



# CompTIA Cybersecurity Analyst (CSA+) Certification Exam Objectives

**EXAM NUMBER: CS0-001**



# About the Exam

The CompTIA Cybersecurity Analyst (CSA+) certification is a vendor-neutral credential. The CompTIA CSA+ exam is an internationally targeted validation of intermediate-level security skills and knowledge. While there is no required prerequisite, the CompTIA CSA+ certification is intended to follow CompTIA Security+ or equivalent experience and has a technical, “hands-on” focus on IT security analytics.

The CompTIA CSA+ examination is designed for IT security analysts, vulnerability analysts or threat intelligence analysts. The exam will certify that the successful candidate has the knowledge and skills required to configure and use threat detection tools, perform data analysis and interpret the results to identify vulnerabilities, threats and risks to an organization with the end goal of securing and protecting applications and systems within an organization.

It is recommended for CompTIA CSA+ certification candidates to have the following:

- **3-4 years of hands-on information security or related experience**
- **Network+, Security+ or equivalent knowledge**

## **CompTIA AUTHORIZED MATERIALS USE POLICY**

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## **PLEASE NOTE**

The lists of examples provided in bulleted format are not exhaustive lists. Other examples of technologies, processes or tasks pertaining to each objective may also be included on the exam although not listed or covered in this objectives document. CompTIA is constantly reviewing the content of our exams and updating test questions to be sure our exams are current and the security of the questions is protected. When necessary, we will publish updated exams based on existing exam objectives. Please know that all related exam preparation materials will still be valid.

## TEST DETAILS

|                        |  |
|------------------------|--|
| Required exam          | CS0-001  |
| Number of questions    | Maximum of 85 questions  |
| Types of questions     | Multiple choice and performance-based  |
| Length of test         | 165 Minutes  |
| Recommended experience | Network+, Security+ or equivalent knowledge.<br><br>Minimum of 3-4 years of hands-on information security or related experience. While there is no required prerequisite, CSA+ is intended to follow CompTIA Security+ or equivalent experience and has a technical, “hands-on” focus. |
| Passing score          | 750 (on a scale of 100-900)  |

## EXAM OBJECTIVES (DOMAINS)

The table below lists the domains measured by this examination and the extent to which they are represented. The CompTIA CSA+ exam is based on these objectives.

| DOMAIN                                  | PERCENTAGE OF EXAMINATION |
|---|---------------------------|
| 1.0 Threat Management                   | 27%                       |
| 2.0 Vulnerability Management            | 26%                       |
| 3.0 Cyber Incident Response             | 23%                       |
| 4.0 Security Architecture and Tool Sets | 24%                       |
| <b>Total</b>                            | <b>100%</b>               |



# 1.0 Threat Management

**1.1** Given a scenario, apply environmental reconnaissance techniques using appropriate tools and processes.

• **Procedures/common tasks**

- Topology discovery
- OS fingerprinting
- Service discovery
- Packet capture
- Log review
- Router/firewall ACLs review
- Email harvesting
- Social media profiling
- Social engineering

- DNS harvesting

- Phishing

• **Variables**

- Wireless vs. wired
- Virtual vs. physical
- Internal vs. external
- On-premises vs. cloud

• **Tools**

- NMAP
- Host scanning

- Network mapping

- NETSTAT

- Packet analyzer

- IDS/IPS

- HIDS/NIDS

- Firewall rule-based and logs

- Syslog

- Vulnerability scanner

**1.2** Given a scenario, analyze the results of a network reconnaissance.

• **Point-in-time data analysis**

- Packet analysis
- Protocol analysis
- Traffic analysis
- Netflow analysis
- Wireless analysis

• **Data correlation and analytics**

- Anomaly analysis
- Trend analysis
- Availability analysis

- Heuristic analysis

- Behavioral analysis

• **Data output**

- Firewall logs
- Packet captures
- NMAP scan results
- Event logs
- Syslogs
- IDS report

• **Tools**

- SIEM
- Packet analyzer
- IDS
- Resource monitoring tool
- Netflow analyzer



### 1.3 Given a network-based threat, implement or recommend the appropriate response and countermeasure.

- **Network segmentation**
    - System isolation
    - Jump box
  - **Honeypot**
  - **Endpoint security**
  - **Group policies**
  - **ACLs**
    - Sinkhole
  - **Hardening**
    - Mandatory Access Control (MAC)
    - Compensating controls
    - Blocking unused ports/services
    - Patching
  - **Network Access Control (NAC)**
    - Time-based
    - Rule-based
    - Role-based
    - Location-based
- 

### 1.4 Explain the purpose of practices used to secure a corporate environment.

- **Penetration testing**
  - Rules of engagement
  - Timing
  - Scope
  - Authorization
  - Exploitation
  - Communication
  - Reporting
- **Reverse engineering**
  - Isolation/sandboxing
  - Hardware
    - Source authenticity of hardware
    - Trusted foundry
    - OEM documentation
  - Software/malware
    - Fingerprinting/hashing
    - Decomposition
- **Training and exercises**
  - Red team
  - Blue team
  - White team
- **Risk evaluation**
  - Technical control review
  - Operational control review
  - Technical impact and likelihood
    - High
    - Medium
    - Low



## 2.0 Vulnerability Management

**2.1** Given a scenario, implement an information security vulnerability management process.

- **Identification of requirements**
  - Regulatory environments
  - Corporate policy
  - Data classification
  - Asset inventory
    - Critical
    - Non-critical
- **Establish scanning frequency**
  - Risk appetite
  - Regulatory requirements
  - Technical constraints
  - Workflow
- **Configure tools to perform scans according to specification**
  - Determine scanning criteria
    - Sensitivity levels
    - Vulnerability feed
    - Scope
    - Credentialed vs. non-credentialed
    - Types of data
    - Server-based vs. agent-based
  - Tool updates/plugin-ins
  - SCAP
  - Permissions and access
- **Execute scanning**
- **Generate reports**
  - Automated vs. manual distribution
- **Remediation**
  - Prioritizing
    - Criticality
    - Difficulty of implementation
  - Communication/change control
  - Sandboxing/testing
  - Inhibitors to remediation
    - MOUs
    - SLAs
    - Organizational governance
    - Business process interruption
    - Degrading functionality
- **Ongoing scanning and continuous monitoring**

**2.2** Given a scenario, analyze the output resulting from a vulnerability scan.

- **Analyze reports from a vulnerability scan**
  - Review and interpret scan results
    - Identify false positives
    - Identify exceptions
    - Prioritize response actions
- **Validate results and correlate other data points**
  - Compare to best practices or compliance
  - Reconcile results
  - Review related logs and/or other data sources
  - Determine trends

**2.3** Compare and contrast common vulnerabilities found in the following targets within an organization.

- Servers
  - Virtual hosts
  - Virtual networks
  - Management interface
- Endpoints
- Network infrastructure
- Network appliances
- Virtual infrastructure
- Mobile devices
- Interconnected networks
- Virtual Private Networks (VPNs)
- Industrial Control Systems (ICSs)
- SCADA devices



## 3.0 Cyber Incident Response

**3.1** Given a scenario, distinguish threat data or behavior to determine the impact of an incident.

- **Threat classification**
  - Known threats vs. unknown threats
  - Zero day
  - Advanced persistent threat
- **Factors contributing to incident severity and prioritization**
  - Scope of impact
  - Downtime
- **Recovery time**
  - Data integrity
  - Economic
  - System process criticality
- **Types of data**
  - Personally Identifiable Information (PII)
  - Personal Health Information (PHI)
- **Payment card information**
  - Intellectual property
  - Corporate confidential
  - Accounting data
  - Mergers and acquisitions

**3.2** Given a scenario, prepare a toolkit and use appropriate forensics tools during an investigation.

- **Forensics kit**
  - Digital forensics workstation
  - Write blockers
  - Cables
  - Drive adapters
  - Wiped removable media
  - Cameras
  - Crime tape
- **Tamper-proof seals**
  - Documentation/forms
  - Chain of custody form
  - Incident response plan
  - Incident form
  - Call list/escalation list
- **Forensic investigation suite**
  - Imaging utilities
- **Analysis utilities**
  - Chain of custody
  - Hashing utilities
  - OS and process analysis
  - Mobile device forensics
  - Password crackers
  - Cryptography tools
  - Log viewers

**3.3** Explain the importance of communication during the incident response process.

- **Stakeholders**
  - HR
  - Legal
  - Marketing
  - Management
- **Purpose of communication processes**
  - Limit communication to trusted parties
  - Disclosure based on regulatory/legislative requirements
  - Prevent inadvertent release of information
  - Secure method of communication
- **Role-based responsibilities**
  - Technical
  - Management
  - Law enforcement
  - Retain incident response provider



### 3.4 Given a scenario, analyze common symptoms to select the best course of action to support incident response.

#### • Common network-related symptoms

- Bandwidth consumption
- Beaconing
- Irregular peer-to-peer communication
- Rogue devices on the network
- Scan sweeps
- Unusual traffic spikes

#### • Common host-related symptoms

- Processor consumption
- Memory consumption
- Drive capacity consumption
- Unauthorized software
- Malicious processes
- Unauthorized changes
- Unauthorized privileges
- Data exfiltration

#### • Common application-related symptoms

- Anomalous activity
- Introduction of new accounts
- Unexpected output
- Unexpected outbound communication
- Service interruption
- Memory overflows

### 3.5 Summarize the incident recovery and post-incident response process.

#### • Containment techniques

- Segmentation
- Isolation
- Removal
- Reverse engineering

#### • Eradication techniques

- Sanitization
- Reconstruction/reimage
- Secure disposal

#### • Validation

- Patching
- Permissions
- Scanning
- Verify logging/communication to security monitoring

#### • Corrective actions

- Lessons learned report
- Change control process
- Update incident response plan

#### • Incident summary report





## 4.0 Security Architecture and Tool Sets

**4.1** Explain the relationship between frameworks, common policies, controls, and procedures.

- **Regulatory compliance**
- **Frameworks**
  - NIST
  - ISO
  - COBIT
  - SABSA
  - TOGAF
  - ITIL
- **Policies**
  - Password policy
  - Acceptable use policy
  - Data ownership policy
- Data retention policy
- Account management policy
- Data classification policy
- **Controls**
  - Control selection based on criteria
  - Organizationally defined parameters
  - Physical controls
  - Logical controls
  - Administrative controls
- **Procedures**
  - Continuous monitoring
  - Evidence production
- Patching
- Compensating control development
- Control testing procedures
- Manage exceptions
- Remediation plans
- **Verifications and quality control**
  - Audits
  - Evaluations
  - Assessments
  - Maturity model
  - Certification

**4.2** Given a scenario, use data to recommend remediation of security issues related to identity and access management.

- **Security issues associated with context-based authentication**
  - Time
  - Location
  - Frequency
  - Behavioral
- **Security issues associated with identities**
  - Personnel
  - Endpoints
  - Servers
  - Services
  - Roles
  - Applications
- **Security issues associated with identity repositories**
  - Directory services
  - TACACS+
  - RADIUS
- **Security issues associated with federation and single sign-on**
  - Manual vs. automatic provisioning/deprovisioning
  - Self-service password reset
- **Exploits**
  - Impersonation
  - Man-in-the-middle
  - Session hijack
  - Cross-site scripting
  - Privilege escalation
  - Rootkit



### 4.3 Given a scenario, review security architecture and make recommendations to implement compensating controls.

- **Security data analytics**
  - Data aggregation and correlation
  - Trend analysis
  - Historical analysis
- **Manual review**
  - Firewall log
  - Syslogs
  - Authentication logs
  - Event logs
- **Defense in depth**
  - Personnel
    - Training
    - Dual control
    - Separation of duties
    - Third party/consultants
    - Cross training
    - Mandatory vacation
    - Succession planning
  - Processes
    - Continual improvement
    - Scheduled reviews
    - Retirement of processes
- **Technologies**
  - Automated reporting
  - Security appliances
  - Security suites
  - Outsourcing
    - Security as a Service
  - Cryptography
- **Other security concepts**
  - Network design
  - Network segmentation

### 4.4 Given a scenario, use application security best practices while participating in the Software Development Life Cycle (SDLC).

- **Best practices during software development**
  - Security requirements definition
  - Security testing phases
    - Static code analysis
    - Web app vulnerability scanning
    - Fuzzing
    - Use interception proxy to crawl application
  - Manual peer reviews
  - User acceptance testing
  - Stress test application
  - Security regression testing
  - Input validation
- **Secure coding best practices**
  - OWASP
  - SANS
  - Center for Internet Security
    - System design recommendations
    - Benchmarks



## 4.5 Compare and contrast the general purpose and reasons for using various cybersecurity tools and technologies.

(\*\*The intent of this objective is NOT to test specific vendor feature sets.)

### • Preventative

- IPS
  - Sourcefire
  - Snort
  - Bro
- HIPS
- Firewall
  - Cisco
  - Palo Alto
  - Check Point
- Antivirus
- Anti-malware
- EMET
- Web proxy
- Web Application Firewall (WAF)
  - ModSecurity
  - NAXSI
  - Imperva

### • Collective

- SIEM
  - ArcSight
  - QRadar
  - Splunk
  - AlienVault
  - OSSIM
  - Kiwi Syslog
- Network scanning
  - NMAP
- Vulnerability scanning
  - Qualys
  - Nessus
  - OpenVAS
  - Nexpose
  - Nikto
  - Microsoft Baseline Security Analyzer

- Packet capture
  - Wireshark
  - tcpdump
  - Network General
  - Aircrack-ng
- Command line/IP utilities
  - netstat
  - ping
  - tracer/traceroute
  - ipconfig/ifconfig
  - nslookup/dig
  - Sysinternals
  - OpenSSL
- IDS/HIDS
  - Bro

### • Analytical

- Vulnerability scanning
  - Qualys
  - Nessus
  - OpenVAS
  - Nexpose
  - Nikto
  - Microsoft Baseline Security Analyzer
- Monitoring tools
  - MRTG
  - Nagios
  - SolarWinds
  - Cacti
  - NetFlow Analyzer
- Interception proxy
  - Burp Suite
  - Zap
  - Vega

### • Exploit

- Interception proxy
  - Burp Suite
  - Zap
  - Vega
- Exploit framework
  - Metasploit
  - Nexpose
- Fuzzers
  - Untidy
  - Peach Fuzzer
  - Microsoft SDL File/Regex Fuzzer

### • Forensics

- Forensic suites
  - EnCase
  - FTK
  - Helix
  - Sysinternals
  - Cellebrite
- Hashing
  - MD5sum
  - SHASum
- Password cracking
  - John the Ripper
  - Cain & Abel
- Imaging
  - DD

# CSA+ Cybersecurity Analyst Acronym List

The following is a list of acronyms that appear on the CompTIA Cybersecurity Analyst exam. Candidates are encouraged to review the complete list and attain a working knowledge of all listed acronyms as a part of a comprehensive exam preparation program.

| <b>ACRONYM</b> | <b>SPELLED OUT</b>  | <b>ACRONYM</b> | <b>SPELLED OUT</b>  |
|----------------|---|----------------|---|
| ACL            | Access Control List                                       | PCA            | Prinicipal Component Analysis                             |
| ARP            | Address Resolution Protocol                               | PCI            | Payment Card Industry                                     |
| BYOD           | Bring Your Own Device                                     | PHI            | Protected Health Information                              |
| CIS            | Center for Internet Security                              | PII            | Personally Identifiable Information                       |
| CoBIT          | Control Objectives for Information and Related Technology | RACI           | Responsible, Accountable, Consulted and Informed          |
| CCTV           | Closed-Circuit Television                                 | RADIUS         | Remote Authentication Dial-In User Service                |
| CRM            | Customer Relations Management                             | SABSA          | Sherwood Applied Business Security Architecture           |
| DDoS           | Distributed Denial of Service                             | SANS           | System Administration, Networking, and Security Institute |
| DNS            | Domain Name Service                                       | SCADA          | Supervisory Control and Data Acquisition                  |
| EMET           | Enhanced Mitigation Experience Toolkit                    | SCAP           | Security Content Automation Protocol                      |
| FISMA          | Federal Information Security Management Act               | SDLC           | Software Development Life Cycle                           |
| FTK            | Forensic Tool Kit   | SEO            | Search Engine Optimization                                |
| FTP            | File Transfer Protocol                                    | SHA            | Secure Hash Algorithm                                     |
| HBSS           | Host Based Security System                                | SIEM           | Security Incident and Event Manager                       |
| HIDS           | Host Intrusion Detection System                           | SLA            | Service Level Agreement                                   |
| HIPS           | Host Intrusion Prevention System                          | SOC            | Security Operations Center                                |
| HR             | Human Resources   | SPF            | Sender Policy Framework                                   |
| ICS            | Industrial Control Systems                                | SSH            | Secure Shell  |
| IDS            | Intrusion Detection System                                | SSL            | Secure Sockets Layer                                      |
| IMAP           | Internet Message Access Protocol                          | TACACS+        | Terminal Access Controller Access Control System Plus     |
| IOC            | Indicator of Compromise                                   | TFTP           | Trivial File Transfer Protocol                            |
| IPS            | Intrusion Prevention System                               | TLS            | Transport Layer Security                                  |
| ISO            | International Organization for Standardization            | TOGAF          | The Open Group Architecture Framework                     |
| ITIL           | Information Technology Infrastructure Library             | USB            | Universal Serial Bus                                      |
| LDAP           | Lightweight Directory Access Protocol                     | VAS            | Vulnerability Assessment System                           |
| MAC            | Mandatory Access Control                                  | VDI            | Virtual Desktop Infrastructure                            |
| MD5            | Message Digest 5  | VLAN           | Virtual Local Area Network                                |
| MOA            | Memorandum Of Agreement                                   | VPN            | Virtual Private Network                                   |
| MOU            | Memorandum Of Understanding                               | WAF            | Web Application Firewall                                  |
| MRTG           | Multi Router Traffic Grapher                              |                |   |
| NAC            | Network Access Control                                    |                |   |
| NAXSI          | Nginx Anti XSS & SQL Injection                            |                |   |
| NIC            | Network Interface Card                                    |                |   |
| NIDS           | Network Intrusion Detection System                        |                |   |
| NIST           | National Institute of Standards & Technology              |                |   |
| OEM            | Original Equipment Manufacturer                           |                |   |
| OSSIM          | Open Source Security Information Management               |                |   |
| OWASP          | Open Web Application Security Project                     |                |   |
| PAM            | Pluggable Authentication Module                           |                |   |

# Suggested Classroom Equipment for CSA+ Certification Training

\*\*CompTIA has included this sample list of hardware and software to assist candidates as they prepare for the CSA+ exam. This list may also be helpful for training companies who wish to create a lab component to their training offering. The bulleted lists below each topic are a sample list and not exhaustive.

## **IT HARDWARE**

- Router
- Switch
- Firewall
- Workstations/laptops
- IDS/IPS
- Servers
- Write blocker
- Pelican cases
- Wireless access point
- Drive adapters
- VoIP phone
- Mobile phone

## **TOOLS**

- Screw driver
- PC service toolkit

## **CONSUMABLES**

- CAT5/6 cables
- Spare drives/flash drives

## **SOFTWARE**

- Virtualization platform
- Kali Linux/BackTrack
- Virtualized attack targets
  - Web servers
  - Database servers
  - Time servers
  - DNS servers
  - PC workstations