

CustomerBill

# NOTICE

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# Introduction

The following document is the specification of the Async API for customer bill management. It includes the model definition as well as all available operations.

Products subscribed by a customer are rated at different prices depending on product offering prices and prices rules and additional terms and conditions determined by the customer. The rating process takes product usages and applies rates to them. The billing process applies additional charges (recurring charges, one time charges), discounts and taxes to products then aggregate applied rates into bills sent to customers.

The bill, ultimate goal of a billing process, can be created as a result of a cycle run (done by batch in general) or by the result of others events such as a customer request or an account termination (done in real-time).

This API allows to find and retrieve one or several customer bills (also called invoices) produced for a customer. A customer bill is an electronic or paper document produced at the end of the billing process. The customer bill gathers and displays different items (applied customer billing rates generated during the rating and billing processes) to be charged to a customer. It represents a total amount due for all the products during the billing period and all significant information like dates, bill reference. The API model support the needs for the three basic billing types : postpaid periodical bill, postpaid real-time bill and prepaid real-time bill.

This API provides also operations to find and retrieve the details of applied customer billing rates presented on a customer bill.

Finally, this API allows to request in real-time a customer bill creation and to manage this request.

Note : Customer Billing covers business entities utilized by rating and billing processes. These entities form the Customer Bill ABE, the Applied Customer Billing Rate ABE and the Customer Bill Collection ABE. They are specified in the GB922 Customer document of the Framework SID Suite R16.5.0.

# Sample Use Cases

To illustrate JSON representation of resources concerned by these APIs, we use the 3 use cases detailed below.

## Use case 1: Retrieval of a Customer\_Bill

This UC is simply the request to fetch one or more bills upon a customer request (self service with a web site or on a call to a call center).

The bill itself is produced in a regular backoffice (batch) process which runs according to the bill cycle definitions.

The bill document should be an attachment to the customer bill resource (realized as reference to the bill document e.g. in PDF format)

The state of the bill is proposed as a set of possible values (enumeration) on the base type “string”. The user is free to redefine this state according to his specific business needs.

## Use case 2: Request of an “off cycle” bill

This UC illustrates the idea of the Customer\_Bill\_On\_Demand resource. This resource is a task type resource which triggers the generation of a bill outside the regular bill cycle.

A POST to create this resource implements the request to produce such an extra bill. The resource represents the status of this off cycle bill production.

## Use case 3: Patch of an customer bill

This UC illustrates the need for a change in a customer bill. In general a patch of a bill is not allowed in order to support the traceability of a bill (e.g. for tax reasons). But there exist some situations resulting in exceptions. This could be a misspelled name or a state change in case of disputes on the bill. This are only examples, there might be other reasons. The operator\* of this API has to decide to which extend a PATCH of a bill is meaningful and valid.

Remark on “misspelled name”: The bill is issued to the person/organization named in the billing account. It should be corrected there. This doesn’t necessarily regenerate the bill – the name of the addressee on the bill has to be changed (if specific conditions/constellations are met, the API operator\* has to decide).

\*operator: The communication service provider using this API to offer the resources internal or external.

# 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 `ACustomerBill` and `BCustomerBill` inheriting properties from the `CustomerBill` 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 `CustomerBill` instances some may be instances of `ACustomerBill` where other could be instances of `BCustomerBill`. 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 `CustomerBillRef` 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 `ACustomerBillRef` or `BCustomerBillRef`, 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

### BillCycle resource

A detailed description of a billing cycle and the various sub steps of a billing cycle.

#### Resource model

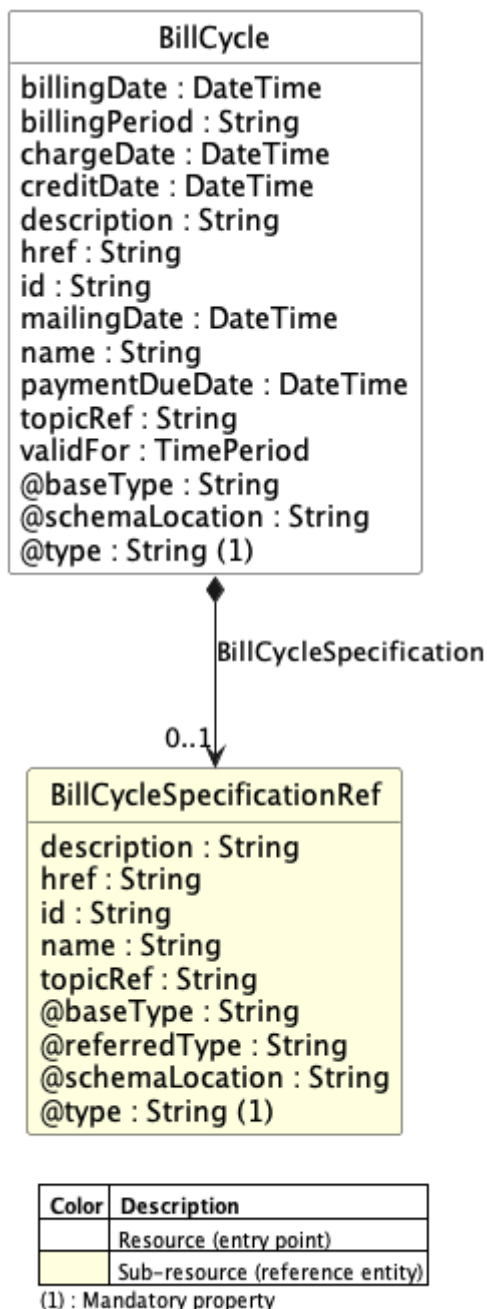


Figure 1 - BillCycle

#### Field descriptions

##### BillCycle fields

|                        |   |
|------------------------|---|
| BillCycleSpecification | A BillCycleSpecificationRef. Refers an BillCycleSpecification.  |
| billingDate            | A DateTime. The billing/settlement date.  |
| billingPeriod          | A String. A billing time period. It is e.g. the concrete expressed month. Example: 'March'.                 |
| chargeDate             | A DateTime. Date through when a payment method (e.g. credit card,...) will be activated.                    |
| creditDate             | A DateTime. Date through which credits previously received by the billing system are displayed on the bill. |
| description            | A String. An explanation regarding this billing cycle. If necessary.  |
| href                   | A String. Hyperlink reference.  |
| id                     | A String. Unique identifier.  |
| mailingDate            | A DateTime. Customer bill mailing date.   |
| name                   | A String. A short descriptive name of the actual billing cycle.   |
| paymentDueDate         | A DateTime. Date, when the payment is due.  |
| topicRef               | A String. A reference to the topic from which this entity can be fetched.                                   |
| validFor               | A TimePeriod. A period of time, either as a deadline (endDateTime only) a startDateTime only, or both.      |
| @baseType              | A String. When sub-classing, this defines the super-class.  |
| @schemaLocation        | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.                 |
| @type                  | A String. When sub-classing, this defines the sub-class Extensible name.                                    |

### BillCycleSpecificationRef sub-resource fields

|                 |   |
|-----------------|---|
| description     | A String. An explanatory text regarding the BillCycleSpecification.                         |
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |



|       |  |
|-------|--|
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |
|-------|--|

## Json representation sample(s)

We provide below a JSON representation as example of the 'BillCycle' resource object.

```
{
  "id" : "BC-1234",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
  "name" : "december regular bill run",
  "description" : "regular bill run",
  "billingDate" : "2020-01-22T12:00:56.982Z",
  "billingPeriod" : "2019-12",
  "chargeDate" : "2020-01-27T00:00:00.000Z",
  "creditDate" : "2020-01-31T23:59:59.999Z",
  "mailingDate" : "2020-01-23T00:00:00.000Z",
  "paymentDueDate" : "2020-02-03T23:59:59.999Z",
  "billCycleSpecification" : {
    "id" : "BCSPEC-M",
    "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billCycleSpecification/BCSPEC-M",
    "name" : "Regular Bill Cycle",
    "@referredType" : "BillCycleSpecification",
    "@type" : "BillCycleSpecificationRef",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillCycleSpecification.co
mmandRequest"
  },
  "validFor" : {
    "endTime" : "2020-01-00T00:00:00.000Z",
    "startTime" : "2020-12-31T23:59:59.999Z"
  },
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}
```

## CustomerBill resource

The customer bill. Can be a regular recurring bill or an extra bill on demand by the customer or the csp.

### Resource model

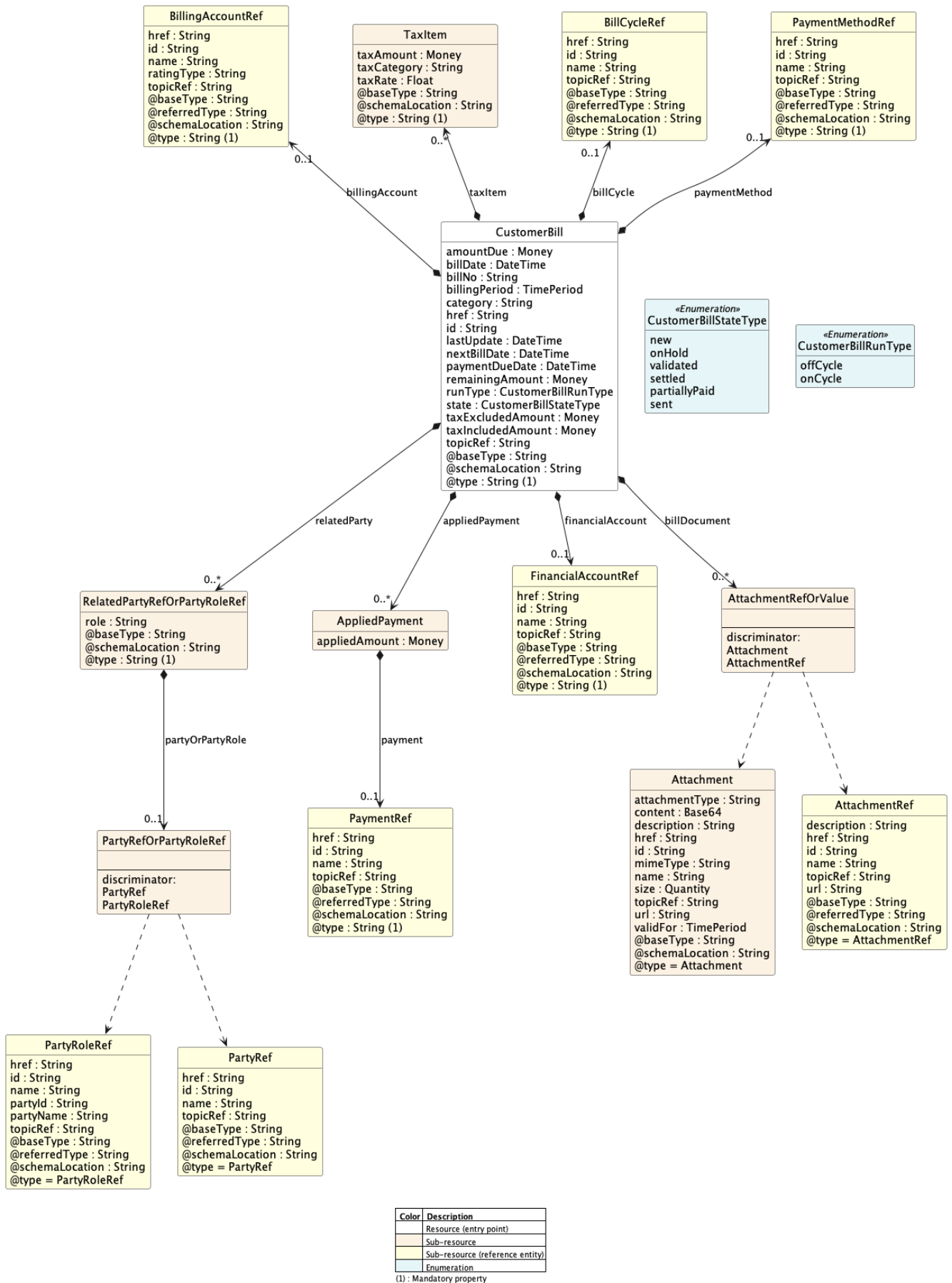


Figure 2 - CustomerBill

## Field descriptions

## CustomerBill fields

|                  |  |
|------------------|--|
| amountDue        | A Money. A base / value business entity used to represent money.   |
| appliedPayment   | An AppliedPayment. The applied payment is the result of lettering process. It enables to assign automatically or manually part of incoming payment amount to a bill.   |
| billCycle        | A BillCycleRef. ....   |
| billDate         | A DateTime. Bill date, external customer view (in consequence: different to the production date of the bill).  |
| billDocument     | An AttachmentRefOrValue. The polymorphic attributes @type, @schemaLocation & @referredType are related to the Attachment entity and not the AttachmentRefOrValue class itself.   |
| billNo           | A String. Bill reference known by the customer or the party and displayed on the bill. Could be different from the id.   |
| billingAccount   | A BillingAccountRef. BillingAccount reference. A BillingAccount is a detailed description of a bill structure.   |
| billingPeriod    | A TimePeriod. A period of time, either as a deadline (endDateTime only) a startDateTime only, or both.   |
| category         | A String. Category of the bill produced : normal, duplicate, interim, last, trial customer or credit note for example.   |
| financialAccount | A FinancialAccountRef. AccountReceivable reference. An account of money owed by a party to another entity in exchange for goods or services that have been delivered or used. An account receivable aggregates the amounts of one or more party accounts (billing or settlement) owned by a given party. |
| href             | A String. Hyperlink reference.   |
| id               | A String. Unique identifier.   |
| lastUpdate       | A DateTime. Date of bill last update.  |
| nextBillDate     | A DateTime. ). Approximate date of the next bill production given for information (only used/meaningful for on cycle / regular bills).   |
| paymentDueDate   | A DateTime. Date at which the amount due should have been paid.  |
| paymentMethod    | A PaymentMethodRef. PaymentMethod reference. A payment method defines a specific mean of payment (e.g direct debit).   |
| relatedParty     | A RelatedPartyRefOrPartyRoleRef. RelatedParty reference. A related party defines party or party role or its reference, linked to a specific entity.  |
| remainingAmount  | A Money. A base / value business entity used to represent money.   |

|                   |   |
|-------------------|---|
| runType           | A CustomerBillRunType. Recommended Enumeration Type (not formal forced in standard): Valid values for the runType of a bill. The bill could be produced in a regular bill cycle 'onCycle'. Otherwise the bill is produced on a request (e.g. customer request). This could be indicated by 'offCycle'.  |
| state             | A CustomerBillStateType. Recommended Enumeration Type (not formal forced in standard): Valid values for the lifecycle state of the bill: new = 'bill is ready to validate or to sent', validated = 'bill is checked (manual / automatic)', sent = 'bill is sent with the channel defined in the billingaccount', settled = 'bill is payed', partiallySettled = 'bill is partially payed', onHold = 'bill will not be in further processing until open issues connected to the bill are solved'. |
| taxExcludedAmount | A Money. A base / value business entity used to represent money.  |
| taxIncludedAmount | A Money. A base / value business entity used to represent money.  |
| taxItem           | A TaxItem. A tax item is created for each tax rate and tax type used in the bill.   |
| topicRef          | A String. A reference to the topic from which this entity can be fetched.   |
| @baseType         | A String. When sub-classing, this defines the super-class.  |
| @schemaLocation   | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.   |
| @type             | A String. When sub-classing, this defines the sub-class Extensible name.  |

### AppliedPayment sub-resource fields

|               |   |
|---------------|---|
| appliedAmount | A Money. A base / value business entity used to represent money.  |
| payment       | A PaymentRef. If an immediate payment has been done at the product order submission, the payment information are captured and stored (as a reference) in the order. |

### Attachment sub-resource fields

|                |  |
|----------------|--|
| attachmentType | A String. A business characterization of the purpose of the attachment, for example logo, instructionManual, contractCopy. |
| content        | A Base64. The actual contents of the attachment object, if embedded, encoded as base64.                                    |
| description    | A String. A narrative text describing the content of the attachment.   |

|                 |  |
|-----------------|--|
| href            | A String. Hyperlink reference.   |
| id              | A String. Unique identifier.   |
| contentType     | A String. A technical characterization of the attachment content format using IETF Mime Types.         |
| name            | A String. The name of the attachment.  |
| size            | A Quantity. An amount in a given unit.   |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                              |
| url             | A String. Uniform Resource Locator, is a web page address (a subset of URI).                           |
| validFor        | A TimePeriod. A period of time, either as a deadline (endDateTime only) a startDateTime only, or both. |
| @baseType       | A String. When sub-classing, this defines the super-class.   |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.            |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                               |

#### AttachmentRef sub-resource fields

|                 |   |
|-----------------|---|
| description     | A String. A narrative text describing the content of the attachment.                        |
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| url             | A String. Link to the attachment media/content.   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### BillCycleRef sub-resource fields

|      |                                |
|------|--------------------------------|
| href | A String. Hyperlink reference. |
| id   | A String. Unique identifier.   |

|                 |   |
|-----------------|---|
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class<br>Extensible name.                 |

#### **BillingAccountRef sub-resource fields**

|                 |  |
|-----------------|--|
| href            | A String. Hyperlink reference.   |
| id              | A String. Unique identifier.   |
| name            | A String. Name of the referred entity.   |
| ratingType      | A String. Indicates whether the account follows a specific payment option such as prepaid or postpaid. |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                              |
| @baseType       | A String. When sub-classing, this defines the super-class.   |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.                       |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.            |
| @type           | A String. When sub-classing, this defines the sub-class<br>Extensible name.                            |

#### **FinancialAccountRef sub-resource fields**

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |

|       |  |
|-------|--|
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |
|-------|--|

### PartyRef sub-resource fields

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### PartyRoleRef sub-resource fields

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| partyId         | A String. The identifier of the engaged party that is linked to the PartyRole object.       |
| partyName       | A String. The name of the engaged party that is linked to the PartyRole object.             |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### PaymentMethodRef sub-resource fields

|      |                                |
|------|--------------------------------|
| href | A String. Hyperlink reference. |
| id   | A String. Unique identifier.   |

|                 |   |
|-----------------|---|
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### **PaymentRef sub-resource fields**

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### **RelatedPartyRefOrPartyRoleRef sub-resource fields**

|                  |  |
|------------------|--|
| partyOrPartyRole | A PartyRefOrPartyRoleRef.  |
| role             | A String. Role played by the related party or party role in the context of the specific entity it is linked to. Such as 'initiator', 'customer', 'salesAgent', 'user'. |
| @baseType        | A String. When sub-classing, this defines the super-class.   |
| @schemaLocation  | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.  |
| @type            | A String. When sub-classing, this defines the sub-class Extensible name.   |

#### **TaxItem sub-resource fields**



|                 |   |
|-----------------|---|
| taxAmount       | A Money. A base / value business entity used to represent money.                            |
| taxCategory     | A String. Tax category.   |
| taxRate         | A Float. Applied rate of the tax.   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### Json representation sample(s)

We provide below a JSON representation as example of the 'CustomerBill' resource object.

```
{
  "id" : "CB-123",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
  "billNo" : "780123456",
  "amountDue" : {
    "unit" : "EUR",
    "value" : 0.0
  },
  "appliedPayment" : [ {
    "appliedAmount" : {
      "unit" : "EUR",
      "value" : 50.0
    },
    "payment" : {
      "id" : "PAY-9876",
      "href" : "https://server:port/tmf-api/Payment_Management/v5/payment/PAY-9876",
      "name" : "csp-bill",
      "@referredtype" : "Payment",
      "@type" : "PaymentRef",
      "topicRef" :
"kafka://server/{prefix}.Payment_Management.v5.retrievePayment.commandRequest"
    },
    "@type" : "AppliedPayment"
  } ],
  "billCycle" : {
    "id" : "BC-1234",
    "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
    "@referredType" : "BillCycle",
    "@type" : "BillCycleRef",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
  },
}
```

```

"billDate" : "2020-01-05T12:00:56.982Z",
"billDocument" : [ {
  "id" : "DOC_1234",
  "href" : "http://server:port/tmf-api/Document_Management/v5/document/DOC_1234",
  "attachmentType" : "application/pdf",
  "content" : "bill",
  "description" : "regular monthly bill",
  "mimeType" : "application/pdf",
  "size" : 172851,
  "uri" : "http://server:port/tmf-api/documentrepository/DOC_1234.pdf",
  "validfor" : {
    "startDateTime" : "2020-01-05T12:00:56.982Z"
  },
  "@type" : "Attachment",
  "topicRef" :
"kafka://server/{prefix}.Document_Management.v5.retrieveDocument.commandRequest"
} ],
"billingAccount" : {
  "id" : "A0815",
  "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
  "name" : "BA Peter Retep",
  "@REFERREDType" : "BillingAccount",
  "@type" : "BillingAccountRef",
  "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
},
"financialAccount" : {
  "id" : "FA12345",
  "href" : "http://host:port/tmf-
api/Account_Management/v5/financialAccount/FA12345",
  "name" : "FA Peter Retep",
  "@REFERREDType" : "FinancialAccount",
  "@type" : "FinancialAccountRef",
  "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveFinancialAccount.commandRequest"
},
"category" : "normal",
"lastUpdate" : "2020-01-05T12:00:56.982Z",
"nextBillDate" : "2020-02-05T12:00:00.000Z",
"paymentDueDate" : "2020-01-15T00:00:00.000Z",
"remainingAmount" : {
  "unit" : "EUR",
  "value" : 0.0
},
"runType" : "onCycle",
"status" : "settled",
"taxExcludedAmount" : {
  "unit" : "EUR",
  "value" : 40.0
},
"taxIncludedAmount" : {

```

```
    "unit" : "EUR",
    "value" : 50.0
  },
  "taxItem" : [ {
    "taxAmount" : {
      "unit" : "EUR",
      "value" : 10.0
    },
    "taxCategory" : "VAT",
    "taxRate" : 0.25,
    "@type" : "TaxItem"
  } ],
  "@type" : "CustomerBill",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}
```

## CustomerBillOnDemand resource

This resource is used to manage the creation request of a customer bill in real-time (on demand).

### Resource model

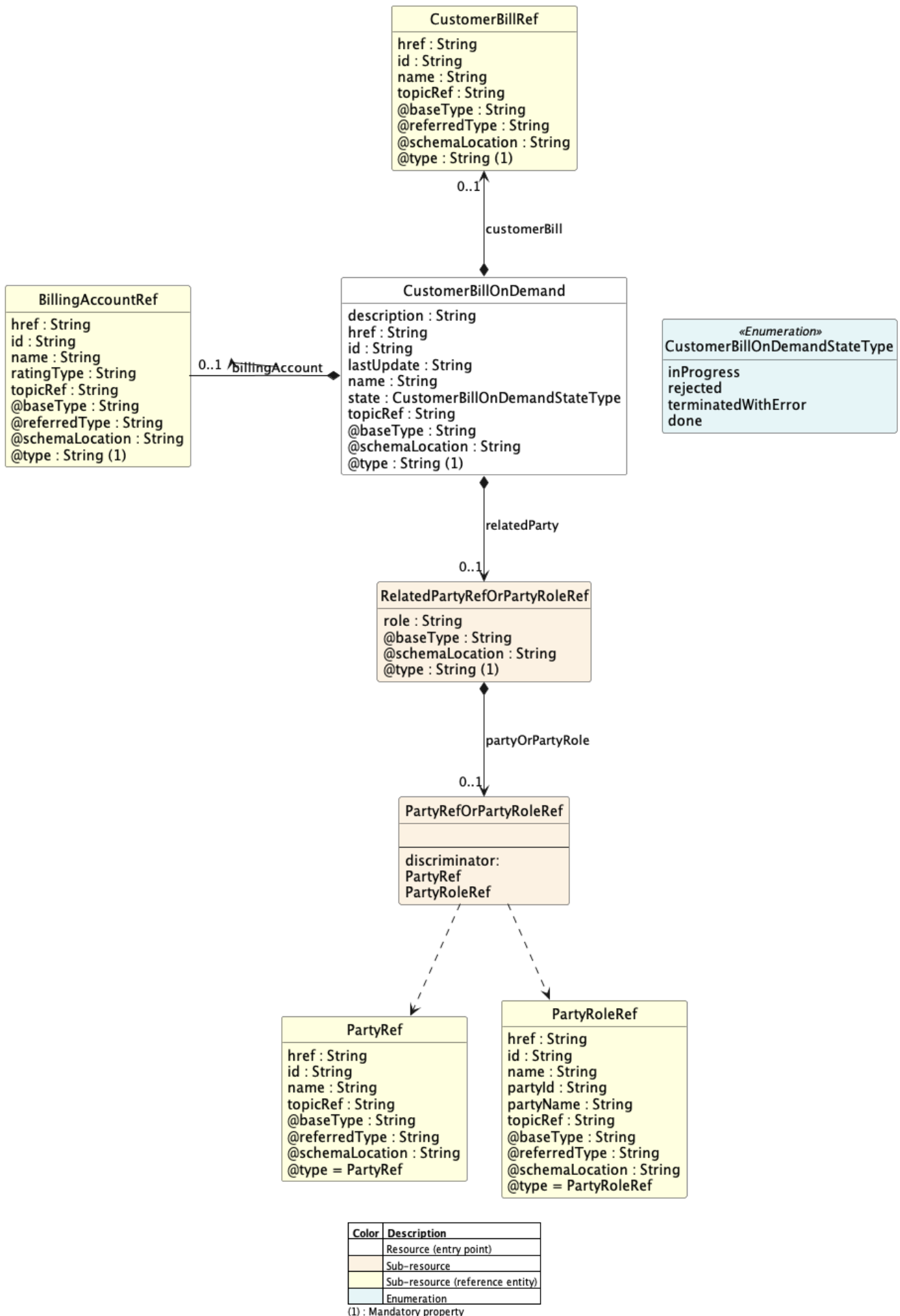


Figure 3 - CustomerBillOnDemand

## Field descriptions

### CustomerBillOnDemand fields

|                 |  |
|-----------------|--|
| billingAccount  | A BillingAccountRef. BillingAccount reference. A BillingAccount is a detailed description of a bill structure.   |
| customerBill    | A CustomerBillRef. Bill reference.   |
| description     | A String. Additional data describing the customer bill on demand request.  |
| href            | A String. Hyperlink reference.   |
| id              | A String. Unique identifier.   |
| lastUpdate      | A String. The last date time when the customer bill on demand has been updated.  |
| name            | A String. Friendly name to identify the customer bill on demand request.   |
| relatedParty    | A RelatedPartyRefOrPartyRoleRef. RelatedParty reference. A related party defines party or party role or its reference, linked to a specific entity.  |
| state           | A CustomerBillOnDemandStateType. Recommended Enumeration Type (not formal forced in standard): Valid values for 'CustomerBillOnDemand': 'inProgress', 'rejected', 'done', 'terminatedWithError'. |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.  |
| @baseType       | A String. When sub-classing, this defines the super-class.   |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.  |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.   |

### BillingAccountRef sub-resource fields

|            |  |
|------------|--|
| href       | A String. Hyperlink reference.   |
| id         | A String. Unique identifier.   |
| name       | A String. Name of the referred entity.   |
| ratingType | A String. Indicates whether the account follows a specific payment option such as prepaid or postpaid. |
| topicRef   | A String. A reference to the topic from which this entity can be fetched.                              |
| @baseType  | A String. When sub-classing, this defines the super-class.   |

|                 |   |
|-----------------|---|
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### CustomerBillRef sub-resource fields

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### PartyRef sub-resource fields

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### PartyRoleRef sub-resource fields

|      |                                |
|------|--------------------------------|
| href | A String. Hyperlink reference. |
| id   | A String. Unique identifier.   |

|                 |   |
|-----------------|---|
| name            | A String. Name of the referred entity.  |
| partyId         | A String. The identifier of the engaged party that is linked to the PartyRole object.       |
| partyName       | A String. The name of the engaged party that is linked to the PartyRole object.             |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### RelatedPartyRefOrPartyRoleRef sub-resource fields

|                  |  |
|------------------|--|
| partyOrPartyRole | A PartyRefOrPartyRoleRef.  |
| role             | A String. Role played by the related party or party role in the context of the specific entity it is linked to. Such as 'initiator', 'customer', 'salesAgent', 'user'. |
| @baseType        | A String. When sub-classing, this defines the super-class.   |
| @schemaLocation  | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.  |
| @type            | A String. When sub-classing, this defines the sub-class Extensible name.   |

### Json representation sample(s)

We provide below a JSON representation as example of the 'CustomerBillOnDemand' resource object.

```
{
  "id" : "D123",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/customerBillOnDemand/D123",
  "description" : "Customer bill on demand",
  "lastUpdate" : "2020-01-19T12:34:56.123Z",
  "name" : "BillOnCustomerDemand",
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://server:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
```

```

    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://server/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "relatedParty" : {
    "role" : "requester",
    "@type" : "RelatedPartyRefOrRelatedPartyRoleRef",
    "partyOrPartyRole" : {
      "id" : "RP0815",
      "href" : "http://server:port/tmf-api/Party_Management/v5/party/RP0815",
      "name" : "Peter Retep",
      "@referredType" : "Individual",
      "@type" : "PartyRef",
      "topicRef" :
"kafka://server/{prefix}.Party_Management.v5.retrieveParty.commandRequest"
    }
  },
  "state" : "InProgress",
  "@type" : "CustomerBillOnDemand",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
}

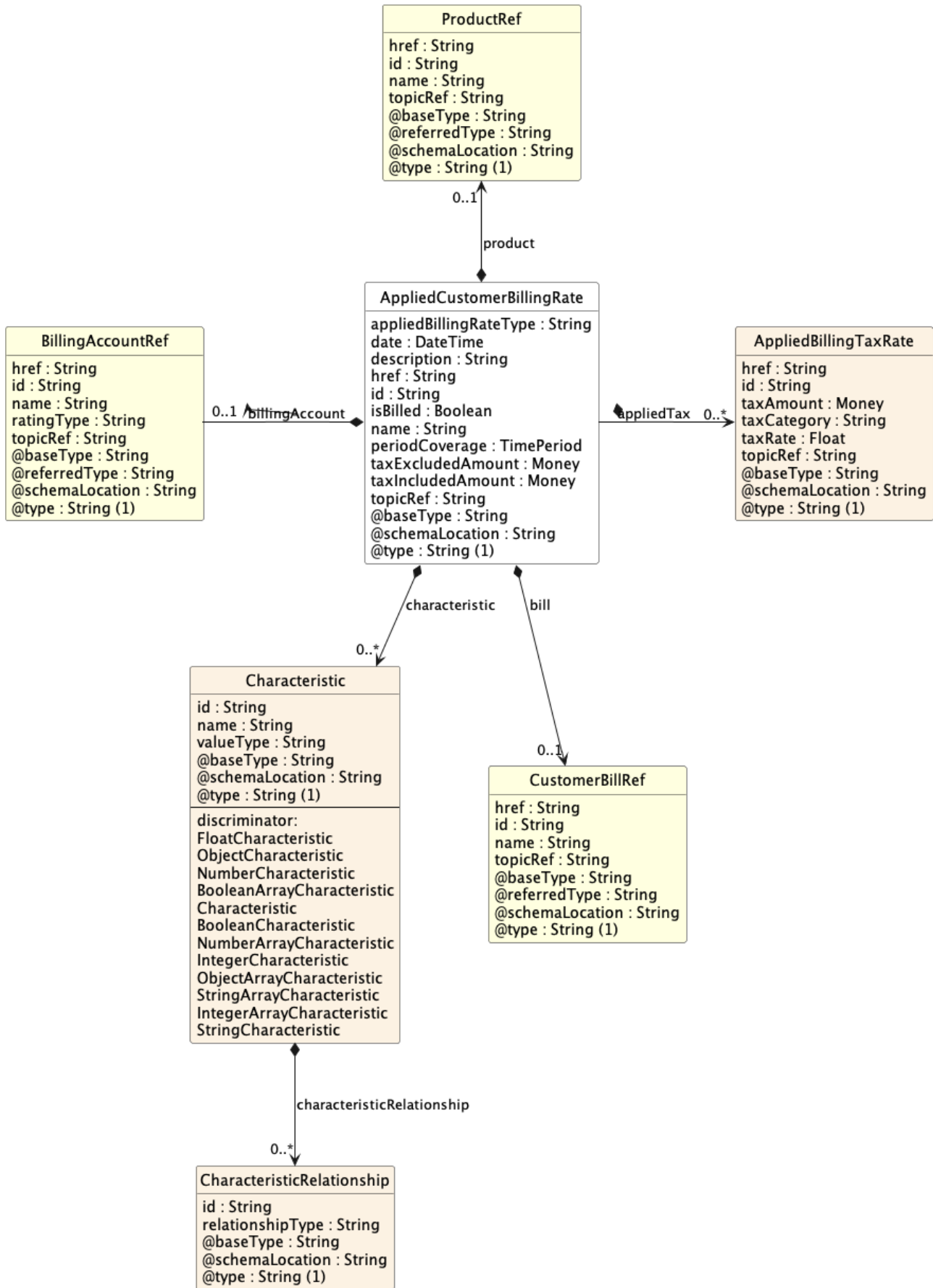
```

## AppliedCustomerBillingRate resource

A customer bill displays applied billing rates created before or during the billing process.

### Resource model





| Color | Description                     |
|-------|---------------------------------|
|       | Resource (entry point)          |
|       | Sub-resource                    |
|       | Sub-resource (reference entity) |

(1) : Mandatory property

Figure 4 - *AppliedCustomerBillingRate*

## Field descriptions

### AppliedCustomerBillingRate fields

|                        |  |
|------------------------|--|
| appliedBillingRateType | A String. Type of the applied billing rate : appliedBillingCharge (any kind of charge except taxation charges : recurringCharge, oneTimeCharge, usageCharge), appliedBillingCredit (any kind of credit : rebate or productAlteration) or appliedPenaltyCharge (penalty charges such as late fees, payment rejection fees,...).   |
| appliedTax             | An AppliedBillingTaxRate. The applied billing tax rate represents taxes applied billing rate it refers to. It is calculated during the billing process.  |
| bill                   | A CustomerBillRef. Bill reference.   |
| billingAccount         | A BillingAccountRef. BillingAccount reference. A BillingAccount is a detailed description of a bill structure.   |
| characteristic         | A Characteristic. Describes a given characteristic of an object or entity through a name/value pair. This is an abstract base class, the actual value is in one of the strongly-typed subclasses : StringCharacteristic, ObjectCharacteristic, FloatCharacteristic, BooleanCharacteristic, NumberCharacteristic, IntegerCharacteristic, StringArrayCharacteristic, ObjectArrayCharacteristic, BooleanArrayCharacteristic, NumberArrayCharacteristic, IntegerArrayCharacteristic... |
| date                   | A DateTime. Creation date of the applied billing rate.   |
| description            | A String. Additional data to be displayed on the bill for this customer applied billing rate.  |
| href                   | A String. Hyperlink reference.   |
| id                     | A String. Unique identifier.   |
| isBilled               | A Boolean. Indicates if this applied billing rate has been presented on a bill or not. If isBilled = true then bill should be provided, if false then billingAccount should be provided.   |
| name                   | A String. Name of the customer applied billing rate.   |
| periodCoverage         | A TimePeriod. A period of time, either as a deadline (endDateTime only) a startDateTime only, or both.   |
| product                | A ProductRef. A Product reference.   |
| taxExcludedAmount      | A Money. A base / value business entity used to represent money.   |
| taxIncludedAmount      | A Money. A base / value business entity used to represent money.   |
| topicRef               | A String. A reference to the topic from which this entity can be fetched.  |
| @baseType              | A String. When sub-classing, this defines the super-class.   |

|                 |   |
|-----------------|---|
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### **AppliedBillingTaxRate sub-resource fields**

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| taxAmount       | A Money. A base / value business entity used to represent money.                            |
| taxCategory     | A String. A categorization of the tax rate.   |
| taxRate         | A Float. Applied rate.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### **BillingAccountRef sub-resource fields**

|                 |  |
|-----------------|--|
| href            | A String. Hyperlink reference.   |
| id              | A String. Unique identifier.   |
| name            | A String. Name of the referred entity.   |
| ratingType      | A String. Indicates whether the account follows a specific payment option such as prepaid or postpaid. |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                              |
| @baseType       | A String. When sub-classing, this defines the super-class.   |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.                       |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.            |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                               |

### **BooleanArrayCharacteristic sub-resource fields**

|       |  |
|-------|--|
| value | A Boolean. A characteristic which value is an array of Boolean(s).       |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

### BooleanCharacteristic sub-resource fields

|       |  |
|-------|--|
| value | A Boolean. Value of the characteristic.                                  |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

### Characteristic sub-resource fields

|                            |   |
|----------------------------|---|
| characteristicRelationship | A CharacteristicRelationship. Another Characteristic that is related to the current Characteristic; |
| id                         | A String. Unique identifier of the characteristic.  |
| name                       | A String. Name of the characteristic.   |
| valueType                  | A String. Data type of the value of the characteristic.   |
| @baseType                  | A String. When sub-classing, this defines the super-class.  |
| @schemaLocation            | A String. A URI to a JSON-Schema file that defines additional attributes and relationships.         |
| @type                      | A String. When sub-classing, this defines the sub-class Extensible name.                            |

### CharacteristicRelationship sub-resource fields

|                  |   |
|------------------|---|
| id               | A String. Unique identifier of the characteristic.  |
| relationshipType | A String. The type of relationship.   |
| @baseType        | A String. When sub-classing, this defines the super-class.                                  |
| @schemaLocation  | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type            | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### CustomerBillRef sub-resource fields

|          |   |
|----------|---|
| href     | A String. Hyperlink reference.  |
| id       | A String. Unique identifier.  |
| name     | A String. Name of the referred entity.                                    |
| topicRef | A String. A reference to the topic from which this entity can be fetched. |

|                 |   |
|-----------------|---|
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

#### **FloatCharacteristic sub-resource fields**

|       |  |
|-------|--|
| value | A Float. Value of the characteristic.                                    |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

#### **IntegerArrayCharacteristic sub-resource fields**

|       |  |
|-------|--|
| value | An Integer. A characteristic which value is an array of Integer(s).      |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

#### **IntegerCharacteristic sub-resource fields**

|       |  |
|-------|--|
| value | An Integer. Value of the characteristic.                                 |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

#### **NumberArrayCharacteristic sub-resource fields**

|       |  |
|-------|--|
| value | A Number. A characteristic which value is an array of Number(s).         |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

#### **NumberCharacteristic sub-resource fields**

|       |  |
|-------|--|
| value | A Number. Value of the characteristic.                                   |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

#### **ObjectArrayCharacteristic sub-resource fields**

|       |   |
|-------|---|
| value | An object. Collection of characteristic values. |
|-------|---|

|       |  |
|-------|--|
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |
|-------|--|

### ObjectCharacteristic sub-resource fields

|       |  |
|-------|--|
| value | An object. Value of the characteristic.                                  |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

### ProductRef sub-resource fields

|                 |   |
|-----------------|---|
| href            | A String. Hyperlink reference.  |
| id              | A String. Unique identifier.  |
| name            | A String. Name of the referred entity.  |
| topicRef        | A String. A reference to the topic from which this entity can be fetched.                   |
| @baseType       | A String. When sub-classing, this defines the super-class.                                  |
| @referredType   | A String. The actual type of the target instance when needed for disambiguation.            |
| @schemaLocation | A String. A URI to a JSON-Schema file that defines additional attributes and relationships. |
| @type           | A String. When sub-classing, this defines the sub-class Extensible name.                    |

### StringArrayCharacteristic sub-resource fields

|       |  |
|-------|--|
| value | A String. Collection of string characteristics.                          |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

### StringCharacteristic sub-resource fields

|       |  |
|-------|--|
| value | A String. Value of the characteristic.                                   |
| @type | A String. When sub-classing, this defines the sub-class Extensible name. |

### Json representation sample(s)

We provide below a JSON representation as example of the 'AppliedCustomerBillingRate' resource object.

```
{
  "id" : "ABR123",
  "href" : "http://server:port/api/appliedCustomerBillingRate/v5/ABR123",
```

```

"appliedBillingRateType" : "monthly",
"date" : "2020-01-19T13:38:18.938Z",
"isBilled" : true,
"name" : "Rental Fee",
"appliedTax" : [ {
  "taxCategory" : "VAT",
  "taxRate" : 20,
  "taxAmount" : {
    "unit" : "EUR",
    "value" : 100
  },
  "@type" : "AppliedBillingTaxRate"
} ],
"bill" : {
  "id" : "B123",
  "href" : "http://server:port/api/bill/v5/B123",
  "name" : "customer bill",
  "@REFERREDType" : "CustomerBill",
  "@type" : "CustomerBillRef",
  "topicRef" : "kafka://broker-address/topic-name"
},
"billingAccount" : {
  "id" : "A0815",
  "href" : "http://server:port/api/billingAccount/v5/A0815",
  "name" : "BA Peter Retep",
  "@REFERREDType" : "BillingAccount",
  "@type" : "BillingAccountRef",
  "topicRef" : "kafka://broker-address/topic-name"
},
"characteristic" : [ {
  "name" : "message",
  "valueType" : "string",
  "@type" : "StringCharacteristic",
  "value" : "Special discount this[ month only"
} ],
"periodCoverage" : {
  "endDateTime" : "2019-12-31T23:59:59.999Z",
  "startDateTime" : "2019-12-01T00:00:00.000Z"
},
"product" : {
  "id" : "P-wfs-123",
  "href" : "http://server:port/api/product/v5/P-wfs-123",
  "name" : "CSPs wonderful fiber service",
  "@REFERREDType" : "Product",
  "@type" : "ProductRef",
  "topicRef" : "kafka://broker-address/topic-name"
},
"taxExcludedAmount" : {
  "unit" : "EUR",
  "value" : 40.0
},

```

```
"taxIncludedAmount" : {  
  "unit" : "EUR",  
  "value" : 50.0  
},  
"@type" : "AppliedCustomerBillingRate",  
"topicRef" : "kafka://broker-address/topic-name"  
}
```

## Notification Resource Models

4 notifications are defined for this API.

Notifications related to CustomerBill:

- Customer Bill Create Event
- Customer Bill State Change Event

Notifications related to CustomerBillOnDemand:

- Customer Bill On Demand Create Event
- Customer Bill On Demand State Change Event

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).



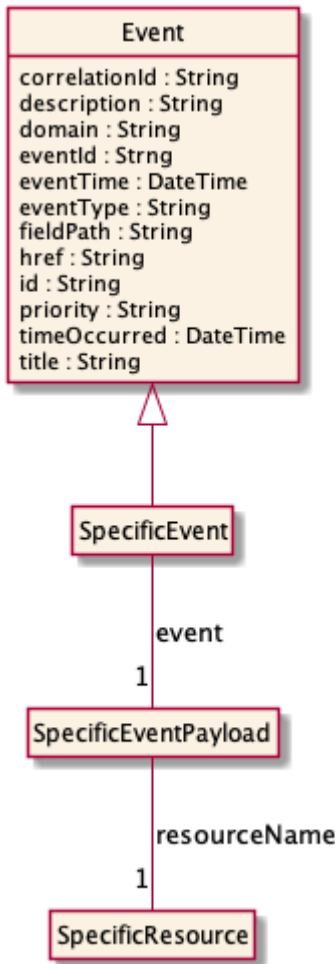


Figure 5 Notification Pattern

## Customer Bill Create Event

Message example for CustomerBillCreateEvent

Content-Type: application/json

```

{
  "correlationId" : "3a8fff52-9b84",
  "description" : "CustomerBillCreateEvent illustration",
  "domain" : "Commercial",
  "eventId" : "453e-9a35-2e5cac56045d",
  "eventTime" : "2023-03-05T12:41:39.884Z",
  "eventType" : "CustomerBillCreateEvent",
  "priority" : "1",
  "timeOccurred" : "2023-03-05T12:41:34.667Z",
  "title" : "CustomerBillCreateEvent",
  "event" : {
    "customerBill" : {
      "id" : "CB-123",
      "href" : "https://server:port/tmf-
api/Customer_Bill_Management/v5/customerBill/CB-123",
      "billNo" : "780123456",
      "amountDue" : {

```

```

        "unit" : "EUR",
        "value" : 0.0
    },
    "appliedPayment" : [ {
        "appliedAmount" : {
            "unit" : "EUR",
            "value" : 50.0
        },
        "payment" : {
            "id" : "PAY-9876",
            "href" : "https://server:port/tmf-api/Payment_Management/v5/payment/PAY-
9876",
            "name" : "csp-bill",
            "@referredtype" : "Payment",
            "@type" : "PaymentRef",
            "topicRef" :
"kafka://server/{prefix}.Payment_Management.v5.retrievePayment.commandRequest"
        },
        "@type" : "AppliedPayment"
    } ],
    "billCycle" : {
        "id" : "BC-1234",
        "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-
1234",
        "@referredType" : "BillCycle",
        "@type" : "BillCycleRef",
        "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
    },
    "billDate" : "2020-01-05T12:00:56.982Z",
    "billDocument" : [ {
        "id" : "DOC_1234",
        "href" : "http://server:port/tmf-
api/Document_Management/v5/document/DOC_1234",
        "attachmentType" : "application/pdf",
        "content" : "bill",
        "description" : "regular monthly bill",
        "mimeType" : "application/pdf",
        "size" : 172851,
        "uri" : "",
        "validfor" : {
            "startDateTime" : "2020-01-05T12:00:56.982Z",
            "endDateTime" : "9999-12-31T23:59:59.999Z"
        },
        "@type" : "Attachment",
        "topicRef" :
"kafka://server/{prefix}.Document_Management.v5.retrieveDocument.commandRequest"
    } ],
    "billingAccount" : {
        "id" : "A0815",
        "href" : "http://host:port/tmf-

```

```

api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
},
    "financialAccount" : {
        "id" : "FA12345",
        "href" : "http://host:port/tmf-
api/Account_Management/v5/financialAccount/FA12345",
        "name" : "FA Peter Retep",
        "@referredType" : "FinancialAccount",
        "@type" : "FinancialAccountRef",
        "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveFinancialAccount.commandRequest"
},
    "category" : "normal",
    "lastUpdate" : "2020-01-05T12:00:56.982Z",
    "nextBillDate" : "2020-02-05T12:00:00.000Z",
    "paymentDueDate" : "2020-01-15T00:00:00.000Z",
    "remainingAmount" : {
        "unit" : "EUR",
        "value" : 0.0
    },
    "runType" : "onCycle",
    "status" : "new",
    "taxExcludedAmount" : {
        "unit" : "EUR",
        "value" : 40.0
    },
    "taxIncludedAmount" : {
        "unit" : "EUR",
        "value" : 50.0
    },
    "taxItem" : [ {
        "taxAmount" : {
            "unit" : "EUR",
            "value" : 10.0
        },
        "taxCategory" : "VAT",
        "taxRate" : 0.25,
        "@type" : "TaxItem"
    } ],
    "@type" : "CustomerBill",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}
},
    "reportingSystem" : {

```

```

    "id" : "222",
    "name" : "APP-756",
    "@type" : "ReportingResource",
    "@referredType" : "LogicalResource"
  },
  "source" : {
    "id" : "233",
    "name" : "APP-628",
    "@type" : "ReportingResource",
    "@referredType" : "LogicalResource"
  },
  "@baseType" : "Event",
  "@type" : "CustomerBillCreateEvent"
}

```

## Customer Bill State Change Event

Message example for CustomerBillStateChangeEvent event

Content-Type: application/json

```

{
  "correlationId" : "10ca43d6-e2a2",
  "description" : "CustomerBillStateChangeEvent illustration",
  "domain" : "Commercial",
  "eventId" : "4992-97e5-25fa266295e3",
  "eventTime" : "2023-03-05T12:41:39.885Z",
  "eventType" : "CustomerBillStateChangeEvent",
  "priority" : "3",
  "timeOccurred" : "2023-03-05T12:41:31.945Z",
  "title" : "CustomerBillStateChangeEvent",
  "event" : {
    "customerBill" : {
      "id" : "CB-123",
      "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
      "status" : "settled",
      "@type" : "CustomerBill",
      "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
    }
  },
  "reportingSystem" : {
    "id" : "222",
    "name" : "APP-756",
    "@type" : "ReportingResource",
    "@referredType" : "LogicalResource"
  },
  "source" : {

```

```

    "id" : "233",
    "name" : "APP-628",
    "@type" : "ReportingResource",
    "@referredType" : "LogicalResource"
  },
  "@baseType" : "Event",
  "@type" : "CustomerBillStateChangeEvent"
}

```

## Customer Bill On Demand Create Event

Message example for CustomerBillOnDemandCreateEvent

Content-Type: application/json

```

{
  "correlationId" : "3a8fff52-9b84",
  "description" : "CustomerBillOnDemandCreateEvent illustration",
  "domain" : "Commercial",
  "eventId" : "453e-9a35-2e5cac56045d",
  "eventTime" : "2023-03-05T12:41:39.884Z",
  "eventType" : "CustomerBillOnDemandCreateEvent",
  "priority" : "1",
  "timeOccured" : "2023-03-05T12:41:34.667Z",
  "title" : "CustomerBillOnDemandCreateEvent",
  "event" : {
    "customerBillOnDemand" : {
      "id" : "D123",
      "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/customerBillOnDemand/D123",
      "description" : "Customer bill on demand",
      "lastUpdate" : "2020-01-19T12:34:56.123Z",
      "name" : "BillOnCustomerDemand",
      "billingAccount" : {
        "id" : "A0815",
        "href" : "http://server:port/tmf-api/Account_Management/v5/billingAccount/A0815",
        "name" : "BA Peter Retep",
        "@referredType" : "BillingAccount",
        "@type" : "BillingAccountRef",
        "topicRef" :
"kafka://server/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
      },
      "relatedParty" : {
        "role" : "requester",
        "@type" : "RelatedPartyRefOrRelatedPartyRoleRef",
        "partyOrPartyRole" : {
          "id" : "RP0815",
          "href" : "http://server:port/tmf-api/Party_Management/v5/party/RP0815",
          "name" : "Peter Retep",

```

```

        "@referredType" : "Individual",
        "@type" : "PartyRef",
        "topicRef" :
"kafka://server/{prefix}.Party_Management.v5.retrieveParty.commandRequest"
    },
    "state" : "InProgress",
    "@type" : "CustomerBillOnDemand",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
    },
    "reportingSystem" : {
        "id" : "222",
        "name" : "APP-756",
        "@type" : "ReportingResource",
        "@referredType" : "LogicalResource"
    },
    "source" : {
        "id" : "233",
        "name" : "APP-628",
        "@type" : "ReportingResource",
        "@referredType" : "LogicalResource"
    },
    "@baseType" : "Event",
    "@type" : "CustomerBillOnDemandCreateEvent"
}

```

## Customer Bill On Demand State Change Event

Message example for CustomerBillOnDemandStateChangeEvent event

Content-Type: application/json

```

{
  "correlationId" : "10ca43d6-e2a2",
  "description" : "CustomerBillOnDemandStateChangeEvent illustration",
  "domain" : "Commercial",
  "eventId" : "4992-97e5-25fa266295e3",
  "eventTime" : "2023-03-05T12:41:39.885Z",
  "eventType" : "CustomerBillOnDemandStateChangeEvent",
  "priority" : "3",
  "timeOccured" : "2023-03-05T12:41:31.945Z",
  "title" : "CustomerBillOnDemandStateChangeEvent",
  "event" : {
    "customerBillOnDemand" : {
      "id" : "D123",
      "href" : "http://server:port/tmf-
api/Customer_Bill_Management/v5/customerBillOnDemand/D123",

```

```

    "state" : "done",
    "@type" : "CustomerBillOnDemand",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
  }
},
"reportingSystem" : {
  "id" : "222",
  "name" : "APP-756",
  "@type" : "ReportingResource",
  "@referredType" : "LogicalResource"
},
"source" : {
  "id" : "233",
  "name" : "APP-628",
  "@type" : "ReportingResource",
  "@referredType" : "LogicalResource"
},
"@baseType" : "Event",
"@type" : "CustomerBillOnDemandStateChangeEvent"
}

```

# API OPERATIONS

Every operation consists of two parts:

- **REQUEST:** Publish a message on a 'commandRequest' channel.
- **RESPONSE:** Subscribe to the corresponding 'commandReply' channel to receive the response.

Remember the following Async Uniform Contract:

| Operation on Entities       | Uniform Async API Operation | Description   |
|-----------------------------|-----------------------------|---|
| Query One Entity            | retrieveResource            | retrieve must be used to retrieve a representation of a resource. |
| Query Entities              | listResource                | list must be used to retrieve a list of resources.                |
| Create Entity               | createResource              | create must be used to create a new resource                      |
| Partial Update of an Entity | patchResource               | patch must be used to partially update a resource                 |
| Remove an Entity            | deleteResource              | delete must be used to remove a resource                          |

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

Notifications are also described in a subsequent section.

## Operations on CustomerBillOnDemand

### Retrieves a CustomerBillOnDemand by ID

Request topic: {prefix}.customerBill.v5.retrieveCustomerBillOnDemand.commandRequest

Reply topic: {prefix}.customerBill.v5.retrieveCustomerBillOnDemand.commandReply

#### Description

This operation retrieves a CustomerBillOnDemand entity. Attribute selection is enabled for all first level attributes. Filtering may be available depending on the compliance level supported by an implementation.

#### Usage samples

##### Request message header

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.retrieveCustomerBillOnDemand.commandReply
```



```
Parameters: {
  "id": D123
}
```

## Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel:
{prefix}.customerBill.v5.retrieveCustomerBillOnDemand.commandRequest
```

## Response Payload

```
{
  "id" : "D123",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/customerBillOnDemand/D123",
  "description" : "Customer bill on demand",
  "lastUpdate" : "2020-01-19T12:34:56.123Z",
  "name" : "BillOnCustomerDemand",
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://server:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://server/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "relatedParty" : {
    "role" : "requester",
    "@type" : "RelatedPartyRefOrRelatedPartyRoleRef",
    "partyOrPartyRole" : {
      "id" : "RP0815",
      "href" : "http://server:port/tmf-api/Party_Management/v5/party/RP0815",
      "name" : "Peter Retep",
      "@referredType" : "Individual",
      "@type" : "PartyRef",
      "topicRef" :
"kafka://server/{prefix}.Party_Management.v5.retrieveParty.commandRequest"
    }
  },
  "state" : "InProgress",
  "@type" : "CustomerBillOnDemand",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
}
```

## List or find CustomerBillOnDemand objects

Request topic: {prefix}.customerBill.v5.listCustomerBillOnDemand.commandRequest

Reply topic: {prefix}.customerBill.v5.listCustomerBillOnDemand.commandReply

### Description

This operation list CustomerBillOnDemand 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 is an example of a request for retrieving a list of CustomerBillOnDemand requests. Fields limited to id, href, billing account.

### Request Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.listCustomerBillOnDemand.commandReply
```

### Request message header

```
{
  "Parameters": {
    "fields": "id,href,billingAccount"
  }
}
```

### Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel: {prefix}.customerBill.v5.listCustomerBillOnDemand.commandRequest
```

### Response Payload

```
[ {
  "id" : "D123",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/customerBillOnDemand/D123",
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://server:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@REFERREDType" : "BillingAccount",
```

```

    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://server/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "@type" : "CustomerBillOnDemand",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
}, {
  "id" : "D12345",
  "href" : "http://server:port/tmf-
api/Customer_Bill_Management/v5/customerBillOnDemand/D12345",
  "billingAccount" : {
    "id" : "A4712",
    "href" : "http://server:port/tmf-api/Account_Management/v5/billingAccount/A4712",
    "name" : "BA Claire Erialc",
    "@REFERREDType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://server/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "@type" : "CustomerBillOnDemand",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
} ]

```

## Creates a CustomerBillOnDemand

Request topic: {prefix}.customerBill.v5.createCustomerBillOnDemand.commandRequest

Reply topic: {prefix}.customerBill.v5.createCustomerBillOnDemand.commandReply

### Description

This operation creates a CustomerBillOnDemand entity.

### Mandatory Attributes

| Mandatory Attributes | Rule |
|----------------------|------|
| billingAccount.id    |      |

### Usage samples

Here is an example of a request for a CustomerBillOnDemand.

### Request Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
```

Reply-Channel: {prefix}.customerBill.v5.createCustomerBillOnDemand.commandReply

## Request Payload

```
{
  "description" : "Customer bill on demand",
  "lastUpdate" : "2020-01-19T12:34:56.123Z",
  "name" : "BillOnCustomerDemand",
  "billingAccount" : {
    "id" : "A0815",
    "@type" : "BillingAccountRef",
    "@referredType" : "BillingAccount"
  },
  "relatedParty" : {
    "role" : "requester",
    "@type" : "RelatedPartyRefOrRelatedPartyRoleRef",
    "partyOrPartyRole" : {
      "id" : "RP0815",
      "@referredType" : "Individual",
      "@type" : "PartyRef"
    }
  },
  "@type" : "CustomerBillOnDemand"
}
```

## Response Headers

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169  
Status-Code: 201  
X-Request-Channel: {prefix}.customerBill.v5.createCustomerBillOnDemand.commandRequest

## Response Payload

```
{
  "id" : "D123",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/customerBillOnDemand/D123",
  "description" : "Customer bill on demand",
  "lastUpdate" : "2020-01-19T12:34:56.123Z",
  "name" : "BillOnCustomerDemand",
  "state" : "InProgress",
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://server:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
  }
}
```

```

    "topicRef" :
"kafka://server/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "relatedParty" : {
    "role" : "requester",
    "@type" : "RelatedPartyRefOrRelatedPartyRoleRef",
    "partyOrPartyRole" : {
      "id" : "RP0815",
      "href" : "http://server:port/tmf-api/Party_Management/v5/party/RP0815",
      "name" : "Peter Retep",
      "@referredType" : "Individual",
      "@type" : "PartyRef",
      "topicRef" :
"kafka://server/{prefix}.Party_Management.v5.retrieveParty.commandRequest"
    }
  },
  "@type" : "CustomerBillOnDemand",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBillOnDemand.comm
andRequest"
}

```

## Operations on CustomerBill

### Retrieves a CustomerBill by ID

Request topic: {prefix}.customerBill.v5.retrieveCustomerBill.commandRequest

Reply topic: {prefix}.customerBill.v5.retrieveCustomerBill.commandReply

#### Description

This operation retrieves a CustomerBill entity. Attribute selection is enabled for all first level attributes. Filtering may be available depending on the compliance level supported by an implementation.

#### Usage samples

##### Request message header

```

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.retrieveCustomerBill.commandReply
Parameters: {
  "id": CB-123
}

```

##### Response Headers

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169  
Status-Code: 200  
X-Request-Channel: {prefix}.customerBill.v5.retrieveCustomerBill.commandRequest

## Response Payload

```
{
  "id" : "CB-123",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
    "kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "taxIncludedAmount" : {
    "unit" : "EUR",
    "value" : 50.0
  },
  "@type" : "CustomerBill",
  "topicRef" :
  "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}
```

## List or find CustomerBill objects

Request topic: {prefix}.customerBill.v5.listCustomerBill.commandRequest

Reply topic: {prefix}.customerBill.v5.listCustomerBill.commandReply

### Description

This operation list CustomerBill 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 is an example of a request for retrieving a list of CustomerBills (Use Case 1). Fields limited to id, href, billing account.

### Request Headers

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169

Reply-Channel: {prefix}.customerBill.v5.listCustomerBill.commandReply

## Request message header

```
{
  "Parameters": {
    "fields": "id, href, billingAccount"
  }
}
```

## Response Headers

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169  
Status-Code: 200  
X-Request-Channel: {prefix}.customerBill.v5.listCustomerBill.commandRequest

## Response Payload

```
[ {
  "id" : "CB-123",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
  "@type" : "CustomerBill",
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@REFERREDType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
    "kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "topicRef" :
  "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}, {
  "id" : "CB-456",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-456",
  "@type" : "CustomerBill",
  "billingAccount" : {
    "id" : "A4712",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A4712",
    "name" : "BA Claire Eriale",
    "@REFERREDType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
```

```
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
},
"topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
} ]
```

## Updates partially a CustomerBill

Request topic: {prefix}.customerBill.v5.patchCustomerBill.commandRequest

Reply topic: {prefix}.customerBill.v5.patchCustomerBill.commandReply

### Description

This operation allows partial updates of a CustomerBill 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 createCustomerBill operation applies to the patchCustomerBill operation. Hence these tables are not repeated here.

### Patchable and Non Patchable Attributes

| Non Patchable Attributes | Rule |
|--------------------------|------|
|                          |      |
| Patchable Attributes     | Rule |
|                          |      |

### Usage samples

Update a Customer Bill using json-patch

This example uses the PatchCustomerBillJsonPatchRequest request message (used for a payload of type application/json-patch+json).

### Request message header

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandReply
Parameters: {
  "id": CB-123
}
```

### Request Payload

```
[ {
  "op" : "replace",
  "path" : "/state",
```



```
"value" : "onHold"
} ]
```

## Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandRequest
```

## Response Payload

```
{
  "id" : "CB-123",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
  "billNo" : "780123456",
  "amountDue" : {
    "unit" : "EUR",
    "value" : 0.0
  },
  "billCycle" : {
    "id" : "BC-1234",
    "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
    "@referredType" : "BillCycle",
    "@type" : "BillCycleRef",
    "topicRef" :
    "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
  },
  "billDate" : "2020-01-05T12:00:56.982Z",
  "billDocument" : [ {
    "id" : "DOC_1234",
    "href" : "http://server:port/tmf-api/Document_Management/v5/document/DOC_1234",
    "attachmentType" : "application/pdf",
    "content" : "bill",
    "description" : "regular monthly bill",
    "mimeType" : "application/pdf",
    "size" : 172851,
    "validfor" : {
      "startDateTime" : "2020-01-05T12:00:56.982Z",
      "endDateTime" : "9999-12-31T23:59:59.999Z"
    },
    "@type" : "Attachment",
    "topicRef" :
    "kafka://server/{prefix}.Document_Management.v5.retrieveDocument.commandRequest"
  } ],
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
```

```

    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "financialAccount" : {
    "id" : "FA12345",
    "href" : "http://host:port/tmf-
api/Account_Management/v5/financialAccount/FA12345",
    "name" : "FA Peter Retep",
    "@referredType" : "FinancialAccount",
    "@type" : "FinancialAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveFinancialAccount.commandRequest"
  },
  "category" : "normal",
  "lastUpdate" : "2020-01-05T12:00:56.982Z",
  "nextBillDate" : "2020-02-05T12:00:00.000Z",
  "paymentDueDate" : "2020-01-15T00:00:00.000Z",
  "remainingAmount" : {
    "unit" : "EUR",
    "value" : 50.0
  },
  "runType" : "onCycle",
  "status" : "onHold",
  "taxExcludedAmount" : {
    "unit" : "EUR",
    "value" : 40.0
  },
  "taxIncludedAmount" : {
    "unit" : "EUR",
    "value" : 50.0
  },
  "taxItem" : [ {
    "taxAmount" : {
      "unit" : "EUR",
      "value" : 10.0
    },
    "taxCategory" : "VAT",
    "taxRate" : 0.25,
    "@type" : "TaxItem"
  } ],
  "@type" : "CustomerBill",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}

```

This example uses the PatchCustomerBillPatchQueryRequest request message (used for a payload of type application/json-patch-query+json).

### Request message header

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandReply
Parameters: {
  "id": CB-123
}
```

### Request Payload

```
{
  "op" : "replace",
  "path" : "/state?state=new",
  "value" : "onHold"
}
```

### Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandRequest
```

### Response Payload

```
{
  "id" : "CB-123",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
  "billNo" : "780123456",
  "amountDue" : {
    "unit" : "EUR",
    "value" : 0.0
  },
  "billCycle" : {
    "id" : "BC-1234",
    "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
    "@referredType" : "BillCycle",
    "@type" : "BillCycleRef",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
  },
  "billDate" : "2020-01-05T12:00:56.982Z",
  "billDocument" : [ {
```

```

    "id" : "DOC_1234",
    "href" : "http://server:port/tmf-api/Document_Management/v5/document/DOC_1234",
    "attachmentType" : "application/pdf",
    "content" : "bill",
    "description" : "regular monthly bill",
    "mimeType" : "application/pdf",
    "size" : 172851,
    "validfor" : {
      "startDateTime" : "2020-01-05T12:00:56.982Z",
      "endDateTime" : "9999-12-31T23:59:59.999Z"
    },
    "@type" : "Attachment",
    "topicRef" :
"kafka://server/{prefix}.Document_Management.v5.retrieveDocument.commandRequest"
  } ],
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "financialAccount" : {
    "id" : "FA12345",
    "href" : "http://host:port/tmf-
api/Account_Management/v5/financialAccount/FA12345",
    "name" : "FA Peter Retep",
    "@referredType" : "FinancialAccount",
    "@type" : "FinancialAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveFinancialAccount.commandRequest"
  },
  "category" : "normal",
  "lastUpdate" : "2020-01-05T12:00:56.982Z",
  "nextBillDate" : "2020-02-05T12:00:00.000Z",
  "paymentDueDate" : "2020-01-15T00:00:00.000Z",
  "remainingAmount" : {
    "unit" : "EUR",
    "value" : 50.0
  },
  "runType" : "onCycle",
  "status" : "onHold",
  "taxExcludedAmount" : {
    "unit" : "EUR",
    "value" : 40.0
  },
  "taxIncludedAmount" : {
    "unit" : "EUR",
    "value" : 50.0
  }
}

```

```

},
"taxItem" : [ {
  "taxAmount" : {
    "unit" : "EUR",
    "value" : 10.0
  },
  "taxCategory" : "VAT",
  "taxRate" : 0.25,
  "@type" : "TaxItem"
} ],
"@type" : "CustomerBill",
"topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}

```

## Update a Customer Bill using patch merge

This example uses the PatchCustomerBillMergePatchRequest request message (used for a payload of type application/merge-patch+json).

### Request message header

```

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandReply
Parameters: {
  "id": CB-123
}

```

### Request Payload

```

{
  "@type" : "CustomerBill",
  "state" : "onHold"
}

```

### Response Headers

```

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandRequest

```

### Response Payload

```

{
  "id" : "CB-123",

```

```

    "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
    "billNo" : "780123456",
    "amountDue" : {
      "unit" : "EUR",
      "value" : 0.0
    },
    "billCycle" : {
      "id" : "BC-1234",
      "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
      "@referredType" : "BillCycle",
      "@type" : "BillCycleRef",
      "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
    },
    "billDate" : "2020-01-05T12:00:56.982Z",
    "billDocument" : [ {
      "id" : "DOC_1234",
      "href" : "http://server:port/tmf-api/Document_Management/v5/document/DOC_1234",
      "attachmentType" : "application/pdf",
      "content" : "bill",
      "description" : "regular monthly bill",
      "mimeType" : "application/pdf",
      "size" : 172851,
      "validfor" : {
        "startDateTime" : "2020-01-05T12:00:56.982Z",
        "endDateTime" : "9999-12-31T23:59:59.999Z"
      },
      "@type" : "Attachment",
      "topicRef" :
"kafka://server/{prefix}.Document_Management.v5.retrieveDocument.commandRequest"
    } ],
    "billingAccount" : {
      "id" : "A0815",
      "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
      "name" : "BA Peter Retep",
      "@referredType" : "BillingAccount",
      "@type" : "BillingAccountRef",
      "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
    },
    "financialAccount" : {
      "id" : "FA12345",
      "href" : "http://host:port/tmf-
api/Account_Management/v5/financialAccount/FA12345",
      "name" : "FA Peter Retep",
      "@referredType" : "FinancialAccount",
      "@type" : "FinancialAccountRef",
      "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveFinancialAccount.commandRequest"

```

```

},
"category" : "normal",
"lastUpdate" : "2020-01-05T12:00:56.982Z",
"nextBillDate" : "2020-02-05T12:00:00.000Z",
"paymentDueDate" : "2020-01-15T00:00:00.000Z",
"remainingAmount" : {
  "unit" : "EUR",
  "value" : 50.0
},
"runType" : "onCycle",
"status" : "onHold",
"taxExcludedAmount" : {
  "unit" : "EUR",
  "value" : 40.0
},
"taxIncludedAmount" : {
  "unit" : "EUR",
  "value" : 50.0
},
"taxItem" : [ {
  "taxAmount" : {
    "unit" : "EUR",
    "value" : 10.0
  },
  "taxCategory" : "VAT",
  "taxRate" : 0.25,
  "@type" : "TaxItem"
} ],
"@type" : "CustomerBill",
"topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
}

```

## Update a Customer Bill using implied merge

This example uses the PatchCustomerBillJsonRequest request message (used for a payload of type application/json).

### Request message header

```

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandReply
Parameters: {
  "id": CB-123
}

```

### Request Payload

```
{
  "@type" : "CustomerBill",
  "state" : "onHold"
}
```

## Response Headers

X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169  
Status-Code: 200  
X-Request-Channel: {prefix}.customerBill.v5.patchCustomerBill.commandRequest

## Response Payload

```
{
  "id" : "CB-123",
  "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-123",
  "billNo" : "780123456",
  "amountDue" : {
    "unit" : "EUR",
    "value" : 0.0
  },
  "billCycle" : {
    "id" : "BC-1234",
    "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
    "@referredType" : "BillCycle",
    "@type" : "BillCycleRef",
    "topicRef" :
    "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
  },
  "billDate" : "2020-01-05T12:00:56.982Z",
  "billDocument" : [ {
    "id" : "DOC_1234",
    "href" : "http://server:port/tmf-api/Document_Management/v5/document/DOC_1234",
    "attachmentType" : "application/pdf",
    "content" : "bill",
    "description" : "regular monthly bill",
    "mimeType" : "application/pdf",
    "size" : 172851,
    "validfor" : {
      "startDateTime" : "2020-01-05T12:00:56.982Z",
      "endDateTime" : "9999-12-31T23:59:59.999Z"
    },
    "@type" : "Attachment",
    "topicRef" :
    "kafka://server/{prefix}.Document_Management.v5.retrieveDocument.commandRequest"
  } ],
}
```



```

"billingAccount" : {
  "id" : "A0815",
  "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
  "name" : "BA Peter Retep",
  "@REFERREDType" : "BillingAccount",
  "@type" : "BillingAccountRef",
  "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
},
"financialAccount" : {
  "id" : "FA12345",
  "href" : "http://host:port/tmf-
api/Account_Management/v5/financialAccount/FA12345",
  "name" : "FA Peter Retep",
  "@REFERREDType" : "FinancialAccount",
  "@type" : "FinancialAccountRef",
  "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveFinancialAccount.commandRequest"
},
"category" : "normal",
"lastUpdate" : "2020-01-05T12:00:56.982Z",
"nextBillDate" : "2020-02-05T12:00:00.000Z",
"paymentDueDate" : "2020-01-15T00:00:00.000Z",
"remainingAmount" : {
  "unit" : "EUR",
  "value" : 50.0
},
"runType" : "onCycle",
"status" : "onHold",
"taxExcludedAmount" : {
  "unit" : "EUR",
  "value" : 40.0
},
"taxIncludedAmount" : {
  "unit" : "EUR",
  "value" : 50.0
},
"taxItem" : [ {
  "taxAmount" : {
    "unit" : "EUR",
    "value" : 10.0
  },
  "taxCategory" : "VAT",
  "taxRate" : 0.25,
  "@type" : "TaxItem"
} ],
"@type" : "CustomerBill",
"topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"

```

```
}
```

## Operations on AppliedCustomerBillingRate

### Retrieves a AppliedCustomerBillingRate by ID

Request topic: {prefix}.customerBill.v5.retrieveAppliedCustomerBillingRate.commandRequest

Reply topic: {prefix}.customerBill.v5.retrieveAppliedCustomerBillingRate.commandReply

#### Description

This operation retrieves a AppliedCustomerBillingRate entity. Attribute selection is enabled for all first level attributes. Filtering may be available depending on the compliance level supported by an implementation.

#### Usage samples

##### Request message header

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel:
{prefix}.customerBill.v5.retrieveAppliedCustomerBillingRate.commandReply
Parameters: {
  "id": ACBR-123
}
```

##### Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel:
{prefix}.customerBill.v5.retrieveAppliedCustomerBillingRate.commandRequest
```

##### Response Payload

```
{
  "id" : "ACBR-123",
  "href" : "https://host:port/tmf-
api/Customer_Bill_Management/v5/appliedCustomerBillingRate/ACBR-123",
  "appliedBillingRateType" : "monthly",
  "date" : "2020-01-19T13:38:18.938Z",
  "isBilled" : true,
  "name" : "Rental Fee",
  "appliedTax" : [ {
    "taxCategory" : "VAT",
    "taxRate" : 20,
```

```

    "taxAmount" : {
      "unit" : "EUR",
      "value" : 100
    },
    "@type" : "AppliedBillingTaxRate"
  } ],
  "bill" : {
    "id" : "B123",
    "href" : "http://server:port/api/bill/v5/B123",
    "name" : "customer bill",
    "@referredType" : "CustomerBill",
    "@type" : "CustomerBillRef",
    "topicRef" : "kafka://broker-address/topic-name"
  },
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://server:port/api/billingAccount/v5/A0815",
    "name" : "BA Peter Retep",
    "@referredType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" : "kafka://broker-address/topic-name"
  },
  "characteristic" : [ {
    "name" : "message",
    "valueType" : "string",
    "@type" : "StringCharacteristic",
    "value" : "Special discount this[ month only"
  } ],
  "periodCoverage" : {
    "endDateTime" : "2019-12-31T23:59:59.999Z",
    "startDateTime" : "2019-12-01T00:00:00.000Z"
  },
  "product" : {
    "id" : "P-wfs-123",
    "href" : "http://server:port/api/product/v5/P-wfs-123",
    "name" : "CSPs wonderful fiber service",
    "@referredType" : "Product",
    "@type" : "ProductRef",
    "topicRef" : "kafka://broker-address/topic-name"
  },
  "taxExcludedAmount" : {
    "unit" : "EUR",
    "value" : 40.0
  },
  "taxIncludedAmount" : {
    "unit" : "EUR",
    "value" : 50.0
  },
  "@type" : "AppliedCustomerBillingRate",
  "topicRef" : "kafka://broker-address/topic-name"

```

```
}
```

## List or find AppliedCustomerBillingRate objects

Request topic: {prefix}.customerBill.v5.listAppliedCustomerBillingRate.commandRequest

Reply topic: {prefix}.customerBill.v5.listAppliedCustomerBillingRate.commandReply

### Description

This operation list AppliedCustomerBillingRate 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 is an example of a request for retrieving a list of AppliedCustomerBillingRates.

### Request Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.listAppliedCustomerBillingRate.commandReply
```

### Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel:
{prefix}.customerBill.v5.listAppliedCustomerBillingRate.commandRequest
```

### Response Payload

```
[ {
  "id" : "ACBR-123",
  "href" : "https://host:port/tmf-
api/Customer_Bill_Management/v5/appliedCustomerBillingRate/ACBR-123",
  "@type" : "AppliedCustomerBillingRate",
  "name" : "voice usage",
  "type" : "appliedCustomerBillingRate",
  "isBilled" : false,
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@REFERREDType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
```

```

},
"date" : "2019-12-07T13:02:34.123Z",
"description" : "voice usage.",
"product" : {
  "id" : "PROD-123",
  "href" : "http://host:port/tmf-api/product_Inventory/v5/product/PROD-123",
  "name" : "Voice service",
  "@REFERREDType" : "Product",
  "@type" : "ProductRef",
  "topicRef" :
"kafka://host/{prefix}.product_Inventory.v5.retrieveProduct.commandRequest"
},
"taxExcludedAmount" : {
  "unit" : "EUR",
  "value" : 0.04
},
"taxIncludedAmount" : {
  "unit" : "EUR",
  "value" : 0.05
},
"appliedTax" : [ {
  "taxCategory" : "VAT",
  "taxRate" : 0.2,
  "taxAmount" : {
    "unit" : "EUR",
    "value" : 0.01
  },
  "@type" : "AppliedTaxRate"
} ],
"topicRef" : "kafka://broker-address/topic-name"
}, {
  "id" : "ACBR-124",
  "href" : "https://host:port/tmf-
api/Customer_Bill_Management/v5/appliedCustomerBillingRate/ACBR-124",
  "@type" : "AppliedCustomerBillingRate",
  "name" : "voice usage",
  "type" : "appliedCustomerBillingRate",
  "isBilled" : true,
  "billingAccount" : {
    "id" : "A0815",
    "href" : "http://host:port/tmf-api/Account_Management/v5/billingAccount/A0815",
    "name" : "BA Peter Retep",
    "@REFERREDType" : "BillingAccount",
    "@type" : "BillingAccountRef",
    "topicRef" :
"kafka://host/{prefix}.Account_Management.v5.retrieveBillingAccount.commandRequest"
  },
  "customerBill" : {
    "id" : "CB-123",
    "href" : "https://server:port/tmf-api/Customer_Bill_Management/v5/customerBill/CB-
123",

```

```

    "@referredType" : "CustomerBill",
    "@type" : "CustomerBillRef",
    "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveCustomerBill.commandRequest"
  },
  "date" : "2019-11-29T17:02:34.123Z",
  "description" : "voice usage.",
  "product" : {
    "id" : "PROD-123",
    "href" : "http://host:port/tmf-api/product_Inventory/v5/product/PROD-123",
    "name" : "Voice service",
    "@referredType" : "Product",
    "@type" : "ProductRef",
    "topicRef" :
"kafka://host/{prefix}.product_Inventory.v5.retrieveProduct.commandRequest"
  },
  "taxExcludedAmount" : {
    "unit" : "EUR",
    "value" : 0.4
  },
  "taxIncludedAmount" : {
    "unit" : "EUR",
    "value" : 0.5
  },
  "appliedTax" : [ {
    "taxCategory" : "VAT",
    "taxRate" : 0.2,
    "taxAmount" : {
      "unit" : "EUR",
      "value" : 0.1
    },
    "@type" : "AppliedTaxRate"
  } ],
  "topicRef" : "kafka://broker-address/topic-name"
} ]

```

## Operations on BillCycle

### Retrieves a BillCycle by ID

Request topic: {prefix}.customerBill.v5.retrieveBillCycle.commandRequest

Reply topic: {prefix}.customerBill.v5.retrieveBillCycle.commandReply

### Description

This operation retrieves a BillCycle entity. Attribute selection is enabled for all first level attributes. Filtering may be available depending on the compliance level supported by an implementation.

## Usage samples

### Request message header

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.retrieveBillCycle.commandReply
Parameters: {
  "id": BC-1234
}
```

### Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel: {prefix}.customerBill.v5.retrieveBillCycle.commandRequest
```

### Response Payload

```
{
  "id" : "BC-1234",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234",
  "name" : "december regular bill run",
  "description" : "regular bill run",
  "billingDate" : "2020-01-22T12:00:56.982Z",
  "billingPeriod" : "2019-12",
  "chargeDate" : "2020-01-27T00:00:00.000Z",
  "creditDate" : "2020-01-31T23:59:59.999Z",
  "mailingDate" : "2020-01-23T00:00:00.000Z",
  "paymentDueDate" : "2020-02-03T23:59:59.999Z",
  "billCycleSpecification" : {
    "id" : "BCSPEC-M",
    "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billCycleSpecification/BCSPEC-M",
    "name" : "Regular Bill Cycle",
    "@referredType" : "BillCycleSpecification",
    "@type" : "BillCycleSpecificationRef",
    "topicRef" :
      "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillCycleSpecification.co
      mmandRequest"
  },
  "validFor" : {
    "endTime" : "2020-01-00T00:00:00.000Z",
    "startTime" : "2020-12-31T23:59:59.999Z"
  },
  "@type" : "BillCycle",
  "topicRef" :
    "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
```

```
}
```

## List or find BillCycle objects

Request topic: {prefix}.customerBill.v5.listBillCycle.commandRequest

Reply topic: {prefix}.customerBill.v5.listBillCycle.commandReply

### Description

This operation list BillCycle 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 is an example of a request for retrieving a list of BillCycles. Fields limited to id and billing date.

### Request Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Reply-Channel: {prefix}.customerBill.v5.listBillCycle.commandReply
```

### Request message header

```
{
  "Parameters": {
    "fields": "id, billingDate"
  }
}
```

### Response Headers

```
X-Correlation-Id: 4226B739-1DD2-4B43-A393-5E6F05CEF169
Status-Code: 200
X-Request-Channel: {prefix}.customerBill.v5.listBillCycle.commandRequest
```

### Response Payload

```
[ {
  "id" : "BC-12345",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-12345",
  "billingDate" : "2020-01-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
  "kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
```



```

}, {
  "id" : "BC-12346",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-12346",
  "billingDate" : "2020-02-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-12347",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-12347",
  "billingDate" : "2020-03-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-12348",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-12348",
  "billingDate" : "2020-04-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-12349",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-12349",
  "billingDate" : "2020-05-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-1234a",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234a",
  "billingDate" : "2020-06-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-1234b",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-1234b",
  "billingDate" : "2020-07-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-1234c",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-

```

```

1234c",
  "billingDate" : "2020-08-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-1234d",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-
1234d",
  "billingDate" : "2020-09-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-1234e",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-
1234e",
  "billingDate" : "2020-10-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-1234f",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-
1234f",
  "billingDate" : "2020-11-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
}, {
  "id" : "BC-12340",
  "href" : "http://server:port/tmf-api/Customer_Bill_Management/v5/billcycle/BC-
12340",
  "billingDate" : "2020-12-22T12:00:00.000Z",
  "@type" : "BillCycle",
  "topicRef" :
"kafka://server/{prefix}.Customer_Bill_Management.v5.retrieveBillcycle.commandRequest"
} ]

```

# NOTIFICATIONS

Topic for CustomerBill entity: {prefix}.customerBill.v5.customerBill.notificationEvent

Topic for CustomerBillOnDemand entity:

{prefix}.customerBill.v5.customerBillOnDemand.notificationEvent

For every single of operation on the entities use the following templates and provide sample notification message payloads.

It is assumed that consumers will subscribe to the notificationEvent channel to receive notifications, and that the server component will post notifications to that channel.

## Publish Event to listener

Here's an example of a notification received by the consumer. 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.

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

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

# Acknowledgements

## Release History

| Release Number                      | Date        | Release led by:  | Description  |
|-------------------------------------|-------------|--|--|
| Version 1.0.0                       | 15-Apr-2016 | Pierre Gauthier TM Forum<br><a href="mailto:pgauthier@tmforum.org">pgauthier@tmforum.org</a><br><br>Sophie Bouleau Orange<br><a href="mailto:sophie.bouleau@orange.com">sophie.bouleau@orange.com</a>  | Initial Document.<br><br>Generated from API Data Model.  |
| Version 2.0.0                       | 03-Mar-2017 | Pierre Gauthier TM Forum<br><a href="mailto:pgauthier@tmforum.org">pgauthier@tmforum.org</a><br><br>Sophie Bouleau Orange<br><a href="mailto:sophie.bouleau@orange.com">sophie.bouleau@orange.com</a>  | New version taking into account various remarks from tmforum members.<br><br>Generated from API Data Model and completed with use cases and samples.   |
| Version 2.0.1                       | 18-Sep-2017 | Pierre Gauthier TM Forum<br><a href="mailto:pgauthier@tmforum.org">pgauthier@tmforum.org</a><br><br>Sophie Bouleau Orange<br><a href="mailto:sophie.bouleau@orange.com">sophie.bouleau@orange.com</a><br><br>Jia Jiangtao Huawei<br><a href="mailto:jjajiangtao@huawei.com">jjajiangtao@huawei.com</a> | New version introducing the CustomerBillOnDemand resource and operations<br><br>In CustomerBill resource, PaymentItem is renamed in AppliedPayment and Document in Attachment (to be conform with Document Management API) |
| Release 17.5.0<br><br>Version 2.0.2 | 22-Jan-2018 | Adrienne Walcott   | <ul style="list-style-type: none"><li>• Formatting/style edits prior to publishing</li></ul>   |
| Version 4.0                         | 22-Jan-2020 | Lucius Gruber (Deutsche Telekom IT GmbH)<br><br><a href="mailto:l.gruber@telekom.de">l.gruber@telekom.de</a>   | Refactoring according to schemafication.<br><br>Introducing refactored resources for BillCycle & BillCycleSpec   |
| Version 5.0.0                       | March 2023  | Jonathan Goldberg<br><br>Amdocs<br><br><a href="mailto:Jonathan.Goldberg@amdocs.com">Jonathan.Goldberg@amdocs.com</a>  | Upgrade to V5 design patterns and OAS3, and removed BillCycleSpec in favor of existing BillCycleSpecification  |

## Contributors to Document

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