

TM Forum Specification

AI Management API Conformance Profile

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INTRODUCTION - API DESCRIPTION

The API Component Suite for AI Management defines the set of operations that should be offered in order that a Service Provider can govern Artificial Intelligence systems deployed at scale. Effective governance and management of AI must span the lifecycle from design through deployment and eventual withdrawal from service. However, the initial focus of the AI Management API is restricted to the in-life aspects of AI and in particular on the management of 'model contracts.

RESOURCE MODEL CONFORMANCE

API MANDATORY RESOURCES

The following table indicates the mandatory resources for this API.

Resource Name	Comment
Alarm	
AiContractSpecification	
AiContractViolation	
AiModelSpecification	
AiContract	
AiModel	
Rule	

GENERAL NOTES ON RESOURCE ATTRIBUTE CONFORMANCE

There are three situations that could occur for an attribute:

- Mandatory attribute,
 - Mandatory attribute if the optional parent attribute is present,
 - Non-mandatory/Optional attribute. Those are all the other attributes not mentioned in the following subsections. Please refer to the corresponding API REST Specification for more details.
- The tables in the subsections below indicate which attributes are mandatory including mandatory when an optional parent is present.
 - Where a resource is an input into an API (e.g. POST, PATCH), Mandatory means that the attribute value must be supplied by the API consumer in the input (and must not be blank or null).
 - Where a resource is an output from an API (e.g. GET, POST), Mandatory means that the attribute value must be supplied by the API provider in the output (and must not be blank or null).
 - For a sub-resource that is not an array, Mandatory (cardinality 1..1) means that the sub-resource must be present, while Optional (cardinality 0..1) means that the sub-resource may be absent. Mandatory and Optional on the sub-resource attributes apply to the sub-resource if present.
 - For a sub-resource that is an array, Mandatory (cardinality 1..*) means that at least one sub-resource must be present in the array, while Optional (cardinality 0..*) means that the array may be absent. Mandatory and Optional on the sub-resource attributes apply to each of the sub-resources if present.

In this table are listed all mandatory attributes. A mandatory attribute MUST be retrieved in resource representation when no attribute selection is used (e.g. GET `./{id}`) without any attribute selection

When an attribute is listed with an indentation (in second column) it means this attribute is mandatory if root (parent) attribute is present.

ALARM RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present		Rule
	alarmRaisedTime	M
	alarmType	M
	alarmedObject	M
	href	M (in response messages)
	id	M (in response messages)
	perceivedSeverity	M
	probableCause	M
	sourceSystemId	M
	state	M
	correlatedAlarm (if present)	Array of AlarmRef
	id	M
	crossedThresholdInformation.threshold (if present)	
	id	M
	parentAlarm (if present)	Array of AlarmRef See conditions for AlarmRef at correlatedAlarm
	place (if present)	Array of RelatedPlaceRefOrValue
	role	M

AICONTRACTSPECIFICATION RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present		Rule
	href	M (in response messages)

Mandatory attribute when parent is present		Rule
	id	M (in response messages)
	name	M
	constraint (if present)	Array of ConstraintRef
	id	M
	entitySpecRelationship (if present)	Array of EntitySpecificationRelationship
	relationshipType	M
	entitySpecRelationship.associationSpec (if present)	
	id	M
	relatedParty (if present)	Array of RelatedParty
	@referredType	M
	id	M
	targetEntitySchema (if present)	
	@schemaLocation	M
	@type	M
	specCharacteristic (if present)	Array of CharacteristicSpecification
	name	M
	specCharacteristic.validFor (if present)	
	endDateTime	If validFor is supplied, one or other or both of the start or end dates must be supplied.
	startDateTime	
	specCharacteristic.characteristicValueSpecification (if present)	Array of CharacteristicValueSpecification
	value	M
	specCharacteristic.characteristicValueSpecification.validFor (if present)	See conditions for TimePeriod at specCharacteristic.validFor
	specCharacteristic.charSpecRelationship (if present)	Array of CharacteristicSpecificationRelationship

Mandatory attribute when parent is present		Rule
href		M (in response messages) O (otherwise)
id		M
name		M
relationshipType		M

AICONTRACTVIOLATION RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present		Rule
href		M (in response messages)
id		M (in response messages)
aiContract		M
id		M
violation		M
actualValue		M
consequence		M
operator		M
referenceValue		M
violation.attachment (if present)		
id		M
violation.rule (if present)		
id		M
relatedParty (if present)		Array of RelatedParty
@referredType		M
id		M

AIMODELSPECIFICATION RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present	Rule
href	M (in response messages)
id	M (in response messages)
name	M
constraint (if present)	Array of ConstraintRef
id	M
resourceSpecification (if present)	Array of ResourceSpecificationRef
id	M
serviceLevelSpecification (if present)	Array of ServiceLevelSpecificationRef
id	M
serviceSpecRelationship (if present)	Array of ServiceSpecRelationship
relationshipType	M
entitySpecRelationship (if present)	Array of EntitySpecificationRelationship
relationshipType	M
entitySpecRelationship.associationSpec (if present)	
id	M
relatedParty (if present)	Array of RelatedParty
@referredType	M
id	M
targetEntitySchema (if present)	
@schemaLocation	M
@type	M
featureSpecification.constraint (if present)	Array of ConstraintRef See conditions for ConstraintRef at constraint
featureSpecification.featureSpecCharacteristic (if present)	Array of FeatureSpecificationCharacteristic

Mandatory attribute when parent is present		Rule
	name	M
featureSpecification.featureSpecRelationship (if present)		Array of FeatureSpecificationRelationship
	name	M
	relationshipType	M

AICONTRACT RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present		Rule
	href	M (in response messages)
	id	M (in response messages)
	state	M
aiContractSpecification		M
	id	M
aiModel		M See conditions for EntityRef at aiContractSpecification
relatedParty		M Array of RelatedParty
	@referredType	M
	id	M
template (if present)		
	id	M
characteristic (if present)		Array of Characteristic
	name	M
	value	M
rule (if present)		
	@type	M

Mandatory attribute when parent is present		Rule
	href	M (in response messages)
	id	M (in response messages)
	name	M

AIMODEL RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present		Rule
	href	M (in response messages)
	id	M (in response messages)
	state	M
	software	M Array of SoftwareRef
	id	M
	aiModelSpecification	M
	href	M (in response messages)
	id	M (in response messages)
	name	M
	aiModelSpecification.constraint (if present)	Array of ConstraintRef
	id	M
	aiModelSpecification.resourceSpecification (if present)	Array of ResourceSpecificationRef
	id	M
	aiModelSpecification.serviceLevelSpecification (if present)	Array of ServiceLevelSpecificationRef
	id	M
	aiModelSpecification.serviceSpecRelationship (if present)	Array of ServiceSpecRelationship
	relationshipType	M

Mandatory attribute when parent is present		Rule
aiModelSpecification.entitySpecRelationship (if present)		Array of EntitySpecificationRelationship
	relationshipType	M
aiModelSpecification.entitySpecRelationship.associationSpec (if present)		
	id	M
aiModelSpecification.relatedParty (if present)		Array of RelatedParty
	@referredType	M
	id	M
aiModelSpecification.targetEntitySchema (if present)		
	@schemaLocation	M
	@type	M
aiModelSpecification.featureSpecification.constraint (if present)		Array of ConstraintRef See conditions for ConstraintRef at aiModelSpecification.constraint
aiModelSpecification.featureSpecification.featureSpecCharacteristic (if present)		Array of FeatureSpecificationCharacteristic
	name	M
aiModelSpecification.featureSpecification.featureSpecRelationship (if present)		Array of FeatureSpecificationRelationship
	name	M
	relationshipType	M
gpu (if present)		
	id	M
place (if present)		Array of RelatedPlaceRefOrValue
	role	M

Mandatory attribute when parent is present		Rule
relatedEntity (if present)		Array of RelatedEntityRefOrValue
	role	M
serviceSpecification (if present)		
	id	M
supportingResource (if present)		Array of ResourceRef See conditions for ResourceRef at gpu
trainingData (if present)		
	id	M
relatedParty (if present)		Array of RelatedParty See conditions for RelatedParty at aiModelSpecification.relatedParty
serviceCharacteristic (if present)		Array of Characteristic
	name	M
	value	M
feature (if present)		Array of Feature
	name	M
	featureCharacteristic	M Array of Characteristic See conditions for Characteristic at serviceCharacteristic
feature.featureRelationship (if present)		Array of FeatureRelationship
	name	M
	relationshipType	M
serviceRelationship (if present)		Array of ServiceRelationship
	relationshipType	M

Mandatory attribute when parent is present	Rule
serviceRelationship.service.place (if present)	Array of RelatedPlaceRefOrValue See conditions for RelatedPlaceRefOrValue at place
serviceRelationship.service.relatedEntity (if present)	Array of RelatedEntityRefOrValue See conditions for RelatedEntityRefOrValue at relatedEntity
serviceRelationship.service.serviceSpecification (if present)	See conditions for ServiceSpecificationRef at serviceSpecification
serviceRelationship.service.feature (if present)	Array of Feature See conditions for Feature at feature
serviceRelationship.service.feature.featureRelationship (if present)	Array of FeatureRelationship See conditions for FeatureRelationship at feature.featureRelationship
supportingService.serviceRelationship (if present)	Array of ServiceRelationship See conditions for ServiceRelationship at serviceRelationship

RULE RESOURCE MANDATORY ATTRIBUTES

Mandatory attribute when parent is present	Rule
@type	M
href	M (in response messages)
id	M (in response messages)
name	M

API OPERATIONS CONFORMANCE

For every single resource the following tables includes mandatory operations.

ALARM MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the Alarm resource:

Uniform API Operation
GET
POST
PATCH

AICONTRACTSPECIFICATION MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the AiContractSpecification resource:

Uniform API Operation
GET
POST

AICONTRACTVIOLATION MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the AiContractViolation resource:

Uniform API Operation
GET
POST

AIMODELSPECIFICATION MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the AiModelSpecification resource:

Uniform API Operation
GET
POST

AICONTRACT MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the AiContract resource:

Uniform API Operation
GET
POST

AIMODEL MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the AiModel resource:

Uniform API Operation
GET
POST

RULE MANDATORY OPERATIONS

The following table indicates which ones are mandatory for the Rule resource:

Uniform API Operation
GET
POST

API GET OPERATION CONFORMANCE

All the GET operations in this API share the same status code pattern.

GET	Mandatory/Optional
Response Status Code 200 if successful	M
Response Status Code 404 if not found	M

DEFINITIONS FOR FILTER

The following definitions apply to all the GET operations:

- **Filtered Search:** A filtered search can be applied using query parameters to obtain only the resources that meet the criteria defined by the filtering parameters included in the query request. Several elements can be applied to the filtered search. In that case logic, a logical AND is applied to combine the criteria (e.g.:?severity=<value>&status=<value>).
- **Attribute selection (Limiting Response Data):** In order to limit which attributes are included in the response, the GET request can include the ?fields= query parameter. Only those attributes whose names are supplied in this parameter will be returned. Attribute selection capabilities are the same for collections retrieval and individual resource queries.
- **Level:** The filtering and attribute selection can apply to the top level properties (attributes) and subproperties. The tables below show which attributes need to be supported in top-level or contained resources.

GET /ALARM?FIELDS=...&{FILTERING}

This operation list or find Alarm entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /ALARM/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a Alarm entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AICONTRACTSPECIFICATION?FIELDS=...&{FILTERING}

This operation list or find AiContractSpecification entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AICONTRACTSPECIFICATION/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a AiContractSpecification entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AICONTRACTVIOLATION?FIELDS=...&{FILTERING}

This operation list or find AiContractViolation entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AICONTRACTVIOLATION/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a AiContractViolation entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AIMODELSPECIFICATION?FIELDS=...&{FILTERING}

This operation list or find AiModelSpecification entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AIMODELSPECIFICATION/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a AiModelSpecification entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AICONTRACT?FIELDS=...&{FILTERING}

This operation list or find AiContract entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AICONTRACT/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a AiContract entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AIMODEL?FIELDS=...&{FILTERING}

This operation list or find AiModel entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /AIMODEL/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a AiModel entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /RULE?FIELDS=...&{FILTERING}

This operation list or find Rule entities

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

GET /RULE/{ID}?FIELDS=...&{FILTERING}

This operation retrieves a Rule entity. Attribute selection is enabled for all first level attributes.

Attribute selection is mandatory for all first level attributes except for the href attribute.

Filtering on sub-resources is optional for all compliance levels

API POST OPERATION CONFORMANCE

All the POST operations in this API share the same status code pattern.

POST	Mandatory/Optional
Status Code 201 if resource created	M

POST /ALARM

This operation creates a Alarm entity.

The following table provides the list of mandatory attributes when creating an instance of the Alarm resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
alarmRaisedTime	
alarmType	
alarmedObject	
perceivedSeverity	
probableCause	
sourceSystemId	
state	

POST /AICONTRACTSPECIFICATION

This operation creates a AiContractSpecification entity.

The following table provides the list of mandatory attributes when creating an instance of the AiContractSpecification resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
name	

POST /AICONTRACTVIOLATION

This operation creates a AiContractViolation entity.

The following table provides the list of mandatory attributes when creating an instance of the AiContractViolation resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
aiContract	
aiContract.id	
violation	
violation.actualValue	
violation.consequence	
violation.operator	
violation.referenceValue	

POST /AIMODELSPECIFICATION

This operation creates a AiModelSpecification entity.

The following table provides the list of mandatory attributes when creating an instance of the AiModelSpecification resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
name	

POST /AICONTRACT

This operation creates a AiContract entity.

The following table provides the list of mandatory attributes when creating an instance of the AiContract resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
aiContractSpecification	
aiContractSpecification.id	
aiModel	
aiModel.id	
relatedParty	
relatedParty.@referredType	

Mandatory Attributes	Rule
relatedParty.id	
state	

POST /AIMODEL

This operation creates a AiModel entity.

The following table provides the list of mandatory attributes when creating an instance of the AiModel resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
aiModelSpecification	
aiModelSpecification.href	
aiModelSpecification.id	
aiModelSpecification.name	
software	
software.id	
state	

POST /RULE

This operation creates a Rule entity.

The following table provides the list of mandatory attributes when creating an instance of the Rule resource, including any possible rule, conditions and applicable default values.

Mandatory Attributes	Rule
@type	
name	

API PATCH OPERATION CONFORMANCE

All the PATCH operations in this API share the same status code pattern.

The mandatory application context is JSON Merge.

PATCH	Mandatory/Optional
Status Code 200 if resource modified	M

PATCH /ALARM/{ID}

This operation updates partially a Alarm entity.

Patchable Attributes	Rule
alarmType	
perceivedSeverity	
probableCause	
state	

PATCH /AICONTRACTSPECIFICATION/{ID}

This operation updates partially a AiContractSpecification entity.

Patchable Attributes	Rule
name	

PATCH /AIMODELSPECIFICATION/{ID}

This operation updates partially a AiModelSpecification entity.

Patchable Attributes	Rule
name	

PATCH /AICONTRACT/{ID}

This operation updates partially a AiContract entity.

Patchable Attributes	Rule
state	

PATCH /AIMODEL/{ID}

This operation updates partially a AiModel entity.

Patchable Attributes	Rule
state	

PATCH /RULE/{ID}

This operation updates partially a Rule entity.

Patchable Attributes	Rule
@type	
name	

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