Out of Band Authentication Adapter

Adapter Loading Process

The ActiveAccess ACS performs Out Of Band (OOB) challenges through OOB Adapters, which connect the existing OOB authentication system with ActiveAccess. During 3DSecure 2.0 challenge flows where OOB Authentication is required, the `ACS` will trigger the external OOB process and perform interactions with the Cardholder via the OOB Adapters.

For this purpose, the `ACS` communicates with the existing `OOB-System` via a middleware, known as the OOB Adapter. The OOB Adapter can be either loaded locally by the ACS or communicated via HTTP calls, known as the Native API and REST API versions respectively.

Native API version of OOB Adapter

The Native API version of OOB Adapter is known as `oob.adapter` in this specification. The Native Adapters are provided in the form of `JAR` files, by GPayments or ActiveAccess clients. Only Java is supported for the Native API version of OOB Adapter.

Native OOB Adapter developers provide the adapters in one or more JAR files. The `oob.adapter` implementation in the adapter must implement the Java interface `OobAdapterService`.

Implementation Steps

The steps for implementing OOB Adapter are:

1. OOB Adapter developers create a Java project and obtain the corresponding Adapter API library from the ActiveAccess package. This library contains the interface definition for `oob.adapter`.

2. The Native API Adapter should be implemented as a Service based on the OOB interface `OobAdapterService`. This specific implementation of the service known as *service provider*. `ACS` loads this class in startup and uses it in OOB Authentication. The requirement enforced by `ACS` is that *provider class* must have a public zero-argument constructor so that it can be instantiated during loading.

3. A service provider is identified by placing a *provider-configuration file* in the resource directory `META-INF/services` . The file's name is the fully-qualified binary name of the service's type, e.g. `com.gpayments.acs.oob.OobAdapterService` . The file contains a list of fully-qualified binary names of concrete provider classes, one per line. Space and tab characters surrounding each name, as well as blank lines, are ignored. The comment character is ' `#` ' ('\u0023', NUMBER SIGN); on each line all characters following the first comment character are ignored. The file must be encoded in `UTF-8` .

OobAdapterService methods

`OobAdapterService` interface has four methods:

- **ping:** Checks if the *OOB Server* responses to *ping* or not.

- **getAdapterInfo:** Returns information about `oob.adapter`

- **requestChallenge:** To call when OOB authentication is necessary and returns whether the authentication method for the card is available or not.

- **getChallengeResult:** Checks if the card is authenticated successfully or not.

The **Input** and **Output** of each `OobAdapterService` method are:

ping

- **Input:** This method takes no arguments.

- **Output:** The result of *OOb Server* pinging should be returned in a *boolean* value; if the server responses to *ping* successfully, `true` should be returned, otherwise `false` should be returned.

getAdapterInfo

- **Input:** This method takes no arguments.

- **Output:** An object of `AdapterInfo` class that contains some information about `oob.adapter` should be returned. Instance variables of `AdapterInfo` class are:

   ◦ **id:** The `ACS` assigned *UUID* to the `oob.adapter` . This field is required and of type *String*.

   ◦ **name:** The `ACS` assigned *name* to the `oob.adapter` . This field is required and of type of *String*.

   ◦ **version:** The *int* value that indicates *version* of `oob.adapter` .

○ **signature:** Signature to validate `oob.adapter` integrity, not used currently, will be included in a future version. It is of type *String*.

requestChallenge

- **Input:** This method requires two parameters to accomplish its task, of types *String* and *TransactionInfo* . The method expects to receive `acsTransactionId` as the first argument and an object of `TransactionInfo` class (for a detailed explanation, refer to the TransactionInfo Data Elements section) as the second.

- **Output:** When `requestChallenge` method is called and has completed its task, it must return an object of `OobRequestChallengeResult` type. `OobRequestChallengeResult` class has three instance variables, named `requestChallengeEnum`, `oobTransId` and `message`, that are of type *RequestChallengeEnum*, *String* and *String* respectively. `requestChallengeEnum` maintains the result of requesting OOB challenge to `OOB-System` ; valid values for this attribute are *OK* and *ERROR*. `oobTransId` is a unique ID that can be generated by `OOB-System` to be used in getting the challenge result. `oobTransId` is an optional attribute and can have no value. If any *message* is required to be returned it should be maintained in the `message` attribute.

getChallengeResult

- **Input:** This method requires two parameters; the first is `acsTransactionId` of type `String` and the second is `oobTransId` retrieved from requestChallenge output. `oobTransId` is of type `String` .

- **Output:** After completing `getChallengeResult` method's task, it must return an object of `OobAuthenticationResult` class to the method's caller. `OobAuthenticationResult` class has two instance variables, named `authenticationResultEnum` and `message` , that are of types *AuthenticationResultEnum* (enum) and *String* respectively. `authenticationResultEnum` maintains the result of the OOB challenge; valid values for this attribute are *AUTHENTICATED*, *NOT_AUTHENTICATED*, *ERROR* or ➕*PENDING*. ➕If any *message* is required to be returned it should be maintained in the `message` attribute. A default message will be displayed on the page in case of the missing message in *PENDING*.

Restful API version of OOB Adapter

For the Restful API version of the `oob.adapter` , a Restful API needs to be defined similar to the adapter interface. `ACS` implements the Restful client and the `OOB Adapter API Server` will be

implemented by the client. In this case, no JARs or plugins need to be loaded by `ACS` . Clients must provide a specific URL for `ACS` . Known as `Adapter-URL` in this document and the required REST API endpoints are defined based on this URL.

Check Adapter Server availability status

`ACS` sends an HTTP request to check whether Adapter Server is up or down. Details of this request are:

- **URL:** `Adapter-URL` /ping

- **Request Method:** GET

- **Request Parameters:** there are not any request parameters for this REST API

- **Response:** If Adapter Server is accessible for the OOB challenge processes, this API returns an HTTP entity with a 200 (OK) HTTP status code.

Get OOB Adapter Information

`ACS` sends an HTTP request to get `oob.adapter` information. The details of this request are:

- **URL:** `Adapter-URL` /adapter-info

- **Request Method:** GET

- **Request Parameters:** there are not any request parameters for this REST API

- **Response:**

  - **Name:** adapterInfo

  - **Format** JSON object of `AdapterInfo` .

  - **Description** `AdapterInfo` has four properties:

    - **id:** The `ACS` assigned UUID to the `oob.adapter` . This field is required and of type String.

    - **name:** The `ACS` name assigned to the `oob.adapter` . This field is required and of type of String.

    - **version:** The int value that indicates the version of `oob.adapter` .

    - **signature:** Signature to validate `oob.adapter` integrity, not currently used, will be included in a future version. It is of type String.

    - **Inclusion:** Required

Requeste OOB Challenge

ACS calls an HTTP API when OOB authentication is necessary and returns whether authentication method for the card is available or not.

- **URL:** `Adapter-URL` /request-challenge/{acsTransactionId}
- **Request Method:** POST
- **Path variables:**
  - **Name:** acsTransactionId
  - **Format:** String
  - **Inclusion:** required
- **Request Body:**
  - **Name:** transactionInfo
  - **Format:** JSON object of TransactionInfo type. For further details of TransactionInfo, refer to the TransactionInfo Data Elements section.
  - **Response:**
    - **Name:** oobRequestChallengeResult
    - **Format:** JSON object of OobRequestChallengeResult.
    - **Description:** `OobRequestChallengeResult` object has three instance variables, named `requestChallengeEnum`, `oobTransId` and `message`. `requestChallengeEnum` maintains the result of requesting OOB challenge to `OOB-System`; valid values for this attribute are *OK* and *Error*. `oobTransId` is the ID assigned by `oob.adapter` for the next requests. If any *message* is required to be returned it should be maintained in `message` attribute.
    - **Inclusion:** required

Check card OOB authentication result

`ACS` calls an HTTP API to check if the card is authenticated successfully or not. The details of this REST API are:

- **URL:** `Adapter-URL` /challenge-result/{acsTransactionId}/{oobTransId}
- **Request Method:** GET

- **Path variables:**

  - **Name:** acsTransactionId

  - **Format:** String

  - **Inclusion:** required

  - **Name:** oobTransId

  - **Format:** String

  - **Inclusion:** Optional

- **Response:**

  - **Name:** oobAuthenticationResult

  - **Format:** JSON object of `OobAuthenticationResult` class.

  - **Description:** `OobAuthenticationResult` class has two instance variables, named `authenticationResultEnum` and `message` . authenticationResultEnum maintains the result of OOB challenge; valid values for this attribute are `AUTHENTICATED` , `NOT_AUTHENTICATED` , `ERROR` , and ➕ `PENDING` . If any message is required to be returned it should be maintained in `message` attribute. ➕A default message will be displayed on the page in case of the missing message in `PENDING` .

  - **Inclusion:** Required

Authentication mechanism for the Restful API version

Certificate based mutual authentication is used as the authentication mechanism for the Restful API version. The steps are:

- `ACS` publishes a CA for adapter communication, known as `Adapter CA`

- `ACS` also issues a server certificate for the adapter.

- `ACS` uses a generated client certificate that is issued by the same `Adapter CA` .

- The Adapter server implementation must be set up with the CA and mutual authentication provided.

- `ACS` will try to connect to the Adapter Server and if the connection can be established then `ACS` will continue with the adapter, otherwise it throws an error.

OobAdapterService Data Elements

TransactionInfo Data Elements

- **Field Name**: `threeDSServerTransID`
  - **Description:** Universally unique transaction identifier assigned by the 3DS Server to identify a single transaction.
  - **Length:** 36 characters
  - **Format:** String
  - **Accepted Value:** Canonical format as defined in IETF RFC 4122. May utilise any of the specified versions if the output meets specified requirements.
  - **Device Channel:** 01-APP, 02-BRW, 03-3RI
  - **Message Category:** 01-PA, 02-NPA
  - **Message Inclusion:** Required
- **Field Name**: `purchaseAmount`
  - **Description:** Purchase amount in minor units of currency with all punctuation removed. When used in conjunction with the Purchase Currency Exponent field, proper punctuation can be calculated.
  - **Length:** 48 characters
  - **Format:** String
  - **Accepted Value:** Example: If the purchase amount is USD 123.45, element will contain the value 12345.
  - **Device Channel:** 01-APP, 02-BRW
  - **Message Category:** 01-PA, 02-NPA
  - **Message Inclusion:** 01-PA: Required, 02-NPA: Conditional
  - **Conditional Inclusion:** Required for 02NPA if 3DS Requestor Authentication Indicator = 02 or 03.
- **Field Name**: `purchaseCurrency`
  - **Description:** Currency in which purchase amount is expressed.
  - **Length:** 3 characters

- **Format:** String
- **Accepted Value:** ISO 4217 three-digit currency code; 901-999 values are excluded and not permitted.
- **Device Channel:** 01-APP, 02-BRW
- **Message Category:** 01-PA, 02-NPA
- **Message Inclusion:** 01-PA: Required, 02-NPA: Conditional
- **Conditional Inclusion:** Required for 02NPA if 3DS Requestor Authentication Indicator = 02 or 03.

- **Field Name**: `purchaseExponent`
  - **Description:** Minor units of currency as specified in the ISO 4217 currency exponent.
  - **Length:** 1 character
  - **Format:** String
  - **Accepted Value:** Number
  - **Device Channel:** 01-APP, 02-BRW
  - **Message Category:** 01-PA, 02-NPA
  - **Message Inclusion:** 01-PA: Required, 02-NPA: Conditional
  - **Conditional Inclusion:** Required for 02NPA if 3DS Requestor Authentication Indicator = 02 or 03.

- **Field Name**: `messageCategory`
  - **Description:** Identifies the category of the message for a specific use case
  - **Length:** 2 characters
  - **Format:** String
  - **Accepted Value:** 01-PA, 02-NPA
  - **Device Channel:** 01-APP, 02-BRW, 03-3RI
  - **Message Category:** 01-PA, 02-NPA
  - **Message Inclusion:** Required

- **Field Name**: `deviceChannel`
  - **Description:** Indicates the type of channel interface being used to initiate the transaction.
  - **Length:** 2 Characters

- **Format:** String

- **Accepted Value:** 01 (APP); 02 (BRW); 03 (3RI)

- **Device Channel:** 01-APP, 02-BRW, 03-3RI

- **Message Category:** 01-PA, 02-NPA

- **Message Inclusion:** Required

- **Field Name**: `acctNumber`

  - **Description:** Account number that will be used in the authorisation request for payment transactions. It will be represented by PAN.

  - **Length:** 13-19 Characters

  - **Format:** String

  - **Accepted Value:** Format represented ISO 7812.

  - **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - **Message Category:** 01-PA, 02-NPA

  - **Message Inclusion:** Required

- **Field Name**: `merchantName`

  - **Description:** Merchant name assigned by the Acquirer or Payment System.

  - **Length:** Variable, maximum 40 characters

  - **Format:** String

  - **Accepted Value:** Same name used in the authorisation message as defined in ISO 8583.

  - **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - **Message Category:** 01-PA, 02-NPA

  - **Message Inclusion:** 01-PA: Required, 02-NPA: Optional

  - **Conditional Inclusion:** Optional but strongly recommended to include for 02NPA if the merchant is also the 3DS Requestor.

- **Field Name**: `cardHolderInfo`

  - **Description:** Information about the Cardholder, which is provided by the 3DS Requestor. For further details, refer to the CardHolderInfo Data Elements section

  - **Type:** CardHolderInfo

- **Field Name**: `issuerName`

  - **Description:** Name of the Issuer

  - **Length:** Variable, maximum 64 characters.

  - **Format:** String

  - **Accepted Value:** Any.

  - **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - **Message Category:** 01-PA, 02-NPA

  - **Message Inclusion:** Required

CardHolderInfo Data Elements

- **Field Name**: `cardholderName`

  - **Description:** Cardholder name

  - **Length:** 2-45

  - **Format:** String

  - **Accepted Value:** Alphanumeric special characters, listed in EMVBook 4, "Appendix B".

  - **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - **Message Category:** 01-PA, 02-NPA

  - **Message Inclusion:** Conditional

  - **Conditional Inclusion:** Required unless market or regional mandate restricts sending this information.

- **Field Name**: `email`

  - **Description:** The email address associated with the account that is either entered by the Cardholder, or is on file with the 3DS Requestor.

  - **Length:** 254 Characters

  - **Format:** String

  - **Accepted Value:** Shall meet requirements of Section 3.4 of IETF RFC 5322.

  - **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - **Message Category:** 01-PA, 02-NPA

  - **Message Inclusion:** Conditional

- ◦ **Conditional Inclusion:** Required unless market or regional mandate restricts sending this information.

- **Field Name**: `homePhone`

    - ◦ **Description:** The home phone number provided by the Cardholder. For further details, refer to the HomePhone Data Elements section

    - ◦ **Type:** HomePhone

    - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

    - ◦ **Message Category:** 01-PA, 02-NPA

    - ◦ **Message Inclusion:** Conditional

    - ◦ **Conditional Inclusion:** Required unless market or regional mandate restricts sending this information.

- **Field Name**: `mobilePhone`

    - ◦ **Description:** The mobile phone number provided by the Cardholder. For further details, refer to the MobilePhone Data Elements section

    - ◦ **Type:** MobilePhone

    - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

    - ◦ **Message Category:** 01-PA, 02-NPA

    - ◦ **Message Inclusion:** Conditional

    - ◦ **Conditional Inclusion:** Required unless market or regional mandate restricts sending this information.

- **Field Name**: `shipAddrCity`

    - ◦ **Description:** City portion of the shipping address requested by the Cardholder

    - ◦ **Length:** Variable, maximum 50 Characters

    - ◦ **Format:** String

    - ◦ **Accepted Value:**

    - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

    - ◦ **Message Category:** 01-PA, 02-NPA

    - ◦ **Message Inclusion:** Optional

- **Field Name**: `shipAddrCountry`

    - ◦ **Description:** Country of the shipping address requested by the Cardholder.

- **Length:** 3 Characters
- **Format:** String
- **Accepted Value:** ISO 3166-1 three-digit country code; 901-999 values are excluded and not permitted.
- **Device Channel:** 01-APP, 02-BRW, 03-3RI
- **Message Category:** 01-PA, 02-NPA
- **Message Inclusion:** Optional

- **Field Name**: `shipAddrLine1`
  - **Description:** First line of the street address or equivalent local portion of the shipping address requested by the Cardholder.
  - **Length:** Variable, maximum 50 Characters
  - **Format:** String
  - **Accepted Value:**
  - **Device Channel:** 01-APP, 02-BRW, 03-3RI
  - **Message Category:** 01-PA, 02-NPA
  - **Message Inclusion:** Optional

- **Field Name**: `shipAddrLine2`
  - **Description:** Second line of the street address or equivalent local portion of the shipping address requested by the Cardholder.
  - **Length:** Variable, maximum 50 Characters
  - **Format:** String
  - **Accepted Value:**
  - **Device Channel:** 01-APP, 02-BRW, 03-3RI
  - **Message Category:** 01-PA, 02-NPA
  - **Message Inclusion:** Optional

- **Field Name**: `shipAddrLine3`
  - **Description:** Third line of the street address or equivalent local portion of the shipping address requested by the Cardholder.
  - **Length:** Variable, maximum 50 Characters
  - **Format:** String

- ◦ **Accepted Value:**

- ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

- ◦ **Message Category:** 01-PA, 02-NPA

- ◦ **Message Inclusion:** Optional

- **Field Name**: `shipAddrPostCode`

  - ◦ **Description:** The ZIP or other postal code of the shipping address requested by the Cardholder

  - ◦ **Length:** Variable, maximum 16 Characters

  - ◦ **Format:** String

  - ◦ **Accepted Value:**

  - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - ◦ **Message Category:** 01-PA, 02-NPA

  - ◦ **Message Inclusion:** Optional

- **Field Name**: `shipAddrState`

  - ◦ **Description:** The state or province of the shipping address associated with the card being used for this purchase.

  - ◦ **Length:** Variable, maximum 3 Characters

  - ◦ **Format:** String

  - ◦ **Accepted Value:** Should be the country subdivision code defined in ISO 3166-2.

  - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - ◦ **Message Category:** 01-PA, 02-NPA

  - ◦ **Message Inclusion:** Optional

- **Field Name**: `workPhone`

  - ◦ **Description:** The work phone number provided by the Cardholder. For further details, refer to the WorkPhone Data Elements section

  - ◦ **Type:** WorkPhone

  - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - ◦ **Message Category:** 01-PA, 02-NPA

  - ◦ **Message Inclusion:** Conditional

- ◦ **Conditional Inclusion:** Required (if available) unless market or regional mandate restricts sending this information.

⚠ HomePhone Data Elements

- **Field Name**: `cc`

  - ◦ **Description:** Country Code of the number

  - ◦ **Length:** 1-3 Characters

  - ◦ **Format:** String

  - ◦ **Accepted Value:** Refer to ITU-E.164 for additional information on format and length.

  - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - ◦ **Message Category:** 01-PA, 02-NPA

- **Field Name**: `subscriber`

  - ◦ **Description:** Subscriber sections of the number

  - ◦ **Length:** Variable, maximum 15 Characters

  - ◦ **Format:** String

  - ◦ **Accepted Value:** Refer to ITU-E.164 for additional information on format and length.

  - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - ◦ **Message Category:** 01-PA, 02-NPA

⚠ MobilePhone Data Elements

- **Field Name**: `cc`

  - ◦ **Description:** Country Code of the number

  - ◦ **Length:** 1-3 Characters

  - ◦ **Format:** String

  - ◦ **Accepted Value:** Refer to ITU-E.164 for additional information on format and length.

  - ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

  - ◦ **Message Category:** 01-PA, 02-NPA

- **Field Name**: `subscriber`

    ◦ **Description:** Subscriber sections of the number

    ◦ **Length:** Variable, maximum 15 Characters

    ◦ **Format:** String

    ◦ **Accepted Value:** Refer to ITU-E.164 for additional information on format and length.

    ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

    ◦ **Message Category:** 01-PA, 02-NPA

⚠ WorkPhone Data Elements

- **Field Name**: `cc`

    ◦ **Description:** Country Code of the number

    ◦ **Length:** 1-3 Characters

    ◦ **Format:** String

    ◦ **Accepted Value:** Refer to ITU-E.164 for additional information on format and length.

    ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

    ◦ **Message Category:** 01-PA, 02-NPA

- **Field Name**: `subscriber`

    ◦ **Description:**

    ◦ **Length:** Variable, maximum 15 Characters

    ◦ **Format:** String

    ◦ **Accepted Value:** Refer to ITU-E.164 for additional information on format and length.

    ◦ **Device Channel:** 01-APP, 02-BRW, 03-3RI

    ◦ **Message Category:** 01-PA, 02-NPA