

# TM Forum Specification

## Customer Bill Management API User Guide

TMF678

Team Approved Date: 28-May-2020

Release Status: Pre-production	Approval Status: Team Approved
Version 4.0.0	IPR Mode: RAND

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Direct inquiries to the TM Forum office:

4 Century Drive, Suite 100  
Parsippany, NJ 07054, USA  
Tel No. +1 973 944 5100  
Fax No. +1 973 998 7196  
TM Forum Web Page: [www.tmforum.org](http://www.tmforum.org)

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N/A

## Introduction

The following document is the specification of the REST 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 a 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 a `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.

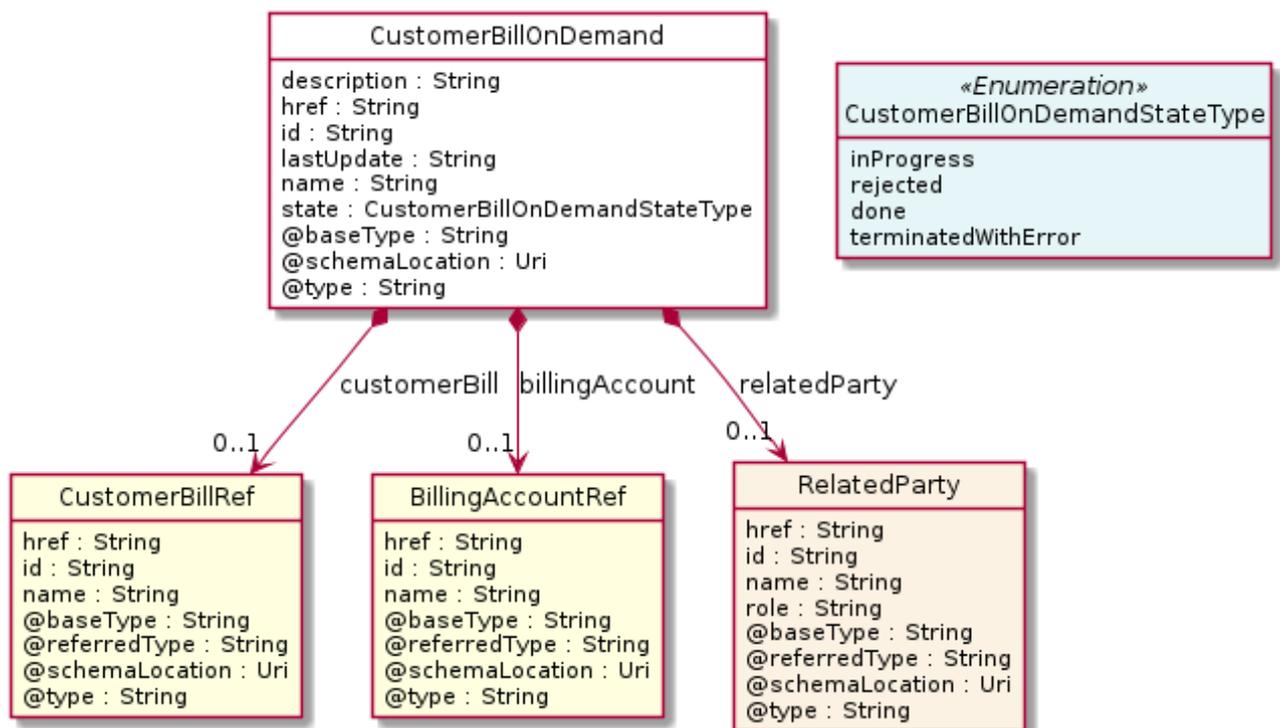
## RESOURCE MODEL

### Managed Entity and Task Resource Models

#### Customer Bill On Demand resource

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

#### Resource model



#### Field descriptions

##### CustomerBillOnDemand fields

billingAccount	A billing account reference (BillingAccountRef). A BillingAccount is a detailed description of a bill structure.
customerBill	A customer bill reference (CustomerBillRef). Bill reference.
description	A string. Additional data describing the customer bill on demand request.
href	A string. Reference of the customer bill on demand request.
id	A string. Explanation: Unique identifier of the customer bill on demand request given by the server.
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 related party (RelatedParty). Related Entity reference. A related party defines party or party role linked to a specific entity.
state	A customer bill on demand state type (CustomerBillOnDemandStateType). State of the request to produce an off cycle bill: Possible values are: inProgress, rejected, done, terminatedWithError.

### RelatedParty sub-resource

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

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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.
role	A string. Role played by the related party.

### BillingAccountRef relationship

BillingAccount reference. A BillingAccount is a detailed description of a bill structure.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the billing account.
id	A string. Unique identifier of the billing account.
name	A string. Name of the billing account.
ratingType	A string. Indicates whether the account follows a specific payment option such as prepaid or postpaid.

CustomerBillRef relationship

Bill reference.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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**

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

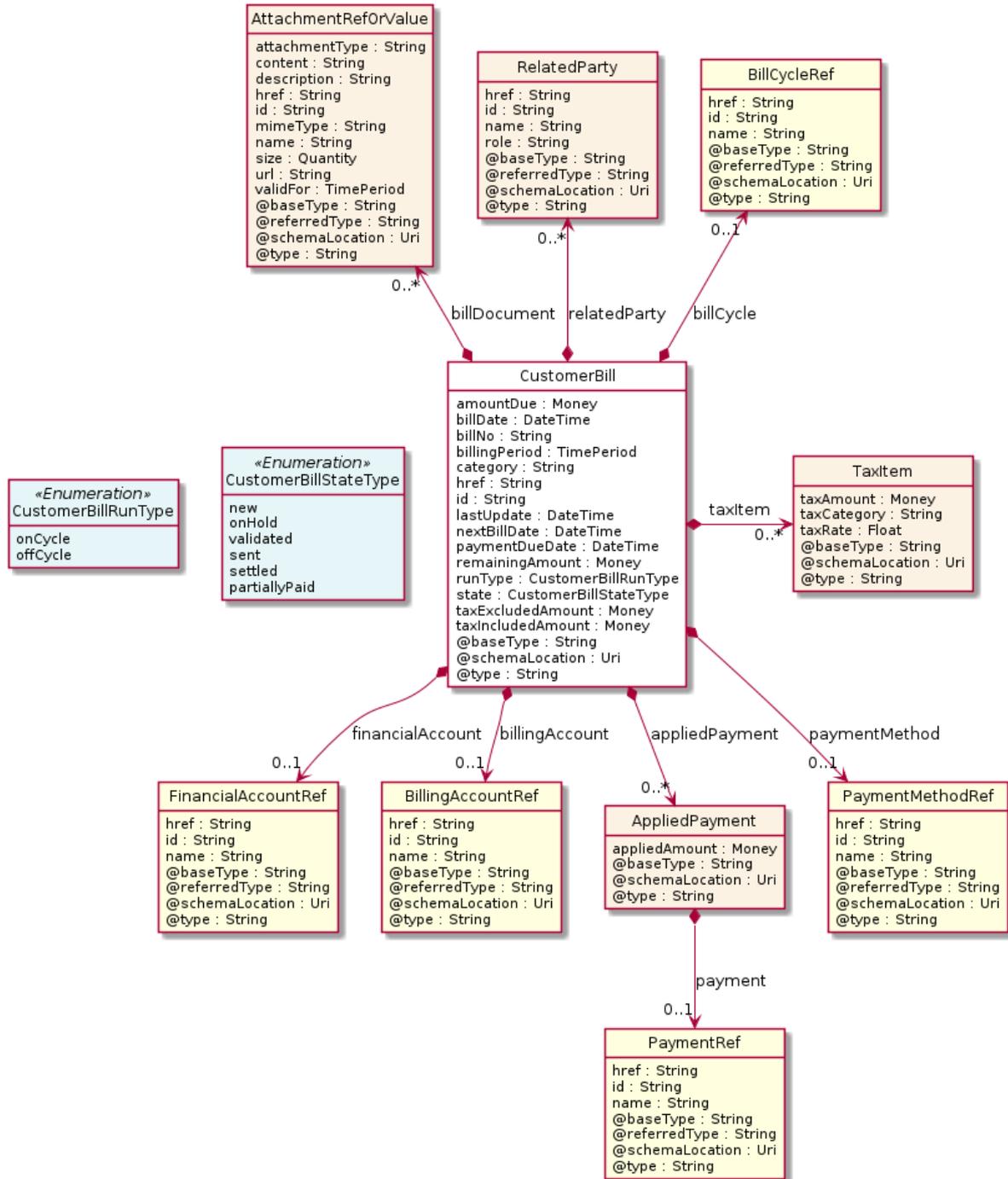
```
{
  "id": "D123",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/customerBillOnDemand/D123",
  "description": "Customer bill on demand",
  "lastUpdate": "2020-01-19T12:34:56.123Z",
  "name": "BillOnCustomerDemand",
  "billingAccount": {
    "id": "A0815",
    "href": "http://server:port/tmf-api/Account_Management/v4/billingAccount/A0815",
    "name": "BA Peter Retep",
    "@referredType": "BillingAccount",
    "@type": "BillingAccountRef",
    "@baseType": "BillingAccountRef",
    "@schemaLocation": "...some href..."
  },
  "customerBill": {},
  "relatedParty": {
    "id": "RP0815",
    "href": "http://server:port/tmf-api/Party_Management/v4/party/RP0815",
    "name": "Peter Retep",
    "role": "requester",
    "@referredType": "RelatedParty",
    "@type": "RelatedParty",
    "@baseType": "RelatedParty",
    "@schemaLocation": "...some href..."
  },
  "state": "InProgress",
  "@type": "CustomerBillOnDemand",
  "@baseType": "CustomerBillOnDemand",
  "@schemaLocation": "http://server:port/tmf-
```

```
api/Customer_Bill_Management/v4/schemas/customerBillOnDemand"
}
```

### Customer Bill resource

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

### Resource model



**Field descriptions**CustomerBill fields

amountDue	A money (Money). A base / value business entity used to represent money.
appliedPayment	A list of applied payments (AppliedPayment [*]). Applied payment is a payment associated with the bill. There may be a partial payment, then there should be several applied payments available. On the other hand, more than one bill could be payed by one payment. In general there is an n:m relation between payment and bill.
billCycle	A bill cycle reference (BillCycleRef). ....
billDate	A date time (DateTime). Bill date, external customer view (in consequence: different to the production date of the bill).
billDocument	A list of attachment ref or values (AttachmentRefOrValue [*]). An attachment by value or by reference. An attachment complements the description of an element, for example through a document, a video, a picture.
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 billing account reference (BillingAccountRef). A BillingAccount is a detailed description of a bill structure.
billingPeriod	A time period. 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 financial account reference (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. Bill unique reference.
id	A string. Explanation: Unique identifier of he bill.
lastUpdate	A date time (DateTime). Date of bill last update.
nextBillDate	A date time (DateTime). ). Approximate date of the next bill production given for information (only used/meaningful for on cycle / regular bills).

paymentDueDate	A date time (DateTime). Date at which the amount due should have been paid.
paymentMethod	A payment method reference (PaymentMethodRef). paymentMethod here is recognized to be not really necessary in a STANDARD. It could be obtained by a GET request on the billing account. Conclusion: paymentMethod is marked to DEPRECATED and will be removed in one of the next versions.
relatedParty	A list of related parties (RelatedParty [*]). Related Entity reference. A related party defines party or party role linked to a specific entity.
remainingAmount	A money (Money). A base / value business entity used to represent money.
runType	A customer bill run type (CustomerBillRunType). onCycle (a bill can be created as a result of a cycle run) or offCycle (a bill can be created as a result of other events such as customer request or account close).
state	A customer bill state type (CustomerBillStateType). Status of the bill.
taxExcludedAmount	A money (Money). A base / value business entity used to represent money.
taxIncludedAmount	A money (Money). A base / value business entity used to represent money.
taxItem	A list of tax items (TaxItem [*]). A tax item is created for each tax rate and tax type used in the bill.

#### AppliedPayment sub-resource

The applied payment is the result of lettering process. It enables to assign automatically or manually part of incoming payment amount to a bill.

appliedAmount	A money (Money). A base / value business entity used to represent money.
payment	A payment reference (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.

#### AttachmentRefOrValue sub-resource

An attachment by value or by reference. An attachment complements the description of an element, for example through a document, a video, a picture.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
description	A string. A narrative text describing the content of the attachment.

href	A string. URI for this Attachment.
id	A string. Unique identifier for this particular attachment.
url	A string. Uniform Resource Locator, is a web page address (a subset of URI).
name	A string. The name of the attachment.
@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.
attachmentType	A string. Attachment type such as video, picture.
content	A base 64 (Base64). The actual contents of the attachment object, if embedded, encoded as base64.
contentType	A string. Attachment mime type such as extension file for video, picture and document.
size	A quantity (Quantity). The size of the attachment.
validFor	A time period. The period of time for which the attachment is valid.

### Money sub-resource

A base / value business entity used to represent money.

unit	A string. Currency (ISO4217 norm uses 3 letters to define the currency).
value	A float. A positive floating point number.

### Quantity sub-resource

An amount in a given unit.

amount	A float. Numeric value in a given unit.
units	A string. Unit.

### RelatedParty sub-resource

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

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

name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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.
role	A string. Role played by the related party.

*TaxItem* sub-resource

A tax item is created for each tax rate and tax type used in the bill.

taxAmount	A money (Money). Amount of tax expressed in the given currency.
taxCategory	A string. Tax category.
taxRate	A float. Applied rate of the tax.

*BillCycleRef* relationship

....@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Unique reference of the account.
id	A string. Unique identifier of the account.
name	A string. Name of the account.

*BillingAccountRef* relationship

BillingAccount reference. A BillingAccount is a detailed description of a bill structure.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the billing account.
id	A string. Unique identifier of the billing account.
name	A string. Name of the billing account.
ratingType	A string. Indicates whether the account follows a specific payment option such as prepaid or postpaid.

FinancialAccountRef relationship

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.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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.

PaymentMethodRef relationship

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

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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.

PaymentRef relationship

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.

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

name	A string. A name for the payment.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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

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

```
{
  "id": "CB-123",
  "href": "https://server:port/tmf-api/Customer_Bill_Management/v4/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/v4/payment/PAY-9876",
        "name": "csp-bill",
        "@referredtype": "Payment",
        "@type": "PaymentRef",
        "@baseType": "PaymentRef",
        "@schemaLocation": "...some href..."
      },
      "@type": "AppliedPayment",
      "@baseType": "AppliedPayment",
      "@schemaLocation": "...some href..."
    }
  ],
  "billCycle": {
    "id": "BC-1234",
    "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234",
    "@referredType": "BillCycle",
    "@type": "BillCycleRef",
    "@baseType": "BillCycleRef",
    "@schemaLocation": "...some href..."
  },
  "billDate": "2020-01-05T12:00:56.982Z",
  "billDocument": [
```

```

{
  "id": "DOC_1234",
  "href": "http://server:port/tmf-api/Document_Management/v4/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"
  },
  "@referredType": "application/pdf",
  "@type": "AttachmentRefOrValue",
  "@baseType": "AttachmentRefOrValue",
  "@schemaLocation": "...some href..."
}
],
"billingAccount": {
  "id": "A0815",
  "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A0815",
  "name": "BA Peter Retep",
  "@referredType": "BillingAccount",
  "@type": "BillingAccountRef",
  "@baseType": "BillingAccountRef",
  "@schemaLocation": "...some href..."
},
"financialAccount": {
  "id": "FA12345",
  "href": "http://host:port/tmf-api/Account_Management/v4/financialAccount/FA12345",
  "name": "FA Peter Retep",
  "@referredType": "FinancialAccount",
  "@type": "FinancialAccountRef",
  "@baseType": "FinancialAccountRef",
  "@schemaLocation": "...some href..."
},
"billingPeriod": {},
"category": "normal",
"lastUpdate": "2020-01-05T12:00:56.982Z",
"nextBillDate": "2020-02-05T12:00:00.000Z",
"paymentDueDate": "2020-01-15T00:00:00.000Z",
"paymentMethod": {},
"relatedParty": [
  {}
],
"remainingAmount": {
  "unit": "EUR",
  "value": 0.0
},
"runType": "regular bill run",
"status": "settled",
"taxExcludedAmount": {
  "unit": "EUR",
  "value": 40.0
},
"taxIncludedAmount": {

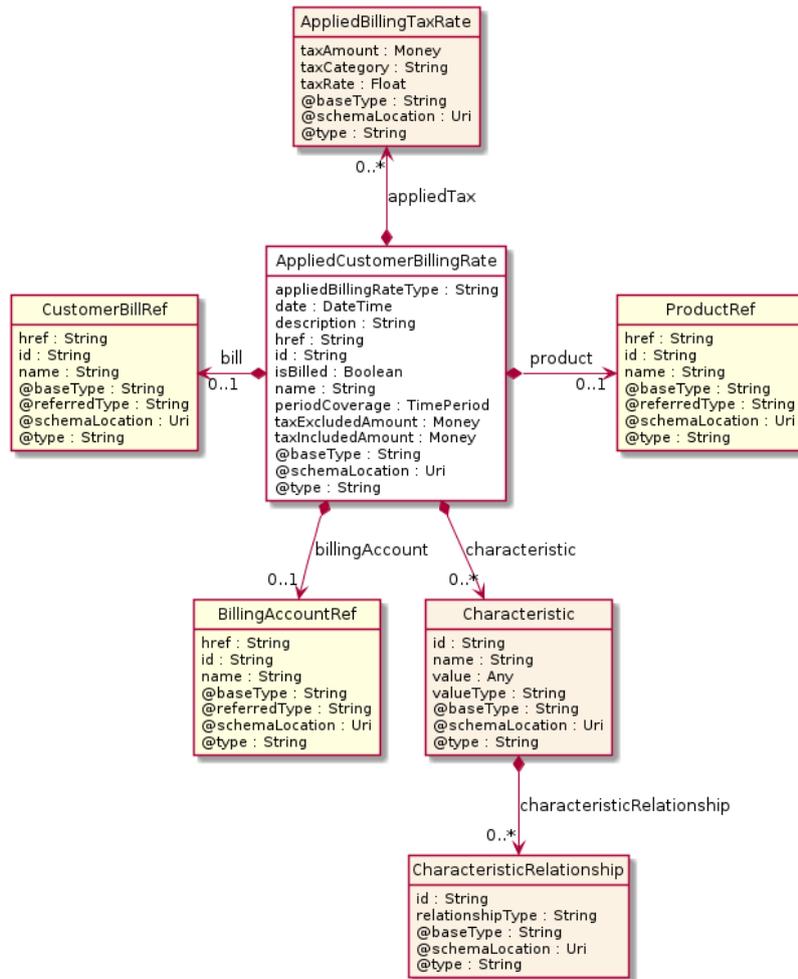
```

```
"unit": "EUR",
"value": 50.0
},
"taxItem": [
  {
    "taxAmount": {
      "unit": "EUR",
      "value": 10.0
    },
    "taxCategory": "VAT",
    "taxRate": 0.25,
    "@type": "TaxItem",
    "@baseType": "TaxItem",
    "@schemalocation": "...some uri..."
  }
],
"@type": "CustomerBill",
"@baseType": "CustomerBill",
"@schemalocation": "...some uri..."
}
```

### Applied Customer Billing Rate resource

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

### Resource model



## 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** A list of applied billing tax rates (AppliedBillingTaxRate [\*]). The applied billing tax rate represents taxes applied billing rate it refers to. It is calculated during the billing process.
- bill** A customer bill reference (CustomerBillRef). Bill reference.
- billingAccount** A billing account reference (BillingAccountRef). A BillingAccount is a detailed description of a bill structure.
- characteristic** A list of characteristics (Characteristic [\*]). Describes a given characteristic of an object or entity through a name/value pair.
- date** A date time (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. Explanation: Reference of the customer applied billing rate.
id	A string. Unique identifier of the customer applied billing rate.
isBilled	A boolean. 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 time period. periodCoverage for RecurringCharge (RC) indicating the RC coverage period dates for different purposes, such as RC proration, display on bill, GL reporting, etc. periodCoverage for OC start and end date will be the same.
product	A product reference (ProductRef). Usually this information should be provided by the PRODUCT, which implies that there is a valid reference to product. In this case, this property should be empty. For all other situations, a text or structured info could be provided using this property. Regular modelling would suggest to use the refovalue pattern for this case. It is not chosen here because it would generate declarational dependencies which would be hard to maintain.
taxExcludedAmount	A money (Money). A base / value business entity used to represent money.
taxIncludedAmount	A money (Money). A base / value business entity used to represent money.

#### AppliedBillingTaxRate sub-resource

The applied billing tax rate represents taxes applied billing rate it refers to. It is calculated during the billing process.

taxAmount	A money (Money). Tax amount expressed in the given currency.
taxCategory	A string. A categorization of the tax rate.
taxRate	A float. Applied rate.

#### Characteristic sub-resource

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

@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	A list of characteristic relationships (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.
value	An any (Any). The value of the characteristic.
valueType	A string. Data type of the value of the characteristic.

#### CharacteristicRelationship sub-resource

Another Characteristic that is related to the current Characteristic;.

id	A string. Unique identifier of the characteristic.
relationshipType	A string. The type of relationship.

#### Money sub-resource

A base / value business entity used to represent money.

unit	A string. Currency (ISO4217 norm uses 3 letters to define the currency).
value	A float. A positive floating point number.

#### BillingAccountRef relationship

BillingAccount reference. A BillingAccount is a detailed description of a bill structure.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Reference of the billing account.
id	A string. Unique identifier of the billing account.
name	A string. Name of the billing account.
ratingType	A string. Indicates whether the account follows a specific payment option such as prepaid or postpaid.

#### CustomerBillRef relationship

Bill reference.

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

name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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.

### ProductRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. Hyperlink reference.
id	A string. unique identifier.
@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

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

```
{
  "id": "ABR123",
  "href": "http://server:port/api/appliedCustomerBillingRate/v4.0/ABR123",
  "appliedBillingRateType": "monthly",
  "date": "2020-01-19T13:38:18.938Z",
  "description": "...some description...",
  "isBilled": true,
  "name": "...some meaningful name (maybe coming from catalogue?)...",
  "appliedTax": [
    {
      "taxCategory": "VAT",
      "taxRate": 20,
      "taxAmount": {
        "unit": "EUR",
        "value": 10.0
      }
    }
  ]
}
```

```

    },
    "@type": "AppliedBillingTaxRate",
    "@baseType": "AppliedBillingTaxRate",
    "@schemaLocation": "...href..."
  }
},
"bill": {
  "id": "B123",
  "href": "http://server:port/api/bill/v4.0/B123",
  "name": "customer bill",
  "@referredType": "CustomerBill",
  "@type": "CustomerBillRef",
  "@baseType": "CustomerBillRef",
  "@schemaLocation": "...href..."
},
"billingAccount": {
  "id": "A0815",
  "href": "http://server:port/api/billingAccount/v4.0/A0815",
  "name": "BA Peter Retep",
  "@referredType": "BillingAccount",
  "@type": "BillingAccountRef",
  "@baseType": "BillingAccountRef",
  "@schemaLocation": "...href..."
},
"characteristic": [
  {
    "id": "string",
    "name": "string",
    "valueType": "string",
    "characteristicRelationship": [
      {
        "id": "string",
        "relationshipType": "string",
        "@type": "CharacteristicRelationship",
        "@baseType": "CharacteristicRelationship",
        "@schemaLocation": "...href..."
      }
    ]
  },
  "@type": "Characteristic",
  "@baseType": "Characteristic",
  "@schemaLocation": "...href..."
}
],
"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/v4.0/P-wfs-123",
  "name": "CSPs wonderful fiber service",
  "@referredType": "Product",
  "@type": "ProductRef",
  "@baseType": "ProductRef",
  "@schemaLocation": "...href..."
},
"taxExcludedAmount": {

```

```

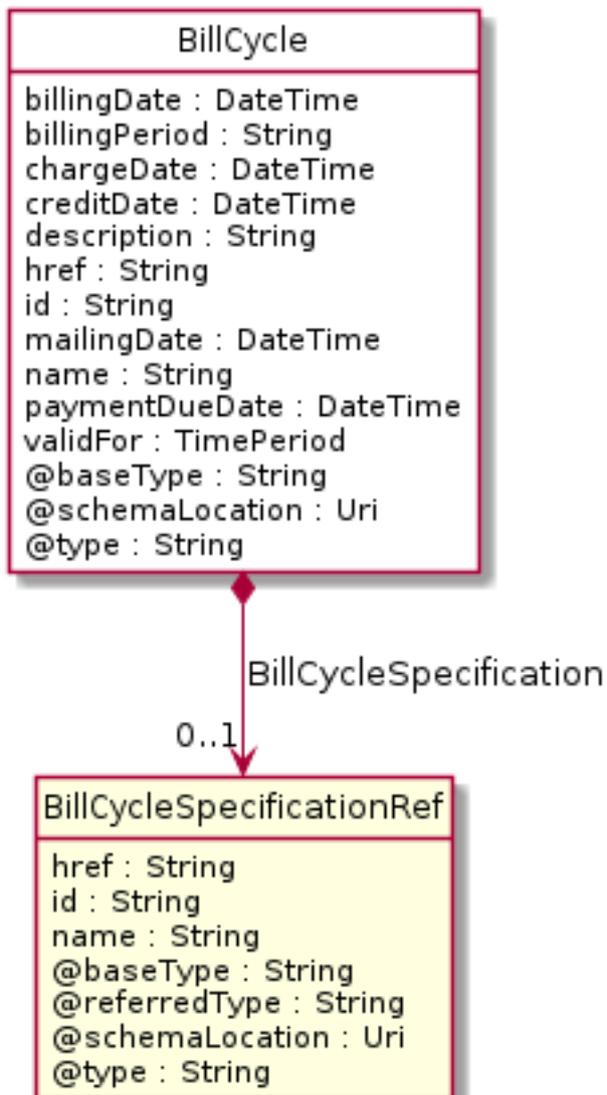
    "unit": "EUR",
    "value": 40.0
  },
  "taxIncludedAmount": {
    "unit": "EUR",
    "value": 50.0
  },
  "@type": "AppliedCustomerBillingRate",
  "@baseType": "AppliedCustomerBillingRate",
  "@schemaLocation": "...href..."
}

```

## Bill Cycle resource

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

### Resource model



**Field descriptions**BillCycle fields

BillCycleSpecification	A bill cycle specification reference (BillCycleSpecificationRef). ....
billingDate	A date time (DateTime). The billing/settlement date.
billingPeriod	A string. A billing time period. It is e.g. the concrete expressed month. Example: 'March'.
chargeDate	A date time (DateTime). Date through when a payment method (e.g. credit card,...) will be activated.
creditDate	A date time (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. Reference of the billing cycle.
id	A string. Unique identifier of the billing cycle.
mailingDate	A date time (DateTime). Customer bill mailing date.
name	A string. A short descriptive name of the actual billing cycle.
paymentDueDate	A date time (DateTime). Date, when the payment is due.
validFor	A time period. The period for which the billing cycle is valid (expressed in a formal formatted way).

BillCycleSpecificationRef relationship

....

@referredType	A string. The actual type of the target instance when needed for disambiguation.
href	A string. Unique reference of the BillCycleSpecification.
id	A string. Unique identifier of the BillCycleSpecification.
name	A string. Name of the BillCycleSpecification.

**Json representation sample**

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

```
{
  "id": "BC-1234",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/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/v4/billCycleSpecification/BCSPEC-M",
  "name": "Regular Bill Cycle",
  "@referredType": "billCycleSpecification",
  "@baseType": "billCycleSpecificationRef",
  "@type": "billCycleSpecificationRef",
  "@schemaLocation": "...some uri..."
},
"validFor": {
  "endDateTime": "2020-01-00T00:00:00.000Z",
  "startDateTime": "2020-12-31T23:59:59.999Z"
},
"@baseType": "BillCycle",
"@type": "BillCycle",
"@schemaLocation": "...some uri..."
}

```

### Bill Cycle Specification resource

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

#### Resource model

BillCycleSpecification
billingDateShift : Integer
billingPeriod : String
chargeDateOffset : Integer
creditDateOffset : Integer
description : String
frequency : String
href : String
id : String
mailingDateOffset : Integer
name : String
paymentDueDateOffset : Integer
validFor : TimePeriod
@baseType : String
@schemaLocation : Uri
@type : String

## Field descriptions

### BillCycleSpecification fields

billingDateShift	An integer. An offset of a billing/settlement date. The offset is expressed as number of days with regard to the start of the billing/settlement period.
billingPeriod	A string. A billing time period. It can be recurring, for example: week, month, quarter of year, year .
chargeDateOffset	An integer. An offset of a date through which charges previously received by the billing system will appear on the bill. The offset is expressed as number of days with regard to the start of the BillingPeriod.
creditDateOffset	An integer. An offset of a date through which credits previously received by the billing system will appear on the bill. The offset is expressed as number of days with regard to the start of the BillingPeriod.
description	A string. An explanation regarding this billing cycle. If necessary.
frequency	A string. Frequency of the billing cycle (monthly for instance).
href	A string. Reference of the billing cycle.
id	A string. Unique identifier of the billing cycle.
mailingDateOffset	An integer. An offset of a customer bill mailing date. The offset is expressed as number of days with regard to the start of the BillingPeriod.
name	A string. A short descriptive name of the actual billing cycle.
paymentDueDateOffset	An integer. An offset of a payment due date. The offset is expressed as number of days with regard to the start of the BillingPeriod.
validFor	A time period. The period for which the billing cycle is valid, expressed in a formatted structured way.

## Json representation sample

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

```
{
  "id": "BCSPEC-M",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billCycleSpecification/BCSPEC-M",
  "name": "regular on cycle bill specification",
  "billingDateShift": 0,
  "billingPeriod": "monthly",
  "chargeDateOffset": 5,
```

```
"creditDateOffset": 14,  
"description": "Regular monthly bill cycle specification.",  
"frequency": "a string ...",  
"mailingDateOffset": 1,  
"paymentDueDateOffset": 6,  
"validFor": {}  
}
```

Lore ipsum

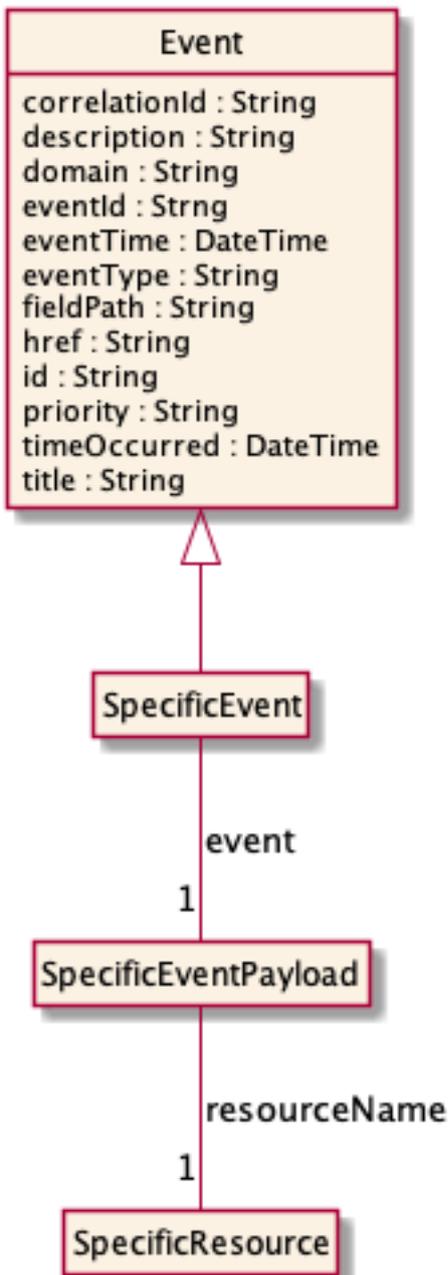
## Notification Resource Models

0 notifications are defined for this API

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).



## API OPERATIONS

Document only allowed following operation:

Operation on Entities	Uniform API Operation	Description
Query Entities	GET CustomerBill	GET must be used to retrieve a representation of a resource.
Partial Update of an Entity	PATCH CustomerBill	PATCH must be used to partially update a resource
Execute an Action on an Entity	POST on TASK cancelProductOrder	POST must be used to execute Task Resources (cancel an order)
Other Request Methods	POST on TASK Resource	GET and POST must not be used to tunnel other request methods.

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

Notifications are also described in a subsequent section.

### Operations on Customer Bill On Demand

#### List customer bill on demands

**GET** /customerBillOnDemand?fields=...&{filtering}

#### Description

This operation list customer bill on demand entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of an request for retrieving a list of BillCycleSpecification (Extra use case).

Request
GET /tmf-api/customerBillManagement/v4/customerBillOnDemand?fields=id,href,billingAccount Accept: application/json
Response
200  <pre>[   {     "id": "D123",     "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/customerBillOnDemand/D123",     "billingAccount": {       "id": "A0815",       "href": "http://server:port/tmf-api/Account_Management/v4/billingAccount/A0815",       "name": "BA Peter Retep",       "@referredType": "BillingAccount",       "@type": "BillingAccoutRef",       "@baseType": "BillingAccoutRef",       "@schemaLocation": "...some href..."     },     "@type": "CustomerBillOnDemand",     "@baseType": "CustomerBillOnDemand",     "@schemaLocation": "...some href..."   },   {     "id": "D12345",     "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/customerBillOnDemand/D12345",     "billingAccount": {       "id": "A4712",       "href": "http://server:port/tmf-api/Account_Management/v4/billingAccount/A4712",       "name": "BA Claire Erialc",       "@referredType": "BillingAccount",       "@type": "BillingAccoutRef",       "@baseType": "BillingAccoutRef",       "@schemaLocation": "...some href..."     },     "@type": "CustomerBillOnDemand",     "@baseType": "CustomerBillOnDemand",     "@schemaLocation": "...some href..."   } ]</pre>

**Retrieve customer bill on demand****GET**

**/customerBillOnDemand/{id}?fields=...&{filtering}**

**Description**

This operation retrieves a customer bill on demand entity.

Attribute selection is enabled for all first level attributes.

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

**Usage Samples**

Here's an example of an request for retrieving a single BillCycle (Extra use case).

<b>Request</b>
GET /tmf-api/customerBillManagement/v4/customerBillOnDemand/D123?fields=id,href,billingAccount Accept: application/json
<b>Response</b>
200  <pre>{   "id": "D123",   "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/customerBillOnDemand/D123",   "billingAccount": {     "id": "A0815",     "href": "http://server:port/tmf-api/Account_Management/v4/billingAccount/A0815",     "name": "BA Peter Retep",     "@referredType": "BillingAccount",     "@type": "BillingAccoutRef",     "@baseType": "BillingAccoutRef",     "@schemaLocation": "...some href..."   },   "@type": "CustomerBillOnDemand",   "@baseType": "CustomerBillOnDemand",   "@schemaLocation": "...some href..." }</pre>

**Create customer bill on demand****POST /customerBillOnDemand****Description**

This operation creates a customer bill on demand entity.

**Mandatory and Non Mandatory Attributes**

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

Mandatory Attributes	Rule
----------------------	------

Non Mandatory Attributes	Rule
billingAccount	
customerBill	
description	
lastUpdate	
name	
relatedParty	
state	

**Usage Samples**

Here's an example of an request for the creation of a customer bill on demand (Use case 2).

Request
POST /tmf-api/customerBillManagement/v4/customerBillOnDemand Content-Type: application/json  <pre>{   "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/v4/billingAccount/A0815",     "name": "BA Peter Retep",     "@referredType": "billingAccount"   },   "customerBill": {},   "relatedParty": {     "id": "RP0815",     "href": "http://server:port/tmf-api/Party_Management/v4/party/RP0815",     "name": "Peter Retep",     "role": "requester",     "@referredType": "relatedParty"   } }</pre>

```

"state": "InProgress",
"@baseType": "customerBillOnDemand",
"@schemaLocation": "http://server:port/tmf-
api/Customer_Bill_Management/v4/schemas/customerBillOnDemand",
"@type": "customerBillOnDemand"
}

```

## Response

201

```

{
  "id": "D123",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/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/v4/billingAccount/A0815",
    "name": "BA Peter Retep",
    "@referredType": "BillingAccount",
    "@type": "BillingAccountRef",
    "@baseType": "BillingAccountRef",
    "@schemaLocation": "...some href..."
  },
  "customerBill": {},
  "relatedParty": {
    "id": "RP0815",
    "href": "http://server:port/tmf-api/Party_Management/v4/party/RP0815",
    "name": "Peter Retep",
    "role": "requester",
    "@referredType": "RelatedParty",
    "@type": "RelatedParty",
    "@baseType": "RelatedParty",
    "@schemaLocation": "...some href..."
  },
  "@type": "customerBillOnDemand",
  "@baseType": "customerBillOnDemand",
  "@schemaLocation": "http://server:port/tmf-
api/Customer_Bill_Management/v4/schemas/customerBillOnDemand"
}

```

## Operations on Customer Bill

### List customer bills

**GET** /customerBill?fields=...&{filtering}

## Description

This operation list customer bill entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of an request for retrieving a list of CustomerBills (Use Case 1).

Request
GET /tmf-api/customerBillManagement/v4/customerBill?fields=id, href, billingAccount Accept: application/json
Response
200  <pre>[   {     "id": "CB-123",     "href": "https://server:port/tmf-api/Customer_Bill_Management/v4/customerBill/CB-123",     "billingAccount": {       "id": "A0815",       "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A0815",       "name": "BA Peter Retep",       "@referredType": "billingAccount",       "@type": "billingAccountRef",       "@baseType": "billingAccountRef",       "@schemaLocation": "...some href..."     }   },   {     "id": "CB-456",     "href": "https://server:port/tmf-api/Customer_Bill_Management/v4/customerBill/CB-456",     "billingAccount": {       "id": "A4712",       "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A4712",       "name": "BA Claire Erialc",       "@referredType": "billingAccount",       "@type": "billingAccountRef",       "@baseType": "billingAccountRef",       "@schemaLocation": "...some href..."     }   } ]</pre>

## Retrieve customer bill

**GET** /customerBill/{id}?fields=...&{filtering}

### Description

This operation retrieves a customer bill entity.

Attribute selection is enabled for all first level attributes.

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

### Usage Samples

Here's an example of an request for retrieving a single customer bill (See Use Case 1). The customer bill id is set to CB-123.

Request
<pre>GET /tmf-api/customerBillManagement/v4/customerBill/CB-123?fields=id, href, billingAccount,taxIncludedAmount Accept: application/json</pre>
Response
<pre>200  {   "id": "CB-123",   "href": "https://server:port/tmf-api/Customer_Bill_Management/v4/customerBill/CB-123",   "billingAccount": {     "id": "A0815",     "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A0815",     "name": "BA Peter Retep",     "@referredType": "billingAccount",     "@type": "CustomerBill",     "@baseType": "CustomerBill",     "@schemaLocation": "...some href..."   },   "taxIncludedAmount": {     "unit": "EUR",     "value": 50.0   },   "@type": "CustomerBill",   "@baseType": "CustomerBill",   "@schemaLocation": "...some href..." }</pre>

## Patch customer bill

**PATCH /customerBill/{id}****Description**

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

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

**Patchable and Non Patchable Attributes**

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

Patchable Attributes	Rule
billCycle	
state	

Non Patchable Attributes	Rule
amountDue	
appliedPayment	
billDate	
billDocument	
billNo	
billingAccount	
billingPeriod	
category	
financialAccount	
href	
id	
lastUpdate	
nextBillDate	
paymentDueDate	
paymentMethod	
relatedParty	
remainingAmount	
runType	
taxExcludedAmount	
taxIncludedAmount	
taxItem	

## Usage Samples

Here's an example of an request for updating a customer bill (see case 2) using json-patch.

Request
PATCH /tmf-api/customerBillManagement/v4/customerBill/CB-123 Content-Type: application/json-patch+json  <pre>[   {     "op": "replace",     "path": "/state",     "value": "onHold"   } ]</pre>
Response
200  <pre>{   "id": "CB-123",   "href": "https://server:port/tmf-api/Customer_Bill_Management/v4/customerBill/CB-123",   "billNo": "780123456",   "amountDue": {     "unit": "EUR",     "value": 0.0   },   "appliedPayment": [     {}   ],   "billCycle": {     "id": "BC-1234",     "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234",     "@referredType": "BillCycle",     "@type": "BillCycleRef",     "@baseType": "BillCycleRef",     "@schemaLocation": "...some href..."   },   "billDate": "2020-01-05T12:00:56.982Z",   "billDocument": [     {       "id": "DOC_1234",       "href": "http://server:port/tmf-api/Document_Management/v4/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", </pre>

```

        "endDateTime": "9999-12-31T23:59:59.999Z"
    },
    "@referredType": "application/pdf",
    "@type": "AttachmentRefOrValue",
    "@baseType": "AttachmentRefOrValue",
    "@schemaLocation": "...some href..."
}
],
"billingAccount": {
    "id": "A0815",
    "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A0815",
    "name": "BA Peter Retep",
    "@referredType": "BillingAccount",
    "@type": "BillingAccountRef",
    "@baseType": "BillingAccountRef",
    "@schemaLocation": "...some href..."
},
"financialAccount": {
    "id": "FA12345",
    "href": "http://host:port/tmf-api/Account_Management/v4/financialAccount/FA12345",
    "name": "FA Peter Retep",
    "@referredType": "FinancialAccount",
    "@type": "FinancialAccountRef",
    "@baseType": "FinancialAccountRef",
    "@schemaLocation": "...some href..."
},
"billingPeriod": {},
"category": "normal",
"lastUpdate": "2020-01-05T12:00:56.982Z",
"nextBillDate": "2020-02-05T12:00:00.000Z",
"paymentDueDate": "2020-01-15T00:00:00.000Z",
"paymentMethod": {},
"relatedParty": [
    {}
],
"remainingAmount": {
    "unit": "EUR",
    "value": 50.0
},
"runType": "regular bill run",
"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",
    "@baseType": "TaxItem",
    "@schemalocation": "...some uri..."
  }
],
"@type": "CustomerBill",
"@baseType": "CustomerBill",
"@schemalocation": "...some uri..."
}

```

## Operations on Applied Customer Billing Rate

### List applied customer billing rates

#### GET

`/appliedCustomerBillingRate?fields=...&{filtering}`

#### Description

This operation list applied customer billing rate entities.

Attribute selection is enabled for all first level attributes.

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

#### Usage Samples

Here's an example of an request for retrieving a list of AppliedCustomerBillingRates (Extra use case).

Request
GET /tmf-api/customerBillManagement/v4/appliedCustomerBillingRate Accept: application/json
Response
200  <pre> [   {     "id": "ACBR-123",     "href": "https://host:port/tmf-api/Customer_Bill_Management/v4/appliedCustomerBillingRate/ACBR-123",     "name": "voice usage",     "type": "appliedCustomerBillingRate",     "isBilled": false,     "billingAccount": {       "id": "A0815", </pre>

```

    "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A0815",
    "name": "BA Peter Retep",
    "@referredType": "billingAccount",
    "@type": "billingAccountRef",
    "@baseType": "billingAccountRef",
    "@schemaLocation": "...some href..."
  },
  "characteristic": [
    {}
  ],
  "customerBill": {},
  "date": "2019-12-07T13:02:34.123",
  "description": "voice usage.",
  "periodCoverage": {},
  "product": {
    "id": "PROD-123",
    "href": "http://host:port/tmf-api/product_Inventory/v4/product/PROD-123",
    "name": "Voice service",
    "@referredType": "Product",
    "@type": "productRef",
    "@baseType": "productRef",
    "@schemaLocation": "...some href..."
  },
  "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",
      "@baseType": "AppliedTaxRate",
      "@schemaLocation": "...some href..."
    }
  ]
},
{
  "id": "ACBR-124",
  "href": "https://host:port/tmf-api/Customer_Bill_Management/v4/appliedCustomerBillingRate/ACBR-124",
  "name": "voice usage",
  "type": "appliedCustomerBillingRate",
  "isBilled": true,
  "billingAccount": {
    "id": "A0815",
    "href": "http://host:port/tmf-api/Account_Management/v4/billingAccount/A0815",
    "name": "BA Peter Retep",
    "@referredType": "billingAccount",

```

```
    "@type": "billingAccountRef",
    "@baseType": "billingAccountRef",
    "@schemaLocation": "...some href..."
  },
  "characteristic": [
    {}
  ],
  "customerBill": {
    "id": "CB-123",
    "href": "https://server:port/tmf-api/Customer_Bill_Management/v4/customerBill/CB-123",
    "@referredType": "CustomerBill",
    "@type": "CustomerBillRef",
    "@baseType": "CustomerBillRef",
    "@schemaLocation": "...some href..."
  },
  "date": "2019-11-29T17:02:34.123",
  "description": "voice usage.",
  "periodCoverage": {},
  "product": {
    "id": "PROD-123",
    "href": "http://host:port/tmf-api/product_Inventory/v4/product/PROD-123",
    "name": "Voice service",
    "@referredType": "Product",
    "@type": "ProductRef",
    "@baseType": "ProductRef",
    "@schemaLocation": "...some href..."
  },
  "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",
      "@baseType": "AppliedTaxRate",
      "@schemaLocation": "...some href..."
    }
  ]
}
```

**Retrieve applied customer billing rate****GET**

```
/appliedCustomerBillingRate/{id}?fields=...&{filtering}
```

**Description**

This operation retrieves an applied customer billing rate entity.

Attribute selection is enabled for all first level attributes.

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

**Usage Samples**

Here's an example of an request for retrieving a single AppliedCustomerBillingRates (Extra use case). The customer bill id is set to ACBR-123.

<b>Request</b>
<pre>GET /tmf-api/customerBillManagement/v4/appliedCustomerBillingRate/ACBR-123?fields=id, taxIncludedAmount Accept: application/json</pre>
<b>Response</b>
<pre>200  {   "id": "ACBR-123",   "href": "https://host:port/tmf-api/Customer_Bill_Management/v4/appliedCustomerBillingRate/ACBR-123",   "taxIncludedAmount": {     "unit": "EUR",     "value": 0.05   },   "@type": "AppliedCustomerBillingRate" }</pre>

**Operations on Bill Cycle****List bill cycles**

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

## Description

This operation list bill cycle entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of an request for retrieving a list of BillCycles (Extra use case).

Request
GET /tmf-api/customerBillManagement/v4/billCycle?fields=id, billingDate Accept: application/json
Response
200  [ { "id": "BC-12345", "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-12345", "billingDate": "2020-01-22T12:00:00.000Z", "@type": "BillCycle" }, { "id": "BC-12346", "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-12346", "billingDate": "2020-02-22T12:00:00.000Z", "@type": "BillCycle" }, { "id": "BC-12347", "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-12347", "billingDate": "2020-03-22T12:00:00.000Z", "@type": "BillCycle" }, { "id": "BC-12348", "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-12348", "billingDate": "2020-04-22T12:00:00.000Z", "@type": "BillCycle" }, { "id": "BC-12349", "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-12349", "billingDate": "2020-05-22T12:00:00.000Z", "@type": "BillCycle" }, ]

```
{
  "id": "BC-1234a",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234a",
  "billingDate": "2020-06-22T12:00:00.000Z",
  "@type": "BillCycle"
},
{
  "id": "BC-1234b",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234b",
  "billingDate": "2020-07-22T12:00:00.000Z",
  "@type": "BillCycle"
},
{
  "id": "BC-1234c",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234c",
  "billingDate": "2020-08-22T12:00:00.000Z",
  "@type": "BillCycle"
},
{
  "id": "BC-1234d",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234d",
  "billingDate": "2020-09-22T12:00:00.000Z",
  "@type": "BillCycle"
},
{
  "id": "BC-1234e",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234e",
  "billingDate": "2020-10-22T12:00:00.000Z",
  "@type": "BillCycle"
},
{
  "id": "BC-1234f",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234f",
  "billingDate": "2020-11-22T12:00:00.000Z",
  "@type": "BillCycle"
},
{
  "id": "BC-12340",
  "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-12340",
  "billingDate": "2020-12-22T12:00:00.000Z",
  "@type": "BillCycle"
}
]
```

## Retrieve bill cycle

**GET** /billCycle/{id}?fields=...&{filtering}

### Description

This operation retrieves a bill cycle entity.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of an request for retrieving a single BillCycle (Extra use case).

<b>Request</b>
GET /tmf-api/customerBillManagement/v4/billCycle/BC-1234?fields=id, billingDate Accept: application/json
<b>Response</b>
200  { "id": "BC-1234", "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BC-1234", "billingDate": "2020-01-22T12:00:56.982Z", "@type": "BillCycle" }

## Operations on Bill Cycle Specification

### List bill cycle specifications

**GET /billCycleSpecification?fields=...&{filtering}**

#### Description

This operation list bill cycle specification entities.

Attribute selection is enabled for all first level attributes.

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

#### Usage Samples

Here's an example of an request for retrieving a list of BillCycleSpecification (Extra use case).

<b>Request</b>
GET /tmf-api/customerBillManagement/v4/billCycleSpecification?fields=id, href Accept: application/json
<b>Response</b>

```

200

[
  {
    "id": "BCSPEC-M",
    "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BCSPEC-M",
    "@type": "BillCycleSecification"
  },
  {
    "id": "BCSPEC-M2",
    "href": "http://server:port/tmf-api/Customer_Bill_Management/v4/billcycle/BCSPEC-M2",
    "@type": "BillCycleSecification"
  }
]

```

## Retrieve bill cycle specification

### GET

`/billCycleSpecification/{id}?fields=...&{filtering}`

### Description

This operation retrieves a bill cycle specification entity. Attribute selection is enabled for all first level attributes. Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

### Usage Samples

Here's an example of an request for retrieving a single BillCycle (Extra use case).

Request
GET /tmf-api/customerBillManagement/v4/billCycleSpecification/BCSPEC-M2?fields=id, billingDateShift Accept: application/json
Response
200  <pre> {   "id": "BCSPEC-M2",   "billingDateShift": 5,   "@type": "BillCycleSecification" } </pre>

## API NOTIFICATIONS

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

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

### Register listener

#### POST /hub

#### Description

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

#### Behavior

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

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

#### Usage Samples

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

Request
POST /api/hub Accept: application/json  {"callback": "http://in.listener.com"}
Response
201 Content-Type: application/json Location: /api/hub/42  {"id": "42", "callback": "http://in.listener.com", "query": null}

## Unregister listener

**DELETE** /hub/{id}

### Description

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

### Behavior

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

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

### Usage Samples

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

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

## Publish Event to listener

**POST** /client/listener

### Description

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

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

### Behavior

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

### Usage Samples

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

<b>Request</b>
----------------

POST /client/listener Accept: application/json  { "event": { EVENT BODY }, "eventType": "EVENT_TYPE" }
<b>Response</b>
201

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

## Acknowledgements

### Version History

Release Number	Date	Release led by:	Description
Version 1.0.0	15-Apr-2016	Pierre Gauthier TM Forum pgauthier@tmforum.org  Sophie Bouleau Orange sophie.bouleau@orange.com	Initial Document.  Generated from API Data Model.
Version 2.0.0	03-Mar-2017	Pierre Gauthier TM Forum pgauthier@tmforum.org  Sophie Bouleau Orange sophie.bouleau@orange.com	New version taking into account various remarks from tmforum members.  Generated from API Data Model and completed with use cases and samples.
Version 2.0.1	18-Sep-2017	Pierre Gauthier TM Forum pgauthier@tmforum.org  Sophie Bouleau Orange sophie.bouleau@orange.com  Jia Jiangtao Huawei ji Jiangtao@huawei.com	New version introducing the CustomerBillOnDemand resource and operations  In CustomerBill resource, PaymentItem is renamed in AppliedPayment and Document in Attachment (to be conform with Document Management API)
Release 17.5.0  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 4.0.0	28-May-2020	Lucius Gruber (Deutsche Telekom IT GmbH)  l.gruber@telekom.de	Refactoring according to schemafication.  Introducing refactored resources for BillCycle & BillCycleSpec

## Release History

Release Number	Date	Release led by:	Description
Pre-production	28-May-2020	Lucius Gruber (Deutsche Telekom IT GmbH)  l.gruber@telekom.de	Refactoring according to schemafication.  Introducing refactored resources for BillCycle & BillCycleSpec

## Contributors to the document

Sophie Bouleau	Orange
Jia Jiangtao	Huawei
Mariano Belaunde	Orange
Pierre Gauthier	TM Forum
Lucius Gruber	Deutsche Telekom