



Communication API REST Specification

Document Number TMF681
November 2017

Release: Framework Release 17.5	Status: Member Evaluation
Version: 1.1.0	IPR Mode: RAND

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INTRODUCTION

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

It provides a standardized mechanism for Communication management such as creation, update, retrieval, deletion and notification of the system communication events.

Communication API manages the following data resources:

- **Communication Message**

- o Communication message means a notification approach in the format of a message which can be dispatched (sent) to the certain user by the system with the content which can be felt and understood by the recipient. The user can be either a final customer or a customer service agent. The message can reach the customer in different interaction channels, including: email, short message, mobile app notification (push).

Normally the communication is implemented as a common shared service for all the IT applications. Whenever there is an application which needs to manage or send the message to the customer, this application can invoke the “communication” API to dispatch the notification.

To help clarify the concept of “communication API”, here all the possible “man-machine” contact approaches are listed as below. The “tick” shows the interaction types for which the “communication API” is designed to support.

Business Interaction Method	Communication API Related
SMS to customer	√
Email to customer	√
Mobile app push message to customer	√
Proactive calling to the customer (human initiated, i.e. person-call-person)	
Proactive calling to the customer (system initiated, i.e. machine-call-person)	
Face to face contact	
Customer browsing web page, open mobile app, calling IVR etc	

Communication API performs the following operation on the resource of “Communication Message”. There are two types of operations provided in this API. One is the management of the request message body. Another is for sending the communication message to the customer.

Operations for Communication Message body management

- Retrieval of an existing Communication Message depending on filter criteria
- Creation of a new Communication Message
- Partial update of an existing Communication Message
- Deletion of an existing Communication Message
- Notification of events:
 - o Creation of Communication Message
 - o Updating Communication Message
 - o Deletion of Communication Message

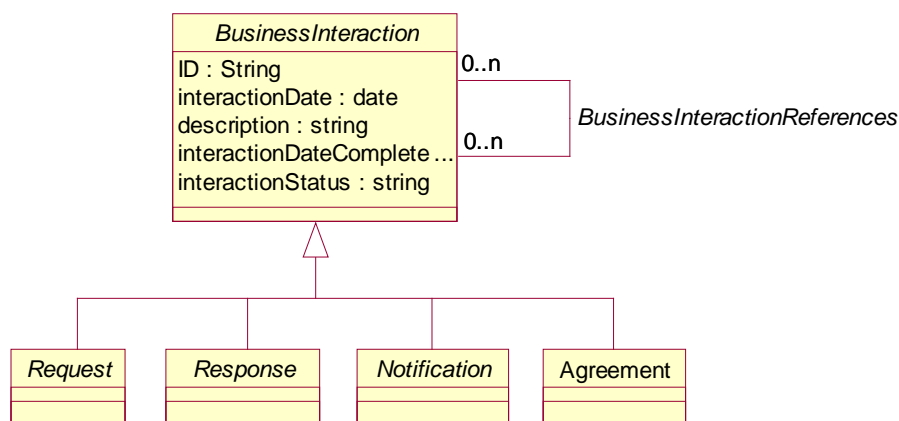
Operations for sending Communication Message.

- Send a message, including:
 - o Send a new message with the whole communication message body (POST operation)
 - o Send a message with the predefined communication message body (POST operation)

MAPPING WITH SID ABE

Communication Message is mapped to “*Business Interaction ABE:: Notification ABE*” in TMF Information Framework (SID).

The Business Interaction ABE is illustrated as the diagram below:

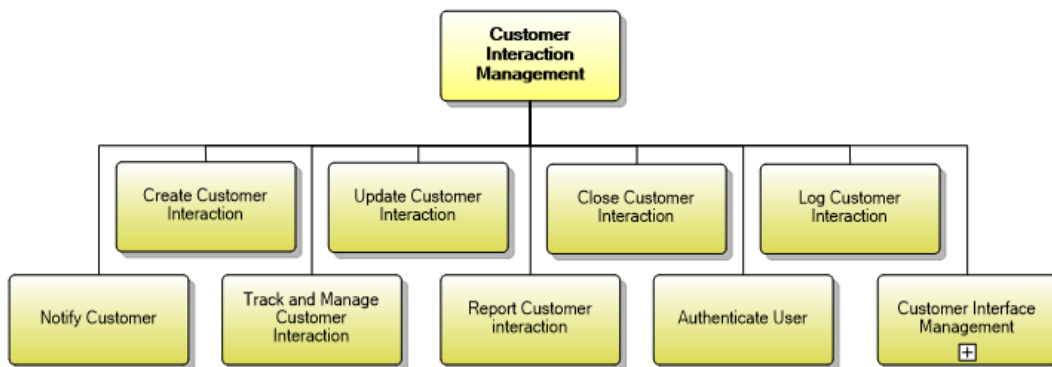


MAPPING WITH ETOM PROCESS

Communication API can be mapped to the “Customer Interaction Management” in TM Forum Process Framework (eTOM).

The relevant process is: **Notify Customer**.

1.3.5 Customer Interaction Management



The definition of TM Forum Process Framework is:

Category: (3) eTOM Process Type

Process Identifier: 1.3.5.5

Original Process Identifier: 1.1.1.18.5

Maturity Level: 4

Description

Notify the customer when interesting events happen.

Extended Description

The purpose of this process is to notify the customer when events related to existing interactions or to significant customer experience happen. Some notifications can be sent immediately using interactive media (such as SMS, Push to applications, etc.) and other notifications can be sent later using asynchronous media such as mail

DISTINCTION BETWEEN THIS API AND EVENT MANAGEMENT API

This API and Event Management API own some similarities.

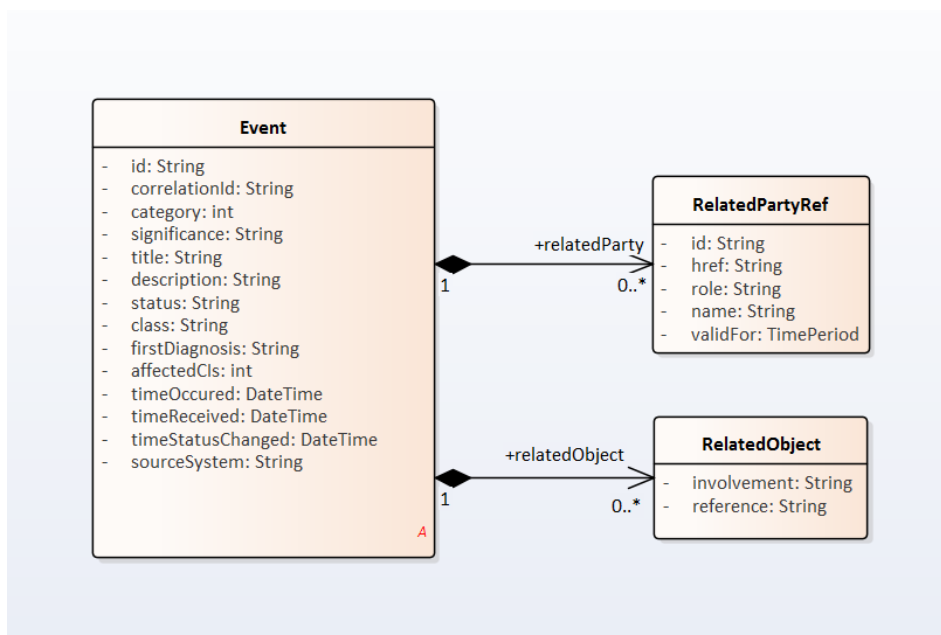
The distinctions between them are explained in the table below:

Comparison Points	Communication API	Event Management API
-------------------	-------------------	----------------------

Definition	Communication message means a message which can be dispatch (sent) to the certain user by the system in the format which can be felt and understood by the recipient	An Event represents a change in the state of a configuration item, service or business data entity
User Role	Sender: Enterprise (e.g. TelCo). Receiver: Customer, agent, O&M staff	IT System. No natural person (customer or agent) is involved.
Business Scenario	The enterprise needs to send the notification information to the customer or the agent. Note: It is used to support the direct interaction with the users.	It can signal status changes or exceptions that allow the appropriate person or system to perform early response actions to ensure service performance and continuity or used as a trigger for automation run books. Note: It is used to manage the intrinsic event inside the system. The event is always created in the EM backend referring to the internal Event Management system.
Relevant IT System	Interaction or contact module of the system	Any module inside the IT system
Data Model	Content of communication message. The content is visible to the user (customer, et al)	The description of how an event is triggered and handled. It has no “content” to contain the concrete communication message information. The “related object” in this API does not distinctly express the meaning of content. The “related object” could be the “attachment” of the message. It has no “sender” and “receiver” for the communication message information. The explanation of “related party” in this API has an example which is “assignee support group”. It shows this API parameter is used to depict who is the “event handler”.
Information Framework (SID) Mapping	Common Business Entities Domain Business Interaction ABE Notification Entity A communication that informs about something that has or will happen. A Notification is typically one-sided, in that no Response is expected. A Notification can be created as the result of a Request.	Common Business Entities Domain Event ABE The Event ABE contains entities that are used to represent events, their occurrence and their recording within systems.

Operation	1) CRUD of communication message in IT system, i.e., create, read, update and deletion. 2) Send the communication message to the user	Create event (i.e. trigger the event) in the system. Query event Update event
Relationship	<p>In the widest conception, any system action can be an event, such as the creation of new offering, execution of order, adding one item into the shopping cart. On this level, the “communication message” is also an event.</p> <p>In the narrow conception, event is for the technical terminology to describe the one-off change of the certain module, such as an event of “memory stack overflow” or “switch the web server”. Such event is collected by the Event Manager to monitor the status of whole running system.</p> <p>According to the definition of Event Management API, this API focuses more on the second concept. “Communication” is also taking place in one-off mode, but it expresses the interactive human-machine contact instead of the pure system action.</p>	

Reference: Event Management API Data Model



DISTINCTION BETWEEN THIS API AND CHANGE REQUEST API

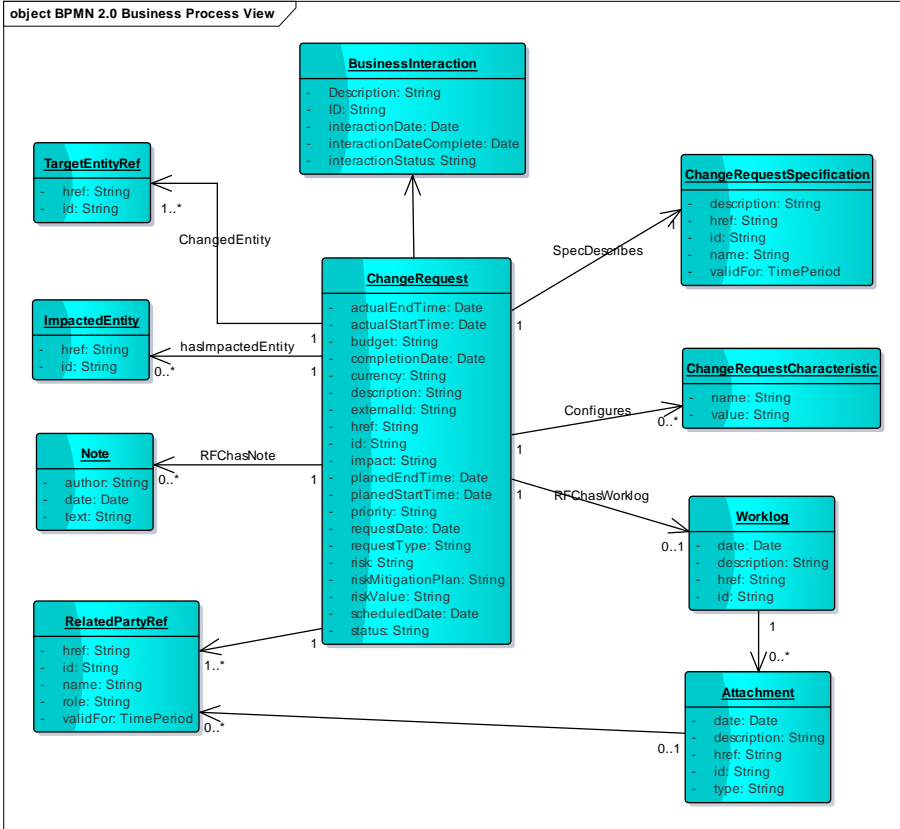
This API and Change Request API own some similarities.

The distinctions between them are explained in the table below:

Comparison Points	Communication API	Event Management API
Definition	Communication message means a message which can be dispatch (sent) to the certain user by the system in the format which can be felt and understood by the recipient	Change Management process is to respond to the customer's changing business requirements. The Change Management API provides the standard integration capabilities between external applications and Change Management Application
User Role	Sender: Enterprise (e.g. TelCo). Receiver: Customer, agent, O&M staff	The involved roles of the API can be: <ul style="list-style-type: none"> - Change Management Application - External application No natural person (customer or agent) is involved.
Business Scenario	The enterprise needs to send the notification information to the customer or the agent. Note: It is used to support the direct interaction with the users.	<ul style="list-style-type: none"> - Asset sharing - NFV MULTI-DIGITAL SERVICE PROVIDER offer the products - Manage Service of Network Operation or OSS

Data Model	<p>Inherit from “Business Interaction”.</p> <p>Content of communication message. The content is visible to the user (customer, et al).</p>	<p>Inherit from “Business Interaction”.</p> <p>nota bene: The “Business Interaction” has a group of derivative objects. “Change Request” is mapped to “request” object, not “notification”.</p> <p>Additionally, this API data model contains:</p> <ul style="list-style-type: none"> - Attachment: <i>This is also included in Communication API</i> - Related Party: The role which is involved. <i>This is also included in Communication API</i> - Target Entity, Impacted Entity: both are referred to “related party”. - Work log <ul style="list-style-type: none"> ✓ If the work log is a type of task for the staff to execute, it is not required in <i>Communication API</i> ✓ If the work log is the pure log (record) of the system action, it is a default function of the system. <i>Communication API</i> has the “log flag” to indicate whether the log should be generated after invoking API. The detail of the log is not required to be explicitly expressed in <i>Communication API</i> - Note: It is an optional attribute. In <i>Communication API</i>, the “content” is used to describe the purpose of the communication message.
Information Framework (SID) Mapping	<p>Common Business Entities Domain</p> <p>Business Interaction ABE</p> <p>Notification Entity</p>	<p>Common Business Entities Domain</p> <p>Business Interaction ABE</p>
Operation	<p>1) CRUD of communication message in IT system, i.e., create, read, update and deletion.</p> <p>2) Send the communication message to the user</p>	<p>CRUD operations of the change request</p>

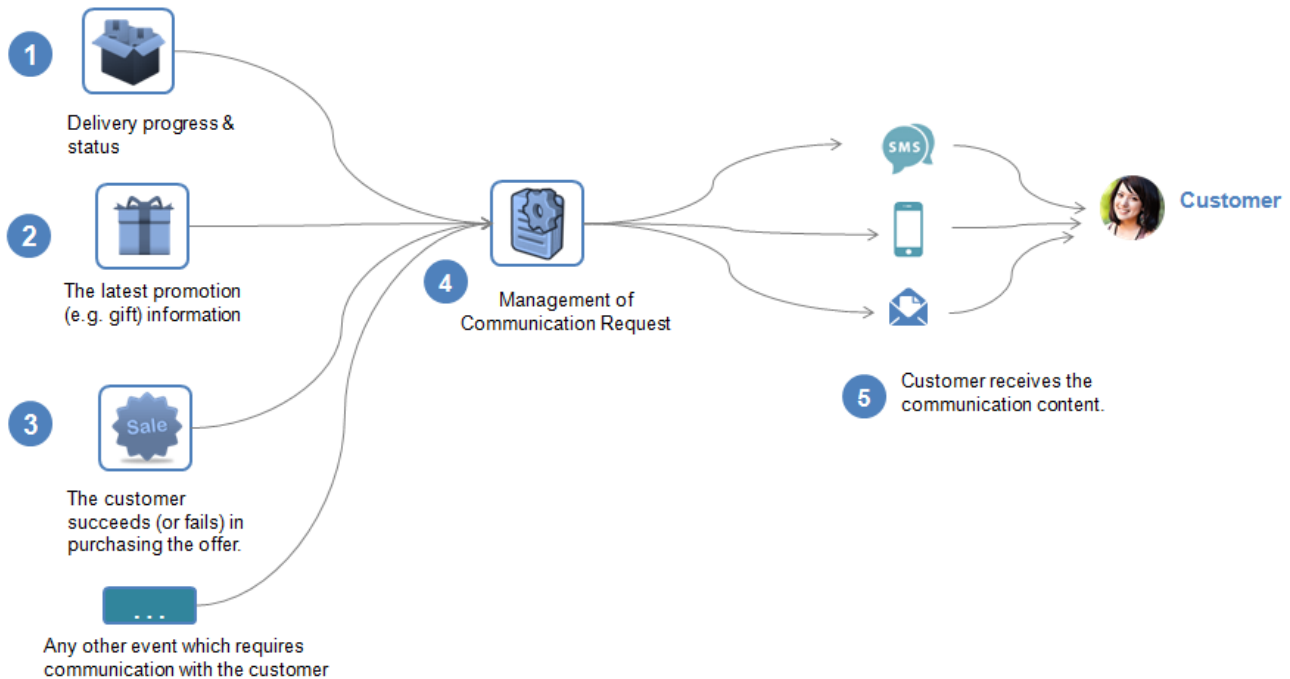
Reference: Change Request API Data Model



SAMPLE USE CASES

Examples of use cases using Communication API is as following

CASE1: COMMUNICATION WITH CUSTOMER



Use Case Id	UC_TMF_CommunicationMessage_0001
Use Case Name	Customer receives communication message.
Summary	This case describes the system manages the communication message and sends the communication message to the customer.
Actor(s)	Customer (person)
Pre-Conditions	NA
Begins When	When the sales/marketing/service or any other business activities requires notifying the customer, the application will initiates the communication message.

Description	<ol style="list-style-type: none"> 1) The system needs to notify the customer about the delivery progress & status. 2) The system needs to notify the customer about the latest promotion (e.g. gift) information. 3) The system needs to notify the customer about the result of purchasing the offer. <p>Or any other event happens which requires communication with the customer.</p> <ol style="list-style-type: none"> 4) The system manages the Communication Message, such as the creation, modification, updating and deletion of the communication. 5) The system sends the communication and the customer receives the communication content.
Ends When	<p><i>In case of communication is done successfully:</i></p> <p>The customer will receive the message.</p> <p><i>In case of failure:</i></p> <p>The system records the failure and the customer cannot know the message. Normally the system will retry to send the message when the network or environment is available.</p>
Post-Conditions	
Exceptions	
Traceability	

CASE2: COMMUNICATION WITH AGENT (CSR)

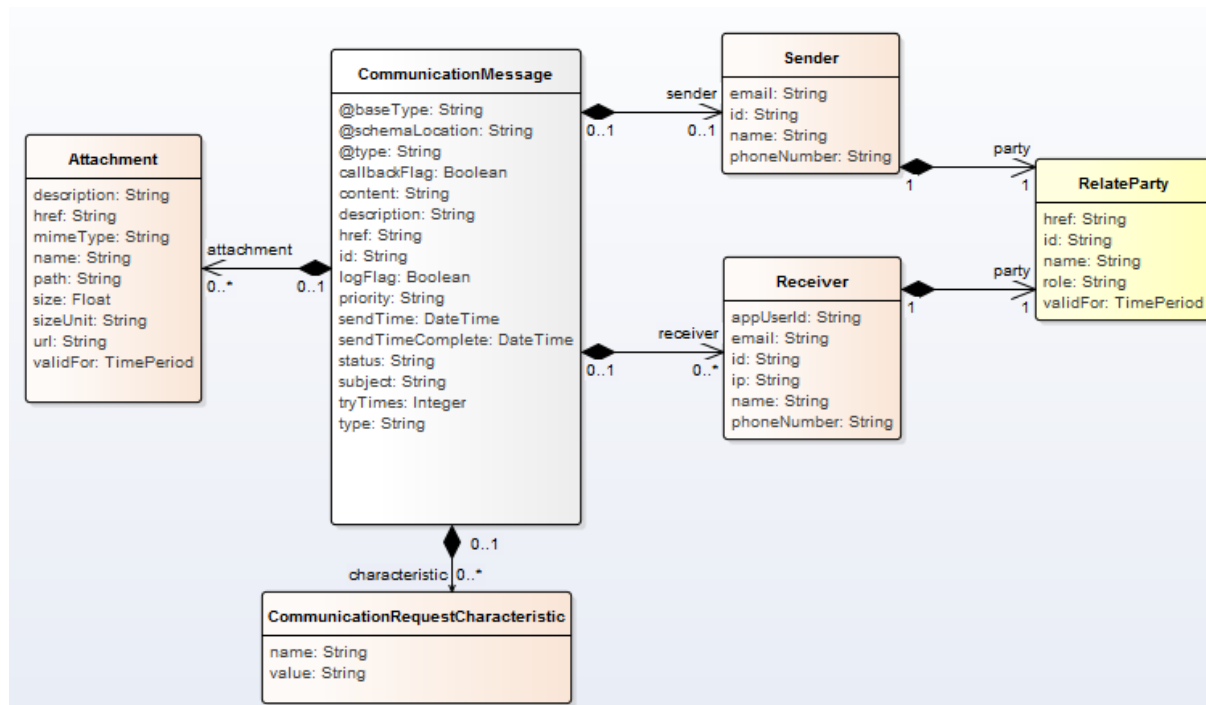
Use Case Id	UC_TMF_CommunicationMessage_0002
Use Case Name	The agent (CSR staff) receives communication message.
Summary	This case describes the system manages the communication message and sends the communication message to the agent.
Actor(s)	Agent staff (person)
Pre-Conditions	NA

Begins When	When the sales/marketing/service or any other business activities requires notifying the agent, the application will initiates the communication message.
Description	<p>The company needs to notify the agent that the latest SLA policy in the market has been published.</p> <p>The agent needs to know such company rule (policy) and obey it when working.</p>
Ends When	<p><i>In case of communication is done successfully:</i></p> <p>The agent will receive the message.</p> <p><i>In case of failure:</i></p> <p>The system records the failure and the customer cannot know the message. Normally the system will retry to send the message when the network or environment is available.</p>
Post-Conditions	
Exceptions	
Traceability	

RESOURCE MODEL

Managed Entity and Task Resource Models

COMMUNICATION MESSAGE RESOURCE MODEL



FIELD DESCRIPTIONS

“Business Interaction” is the inherited SID ABE of this API. So it is not shown in the API fields

Parameter	Data Type	Description
@type	String	It indicates the class type of the catalog.
@schemaLocation	String	It provides the link to the schema describing REST resource
@baseType	String	It indicates the base type of REST resource.
id	String	Unique identifier of Communication Message (inherit from Business Interaction ABE)

Parameter	Data Type	Description
href	String	Hypertext Reference of the Communication Message.
Priority	Integer	Priority level for applying this alteration among all the defined alterations .
Type	String	It could be SMS, Email, "MobileApp" (push notification)
Subject	String	The title of the message. It is necessary for the email and mobile app push.
Content	String	The content of the communication message.
SendTime	DateTime	The time of sending communication message. (inherit from Business Interaction ABE)
sendTimeComplete	DateTime	The time of completion of sending communication message. (inherit from Business Interaction ABE)
status	String	Status of communication message (inherit from Business Interaction ABE)
description	String	Description for the whole object (inherit from Business Interaction ABE)
logFlag	Boolean	It is used to decide whether the contact log is need to be recorded.
callbackFlag	Boolean	It is used to decide whether the contact message needs to be replied.
tryTimes	Integer	If fail to send the communication message, how many times the system will retry.
CommunicationRequestCharacteristic	List of String	The values of parameters which are used in the content if the content contains them.
name	String	Content parameter identifier.
value	String	Content parameter value.
Sender	NA	Sender of the communication message.
email	String	Sender address of email, if the communication type is email

Parameter	Data Type	Description
id	String	ID of the sender
name	String	Name of the sender
phoneNumber	String	Phone number of the sender, if the communication type is SMS.
Receiver	List of data objects	Receivers of the communication message.
appUserId	String	ID of the mobile app user
email	String	Receiver address of email, if the communication type is email
id	String	ID of the receiver
ip	String	IP address of the receiver
name	String	Name of the receiver
phoneNumber	String	Phone number of the receiver, if the communication type is SMS.
RelatedParty	NA	The party entity of the receiver (user)
id	String	Unique identifier of party (inherit from Business Interaction ABE)
href	String	Hypertext Reference of the party
name	String	name of the party
role	String	role of the party (customer, partner, etc)
validFor	TimePeriod	Validity period of the party
Attachment	List of data objects	The attachments of the communication message (when it is email type).
name	String	The name of attached file in the communication message.
Path	String	The path of the attached file in the communication message.
description	String	Description of the attached file
Href	String	href of the attached file
contentType	String	Multi-purpose Internet Mail Extensions Type

Parameter	Data Type	Description
Size	Float	Size of the attached file
sizeUnit	String	Size Unit of the attached file
URL	String	URL of the attached file
validFor	TimePeriod	“Valid For” period of the attached file

EXAMPLE OF THE RESOURCE

```
{
  "id": "1001",
  "href": "http://serverlocation:port/communicationMessage/v1/communicationMessage/564",
  "type": "1",
  "priority": "1",
  "subject": "News: the latest promotion for you",
  "sendTime": "2016-12-19 T04:00:00.0Z",
  "sendTimeComplete": "2016-12-19 T05:00:00.0Z",
  "status": "Completed",
  "description": "this is communication message for promotion",
  "content": "Dear $Parameter1, Here is the information of the promotion $Parameter2",
  "@type": "communication",
  "@schemaLocation": "http://serverlocation:port/communication/schema/communication.yml",
  "@baseType": "",
  "contactLogFlag": "false",
  "callbackFlag": "true",
  "tryTimes": "3"

  "CommunicationRequestCharacteristic": [
    {
      "name": "$Parameter1",
      "value": "Mr. Bush"
    },
    {
      "Name": "$Parameter2",
      "value": "4G_LTE Discount 30%"
    }
  ],
  "attachment": [
    {
      "path": "/attachedfile/1/attachedfile/",
      "name": "File_XYZ_001"
    }
  ],
  "sender": {
    "id": "10099",

```

```
    "name" : "ABC Company",
    "phoneNumber" : "10086"
  },
  "receiver": [ {
    "id": "10234",
    "name" : "Customer",
    "phoneNumber" : "008613811112222"
  },
  "relatedParty": {
    "id": "991",
    "href": "http://serverlocation:port/partyManagement/individual/1",
    "role": "customer",
    "name": "John Lock"
  },
  },
  ]
}
```

COMMUNICATION MESSAGE CREATION NOTIFICATION

It is used to notify that a Communication Message is created.

```
{
  "eventType": " CommunicationMessageCreationNotification",
  "eventTime": "2014-09-27T05:46:25.0Z",
  "eventId": "8976",
  "event":
    {
      "CommunicationMessage": [
        {
          "id": "s1234",
          Following a whole representation of the Communication Message resource with all its attributes.
          Refer to communication message Resource.
        }
      ]
    }
}
```

COMMUNICATION MESSAGE DELETION NOTIFICATION

It is used to notify that a Communication Message is deleted.

```
{
  "eventType": "CommunicationMessageDeletionNotification",
  "eventTime": "2014-09-27T05:46:25.0Z",
  "eventId": "8976",
  "CommunicationMessage":{
    "id": " s1234",
    Following a whole representation of the Communication Message resource with all its attributes.
    Refer to Communication Message Resource.
  }
}
```

```
}  
}
```

COMMUNICATION MESSAGE UPDATE NOTIFICATION

```
{  
  "eventType": "CommunicationMessageUpdateNotification",  
  "eventTime": "2014-09-27T05:46:25.0Z",  
  "eventId": "8976",  
  "CommunicationMessage":{  
    "id": "s1234",  
    Following a whole representation of the Communication Message resource with all its attributes.  
    Refer to Communication Message Resource.  
  }  
}
```

API OPERATION TEMPLATES

For every single of operation on the entities use the following templates and provide sample REST requests and responses.

Remember that the following Uniform Contract rules must be used:

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 For reconciliation processes
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

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

Notifications are also described in a subsequent section.

Communication Message Creation

HTTP Verb + URI:

POST /communicationMessage

Description:

- This API is used to create a new Communication Message. The Communication Message is used to express the message itself. After the Communication Message has been created, it can be sent by the system to the “receiver” later.
- Condition:
There is no parameter in this POST verb URI

Behavior:

- Return Status Codes:

Status Code	Description
201	The resource has been added successfully
400	Request Error
500	The server encountered an unexpected condition which prevented it from fulfilling the request
Other	The server may use other HTTP error status codes to reflect the error, the client must be processed in accordance with the error messages in other HTTP specification.

Sample:

```

REQUEST
POST /communicationMessage
Content-type: application/json

{
    "id": "1001",
    "href": "http://serverlocation:port/communicationMessage/v1/communicationMessage/56445633245",
    "type": "1",
    "priority": "1",
    "subject": "News: the latest promotion for you",
    "sendTime": "2016-12-19 T04:00:00.OZ",
    "sendTimeComplete": "2016-12-19 T05:00:00.OZ",
    "status": 'Completed',
    "description": "this is communication message for promotion",

```

```

"content" : "Dear $Parameter1, Here is the information of the promotion $Parameter2",
"contactLogFlag": "false",
"callbackFlag" : "true",
"tryTimes" : "3",

"CommunicationRequestCharacteristic": [
  {
    {"name": "$Parameter1",
    "value": "Mr. Bush"
    },
  {
    "Name": "$Parameter2",
    "value": "4G_LTE Discount 30%"
  }
],
"attachment" : [{
  "path": "/attachedfile/1, /attachedfile/",
  "name": "File_XYZ_001"
}],

"sender": {
  "id": "10099",
  "name": "ABC Company",
  "phoneNumber": "10086"
},
"receiver": [ {
  "id": "10234",
  "name": "Customer",
  "phoneNumber": "008613811112222"
}
"relatedParty": {
  "id": "991",
  "href": "http://serverlocation:port/partyManagement/individual/1",
  "role": "customer",
  "name": "John Lock"
},
}
}

```

}
RESPONSE
<p>201 Content-Type: application/json</p> <p><i>Following a whole representation of the Communication Message resource with all its attributes.</i></p> <p><i>Refer to Communication Message Resource.</i></p>

Communication Message Sending (Send New Message)

HTTP Verb + URI:

POST /communicationMessage/send

Description:

- This API is used to send a new Communication message from the “sender” to the “receiver”. When executing this API, the message will be directly sent to the receiver, i.e., the final customer. The full message body and attributes should be filled in this operation request.
- Condition:
The parameter of POST is “send” to indicate this operation is for the “sending message” action.

Behavior:

- Return Status Codes:

Status Code	Description
200	The message of communication message has been sent.
400	Request Error
500	The server encountered an unexpected condition which prevented it from fulfilling the request
Other	The server may use other HTTP error status codes to reflect the error, the client must be processed in accordance with the error messages in other HTTP specification.

Sample:

REQUEST
POST /communicationMessage/send Content-type: application/json <i>The following is a whole representation of the Communication Message resource with all its attributes.</i> <i>Please refer to the "Communication Message Creation" for the content of example.</i>
RESPONSE
200

Communication Message Sending (Send Pre-defined Message)

HTTP Verb + URI:

POST /communicationMessage/{id}/send

Description:

- This API is used to send a pre-defined Communication message from the “sender” to the “receiver”. When executing this API, the message will be sent to the receiver, i.e., the final customer. In this mode, the message body should be created in advance. The “Communication Message Creation” needs to be invoked firstly, so the system can send the pre-defined message.
- Condition:
The parameter of POST is “send” to indicate this operation is for the “sending message” action.

Behavior:

- Return Status Codes:

Status Code	Description

Status Code	Description
200	The message of communication message has been sent.
400	Request Error
500	The server encountered an unexpected condition which prevented it from fulfilling the request
Other	The server may use other HTTP error status codes to reflect the error, the client must be processed in accordance with the error messages in other HTTP specification.

Sample:

REQUEST
POST /communicationMessage/1001/send Content-type: application/json
RESPONSE
200

Communication Message Enquiry

HTTP Verb + URI:

GET /communicationMessage /{id}

Description:

- This API is used to query an existing pre-defined message body by query conditions

Behavior:

- Return Status Codes:

Status Code	Description
200	The resource has been retrieved
404	If no record was found
500	The server encountered an unexpected condition which prevented it from fulfilling the request
Others	The server may use other HTTP error status codes to reflect the error, the client must be processed in accordance with the error messages in other HTTP specification.

REQUEST
GET /communicationMessage/11006 Content-type: application/json Accept: application/json
RESPONSE
200 Content-Type: application/json <i>Following a whole representation of the Communication Message resource with all its attributes.</i> <i>Refer to Communication Message Resource.</i>

Communication Message Deletion

HTTP Verb + URI:

DELETE /communicationMessage/{id}

Description:

- This API is used to delete an existing pre-defined message body.

Behavior:

- Return Status Codes :

Status Code	Description
204	Delete the communication message successfully
400	Request Error
404	If no record was found
500	The server encountered an unexpected condition which prevented it from fulfilling the request
Others	The server may use other HTTP error status codes to reflect the error, the client must be processed in accordance with the error messages in other HTTP specification.

REQUEST
DELETE / communicationMessage/1006 Content-type: application/json
RESPONSE
204

Communication message Update

HTTP Verb + URI:

PATCH /communicationMessage/{id}

Description:

- This API is used to partially update an existing pre-defined message body.

Behavior:

- Return Status Codes :

Status Code	Description
201	Update the communication message successfully

Status Code	Description
400	Request Error
404	If no record was found
500	The server encountered an unexpected condition which prevented it from fulfilling the request
Others	The server may use other HTTP error status codes to reflect the error, the client must be processed in accordance with the error messages in other HTTP specification.

REQUEST
PATCH / communicationMessage/1006 Content-type: application/json <pre>{ "lifecycleStatus": "Release", "name": "Gift_On_Birthday" }</pre>
RESPONSE
201 Content-Type: application/json <i>Following a whole representation of the communication message resource with all its attributes.</i> <i>Refer to communication message Resource.</i>

API NOTIFICATION TEMPLATES

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

It is assumed that the Publish/Subscribe 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.

REQUEST
POST /api/hub Accept: application/json <pre>{"callback": "http://in.listener.com"}</pre>
RESPONSE
201 Content-Type: application/json Location: /api/hub/42 <pre>{"id": "42", "callback": "http://in.listener.com", "query": null}</pre>

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.

REQUEST
DELETE /api/hub/{id} Accept: application/json
RESPONSE
204

PUBLISH {EVENTTYPE} POST /LISTENER

Description:

Provide the Event description

Behavior:

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

REQUEST
POST /client/listener Accept: application/json <pre>{ "event": { EVENT BODY }, "eventType": "eventType" }</pre>
RESPONSE
201 Content-Type: application/json

Example see TMF REST Design Guidelines.

RELEASE HISTORY

Release Number	Date	Release led by:	Description
Release 1.0	13/11/2016	Maxu maxu@huawei.com	Initial Document.
	09/10/2017	Maxu maxu@huawei.com Hongxia Hao haohongxia@huawei.com	Addressed some comments from Orange & Vodafone & TMF .

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