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1.3.

OpenSCAP

## 2. SCAP

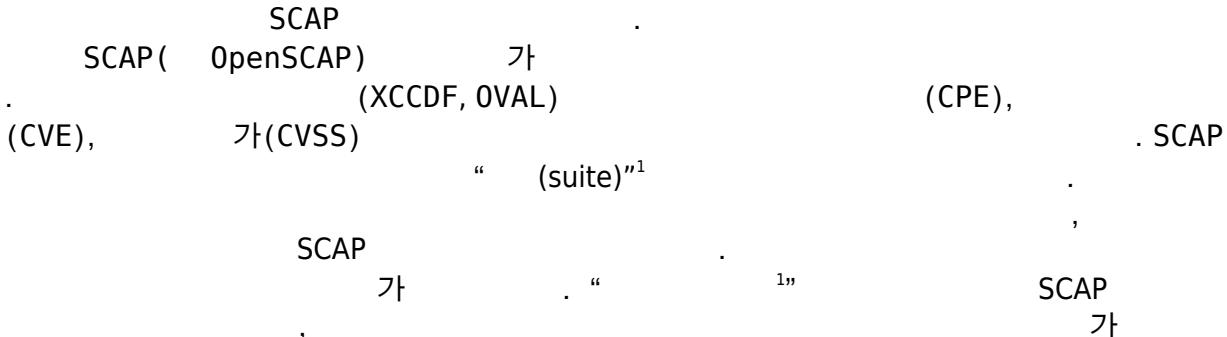
SCAP , SCAP

## 2.1. **SCAP**

SCAP 1

- XCCDF (Extensible Configuration Checklist Description Format):  
    , XML  
    <sup>1</sup> SCAP      가      (SSG)      XCCDF  
    <sup>3</sup>
- OVAL (Open Vulnerability and Assessment Language):  
    가      ,      . OVAL      ( :  
    ,      )  
    <sup>1</sup>
- CVE (Common Vulnerabilities and Exposures):  
    ,      <sup>1</sup>
- CPE (Common Platform Enumeration):  
    ,      ,  
    <sup>1</sup>
- CVSS (Common Vulnerability Scoring System):  
    ,      remediation  
    <sup>1</sup> ;
- CCE (Common Configuration Enumeration):

- ARF (Asset Reporting Format):  
oscap ARF<sup>9</sup>
- TMSAD (Trust Model for Security Automation Data):
- AID (Asset Identification):
- CCSS (Common Configuration Scoring System):



## 2.2. SCAP

SCAP  
SCAP, SCAP

	<b>(Full Name)</b>		<b>SCAP</b>
XCCDF	Extensible Configuration Checklist Description Format ( )	, “ ” XML	가
OVAL	Open Vulnerability and Assessment Language ( 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

OpenSCAP . SCAP , SCAP 가

### 3. OpenSCAP

OpenSCAP SCAP  
. .  
(oscap) . .  
OpenSCAP  
(SCAP Workben

### 3.1. OpenSCAP

```

graph TD
    A[SCAP Workbench, Red Hat Satellite] --> B[OpenSCAP Base C API]
    B --> C[SCAP API11]
    C --> D[OpenSCAP]
    D --> E[SCAP]
    E --> F[SCAP]
    F --> G[SCAP]
    G --> H[SCAP]
    H --> I[SCAP]
    I --> J[SCAP]
    J --> K[SCAP]
    K --> L[SCAP]
    L --> M[SCAP]
    M --> N[SCAP]
    N --> O[SCAP]
    O --> P[SCAP]
    P --> Q[SCAP]
    Q --> R[SCAP]
    R --> S[SCAP]
    S --> T[SCAP]
    T --> U[SCAP]
    U --> V[SCAP]
    V --> W[SCAP]
    W --> X[SCAP]
    X --> Y[SCAP]
    Y --> Z[SCAP]
    Z --> AA[SCAP]
    AA --> BB[SCAP]
    BB --> CC[SCAP]
    CC --> DD[SCAP]
    DD --> EE[SCAP]
    EE --> FF[SCAP]
    FF --> GG[SCAP]
    GG --> HH[SCAP]
    HH --> II[SCAP]
    II --> JJ[SCAP]
    JJ --> KK[SCAP]
    KK --> LL[SCAP]
    LL --> MM[SCAP]
    MM --> NN[SCAP]
    NN --> OO[SCAP]
    OO --> PP[SCAP]
    PP --> QQ[SCAP]
    QQ --> RR[SCAP]
    RR --> SS[SCAP]
    SS --> TT[SCAP]
    TT --> UU[SCAP]
    UU --> VV[SCAP]
    VV --> WW[SCAP]
    WW --> XX[SCAP]
    XX --> YY[SCAP]
    YY --> ZZ[SCAP]
    ZZ --> AA
  
```

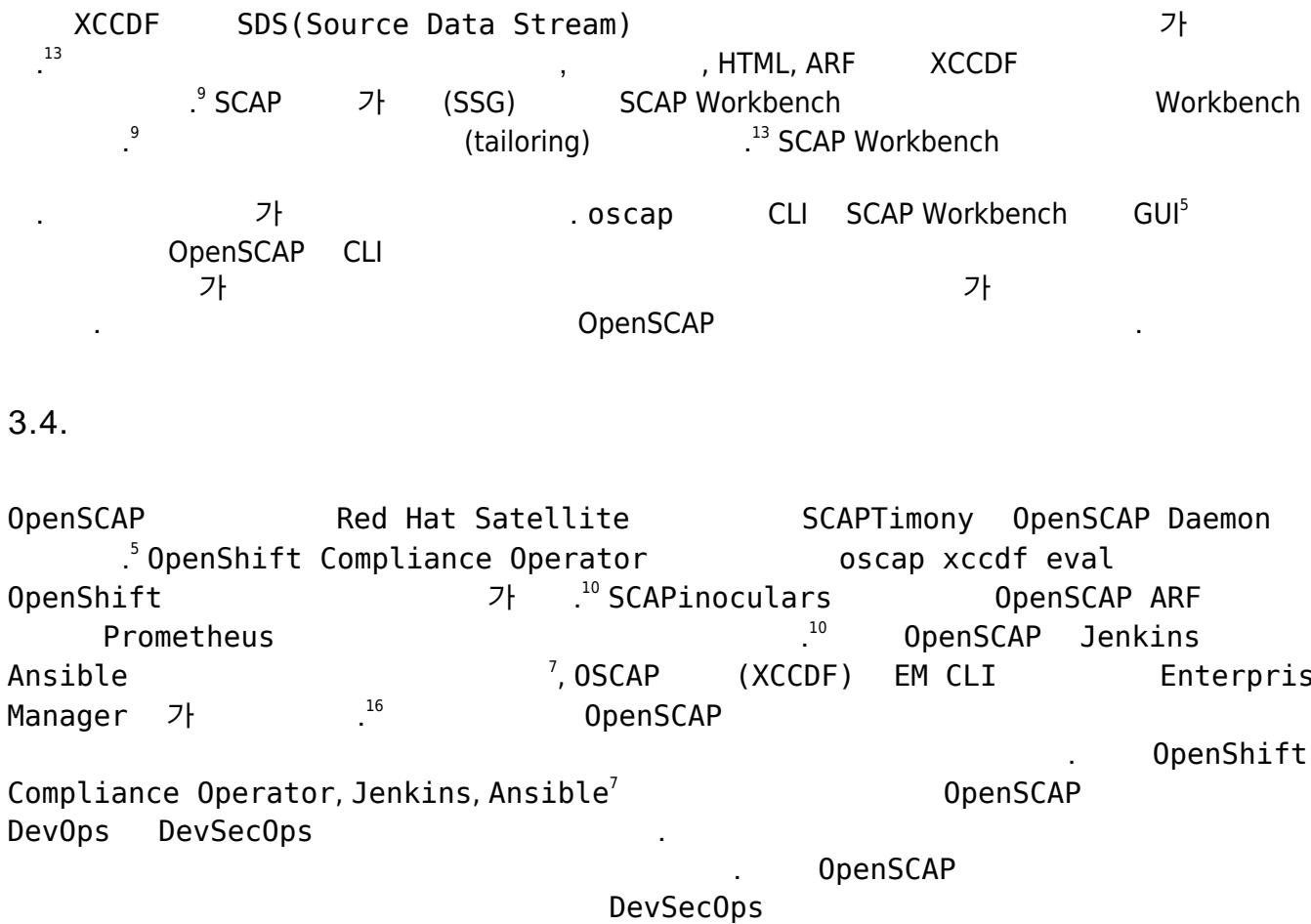
The diagram illustrates the architecture of OpenSCAP. It starts with the SCAP Workbench and Red Hat Satellite, which interact with the OpenSCAP Base C API. This API then connects to the SCAP API<sup>11</sup>, which in turn connects to the OpenSCAP daemon. The daemon interacts with the SCAP API, which then connects to the OpenSCAP daemon. This cycle repeats, with each instance of the OpenSCAP daemon interacting with the SCAP API and the previous instance of the OpenSCAP daemon. The final instance of the OpenSCAP daemon connects to the SCAP API, which then connects back to the initial instance of the OpenSCAP daemon.

## 3.2. oscap:

```
graph TD; OpenSCAP --> XCCDF; OpenSCAP --> SCAP12; OpenSCAP --> SCAP11; OpenSCAP --> OVAL; OpenSCAP --> RedHat; XCCDF --> DISASTIG[NIST]; XCCDF --> USGCBPCI[USGCB, PCI-DSS]; SCAP12 --> DISASTIG; SCAP11 --> USGCBPCI; OVAL --> RedHat; RedHat --> oscarXccdfEval[oscap xccdf eval]; oscarXccdfEval --> oscarInfo[oscap info]; oscarInfo --> oscarGenerateReport[oscap xccdf generate report]; oscarGenerateReport --> ARFXML[ARF/XML]; oscarGenerateReport --> HTML[HTML]; oscarGenerateReport --> oscarVerbose[oscap (verbose)]; oscarVerbose --> OpenSCAPCLI[OpenSCAP (CLI)]; OpenSCAPCLI --> GUI[GUI]; GUI --> CronAnsibleCI[(: cron, Ansible, CI/CD)]; CronAnsibleCI --> oscar5[oscap 5]; oscar5 --> OpenSCAP
```

### 3.3. SCAP Workbench:

SCAP Workbench OpenSCAP 9



## 4. 가 : OpenSCAP 가

OpenSCAP  
OpenSCAP  
가

4.1.

## OpenSCAP

```
sudo apt-get install -y openscap-scanner scap-security-guide
oscap-anaconda-addon17
12
```

## SCAP 가 (SSG) :

- Fedora: dnf install scap-security-guide.<sup>14</sup>
- RHEL/CentOS: yum install scap-security-guide.<sup>9</sup>
- Debian 10+/Ubuntu 18.04+: apt install ssg-base ssg-debderived ssg-debian ssg-nondebian ssg-applications.<sup>14</sup>

OpenSCAP

	<b>oscap</b>	<b>SSG</b>	<b>SCAP Workbench</b> ( )	
Fedora	sudo dnf install openscap-scanner scap-security-guide		sudo dnf install scap-workbench	Workbench openscap-scanner
RHEL/CentOS 7	sudo yum install openscap-scanner scap-security-guide		sudo yum install scap-workbench	가 .
RHEL/CentOS 8	sudo dnf install openscap-scanner scap-security-guide		sudo dnf install scap-workbench	
Ubuntu 18.04+	sudo apt update && sudo apt install openscap-scanner scap-security-guide		sudo apt install scap-workbench	Ubuntu scap-security-guide ssg- scap-security-guide <sup>14</sup> ( <sup>17</sup> )
Debian 10+	sudo apt update && sudo apt install libopenscap8 scap-security-guide ( <sup>14</sup> ssg- )		sudo apt install scap-workbench	libopenscap8 oscap SSG <sup>14</sup> ssg-* 가 . <sup>5</sup>

가 OpenSCAP ( : SSG)

가 , 가

가 OpenSCAP

가 .

## 4.2. SCAP 가 (SSG)

SCAP 가 (SSG) SCAP , remediation , <sup>14</sup> OSCAP SSG  
SCAP Workbench<sup>4</sup> SSG SCAP Workbench  
( : yum install scap-security-guide).<sup>9</sup> Fedora, RHEL, CentOS,  
Scientific Linux SSG .<sup>9</sup> SSG  
`/usr/share/xml/scap/ssg/content/` .<sup>9</sup> XCCDF, OVAL  
( \*-ds.xml ) .<sup>3</sup> SSG PCI DSS, STIG, USGCB .<sup>14</sup> SSG

가 DISA FSO, NSA, Red Hat

14

SSG

가  
가

## 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).<sup>9</sup> SCAP  
Workbench 9 ( : 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>.<sup>9</sup> DISA STIG oscap xccdf eval --profile  
selected\_profile --results result\_file --cpe cpe\_dictionary disa\_stig\_content  
5 가 9 , oscap OVAL  
가 : oscap oval eval....<sup>19</sup> OpenSCAP ,

### 4.3.3. (HTML, ARF, XCCDF)

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

## 4.4. (Tailoring)

(Tailoring)  
SCAP Workbench 13 , (fork)  
ID / 15 SCAP  
가 “ ” “ ” “ ”  
15 OpenSCAP XCCDF 1.1 ,

( :SSG )  
<sup>14</sup>,  
<sup>15</sup>(<sup>15</sup>  
<sup>15</sup>,  
<sup>15</sup>  
 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 .<sup>6</sup> Red Hat RHEL(Red Hat Enterprise  
 Linux) CIS scap-security-guide  
<sup>18</sup>  
 oscap SSG CIS CIS  
<sup>18</sup> 가, oscap Ansible CIS  
 remediation( ) .<sup>18</sup> OpenSCAP Ubuntu CIS (Level  
 1 Level 2 )<sup>17</sup>, -- remediate  
<sup>17</sup>  
 OpenSCAP remediation<sup>18</sup>, remediation 100%  
 . , SSG RHEL 8 CIS remediation CIS 100%  
 98% SSG  
 remediation 가 .<sup>18</sup>  
 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 , RHEL 6 DISA STIG SSG  
 oscap xccdf eval --profile <STIG\_profile>... .14 STIG  
 OpenSCAP/SSG /usr/share/xml/scap/ssg/content 5, STIG  
<sup>20</sup> STIG

remediation Content)	Ansible .20 SSG, Red Hat, DISA FSO .	DISA . NSA .	가 . NSA .	가 . NSA .	(Supplemental Automation STIG .	14 , DoD
STIG	STIG .	가 .	가 .	가 .	(SSG .)	

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

OpenSCAP	CIS	STIG	. SCAP
NIST SP 800-53		1, FISMA	.1 PCI-DSS
SSG	HIPAA	(5, SSG가 PCI DSS "")	14), Oracle Linux .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 ,  
 가 가 .1 .7  
 가 .6 .2.  
 : SCAP .1 , SCAP  
 “ ” 6, SCAP  
 .6 가 가  
 . 6.3. ( ): OpenSCAP .4 SCAP  
 6, OpenSCAP(SCC + OVAL) Nessus  
 .21 .22  
 OpenSCAP . 6.4. :  
 .7 .7 .8 .6.5. :  
 7, remediation OpenSCAP  
 가 .7 .6.6. :  
 CLI oscap . Jenkins, Ansible . OpenSCAP  
 . 6.6. : Jenkins, Ansible  
 . 6.7 . OpenSCAP  
 . 6.7 . OpenSCAP

OpenSCAP

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

7.

## 8. OpenSCAP

OpenSCAP 가  
Nessus  
Qualys  
VMDR OpenSCAP

## 8.1. OpenSCAP Nessus

OpenSCAP Nessus 가 , , , , 가  
 / : Nessus (Nessus Attack Scripting Language )  
 remediation .21 OpenSCAP SCAP . SCAP  
 DoD , Nessus SCAP ( : RHEL 8 SCAP  
 ).21 Tenable(Nessus ) Nessus SCAP  
 .21 : OpenSCAP 96%

Nessus 72% 25, 가 .21 Remediation:  
 . SCAP .18 Nessus remediation  
 OpenSCAP remediation ( : CIS Ansible ) .18 Nessus remediation  
 .21 UI: OpenSCAP , Nessus GUI  
 .21 Nessus OpenSCAP( SCC + OVAL ) .21  
 : SCAP( OpenSCAP ) DoD .21 Nessus  
 .26

## 8.2. OpenSCAP Qualys VMDR

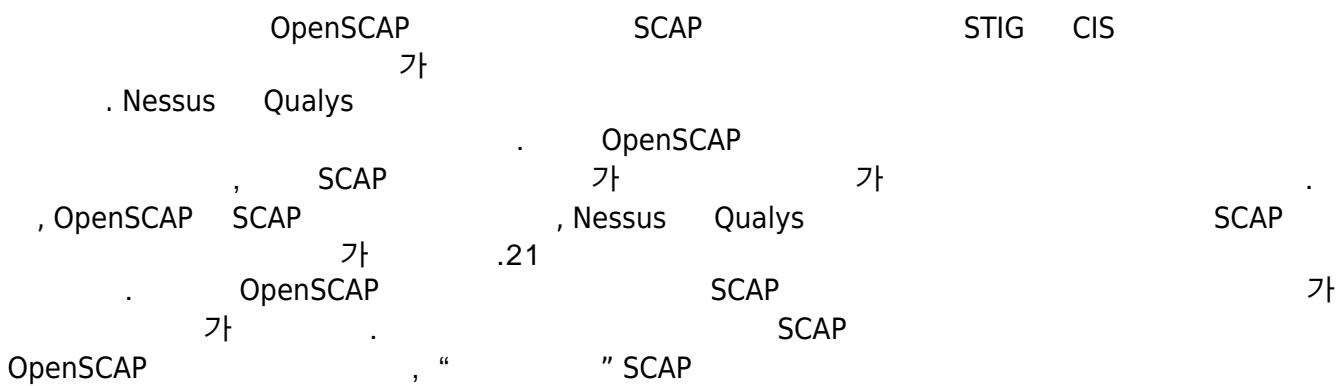
OpenSCAP Qualys VMDR 가 , , , SCAP  
 . / : OpenSCAP  
 .22 Qualys VMDR IT, OT, IoT  
 가 , (VMDR) .22 Qualys ( , , OS )  
 .22 Qualys SCAP : OpenSCAP .22 Qualys IT, OT, IoT  
 가 .22 Qualys VMDR (가 )  
 : OpenSCAP .22 Qualys VMDR (가 ) .22 Qualys  
 .22 ( 가 ) : OpenSCAP ( ) .22 Qualys .22 Qualys  
 ( , OpenSCAP , Qualys ).

## 8.3. : OpenSCAP, Nessus, Qualys VMDR

OpenSCAP, Nessus, Qualys VMDR

	<b>OpenSCAP</b>	<b>Nessus (Tenable )</b>	<b>Qualys VMDR</b>
	SCAP 가 (OVAL ) ,	, ,	(VMDR), ,
	SCAP (XCCDF, OVAL, CPE, CVE)	, , NASL , Tenable	, ,
	( )	(Nessus Pro, Tenable.io )	( )
SCAP		; SCAP 가	/ 가 , SCAP 가
	, (SSG , STIG, CIS) (oscap)	, , GUI,	, , (IT/OT/IoT)
	HTML, ARF, XCCDF; / ,	, , 가	, ,

	<b>OpenSCAP</b>	<b>Nessus (Tenable )</b>	<b>Qualys VMDR</b>
Remediation	remediation 가 ( : SSG Ansible)	remediation	,
	/ ,	가, ,	,
	CLI (oscap), GUI (SCAP Workbench)	GUI (Nessus Pro, Tenable.io )	
	SCAP 가 ,	가, ,	VMDR 가 , MSSP,



## 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 API 11,  
 OpenSCAP  
 lcov, genhtml 가 .12

### 9.2. OpenSCAP

OpenSCAP , GitHub .18 GitHub  
 .12 .18  
 .12, API 11, 18  
 OpenSCAP 가

OpenSCAP, 가

## 10.

OpenSCAP

OpenSCAP

가

### 10.1. OpenSCAP 가

OpenSCAP

가

SCAP

가

: CVE, CPE, XCCDF, OVAL

가

OpenSCAP

## 10.2.

### OpenSCAP

DevSecOps,

OpenSCAP

OpenShift Compliance Operator 10

OpenSCAP IT

OpenSCAP

, SCAP

가

(Security as Code)"

(XCCDF)

.1 OpenSCAP

" (Shift Left)"

"

OpenSCAP

OpenSCAP

가

가 가

OpenSCAP

SCAP

가 (SSG)

가

가 가

, , IoT

OpenSCAP

14

(

)

,

OpenSCAP

SCAP

, OpenSCAP

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[https://en.wikipedia.org/wiki/Security\\_Content\\_Automation\\_Protocol#:~:text=Security%20Content%20Automation%20Protocol%20\(SCAP\)%20checklists%20standardize%20and%20enable%20automation,800%2D53\)%20controls%20framework.](https://en.wikipedia.org/wiki/Security_Content_Automation_Protocol#:~:text=Security%20Content%20Automation%20Protocol%20(SCAP)%20checklists%20standardize%20and%20enable%20automation,800%2D53)%20controls%20framework.)
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