

TM Forum Specification

Customer Management API REST Specification

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TABLE OF CONTENTS

Table of Contents 3	
List of Tables 4	
ntroduction 5	
SAMPLE USE CASES 6	
Support of polymorphism and extension patterns 7	
RESOURCE MODEL 8	
Managed Entity and Task Resource Models	8
FIRST resource	Error! Bookmark not defined
Notification Resource Models	15
First Notification	Error! Bookmark not defined
API OPERATIONS 19	
VERB url	Error! Bookmark not defined
API NOTIFICATIONS 28	
Register listener	28
Register listener Unregister listener	
	29
Unregister listener	29
Unregister listener Publish Event to listener	
Unregister listener Publish Event to listener Acknowledgements 31	



LIST OF TABLES

N/A



INTRODUCTION

The following document is the specification of the REST API for Customer Management. It includes the model definition as well as all available operations.

It provides a standardized mechanism for customer and customer account management such as creation, update, retrieval, deletion and notification of events.

Customer can be a person, an organization or another service provider who buys products from an enterprise. Customer management API allows management of identification and financial information about him.

Customer management API manages the following data resources:

- Customer

- Customer represents a person or organization that buys products and services from the enterprise or receives free offers or services. Customers can also be other service providers who resell the enterprises products, other service providers that lease the enterprise's resources for utilization by the other service provider's products and services, and so forth.
- Customer resource contains information about the customer. Main attributes are its identifier, name, status
 and validity, description, characteristics, contact medium, related customer account, related party,
 customer credit profile information

The customer management API performs the following operation on customer:

Retrieval, creation, full or partial update and deletion of customers.

API Dependencies

This API assumes that the information regarding customer *accounts* and *payment means* is obtained by accessing the *Account Management API*.

This API assumes that the information regarding related parties is obtained by accessing the *Party Management API*.



SAMPLE USE CASES

Reader will find example of use cases using Usage API in "Open Digital Business Scenarios and Use Cases" document.



SUPPORT OF POLYMORPHISM AND EXTENSION PATTERNS

Support of polymorphic collections and types and schema based extension is provided by means of a list of generic meta-attributes that we describe below. Polymorphism in collections occurs when entities inherit from base entities, for instance a BillingAccount and SettlementAccount inheriting properties from the abstract Account entity.

Generic support of polymorphism and pattern extensions is described in the TMF API Guidelines v3.0 Part 2 document.

The @type attribute provides a way to represent the actual class type of an entity. For example, within a list of Account instances some may be instances of BillingAccount where other could be instances of SettlementAccount. The @type gives this information. All resources and sub-resources of this API have a @type attributes that can be provided when this is useful.

The @referredType can be used within reference entities (like for instance an AccountRef object) to explicitly denote the actual entity type of the referred class. Notice that in reference entities the @type, when used, denotes the class type of the reference itself, such as BillingAccountRef or SettlementAccountRef, and not the class type of the referred object. However since reference classes are rarely sub-classed, @type is generally not useful in reference objects.

The @schemaLocation property can be used in resources to allow specifying user-defined properties of an Entity or to specify the expected *characteristics* of an entity.

The @baseType attribute gives a way to provide explicitly the base of class of a given resource that has been extended.



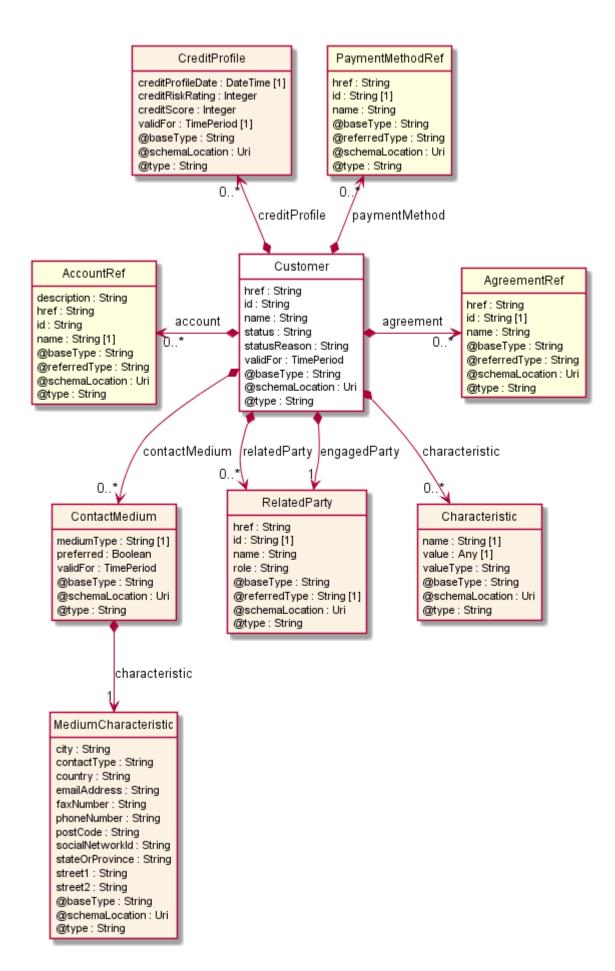
RESOURCE MODEL

Managed Entity and Task Resource Models

CUSTOMER RESOURCE

Resource model







Field descriptions

Customer fields

account A list of account references (AccountRef [*]). A account may be a party account

or a financial account.

agreement A list of agreement references (AgreementRef [*]). An agreement represents a

contract or arrangement, either written or verbal and sometimes enforceable by law, such as a service level agreement or a customer price agreement. An agreement involves a number of other business entities, such as products,

services, and resources and/or their specifications.

characteristic A list of characteristics (Characteristic [*]). Describes the characteristic of a

customer.

contactMedium A list of contact mediums (ContactMedium [*]). Indicates the contact medium

that could be used to contact the party.

creditProfile A list of credit profiles (CreditProfile [*]). Credit profile for the party (containing

credit scoring, ...). By default only the current credit profile is retrieved. It can be used as a list to give the party credit profiles history, the first one in the list

will be the current one.

engagedParty A related party (RelatedParty). The party - an organization or an individual -

that is engaged as a customer.

href A string. Url used to reference the customer.

id A string. Unique identifier for Customers.

name A string. A word, term, or phrase by which the Customer is known and

distinguished from other Customers.

paymentMethod A list of payment method references (PaymentMethodRef [*]). A payment

method defines a specific mean of payment (e.g direct debit).

relatedParty A list of related parties (RelatedParty [*]). Related Entity reference. A related

party defines party or party role linked to a specific entity.

status A string. Used to track the lifecycle status of the customer.

statusReason A string. A string providing an explanation on the value of the status lifecycle.

For instance if the status is Rejected, statusReason will provide the reason for

rejection.

validFor A time period. The time period that the Customer is valid for.

Characteristic sub-resource

Describes a given characteristic of an object or entity through a name/value pair.



name A string. Name of the characteristic.

value An any (Any). The value of the characteristic.

valueType A string. Data type of the value of the characteristic.

ContactMedium sub-resource

Indicates the contact medium that could be used to contact the party.

characteristic A medium characteristic (MediumCharacteristic). Any additional

characteristic(s) of this contact medium.

mediumType A string. Type of the contact medium, such as: email address, telephone

number, postal address.

preferred A boolean. If true, indicates that is the preferred contact medium.

validFor A time period. The time period that the contact medium is valid for.

CreditProfile sub-resource

Credit profile for the party (containing credit scoring, ...). By default only the current credit profile is retrieved. It can be used as a list to give the party credit profiles history, the first one in the list will be the current one.

creditProfileDate A date time (DateTime). The date the profile was established.

creditRiskRating An integer. This is an integer whose value is used to rate the risk.

creditScore An integer. A measure of a person or organizations creditworthiness calculated

on the basis of a combination of factors such as their income and credit history.

validFor A time period. The period for which the profile is valid.

MediumCharacteristic sub-resource

Describes the contact medium characteristics that could be used to contact a party (an individual or an organization).

city A string. The city.

contactType A string. The type of contact, for example: phone number such as mobile, fixed

home, fixed office. postal address such as shipping instalation....

country A string. The country.

emailAddress A string. Full email address in standard format.

faxNumber A string. The fax number of the contact.

phoneNumber A string. The primary phone number of the contact.



postCode A string. Postcode.

socialNetworkId A string. Identifier as a member of a social network.

stateOrProvince A string. State or province.

street1 A string. Describes the street.

street2 A string. Complementary street description.

RelatedParty sub-resource

Related Entity reference. A related party defines party or party role linked to a specific entity.

@referredType A string. The actual type of the target instance when needed for

disambiguation.

href A string. Reference of the related entity.

id A string. Unique identifier of a related entity.

name A string. Name of the related entity.

role A string. Role played by the related party.

AccountRef relationship

Account reference. A account may be a party account or a financial account.

@referredType A string. The actual type of the target instance when needed for

disambiguation.

description A string. Detailed description of the account.

href A string. Reference of the account.

id A string. Unique identifier of the account.

name A string. Name of the account.

AgreementRef relationship

Agreement reference. An agreement represents a contract or arrangement, either written or verbal and sometimes enforceable by law, such as a service level agreement or a customer price agreement. An agreement involves a number of other business entities, such as products, services, and resources and/or their specifications.

@referredType A string. The actual type of the target instance when needed for

disambiguation.

href A string. Reference of the related entity.

id A string. Unique identifier of a related entity.



name A string. Name of the agreement.

PaymentMethodRef relationship

PaymentMethod reference. A payment method defines a specific mean of payment (e.g direct debit).

@referredType A string. The actual type of the target instance when needed for

disambiguation.

href A string. Reference of the payment mean.

id A string. Unique identifier of the payment mean.

name A string. Name of the payment mean.

Json representation sample

We provide below the json representation of an example of a 'Customer' resource object

```
"@type": "Customer",
"href": "https://host:port/tmf-api/customerManagement/v4/customer/1140",
"id": "1140",
"name": "Moon Football Club",
"status": "Approved",
"statusReason": "Account details checked",
"validFor": {
  "startDateTime": "2018-06-12T00:00Z",
  "endDateTime": "2019-01-11T00:00Z"
},
"engagedParty": [
    "@referredType": "Organization",
    "href": "https://host:port/tmf-api/partyManagement/v4/organization/500",
    "id": "500",
    "name": "Happy Travellers"
 }
],
"account": [
    "@referredType": "BillingAccount",
    "description": "This account ...",
    "href": "https://host:port/tmf-api/accountManagement/v4/account/8251",
    "id": "8251",
    "name": "Travel Account"
 }
],
"paymentMethod": [
    "@referredType": "CreditCardPayment",
    "href": "https://host:port/tmf-api/paymentMethods/v1/paymentMethod/9562",
    "id": "9562",
    "name": "professional payment"
 }
```



```
"contactMedium": [
    "@referredType": "TelephoneMedium",
    "@schemaLocation": "https://my.schemas/TelephoneMedium.schema.json",
    "preferred": false,
    "mediumType": "TelephoneNumber",
    "validFor": {
      "startDateTime": "2018-06-13T00:00Z",
      "endDateTime": "2019-01-11T00:00Z"
    "characteristic": {
      "city": "Paris",
      "street1": "15 Rue des Canards",
      "emailAddress": "alain.delon@best-actor.fr",
      "postCode": "75014",
      "country": "France",
      "contactType": "home"
  }
],
"characteristic": [
  {
    "name": "fidelityProgram",
    "value": "premium",
    "valueType": "string"
  }
],
"creditProfile": [
  {
    "creditProfileDate": "2018-06-15T00:00Z",
    "creditRiskRating": 4,
    "creditScore": 5,
    "validFor": {
      "startDateTime": "2018-06-13T00:00Z",
      "endDateTime": "2019-01-11T00:00Z"
    }
  }
],
"agreement": [
    "@referredType": "Agreement",
    "href": "https://host:port/tmf-api/agreementManagement/v4/agreement/4721",
    "id": "4721",
    "name": "Summer Contract Agreement"
  }
],
"relatedParty": [
    "@referredType": "Organization",
    "href": "https://host:port/tmf-api/partyManagement/v4/organization/2777",
    "id": "2777",
    "name": "John Doe",
    "role": "bill receiver"
  }
]
```



Notification Resource Models

4 notifications are defined for this API

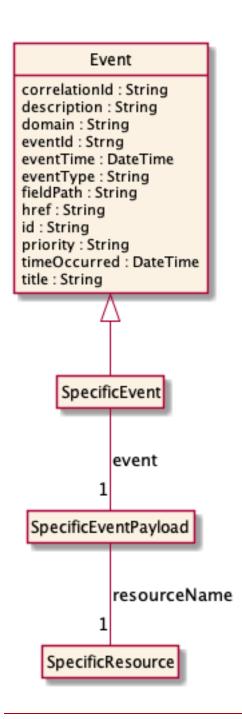
Notifications related to Customer:

- CustomerCreateEvent
- CustomerAttributeValueChangeEvent
- CustomerStateChangeEvent
- CustomerDeleteEvent

The notification structure for all notifications in this API follow the pattern depicted by the figure below. A notification event resource (depicted by "SpecificEvent" placeholder) is a sub class of a generic Event structure containing at least an id of the event occurrence (eventId), an event timestamp (eventTime), and the name of the resource (eventType).

This notification structure owns an event payload structure ("SpecificEventPayload" placeholder) linked to the resource concerned by the notification using the resource name as access field ("resourceName" placeholder).





CUSTOMER CREATE EVENT

Notification CustomerCreateEvent case for resource Customer

Json representation sample

We provide below the json representation of an example of a 'CustomerCreateEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"CustomerCreateEvent",
```



```
"event": {
    "customer" :
    {-- SEE Customer RESOURCE SAMPLE --}
}
```

CUSTOMER ATTRIBUTE VALUE CHANGE EVENT

Notification CustomerAttributeValueChangeEvent case for resource Customer

Json representation sample

We provide below the json representation of an example of a 'CustomerAttributeValueChangeEvent' notification event object

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"CustomerAttributeValueChangeEvent",
  "event": {
     "customer":
     {-- SEE Customer RESOURCE SAMPLE --}
  }
}
```

CUSTOMER STATE CHANGE EVENT

Notification CustomerStateChangeEvent case for resource Customer

Json representation sample

We provide below the json representation of an example of a 'CustomerStateChangeEvent' notification event object

CUSTOMER DELETE EVENT

Notification CustomerDeleteEvent case for resource Customer

Json representation sample



We provide below the json representation of an example of a 'CustomerDeleteEvent' notification event object



API OPERATIONS

Remember the following Uniform Contract:

Operation on Entities	Uniform API Operation	Description
Query Entities	GET Resource	GET must be used to retrieve a representation of a resource.
Create Entity	POST Resource	POST must be used to create a new resource
Partial Update of an Entity	PATCH Resource	PATCH must be used to partially update a resource
Complete Update of an Entity	PUT Resource	PUT must be used to completely update a resource identified by its resource URI
Remove an Entity	DELETE Resource	DELETE must be used to remove a resource
Execute an Action on an Entity	POST on TASK Resource	POST must be used to execute Task Resources
Other Request Methods	POST on TASK Resource	GET and POST must not be used to tunnel other request methods.

Filtering and attribute selection rules are described in the TMF REST Design Guidelines.

Notifications are also described in a subsequent section.

OPERATIONS ON CUSTOMER



LIST CUSTOMERS

GET /customer?fields=...&{filtering}

Description

This operation list customer entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Here's an example of a request for retrieving Customer resources.

Request

GET /tmf-api/customerManagement/v4/customer Accept: application/json

Response

```
200
[
    "@type": "Customer",
    "href": "https://host:port/tmf-api/customerManagement/v4/customer/1140",
    "id": "1140",
    "name": "Moon Football Club",
    "status": "Approved",
    "statusReason": "Account details checked",
    "validFor": {
      "startDateTime": "2018-06-12T00:00Z",
      "endDateTime": "2019-01-11T00:00Z"
    "engagedParty": [
        "@referredType": "Organization",
        "href": "https://host:port/tmf-api/partyManagement/v4/organization/500",
        "id": "500",
        "name": "Happy Travellers"
      }
    1,
    "account": [
        "@referredType": "BillingAccount",
        "description": "This account ...",
        "href": "https://host:port/tmf-api/accountManagement/v4/account/8251",
        "id": "8251",
```



```
"name": "Travel Account"
 }
"paymentMethod": [
    "@referredType": "CreditCardPayment",
    "href": "https://host:port/tmf-api/paymentMethods/v1/paymentMethod/9562",
    "id": "9562",
    "name": "professional payment"
  }
],
"contactMedium": [
    "@referredType": "TelephoneMedium",
    "@schemaLocation": "https://my.schemas/TelephoneMedium.schema.json",
    "preferred": false,
    "mediumType": "TelephoneNumber",
    "validFor": {
      "startDateTime": "2018-06-13T00:00Z",
      "endDateTime": "2019-01-11T00:00Z"
    "characteristic": {
      "city": "Paris",
      "street1": "15 Rue des Canards",
      "emailAddress": "alain.delon@best-actor.fr",
      "postCode": "75014",
      "country": "France",
      "contactType": "home"
  }
"characteristic": [
    "name": "fidelityProgram",
    "value": "premium",
    "valueType": "string"
 }
],
"creditProfile": [
    "creditProfileDate": "2018-06-15T00:00Z",
    "creditRiskRating": 4,
    "creditScore": 5,
    "validFor": {
      "startDateTime": "2018-06-13T00:00Z",
      "endDateTime": "2019-01-11T00:00Z"
    }
  }
"agreement": [
    "@referredType": "Agreement",
    "href": "https://host:port/tmf-api/agreementManagement/v4/agreement/4721",
    "id": "4721",
    "name": "Summer Contract Agreement"
```



```
],
    "relatedParty": [
        {
            "@referredType": "Organization",
            "href": "https://host:port/tmf-api/partyManagement/v4/organization/2777",
            "id": "2777",
            "name": "John Doe",
            "role": "bill receiver"
        }
    ]
    ]
}
```

RETRIEVE CUSTOMER

GET /customer/{id}?fields=...&{filtering}

Description

This operation retrieves a customer entity.

Attribute selection is enabled for all first level attributes.

Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Here's an example of a request for retrieving a Customer resource

Request

GET /tmf-api/customerManagement/v4/customer/1140 Accept: application/json

Response

```
{
    "@type": "Customer",
    "href": "https://host:port/tmf-api/customerManagement/v4/customer/1140",
    "id": "1140",
    "name": "Moon Football Club",
    "status": "Approved",
    "statusReason": "Account details checked",
    "validFor": {
        "startDateTime": "2018-06-12T00:00Z",
        "endDateTime": "2019-01-11T00:00Z"
    },
```



```
"engagedParty": [
            "@referredType": "Organization",
            "href": "https://host:port/tmf-api/partyManagement/v4/organization/500",
            "id": "500",
            "name": "Happy Travellers"
     }
],
"account": [
            "@referredType": "BillingAccount",
            "description": "This account ...",
            "href": "https://host:port/tmf-api/accountManagement/v4/account/8251",
            "id": "8251",
            "name": "Travel Account"
     }
],
"paymentMethod": [
            "@referredType": "CreditCardPayment",
            "href": "https://host:port/tmf-api/paymentMethods/v1/paymentMethod/9562",
            "id": "9562",
            "name": "professional payment"
     }
],
"contactMedium": [
            "@referredType": "TelephoneMedium",
            "@schema Location": "https://my.schemas/Telephone Medium.schema.json", and the properties of the pro
            "preferred": false,
            "mediumType": "TelephoneNumber",
            "validFor": {
                  "startDateTime": "2018-06-13T00:00Z",
                  "endDateTime": "2019-01-11T00:00Z"
            "characteristic": {
                  "city": "Paris",
                  "street1": "15 Rue des Canards",
                  "emailAddress": "alain.delon@best-actor.fr",
                  "postCode": "75014",
                 "country": "France",
                  "contactType": "home"
     }
],
"characteristic": [
            "name": "fidelityProgram",
            "value": "premium",
            "valueType": "string"
     }
],
"creditProfile": [
            "creditProfileDate": "2018-06-15T00:00Z",
            "creditRiskRating": 4,
```



```
"creditScore": 5,
      "validFor": {
        "startDateTime": "2018-06-13T00:00Z",
         "endDateTime": "2019-01-11T00:00Z"
    }
  ],
  "agreement": [
      "@referredType": "Agreement",
      "href": "https://host:port/tmf-api/agreementManagement/v4/agreement/4721",
      "id": "4721",
      "name": "Summer Contract Agreement"
    }
  ],
  "relatedParty": [
      "@referredType": "Organization",
      "href": "https://host:port/tmf-api/partyManagement/v4/organization/2777",
      "id": "2777",
      "name": "John Doe",
      "role": "bill receiver"
    }
 ]
}
```

CREATE CUSTOMER

POST /customer

Description

This operation creates a customer entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a Customer, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
name	
engagedParty	

Non Mandatory Attributes	Rule
account	
agreement	
characteristic	
contactMedium	
creditProfile	
paymentMethod	



relatedParty	
status	
statusReason	
validFor	

Additional Rules

The following table provides additional rules indicating mandatory fields in sub-resources or relationships when creating a Customer resource.

Context	Mandatory Sub-Attributes
characteristic	name, value
contactMedium	mediumType, characteristic
account	name
creditProfile	creditProfileDate, validFor

Usage Samples

Here's an example of a request for creating a Customer resource. In this example, the engaged party is searched based on the customer name, then it is included in the result (retrieved if existing or created on the fly if not existing).

Request

```
POST /tmf-api/customerManagement/v4/customer
Content-Type: application/json

{
    "name": "Moon Football Club",
    "relatedParty": [
        {
             "@referredType": "Organization",
            "id": "500",
            "name": "Moon Football Club "
        }
     }
}
```

Response

```
{
    "@type": "Customer",
    "href": "https://host:port/tmf-api/customerManagement/v4/customer/1140",
    "id": "1140",
    "name": "Moon Football Club",
    "relatedParty": [
    {
```



PATCH CUSTOMER

PATCH /customer/{id}

Description

This operation allows partial updates of a customer entity. Support of json/merge (https://tools.ietf.org/html/rfc7386) is mandatory, support of json/patch (http://tools.ietf.org/html/rfc5789) is optional.

Note: If the update operation yields to the creation of sub-resources or relationships, the same rules concerning mandatory sub-resource attributes and default value settings in the POST operation applies to the PATCH operation. Hence these tables are not repeated here.

Patchable and Non Patchable Attributes

The tables below provide the list of patchable and non patchable attributes, including constraint rules on their usage.

Patchable Attributes	Rule	
account		
agreement		
characteristic		
contactMedium		
creditProfile		
engagedParty		
name		
paymentMethod		
relatedParty		
status		
statusReason		
validFor		

Non Patchable Attributes	Rule
href	
id	

Usage Samples

Here's an example of a request for patching a Customer resource. Changing the name (using json-merge).



Request
PATCH /tmf-api/customerManagement/v4/customer/42
Content-Type: application/merge-patch+json
{ "name": "new name" }
Response
200
{ Similar JSON as in GET response with name changed }

DELETE CUSTOMER

DELETE /customer/{id}

Description

This operation deletes a customer entity.

Usage Samples

This operation deletes a Customer resource.

Request
DELETE /tmf-api/customerManagement/v4/customer/42
Response
204



API NOTIFICATIONS

For every single of operation on the entities use the following templates and provide sample REST notification POST calls.

It is assumed that the Pub/Sub uses the Register and UnRegister mechanisms described in the REST Guidelines reproduced below.

REGISTER LISTENER

POST /hub

Description

Sets the communication endpoint address the service instance must use to deliver information about its health state, execution state, failures and metrics. Subsequent POST calls will be rejected by the service if it does not support multiple listeners. In this case DELETE /api/hub/{id} must be called before an endpoint can be created again.

Behavior

Returns HTTP/1.1 status code 204 if the request was successful.

Returns HTTP/1.1 status code 409 if request is not successful.

Usage Samples

Here's an example of a request for registering a listener.

Request

POST /api/hub

Accept: application/json

{"callback": "http://in.listener.com"}

Response

201

Content-Type: application/json

Location: /api/hub/42

{"id":"42","callback":"http://in.listener.com","query":null}



UNREGISTER LISTENER

DELETE /hub/{id}

Description

Clears the communication endpoint address that was set by creating the Hub..

Behavior

Returns HTTP/1.1 status code 204 if the request was successful.

Returns HTTP/1.1 status code 404 if the resource is not found.

Usage Samples

Here's an example of a request for un-registering a listener.

Request	
DELETE /api/hub/42 Accept: application/json	
Response	
204	

PUBLISH EVENT TO LISTENER

POST /client/listener

Description

Clears the communication endpoint address that was set by creating the Hub.

Provides to a registered listener the description of the event that was raised. The /client/listener url is the callback url passed when registering the listener.

Behavior

Returns HTTP/1.1 status code 201 if the service is able to set the configuration.

Usage Samples

Here's an example of a notification received by the listener. In this example "EVENT TYPE" should be replaced by one of the notification types supported by this API (see Notification resources Models section) and EVENT BODY refers to the data structure of the given notification type.



```
POST /client/listener
Accept: application/json

{
    "event": {
        EVENT BODY
        },
    "eventType": "EVENT_TYPE"
}

Response
```

For detailed examples on the general TM Forum notification mechanism, see the TMF REST Design Guidelines.



ACKNOWLEDGEMENTS

RELEASE HISTORY

Release Number	Date	Release led by:	Description
0.a	28/11/2013	Arindam Basu (Ericsson) Sudipta Dutta (Ericsson) Brinda Santh M (IBM) Hemant Gour (IBM) Shashank Singh (IBM) Vishal Aggarwal (IBM) Nitish Jaisoor (Infosys) Rajesh Gannaprapu (Infosys) Srinivasan Duraiswamy (Infosys) Veeramani K (Infosys)	Initial Spec prepared in the TMF Conference held at Bangalore, India (Nov 26 to Nov 28)
0.b	5/03/2014	Christian Traxler (Infonova) Alexander Sturn (Infonova) Gilbert Scheiblhofer (A1) Josh Salomon (Amdocs) Véronique Mauneau (Orange) Maxime Delon (Orange)	Extension of customer API mgmt. during Spec Jam held in Vienna, Austria
2.0	15/04/2016	Pierre Gauthier (TM Forum) Mariano Belaunde (Orange)	Regenerated from API Data Model and re-branded. Does not include any more accounting and payment mean resources since this is provided through the Accounting API.
3.0	24/04/2018	Mariano Belaunde (Orange)	Update to support Guidelines 3.0
Release 4.0	30/05/2019	Mariano Belaunde Orange Labs	Regeneration after schematization

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