

# TM Forum Specification

## Risk Management API User Guide

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N/A

## Introduction

The Risk Management API allows the retrieval of Risk Assessments during interaction with PartyRoles (individuals or organizations) typically engaged in an Order process from ProviderPartyRole. The Risk Assessment request is usually issued by the ProviderPartyRole (e.g. Service Provider). The resources used to retrieve these assessment are Task resources, as per the Open API guidelines for tasks.

Order related interactions of a PartyRole with a Service Provider entity is done via: Customer Service Representative, Call Center, Store, Dealer, Point of Sale, WEB Portal, Applications Portal, USSD Portal, etc.

### Assessed Entities

Order process related Risk Scores are assessed for the following entities:

- **PartyRole** – individual or organization playing (or intending to play) a specific role with the service provider
- **ProductOffering** – a specific offering (not necessarily related with a specific PartyRole)
- **PartyRoleProductOffering** – a specific offering addressed by the PartyRole (e.g. currently browsed/viewed by the PartyRole)
- **ShoppingCart** – the shopping cart assembled by the PartyRole
- **ProductOrder** – the overall order bound for payment by the PartyRole

As the Order Process progresses, the ProviderPartyRole may issue Risk Assessment Scores request for each of the above-mentioned entities

Following a response to a Risk Assessment request, the ProviderPartyRole may practice (its own) relevant Policies, for example:

- getting of risk assessment scores for a PartyRole may be require a mandatory request for risk scores for PartyRoleOrder (of the same PartyRole).
- getting of risk assessment scores for a ShoppingCart may result in request for an advanced full payment, rather than offer installment.

### Risk Assessment Categorizations

The following table introduces the types of risks per entities:

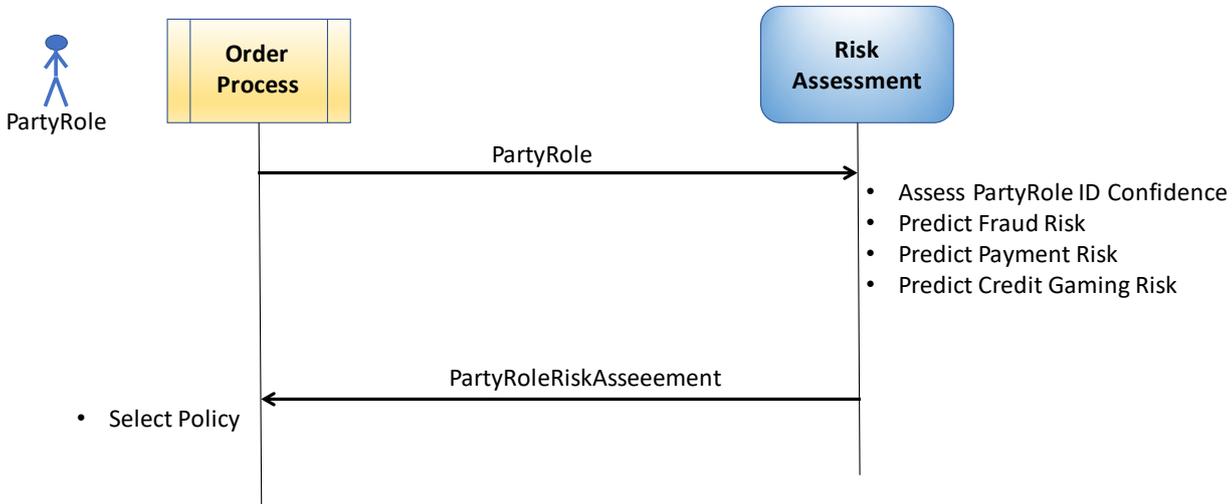
Scored Entity	Risk Type	Impact
PartyRole	IDConfidenceRisk	PartyRole might not be genuine (e.g. Identity Theft)
	FraudRisk	PartyRole predicted to practice fraud
	BadPaymentRisk	PartyRole predicted to avoid payments
	CreditGamingRisk	PartyRole predicted to engage in credit gaming
ProductOffering	FraudRisk	ProductOffering predicted to be affected by fraud
	BadPaymentRisk	ProductOffering predicted to be inflicted by payment issues

Scored Entity	Risk Type	Impact
	CreditGamingRisk	ProductOffering predicted to be inflicted by credit gaming
PartyRoleProductOffering	IDConfidenceRisk	PartyRole might not be genuine (e.g. Identity Theft)
	FraudRisk	PartyRoleProductOffering predicted to be affected by fraud
	BadPaymentRisk	PartyRoleProductOffering predicted to be inflicted by payment issues
	CreditGamingRisk	PartyRoleProductOffering predicted to be inflicted by credit gaming
ShoppingCart	IDConfidenceRisk	PartyRole might not be genuine (e.g. Identity Theft)
	FraudRisk	ShoppingCart predicted to be affected by fraud
	BadPaymentRisk	ShoppingCart predicted to be inflicted by payment issues
	CreditGamingRisk	ShoppingCart predicted to be inflicted by credit gaming
ProductOrder	IDConfidenceRisk	PartyRole might not be genuine (e.g. Identity Theft)
	PaymentMethodRisk	PartyRole might use “questionable” payment credentials (e.g. too many/suspicious purchases with a credit card)
	FraudRisk	ProductOrder predicted to be affected by fraud
	BadPaymentRisk	ProductOrder predicted to be inflicted by payment issues
	CreditGamingRisk	ProductOrder predicted to be inflicted by credit gaming

# Sample Use Cases

## Assessing Risks of a PartyRole

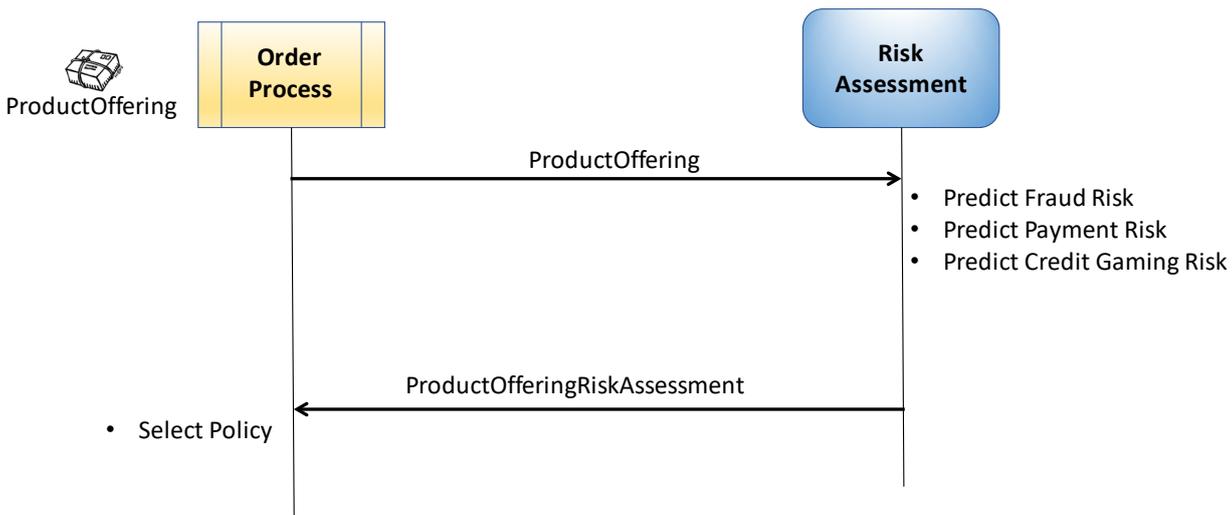
Assess Risks related with a PartyRole introduced to an Order process



According to the retrieved PartyRoleRiskAssessment, the Order process may hide specific offerings for that PartyRole. If the IDConfidenceRisk assesses a non-genuine PartyRole (e.g. account take-over or false ID credentials), the Order process may stop or request additional ID credentials.

## Assessing Risks of a ProductOffering

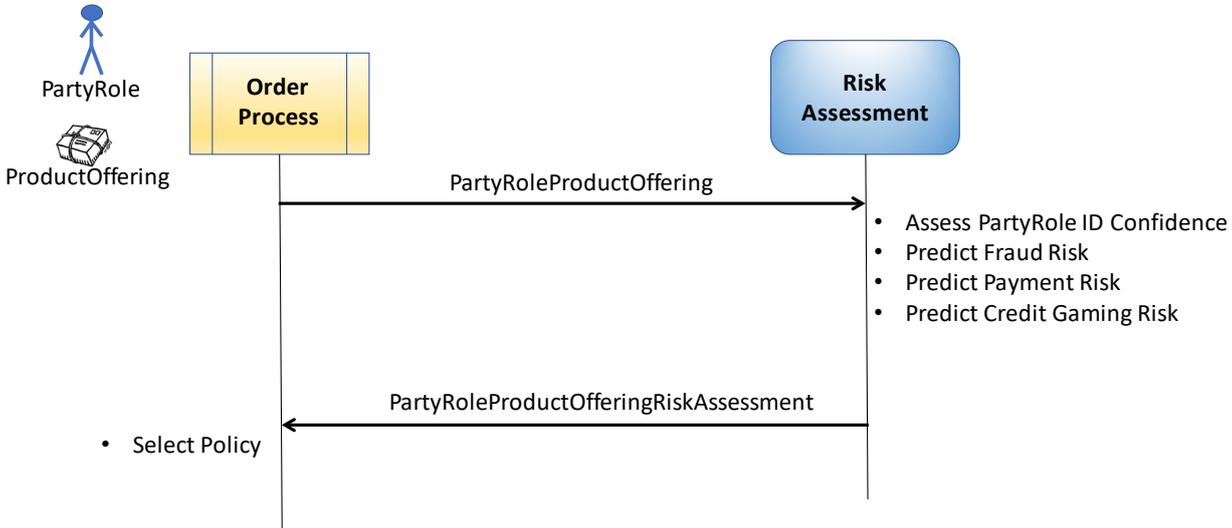
Assess Risks related with a ProductOffering, not necessarily related with a PartyRole



According to the retrieved ProductOfferingRiskAssessment, the Order process may choose to highlight or hide specific offerings to PartyRoles associated with specific Places.

## Assessing Risks of a PartyRoleProductOffering

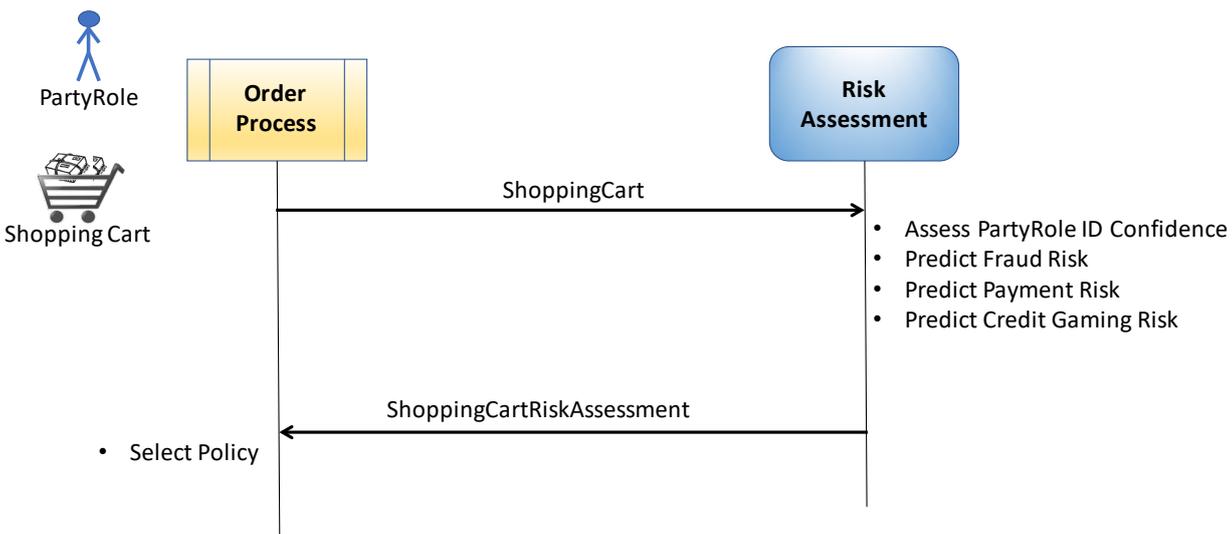
Assess Risks related with a ProductOffering currently observed by a specific PartyRole



According to the retrieved PartyRoleProductOfferingRiskAssessment, the Order process may choose to alter the purchase criteria of that ProductOffering for that specific PartyRole.

## Assessing Risks of a ShoppingCart

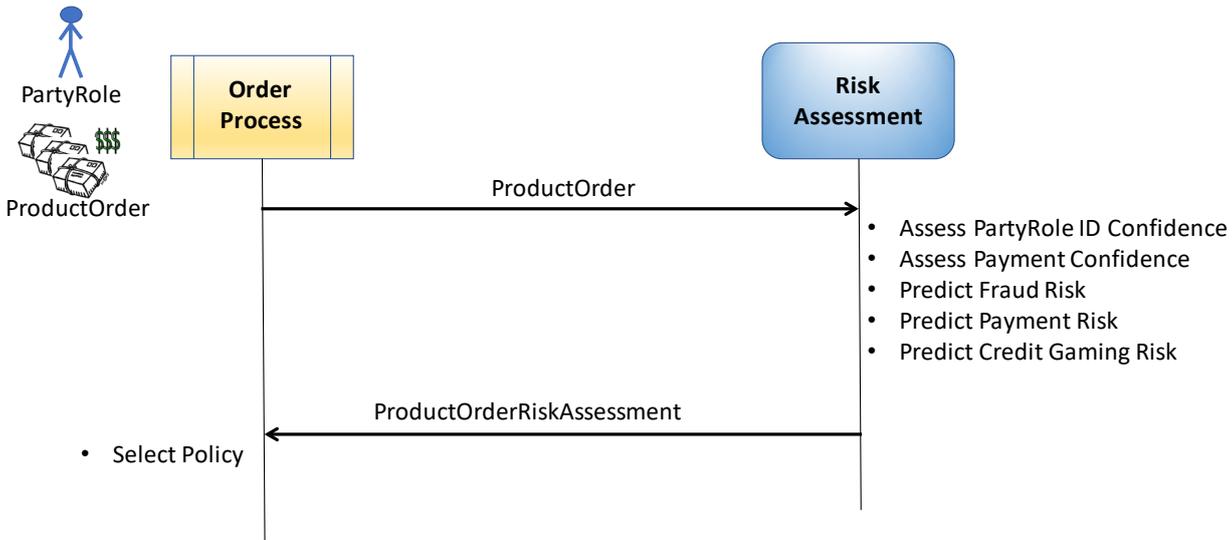
Assess Risks related with a ShoppingCart currently assembled by a specific PartyRole



According to the retrieved ShoppingCartRiskAssessment, the Order process may choose to alter the payment terms criteria of that ShoppingCart for that specific PartyRole.

## Assessing Risks of a ProductOrder

Assess Risks related with a ProductOrder currently forwarded for payment



According to the retrieved ProductOrderRiskAssessment, the Order process may choose not to offer payment installment. If PaymentMethodRisk indicates an issue than, the Order process may request other payment credentials.

## Task Mode of Operation

The risk assessment tasks may be executed synchronously or asynchronously, according to the specific implementation.

- For an implementation that supports synchronous execution, the POST of the task is expected to return an immediate result.
  - If the implementation chooses to persist the task (e.g. for accounting purposes), then the id and href should be populated in the POST response, and the implementation must support GET and DELETE.
  - If the implementation does not persist the task, then the id and href should not be populated in the POST response, and the implementation must not support GET and DELETE.
- For an implementation that supports asynchronous execution, the POST of the task is expected to return an interim result, and to raise an event when the execution is complete. The id and href should be populated in the POST response, and the implementation must support GET and DELETE.

## 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.

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 `RiskScore` instances some may be instances of an enhanced resource `RiskScoreWithConfidence` (with a confidence level added for the score) where other could be instances of the basic `RiskScore`. 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 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, and not the class type of the referred object.

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, so if `@type` was `RiskScoreWithConfidence` then `@baseType` would be `RiskScore`.

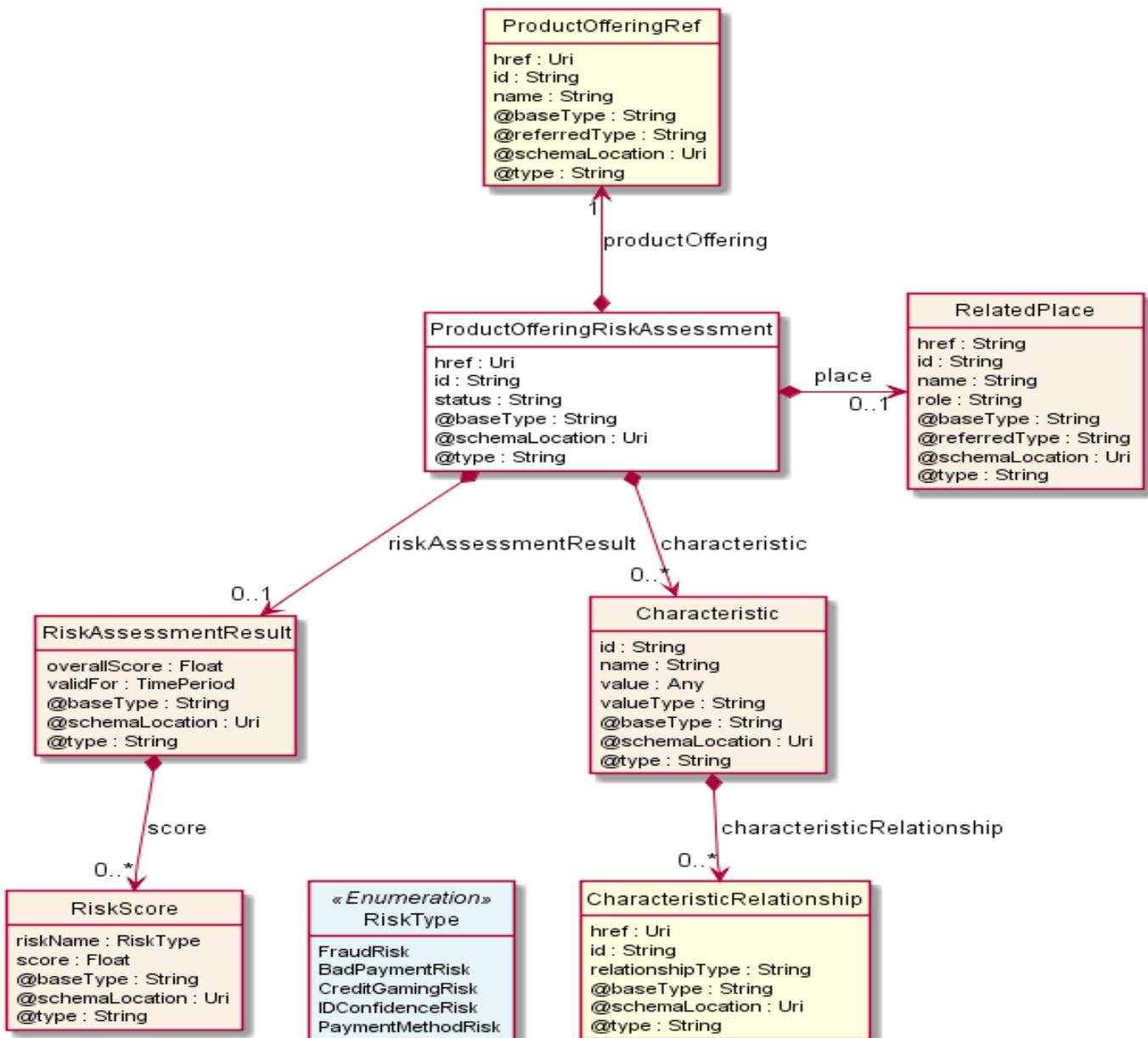
# RESOURCE MODEL

## Managed Entity and Task Resource Models

### Product Offering Risk Assessment resource

This is a task resource allowing assessment of the risks associated with a product offering. For example, the risk associated with iPhone X will probably be higher than the risk for a battery.

#### Resource model



**Field descriptions**ProductOfferingRiskAssessment fields

status	A string. The status of the risk assessment, such as Succeeded, In Progress, Failed, output from the task.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
productOffering	A product offering reference (ProductOfferingRef). The product offering for which the assessment is to be carried out, must be supplied as input to the task, with the attribute id populated.
characteristic	A list of characteristics (Characteristic [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
place	A related place (RelatedPlace). The place for which the risk is assessed, this is optional input to the task.
riskAssessmentResult	A risk assessment result (RiskAssessmentResult). The result of the risk assessment, output from the task.

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	An uri (Uri). 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;

href	An uri (Uri). Hyperlink reference.
id	A string. Unique identifier of the characteristic.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
relationshipType	A string. The type of relationship.

RelatedPlace sub-resource

A Place and an associated role as installation address, delivery address, etc....

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 of the place, such as: [home delivery], [shop retrieval]).

RiskAssessmentResult sub-resource

This resource reflects the risk assessment.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
overallScore	A float. An overall assessment of the risk, composed from the individual scores.
score	A list of risk scores (RiskScore [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
validFor	A time period. Period for which this result is considered valid and not stale.

#### RiskScore sub-resource

This resource reflects a score for a specific risk.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
riskName	A risk type (RiskType). The name of the risk.
score	A float. The risk score.

#### ProductOfferingRef relationship

ProductOffering reference. A product offering represents entities that are orderable from the provider of the catalog, this resource includes pricing information.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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

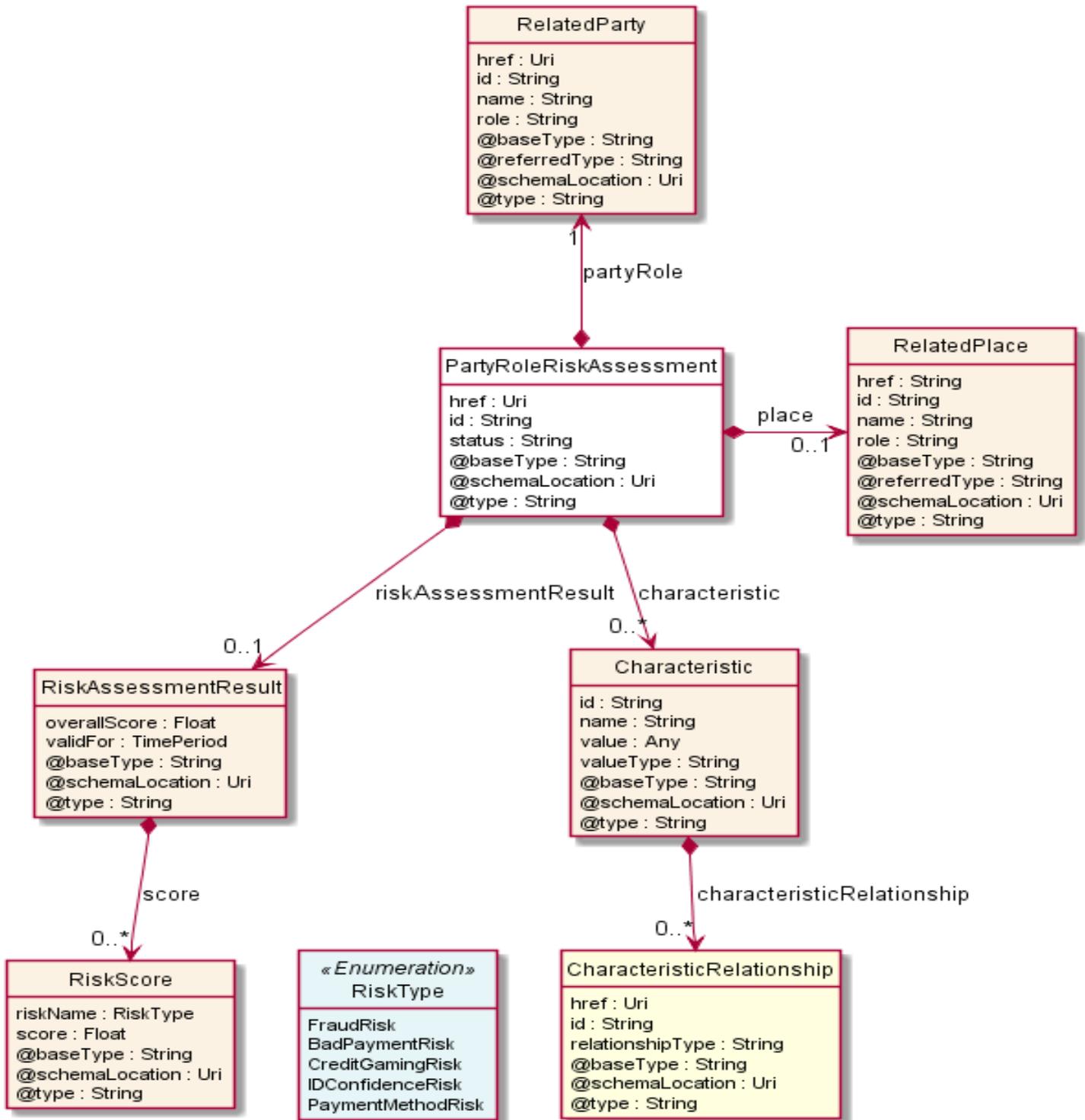
We provide below the json representation of an example of a 'ProductOfferingRiskAssessment' resource object

```
{
  "status": "Completed",
  "characteristic": [
    {
      "name": "Bandwidth",
      "valueType": "string",
      "value": "500MBps"
    }
  ],
  "productOffering": {
    "id": "7656",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",
    "name": "Home Gateway",
    "@referredType": "ProductOffering"
  },
  "place": {
    "@type": "RelatedPlace",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
    "@referredType": "GeographicAddress"
  },
  "riskAssessmentResult": {
    "overallScore": 19,
    "validFor": {
      "startDateTime": "2017-08-23T00:00:22.920Z",
      "endDateTime": "2018-03-25T00:00:22.920Z"
    }
  },
  "score": [
    {
      "score": 20,
      "riskName": "FraudRisk"
    },
    {
      "score": 7,
      "riskName": "BadPaymentRisk"
    },
    {
      "score": 5,
      "riskName": "CreditGamingRisk"
    }
  ]
}
```

### Party Role Risk Assessment resource

This is a task resource allowing assessment of the risks associated with a party role.

#### Resource model



**Field descriptions**PartyRoleRiskAssessment fields

status	A string. The status of the risk assessment, such as Succeeded, In Progress, Failed, output from the task.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
partyRole	A related party (RelatedParty). The party role for which the assessment is to be carried out, must be supplied as input to the task, with the attribute id populated.
characteristic	A list of characteristics (Characteristic [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
place	A related place (RelatedPlace). The place for which the risk is assessed, this is optional input to the task.
riskAssessmentResult	A risk assessment result (RiskAssessmentResult). The result of the risk assessment, output from the task.

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	An uri (Uri). 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;

href                         An uri (Uri). Hyperlink reference.

id                            A string. Unique identifier of the characteristic.

@baseType                 A string. When sub-classing, this defines the super-class.

@schemaLocation         An uri (Uri). 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.

relationshipType         A string. The type of relationship.

#### 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                        An uri (Uri). Hyperlink reference.

id                            A string. unique identifier.

@baseType                 A string. When sub-classing, this defines the super-class.

@schemaLocation         An uri (Uri). 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.

#### RelatedPlace sub-resource

A Place and an associated role as installation adress, delivery address, etc....

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

name                        A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].

href                        A string. Unique reference of the place.

id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 of the place, such as: [home delivery], [shop retrieval].

#### RiskAssessmentResult sub-resource

This resource reflects the risk assessment.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
overallScore	A float. An overall assessment of the risk, composed from the individual scores.
score	A list of risk scores (RiskScore [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
validFor	A time period. Period for which this result is considered valid and not stale.

#### RiskScore sub-resource

This resource reflects a score for a specific risk.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
riskName	A risk type (RiskType). The name of the risk.
score	A float. The risk score.

#### Json representation sample

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

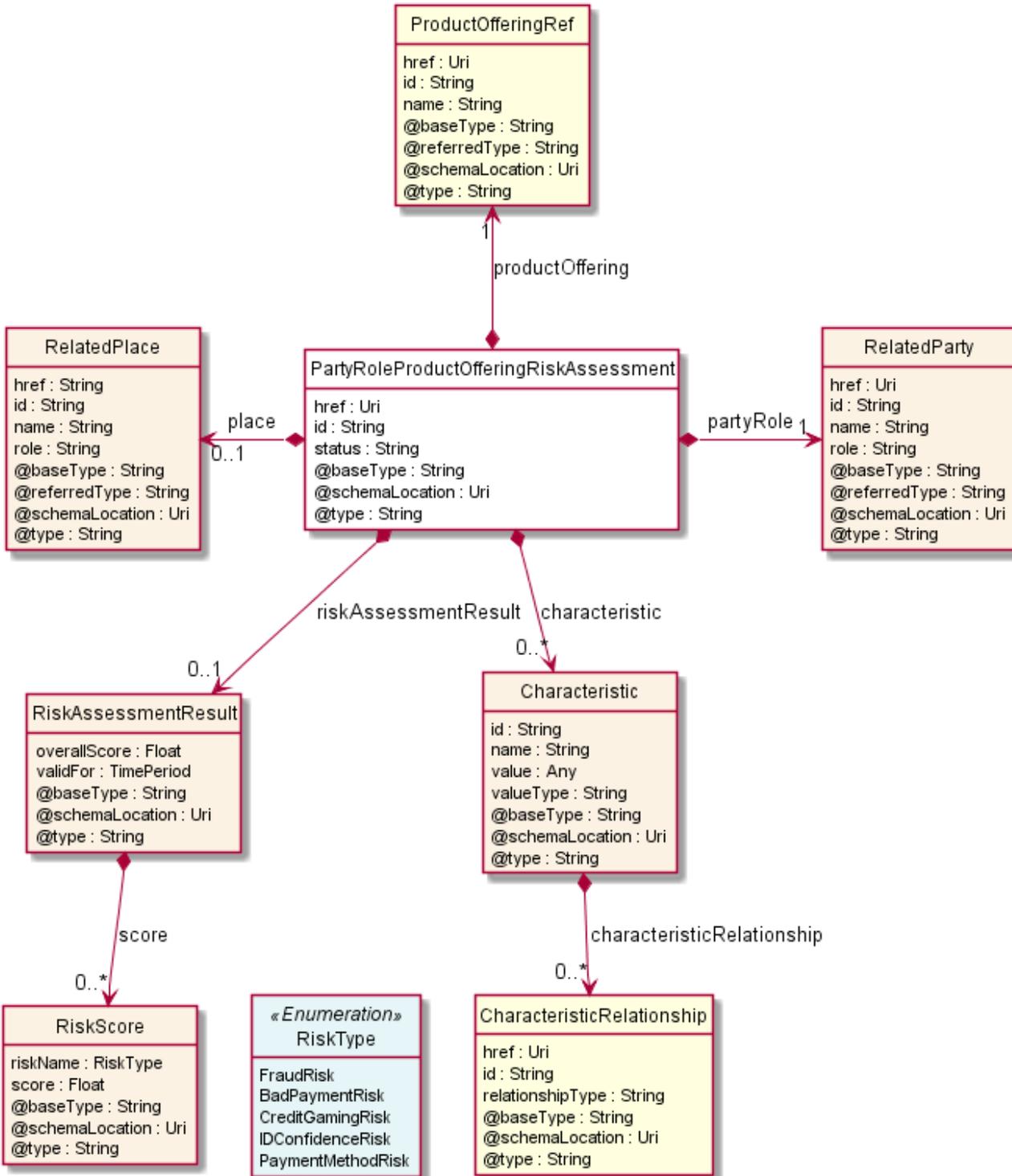
```
{
  "status": "Completed",
  "partyRole": {
    "id": "9866",
```

```
"href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866",
"name": "Sandy Smith",
"@referredType": "Individual"
},
"place": {
"@type": "RelatedPlace",
"role": "home address",
"id": "234546467567334",
"href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
"@referredType": "GeographicAddress"
},
"riskAssessmentResult": {
"overallScore": 65,
"validFor": {
"startDateTime": "2017-08-23T00:00:22.920Z",
"endDateTime": "2018-03-25T00:00:22.920Z"
},
"score": [
{
"score": 0,
"riskName": "IDConfidenceRisk"
},
{
"score": 80,
"riskName": "FraudRisk"
},
{
"score": 20,
"riskName": "BadPaymentRisk"
},
{
"score": 14,
"riskName": "CreditGamingRisk"
}
]
}
}
```

### Party Role Product Offering Risk Assessment resource

This is a task resource allowing assessment of the risks associated with a party or party role that considers acquiring a specific product offering.

Resource model



**Field descriptions**PartyRoleProductOfferingRiskAssessment fields

status	A string. The status of the risk assessment, such as Succeeded, In Progress, Failed, output from the task.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
partyRole	A related party (RelatedParty). The party or party role for which the assessment is to be carried out, must be supplied as input to the task, with the attribute id populated.
productOffering	A product offering reference (ProductOfferingRef). The product offering for which the assessment is to be carried out, must be supplied as input to the task, with the attribute id populated.
characteristic	A list of characteristics (Characteristic [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
place	A related place (RelatedPlace). The place for which the risk is assessed, this is optional input to the task.
riskAssessmentResult	A risk assessment result (RiskAssessmentResult). The result of the risk assessment, output from the task.

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	An uri (Uri). 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;

href	An uri (Uri). Hyperlink reference.
id	A string. Unique identifier of the characteristic.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
relationshipType	A string. The type of relationship.

#### 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	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.

#### RelatedPlace sub-resource

A Place and an associated role as installation address, delivery address, etc....

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store],

[Main Home].

href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 of the place, such as: [home delivery], [shop retrieval]).

#### RiskAssessmentResult sub-resource

This resource reflects the risk assessment.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
overallScore	A float. An overall assessment of the risk, composed from the individual scores.
score	A list of risk scores (RiskScore [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
validFor	A time period. Period for which this result is considered valid and not stale.

#### RiskScore sub-resource

This resource reflects a score for a specific risk.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
riskName	A risk type (RiskType). The name of the risk.
score	A float. The risk score.

#### ProductOfferingRef relationship

ProductOffering reference. A product offering represents entities that are orderable from the provider of the catalog, this resource includes pricing information.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 'PartyRoleProductOfferingRiskAssessment' resource object

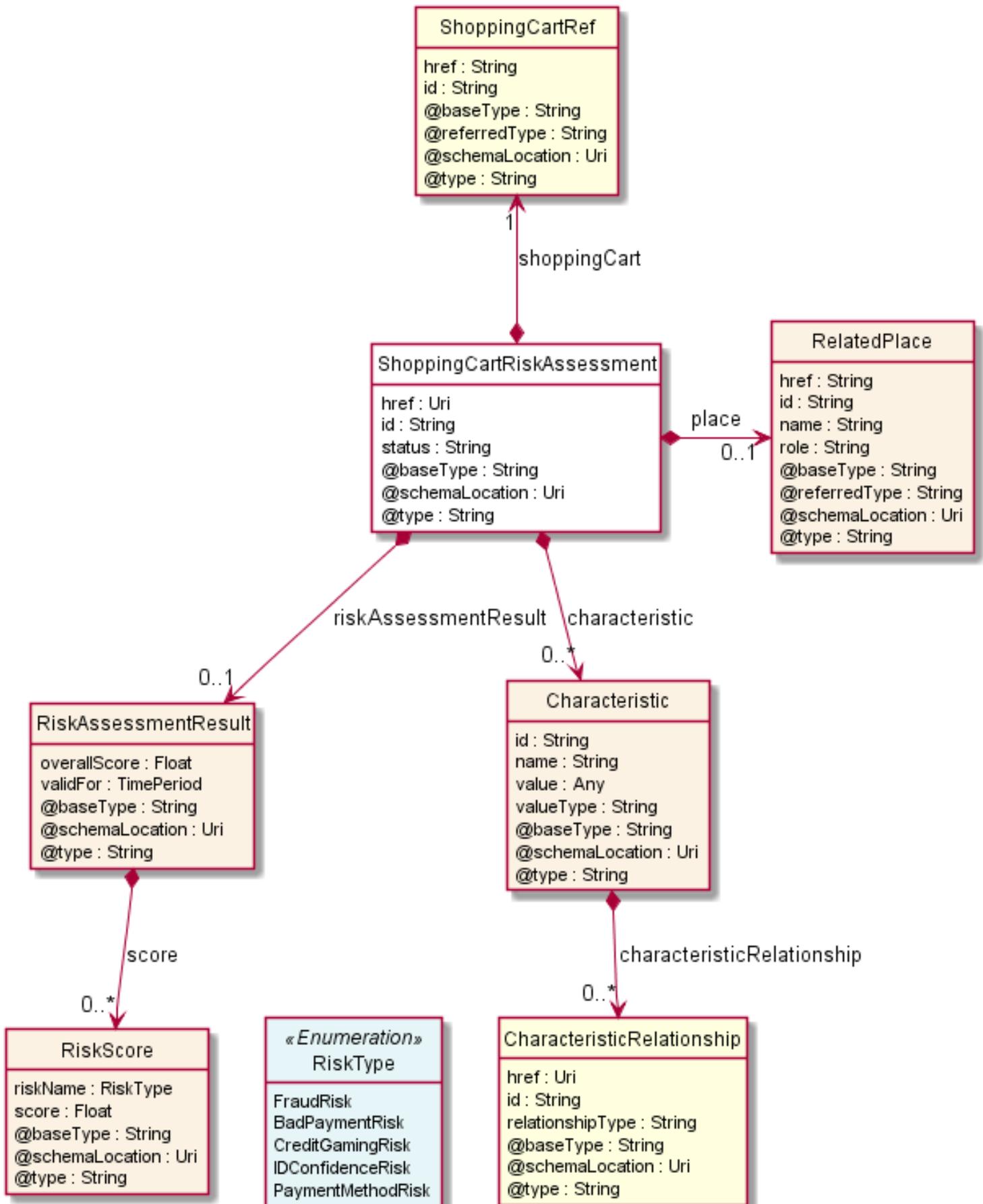
```
{
  "status": "Completed",
  "characteristic": [
    {
      "name": "Bandwidth",
      "valueType": "string",
      "value": "500MBps"
    }
  ],
  "partyRole": {
    "@type": "RelatedParty",
    "id": "9866",
    "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866",
    "name": "Sandy Smith",
    "@referredType": "Individual"
  },
  "productOffering": {
    "id": "7656",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",
    "name": "Home Gateway",
    "@referredType": "ProductOffering"
  },
  "place": {
    "@type": "RelatedPlace",
    "@referredType": "GeographicalAddress",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-api/geographicalAddressManagement/v4/geographicalAddress/234546467567334"
  },
}
```

```
"riskAssessmentResult": {
  "overallScore": 21,
  "validFor": {
    "startDateTime": "2017-08-23T00:00:22.920Z",
    "endDateTime": "2018-03-25T00:00:22.920Z"
  },
  "score": [
    {
      "score": 0,
      "riskName": "IDConfidenceRisk"
    },
    {
      "score": 32,
      "riskName": "FraudRisk"
    },
    {
      "score": 8,
      "riskName": "BadPaymentRisk"
    },
    {
      "score": 16,
      "riskName": "CreditGamingRisk"
    }
  ]
}
```

### Shopping Cart Risk Assessment resource

This is a task resource allowing assessment of the risks associated with a shopping cart - presumably created by a party role and containing one or more product offerings.

#### Resource model



**Field descriptions**ShoppingCartRiskAssessment fields

status	A string. The status of the risk assessment, such as Succeeded, In Progress, Failed, output from the task.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
shoppingCart	A shopping cart reference (ShoppingCartRef). The shopping cart for which the assessment is to be carried out, must be supplied as input to the task, with the attribute id populated.
characteristic	A list of characteristics (Characteristic [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
place	A related place (RelatedPlace). The place for which the risk is assessed, this is optional input to the task.
riskAssessmentResult	A risk assessment result (RiskAssessmentResult). The result of the risk assessment, output from the task.

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	An uri (Uri). 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;

href	An uri (Uri). Hyperlink reference.
id	A string. Unique identifier of the characteristic.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
relationshipType	A string. The type of relationship.

RelatedPlace sub-resource

A Place and an associated role as installation address, delivery address, etc....

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 of the place, such as: [home delivery], [shop retrieval]).

RiskAssessmentResult sub-resource

This resource reflects the risk assessment.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
overallScore	A float. An overall assessment of the risk, composed from the individual scores.
score	A list of risk scores (RiskScore [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
validFor	A time period. Period for which this result is considered valid and not stale.

RiskScore sub-resource

This resource reflects a score for a specific risk.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
riskName	A risk type (RiskType). The name of the risk.
score	A float. The risk score.

ShoppingCartRef relationship

ShoppingCart (ShoppingCartRef) . The shopping cart which the recommendation is related with.

href	A string. Hypertext Reference of the shopping cart.
id	A string. Unique identifier of shopping cart.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
@referredType	A string. The actual type of the target instance when needed for disambiguation.

**Json representation sample**

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

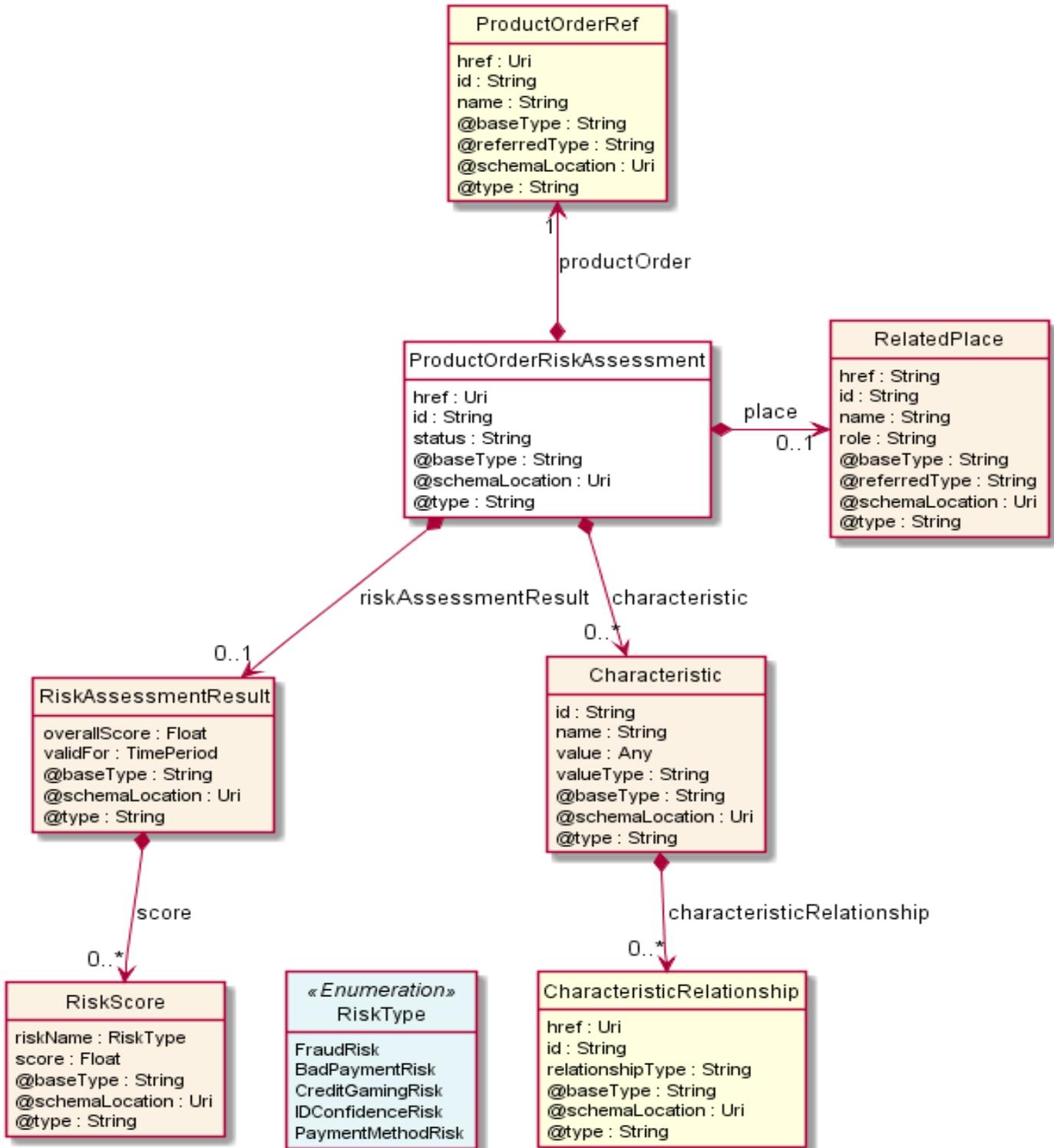
```
{
  "status": "Completed",
  "characteristic": [
    {
      "name": "ContactPersonName",
```

```
    "valueType": "string",
    "value": "David Alexander"
  }
},
"shoppingCart": {
  "id": "1203",
  "href": "https://mycsp.com:8080/tmf-api/shoppingCart/v4/shoppingCart/1203",
  "@referredType": "ShoppingCart"
},
"place": {
  "@type": "RelatedPlace",
  "role": "home address",
  "id": "234546467567334",
  "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
  "@referredType": "GeographicAddress"
},
"riskAssessmentResult": {
  "overallScore": 12,
  "validFor": {
    "startDateTime": "2017-08-23T00:00:22.920Z",
    "endDateTime": "2018-03-25T00:00:22.920Z"
  },
  "score": [
    {
      "score": 0,
      "riskName": "IDConfidenceRisk"
    },
    {
      "score": 10,
      "riskName": "FraudRisk"
    },
    {
      "score": 13,
      "riskName": "BadPaymentRisk"
    },
    {
      "score": 9,
      "riskName": "CreditGamingRisk"
    }
  ]
}
}
```

### Product Order Risk Assessment resource

This is a task resource allowing assessment of the risks associated with a product order - presumably submitted by a party role and containing one or more product offerings.

#### Resource model



**Field descriptions**ProductOrderRiskAssessment fields

status	A string. The status of the risk assessment, such as Succeeded, In Progress, Failed, output from the task.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
productOrder	A product order reference (ProductOrderRef). The product order for which the assessment is to be carried out, must be supplied as input to the task, with the attribute id populated.
characteristic	A list of characteristics (Characteristic [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
place	A related place (RelatedPlace). The place for which the risk is assessed, this is optional input to the task.
riskAssessmentResult	A risk assessment result (RiskAssessmentResult). The result of the risk assessment, output from the task.

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	An uri (Uri). 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;

href	An uri (Uri). Hyperlink reference.
id	A string. Unique identifier of the characteristic.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
relationshipType	A string. The type of relationship.

#### RelatedPlace sub-resource

A Place and an associated role as installation address, delivery address, etc....

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 of the place, such as: [home delivery], [shop retrieval]).

#### RiskAssessmentResult sub-resource

This resource reflects the risk assessment.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
overallScore	A float. An overall assessment of the risk, composed from the individual scores.
score	A list of risk scores (RiskScore [*]). Additional characteristics for which the risk might be assessed, optional input to the task.
validFor	A time period. Period for which this result is considered valid and not stale.

RiskScore sub-resource

This resource reflects a score for a specific risk.

@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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.
riskName	A risk type (RiskType). The name of the risk.
score	A float. The risk score.

ProductOrderRef relationship

ProductOrder (ProductOrder) .The product order which the recommendation is related with.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). 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 'ProductOrderRiskAssessment' resource object

```
{
  "status": "Completed",
  "characteristic": [
```

```
{
  "name": "CouponType",
  "valueType": "string",
  "value": "Discount21"
}
],
"productOrder": {
  "id": "267734",
  "href": "https://mycsp.com:8080/tmf-api/productOrder/v4/productOrder/267734",
  "@referredType": "ProductOrder"
},
"place": {
  "@type": "RelatedPlace",
  "role": "home address",
  "id": "234546467567334",
  "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
  "@referredType": "GeographicAddress"
},
"riskAssessmentResult": {
  "overallScore": 16,
  "validFor": {
    "startDateTime": "2017-08-23T00:00:22.920Z",
    "endDateTime": "2018-03-25T00:00:22.920Z"
  },
  "score": [
    {
      "score": 0,
      "riskName": "IDConfidenceRisk"
    },
    {
      "score": 0,
      "riskName": "PaymentMethodRisk"
    },
    {
      "score": 15,
      "riskName": "FraudRisk"
    },
    {
      "score": 14,
      "riskName": "BadPaymentRisk"
    },
    {
      "score": 7,
      "riskName": "CreditGamingRisk"
    }
  ]
}
}
```

## Notification Resource Models

15 notifications are defined for this API

Notifications related to ProductOfferingRiskAssessment:

- ProductOfferingRiskAssessmentCreateEvent
- ProductOfferingRiskAssessmentDeleteEvent
- ProductOfferingRiskAssessmentStatusChangeEvent

Notifications related to PartyRoleRiskAssessment:

- PartyRoleRiskAssessmentCreateEvent
- PartyRoleRiskAssessmentDeleteEvent
- PartyRoleRiskAssessmentStatusChangeEvent

Notifications related to PartyRoleProductOfferingRiskAssessment:

- PartyRoleProductOfferingRiskAssessmentCreateEvent
- PartyRoleProductOfferingRiskAssessmentDeleteEvent
- PartyRoleProductOfferingRiskAssessmentStatusChangeEvent

Notifications related to ShoppingCartRiskAssessment:

- ShoppingCartRiskAssessmentCreateEvent
- ShoppingCartRiskAssessmentDeleteEvent
- ShoppingCartRiskAssessmentStatusChangeEvent

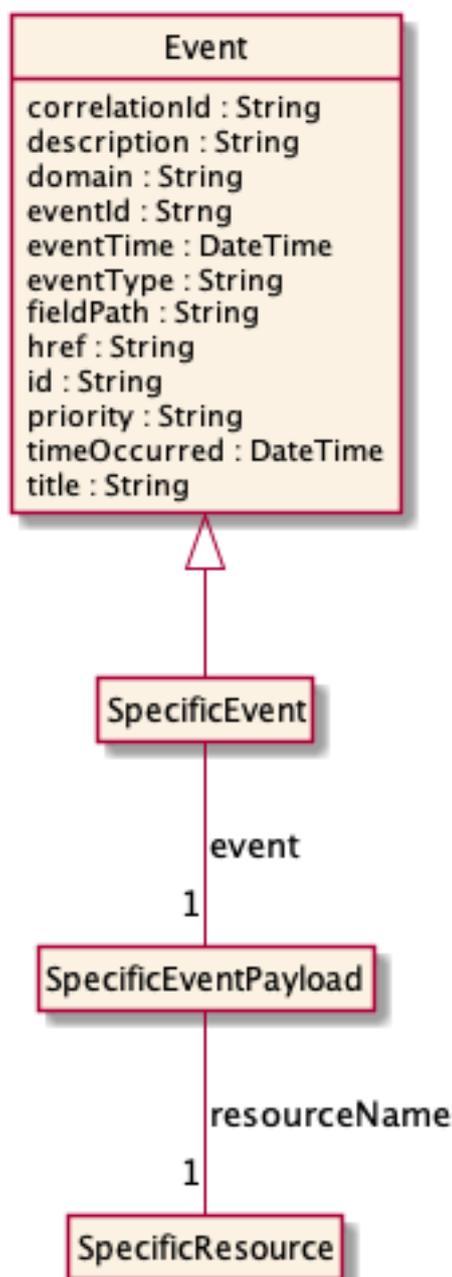
Notifications related to ProductOrderRiskAssessment:

- ProductOrderRiskAssessmentCreateEvent
- ProductOrderRiskAssessmentDeleteEvent
- ProductOrderRiskAssessmentStatusChangeEvent

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).



### Product Offering Risk Assessment Create Event

Notification `ProductOfferingRiskAssessmentCreateEvent` case for resource `ProductOfferingRiskAssessment`

#### Json representation sample

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

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

```
"eventType":"ProductOfferingRiskAssessmentCreateEvent",
"event": {
  "productOfferingRiskAssessment" :
    [-- SEE ProductOfferingRiskAssessment RESOURCE SAMPLE --]
}
}
```

### Product Offering Risk Assessment Delete Event

Notification ProductOfferingRiskAssessmentDeleteEvent case for resource ProductOfferingRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ProductOfferingRiskAssessmentDeleteEvent",
  "event": {
    "productOfferingRiskAssessment" :
      [-- SEE ProductOfferingRiskAssessment RESOURCE SAMPLE --]
  }
}
```

### Product Offering Risk Assessment Status Change Event

Notification ProductOfferingRiskAssessmentStatusChangeEvent case for resource ProductOfferingRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ProductOfferingRiskAssessmentStatusChangeEvent",
  "event": {
    "productOfferingRiskAssessment" :
      [-- SEE ProductOfferingRiskAssessment RESOURCE SAMPLE --]
  }
}
```

### Party Role Risk Assessment Create Event

Notification PartyRoleRiskAssessmentCreateEvent case for resource PartyRoleRiskAssessment

### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"PartyRoleRiskAssessmentCreateEvent",
  "event": {
    "partyRoleRiskAssessment" :
      {-- SEE PartyRoleRiskAssessment RESOURCE SAMPLE --}
  }
}
```

### Party Role Risk Assessment Delete Event

Notification PartyRoleRiskAssessmentDeleteEvent case for resource PartyRoleRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"PartyRoleRiskAssessmentDeleteEvent",
  "event": {
    "partyRoleRiskAssessment" :
      {-- SEE PartyRoleRiskAssessment RESOURCE SAMPLE --}
  }
}
```

### Party Role Risk Assessment Status Change Event

Notification PartyRoleRiskAssessmentStatusChangeEvent case for resource PartyRoleRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"PartyRoleRiskAssessmentStatusChangeEvent",
  "event": {
    "partyRoleRiskAssessment" :
      {-- SEE PartyRoleRiskAssessment RESOURCE SAMPLE --}
  }
}
```

```
}  
}
```

### Party Role Product Offering Risk Assessment Create Event

Notification PartyRoleProductOfferingRiskAssessmentCreateEvent case for resource PartyRoleProductOfferingRiskAssessment

#### Json representation sample

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

```
{  
  "eventId":"00001",  
  "eventTime":"2015-11-16T16:42:25-04:00",  
  "eventType":"PartyRoleProductOfferingRiskAssessmentCreateEvent",  
  "event": {  
    "partyRoleProductOfferingRiskAssessment" :  
      {-- SEE PartyRoleProductOfferingRiskAssessment RESOURCE SAMPLE --}  
  }  
}
```

### Party Role Product Offering Risk Assessment Delete Event

Notification PartyRoleProductOfferingRiskAssessmentDeleteEvent case for resource PartyRoleProductOfferingRiskAssessment

#### Json representation sample

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

```
{  
  "eventId":"00001",  
  "eventTime":"2015-11-16T16:42:25-04:00",  
  "eventType":"PartyRoleProductOfferingRiskAssessmentDeleteEvent",  
  "event": {  
    "partyRoleProductOfferingRiskAssessment" :  
      {-- SEE PartyRoleProductOfferingRiskAssessment RESOURCE SAMPLE --}  
  }  
}
```

### Party Role Product Offering Risk Assessment Status Change Event

Notification PartyRoleProductOfferingRiskAssessmentStatusChangeEvent case for resource PartyRoleProductOfferingRiskAssessment

**Json representation sample**

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"PartyRoleProductOfferingRiskAssessmentStatusChangeEvent",
  "event": {
    "partyRoleProductOfferingRiskAssessment" :
      {-- SEE PartyRoleProductOfferingRiskAssessment RESOURCE SAMPLE --}
  }
}
```

**Shopping Cart Risk Assessment Create Event**

Notification ShoppingCartRiskAssessmentCreateEvent case for resource ShoppingCartRiskAssessment

**Json representation sample**

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ShoppingCartRiskAssessmentCreateEvent",
  "event": {
    "shoppingCartRiskAssessment" :
      {-- SEE ShoppingCartRiskAssessment RESOURCE SAMPLE --}
  }
}
```

**Shopping Cart Risk Assessment Delete Event**

Notification ShoppingCartRiskAssessmentDeleteEvent case for resource ShoppingCartRiskAssessment

**Json representation sample**

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ShoppingCartRiskAssessmentDeleteEvent",
  "event": {
    "shoppingCartRiskAssessment" :
      {-- SEE ShoppingCartRiskAssessment RESOURCE SAMPLE --}
  }
}
```

```
}
}
```

### Shopping Cart Risk Assessment Status Change Event

Notification ShoppingCartRiskAssessmentStatusChangeEvent case for resource ShoppingCartRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ShoppingCartRiskAssessmentStatusChangeEvent",
  "event": {
    "shoppingCartRiskAssessment" :
      {-- SEE ShoppingCartRiskAssessment RESOURCE SAMPLE --}
  }
}
```

### Product Order Risk Assessment Create Event

Notification ProductOrderRiskAssessmentCreateEvent case for resource ProductOrderRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ProductOrderRiskAssessmentCreateEvent",
  "event": {
    "productOrderRiskAssessment" :
      {-- SEE ProductOrderRiskAssessment RESOURCE SAMPLE --}
  }
}
```

### Product Order Risk Assessment Delete Event

Notification ProductOrderRiskAssessmentDeleteEvent case for resource ProductOrderRiskAssessment

#### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ProductOrderRiskAssessmentDeleteEvent",
  "event": {
    "productOrderRiskAssessment" :
      {-- SEE ProductOrderRiskAssessment RESOURCE SAMPLE --}
  }
}
```

## Product Order Risk Assessment Status Change Event

Notification ProductOrderRiskAssessmentStatusChangeEvent case for resource ProductOrderRiskAssessment

### Json representation sample

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

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"ProductOrderRiskAssessmentStatusChangeEvent",
  "event": {
    "productOrderRiskAssessment" :
      {-- SEE ProductOrderRiskAssessment RESOURCE SAMPLE --}
  }
}
```

## API OPERATIONS

Remember the following Uniform Contract:

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

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

Notifications are also described in a subsequent section.

### Operations on Product Offering Risk Assessment

#### List product offering risk assessments

**GET** `/productOfferingRiskAssessment?fields=...&{filtering}`

## Description

This operation list product offering risk assessment entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of a request for retrieving multiple tasks for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/productOfferingRiskAssessment Accept: application/json
<b>Response</b>
200  [ { "id": "777666345666", "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/productOfferingRiskAssessment/777666345666", "status": "InProgress", "characteristic": [ { "name": "Bandwidth", "valueType": "string", "value": "500MBps" } ], "productOffering": { "id": "7656", "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656", "name": "Home Gateway", "@referredType": "ProductOffering" }, "place": { "@type": "RelatedPlace", "role": "home address", "id": "234546467567334", "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334", "@referredType": "GeographicAddress" } } ]

**Retrieve product offering risk assessment****GET****/productOfferingRiskAssessment/{id}?fields=...&{filtering}****Description**

This operation retrieves a product offering risk assessment entity.

Attribute selection is enabled for all first level attributes.

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

**Usage Samples**

Here's an example of a request for retrieving a specific task for party role risk assessment.

<b>Request</b>
<pre>GET /tmf-api/riskManagement/v4/productOfferingRiskAssessment/777666345666 Accept: application/json</pre>
<b>Response</b>
<pre>200 {   "id": "777666345666",   "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/productOfferingRiskAssessment/777666345666",   "status": "InProgress",   "characteristic": [     {       "name": "Bandwidth",       "valueType": "string",       "value": "500MBps"     }   ],   "productOffering": {     "id": "7656",     "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",     "name": "Home Gateway",     "@referredType": "ProductOffering"   },   "place": {     "@type": "RelatedPlace",     "role": "home address",     "id": "234546467567334",     "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",     "@referredType": "GeographicAddress"   } }</pre>

```

}
}

```

## Create product offering risk assessment

### POST /productOfferingRiskAssessment

#### Description

This operation creates a product offering risk assessment entity.

#### Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ProductOfferingRiskAssessment, 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
productOffering	

Non Mandatory Attributes	Rule
status	
@baseType	
@schemaLocation	
@type	
characteristic	
place	
riskAssessmentResult	

#### Usage Samples

Here's an example of a request for executing a task for party role risk assessment. In this example, we illustrate a synchronous execution with no persistence, so there is no id or href in the response.

Request
POST /tmf-api/riskManagement/v4/productOfferingRiskAssessment Content-Type: application/json  <pre> {   "characteristic": [     {       "name": "Bandwidth",       "valueType": "string",       "value": "500MBps"     }   ] } </pre>

```

    ],
    "productOffering": {
      "id": "7656",
      "@referredType": "ProductOffering"
    },
    "place": {
      "id": "234546467567334",
      "@referredType": "GeographicAddress"
    }
  }
}

```

## Response

201

```

{
  "status": "Completed",
  "characteristic": [
    {
      "name": "Bandwidth",
      "valueType": "string",
      "value": "500MBps"
    }
  ],
  "productOffering": {
    "id": "7656",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",
    "name": "Home Gateway",
    "@referredType": "ProductOffering"
  },
  "place": {
    "@type": "RelatedPlace",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
    "@referredType": "GeographicAddress"
  },
  "riskAssessmentResult": {
    "overallScore": 19,
    "validFor": {
      "startDateTime": "2017-08-23T00:00:22.920Z",
      "endDateTime": "2018-03-25T00:00:22.920Z"
    },
    "score": [
      {
        "score": 20,
        "riskName": "FraudRisk"
      },
      {
        "score": 7,
        "riskName": "BadPaymentRisk"
      }
    ]
  }
}

```

```
{
  "score": 5,
  "riskName": "CreditGamingRisk"
}
]
```

### Delete product offering risk assessment

**DELETE** /productOfferingRiskAssessment/{id}

#### Description

This operation deletes a product offering risk assessment entity.

#### Usage Samples

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

<b>Request</b>
DELETE /tmf-api/riskManagement/v4/productOfferingRiskAssessment/777666345666
<b>Response</b>
204

## Operations on Party Role Risk Assessment

### List party role risk assessments

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

#### Description

This operation list party role risk assessment entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of a request for retrieving multiple tasks for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/partyRoleRiskAssessment?status=InProgress Accept: application/json
<b>Response</b>
200  [ { "id": "777666444555", "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/partyRoleRiskAssessment/777666444555", "status": "InProgress", "partyRole": { "id": "9866", "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866", "name": "Sandy Smith", "@referredType": "Individual" }, "place": { "@type": "RelatedPlace", "role": "home address", "id": "234546467567334", "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334", "@referredType": "GeographicAddress" } } ]

## Retrieve party role risk assessment

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

### Description

This operation retrieves a party role risk assessment entity.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of a request for retrieving a specific task for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/partyRoleRiskAssessment/777666444555 Accept: application/json
<b>Response</b>
200  { "id": "777666444555", "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/partyRoleRiskAssessment/777666444555", "status": "InProgress", "partyRole": { "id": "9866", "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866", "name": "Sandy Smith", "@referredType": "Individual" }, "place": { "@type": "RelatedPlace", "role": "home address", "id": "234546467567334", "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334", "@referredType": "GeographicAddress" } }

## Create party role risk assessment

### POST /partyRoleRiskAssessment

#### Description

This operation creates a party role risk assessment entity.

#### Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a PartyRoleRiskAssessment, 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
partyRole	

Non Mandatory Attributes	Rule
status	
@baseType	
@schemaLocation	
@type	
characteristic	
place	
riskAssessmentResult	

## Usage Samples

Here's an example of a request for executing a task for party role risk assessment. In this example, we illustrate a synchronous execution with no persistence, so there is no id or href in the response.

Request
POST /tmf-api/riskManagement/v4/partyRoleRiskAssessment Content-Type: application/json  <pre>{   "partyRole": {     "id": "9866",     "@referredType": "Individual"   },   "place": {     "role": "home address",     "id": "234546467567334",     "@referredType": "GeographicAddress"   } }</pre>
Response
201  <pre>{   "status": "Completed",   "partyRole": {     "id": "9866",     "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866",     "name": "Sandy Smith",     "@referredType": "Individual"   },   "place": {     "@type": "RelatedPlace",     "role": "home address",</pre>

```
"id": "234546467567334",
"href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
"@referredType": "GeographicAddress"
},
"riskAssessmentResult": {
  "overallScore": 65,
  "validFor": {
    "startDateTime": "2017-08-23T00:00:22.920Z",
    "endDateTime": "2018-03-25T00:00:22.920Z"
  },
  "score": [
    {
      "score": 0,
      "riskName": "IDConfidenceRisk"
    },
    {
      "score": 80,
      "riskName": "FraudRisk"
    },
    {
      "score": 20,
      "riskName": "BadPaymentRisk"
    },
    {
      "score": 14,
      "riskName": "CreditGamingRisk"
    }
  ]
}
}
```

## Delete party role risk assessment

**DELETE** /partyRoleRiskAssessment/{id}

### Description

This operation deletes a party role risk assessment entity.

### Usage Samples

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

#### Request

```
DELETE /tmf-api/riskManagement/v4/partyRoleRiskAssessment/777666444555
```

<b>Response</b>
204

## Operations on Party Role Product Offering Risk Assessment

### List party role product offering risk assessments

#### GET

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

#### Description

This operation list party role product offering risk assessment entities.

Attribute selection is enabled for all first level attributes.

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

#### Usage Samples

Here's an example of a request for retrieving multiple tasks for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/partyRoleProductOfferingRiskAssessment Accept: application/json
<b>Response</b>
200  [ { "id": "777666121888", "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/partyRoleProductOfferingRiskAssessment/777666121888", "status": "InProgress", "characteristic": [ { "name": "Bandwidth", "valueType": "string", "value": "500MBps" } ] } ]

```

],
"partyRole": {
  "@type": "RelatedParty",
  "id": "9866",
  "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866",
  "name": "Sandy Smith",
  "@referredType": "Individual"
},
"productOffering": {
  "id": "7656",
  "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",
  "name": "Home Gateway",
  "@referredType": "ProductOffering"
},
"place": {
  "@type": "RelatedPlace",
  "@referredType": "GeographicalAddress",
  "role": "home address",
  "id": "234546467567334",
  "href": "https://mycsp.com:8080/tmf-
api/geographicalAddressManagement/v4/geographicalAddress/234546467567334"
}
}
]

```

## Retrieve party role product offering risk assessment

### GET

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

### Description

This operation retrieves a party role product offering risk assessment entity.

Attribute selection is enabled for all first level attributes.

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

### Usage Samples

Here's an example of a request for retrieving a specific task for party role risk assessment.

#### Request

```

GET /tmf-api/riskManagement/v4/partyRoleProductOfferingRiskAssessment/777666121888
Accept: application/json

```

**Response**

```
200

{
  "id": "777666121888",
  "href": "https://mycsp.com:8080/tmf-
api/riskManagement/v4/partyRoleProductOfferingRiskAssessment/777666121888",
  "status": "InProgress",
  "characteristic": [
    {
      "name": "Bandwidth",
      "valueType": "string",
      "value": "500MBps"
    }
  ],
  "partyRole": {
    "@type": "RelatedParty",
    "id": "9866",
    "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866",
    "name": "Sandy Smith",
    "@referredType": "Individual"
  },
  "productOffering": {
    "id": "7656",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",
    "name": "Home Gateway",
    "@referredType": "ProductOffering"
  },
  "place": {
    "@type": "RelatedPlace",
    "@referredType": "GeographicalAddress",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-
api/geographicalAddressManagement/v4/geographicalAddress/234546467567334"
  }
}
```

**Create party role product offering risk assessment****POST /partyRoleProductOfferingRiskAssessment****Description**

This operation creates a party role product offering risk assessment entity.

## Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a PartyRoleProductOfferingRiskAssessment, 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
partyRole	
productOffering	

Non Mandatory Attributes	Rule
status	
@baseType	
@schemaLocation	
@type	
characteristic	
place	
riskAssessmentResult	

## Usage Samples

Here's an example of a request for executing a task for party role risk assessment. In this example, we illustrate a synchronous execution with no persistence, so there is no id or href in the response.

Request
POST /tmf-api/riskManagement/v4/partyRoleProductOfferingRiskAssessment Content-Type: application/json  <pre>{   "characteristic": [     {       "name": "Bandwidth",       "valueType": "string",       "value": "500MBps"     }   ],   "partyRole": {     "id": "9866",     "@referredType": "Individual"   },   "productOffering": {     "id": "7656",     "@referredType": "ProductOffering"   },   "place": {     "@referredType": "GeographicalAddress",     "role": "home address", </pre>

```

    "id": "234546467567334"
  }
}

```

## Response

201

```

{
  "status": "Completed",
  "characteristic": [
    {
      "name": "Bandwidth",
      "valueType": "string",
      "value": "500MBps"
    }
  ],
  "partyRole": {
    "@type": "RelatedParty",
    "id": "9866",
    "href": "https://mycsp.com:8080/tmf-api/partyManagement/v1/individual/9866",
    "name": "Sandy Smith",
    "@referredType": "Individual"
  },
  "productOffering": {
    "id": "7656",
    "href": "https://mycsp.com:8080/tmf-api/productCatalogManagement/v4/productOffering/7656",
    "name": "Home Gateway",
    "@referredType": "ProductOffering"
  },
  "place": {
    "@type": "RelatedPlace",
    "@referredType": "GeographicalAddress",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-
api/geographicalAddressManagement/v4/geographicalAddress/234546467567334"
  },
  "riskAssessmentResult": {
    "overallScore": 21,
    "validFor": {
      "startDateTime": "2017-08-23T00:00:22.920Z",
      "endDateTime": "2018-03-25T00:00:22.920Z"
    },
    "score": [
      {
        "score": 0,
        "riskName": "IDConfidenceRisk"
      },
      {
        "score": 32,
        "riskName": "FraudRisk"
      }
    ]
  }
}

```

```
    },
    {
      "score": 8,
      "riskName": "BadPaymentRisk"
    },
    {
      "score": 16,
      "riskName": "CreditGamingRisk"
    }
  ]
}
```

### Delete party role product offering risk assessment

**DELETE** /partyRoleProductOfferingRiskAssessment/{id}

#### Description

This operation deletes a party role product offering risk assessment entity.

#### Usage Samples

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

<b>Request</b>
DELETE /tmf-api/riskManagement/v4/partyRoleProductOfferingRiskAssessment/777666121888
<b>Response</b>
204

## Operations on Shopping Cart Risk Assessment

### List shopping cart risk assessments

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

## Description

This operation list shopping cart risk assessment entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of a request for retrieving multiple tasks for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/shoppingCartRiskAssessment?status=InProgress Accept: application/json
<b>Response</b>
200  [ { "id": "777666345777", "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/shoppingCartRiskAssessment/777666345777", "status": "InProgress", "characteristic": [ { "name": "ContactPersonName", "valueType": "string", "value": "David Alexander" } ], "shoppingCart": { "id": "1203", "href": "https://mycsp.com:8080/tmf-api/shoppingCart/v4/shoppingCart/1203", "@referredType": "ShoppingCart" }, "place": { "@type": "RelatedPlace", "role": "home address", "id": "234546467567334", "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334", "@referredType": "GeographicAddress" } } ]

## Retrieve shopping cart risk assessment

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

### Description

This operation retrieves a shopping cart risk assessment entity.

Attribute selection is enabled for all first level attributes.

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

### Usage Samples

Here's an example of a request for retrieving a specific task for party role risk assessment.

Request
<pre>GET /tmf-api/riskManagement/v4/shoppingCartRiskAssessment/777666123777 Accept: application/json</pre>
Response
<pre>200 {   "id": "777666345777",   "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/shoppingCartRiskAssessment/777666345777",   "status": "InProgress",   "characteristic": [     {       "name": "ContactPersonName",       "valueType": "string",       "value": "David Alexander"     }   ],   "shoppingCart": {     "id": "1203",     "href": "https://mycsp.com:8080/tmf-api/shoppingCart/v4/shoppingCart/1203",     "@referredType": "ShoppingCart"   },   "place": {     "@type": "RelatedPlace",     "role": "home address",     "id": "234546467567334",     "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",     "@referredType": "GeographicAddress"   } }</pre>

## Create shopping cart risk assessment

### POST /shoppingCartRiskAssessment

#### Description

This operation creates a shopping cart risk assessment entity.

#### Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ShoppingCartRiskAssessment, 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
shoppingCart	

Non Mandatory Attributes	Rule
status	
@baseType	
@schemaLocation	
@type	
characteristic	
place	
riskAssessmentResult	

#### Usage Samples

Here's an example of a request for executing a task for party role risk assessment. In this example, we illustrate a synchronous execution with no persistence, so there is no id or href in the response.

Request
POST /tmf-api/riskManagement/v4/shoppingCartRiskAssessment Content-Type: application/json  <pre>{   "characteristic": [     {       "name": "ContactPersonName",       "valueType": "string",       "value": "David Alexander"     }   ],   "shoppingCart": {</pre>

```

    "id": "1203",
    "@referredType": "ShoppingCart"
  },
  "place": {
    "role": "home address",
    "id": "234546467567334",
    "@referredType": "GeographicAddress"
  }
}

```

## Response

```

201

{
  "status": "Completed",
  "characteristic": [
    {
      "name": "ContactPersonName",
      "valueType": "string",
      "value": "David Alexander"
    }
  ],
  "shoppingCart": {
    "id": "1203",
    "href": "https://mycsp.com:8080/tmf-api/shoppingCart/v4/shoppingCart/1203",
    "@referredType": "ShoppingCart"
  },
  "place": {
    "@type": "RelatedPlace",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
    "@referredType": "GeographicAddress"
  },
  "riskAssessmentResult": {
    "overallScore": 12,
    "validFor": {
      "startDateTime": "2017-08-23T00:00:22.920Z",
      "endDateTime": "2018-03-25T00:00:22.920Z"
    },
    "score": [
      {
        "score": 0,
        "riskName": "IDConfidenceRisk"
      },
      {
        "score": 10,
        "riskName": "FraudRisk"
      },
      {
        "score": 13,

```

```
    "riskName": "BadPaymentRisk"
  },
  {
    "score": 9,
    "riskName": "CreditGamingRisk"
  }
]
```

### Delete shopping cart risk assessment

**DELETE** /shoppingCartRiskAssessment/{id}

#### Description

This operation deletes a shopping cart risk assessment entity.

#### Usage Samples

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

<b>Request</b>
DELETE /tmf-api/riskManagement/v4/shoppingCartRiskAssessment/777666123777
<b>Response</b>
204

## Operations on Product Order Risk Assessment

### List product order risk assessments

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

#### Description

This operation list product order risk assessment entities.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of a request for retrieving multiple tasks for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/productOrderRiskAssessment Accept: application/json
<b>Response</b>
200  [ { "id": "777666121999", "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/productOrderRiskAssessment/777666121999", "status": "InProgress", "characteristic": [ { "name": "CouponType", "valueType": "string", "value": "Discount21" } ], "productOrder": { "id": "267734", "href": "https://mycsp.com:8080/tmf-api/productOrder/v4/productOrder/267734", "@referredType": "ProductOrder" }, "place": { "@type": "RelatedPlace", "role": "home address", "id": "234546467567334", "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334", "@referredType": "GeographicAddress" } } ]

### Retrieve product order risk assessment

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

## Description

This operation retrieves a product order risk assessment entity.

Attribute selection is enabled for all first level attributes.

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

## Usage Samples

Here's an example of a request for retrieving a specific task for party role risk assessment.

<b>Request</b>
GET /tmf-api/riskManagement/v4/productOrderRiskAssessment/777666121999 Accept: application/json
<b>Response</b>
200  <pre>{   "id": "777666121999",   "href": "https://mycsp.com:8080/tmf-api/riskManagement/v4/productOrderRiskAssessment/777666121999",   "status": "InProgress",   "characteristic": [     {       "name": "CouponType",       "valueType": "string",       "value": "Discount21"     }   ],   "productOrder": {     "id": "267734",     "href": "https://mycsp.com:8080/tmf-api/productOrder/v4/productOrder/267734",     "@referredType": "ProductOrder"   },   "place": {     "@type": "RelatedPlace",     "role": "home address",     "id": "234546467567334",     "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",     "@referredType": "GeographicAddress"   } }</pre>

**Create product order risk assessment****POST /productOrderRiskAssessment****Description**

This operation creates a product order risk assessment entity.

**Mandatory and Non Mandatory Attributes**

The following tables provide the list of mandatory and non mandatory attributes when creating a ProductOrderRiskAssessment, 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
productOrder	

Non Mandatory Attributes	Rule
status	
@baseType	
@schemaLocation	
@type	
characteristic	
place	
riskAssessmentResult	

**Usage Samples**

Here's an example of a request for executing a task for party role risk assessment. In this example, we illustrate a synchronous execution with no persistence, so there is no id or href in the response.

Request
POST /tmf-api/riskManagement/v4/productOrderRiskAssessment Content-Type: application/json  <pre>{   "characteristic": [     {       "name": "CouponType",       "valueType": "string",       "value": "Discount21"     }   ],   "productOrder": {     "id": "267734",     "@referredType": "ProductOrder"   } },</pre>

```

"place": {
  "role": "home address",
  "id": "234546467567334",
  "@referredType": "GeographicAddress"
}
}

```

## Response

201

```

{
  "status": "Completed",
  "characteristic": [
    {
      "name": "CouponType",
      "valueType": "string",
      "value": "Discount21"
    }
  ],
  "productOrder": {
    "id": "267734",
    "href": "https://mycsp.com:8080/tmf-api/productOrder/v4/productOrder/267734",
    "@referredType": "ProductOrder"
  },
  "place": {
    "@type": "RelatedPlace",
    "role": "home address",
    "id": "234546467567334",
    "href": "https://mycsp.com:8080/tmf-api/geographicAddress/v4/geographicAddress/234546467567334",
    "@referredType": "GeographicAddress"
  },
  "riskAssessmentResult": {
    "overallScore": 16,
    "validFor": {
      "startDateTime": "2017-08-23T00:00:22.920Z",
      "endDateTime": "2018-03-25T00:00:22.920Z"
    }
  },
  "score": [
    {
      "score": 0,
      "riskName": "IDConfidenceRisk"
    },
    {
      "score": 0,
      "riskName": "PaymentMethodRisk"
    },
    {
      "score": 15,
      "riskName": "FraudRisk"
    }
  ]
}

```

```
    "score": 14,
    "riskName": "BadPaymentRisk"
  },
  {
    "score": 7,
    "riskName": "CreditGamingRisk"
  }
]
```

## Delete product order risk assessment

**DELETE** /productOrderRiskAssessment/{id}

### Description

This operation deletes a product order risk assessment entity.

### Usage Samples

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

<b>Request</b>
DELETE /tmf-api/riskManagement/v4/productOrderRiskAssessment/777666121999
<b>Response</b>
204

## API NOTIFICATIONS

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

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

### Register listener

#### POST /hub

#### Description

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

#### Behavior

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

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

#### Usage Samples

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

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

Unregister listener

**DELETE** /hub/{id}

### Description

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

### Behavior

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

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

### 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

## Document History

### Release History

Release Status	Date	Release led by:	Description
Release 0.1	24-Sep-2019	Moshe Zolotov Amdocs Moshe.Zolotov@amdocs.com	Initial work-in-progress iteration of draft.
Release 1.0	25-Mar-2020	Jonathan Goldberg, Amdocs Jonathan.Goldberg@Amdocs.com	Alignment with design guidelines, correcting examples
Pre-production	02-Oct-2020	Jonathan Goldberg, Amdocs Jonathan.Goldberg@Amdocs.com	2020 Sprint 5

### Version History

Version Number	Date	Release led by:	Description
4.0.0	02-Oct-2020	Alan Pope	Final edits prior to publication

## Acknowledgements

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