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OAuth 2.0 Rich Authorization Requests

Abstract

This document specifies a new parameter `authorization_details` that is used to carry fine-grained authorization data in OAuth messages.

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1. Introduction

The OAuth 2.0 authorization framework [[RFC6749](#)] defines the scope parameter that allows OAuth clients to specify the requested scope, i.e., the limited capability, of an access token. This mechanism is sufficient to implement static scenarios and coarse-grained authorization requests, such as "give me read access to the resource owner's profile" but it is not sufficient to specify fine-grained authorization requirements, such as "please let me transfer an amount of 45 Euros to Merchant A" or "please give me read access to directory A and write access to file X".

This specification introduces a new parameter `authorization_details` that allows clients to specify their fine-grained authorization requirements using the expressiveness of JSON [[RFC8259](#)] data structures.

For example, an authorization request for a credit transfer (designated as "payment initiation" in several open banking initiatives) can be represented using a JSON object like this:

```
{
  "type": "payment_initiation",
  "locations": [
    "https://example.com/payments"
  ],
  "instructedAmount": {
    "currency": "EUR",
    "amount": "123.50"
  },
  "creditorName": "Merchant A",
  "creditorAccount": {
    "bic": "ABCIDEFFXXX",
    "iban": "DE02100100109307118603"
  },
  "remittanceInformationUnstructured": "Ref Number Merchant"
}
```

Figure 1: Example authorization request for a credit transfer.

This object contains detailed information about the intended payment, such as amount, currency, and creditor, that are required to inform the user and obtain their consent. The authorization server (AS) and the respective resource server (RS) (providing the payment initiation API) will together enforce this consent.

For a comprehensive discussion of the challenges arising from new use cases in the open banking and electronic signing spaces see [[transaction-authorization](#)].

In addition to facilitating custom authorization requests, this specification also introduces a set of common data type fields for use across different APIs.

1.1. Conventions and Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here.

This specification uses the terms "access token", "refresh token", "authorization server", "resource server", "authorization endpoint", "authorization request", "authorization response", "token endpoint", "grant type", "access token request", "access token response", and "client" defined by The OAuth 2.0 Authorization Framework [[RFC6749](#)].

2. Request parameter "authorization_details"

The request parameter `authorization_details` contains, in JSON notation, an array of objects. Each JSON object contains the data to specify the authorization requirements for a certain type of resource. The type of resource or access requirement is determined by the `type` field, which is defined as follows:

type: An identifier for the authorization details type as a string. The value of the `type` field determines the allowable contents of the object which contains it and is unique for the described API in the context of the AS. This field is REQUIRED.

An `authorization_details` array MAY contain multiple entries of the same type.

This example shows an `authorization_details` of type `payment_initiation` using the example data shown above:

```
[
  {
    "type": "payment_initiation",
    "actions": [
      "initiate",
      "status",
      "cancel"
    ],
    "locations": [
      "https://example.com/payments"
    ],
    "instructedAmount": {
      "currency": "EUR",
      "amount": "123.50"
    },
    "creditorName": "Merchant A",
    "creditorAccount": {
      "iban": "DE02100100109307118603"
    },
    "remittanceInformationUnstructured": "Ref Number Merchant"
  }
]
```

Figure 2: Example authorization_details for a credit transfer.

This example shows a combined request asking for access to account information and permission to initiate a payment:

```
[
  {
    "type": "account_information",
    "actions": [
      "list_accounts",
      "read_balances",
      "read_transactions"
    ],
    "locations": [
      "https://example.com/accounts"
    ]
  },
  {
    "type": "payment_initiation",
    "actions": [
      "initiate",
      "status",
      "cancel"
    ],
    "locations": [
      "https://example.com/payments"
    ],
    "instructedAmount": {
      "currency": "EUR",
      "amount": "123.50"
    },
    "creditorName": "Merchant A",
    "creditorAccount": {
      "iban": "DE02100100109307118603"
    },
    "remittanceInformationUnstructured": "Ref Number Merchant"
  }
]
```

Figure 3: Example authorization_details for a combined request.

The JSON objects with type fields of account_information and payment_initiation represent the different authorization_details to be used by the AS to ask for consent.

Note: The AS will make this data subsequently available to the respective resource servers (see [Section 9](#)).

2.1. Authorization Details Types

Interpretation of the value of the type parameter, and the object fields that the type parameter allows, is under the control of the AS. However, the value of the type parameter is also generally documented and intended to be used by developers, it is RECOMMENDED

that API designers choose type values that are easily copied without ambiguity. For example, some glyphs have multiple Unicode code points for the same visual character, and a developer could potentially type a different character than what the AS has defined. Possible means of reducing potential confusion are limiting the value to ASCII [[RFC0020](#)] characters, providing a machine-readable listing of data type values, or instructing developers to copy and paste directly from the documentation.

If an application or API is expected to be deployed across different servers, such as the case in an open standard, the API designer is RECOMMENDED to use a collision-resistant namespace under their control, such as a URI that the API designer controls.

The following example shows how an implementation could utilize the namespace `https://scheme.example.org/` to ensure collision-resistant type values.

```
{
  "type": "https://scheme.example.org/files",
  "locations": [
    "https://example.com/files"
  ],
  "permissions": [
    {
      "path": "/myfiles/A",
      "access": [
        "read"
      ]
    },
    {
      "path": "/myfiles/A/X",
      "access": [
        "read",
        "write"
      ]
    }
  ]
}
```

Figure 4: Example for `authorization_details` with a URL as type identifier.

2.2. Common data fields

This specification defines a set of common data fields that are designed to be usable across different types of APIs. This specification does not require the use of these common fields by an

API definition, but instead provides them as reusable generic components for API designers to make use of. The allowable values of all fields are determined by the API being protected, as defined by a particular "type" value.

locations: An array of strings representing the location of the resource or resource server. These strings are typically URIs identifying the location of the RS. This field can allow a client to specify a particular RS, as discussed in [Section 12](#).

actions: An array of strings representing the kinds of actions to be taken at the resource.

datatypes: An array of strings representing the kinds of data being requested from the resource.

identifier: A string identifier indicating a specific resource available at the API.

privileges: An array of strings representing the types or levels of privilege being requested at the resource.

When different common data fields are used in combination, the permissions the client requests are the product of all the values. The object represents a request for all action values listed within the object to be used at all locations values listed within the object for all datatype values listed within the object. In the following example, the client is requesting read and write access to both the contacts and photos belonging to customers in a customer_information API. If this request is granted, the client would assume it would be able to use any combination of rights defined by the API, such as reading the photos and writing the contacts.

```
[
  {
    "type": "customer_information",
    "locations": [
      "https://example.com/customers"
    ],
    "actions": [
      "read",
      "write"
    ],
    "datatypes": [
      "contacts",
      "photos"
    ]
  }
]
```

Figure 5: Example for authorization_details with common data fields.

If the client wishes to have finer control over its access, it can send multiple objects. In this example, the client is asking for read access to the contacts and write access to the photos in the same API endpoint. If this request is granted, the client would not be able to write to the contacts.

```
[
  {
    "type": "customer_information",
    "locations": [
      "https://example.com/customers"
    ],
    "actions": [
      "read"
    ],
    "datatypes": [
      "contacts"
    ]
  },
  {
    "type": "customer_information",
    "locations": [
      "https://example.com/customers"
    ],
    "actions": [
      "write"
    ],
    "datatypes": [
      "photos"
    ]
  }
]
```

Figure 6: Example for `authorization_details` with common data fields in multiple objects.

An API MAY define its own extensions, subject to the type of the respective authorization object. It is anticipated that API designers will use a combination of common data fields defined in this specification as well as fields specific to the API itself. The following non-normative example shows the use of both common and API-specific fields as part of two different fictitious API type values. The first access request includes the actions, locations, and datatypes fields specified here as well as the API-specific geolocation field, indicating access to photos taken at the given coordinates. The second access request includes the actions and identifier fields specified here as well as the API-specific currency fields.

```
[
  {
    "type":"photo-api",
    "actions":[
      "read",
      "write"
    ],
    "locations":[
      "https://server.example.net/",
      "https://resource.local/other"
    ],
    "datatypes":[
      "metadata",
      "images"
    ],
    "geolocation":[
      {
        "lat":-32.364,
        "lng":153.207
      },
      {
        "lat":-35.364,
        "lng":158.207
      }
    ]
  },
  {
    "type":"financial-transaction",
    "actions":[
      "withdraw"
    ],
    "identifier":"account-14-32-32-3",
    "currency":"USD"
  }
]
```

Figure 7: Example for authorization_details using common and extension data fields.

If this request is approved, the resulting access token's access rights will be the union of the requested types of access for each of the two APIs, just as above.

3. Authorization Request

The `authorization_details` authorization request parameter can be used to specify authorization requirements in all places where the `scope` parameter is used for the same purpose, examples include:

- *Authorization requests as specified in [RFC6749],
- *Device Authorization Request as specified in [RFC8628],
- *Backchannel Authentication Requests as defined in [OpenID.CIBA].

In case of authorization requests as defined in [RFC6749], implementors MAY consider using pushed authorization requests [RFC9126] to improve the security, privacy, and reliability of the flow. See [Section 12](#), [Section 13](#), and [Section 11.4](#) for details.

Parameter encoding is determined by the respective context. In the context of an authorization request according to [RFC6749], the parameter is encoded using the application/x-www-form-urlencoded format of the serialized JSON as shown in the following using the example from [Section 2](#) (line breaks for display purposes only):

```
GET /authorize?response_type=code
&client_id=s6BhdRkqt3
&state=af0ifjsldkj
&redirect_uri=https%3A%2F%2Fclient.example.org%2Fcb
&code_challenge_method=S256
&code_challenge=K2-ltc83acc4h0c9w6ESC_rEMTJ3bwc-uCHaoeK1t8U
&authorization_details=%5B%7B%22type%22%3A%22account%5Finfo
rmation%22%2C%22actions%22%3A%5B%22list%5Faccounts%22%2C%22
read%5Fbalances%22%2C%22read%5Ftransactions%22%5D%2C%22loca
tions%22%3A%5B%22https%3A%2F%2Fexample%2Ecom%2Faccounts%22%
5D%7D%2C%7B%22type%22%3A%22payment%5Finitiation%22%2C%22act
ions%22%3A%5B%22initiate%22%2C%22status%22%2C%22cancel%22%5
D%2C%22locations%22%3A%5B%22https%3A%2F%2Fexample%2Ecom%2Fp
ayments%22%5D%2C%22instructedAmount%22%3A%7B%22currency%22%
3A%22EUR%22%2C%22amount%22%3A%22123%2E50%22%7D%2C%22credito
rName%22%3A%22Merchant%20A%22%2C%22creditorAccount%22%3A%7B%
22iban%22%3A%22DE02100100109307118603%22%7D%2C%22remittance
InformationUnstructured%22%3A%22RefNumberMerchant%22%7D%5D HTTP/1.1
Host: server.example.com
```

Figure 8: Example authorization request with `authorization_details`.

Based on the data provided in the `authorization_details` parameter the AS will ask the user for consent to the requested access permissions.

Note: the user may also grant a subset of the requested authorization details.

In this example, the client wants to get access to account information and initiate a payment:

```
[
  {
    "type": "account_information",
    "actions": [
      "list_accounts",
      "read_balances",
      "read_transactions"
    ],
    "locations": [
      "https://example.com/accounts"
    ]
  },
  {
    "type": "payment_initiation",
    "actions": [
      "initiate",
      "status",
      "cancel"
    ],
    "locations": [
      "https://example.com/payments"
    ],
    "instructedAmount": {
      "currency": "EUR",
      "amount": "123.50"
    },
    "creditorName": "Merchant A",
    "creditorAccount": {
      "iban": "DE02100100109307118603"
    },
    "remittanceInformationUnstructured": "Ref Number Merchant"
  }
]
```

Figure 9: URL decoded authorization_details.

3.1. Relationship to "scope" parameter

authorization_details and scope can be used in the same authorization request for carrying independent authorization requirements.

Combined use of authorization_details and scope is supported by this specification in part to allow existing OAuth-based applications to incrementally migrate towards using authorization_details

exclusively. It is RECOMMENDED that a given API use only one form of requirement specification.

The AS MUST process both sets of requirements in combination with each other for the given authorization request. The details of how the AS combines these parameters are specific to the APIs being protected and outside the scope of this specification.

When gathering user consent, the AS MUST present the merged set of requirements represented by the authorization request.

If the resource owner grants the client the requested access, the AS will issue tokens to the client that are associated with the respective `authorization_details` (and scope values, if applicable).

3.2. Relationship to "resource" parameter

The resource authorization request parameter as defined in [\[RFC8707\]](#) can be used to further determine the resources where the requested scope can be applied. The resource parameter does not have any impact on the way the AS processes the `authorization_details` authorization request parameter.

4. Authorization Response

This specification does not define extensions to the authorization response.

5. Authorization Error Response

The AS MUST refuse to process any unknown authorization details type or authorization details not conforming to the respective type definition. The AS MUST abort processing and respond with an error `invalid_authorization_details` to the client if any of the following are true of the objects in `authorization_details` structure:

- *Contains an unknown authorization details type value,
- *An object of known type but containing unknown fields,
- *Contains fields of the wrong type for the authorization details type,
- *Contains fields with invalid values for the authorization details type, or
- *Missing required fields for the authorization details type.

6. Token Request

The `authorization_details` token request parameter can be used to specify the authorization details a client wants the AS to assign to an access token. The AS checks whether the underlying grant (in case of grant types `authorization_code`, `refresh_token`, ...) or the

client's policy (in case of grant type `client_credential`) allows the issuance of an access token with the requested authorization details. Otherwise, the AS refuses the request with the error code `invalid_authorization_details` (similar to `invalid_scope`).

6.1. Comparing authorization details

Many actions in the OAuth protocol allow the AS and RS to make security decisions based on whether the request is asking for "more" or "less" than a previous, existing request. For example, upon refreshing a token, the client can ask for a new access token with "fewer permissions" than had been previously authorized by the resource owner. The requested access token will convey the reduced permissions but the resource owner's previous authorization is unchanged by such requests. Since the semantics of the fields in the `authorization_details` will be implementation specific to a given API or set of APIs, there is no standardized mechanism to compare two arbitrary authorization detail requests. Authorization servers should not rely on simple object comparison in most cases, as the intersection of some fields within a request could have side effects on the access rights granted, depending on how the API has been designed and deployed. This is a similar effect to the scope values used with some APIs.

When comparing a new request to an existing request, authorization servers can use the same processing techniques as used in granting the request in the first place to determine if a resource owner needs to authorize the request. The details of this comparison are dependent on the definition of the type of authorization request and outside the scope of this specification, but common patterns can be applied.

This shall be illustrated using our running example. The example authorization request in [Section 3](#), if approved by the user, resulted in the issuance of an authorization code associated with the privileges to

- *list accounts
- *access the balance of one or more accounts,
- *access the transactions of one or more accounts, and
- *to initiate, check the status of, and cancel a payment.

The client could now request the AS to issue an access token assigned with the privilege to just access a list of accounts as follows:

```
[
  {
    "type": "account_information",
    "actions": [
      "list_accounts"
    ],
    "locations": [
      "https://example.com/accounts"
    ]
  }
]
```

Figure 10: Example for authorization_details reduced privileges.

The example API is designed such that each field used by the account_information type contains additive rights, with each value within the actions and locations arrays specifying a different element of access. To make a comparison in this instance, the AS would perform the following steps:

- *compare that the authorization code issued in the previous step contains an authorization details object of type account_information
- *compare whether the approved list of actions contains list_account, and
- *whether the locations value includes only previously-approved locations.

If all checks succeed, the AS would issue the requested access token with the reduced set of access.

Note that this comparison is relevant to this specific API type definition. A different API type definition could have different processing rules. For example, the value of an action could subsume the rights associated with another action value. For example, if a client initially asks for a token with write access, which implies both read and write access to this API:

```
[
  {
    "type": "example_api",
    "actions": [
      "write"
    ]
  }
]
```

Figure 11: Example for authorization_details requesting "write" access to an API.

Later that same client makes a refresh request for read access:

```
[
  {
    "type": "example_api",
    "actions": [
      "read"
    ]
  }
]
```

Figure 12: Example for authorization_details requesting "read" access to an API.

The AS would compare the type value and the action value to determine that the read access is already covered by the write access previously granted to the client.

This same API could be designed with a possible value for privileges of admin, used in this example to denote that the resulting token is allowed to perform any functions on the resources. If that client is then granted such admin privileges to the API:

```
[
  {
    "type": "example_api",
    "privileges": [
      "admin"
    ]
  }
]
```

Figure 13: Example for authorization_details requesting "admin" access to an API.

The AS would compare the type value and find the privileges value subsumes any aspects of read or write access that had been granted to the client previously. Note that other API definitions can use privileges such that values do not subsume one another.

The next example shows how the client can use the common data element locations (see [Section 2.2](#)) to request the issuance of an access token restricted to a certain resource server. In our running example, the client may ask for all permissions of the approved grant of type payment_iniation applicable to the resource server residing at <https://example.com/payments> as follows:


```
[
  {
    "type": "payment_initiation",
    "locations": [
      "https://example.com/payments"
    ]
  }
]
```

Figure 14: Example for authorization_details requesting an audience restricted access token.

7. Token Response

In addition to the token response parameters as defined in [\[RFC6749\]](#), the authorization server MUST also return the authorization_details as granted by the resource owner and assigned to the respective access token.

The authorization details assigned to the access token issued in a token response are determined by the authorization_details parameter of the corresponding token request. If the client does not specify the authorization_details token request parameters, the AS determines the resulting authorization_details at its discretion.

The AS MAY omit values in the authorization_details to the client.

For our running example, this would look like this:

```

HTTP/1.1 200 OK
Content-Type: application/json
Cache-Control: no-store

{
  "access_token": "2YotnFZFEjr1zCsicMWpAA",
  "token_type": "example",
  "expires_in": 3600,
  "refresh_token": "tGzv3J0kF0XG5Qx2TlKWIA",
  "authorization_details": [
    {
      "type": "payment_initiation",
      "actions": [
        "initiate",
        "status",
        "cancel"
      ],
      "locations": [
        "https://example.com/payments"
      ],
      "instructedAmount": {
        "currency": "EUR",
        "amount": "123.50"
      },
      "creditorName": "Merchant A",
      "creditorAccount": {
        "iban": "DE02100100109307118603"
      },
      "remittanceInformationUnstructured": "Ref Number Merchant"
    }
  ]
}

```

Figure 15: Example token response.

7.1. Enriched authorization details in Token Response

The authorization details attached to the access token MAY differ from what the client requests. In addition to the user authorizing less than what the client requested, there are some use cases where the authorization server enriches the data in an authorization details object. Whether enrichment is allowed and specifics of how it works are necessarily part of the definition of the respective authorization details type.

As one example, a client may ask for access to account information but leave the decision about the specific accounts it will be able to access to the user. The user would, during the course of the authorization process, select the subset of their accounts that they

want to allow the client to access. As one design option to convey the selected accounts, the authorization server could add this information to the respective authorization details object.

In that example, the requested authorization detail parameter might look like the following. In this example the empty arrays serve as placeholders for where data will be added during enrichment by the AS. This example is illustrative only and is not intended to suggest a preference for designing the specifics of any authorization details type this way.

```
"authorization_details": [  
  {  
    "type": "account_information",  
    "access": {  
      "accounts": [],  
      "balances": [],  
      "transactions": []  
    },  
    "recurringIndicator":true  
  }  
]
```

Figure 16: Example for requested authorization_details.

The authorization server then would expand the authorization details object and add the respective account identifiers.

```
HTTP/1.1 200 OK
Content-Type: application/json
Cache-Control: no-store
```

```
{
  "access_token":"2YotnFZFEjr1zCsicMWpAA",
  "token_type":"example",
  "expires_in":3600,
  "refresh_token":"tGzv3JokF0XG5Qx2TlKWIA",
  "authorization_details":[
    {
      "type":"account_information",
      "access":{
        "accounts":[
          {
            "iban":"DE2310010010123456789"
          },
          {
            "maskedPan":"123456xxxxxx1234"
          }
        ],
        "balances":[
          {
            "iban":"DE2310010010123456789"
          }
        ],
        "transactions":[
          {
            "iban":"DE2310010010123456789"
          },
          {
            "maskedPan":"123456xxxxxx1234"
          }
        ]
      },
      "recurringIndicator":true
    }
  ]
}
```

Figure 17: Example for enriched authorization_details.

For another example, the client is asking for access to a medical record but does not know the record number at request time. In this example, the client specifies the type of access it wants but doesn't specify the location or identifier of that access.

```
{
  "authorization_details": [
    {
      "type": "medical_record",
      "sens": [ "HIV", "ETH", "MART" ],
      "actions": [ "read" ],
      "datatypes": [ "Patient", "Observation", "Appointment" ]
    }
  ]
}
```

Figure 18: Example for requested authorization_details.

When the user interacts with the AS, they select which of the medical records they are responsible for giving to the client. This information gets returned with the access token.

```
{
  "access_token": "2YotnFZFEjr1zCsicMWpAA",
  "token_type": "example",
  "expires_in": 3600,
  "refresh_token": "tGzv3JokF0XG5Qx2TlKWIA",
  "authorization_details": [
    {
      "type": "medical_record",
      "sens": [ "HIV", "ETH", "MART" ],
      "actions": [ "read" ],
      "datatypes": [ "Patient", "Observation", "Appointment" ],
      "identifier": "patient-541235",
      "locations": [ "https://records.example.com/" ]
    }
  ]
}
```

Figure 19: Example for enriched authorization_details.

Note: the client needs to be aware upfront of the possibility that a certain authorization details object can be enriched. It is assumed that this property is part of the definition of the respective authorization details type.

8. Token Error Response

The Token Error Response MUST conform to the rules given in [Section 5](#).

9. Resource Servers

In order to enable the RS to enforce the authorization details as approved in the authorization process, the AS MUST make this data

available to the RS. The AS MAY add the `authorization_details` field to access tokens in JWT format or to Token Introspection responses.

9.1. JWT-based Access Tokens

If the access token is a JWT [[RFC7519](#)], the AS is RECOMMENDED to add the `authorization_details` object, filtered to the specific audience, as a top-level claim.

The AS will typically also add further claims to the JWT the RS requires for request processing, e.g., user id, roles, and transaction-specific data. What claims the particular RS requires is defined by the RS-specific policy with the AS.

The following shows the contents of an example JWT for the payment initiation example above:

```

{
  "iss": "https://as.example.com",
  "sub": "24400320",
  "aud": "a7AfcPcs12",
  "exp": 1311281970,
  "acr": "psd2_sca",
  "txn": "8b4729cc-32e4-4370-8cf0-5796154d1296",
  "authorization_details": [
    {
      "type": "https://scheme.example.com/payment_initiation",
      "actions": [
        "initiate",
        "status",
        "cancel"
      ],
      "locations": [
        "https://example.com/payments"
      ],
      "instructedAmount": {
        "currency": "EUR",
        "amount": "123.50"
      },
      "creditorName": "Merchant A",
      "creditorAccount": {
        "iban": "DE02100100109307118603"
      },
      "remittanceInformationUnstructured": "Ref Number Merchant"
    }
  ],
  "debtorAccount": {
    "iban": "DE40100100103307118608",
    "user_role": "owner"
  }
}

```

Figure 20: Example for authorization_details in JWT-based access token.

In this case, the AS added the following example claims to the JWT-based access token:

- *sub: conveys the user on which behalf the client is asking for payment initiation
- *txn: transaction id used to trace the transaction across the services of provider example.com
- *debtorAccount: API-specific field containing the debtor account. In the example, this account was not passed in the authorization_details but selected by the user during the authorization process. The field user_role conveys the role the user has with respect to this particular account. In this case,

they are the owner. This data is used for access control at the payment API (the RS).

9.2. Token Introspection

Token introspection [[RFC7662](#)] provides a means for an RS to query the AS to determine information about an access token. If the AS includes authorization detail information for the token in its response, the information MUST be conveyed with `authorization_details` as a top-level member of the introspection response JSON object. The `authorization_details` member MUST contain the same structure defined in [Section 2](#), potentially filtered and extended for the RS making the introspection request.

Here is an example introspection response for the payment initiation example:


```

{
  "active": true,
  "sub": "24400320",
  "aud": "s6BhdRkqt3",
  "exp": 1311281970,
  "acr": "psd2_sca",
  "txn": "8b4729cc-32e4-4370-8cf0-5796154d1296",
  "authorization_details": [
    {
      "type": "https://scheme.example.com/payment_initiation",
      "actions": [
        "initiate",
        "status",
        "cancel"
      ],
      "locations": [
        "https://example.com/payments"
      ],
      "instructedAmount": {
        "currency": "EUR",
        "amount": "123.50"
      },
      "creditorName": "Merchant123",
      "creditorAccount": {
        "iban": "DE02100100109307118603"
      },
      "remittanceInformationUnstructured": "Ref Number Merchant"
    }
  ],
  "debtorAccount": {
    "iban": "DE40100100103307118608",
    "user_role": "owner"
  }
}

```

Figure 21: Example for authorization_details in introspection response.

10. Metadata

To advertise its support for this feature, the supported list of authorization details types is included in the AS metadata response [[RFC8414](#)] using the metadata parameter `authorization_details_types_supported`, which is a JSON array.

This is illustrated by the following example:

```

{
  ...
  "authorization_details_types_supported":[
    "payment_initiation",
    "account_information"
  ]
}

```

Figure 22: Example for server metadata about the supported authorization details.

Clients MAY indicate the authorization details types they will use when requesting authorization with the client registration metadata parameter `authorization_details_types`, which is a JSON array.

This is illustrated by the following example:

```

{
  ...
  "authorization_details_types":[
    "payment_initiation"
  ]
}

```

Figure 23: Example for server metadata about authorization details.

The registration of authorization details types with the AS is out of scope of this specification.

11. Implementation Considerations

11.1. Using authorization details in a certain deployment

Using authorization details in a certain deployment will require the following steps:

- *Define authorization details types
- *Publish authorization details types in the OAuth server metadata
- *Determine how authorization details are shown to the user in the user consent prompt
- *(if needed) Enrich authorization details in the user consent process (e.g. add selected accounts or set expirations)
- *(if needed) Determine how authorization details are reflected in access token content or introspection responses
- *Determine how the resource server(s) process(s) the authorization details or token data derived from authorization details
- *(if needed) Entitle clients to use certain authorization details types

11.2. Minimal implementation support

General authorization server implementations supporting this specification should provide the following basic functions:

- *Support advertisement of supported authorization details types in OAuth server metadata
- *Accept `authorization_details` parameter in authorization requests in conformance with this specification
- *Support storage of consented authorization details as part of a grant
- *Implement default behavior for adding authorization details to access tokens and token introspection responses in order to make them available to resource servers (similar to scope values). This should work with any grant type, especially `authorization_code` and `refresh_token`.

Processing and presentation of authorization details will vary significantly among different authorization details types. Implementations should therefore support customization of the respective behavior. In particular, implementations should:

- *allow deployments to determine presentation of the authorization details
- *allow deployments to modify requested authorization details in the user consent process, e.g. adding fields
- *allow deployments to merge requested and pre-existing authorization details

One approach to supporting such customization would be to have a mechanism allowing the registration of extension modules, each of them responsible for rendering the respective user consent and any transformation needed to provide the data needed to the resource server by way of structured access tokens or token introspection responses.

11.3. Use of Machine-readable Type Schemas

Implementations might allow deployments to use machine-readable schema languages for defining authorization details types to facilitate creating and validating authorization details objects against such schemas. For example, if an authorization details type were defined using JSON Schemas [[JSON.Schema](#)], the JSON Schema identifier could be used as type value in the respective authorization details objects.

Note however that type values are identifiers understood by the AS and, to the extent necessary, the client and RS. This specification makes no assumption that a type value point to a machine-readable schema format, or that any party in the system (such as the client,

AS, or RS) dereference or process the contents of the type field in any specific way.

11.4. Large requests

Authorization request URIs containing authorization_details in a request parameter or a request object can become very long. Implementers should therefore consider using the request_uri parameter as defined in [\[RFC9101\]](#) in combination with the pushed request object mechanism as defined in [\[RFC9126\]](#) to pass authorization_details in a reliable and secure manner. Here is an example of such a pushed authorization request that sends the authorization request data directly to the AS via an HTTPS-protected connection:

```
POST /as/par HTTP/1.1
Host: as.example.com
Content-Type: application/x-www-form-urlencoded
Authorization: Basic czZCaGRSa3F0Mzo3RmpmcDBaQnIxS3REUmJuZlZkbUl3

response_type=code&
client_id=s6BhdRkqt3
&state=af0ifjsldkj
&redirect_uri=https%3A%2F%2Fclient.example.org%2Fcb
&code_challenge_method=S256
&code_challenge=K2-ltc83acc4h0c9w6ESC_rEMTJ3bwc-uCHaoeK1t8U
&authorization_details=%5B%7B%22type%22%3A%22account_information%22%2C%22actions%22%3A%5B%22list_accounts%22%2C%22read_balances%22%2C%22read_transactions%22%5D%2C%22locations%22%3A%5B%22https%3A%2F%2Fexample.com%2Faccounts%22%5D%7D%2C%7B%22type%22%3A%22payment_initiation%22%2C%22actions%22%3A%5B%22initiate%22%2C%22status%22%2C%22cancel%22%5D%2C%22locations%22%3A%5B%22https%3A%2F%2Fexample.com%2Fpayments%22%5D%2C%22instructedAmount%22%3A%7B%22currency%22%3A%22EUR%22%2C%22amount%22%3A%22123.50%22%7D%2C%22creditorName%22%3A%22Merchant123%22%2C%22creditorAccount%22%3A%7B%22iban%22%3A%22DE02100100109307118603%22%7D%2C%22remittanceInformationUnstructured%22%3A%22Ref%20Number%20Merchant%22%7D%5D
```

Figure 24: Example for large request including authorization_details.

12. Security Considerations

The authorization_details parameter is sent through the user agent in case of an OAuth authorization request, which makes them vulnerable to modifications by the user. If integrity of the authorization_details is a concern, clients MUST protect authorization_details against tampering and swapping. This can be achieved by signing the request using signed request objects as defined in [\[RFC9101\]](#) or using the request_uri authorization request

parameter as defined in [\[RFC9101\]](#) in conjunction with [\[RFC9126\]](#) to pass the URI of the request object to the authorization server.

All string comparisons in an `authorization_details` parameter are to be done as defined by [\[RFC8259\]](#). No additional transformation or normalization is to be done in evaluating equivalence of string values.

The common data field locations allows a client to specify where it intends to use a certain authorization, i.e., it is possible to unambiguously assign permissions to resource servers. In situations with multiple resource servers, this prevents unintended client authorizations (e.g. a read scope value potentially applicable for an email as well as a cloud service) through audience restriction.

The AS MUST properly sanitize and handle the data passed in the `authorization_details` in order to prevent injection attacks.

The Security Considerations of [\[RFC6749\]](#), [\[RFC7662\]](#), and [\[RFC8414\]](#) also apply.

13. Privacy Considerations

It is especially important for implementers to design and use authorization details in a privacy-preserving manner.

Any sensitive personal data included in `authorization_details` must be prevented from leaking, e.g., through referrer headers. Implementation options include encrypted request objects as defined in [\[RFC9101\]](#) or transmission of `authorization_details` via end-to-end encrypted connections between client and authorization server by utilizing [\[RFC9126\]](#) and the `request_uri` authorization request parameter as defined in [\[RFC9101\]](#). The latter does not require application level encryption but it requires another message exchange between client and AS.

Even if the request data is encrypted, an attacker could use the authorization server to learn the user's data by injecting the encrypted request data into an authorization request on a device under their control and use the authorization server's user consent screens to show the (decrypted) user data in the clear. Implementations need to consider this attack vector and implement appropriate countermeasures, e.g. by only showing portions of the data or, if possible, determining whether the assumed user context is still the same (after user authentication).

The AS needs to take into consideration the privacy implications when sharing `authorization_details` with the client or resource servers. The AS should share this data with those parties on a "need to know" basis as determined by local policy.

14. Acknowledgements

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15. IANA Considerations

15.1. OAuth Parameters Registration

This specification requests registration of the following parameter in the "OAuth Parameters" registry [[IANA.OAuth.Parameters](#)] established by [[RFC6749](#)].

Name: authorization_details

Parameter Usage Location: authorization request, token request, token response

Change Controller: IETF

Specification Document(s): [[this document]]

15.2. JSON Web Token Claims Registration

This specification requests registration of the following value in the IANA "JSON Web Token Claims" registry established by [[RFC7519](#)].

Claim Name: authorization_details

Claim Description: The claim authorization_details contains a JSON array of JSON objects representing the rights of the access token. Each JSON object contains the data to specify the authorization requirements for a certain type of resource.

Change Controller: IETF

Specification Document(s): [Section 9.1](#) of [[this document]]

15.3. OAuth Token Introspection Response Registration

This specification requests registration of the following value in the IANA "OAuth Token Introspection Response" registry established by [[RFC7662](#)].

Name: authorization_details

Description: The member authorization_details contains a JSON array of JSON objects representing the rights of the access token. Each JSON object contains the data to specify the authorization requirements for a certain type of resource.

Change Controller: IETF

Specification Document(s): [Section 9.2](#) of [[this document]]

15.4. OAuth Authorization Server Metadata Registration

This specification requests registration of the following values in the IANA "OAuth Authorization Server Metadata" registry of [\[IANA.OAuth.Parameters\]](#) established by [\[RFC8414\]](#).

Metadata Name: authorization_details_types_supported

Metadata Description: JSON array containing the authorization details types the AS supports

Change Controller: IETF

Specification Document(s): [Section 10](#) of [[this document]]

15.5. OAuth Dynamic Client Registration Metadata Registration

This specification requests registration of the following value in the IANA "OAuth Dynamic Client Registration Metadata" registry of [\[IANA.OAuth.Parameters\]](#) established by [\[RFC7591\]](#).

Metadata Name: authorization_details_types

Metadata Description: Indicates what authorization details types the client uses.

Change Controller: IETF

Specification Document(s): [Section 10](#) of [[this document]]

15.6. OAuth Extensions Error Registration

This specification requests registration of the following value in the IANA "OAuth Extensions Error" registry of [\[IANA.OAuth.Parameters\]](#) established by [\[RFC6749\]](#).

Error name: invalid_authorization_details

Error usage location: token endpoint, authorization endpoint

Related protocol extension: OAuth 2.0 Rich Authorization Requests

Change Controller: IETF

Reference: [Section 5](#) of [[this document]]

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Appendix A. Additional Examples

A.1. OpenID Connect

OpenID Connect [OIDC] specifies the JSON-based claims request parameter that can be used to specify the claims a client (acting as OpenID Connect Relying Party) wishes to receive in a fine-grained and privacy-preserving way as well as assign those claims to certain delivery mechanisms, i.e. ID Token or userinfo response.

The combination of the scope value openid and the additional parameter claims can be used beside authorization_details in the same way as every non-OIDC scope value.

Alternatively, there could be an authorization details type for OpenID Connect. This section gives an example of what such an authorization details type could look like, but defining this authorization details type is outside the scope of this specification.

These hypothetical examples try to encapsulate all details specific to the OpenID Connect part of an authorization process into an authorization JSON object.

The top-level field are based on the definitions given in [\[OIDC\]](#):

- *claim_sets: names of predefined claim sets, replacement for respective scope values, such as profile
- *max_age: Maximum Authentication Age
- *acr_values: requested Authentication Context Class Reference (ACR) values.
- *claims: the claims JSON structure as defined in [\[OIDC\]](#)

This is a simple request for some claim sets.

```
[
  {
    "type": "openid",
    "locations": [
      "https://op.example.com/userinfo"
    ],
    "claim_sets": [
      "email",
      "profile"
    ]
  }
]
```

Figure 25: Example for OpenID Connect request utilizing authorization_details.

Note: locations specifies the location of the userinfo endpoint since this is the only place where an access token is used by a client (RP) in OpenID Connect to obtain claims.

A more sophisticated example is shown in the following

```
[
  {
    "type": "openid",
    "locations": [
      "https://op.example.com/userinfo"
    ],
    "max_age": 86400,
    "acr_values": "urn:mace:incommon:iap:silver",
    "claims": {
      "userinfo": {
        "given_name": {
          "essential": true
        },
        "nickname": null,
        "email": {
          "essential": true
        },
        "email_verified": {
          "essential": true
        },
        "picture": null,
        "http://example.com/claims/groups": null
      },
      "id_token": {
        "auth_time": {
          "essential": true
        }
      }
    }
  }
]
```

Figure 26: Advanced example for OpenID Connect request utilizing authorization_details.

A.2. Remote Electronic Signing

The following example is based on the concept laid out for remote electronic signing in ETSI TS 119 432 [[ETSI](#)] and the CSC API for remote signature creation [[CSC](#)].

```
[
  {
    "type": "sign",
    "locations": [
      "https://signing.example.com/signdoc"
    ],
    "credentialID": "60916d31-932e-4820-ba82-1fcead1c9ea3",
    "documentDigests": [
      {
        "hash": "sT0gwOm+474gFj0q0x1iSNspKqbcse4IeiqlDg/HWuI=",
        "label": "Credit Contract"
      },
      {
        "hash": "HZQzZmMAIWekfGH0/ZKW1nsdt0xg3H6bZYztgsMTLw0=",
        "label": "Contract Payment Protection Insurance"
      }
    ],
    "hashAlgorithmOID": "2.16.840.1.101.3.4.2.1"
  }
]
```

Figure 27: Example for electronic signing.

The top-level fields have the following meaning:

- *credentialID: identifier of the certificate to be used for signing
- *documentDigests: array containing the hash of every document to be signed (hash fields). Additionally, the corresponding label field identifies the respective document to the user, e.g. to be used in user consent.
- *hashAlgorithm: algorithm that was used to calculate the hash values.

The AS is supposed to ask the user for consent for the creation of signatures for the documents listed in the structure. The client uses the access token issued as a result of the process to call the sign doc endpoint at the respective signing service to actually create the signature. This access token is bound to the client, the user id and the hashes (and signature algorithm) as consented by the user.

A.3. Access to Tax Data

This example is inspired by an API allowing third parties to access citizen's tax declarations and income statements, for example, to determine their creditworthiness.

```
[
  {
    "type": "tax_data",
    "locations": [
      "https://taxservice.govehub.no.example.com"
    ],
    "actions": "read_tax_declaration",
    "periods": ["2018"],
    "duration_of_access": 30,
    "tax_payer_id": "23674185438934"
  }
]
```

Figure 28: Example for tax data access.

The top-level fields have the following meaning:

- *periods: determines the periods the client wants to access
- *duration_of_access: how long does the client intend to access the data in days
- *tax_payer_id: identifier of the taxpayer (if known to the client)

A.4. eHealth

These two examples are inspired by requirements for APIs used in the Norwegian eHealth system.

In this use case, the physical therapist sits in front of their computer using a local Electronic Health Records (EHR) system. They want to look at the electronic patient records of a certain patient and they also want to fetch the patients journal entries in another system, perhaps at another institution or a national service. Access to this data is provided by an API.

The information necessary to authorize the request at the API is only known by the EHR system, and must be presented to the API.

In the first example, the authorization details object contains the identifier of an organization. In this case, the API needs to know if the given organization has the lawful basis for processing personal health information to give access to sensitive data.

```

"authorization_details": {
  "type": "patient_record",
  "requesting_entity": {
    "type": "Practitioner",
    "identifier": [
      {
        "system": "urn:oid:2.16.578.1.12.4.1.4.4",
        "value": "1234567"
      }
    ],
    "practitioner_role": {
      "organization": {
        "identifier": {
          "system": "urn:oid:2.16.578.1.12.4.1.2.101",
          "type": "ENH",
          "value": "[organizational number]"
        }
      }
    }
  }
}

```

Figure 29: eHealth Example.

In the second example, the API requires more information to authorize the request. In this case, the authorization details object contains additional information about the health institution and the current profession the user has at the time of the request. The additional level of detail could be used for both authorization and data minimization.

```
[
  {
    "type": "patient_record",
    "location": "https://fhir.example.com/patient",
    "actions": [
      "read"
    ],
    "patient_identifier": [
      {
        "system": "urn:oid:2.16.578.1.12.4.1.4.1",
        "value": "12345678901"
      }
    ],
    "reason_for_request": "Clinical treatment",
    "requesting_entity": {
      "type": "Practitioner",
      "identifier": [
        {
          "system": "urn:oid:2.16.578.1.12.4.1.4.4",
          "value": "1234567"
        }
      ]
    },
    "practitioner_role": {
      "organization": {
        "identifier": [
          {
            "system": "urn:oid:2.16.578.1.12.4.1.2.101",
            "type": "ENH",
            "value": "<organizational number>"
          }
        ]
      },
      "type": {
        "coding": [
          {
            "system":
              "http://hl7.example.org/fhir/org-type",
            "code": "dept",
            "display": "Hospital Department"
          }
        ]
      },
      "name": "Akuttmottak"
    },
    "profession": {
      "coding": [
        {
          "system": "http://snomed.example.org/sct",
          "code": "36682004",
          "display": "Physical therapist"
        }
      ]
    }
  }
]
```

```
]
  }
  }
  }
  }
  ]
}
```


Figure 30: Advanced eHealth example.

Description of the fields:

- *patient_identifier: the identifier of the patient composed of a system identifier in OID format (namespace) and the actual value within this namespace.
- *reason_for_request: the reason why the user wants to access a certain API
- *requesting_entity: specification of the requester by means of identity, role and organizational context. This data is provided to facilitate authorization and for auditing purposes.

In this use case, the AS authenticates the requester, who is not the patient, and approves access based on policies.

Appendix B. Document History

[[To be removed from the final specification]]

-22

- *Add clarifying language around the geolocation example and Section 6.1 per Paul Wouters' ballot comment

-21

- *incorporated feedback from Robert Wilton and É (U+00C9)ric Vyncke

-20

- *incorporated feedback from Murray Kucherawy

-19

- *incorporated feedback from Lars Eggert

-18

- *IANA Considerations cleanup

-17

- *incorporated feedback from Genart review

-16

- *incorporated feedback from Sec Dir review

-15

- *Editorial updates from Roman Danyliw's AD review
- *Other editorial updates

-14

- *Added clarification regarding authorization details types matching
- *Removed duplicate text on use of "scope" and "resource" parameters alongside "authorization_details"
- *Replaced duplicate error response description in Section 8 with reference to Section 5

-13

- *Editorial updates from Roman Danyliw's AD review
- *Removed normative language from field definitions.

-12

- *Clarify introspection response.
- *Editorial updates

-11

- *Updated IANA registrations adding authorization_details parameter

-10

- *Updated IANA registrations

-09

- *Incorporated feedback by Hannes as document shepherd

-08

- *formatting in authorization details type section
- *added example for privileges common data element

-07

- *incorporated review feedback from WGLC
- *fixed wording in token introspection section
- *added privacy considerations re authorization details in token response

-06

- *removed use of resource indicators to filter authorization details in token response

-05

- *added authorization_details token request parameter and discussion on authorization details comparison
- *added privileges field to authorization details (to align with GNAP)
- *added IANA text and changed metadata parameter names
- *added text about use of machine-readable type schemas, e.g. JSON Schema
- *added text on how authorization details are determined for access token issued with token response
- *added token error response and further error conditions to authorization error response

-04

- *restructured draft for better readability
- *simplified normative text about use of the resource parameter with authorization_details
- *added implementation considerations for deployments and products
- *added type union language from GNAP
- *added recommendation to use PAR to cope with large requests and for request protection

-03

- *Updated references to current revisions or RFC numbers
- *Added section about enrichment of authorization details objects by the AS
- *Clarified processing of unknown authorization details parameters
- *clarified dependencies between resource and authorization_details parameters

-02

- *Clarify "type" parameter processing

-01

- *Minor fix-up in a few examples

-00 (WG draft)

- *initial WG revision

-03

- *Reworked examples to illustrate privacy preserving use of authorization_details
- *Added text on audience restriction
- *Added description of relationship between scope and authorization_details
- *Added text on token request & response and authorization_details
- *Added text on how authorization details are conveyed to RSs by JWTs or token introspection endpoint response
- *Added description of relationship between claims and authorization_details
- *Added more example from different sectors
- *Clarified string comparison to be byte-exact without collation

-02

- *Added Security Considerations
- *Added Privacy Considerations
- *Added notes on URI size and authorization details
- *Added requirement to return the effective authorization details granted by the resource owner in the token response
- *changed authorization_details structure from object to array
- *added Justin Richer & Brian Campbell as Co-Authors

-00 / -01

- *first draft

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