

OpenSCAP	3
1. (SCAP) OpenSCAP	3
1.1. SCAP 가?	3
1.2. OpenSCAP :	3
1.3.	4
2. SCAP	4
2.1. SCAP	4
2.2. SCAP	5
3. OpenSCAP :	6
3.1. OpenSCAP :	6
3.2. oscap:	6
3.3. SCAP Workbench:	6
3.4.	7
4. 가 : OpenSCAP 가	7
4.1.	7
4.2. SCAP 가 (SSG)	8
4.3.	9
4.4. (Tailoring)	9
5. OpenSCAP	10
5.1. CIS(Center for Internet Security)	10
5.2. DISA STIGs(Security Technical Implementation Guides)	10
5.3. (: FISMA, HIPAA, PCI-DSS, NIST SP 800-53)	11
6. OpenSCAP	11
7.	12
SCAP	12
(Coverage Gaps)	12
8. OpenSCAP :	13
8.1. OpenSCAP Nessus	13
8.2. OpenSCAP Qualys VMDR	13
8.3. : OpenSCAP, Nessus, Qualys VMDR	14
9.	15
9.1. OpenSCAP: , , API	15
9.2. OpenSCAP	15
10.	15
10.1. OpenSCAP 가	15
10.2. OpenSCAP	16
	16

OpenSCAP

Google Gemini

.

: 2025-06-09

1. (SCAP) OpenSCAP

(IT) 가 , 가, (SCAP) OpenSCAP .

1.1. SCAP 가?

SCAP(Security Content Automation Protocol) ,
가 가 .¹ SCAP
(NIST) 800-53(SP 800-53)
¹ (FISMA)
¹ SCAP
NIST가 (NVD) .¹ SCAP
,
.
.
¹ SCAP
가 ,
¹ .
SCAP NIST , 가 , NIST FISMA
¹ NIST SCAP
, FISMA
.
SCAP
가 , SCAP “ ”
“ ”
.
.

1.2. OpenSCAP :

OpenSCAP (OSCAP) SCAP .³ SCAP
, SCAP
¹ OpenSCAP SCAP 가 (SSG) 가 (oscap)
³ OpenSCAP SCAP
,
SCAP . OpenSCAP
가
.

1.3.

SCAP
가
, SCAP
가
DSS, NIST, FedRAMP, FISMA
IT
가
가
OpenSCAP
가

2. SCAP

SCAP
SCAP

2.1. SCAP

- SCAP
- XCCDF (Extensible Configuration Checklist Description Format):
XML
SCAP 가 (SSG) XCCDF
 - OVAL (Open Vulnerability and Assessment Language):
가
. OVAL (:
 - CVE (Common Vulnerabilities and Exposures):
 - CPE (Common Platform Enumeration):
 - CVSS (Common Vulnerability Scoring System):
remediation
 - CCE (Common Configuration Enumeration):

- ARF (Asset Reporting Format):
 - . oscap ARF
- TMSAD (Trust Model for Security Automation Data):
- AID (Asset Identification):
- CCSS (Common Configuration Scoring System):

SCAP
SCAP(OpenSCAP) 가
(XCCDF, OVAL) (CPE),
(CVE), 가(CVSS) “ (suite)”¹ SCAP
SCAP 가 “ 1” SCAP 가

2.2. SCAP

SCAP
SCAP , SCAP

	(Full Name)		SCAP
XCCDF	Extensible Configuration Checklist Description Format ()	, XML “ ”	가
OVAL	Open Vulnerability and Assessment Language (가)	(: , 가) XML ()	XCCDF “ ”
CVE	Common Vulnerabilities and Exposures ()		가
CPE	Common Platform Enumeration ()	IT (, OS,)	
CVSS	Common Vulnerability Scoring System (가)	가	remediation
CCE	Common Configuration Enumeration ()	()	
ARF	Asset Reporting Format ()	가	가 가

SCAP

SCAP
가
SCAP
OpenSCAP

3. OpenSCAP :

OpenSCAP SCAP
OpenSCAP 가 ,
(oscap) (SCAP Workbench)

3.1. OpenSCAP :

OpenSCAP⁵
SCAP Workbench, Red Hat Satellite SCAPTimony, OpenSCAP⁵
Daemon
SCAP⁵ OpenSCAP Base C API
SCAP¹¹ 가
, API
, OpenSCAP SCAP
가 , 가
. API
SCAP SCAP
SCAP

3.2. oscap:

oscap OpenSCAP⁵
XCCDF OVAL 가⁵
SCAP 1.2 SCAP 1.1 1.0⁵
DISA STIG, NIST USGCB, PCI-DSS Red Hat 가⁵
oscap xccdf eval 가⁹, oscap info
oscap xccdf generate report ARF/XML HTML¹²
(CLI) oscap (verbose) oscap¹²
. GUI OpenSCAP
. oscap⁵, CLI, CI/CD
(: cron , Ansible, CI/CD) , OpenSCAP

3.3. SCAP Workbench:

SCAP Workbench OpenSCAP⁹

XCCDF SDS(Source Data Stream) 가

¹³ , HTML, ARF XCCDF

⁹ SCAP 가 (SSG) SCAP Workbench Workbench

⁹ (tailoring) ¹³ SCAP Workbench

가 . oscap CLI SCAP Workbench GUI⁵

OpenSCAP CLI

가

OpenSCAP

3.4.

OpenSCAP Red Hat Satellite SCAPTimony OpenSCAP Daemon

⁵ OpenShift Compliance Operator oscap xccdf eval

OpenShift 가 ¹⁰ SCAPinoculars OpenSCAP ARF

Prometheus ¹⁰ OpenSCAP Jenkins

Ansible ⁷ OSCAP (XCCDF) EM CLI Enterprise

Manager 가 ¹⁶ OpenSCAP

Compliance Operator, Jenkins, Ansible⁷ OpenSCAP OpenShift

DevOps DevSecOps

OpenSCAP

DevSecOps

4. 가 : OpenSCAP 가

OpenSCAP

OpenSCAP 가

4.1.

OpenSCAP

SCAP 가 (SSG)

- Fedora: dnf install openscap-scanner⁵ oscap SCAP Workbench yum install scap-workbench⁹ , openscap-scanner 가 . ¹² 가
- RHEL 6/7, CentOS 6/7: yum install openscap-scanner⁵ yum install scap-workbench⁹ .
- RHEL 8+/CentOS 8+: Fedora dnf , ¹² .
- Debian/Ubuntu: oscap libopenscap8 apt-get install libopenscap8⁵ . Ubuntu SCAP Workbench SSG

가 DISA FSO, NSA, Red Hat

14

가

가

가

SSG

4.3.

4.3.1.

가

, SSG

⁹

⁹ 가

```
<datastream_file.xml> oscap info <datastream_file.xml>
( : oscap info /usr/share/xml/scap/ssg/content/ssg-rhel6-ds.xml).9 SCAP
Workbench9 ( : RHEL 8 )
( : CIS Benchmark Level 1)
```

4.3.2. 가 **oscap**

```
oscap 가 : oscap xccdf eval --profile <profile_id>
--results <results_file.xml> --report <report_file.html>
<datastream_file.xml>.9 DISA STIG oscap xccdf eval --profile
selected_profile --results result_file --cpe cpe_dictionary disa_stig_content
.5 가9, oscap OVAL
가 : oscap oval eval....19 OpenSCAP
```

4.3.3. (HTML, ARF, XCCDF)

```
. --results-arf arf.xml
(ARF)9, --report report.html HTML
.9 XCCDF9 HTML
9, SCAPinoculars ARF HTML
.10 가 (ARF,
XCCDF) 가 (HTML)
OpenSCAP
```

4.4. (Tailoring)

```
. (Tailoring)
SCAP Workbench13, (fork)
ID /15
“ ” “ ”15
15 SCAP
가15 OpenSCAP XCCDF 1.1
```

openscap13

(: SSG)14,
(15)
15,
15
가 ,

5. OpenSCAP

OpenSCAP
가 CIS(Center for Internet Security) DISA STIG(Security
Technical Implementation Guides)
가

5.1. CIS(Center for Internet Security)

CIS
. OpenSCAP CIS PCI DSS, NIST, FedRAMP,
FISMA 6 Red Hat RHEL(Red Hat Enterprise
Linux) CIS scap-security-guide
18
oscap SSG
18 가, oscap
remediation() CIS
1 Level 2) 18 OpenSCAP Ubuntu CIS
17, CIS (Level
--remediate
17
OpenSCAP remediation 18, remediation
. , SSG RHEL 8 CIS remediation CIS 100%
98% 18 SSG
remediation 가 100%
remediation 가 ,

5.2. DISA STIGs(Security Technical Implementation Guides)

DISA STIG (DoD)
5 SCAP 가 (SSG) STIG 20 OpenSCAP DISA STIG 가
14 SSG DoD STIG Red Hat RHEL 6 DISA STIG SSG 14
STIG oscap xccdf eval --profile <STIG_profile>...

⁵, STIG OpenSCAP/SSG /usr/share/xml/scap/ssg/content
²⁰ STIG remediation Ansible DISA 가
(Supplemental Automation Content) ²⁰ .
SSG, Red Hat, DISA FS0 NSA STIG ¹⁴ .
가 DoD , DoD STIG .
가 가 (SSG) STIG

5.3. (: **FISMA, HIPAA, PCI-DSS, NIST SP 800-53**)

OpenSCAP CIS STIG . SCAP
NIST SP 800-53 ¹, FISMA ¹
PCI-DSS 가 (⁵, SSG가 PCI DSS ¹⁴), Oracle
Linux SSG HIPAA “ ” ¹⁶.SCAP
NIST ¹ .
OpenSCAP FISMA, HIPAA, PCI-DSS, NIST SP 800-53 ¹
SCAP 가 가 (OVAL)
SSG가 .
OpenSCAP 가 SSG 가 .

6. OpenSCAP

- OpenSCAP .
- 6.1. : OpenSCAP , ⁷
가 가 ¹ 가 .
 - 6.2. : SCAP ¹
, SCAP “ ” ⁶, SCAP 가 ⁶
가 .
 - 6.3. (): OpenSCAP ⁴ SCAP Nessus
⁶, OpenSCAP (SCC + OVAL) ²²
²¹ .
OpenSCAP .
 - 6.4. : ⁷, remediation 가
⁷ 가 ⁸ OpenSCAP 가
 - 6.5. : ⁷ CLI oscap .
OpenSCAP .
 - 6.6. : Jenkins, Ansible ⁷ .

OpenSCAP

(6.1) (, 6.3) 가
(6.4). (6.2) (6.6)
.
,
, 가 .
, 가 .

7.

OpenSCAP 가 , 가 . OpenSCAP

OpenSCAP 가 (: 2GB)
 “Out of memory: Killed process (oscap)” “Memory allocation failed”
 가 , / , /
 24

OSCAP_PROBE_MEMORY_USAGE_RATIO ,
OSCAP_PROBE_IGNORE_PATHS (:/home) ,
remediation , , oscap .²⁴
가 / 가

SCAP

가 (XCCDF, OVAL) , .⁸ SCAP 가
(²⁴ “ 가 ”)
, SCAP , openSCAP

(Coverage Gaps)

SSG RHEL 8 CIS remediation 98% 100% 가

SSG 100% 가

OpenSCAP

가

가

18

8 SCAP 가

SSG

SSG

8. OpenSCAP :

OpenSCAP 가

Nessus

Qualys

VMDR OpenSCAP

8.1. OpenSCAP Nessus

OpenSCAP Nessus 가 , , 가

- / : Nessus (Nessus Attack Scripting Language)
remediation²¹ OpenSCAP SCAP
SCAP DoD , Nessus SCAP
(: RHEL 8 SCAP).²¹ Tenable(Nessus) Nessus SCAP
- : OpenSCAP 96%
Nessus 72%²⁵ 가
- Remediation: OpenSCAP remediation (: CIS Ansible)¹⁸
Nessus remediation²¹
- UI: OpenSCAP , Nessus GUI²¹
Nessus OpenSCAP(SCC + OVAL)²¹
- : SCAP(OpenSCAP) DoD²¹ Nessus²⁶

8.2. OpenSCAP Qualys VMDR

OpenSCAP Qualys VMDR 가 , ,

- / : OpenSCAP SCAP²² Qualys
VMDR IT, OT, IoT
(VMDR)²² Qualys , ,
- 가²²
: (, , OS)²² , Qualys
- : OpenSCAP SCAP /
²² Qualys IT, OT, IoT 가

- 가 : OpenSCAP . Qualys VMDR (가)²²
- : OpenSCAP (가) , OpenSCAP , Qualys (²⁷).

8.3. : OpenSCAP, Nessus, Qualys VMDR

OpenSCAP, Nessus, Qualys VMDR .

	OpenSCAP	Nessus (Tenable)	Qualys VMDR
	SCAP 가 (OVAL) ,	,	(VMDR), ,
	SCAP (XCCDF, OVAL, CPE, CVE)	, NASL , Tenable	,
	()	(Nessus Pro, Tenable.io)	()
SCAP		가 ; SCAP	/ 가 , SCAP 가
	(SSG STIG, CIS) (oscap)	GUI, ,	, (IT/OT/IoT)
	HTML, ARF, XCCDF; / ,	가 ,	,
Remediation	remediation 가 (: SSG Ansible)	remediation	,
	/ ,	가, ,	, ,
	CLI (oscap), GUI (SCAP Workbench)	GUI (Nessus Pro, Tenable.io)	
	SCAP 가 , ,	가, ,	VMDR 가 , MSSP, ,

OpenSCAP SCAP STIG CIS 가 . Nessus Qualys . OpenSCAP 가 , SCAP 가 . , OpenSCAP SCAP , Nessus Qualys SCAP

가²¹
OpenSCAP SCAP
가 SCAP
가 OpenSCAP
“ ” SCAP

9.
OpenSCAP
OpenSCAP

9.1. OpenSCAP: , API
OpenSCAP OpenSCAP
¹² OpenSCAP cmake make
Fedora, RHEL, Ubuntu/Debian
¹²
(oscap -v), (LD_LIBRARY_PATH,
OSCAP_SCHEMA_PATH)¹² OpenSCAP Base C API¹¹,
OpenSCAP
lcov, genhtml 가¹²

9.2. OpenSCAP
OpenSCAP GitHub¹⁸ GitHub
¹⁸
¹²
¹², API¹¹,¹⁸
OpenSCAP 가
가 OpenSCAP

10.
OpenSCAP
가 OpenSCAP

10.1. OpenSCAP 가
OpenSCAP 가 , 가

SCAP
가
: CVE, CPE, XCCDF, OVAL
가
OpenSCAP

10.2. OpenSCAP

DevSecOps,
OpenSCAP
OpenShift Compliance Operator 10
OpenSCAP IT
OpenSCAP
SCAP
“ (Shift Left)” “ (Security as Code)”
OpenSCAP (XCCDF)
OpenSCAP .1 OpenSCAP
SCAP 가 (SSG) 가 가 OpenSCAP , IoT
OpenSCAP 14 (
OpenSCAP
SCAP
, OpenSCAP

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