TM Forum Specification

Process Flow API REST Specification

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NOTICE

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Introduction

The following document is the specification of the REST API for ProcessFlow Management. It includes the model definition as well as all available operations. Possible actions are creating, updating and retrieving ProcessFlow and TaskFlow.

The ProcessFlow API allows management of business process. It provided all required information to achieve business task requiring manual action:

- A ProcessFlow will describe an orchestration of TaskFlow
- In event-based architecture the processFlow are triggered as conssequeence of event
- TaskFlow could be completed automatically (rules, event triggered, process delegation) or requiring manual action
- Operations on taskFlow allow to update taskFlow

ProcessFlow API manages ProcessFlow and TaskFlow resource:

- A ProcessFlow represents an instance of a pre-designed ProcessFlow type described in in BPMN engine or hard coded. It defines a start point, a sequence of TaskFlow (that could be dynamically instantiated) and end point(s).
- A TaskFlow is a “work” to be done within a ProcessFlow. It could an automated work (send an email, execute a business rule, wait for an event triggered by an external system) or a human work (a form to be completed). A taskFlow is an instantiation of a taskFlow type (defined design-time).

ProcessFlow API performs the following operations on ProcessFlow resource:

- Retrieval of a ProcessFlow or a collection of ProcessFlow(s) depending on filter criteria
- Creation of a ProcessFlow
- Deletion of ProcessFlow (for administration purposes)
- Notification of events on ProcessFlow
  - ProcessFlow creation
  - ProcessFlow status change

And on TaskFlow resource:

- Retrieval of a TaskFlow or a collection of TaskFlow (s) depending on filter criteria
- Partial update of a TaskFlow
- Notification of events on TaskFlow
  - TaskFlow creation
  - TaskFlow status change

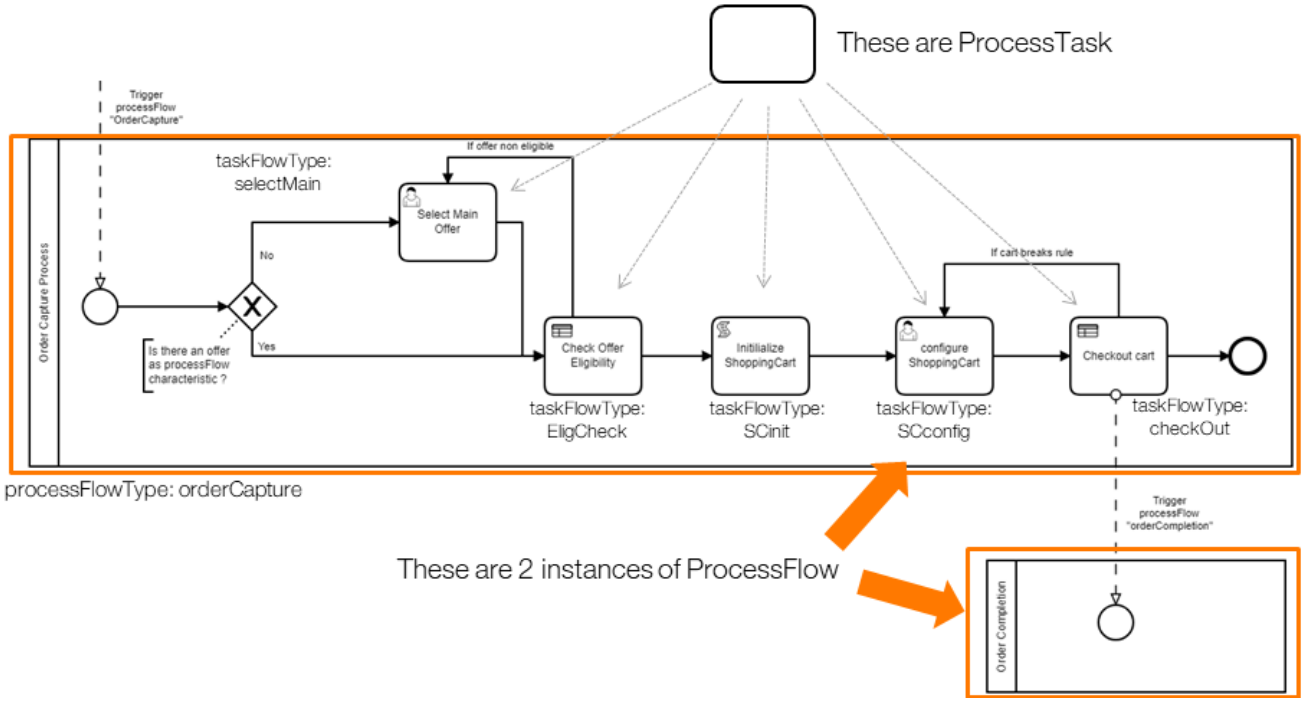
The following assumptions were considered in the development of this document:

- The processFlow API should relie on a bpmn tool but nothing prevent to have it from an hard-coded component.

SAMPLE USE CASES

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

In order to illustrate JSON we’ll use the following examples. **These examples are only for illustration purpose and they must not be considered as process guideline**.



We’ll use an orderCapture process that will manage a ‘shoppingCart’ initialization and completion. The process is very simple:

- The orderCapture process is launches with contextual information about the interaction
- A productOffering may be passed in this request. If not the first task is to ask for one.
- Once commercial eligibility done, a shoppingCart is intialized
- After shopping cart configuration and user acknowledgement, a task is performed to chech cart completion and if it’s succesful a orderCompletion processFLow is launched.

This example leverage existing TMF API as productCatalog, productOfferingQualification, shoppingCart, productOrder, etc… These APIs use will not be illustrated in this document (done within taskFlow execution).

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 an OrderCaptureProcess and a BillDisputeProcess inheriting properties from ProcessFlow 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 ProcessFlow instances some may be instances of OrderCaptureProcess where other could be instances of BillDisputeProcess. 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 a ProcessFlowRef 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 OrderCaptureProcessRef or BillDisputeProcessRef, 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.

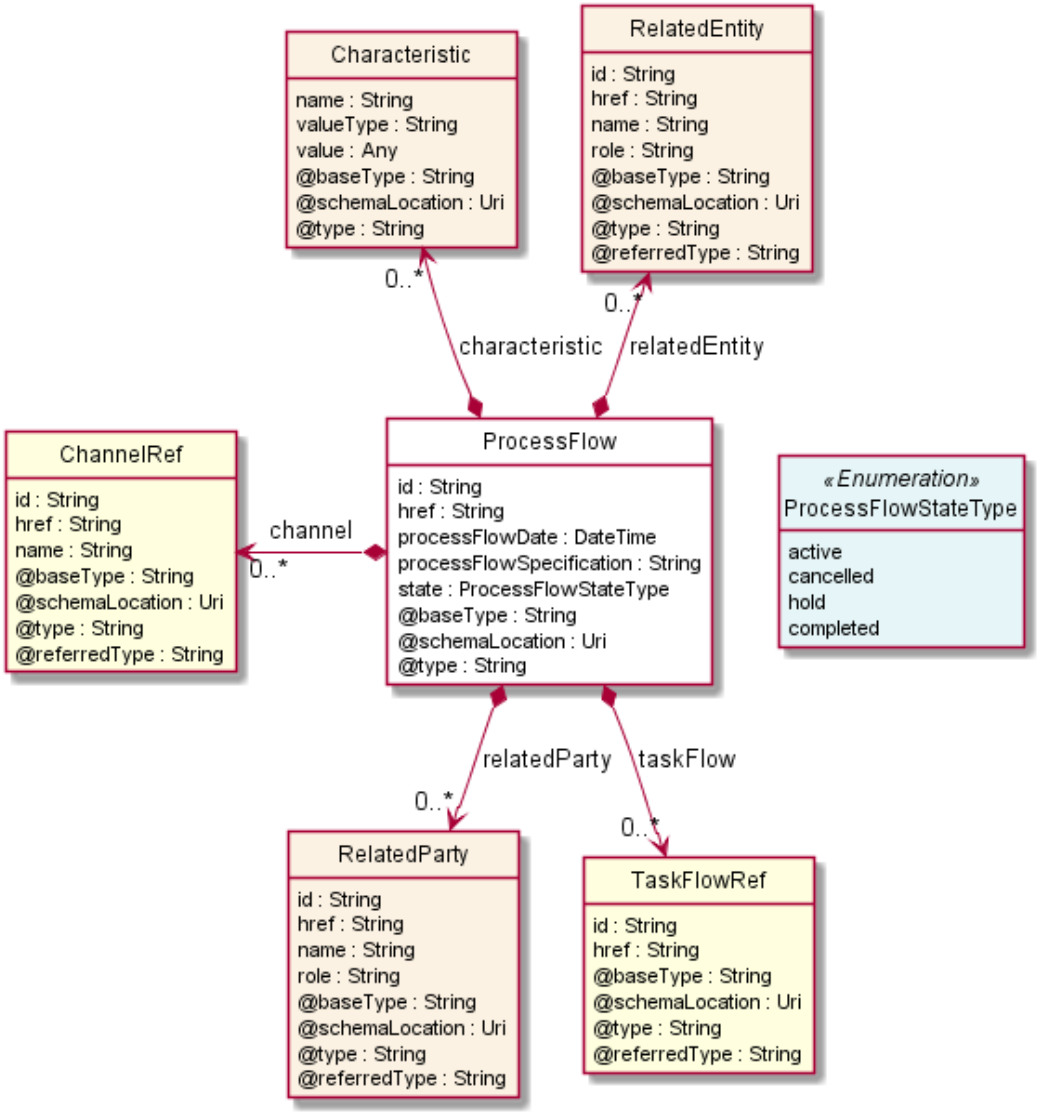
The @baseType attribute gives a way to provide explicitly the base of class of a given resource that has been extended.

RESOURCE MODEL

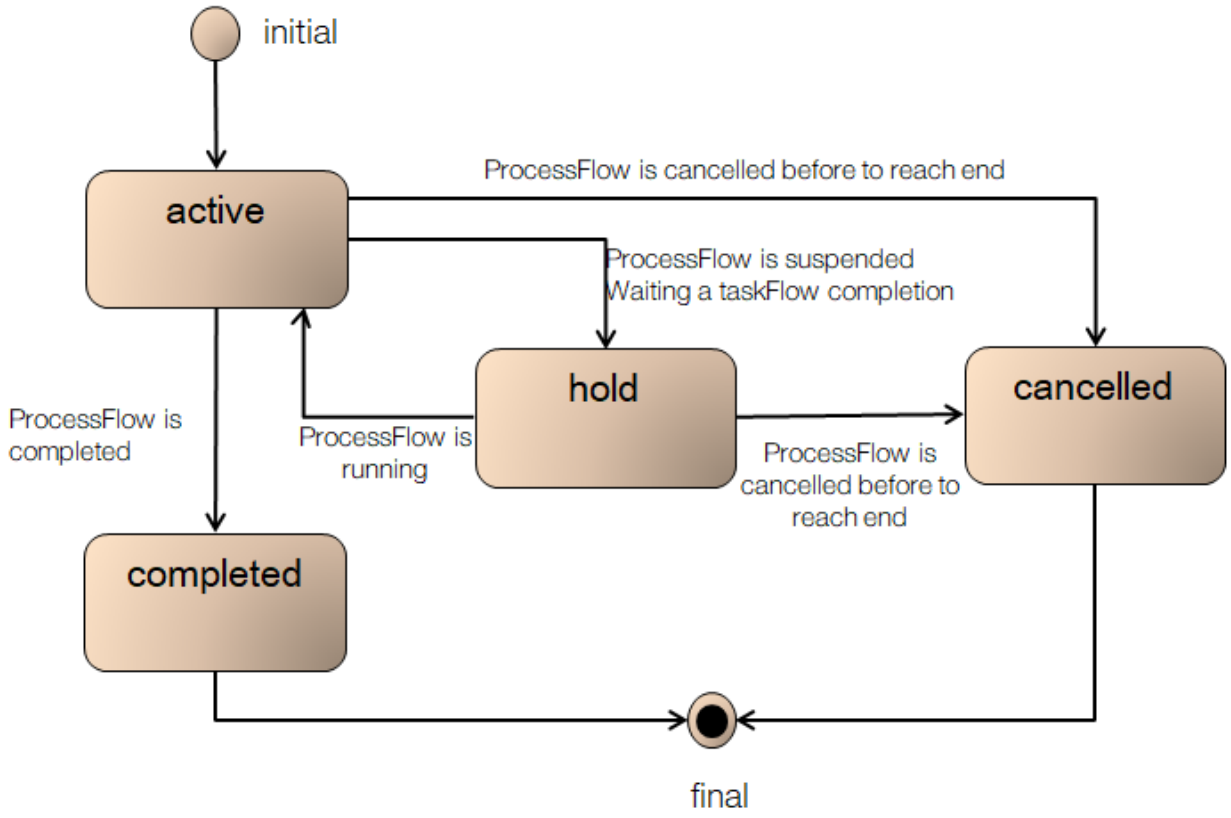
Managed Entity and Task Resource Models

Process Flow resource

Resource model



Lifecycle



State definition:

ProcessFLow State	Definition
Active	The Process is running (at least one task is new or in progress or hold).
Cancelled	The process has been aborted before nominal end. This is a final state.
Hold	The process is stuck abnormally
Completed	The process has been successfully completed

Field descriptions

ProcessFlow fields

channel	A list of channel references (ChannelRef [*]). A list of channel(s) where this processFlow is executed.
characteristic	A list of characteristics (Characteristic [*]). A list of characteristic(s) associated to this processFlow.
href	A string. Reference of the ProcessFlow.

id	A string. Identifier of the Process flow.
processFlowDate	A date time (DateTime). Is the date when the processFlow was created in base (timestamp).
processFlowSpecification	A string. Specification of the processFlow.
relatedEntity	A list of related entities (RelatedEntity [*]). A list of related entity(ies) to this processFlow.
relatedParty	A list of related parties (RelatedParty [*]). A list of related party(ies) to this processFlow.
state	A process flow state type (ProcessFlowStateType). State of the ProcessFlow: described in the state machine diagram.
taskFlow	A list of task flow references (TaskFlowRef [*]). A list of taskflow related to this processFlow.

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.

RelatedEntity sub-resource

A reference to an entity, where the type of the entity is not known in advance.

@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. The role of an entity.

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.

ChannelRef relationship

The channel to which the resource reference to. e.g. channel for selling product offerings, channel for opening a trouble ticket etc.

@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 channel.
name	A string. Name of the channel.

TaskFlowRef relationship

@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.

Json representation sample

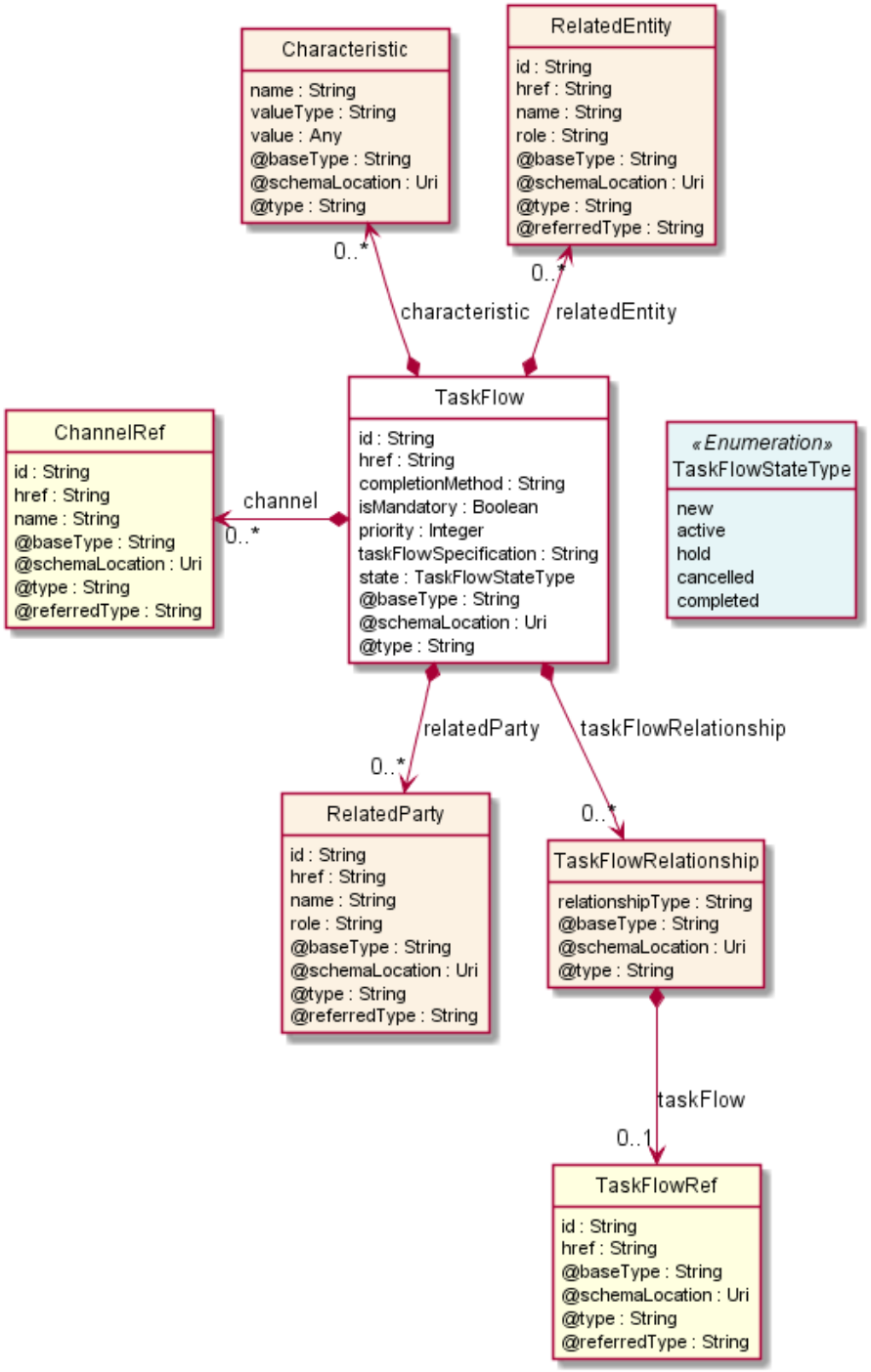
We provide below the json representation of an example of a 'ProcessFlow' resource object


```
{
  "id": "4fd-ty56-gg55",
  "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55",
  "processFlowSpecification": "orderCapture",
  "processFlowDate": "2019-04-11T14:52:21.823Z",
  "channel": [
    {
      "id": "1",
      "name": "TMFWebStore",
      "@type": "Channel"
    }
  ],
  "characteristic": [
    {
      "name": "productOfferingId",
      "valueType": "string",
      "value": "TMF Mobile 20"
    }
```

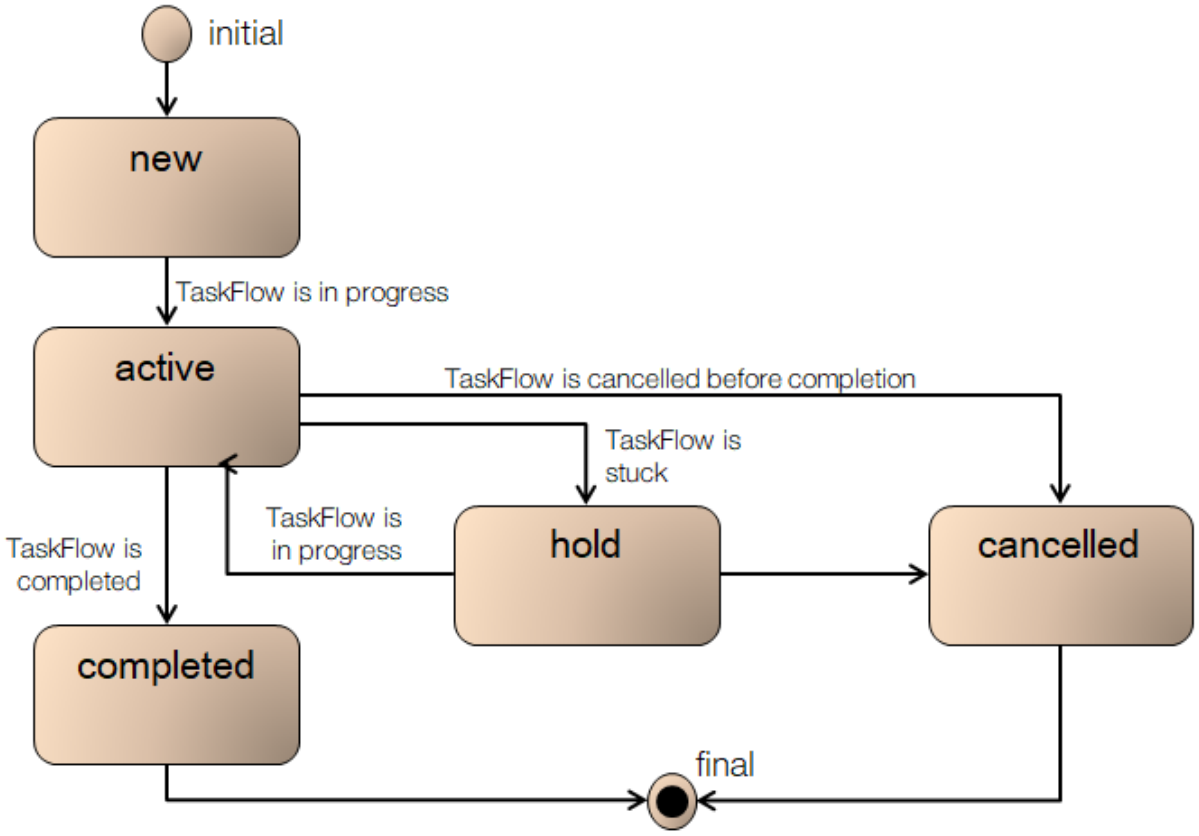
```
  ],
  "relatedEntity": [
    {
      "id": "qq12-gg22",
      "href": ".../shoppingCartManagement/v4/shoppingCart/qq12-gg22",
      "name": "web ShoppingCart for Jean Pontus",
      "role": "shoppingCart",
      "@referredType": "ShoppingCart",
      "@type": "RelatedEntity"
    }
  ],
  "relatedParty": [
    {
      "id": "456-f69",
      "href": ".../partyManagement/v4/individual/456-f69",
      "name": "Jean Pontus",
      "role": "Customer",
      "@type": "RelatedParty",
      "@referredType": "Individual"
    }
  ],
  "state": "active",
  "taskFlow": [
    {
      "id": "4fd-ty56-gg55-1",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-1",
      "@type": "TaskFlow"
    },
    {
      "id": "4fd-ty56-gg55-2",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-2",
      "@type": "TaskFlow"
    },
    {
      "id": "4fd-ty56-gg55-3",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-3",
      "@type": "TaskFlow"
    },
    {
      "id": "4fd-ty56-gg55-4",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-4",
      "@type": "TaskFlow"
    }
  ],
  "@type": "ProcessFlow",
  "@baseType": "ProcessFlow"
}
```

Task Flow resource

Resource model



Lifecycle



State definition:

TaskFlow State	Significance
New	The task has not yet started. It could be a next task to be started
Active	The task is currently in progress to be completed
Hold	The task is abnormally stuck -
Cancelled	The task has been cancelled before to be completed. This is a final state
Completed	The task as been successfully completed

Consistence rule must be defined between process and task state (for example a process is Completed if its last task is Completed).

Field descriptions

TaskFlow fields

channel	A list of channel references (ChannelRef [*]). A list of channel(s) where this taskFlow is executed.
characteristic	A list of characteristics (Characteristic [*]). A list of characteristic(s) associated to this taskFlow.

completionMethod	A string. TaskFlow completion method.
href	A string. Reference of the taskFlow.
id	A string. Identifier of the taskFlow.
isMandatory	A boolean. Indicate mandatory TaskFlow.
priority	An integer. TaskFlow priority.
relatedEntity	A list of related entities (RelatedEntity [*]). A list of related entity(ies) to this taskFlow.
relatedParty	A list of related parties (RelatedParty [*]). A list of related party(ies) to this task.
state	A task flow state type (TaskFlowStateType). State of the taskFlow: described in the state machine diagram.
taskFlowRelationship	A list of task flow relationships (TaskFlowRelationship [*]). A list of taskFlows related to this taskFlow.
taskFlowSpecification	A string. Specification of the taskFlow.

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.

RelatedEntity sub-resource

A reference to an entity, where the type of the entity is not known in advance.

@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. The role of an entity.

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.

TaskFlowRelationship sub-resource

Describes relationship between taskFlow.

relationshipType	A string. The type of taskFlow relationship (requires, triggers, etc.).
taskFlow	A task flow reference (TaskFlowRef). The taskFlow being referred to.

ChannelRef relationship

The channel to which the resource reference to. e.g. channel for selling product offerings, channel for opening a trouble ticket etc.

@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 channel.
name	A string. Name of the channel.

TaskFlowRef relationship

@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.

Json representation sample

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


```
{
  "id": "4fd-ty56-gg55-3",
  "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-3",
  "completionMethod": "automatic",
  "isMandatory": true,
  "priority": 0,
  "taskFlowSpecification": "SCinit",
  "relatedEntity": [
```

```
      {
        "id": "qq12-gg22",
        "href": ".../shoppingCartManagement/v4/shoppingCart/qq12-gg22",
        "name": "web ShoppingCart for Jean Pontus",
        "role": "shoppingCart",
        "@referredType": "ShoppingCart",
        "@type": "RelatedEntity"
      }
    ],
    "state": "completed",
    "taskFlowRelationship": [
      {
        "relationshipType": "nextTask",
        "taskFlow": {
          "id": "4fd-ty56-gg55-4",
          "href": ".../processFlowManagement/v1/taskFlow/4fd-ty56-gg55-4",
          "@type": "TaskFlow"
        }
      }
    ],
    "@type": "TaskFlow",
    "@baseType": "TaskFlow"
}
```


Notification Resource Models

9 notifications are defined for this API

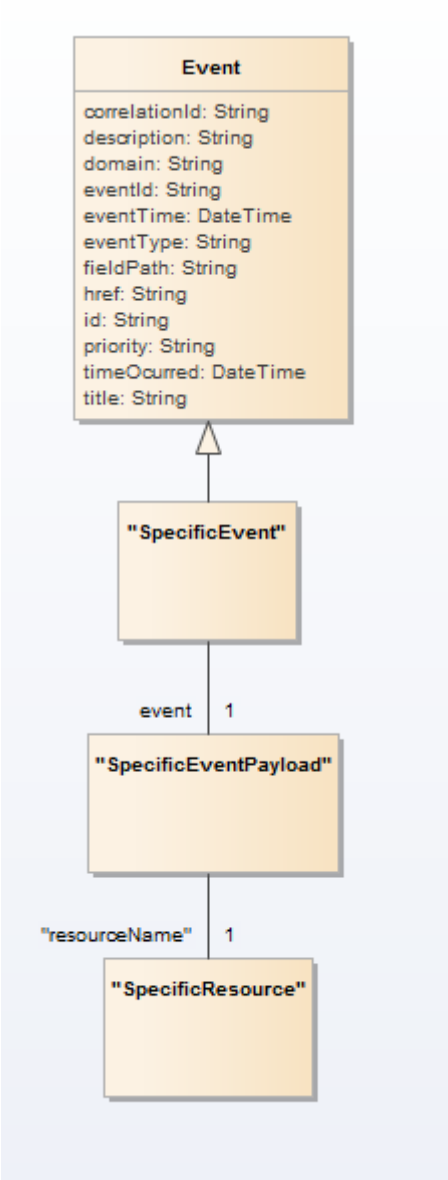
Notifications related to ProcessFlow:

- ProcessFlowCreateEvent
- ProcessFlowStateChangeEvent
- ProcessFlowDeleteEvent
- ProcessFlowAttributeValueChangeEvent

Notifications related to TaskFlow:

- TaskFlowCreateEvent
- TaskFlowStateChangeEvent
- TaskFlowDeleteEvent
- TaskFlowAttributeValueChangeEvent
- TaskFlowInformationRequiredEvent

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).



Process Flow Create Event

Notification ProcessFlowCreateEvent case for resource ProcessFlow

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProcessFlowCreateEvent",
    "event": {
      "processFlow" :
        {-- SEE ProcessFlow RESOURCE SAMPLE --}
   }
```

```
}
```

Process Flow State Change Event

Notification ProcessFlowStateChangeEvent case for resource ProcessFlow

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProcessFlowStateChangeEvent",
    "event": {
      "processFlow" :
        {-- SEE ProcessFlow RESOURCE SAMPLE --}
   }
}
```

Process Flow Delete Event

Notification ProcessFlowDeleteEvent case for resource ProcessFlow

Json representation sample

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

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ProcessFlowDeleteEvent",
    "event": {
      "processFlow" :
        {-- SEE ProcessFlow RESOURCE SAMPLE --}
   }
}
```

Process Flow Attribute Value Change Event

Notification ProcessFlowAttributeValueChangeEvent case for resource ProcessFlow

Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ProcessFlowAttributeValueChangeEvent",
   "event": {
     "processFlow" :
       {-- SEE ProcessFlow RESOURCE SAMPLE --}
  }
}
```

Task Flow Create Event

Notification TaskFlowCreateEvent case for resource TaskFlow

Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"TaskFlowCreateEvent",
   "event": {
     "taskFlow" :
       {-- SEE TaskFlow RESOURCE SAMPLE --}
  }
}
```

Task Flow State Change Event

Notification TaskFlowStateChangeEvent case for resource TaskFlow

Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"TaskFlowStateChangeEvent",
   "event": {
     "taskFlow" :
       {-- SEE TaskFlow RESOURCE SAMPLE --}
  }
}
```

Task Flow Delete Event

Notification TaskFlowDeleteEvent case for resource TaskFlow

Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"TaskFlowDeleteEvent",
   "event": {
     "taskFlow" :
        {-- SEE TaskFlow RESOURCE SAMPLE --}
  }
}
```

Task Flow Attribute Value Change Event

Notification TaskFlowAttributeValueChangeEvent case for resource TaskFlow

Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"TaskFlowAttributeValueChangeEvent",
   "event": {
     "taskFlow" :
        {-- SEE TaskFlow RESOURCE SAMPLE --}
  }
}
```

Task Flow Information Required Event

Notification TaskFlowInformationRequiredEvent case for resource TaskFlow

Json representation sample

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

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

```
      "taskFlow" :
        {-- SEE TaskFlow RESOURCE SAMPLE --}
   }
}
```

API OPERATIONS

Only available operations are displayed:

Operation on Entities	Uniform API Operation	Description
Query Entities	GET ProcessFlow GET TaskFlow	GET must be used to retrieve a representation of a resource.
Create Entity	POST ProcessFLow	POST must be used to create a new resource
Partial Update of an Entity	PATCH TaskFlow	PATCH must be used to partially update a resource
Remove an Entity	DELETE ProcessFlow	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.

Operations on Process Flow

List process flows

```
GET /processFlow?fields=...&{filtering}
```

Description

This operation list process flow 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 a list of process flow(s) with only id, href, state and date. The given criteria is processFlowType (orderCapture).

Request

GET https://serverRoot/tmf-api/processFlowManagement/v4/processFlow?fields=id,href,state,
processFlowDate&processFlowType=orderCapture
Accept: application/json

Response

200


```
[
  {
    "id": "4fd-ty56-gg55",
    "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55",
    "processFlowDate": "2019-04-11T14:52:21.823Z",
    "state": "active"
  },
  {
    "id": "d4d5-98d-sd223",
    "href": ".../processFlowManagement/v4/processFlow/d4d5-98d-sd223",
    "processFlowDate": "2019-04-11T14:50:31.325Z",
    "state": "active"
  },
  {
    "id": "8gg-9df-ghhf",
    "href": ".../processFlowManagement/v4/processFlow/8gg-9df-ghhf",
    "processFlowDate": "2019-04-11T14:49:31.325Z",
    "state": "cancelled"
  },
  {
    "id": "sqf-d77-e6dg5",
    "href": ".../processFlowManagement/v4/processFlow/sqf-d77-e6dg5",
    "processFlowDate": "2019-04-11T14:49:28.325Z",
    "state": "completed"
  }
]
```


Retrieve process flow

`GET /processFlow/{id}?fields=...&{filtering}`

Description

This operation retrieves a process flow 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 processFlow. The given criteria is the processFlow id 4fd-ty56-gg55.

Request

```
GET https://serverRoot/tmf-api/processFlowManagement/v4/processFlow/4fd-ty56-gg55
Accept: application/json
```

Response

```
200

{
  "id": "4fd-ty56-gg55",
  "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55",
  "processFlowSpecification": "orderCapture",
  "processFlowDate": "2019-04-11T14:52:21.823Z",
  "channel": [
    {
      "id": "1",
      "name": "TMFWebStore"
    }
  ],
  "characteristic": [
    {
      "name": "productOfferingId",
      "valueType": "string",
      "value": "TMF Mobile 20"
    }
  ],
  "relatedEntity": [
    {
      "id": "qq12-gg22",
      "href": ".../shoppingCartManagement/v4/shoppingCart/qq12-gg22",
      "name": "web ShoppingCart for Jean Pontus",
      "role": "shoppingCart",
      "@referredType": "ShoppingCart"
    }
  ],
  "relatedParty": [
    {
      "id": "456-f69",
      "href": ".../partyManagement/v4/individual/456-f69",
      "name": "Jean Pontus",
      "role": "Customer",
      "@type": "RelatedParty",
      "@referredType": "Individual"
    }
  ],
  "state": "active",
```

```
  "taskFlow": [
    {
      "id": "4fd-ty56-gg55-1",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-1"
    },
    {
      "id": "4fd-ty56-gg55-2",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-2"
    },
    {
      "id": "4fd-ty56-gg55-3",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-3"
    },
    {
      "id": "4fd-ty56-gg55-4",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-4"
    }
  ]
}
```


Create process flow

POST /processFlow

Description

This operation creates a process flow entity.

Mandatory and Non-Mandatory Attributes

The following tables provide the list of mandatory and non-mandatory attributes when creating a ProcessFlow, 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
processFlowSpecification	Mandatory

Non-Mandatory Attributes	Rule
channel	
characteristic	
processFlowDate	Must not be valued in the request
relatedEntity	
relatedParty	
state	Must not be valued in the request
taskFlow	Must not be valued in the request

Additional Rules

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

Context	Mandatory Sub-Attributes
relatedParty	id, @referredType
relatedEntity	id, role, @referredType

Usage Samples

Here's an example of a request for creating a processFlow - the resulting processFlow is 4fd-ty56-gg55.

Request

```
POST https://serverRoot/tmf-api/processFlowManagement/v4/processFlow
Content-Type: application/json

{
  "processFlowSpecification": "orderCapture",
  "channel": [
    {
      "id": "1",
      "name": "TMFWebStore",
      "@type": "Channel"
    }
  ],
  "relatedParty": [
    {
      "id": "456-f69",
      "href": ".../partyManagement/v4/individual/456-f69",
      "name": "Jean Pontus",
      "role": "Customer",
      "@type": "RelatedParty",
      "@referredType": "Individual"
    }
  ],
  "@type": "ProcessFlow",
  "@baseType": "ProcessFlow"
}
```

Response

```
201

{
  "id": "4fd-ty56-gg55",
```

```
  "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55",
  "processFlowSpecification": "orderCapture",
  "processFlowDate": "2019-04-11T14:52:21.823Z",
  "channel": [
    {
      "id": "1",
      "name": "TMFWebStore"
    }
  ],
  "relatedParty": [
    {
      "id": "456-f69",
      "href": ".../partyManagement/v4/individual/456-f69",
      "name": "Jean Pontus",
      "role": "Customer",
      "@type": "RelatedParty",
      "@referredType": "Individual"
    }
  ],
  "state": "active",
  "taskFlow": [
    {
      "id": "4fd-ty56-gg55-1",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-1"
    }
  ]
}
```


Delete process flow

`DELETE /processFlow/{id}`

Description

This operation deletes a process flow entity.

Usage Samples

Here's an example of a request for deleting a processFlow.

Request
DELETE https://serverRoot/tmf-api/processFlowManagement/v4/processFlow/4fd-ty56-gg55
Response

204

Operations on Task Flow

List task flows

GET
processFlow/{processFlowId}/taskFlow?fields=...&{filtering}

Description

This operation list task flow 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 a list of taskflow(s). The given criteria is the processFlow id (4fd-ty56-gg55).

Request

```
GET https://serverRoot/tmf-api/processFlowManagement/v4/taskFlow?fields=id,href,state&processFlowId=4fd-ty56-gg55
Accept: application/json
```

Response

200

```
[
  {
    "id": "4fd-ty56-gg55-1",
    "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-1",
    "state": "completed"
  },
  {
    "id": "4fd-ty56-gg55-2",
    "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-2",
    "state": "completed"
  },
  {
    "id": "4fd-ty56-gg55-3",
    "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-3",
```

```
      "state": "completed"
   },
   {
      "id": "4fd-ty56-gg55-4",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-4",
      "state": "active"
   }
]
```


Retrieve task flow

GET processFlow/{processFlowId}/taskFlow/{id}?fields=...&{filtering}

Description

This operation retrieves a task flow 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 taskFlow. The given criteria is the taskFlow id 4fd-ty56-gg55-3.

Request

```
GET https://serverRoot/tmf-api/processFlowManagement/v4/taskFlow/4fd-ty56-gg55-3
Accept: application/json
```

Response


```
200

{
   "id": "4fd-ty56-gg55-3",
   "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-3",
   "completionMethod": "automatic",
   "isMandatory": true,
   "priority": 0,
   "taskFlowSpecification": "SCinit",
   "relatedEntity": [
      {
         "id": "qq12-gg22",
         "href": ".../shoppingCartManagement/v4/shoppingCart/qq12-gg22",
```

```
        "name": "web ShoppingCart for Jean Pontus",
        "role": "shoppingCart",
        "@referredType": "ShoppingCart"
      }
    ],
    "state": "completed",
    "taskFlowRelationship": [
      {
        "relationshipType": "nextTask",
        "taskFlow": {
          "id": "4fd-ty56-gg55-4",
          "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-4"
        }
      }
    ]
}
```


Patch task flow

PATCH processFlow/{processFlowId}/taskFlow/{id}

Description

This operation allows partial updates of a task flow 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
channel	
characteristic	
completionMethod	
isMandatory	
priority	
relatedEntity	
relatedParty	
taskFlowRelationship	
taskFlowSpecification	

Non-Patchable Attributes	Rule
href	
id	
state	
taskFlowType	

Usage Samples

Here's an example of a request for updating a taskFlow - provide configured cart items.

Request

```
PATCH https://serverRoot/tmf-api/processFlowManagement/v4/taskFlow/4fd-ty56-gg55-4
Content-Type: application/json-patch+json

{
  "id": "4fd-ty56-gg55-4",
  "completionMethod": "userInput",
  "taskFlowSpecification": "SCconfig",
  "characteristic": [
    {
      "name": "cartItem",
      "valueType": "object",
      "value": {
        "@schemaLocation": "..../schema/characteristic/cartItem.json",
        "@type": "CartItem",
        "cartItem": [
          {
            "id": "1",
            "action": "add",
            "quantity": 1,
            "status": "active",
            "productOffering": {
              "id": "45d-666",
              "name": "TMF mobile Line"
            }
          },
          {
            "id": "2",
            "action": "add",
            "quantity": 1,
            "status": "active",
            "productOffering": {
              "id": "489-uuy",
              "name": "TMF mobile plan"
            },
            "cartItemRelationship": [
              {
                "id": "1",
```

```
                    "type": "reliesOn"
                  }
                ]
              },
              {
                "id": "3",
                "action": "add",
                "quantity": 1,
                "status": "active",
                "productOffering": {
                  "id": "ze2-gt1",
                  "name": "TMF Sim Only Offer"
                },
                "cartItemRelationship": [
                  {
                    "id": "1",
                    "type": "reliesOn"
                  }
                ]
              }
            ]
          }
        }
    ]
}
```


Response

200


```
{
  "id": "4fd-ty56-gg55-4",
  "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-4",
  "completionMethod": "userInput",
  "isMandatory": true,
  "priority": 0,
  "taskFlowSpecification": "SCconfig",
  "characteristic": [
    {
      "name": "cartItem",
      "valueType": "object",
      "value": {
        "@schemaLocation": "..../schema/characteristic/cartItem.json",
        "@type": "CartItem",
        "cartItem": [
          {
            "id": "1",
            "action": "add",
            "quantity": 1,
            "status": "active",
            "productOffering": {
              "id": "45d-666",
```

```
            "name": "TMF mobile Line"
          }
        },
        {
          "id": "2",
          "action": "add",
          "quantity": 1,
          "status": "active",
          "productOffering": {
            "id": "489-uuy",
            "name": "TMF mobile plan"
          },
          "cartItemRelationship": [
            {
              "id": "1",
              "type": "reliesOn"
            }
          ]
        },
        {
          "id": "3",
          "action": "add",
          "quantity": 1,
          "status": "active",
          "productOffering": {
            "id": "ze2-gt1",
            "name": "TMF Sim Only Offer"
          },
          "cartItemRelationship": [
            {
              "id": "1",
              "type": "reliesOn"
            }
          ]
        }
      ]
    }
  }
],
"relatedEntity": [
  {
    "id": "qq12-gg22",
    "href": ".../shoppingCartManagement/v4/shoppingCart/qq12-gg22",
    "name": "web ShoppingCart for Jean Pontus",
    "role": "shoppingCart",
    "@referredType": "ShoppingCart"
  }
],
"state": "completed",
"taskFlowRelationship": [
  {
    "relationshipType": "nextTask",
    "taskFlow": {
      "id": "4fd-ty56-gg55-5",
      "href": ".../processFlowManagement/v4/processFlow/4fd-ty56-gg55/taskFlow/4fd-ty56-gg55-5"
```

```
      }
    }
  ]
}
```

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.

Request

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

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

Response

201

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

Acknowledgements

Version History

Release Number	Date	Release led by:	Description
Release 4.0.0	11-Aug-2019	Ludovic Robert Orange ludovic.robert@orange.com Pierre Gauthier TM Forum pgauthier@tmforum.org	First Release of this API *Note: the version 4.0 is assigned to all the APIs delivered in the release 19.0.*
4.0.1	04-Nov-2019	Adrienne Walcott	Updated to reflect TM Forum Approved Status

Release History

Release Number	Date	Release led by	Description
19.0.0	11-Aug-2019	Ludovic Robert Orange ludovic.robert@orange.com Pierre Gauthier TM Forum pgauthier@tmforum.org	Version 4.0 of the API REST *Note: the version 4.0 is assigned to all the APIs delivered in the release 19.0*
19.0.1	04-Nov-2019	Adrienne Walcott	Updated to reflect TM Forum Approved Status