2, 12.3, 12.4 | |
| R33 | T | M | 12.1, 12.2, 12.3, 12.4 | |
| R34 | T | M | 12.1, 12.2, 12.3, 12.4 | |
| R35 | T | M | 9.1, 9.2, 9.3 | |
| R36 | T | M | 9.1, 9.2, 9.3 | |
| R37 | T | M | 9.1, 9.2, 9.3 | |
| R38 | T | M | 9.1, 9.2, 9.3 | |
| R39 | T | D | | SP requirement |
| R40 | T | M | 9.1, 9.2, 9.3 | |
| R41 | T | M | 9.1, 9.2, 9.3 | |
| R42 | T | D | | SP requirement |
| R43 | T | M | 9.1, 9.2, 9.3 | |
| R44 | T | M | 9.1, 9.2, 9.3 | |
| R45 | T | M | 9.1, 9.2, 9.3 | |
| D2 | T | O | Needs Test Methodology | |
| D3 | T | O | Needs Test Methodology | |
| R46 | T | M | 9.1, 9.2, 9.3 | |
| R47 | T | M | 9.1, 9.2, 9.3 | |
| R48 | T | M | 9.1, 9.2, 9.3 | |
| R49 | T | D | | SP requirement |
| R50 | T | D | | SP requirement |
| R51 | T | M | 10 | |
| R52 | T | M | 10 | |
| R53 | T | D | | SP requirement |
| R54 | T | D | | SP requirement |
| R55 | T | M | Needs Test Methodology | |
| R56 | T | D | | SP requirement |
| R57 | T | M | Needs Test Methodology | |
| D4 | T | O | Needs Test Methodology | |
| R58 | T | M | Needs Test Methodology | |

| MEF 88 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology from this document | Comments |
|--------------------|----------------------------------|--|--|----------------|
| R59 | T | D | | SP requirement |
| R60 | T | D | | SP requirement |
| R61 | T | D | | SP requirement |
| R62 | T | M | Needs Test Methodology | |
| R63 | T | D | | SP requirement |
| R64 | T | M | Needs Test Methodology | How |
| D5 | T | O | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R65 | T | M | Needs Test Methodology | |
| R66 | T | D | | SP requirement |
| R67 | T | D | | SP requirement |
| R68 | T | D | | SP requirement |
| R69 | T | M | Needs Test Methodology | |
| R70 | T | D | | SP requirement |
| R71 | T | M | Needs Test Methodology | |
| D6 | T | O | Needs Test Methodology | |
| R72 | T | D | | SP requirement |
| R73 | T | D | | SP requirement |
| R74 | T | D | | SP requirement |
| R75 | T | M | 12.3 | |
| R76 | T | M | 12.3 | |
| R77 | T | D | | SP requirement |

Table 10 – Applicable MEF 88 Requirements

Editor Note 13: The test methodology is still being discussed for rows that have a Test Methodology indicating that it Needs Test Methodology. Once finalized, the test methodology will be updated.

15 Testing of MEF 117 Requirements

The focus of this section is to identify which requirements from MEF 117 [10] are tested using the test methodologies defined in sections 8, 9, 10, 11, and 12.

Requirements are either Mandatory, meaning that they must be tested as a part of certification, Optional, meaning that they may be tested as a part of certification, or Deferred, meaning that they are requirements focused on Service Providers who are not included in the scope of this certification test.



| MEF 117 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology | Comments |
|---------------------|----------------------------------|--|------------------------|--|
| R1 | N | | | |
| R2 | N | | | |
| R3 | N | | | |
| R4 | N | | | |
| R5 | N | | | |
| R6 | N | | | |
| R7 | N | | | |
| R8 | N | | | |
| R9 | N | | | |
| R10 | N | | | |
| R11 | N | | | |
| R12 | N | | | |
| R13 | N | | | |
| R14 | N | | | |
| R15 | Y | M | Needs Test Methodology | |
| R16 | Y | M | Needs Test Methodology | |
| R17 | N | | | |
| R18 | Y | M | Needs Test Methodology | |
| R19 | N | | | |
| R20 | N | | | |
| R21 | N | | | |
| R22 | N | | | |
| R23 | N | | | |
| D1 | N | | | |
| R24 | N | | | |
| R25 | N | | | |
| R26 | N | | | |
| R27 | N | | | |
| R28 | T | M | 11.2 | |
| R29 | T | M | 11.1 | |
| R30 | T | M | | See MEF 118 list requirements R3-R11 inclusive |
| R31 | N | | | ZT requirement |
| R32 | N | | | ZT requirement |
| D2 | N | | | ZT requirement |
| R33 | N | | | ZT requirement |
| R34 | N | | | ZT requirement |



| MEF 117 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology | Comments |
|---------------------|----------------------------------|--|--|--|
| R35 | N | | | ZT requirement |
| D3 | N | | | ZT requirement |
| R36 | N | | | |
| R37 | N | | | |
| R38 | N | | | ZT requirement |
| R39 | N | | | ZT requirement |
| R40 | N | | | ZT requirement |
| R41 | N | | | |
| R42 | T | M | Needs Test Methodology | How to verify state? |
| R43 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| D4 | T | O | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| D5 | N | | | See MEF W90.2 |
| R44 | T | M | 10.2 | |
| R45 | T | M | 10.2 | |
| R46 | T | M | | How |
| R47 | T | M | | See Table 10 – Applicable MEF 88 Requirements |
| R48 | T | M | | See Table 10 – Applicable MEF 88 Requirements |
| R49 | T | M | | See Table 10 – Applicable MEF 88 Requirements |
| R50 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R51 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R52 | T | D | | SP REQUIREMENT |



| MEF 117 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology | Comments |
|---------------------|----------------------------------|--|--|----------------|
| R53 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R54 | T | M | 11.1 | |
| R55 | T | D | | SP REQUIREMENT |
| R56 | T | M | 11.1 | |
| R57 | T | M | 11.1 | |
| D6 | T | O | 11.1 | |
| R58 | T | M | 10.2 | |
| R59 | T | M | 10.2 | |
| R60 | T | M | 10.2 | |
| R61 | T | M | 10.2 | |
| R62 | N | | | |
| R63 | T | D | | SP requirement |
| R64 | T | M | 10.2 | |
| R65 | N | | | |
| R66 | T | M | 10.2 | |
| R67 | T | M | 10.2 | |
| R68 | Y | M | 12.2 | |
| R69 | T | M | 10.1 | |
| R70 | T | M | 10.1 | |
| D7 | T | O | 10.1 | |
| R71 | T | M | 9.1, 9.2, 9.3 | |
| D8 | T | O | Needs Test Methodology | |
| R72 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R73 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R74 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R75 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| CR1 | N | | | |
| CR2 | N | | | |
| R76 | T | M | 10.2 | |
| R77 | N | | | |

| MEF 117 Requirement | Testable (T) or Not Testable (N) | Mandatory (M), Deferred (D), or Optional (O) | Test Methodology | Comments |
|---------------------|----------------------------------|--|--|----------------|
| R78 | T | M | 10.2 | |
| R79 | T | M | 10.2 | |
| R80 | T | M | 10.2 | |
| R81 | N | | | |
| R82 | T | M | 10.2 | |
| R83 | N | | | |
| R84 | N | | | |
| R85 | T | M | 10.2 | |
| CR3 | N | | | |
| CR4 | N | | | |
| R86 | N | | | |
| R87 | T | M | 10.2 | |
| R88 | N | | | |
| R89 | T | M | 10.2 | |
| R90 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R91 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| R92 | T | M | 11.1, 11.2.1, 11.2.2, 11.2.3, 11.2.4, 11.3 | |
| D9 | T | D | | SP REQUIREMENT |
| D10 | T | D | | SP REQUIREMENT |

Table 11 – MEF 117 Requirements

Editor Note 14: The test methodology is still being discussed for rows that have a test methodology of Needs Test Methodology. Once finalized, the test methodology will be updated.

16 Rating Methodology

The method used to determine the rating for an SD-WAN Edge Vendor solution or a SP SWVC solution under test use objective methods to provide a rating. Ratings use a 0-to-800-point scale. The point values for each rating are shown in Table 12.

| Rating | Minimum Points | Maximum Points |
|--------|----------------|----------------|
| AAA | 775 | 800 |
| AA | 720 | 774 |
| A | 660 | 719 |
| BBB | 590 | 659 |
| BB | 540 | 589 |
| B | 480 | 539 |
| CCC | 420 | 479 |
| CC | 360 | 419 |
| C | 300 | 359 |
| D | 0 | 299 |

Table 12 – Rating Point Values

Each session of testing begins with the allocation of 800 points. Points are then deducted from the 800 points when a test does not perform as specified. A percentage of points is allocated to specific sections of the document.



| Section Number | Penalty | Comments |
|----------------|------------|---------------|
| 8.1.1 | No penalty | Record values |
| 8.1.2 | No penalty | Record values |
| 8.2.1 | No penalty | Record values |
| 8.2.2 | No penalty | Record values |
| 8.3.1.1 | No penalty | Record values |
| 8.3.1.2 | No penalty | Record values |
| 8.3.1.3 | No penalty | Record values |
| 8.3.1.4 | No penalty | Record values |
| 8.3.1.5 | No penalty | Record values |
| 8.3.2.1 | No penalty | Record values |
| 8.3.2.2 | No penalty | Record values |
| 8.3.2.3 | No penalty | Record values |
| 8.3.2.4 | No penalty | Record values |
| 8.3.2.5 | No penalty | Record values |
| 8.3.3.1 | No penalty | Record values |
| 8.3.3.2 | No penalty | Record values |
| 8.3.3.3 | No penalty | Record values |
| 8.3.3.4 | No penalty | Record values |
| 8.3.3.5 | No penalty | Record values |
| 8.3.4.1 | No penalty | Record values |
| 8.3.4.2 | No penalty | Record values |
| 8.3.4.3 | No penalty | Record values |
| 8.3.4.4 | No penalty | Record values |
| 8.3.4.5 | No penalty | Record values |
| 9.1.1 | 100% | |
| 9.1.2 | 100% | |
| 9.2 | 100% | |
| 9.3 | 100% | |
| 10.1.1 | 100% | |
| 10.2.1.1 | 100% | |
| 10.2.1.2 | 100% | |
| 10.2.1.3 | 100% | |
| 10.2.1.4 | 100% | |
| 10.2.1.5 | 100% | |
| 10.2.1.6 | 100% | |
| 10.2.2.1 | 100% | |
| 10.2.2.2 | 100% | |
| 10.2.2.3 | 100% | |
| 10.2.2.4 | 100% | |
| 10.2.2.5 | 100% | |
| 10.2.2.6 | 100% | |
| 10.2.3 | 25% | |
| 11.1 | 50% | |
| 11.2.1 | 100% | |

| Section Number | Penalty | Comments |
|----------------|-------------------------|----------|
| 11.2.2 | 10% | |
| 11.2.3 | 10% | |
| 11.2.4 | 5% | |
| 11.3 | 15% | |
| 12.1.1 | 100% | |
| 12.1.2 | 100% | |
| 12.2 | 100% | |
| 12.3 | 10% per missing exploit | |
| 12.3.2 | 100% | |
| 12.3.3 | 100% | |
| 12.3.4 | 100% | |
| 12.3.5 | 100% | |
| 12.4 | 50% | |
| 13.1 | 3% per missing evasion | |
| 13.2 | 3% per missing evasion | |
| 13.3 | 3% per missing evasion | |
| 13.4 | 3% per missing evasion | |
| 13.5 | 3% per missing evasion | |

Table 13 – Point Penalty Allocation per Section

As can be seen in Table 13, some areas of testing are considered “table stakes” for an SSE Vendor solution and test results that indicate that the expected capabilities are not provided results in a significant penalty.

Other areas of testing are considered “nice to have” functions and a lower penalty is deducted if the test results in these areas are lower than expected.

Some areas of testing are used as benchmarks for performance of the SD-WAN Edge Vendor solution or a SP SWVC solution that are compared to other tests that introduce impairments or high loads to determine their impact on the performance. No points are deducted for these areas.

The percentage of penalty is calculated and deducted from the total points and the total points associated with the testing are determined. The overall rating is determined based on the total points as shown in Table 12. Scores are not provided for each section of the testing, only for the overall results.

Note: If a specific exploit, malware, or evasion fails an initial test it is not used again when steps like layered evasions are tested.

16.1 MEF Certification Pass/Fail Criteria

To allow for a MEF Certification a Pass/Fail criteria has been defined within this section. Scores are calculated as describe below.

It is proposed that a minimum of 90% of the requirements from MEF 88 and MEF 117 shown in section 14 (MEF 88) and section 15 (MEF 117) as testable are required to pass in order for an SSE



solution to be eligible for MEF Certification. Solutions that fail to meet these criteria may still be provided a rating but need are not MEF certified.

17 References

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