

## Schema

**title:** OpenC2 Language Objects  
**module:** oasis-open.org/openc2/v1.0/openc2-lang  
**version:** wd06  
**description:** Datatypes that define the content of OpenC2 commands and responses.  
**exports:** OpenC2-Command, OpenC2-Response, OpenC2-Message  
**imports:** slpff: oasis-open.org/openc2/v1.0/ap-slpff  
jadr: oasis-open.org/openc2/v1.0/jadr

## 3.2 Structure Types

### 3.2.1 OpenC2-Command

The OpenC2 Command describes an action performed on a target. It can be directive or descriptive depending on the context.

#### OpenC2-Command (Record)

ID	Name	Type	#	Description
1	action	Action	1	The task or activity to be performed (i.e., the 'verb')
2	target	Target	1	The object of the action. The action is performed on the target
3	actuator	Actuator	0..1	The subject of the action. The actuator executes the action on the target
4	args	Args	0..1	Additional information that applies to the command
5	id	Command-ID	0..1	Identifier used to link responses to a command

### 3.2.2 Action

#### Action (Enumerated)

ID	Name	Description
1	scan	Systematic examination of some aspect of the target entity or its environment in order to obtain information.
2	locate	Find the target object physically, logically, functionally, or by organization.
3	query	Initiate a request for information.
4	report	Task an entity to provide information to a designated recipient.
5	notify	Set an entity's alerting preferences.
6	deny	Prevent a certain event or action from completion, such as preventing a flow from reaching a destination or preventing access.
7	contain	Isolate a file, process, or entity so that it cannot modify or access other assets or processes.
8	allow	Permit access to or execution of a target.
9	start	Initiate a process, application, system, or activity.
10	stop	Halt a system or end an activity.
11	restart	Stop then start a system or activity.
12	pause	Cease a system or activity while maintaining state.
13	resume	Start a system or activity from a paused state.
14	cancel	Invalidate a previously issued action.
15	set	Change a value, configuration, or state of a managed entity.
16	update	Instruct a component to retrieve, install, process, and operate in accordance with a software update, reconfiguration, or other update.
17	move	Change the location of a file, subnet, network, or process.
18	redirect	Change the flow of traffic to a destination other than its original destination.
19	create	Add a new entity of a known type (e.g., data, files, directories).
20	delete	Remove an entity (e.g., data, files, flows).
21	snapshot	Record and store the state of a target at an instant in time.
22	detonate	Execute and observe the behavior of a target (e.g., file, hyperlink) in an isolated environment.
23	restore	Return the system to a previously known state.
24	save	Commit data or system state to memory.
25	throttle	Adjust the rate of a process, function, or activity.
26	delay	Stop or hold up an activity or data transmittal.
27	substitute	Replace all or part of the data, content or payload.
28	copy	Duplicate a file or data flow.
29	sync	Synchronize a sensor or actuator with other system components.
30	investigate	Task the recipient to aggregate and report information as it pertains to a security event or incident.
31	mitigate	Task the recipient to circumvent a problem without necessarily eliminating the vulnerability or attack point.
32	remediate	Task the recipient to eliminate a vulnerability or attack point.

### 3.2.3 Target

OpenC2 Target datatypes

Target (Choice)			
ID	Name	Type	Description
1	artifact	artifact	An array of bytes representing a file-like object or a link to that object. A reference to a previously issued OpenC2 command
2	command	command-id	
3	device	device	
4	directory	directory	
5	disk	disk	
6	disk_partition	disk-partition	
7	domain_name	domain-name	
8	email_addr	email-addr	
9	email_message	email-message	
10	file	file	
11	ipv4_addr	ipv4-addr	
12	ipv6_addr	ipv6-addr	
13	mac_addr	mac-addr	
14	memory	memory	
15	ip_connection	ip-connection	
16	openc2	openc2	OpenC2 – query actuator for supported capabilities, negotiate connection
17	process	process	
18	software	software	
19	uri	uri	
20	user_account	user-account	
21	user_session	user-session	
22	volume	volume	
23	windows_registry_key	windows-registry-key	
24	x509_certificate	x509-certificate	
1024	slpff	slpff:Target	Target imported from the Stateless Packet Filter Firewall profile

### 3.2.4 Actuator

Actuator (Choice)			
ID	Name	Type	Description
1	generic	ActuatorSpecifiers	
1024	slpff	slpff:Specifiers	Specifiers as defined in the Stateless Packet Filtering Firewall profile, oasis-open.org/openc2/v1.0/ap-slpff

### 3.2.5 ActuatorSpecifiers

ActuatorSpecifiers (Map)				
ID	Name	Type	#	Description
1	actuator_id	uri	0..1	
2	asset_id	String	0..1	

### 3.2.6 Args

Args (Map)				
ID	Name	Type	#	Description
1	start_time	Date-Time	0..1	The specific date/time to initiate the action
2	end_time	Date-Time	0..1	The specific date/time to terminate the action
3	duration	Duration	0..1	The length of time for an action to be in effect
4	response_requested	Response-Type	0..1	The type of response required for the action
1024	slpff	slpff:Args	0..1	Command arguments defined in the Stateless Packet Filtering Firewall profile

### 3.2.7 OpenC2-Response

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### OpenC2-Response (Record)

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ID	Name	Type	#	Description
1	id	Command-ID	1	Id of the ommand that induced this response
2	status	Status-Code	1	An integer status code
3	status_text	String	0..1	A free-form human-readable description of the response status
4	*	Results	1	Data or extended status information that was requested from an OpenC2 command

### 3.2.8 Status-Code

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#### Status-Code (Enumerated.Tag)

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Value	Description
102	Processing -- An interim response used to inform the client that the server has accepted the request but not yet completed it.
200	OK -- The request has succeeded.
301	Moved Permanently -- The target resource has been assigned a new permanent URI
400	Bad Request -- The server cannot process the request due to something that is perceived to be a client error (e.g., malformed request syntax.)
401	Unauthorized -- The request lacks valid authentication credentials for the target resources or authorization has been refused for the submitted credentials.
403	Forbidden -- The server understood the request but refuses to authorize it.
500	Server Error -- The server encountered an unexpected condition that prevented it from fulfilling the request.
501	Not Implemented -- The server does not support the functionality required to fulfill the request.

### 3.2.9 artifact

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#### artifact (Record)

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ID	Name	Type	#	Description
1	mime_type	String	0..1	Permitted values specified in the IANA Media Types registry
2	*	payload	0..1	choice of literal content or URL to obtain content
3	hashes	hashes	0..1	Specifies a dictionary of hashes for the contents of the payload

### 3.2.10 payload

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#### payload (Choice)

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ID	Name	Type	Description
1	payload_bin	Binary	Specifies the data contained in the artifact.
2	url	uri	MUST be a valid URL that resolves to the un-encoded content

### 3.2.11 openc2

A target used to query Actuator for its supported capabilities

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#### openc2 (ArrayOf.Query-Item ['max', 'min'])

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### 3.2.12 Query-Item

Results to be included in response to query openc2 command

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#### Query-Item (Enumerated)

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ID	Name	Description
1	versions	OpenC2 language versions supported by this actuator
2	profiles	List of profiles supported by this actuator
3	schema	Definition of the command syntax supported by this actuator

### 3.2.13 ip-connection

5-tuple that specifies a tcp/ip connection

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**ip-connection (Record)**

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ID	Name	Type	#	Description
1	src_addr	ip-addr	0..1	source address
2	src_port	port	0..1	source TCP/UDP port number
3	dst_addr	ip-addr	0..1	destination address
4	dst_port	port	0..1	destination TCP/UDP port number
5	layer4_protocol	layer4-protocol	0..1	Protocol (IPv4) / Next Header (IPv6)

### 3.2.14 layer4-protocol

protocol (IPv4) or next header (IPv6) field - any IANA value, RFC 5237

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**layer4-protocol (Enumerated)**

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ID	Name	Description
1	icmp	Internet Control Message Protocol – RFC 792
6	tcp	Transmission Control Protocol – RFC 793
17	udp	User Datagram Protocol – RFC 768
132	sctp	Stream Control Transmission Protocol – RFC 4960

### 3.2.15 file

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**file (Map)**

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ID	Name	Type	#	Description
1	name	String	0..1	The name of the file as defined in the file system
2	path	String	0..1	The absolute path to the location of the file in the file system
3	hashes	hashes	0..1	One or more cryptographic hash codes of the file contents

### 3.2.16 Response-Type

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**Response-Type (Enumerated)**

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ID	Name	Description
0	None	No response
1	Ack	Respond when command received
2	Complete	Respond when all aspects of command completed

### 3.2.17 Process

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**Process (Map)**

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ID	Name	Type	#	Description
1	pid	Integer	0..1	Process ID of the process
2	name	String	0..1	Name of the process
3	cwd	String	0..1	Current working directory of the process
4	executable	File	0..1	Executable that was executed to start the process
5	parent	Process	0..1	Process that spawned this one
6	command_line	String	0..1	The full command line invocation used to start this process, including all arguments

### 3.2.18 hashes

Cryptographic Hash values

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**hashes (Map)**

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ID	Name	Type	#	Description
1	md5	Binary	0..1	Hex-encoded MD5 hash as defined in RFC3121
4	sha1	Binary	0..1	Hex-encoded SHA1 hash as defined in RFC3174
6	sha256	Binary	0..1	Hex-encoded SHA256 as defined in RFC6234

3.2.19 device

TODO: Add inventory device-id?

device (Map)				
ID	Name	Type	#	Description
1	description	String	0..1	
2	device_type	String	0..1	
3	manufacturer	String	0..1	
4	model	String	0..1	
5	serial_number	String	0..1	
6	firmware_version	String	0..1	
7	system_details	String	0..1	

3.3 Primitive Types

Name	Type	Description
command-id	String	Uniquely identifies a particular command – TBD syntax
date-time	String (date-time)	RFC 3339 date-time
duration	String (duration)	RFC 3339 / ISO 8601 duration
domain-name	String (hostname)	Domain name, RFC 1034, section 3.5
email-addr	String (email)	Email address, RFC 5322, section 3.4.1
ip-addr	String (ip)	IPv4 or IPv6 address
ipv4-addr	String (ipv4)	IPv4 address or range in CIDR notation, RFC 2673, section 3.2
ipv6-addr	String (ipv6)	IPv6 address or range, RFC 4291 , section 2.2
mac-addr	String (mac)	48 bit Media Access Code address
port	String (port)	Service Name or Transport Protocol Port Number, RFC 6335
version	String	Version string – TBD syntax
uri	String (uri)	Uniform Resource Identifier