

# SLA Management

## Business Service Specification

Author: Cliff C Faurer

Revision: 14.5.0

AMKB Cloud LLC

Denver, CO  
USA

February 26, 2015

## TABLE OF CONTENTS

Table of Contents .....	2
List of Figures.....	5
SLA Management .....	6
SLA Management Business Entities .....	8
SLA 9	
<b>Business Entity – CreateSla</b> .....	9
<b>Business Entity – PartialUpdateSla</b> .....	10
<b>Business Entity – Rule</b> .....	10
<b>Business Entity – Sla</b> .....	11
<b>Business Entity – Template</b> .....	11
SLA Violation.....	12
<b>Business Entity – CreateSlaViolation</b> .....	12
<b>Business Entity – PartialUpdateSlaViolation</b> .....	13
<b>Business Entity – SlaViolation</b> .....	13
SLA Common.....	14
<b>Business Entity – AttachmentRef</b> .....	14
<b>Business Entity – RuleRef</b> .....	14
<b>Business Entity – SLARef</b> .....	14
<b>Business Entity – Violation</b> .....	15
Common Business Entities .....	16
<b>Business Entity – Alias</b> .....	16
<b>Business Entity – ArrayUpdate</b> .....	16
<b>Business Entity – BillingAccountRef</b> .....	16
<b>Business Entity – Characteristic</b> .....	16
<b>Business Entity – ContactMedium</b> .....	16
<b>Business Entity – CreateListener</b> .....	17
<b>Business Entity – Credential</b> .....	17
<b>Business Entity – Header</b> .....	17

**Business Entity – Listener** ..... 17

**Business Entity – Medium**..... 17

**Business Entity – Money**..... 18

**Business Entity – Note** ..... 18

**Business Entity – PaymentMeanRef**..... 18

**Business Entity – Period** ..... 18

**Business Entity – PlaceRef**..... 19

**Business Entity – RelatedPartyRef** ..... 19

**Business Entity – TimePeriod**..... 19

Notification Event .....20

**Business Entity – SLAViolationStateChangeNotification**..... 20

SLA21

**Business Entity – SLAEvent** ..... 21

**Business Entity – SLAStateChangeNotification** ..... 21

SLA Violation.....22

**Business Entity – SLAViolationCreateNotification**..... 22

**Business Entity – SLAViolationEvent**..... 22

Notification Common.....23

**Business Entity – Notification** ..... 23

State Machine ..... 24

SLA25

SLAViolation.....26

SLA Management Business Services.....27

**Business Service – SLA REST Service**..... 27

**Operation – postSLA** ..... 27

**Operation – getSLA** ..... 27

**Operation – getSLAs** ..... 27

**Operation – putSLA** ..... 27

**Operation – patchSLA** ..... 28

**Operation – deleteSLA** ..... 28

<b>Business Service – SLA Violation REST Service</b> .....	28
<b>Operation – postSLAViolation</b> .....	29
<b>Operation – getSLAViolation</b> .....	29
<b>Operation – getSLAViolations</b> .....	29
<b>Operation – putSLAViolation</b> .....	29
<b>Operation – patchSLAViolation</b> .....	29
<b>Operation – deleteSLAViolation</b> .....	30
Hub Business Service .....	31
<b>Business Service – SLA Violation Hub REST Service</b> .....	31
<b>Operation – registerSlaViolationListener</b> .....	31
<b>Operation – unregisterSlaViolationListener</b> .....	31

**LIST OF FIGURES**

Figure 1.	SLA Management	7
Figure 2.	Service Level Agreement	9
Figure 3.	SLA Violation	12
Figure 4.	Common	14
Figure 5.	SLA Notification	20
Figure 6.	SLASM	25
Figure 7.	SLAViolationSM	26
Figure 8.	SLA Business Service	27
Figure 9.	SLA Violation Business Service	28

## SLA MANAGEMENT

The following document is the specification of the REST API for the SLA and SLA Violation resources. It includes the model definition as well as all available operations. Possible actions are creating and retrieving a SLA or SLA Violation, updating the whole SLA or only do a patch update. Furthermore the HTTP GET allows filtering.

The SLA API provides a standardized interface for SLA life cycle Management (SLA Negotiation, SLA configuration, SLA Activation/enforcement, SLA Operations, SLA violation / consequence handling, SLA reporting) between a Customer and a Service Provider which provides offers (product with attached SLA in its catalogue) the customer can discover, browse, trigger and order.

It will be also useful in a multi-partner environment where exchanging SLA is needed in order to allow rapid and efficient SLA life cycle management across a partner's environment. From SLA perspective, duties and rights are assigned to each actor & associated roles mainly in the case where a service is composed of various components brought by different partners within federation or / and syndication models.

SLA Management API manages the following resources:

### Service Level Agreement (SLA)

- o Part of a business agreement between a Service Provider and a Customer, quantitatively specifying the service performance level the Service Provider commits to deliver. Other actors & roles can be involved such as SLA Auditor or SLA Integrator. SLA includes rules or Service Level Specifications (SLA Parameters, Metrics and Thresholds), as well as a description of measuring, reporting and violation handling processes. For the purpose of the specification, it can be expressed in terms of validity of period, related parties, and rules (metrics, reference value, tolerance, consequence ...).
- o From the Customer perspective, this means that the end Customer provides Quality of Service requirements associated to its business applications to a Service Provider. The two parties negotiate the specific set of SLA parameters and parameter values that best serves them.
- o From the Service Provider perspective, each offered product or service can be provided with a standard Product SLA.

### SLA Violation

- o It represents any SLA failures observed through a metric threshold crossing restricted to what has been agreed in the SLAs for the given service (consequences, penalties, remedies...). SLA Violation is composed of Metrics, reported date, period,. The Related Parties are represented in the same way as for "SLA" resource. This practical and operational view allows the related parties to react and perform an immediate and direct analysis of potential impacts of the violation.
- o There is also an "Attachment" which represents statistics, a dashboard or reporting data to be presented to the target parties, for deeper analysis purpose.

SLA API performs the following operations on Service Level Agreement:

### Retrieval

- o all SLAs (with "SLA Provider", "SLA Customer" or "End User" role)
- o SLAs based on template
- o SLAs with specified ID – only one SLA is returned

- Creation of a SLA (planned)
- Full update of a SLA (planned)
- Partial update of a SLA (planned)
- Creation of a SLA violation (planned)
- Retrieval of a SLA violation
- Notification of SLA Violation Creation

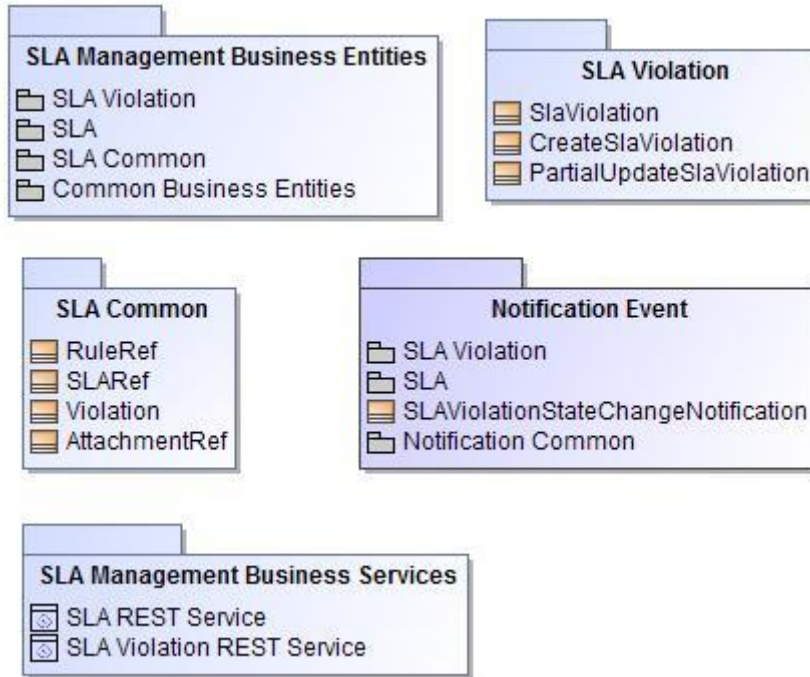


Figure 1. SLA Management

## SLA MANAGEMENT BUSINESS ENTITIES

Part of a business agreement between a Service Provider and a Customer, quantitatively specifying the service performance level the Service Provider commits to deliver. Other actors & roles can be involved such as SLA Auditor or SLA Integrator. SLA includes Service Level Specifications (SLS Parameters and Thresholds), as well as a description of measuring, reporting and violation handling processes. For the purpose of the specification, it can be expressed in terms of validity of period, related parties, and rules (metrics, reference value, tolerance, consequence ...).

From the Customer perspective, this means that the end Customer provides Quality of Service requirements associated to its business applications to a Service Provider. The two parties negotiate the specific set of SLA parameters and parameter values that best serves them.

From the Service Provider perspective, each offered product or service can be provided with a standard Product SLA.

### SLA Entity Model Description

This SLA Resource Model aims at illustrating the way to translating “SLA Resource Model” in JSON representation, reflecting the resource aspect described in the “SLA API Profile” (Management Requirements) document V0.2. Interaction between the resources as described in SID SLA modeling is a main focus in this JSON representation work. Besides, regarding “SLA States” modeling, we used “WS-Agreement” diagram as recommended in the “SLA Profile” document (section 4) when applicable.

For instance, we don't represent the “SLA Agreement” as a standalone object; rather we rely on existing SID “Agreement”, “Agreement items” and its interactions, meaning SLA “Approval” and “Terms or Conditions” and “Consequence” processes. All these processes that are linked to the “Negotiation Phase” of the SLA Management lifecycle are assumed to be completed. That means, we assume only one state “Observed” which supposes the SLA is approved and accepted by the involved parties. The latter are represented in terms of roles, each with its rights & duties covering Multi-partner model. Here we are illustrating B2B model (SLA Provider, SLA Consumer, SLA Auditor, EndUser roles). In our model, “SLA Provider” is referring to a CSP while “SLA Consumer” is referring to a DSP. The “EndUser” is referring to the customer of the DSP, in some cases he could be a customer of both (CSP and DSP). “SLA Auditor” role is to monitor SLA as described in TR178V2. It could be played either by the CSP himself or delegated to a 3rd party. The “Agreed” or “Approved SLA” is described in terms of “SLS” which contains the KPIs / KQIs, their related values or range, thresholds, valid period or date, consequences in case of violation of any clause of the SLA. We considered a “Single” SLS model as well as “Composite” SLS one.

We also assume all KPIs (Metrics) are existing ones, stored in the Service Provider “Metrics Library” with their attached references. Besides, each metric is attached to a given Product in the Catalogue we can refer to via an “URL”. We also characterized the SLA resource model by its “validity period”. This use case covers the situation where the validity period is predetermined (planned) which excludes the case of Time-variant SLA that could be attached to a “SLA on-Demand” use case. The latter could be considered in another release for specific use cases (Cloud, virtualization) for instance.

In order to optimize this SLA resource model, we tried to define a common pattern or Template for the SLS we named “rule”. Indeed, this “rule” intends to reflect prescribed items a SLS may contain. So, this pattern is structured as following: the Id of the metric, its name, the measurement unit attached to the considered metric, its reference value, the tolerance value when the threshold is crossed and the consequence in case of violation. This pattern can be reused for any Metric in any “rule” or SLS in this representation rather than creating each time such a structure.

When it comes to the financial-related aspect and penalties associated to a consequence, we just do a pointer to the SLA contract.



SLA

This Service Level Agreement “SLA” Resource Model aims at illustrating the way to translating “SLA Resource Model” in JSON representation, reflecting the resource aspect described in the “SLA API Profile” (Management Requirements) document V0.2. Service Level Agreement (SLA) Resource Model and associate attributes are aligned with those described in SID Service Level Agreement modeling. Meaning no Resources are imported from other sources. Besides, the entities are represented in terms of roles, each with its rights & duties covering Multi-partner model illustrating B2BX model (SLA Provider, SLA Consumer, SLA Auditor, EndUser roles). In this model, “SLA Provider” is referring to a CSP while “SLA Consumer” is referring to a DSP. The “EndUser” is referring to the customer of the DSP, in some cases he could be a customer of both (CSP and DSP). “SLA Auditor” role is to monitor SLA as described in TR178V2. It could be played either by the CSP himself or delegated to a 3rd party. The “Agreed” or “Approved SLA” is described in terms of SLA rules which contains the Metrics, their related values or range, thresholds, valid period or date, consequences in case of violation of any clause of the SLA. It is also assumed all Metrics are the existing ones which are stored in the Service Provider “Metrics Library” with their attached references. Besides, each metric is attached to a given Product in the Catalogue with a dedicated reference e.g. “URL”. The Service Level Agreement “SLA” resource model is also characterized by its “validity period”. This use case covers the situation where the validity period is pre-determined (planned) which excludes the case of Time-variant SLA that could be attached to a “SLA on-Demand” use case. The latter could be considered in another release for specific use cases (Cloud, virtualization) for instance.

In order to optimize the SLA resource, there is a need for defining a common pattern or Template “rule”. This pattern is structured as following: the Id of the metric, its name, the measurement unit attached to the considered metric, its reference value, the tolerance value when the threshold is crossed and the consequence in case of violation. Regarding the financial-related aspect and penalties associated to a consequence, a pointer is simply mentioned to the Service Level Agreement “SLA” contract.

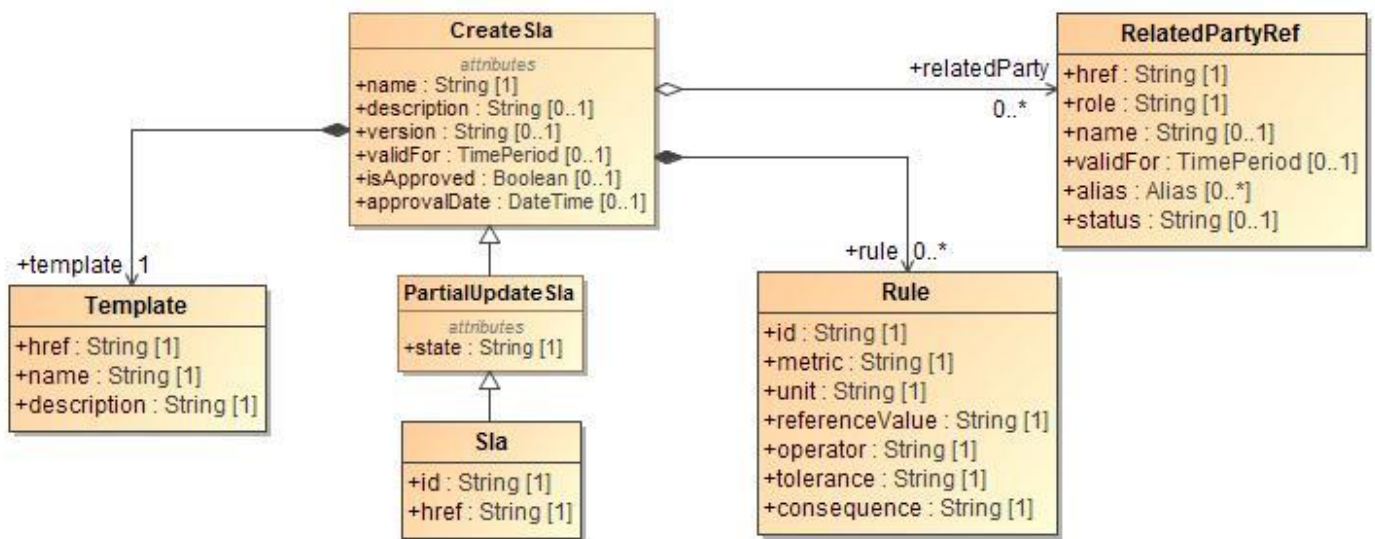


Figure 2. Service Level Agreement

BUSINESS ENTITY – CREATESLA

Attributes

Name	Type	Multiplicity	Description
approvalDate	DateTime	0..1	Date and time the approval was made.

description	String	0..1	Description of the Service level Agreement (SLA)
isApproved	Boolean	0..1	Indicates if the service level agreement is approved or not (true or false)
name	String	1	Name of the Service level Agreement (SLA)
relatedParty	RelatedPartyRef	0..*	Parties engaged in the SLA (SLA provider, SLA consumer, ...)
rule	Rule	0..*	Common pattern or Template for the SLA parameters, metrics, and thresholds
template	Template	1	SLA Template characteristics
validFor	TimePeriod	0..1	Period where the clauses of the SLA are applicable
version	String	0..1	Version of the Service level Agreement (SLA)

## BUSINESS ENTITY – PARTIALUPDATESLA

### Attributes

Name	Type	Multiplicity	Description
approvalDate	DateTime	0..1	Date and time the approval was made.
description	String	0..1	Description of the Service level Agreement (SLA)
isApproved	Boolean	0..1	Indicates if the service level agreement is approved or not (true or false)
name	String	1	Name of the Service level Agreement (SLA)
relatedParty	RelatedPartyRef	0..*	Parties engaged in the SLA (SLA provider, SLA consumer, ...)
rule	Rule	0..*	Common pattern or Template for the SLA parameters, metrics, and thresholds
state	String	1	State of SLA - defined, observed, closed
template	Template	1	SLA Template characteristics
validFor	TimePeriod	0..1	Period where the clauses of the SLA are applicable
version	String	0..1	Version of the Service level Agreement (SLA)

### Business Rules

Name	Severity	Specification	Message
can be updated		[name description version validFor state - defined, observed, closed approved template.href template.name template.description relatedParty rule.id rule.metric rule.unit rule.referenceValue rule.operator rule.tolerance rule.consequence]	

## BUSINESS ENTITY – RULE

Common pattern or Template for SLA parameters, metrics, and thresholds

## Attributes

Name	Type	Multiplicity	Description
consequence	String	1	defines the action to be applied as a result of a threshold crossing
id	String	1	Unique identifier of the metric
metric	String	1	Reference of metric stored in the Service Provider Metrics Library
operator	String	1	Operator used when calculating the rule
referenceValue	String	1	Reference value of metric
tolerance	String	1	Allowable variation of metric
unit	String	1	Unit of measure of metric

## BUSINESS ENTITY – SLA

### Attributes

Name	Type	Multiplicity	Description
approvalDate	DateTime	0..1	Date and time the approval was made.
description	String	0..1	Description of the Service level Agreement (SLA)
href	String	1	Reference to a service level agreement
id	String	1	Unique identifier of the Service level Agreement (SLA)
isApproved	Boolean	0..1	Indicates if the service level agreement is approved or not (true or false)
name	String	1	Name of the Service level Agreement (SLA)
relatedParty	RelatedPartyRef	0..*	Parties engaged in the SLA (SLA provider, SLA consumer, ...)
rule	Rule	0..*	Common pattern or Template for the SLA parameters, metrics, and thresholds
state	String	1	State of SLA - defined, observed, closed
template	Template	1	SLA Template characteristics
validFor	TimePeriod	0..1	Period where the clauses of the SLA are applicable
version	String	0..1	Version of the Service level Agreement (SLA)

## BUSINESS ENTITY – TEMPLATE

Description of the template

### Attributes

Name	Type	Multiplicity	Description
description	String	1	description
href	String	1	Reference of the Template
name	String	1	Name of the template

## SLA VIOLATION

We assume all KPIs (Metrics) are existing ones, stored in the Service Provider “Metrics Library” with their attached references.

We defined “Violations” in terms of ID, description (KPIs, reported date, period, start Time, end Time). Besides, the Involved Parties such as SLA Provider (CSP), SLA Consumer” (DSP) and SLA Auditor (for SLA monitoring) are represented in the same way we did for SLA” resource model. The same goes for “EndUser” role. The important thing we wanted to introduce in such an “Event” representation is to present an immediate view of the event result or impact. This practical and operational view allows the involved parties to react and perform an immediate and direct analysis of potential impacts of the violation.

We also introduced “Attachments” which represents statistics, a dashboard or reporting data to be presented to the target parties, DSP (SLA Consumer) or / and to CSP (SLA Provider) for deeper analysis purpose.

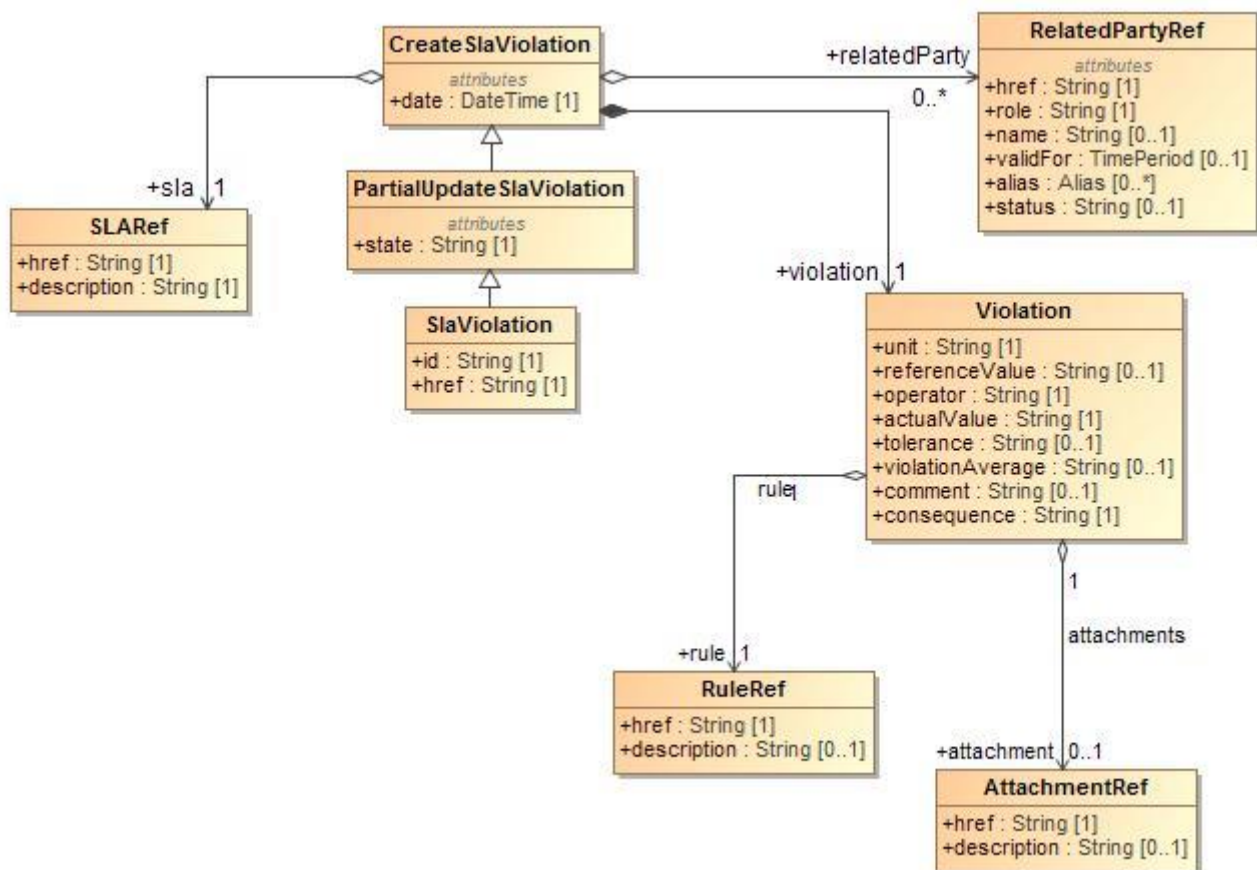


Figure 3. SLA Violation

## BUSINESS ENTITY – CREATESLAVIOLATION

### Attributes

Name	Type	Multiplicity	Description
date	DateTime	1	Date/time when the event was generated (may be posterior to SLAViolation creation date)
relatedParty	RelatedPartyRef	0..*	Party engaged in the SLA (SLA provider, SLA

			consumer, ...)
sla	SLARef	1	
violation	Violation	1	A discrepancy identified by applying rules to Service Level Agreement related entities.

## BUSINESS ENTITY – PARTIALUPDATESLAVIOLATION

### Attributes

Name	Type	Multiplicity	Description
date	DateTime	1	Date/time when the event was generated (may be posterior to SLAViolation creation date)
relatedParty	RelatedPartyRef	0..*	Party engaged in the SLA (SLA provider, SLA consumer, ...)
sla	SLARef	1	
state	String	1	State of SLA - defined, observed, closed
violation	Violation	1	A discrepancy identified by applying rules to Service Level Agreement related entities.

### Business Rules

Name	Severity	Specification	Message
can be updated		[state - defined, observed, closed relatedParty sla.description violation violation.rule.description violation.attachment.description]	

## BUSINESS ENTITY – SLAVIOLATION

The SLAViolation is the second resource considered in this translation into JSON representation. The same representation used for SLA resource is applied and is aligned with the SID modeling as well. It is assumed all Metrics are the ones already stored in the Service Provider Metrics Library with their attached references and associated with products on-boarded in the Catalogue.

### Attributes

Name	Type	Multiplicity	Description
date	DateTime	1	Date/time when the event was generated (may be posterior to SLAViolation creation date)
href	String	1	Reference to a service level agreement violation
id	String	1	Unique identifier of the service level agreement violation
relatedParty	RelatedPartyRef	0..*	Party engaged in the SLA (SLA provider, SLA consumer, ...)
sla	SLARef	1	
state	String	1	State of SLA - defined, observed, closed
violation	Violation	1	A discrepancy identified by applying rules to Service Level Agreement related entities.

**SLA COMMON**

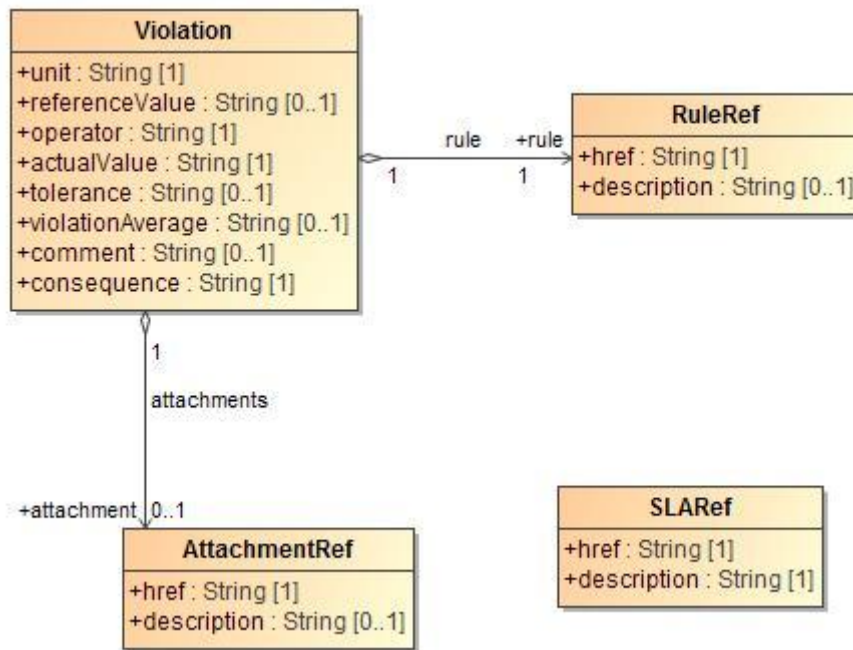


Figure 4. Common

**BUSINESS ENTITY – ATTACHMENTREF**

The attachment is associated with the event and represents statistics, a dashboard or reporting data to be presented to the target Related Party, DSP (SLA Consumer) or / and to CSP (SLA Provider) for deeper analysis purpose.

**Attributes**

Name	Type	Multiplicity	Description
description	String	0..1	Description of the attachment
href	String	1	Reference to the attachment

**BUSINESS ENTITY – RULEREF**

The rule represents the value of the threshold of the metric. Once crossed it triggers a violation.

**Attributes**

Name	Type	Multiplicity	Description
description	String	0..1	Description of the rule
href	String	1	Reference to the rule

**BUSINESS ENTITY – SLAREF**

**Attributes**

Name	Type	Multiplicity	Description
description	String	1	Description of the referenced SLA

href	String	1	Reference to the service level agreement
------	--------	---	--

## BUSINESS ENTITY – VIOLATION

The violation is defined in terms of ID, description (Metrics, reported date, period). Besides, the RelatedParty such as SLA Provider (CSP), SLA Consumer (DSP) and SLA Auditor (for SLA monitoring) is represented in the same way as for Service Level Agreement SLA resource . The same goes for EndUser role. Two levels of event representation could be useful to introduce: an immediate view of the event result impact. This practical and operational view allows the Related Party to react and perform an immediate and direct analysis of potential impacts of the violation.

### Attributes

Name	Type	Multiplicity	Description
actualValue	String	1	Actual value of the metric
attachment	AttachmentRef	0..1	Represents statistics, a dashboard or reporting data to be presented to the target parties.
comment	String	0..1	Comment about violation
consequence	String	1	Defines the action to be applied as a result of a threshold crossing
operator	String	1	Operator used when calculating the rule
referenceValue	String	0..1	Reference value of metric
rule	RuleRef	1	The rule represents the value of the threshold of the metric. Once crossed it triggers a violation.
tolerance	String	0..1	Allowable variation of metric
unit	String	1	Unit of measure of metric
violationAverage	String	0..1	TBD

## COMMON BUSINESS ENTITIES

### BUSINESS ENTITY – ALIAS

#### Attributes

Name	Type	Multiplicity	Description
type	String		
value	String		

### BUSINESS ENTITY – ARRAYUPDATE

Used to partially update an array

#### Attributes

Name	Type	Multiplicity	Description
op	String		Operation to be performed on the array - test, remove, add, replace, move, copy
path	String		The reference to the array to be modified
value	String		

### BUSINESS ENTITY – BILLINGACCOUNTREF

BillingAccount to use to bill the ordered products.

#### Attributes

Name	Type	Multiplicity	Description
href	String	1	Reference of the billing account.

### BUSINESS ENTITY – CHARACTERISTIC

Describes the characteristics of the individual or the organization such as individual hobbies, center of interests.

#### Attributes

Name	Type	Multiplicity	Description
name	String	1	Name of the characteristic.
value	String	0..1	Value of the characteristic.

### BUSINESS ENTITY – CONTACTMEDIUM

Describes the contact mediums that could be used to contact the customer (Email, TelephoneNumber, PostalAddress).

#### Attributes

Name	Type	Multiplicity	Description
isPreferred	Boolean	0..1	If true, indicates that is the preferred contact medium.
medium	Medium	0..1	Describes the contact medium that can be



			used to contact the customer.
type	String	1	Email address, telephone number, postal address, etc.
validFor	TimePeriod	0..1	The time period that the contact medium is valid for.

## BUSINESS ENTITY – CREATELISTENER

### Attributes

Name	Type	Multiplicity	Description
callback	String		Callback address of the listener
query	String		

## BUSINESS ENTITY – CREDENTIAL

### Attributes

Name	Type	Multiplicity	Description
login	String		
password	String		
updateType	String		

## BUSINESS ENTITY – HEADER

### Attributes

Name	Type	Multiplicity	Description
key	String		URL Parameter Key e.g., Content-Type
value	String		Value e.g., application/json, application/xml

## BUSINESS ENTITY – LISTENER

### Attributes

Name	Type	Multiplicity	Description
callback	String		Callback address of the listener
href	String	1	Reference to the listener
id	String	1	
query	String		

## BUSINESS ENTITY – MEDIUM

Describes the contact medium that can be used to contact the customer.

### Attributes

Name	Type	Multiplicity	Description
city	String	0..1	
country	String	0..1	
emailAddress	String	0..1	Full e-mail address in standard format (e.g., fred.bloggs@thing.com)

number	String	0..1	Phone number
postcode	String	0..1	Postcode
stateOrProvince	String	0..1	State or province
street1	String	0..1	Describes the street
street2	String	0..1	Complementary street description
type	String	0..1	Type of medium (fax, mobile phone...)

## BUSINESS ENTITY – MONEY

A base / value business entity used to represent money

### Attributes

Name	Type	Multiplicity	Description
amount	Float	1	A positive floating point number.
currencyCode	String	1	Currency. Notes: refer to [ISO 4217]
digits	Integer	0..1	Number of digits to the right of the decimal point

## BUSINESS ENTITY – NOTE

Extra-information about an entity (e.g. useful to add extra delivery information that could be useful for a human process : a digicode access to a building, ...).

### Attributes

Name	Type	Multiplicity	Description
author	String	0..1	Author of the note
date	DateTime	0..1	Date of the note
text	String	1	Text of the note

## BUSINESS ENTITY – PAYMENTMEANREF

### Attributes

Name	Type	Multiplicity	Description
href	String	1	Reference of the payment means
name	String	0..1	Name of the payment means

## BUSINESS ENTITY – PERIOD

defines the period of a recurring charge

### Attributes

Name	Type	Multiplicity	Description
endPeriod	DateTime	0..1	End date of the period
startPeriod	DateTime	1	Start date of the period

### Business Rules

Name	Severity	Specification	Message
StartPeriod Before EndPeriod	error	[startPeriod.before(endPeriod) or startPeriod = endPeriod]	The start period must be on or before the end period.

## BUSINESS ENTITY – PLACEREF

Used to defined a place useful for the entity (for example a delivery geographical place).

### Attributes

Name	Type	Multiplicity	Description
href	String	1	Reference of a place (for instance in Google map).
role	String	1	Role of the place (for instance delivery geographical place).

## BUSINESS ENTITY – RELATEDPARTYREF

Defines party or partyRole linked to a specific entity. Used to represent an association between a resource and a party or role object playing a role regarding that object.

### Attributes

Name	Type	Multiplicity	Description
alias	Alias	0..*	
href	String	1	Reference to the related party.
name	String	0..1	Name of the related party.
role	String	1	Role of the related party.
status	String	0..1	The status of the relationship between the party and the related entity.
validFor	TimePeriod	0..1	The period for which the related party is valid.

## BUSINESS ENTITY – TIMEPERIOD

### Attributes

Name	Type	Multiplicity	Description
endTime	DateTime	0..1	
startTime	DateTime	1	

### Business Rules

Name	Severity	Specification	Message
Start DateTime Before End DateTime	error	[startTime.before(endDateTi me) or startTime = endTime]	The start period must be on or before the end period.

## NOTIFICATION EVENT

Refer to Common Management Spec for details on how to Register and Unregister a Listener.

The notification events supported by SLA Management are:

- o SLA Violation

The Event is published to the registered listener

REST Example:

POST client/listener

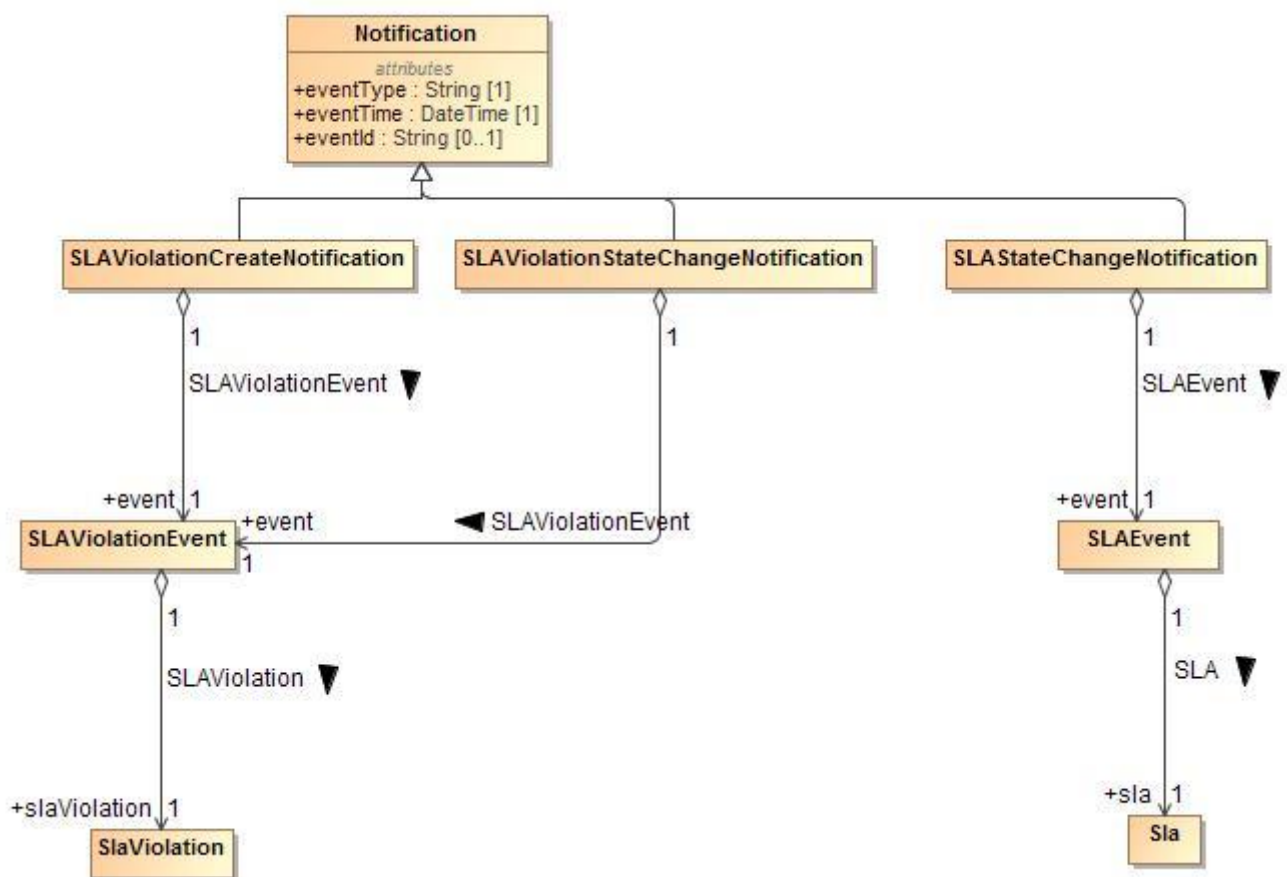


Figure 5. SLA Notification

## BUSINESS ENTITY – SLAVIOLATIONSTATECHANGENOTIFICATION

### Attributes

Name	Type	Multiplicity	Description
event	SLAViolationEvent	1	
eventId	String	0..1	Unique identifier of the event
eventTime	DateTime	1	
eventType	String	1	

## SLA

## BUSINESS ENTITY – SLAEVENT

## Attributes

Name	Type	Multiplicity	Description
sla	Sla	1	

## BUSINESS ENTITY – SLASTATECHANGENOTIFICATION

## Attributes

Name	Type	Multiplicity	Description
event	SLAEvent	1	
eventId	String	0..1	Unique identifier of the event
eventTime	DateTime	1	
eventType	String	1	

## SLA VIOLATION

### BUSINESS ENTITY – SLAVIOLATIONCREATENOTIFICATION

#### Attributes

Name	Type	Multiplicity	Description
event	SLAViolationEvent	1	
eventId	String	0..1	Unique identifier of the event
eventTime	DateTime	1	
eventType	String	1	

### BUSINESS ENTITY – SLAVIOLATIONEVENT

#### Attributes

Name	Type	Multiplicity	Description
slaViolation	SlaViolation	1	

**NOTIFICATION COMMON****BUSINESS ENTITY – NOTIFICATION**

## Attributes

<b>Name</b>	<b>Type</b>	<b>Multiplicity</b>	<b>Description</b>
eventId	String	0..1	Unique identifier of the event
eventTime	DateTime	1	
eventType	String	1	

## STATE MACHINE



SLA

SlaSM

Service Level Agreement

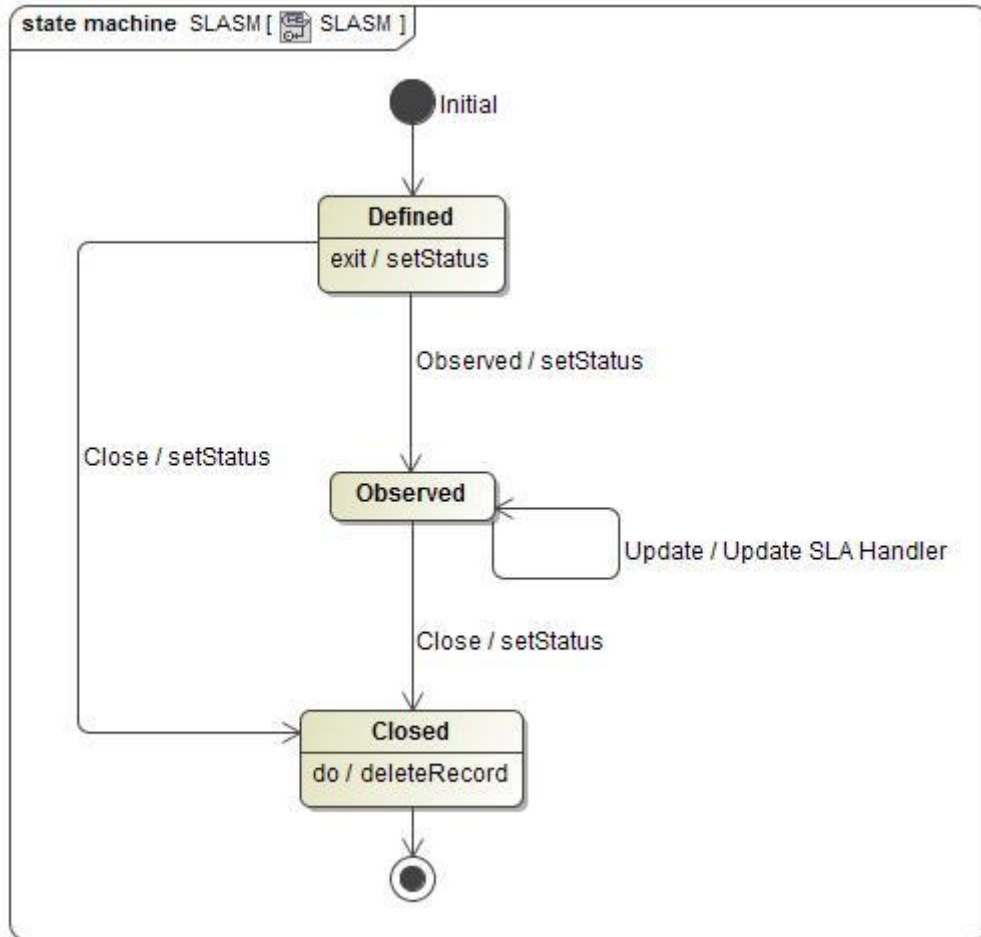


Figure 6. SLASM

Name	Description
<b>Closed</b>	The billing account is closed and can not be changed to another state.
<b>Defined</b>	Billing account has been created but no related invoice can be produced
<b>Observed</b>	The billing account is active and related invoices are produced

**SLAVIOLATION**

**SLAViolationSM**

Service Level Agreement

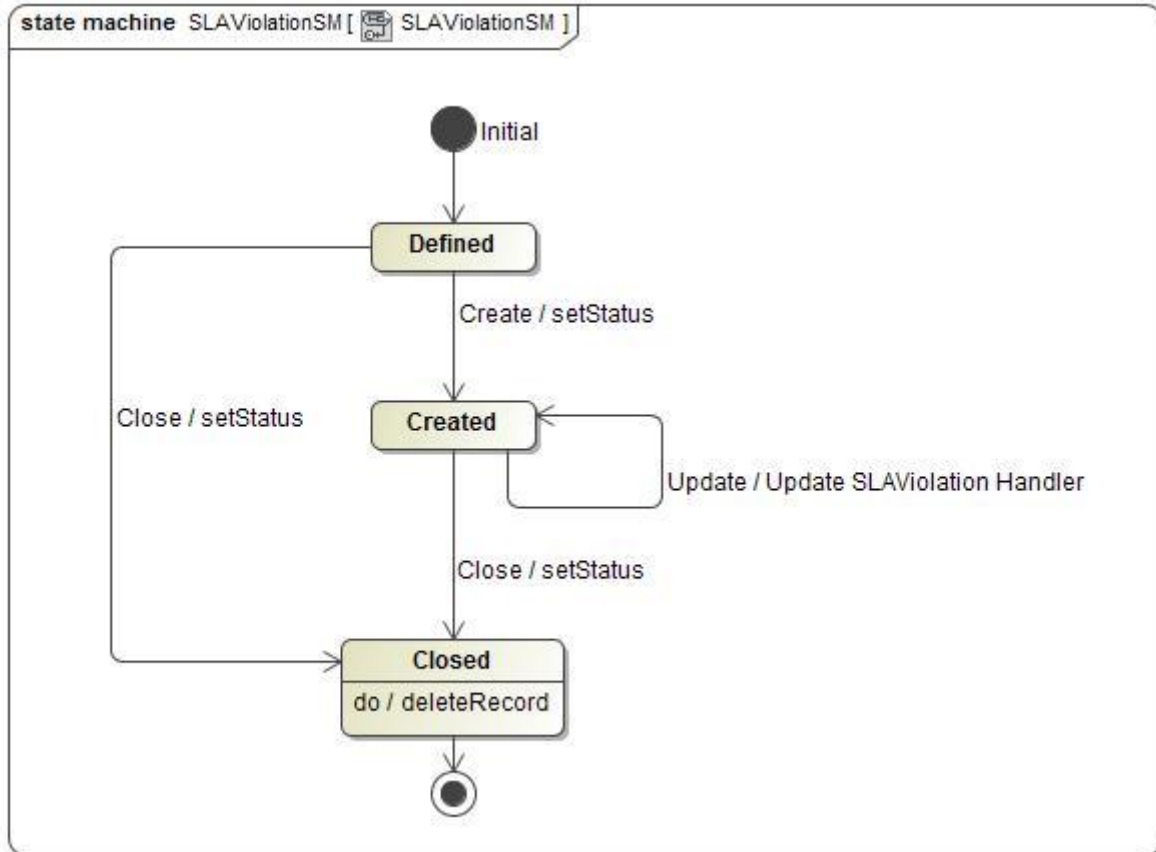


Figure 7. SLAViolationSM

Name	Description
<b>Closed</b>	The billing account is closed and can not be changed to another state.
<b>Created</b>	The billing account is active and related invoices are produced
<b>Defined</b>	Billing account has been created but no related invoice can be produced

## SLA MANAGEMENT BUSINESS SERVICES

### BUSINESS SERVICE – SLA REST SERVICE



Figure 8. SLA Business Service

#### OPERATION – POSTSLA

##### Description

This operation is used to create an sla.

##### Business Rules

Name	Severity	Specification	Message
mandatory attributes		[name]	

#### OPERATION – GETSLA

##### Description

This operation retrieves an sla.

##### Business Rules

Name	Severity	Specification	Message
mandatory attributes		[id]	

#### OPERATION – GETSLAS

##### Description

This operation is used to retrieve a collection of slas.

#### OPERATION – PUTSLA

##### Description

This operation is used to completely update the representation of an sla.

##### Business Rules

Name	Severity	Specification	Message
------	----------	---------------	---------

mandatory attributes	[id]
----------------------	------

### OPERATION – PATCHSLA

#### Description

This operation is used to partially update the representation of an sla.

#### Business Rules

Name	Severity	Specification	Message
can be updated		[name description version validFor state - defined, observed, closed approved template.href template.name template.description relatedParty rule.id rule.metric rule.unit rule.referenceValue rule.operator rule.tolerance rule.consequence]	
mandatory attributes		[id]	

### OPERATION – DELETESLA

#### Description

This operation is used to delete an sla.

#### Business Rules

Name	Severity	Specification	Message
mandatory attributes		[id]	

## BUSINESS SERVICE – SLA VIOLATION REST SERVICE



Figure 9. SLA Violation Business Service

---

**OPERATION – POSTSLAVIOLATION****Description**

This operation is used to create an slaViolation.

**Business Rules**

Name	Severity	Specification	Message
mandatory attributes		[name]	

---

**OPERATION – GETSLAVIOLATION****Description**

This operation retrieves an slaViolation.

**Business Rules**

Name	Severity	Specification	Message
mandatory attributes		[id]	

---

**OPERATION – GETSLAVIOLATIONS****Description**

This operation is used to retrieve a collection of slaViolations.

---

**OPERATION – PUTSLAVIOLATION****Description**

This operation is used to completely update the representation of an slaViolation.

**Business Rules**

Name	Severity	Specification	Message
mandatory attributes		[id]	

---

**OPERATION – PATCHSLAVIOLATION****Description**

This operation is used to partially update the representation of an slaViolation.

**Business Rules**

Name	Severity	Specification	Message
can be updated		[state - defined, observed, closed relatedParty sla.description violation violation.rule.description violation.attachment.description]	
mandatory attributes		[id]	

---

**OPERATION – DELETESLAVIOLATION****Description**

This operation is used to delete an slaViolation.

**Business Rules**

Name	Severity	Specification	Message
mandatory attributes		[id]	

## HUB BUSINESS SERVICE

The notification events supported by SLA Management are:

- o SLA state change
- o SLA Violation state change

The Event is published to the registered listener

REST Example:  
POST client/listener

## BUSINESS SERVICE – SLA VIOLATION HUB REST SERVICE

### OPERATION – REGISTERSLAVIOLATIONLISTENER

#### Description

This operation is used to register an SLA listener to be notified of the following events: SLA state change.

#### Business Rules

Name	Severity	Specification	Message
mandatory attributes		[description severity type]	

### OPERATION – UNREGISTERSLAVIOLATIONLISTENER

#### Description

This operation is used to unregister an SLA listener.

#### Business Rules

Name	Severity	Specification	Message
mandatory attributes		[description severity type]	