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 OpenID Connect MODRNA Client initiated Backchannel Authentication Flow

 1.0

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Abstract

 OpenID Connect allows RP's to authenticate their users for clients of

 all types, including browser-based JavaScript and native mobile apps,

 to launch sign-in flows and receive verifiable assertions about the

 identity of signed-in users.

 In all of these flows initiated by the RP, the end-user interaction

 from the consumption device is required and, they are based on HTTP

 redirection mechanisms. However, some use cases not covered by these

 flows have been raised, where the RP needs to be the initiator of the

 user authentication flow and the end-user interaction from the

 consumption device is not needed.

 The MODRNA Client initiated Backchannel Authentication Flow specifies

 a new authentication flow, by means of which the RP's that know the

 user identifier they want to authenticate (e-mail, telefon number),

 will be able to initiate an interaction flow to authenticate their

 users without having end-user interaction from a consumption device.

 \*Remark:\* As there is no any consumption device through which the

 end-user is interacting with the Relying Party, this flow will not

 cause any user credentials to go through the RP. So it should be

 highlighted that traditional username/password authentication could

 not be used because and only out-band mechanisms will work in

 conjunction with this flow.

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1. Introduction

 OpenID Connect MODRNA Client initiated Backchannel Authentication

 Flow 1.0 is an authentication flow of the OpenID Connect Core 1.0

 [OpenID.Core] specification intended to allow RP's who already know

 the identifier of an end-user to initiate an authentication flow to

 request user authentication. Moreover it defines Mandatory to

 Implement features to ensure interoperability of clients.

1.1. Requirements Notation and Conventions

 The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",

 "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this

 document are to be interpreted as described in [RFC2119].

 Throughout this document, values are quoted to indicate that they are

 to be taken literally. When using these values in protocol messages,

 the quotes MUST NOT be used as part of the value.

2. Terminology

 This specification uses the term "OpenID Provider (OP)" and "Relying

 Party (RP)" as defined by OpenID Connect Core [OpenID.Core]. This

 specification also uses the following terms:

 Consumption Device (CD) A user agent, most probably a browser, on

 which the user consumes the actual service provided by the Relying

 Party.

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 Authentication Device (AD) A mobile device on which the user will

 authenticate the actual login.

3. Overview

 This specification defines a new authentication flow based on

 [OpenID.Core].

 It introduces a new endpoint used to initiate user authentication

 using a backchannel request. This new endpoint utilizes existing

 Authentication Requests and defines new parameters as appropriate.

 For example, it re-uses the scope parameter but it omits nonce, state

 and redirect\_uri, which are need to perform and secure authentication

 transactions on the front channel.

 CIBA polling is illustrated in the following diagram:

 +--------+ +--------+

 | | | |

 | |<---(1) CIBA Request-------------------------->| |

 | | | |

 | | +--------+ | |

 | | | | | |

 | Client | | End- |<--(2) User interactions --------->| OP |

 | | | User | | |

 | | | | | |

 | | +--------+ | |

 | | | |

 | |----(3a) CIBA Polling Request----------------->| |

 | |<---(3b) CIBA Polling Response-----------------| |

 | | | |

 +--------+ +--------+

 If the Client expects to be notified about the authentication result

 asynchronously then it has to specify a Client Notification Endpoint

 during its registration at the Authorization Server.

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 CIBA notification is illustrated in the following diagram:

 +--------+ +--------+

 | | | |

 | |<---(1) CIBA Request-------------------------->| |

 | | | |

 | | +--------+ | |

 | | | | | |

 | Client | | End- |<--(2) User interactions --------->| OP |

 | | | User | | |

 | | | | | |

 | | +--------+ | |

 | | | |

 | |<---(3) CIBA Notification Callback ------------| |

 | | | |

 +--------+ +--------+

4. Backchannel Authentication Endpoint

 The Backchannel Authentication Endpoint performs Authentication of

 the End-User. This is done by sending an HTTP POST message directly

 from the Relying Party to the Authorization Server's Backchannel

 Authentication Endpoint, using request parameters defined by OAuth

 2.0 and additional parameters and parameter values defined by OpenID

 Connect.

 Communication with the Backchannel Authentication Endpoint MUST

 utilize TLS. See Section 16.17 [OpenID.Core] for more information on

 using TLS.

4.1. Authentication Request

 An Authentication Request is an OAuth 2.0 [RFC6749] Authorization

 Request that requests that the End-User be authenticated by the

 Authorization Server.

 MODRNA Client initiated Backchannel Authentication defines an

 authentication request that is requested directly from the client to

 the Authorization Server without going through the user's browser.

 The client MUST send an authentication request to the Authorization

 Server by building an "HTTP POST" request that will take to the

 Authorization Server all the information needed to authenticate the

 user without asking them for their identifier.

 The client MUST authenticate to the Backchannel Authentication

 Endpoint using the authentication method registered for its

 client\_id, as described in Section 9 of [OpenID.Core].

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 Authentication Requests are made using the MODRNA profile. Only the

 following parameters are taking in consideration in the Client

 initiated Backchannel Authentication flow. The rest of the request

 parameters defined in OAuth 2.0 [RFC6749] MUST be ignored by the

 Authorization Server.

 scope REQUIRED. OpenID Connect implements authentication as an

 extension to the OAuth 2.0 by including the openid scope value in

 the Authorization Request.

 client\_req\_id REQUIRED. It is a unique id provided by the RP that

 will be used by the Identity Provider as a beared token to

 authenticate the callback request to send the tokens to the RP.

 client\_notification\_endpoint OPTIONAL. Callback URI to which the

 response will be sent. This URI MUST exactly match one of the

 "Client initiated Backchannel Authentication" callback URI values

 for the Client pre-registered at the OpenID Provider, with the

 matching performed as described in Section 6.2.1 of [RFC3986]

 (Simple String Comparison). When using this flow, the Callback

 URI SHOULD use the https scheme. This paramter will be MANDATORY

 if the RP has been registered to receive callbacks.

 At the time of registering in Mobile Connect, the RP must provide

 the information about whether receiving the token response through

 a callback to the "client\_notification\_endpoint" or through a

 polling mechanism where the RP MUST poll the authorization server

 repeatedly as defined in

 Successful Authentication Request Acknowledgement until the end-

 user completes the approval process.

 acr\_values REQUIRED. As defined in

 OpenID Connect MODRNA Authentication Profile 1.0.

 login\_hint\_token OPTIONAL. As defined in

 OpenID Connect MODRNA Authentication Profile 1.0.

 id\_token\_hint OPTIONAL. As defined in Section 3.1.2.1 of

 [OpenID.Core].

 login\_hint OPTIONAL. As defined in Section 3.1.2.1 of

 [OpenID.Core].

 context REQUIRED. This parameter provides a context in the Mobile

 Connect request that clearly identifies the action/transaction

 that the user is being asked to authorise.

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 As the Client initiated Backchannel Authentication flow does not have

 an interaction with the end-user through a consumption device, it is

 REQUIRED that the RP provides one (and only one) of the hints

 specified above in the authentication request, that is

 "login\_hint\_token", "id\_token\_hint" or "login\_hint".

 The following is a non-normative example from an authentication

 request (with line wraps within values for display purposes only):

 POST /bc-authorize HTTP/1.1

 Host: server.example.com

 Content-Type: application/json

 {

 "scope": "openid",

 "client\_req\_id": "8d67dc78-7faa-4d41-aabd-67707b374255",

 "client\_notification\_endpoint": "https://client.example.com/cb",

 "acr\_values": "mod-mf",

 "login\_hint\_token": "eyJhbGciOiJSU0EtT0FFUCIsImVuYyI6IkEyNTZHQ00ifQ.

 OKOawDo13gRp2ojaHV7LFpZcgV7T6DVZKTyKOMTYUmKoTCVJRgckCL9kiMT03JGe

 ipsEdY3mx\_etLbbWSrFr05kLzcSr4qKAq7YN7e9jwQRb23nfa6c9d-StnImGyFDb

 Sv04uVuxIp5Zms1gNxKKK2Da14B8S4rzVRltdYwam\_lDp5XnZAYpQdb76FdIKLaV

 mqgfwX7XWRxv2322i-vDxRfqNzo\_tETKzpVLzfiwQyeyPGLBIO56YJ7eObdv0je8

 1860ppamavo35UgoRdbYaBcoh9QcfylQr66oc6vFWXRcZ\_ZT2LawVCWTIy3brGPi

 6UklfCpIMfIjf7iGdXKHzg.

 48V1\_ALb6US04U3b.

 5eym8TW\_c8SuK0ltJ3rpYIzOeDQz7TALvtu6UG9oMo4vpzs9tX\_EFShS8iB7j6ji

 SdiwkIr3ajwQzaBtQD\_A.

 XFBoMYUZodetZdvTiFvSkQ"

 }

4.2. Authentication Request Validation

 The Authorization Server MUST validate the request received as

 follows:

 1. Authenticate the Client.

 e.g.: by validating the Client Credentials as described in

 Section 9 on [OpenID.Core].

 2. The Authorization Server MUST validate all the OAuth 2.0

 parameters according to the MODRNA specification.

 3. In the event of a request contains more than one of this hints

 specified in Authentication Request (Section 4.1), the Identity

 provider MUST return an "invalid\_request" error response as per

 Section 3.1.2.6 on [OpenID.Core].

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 4. The Authorization server MUST validate that the hint provided

 (login\_hint, login\_token\_hint or id\_token\_hint) exist and are not

 expired, otherwise it should return an error to notify that the

 hint provided has not been found.

 5. If the authentication request contains a

 "client\_notification\_endpoint" when it has not been provided at

 the registering time or viceversa, it is contained when it has

 not been provided, the Identity Provider MUST return an

 "invalid\_request" error response, per Section 3.1.2.6 on

 [OpenID.Core].

 6. If the "client\_notification\_endpoint" parameter is present, it

 MUST exactly match one of the callback URI values for the Client

 pre-registered at the OpenID Provider, with the matching

 performed as described in Section 6.2.1 of [RFC3986] (Simple

 String Comparison).

 NOTE: the callback URI values registered for the

 "client\_notification\_endpoint" are different than those

 registered for the redirect\_uri in the Authorization Code flow.

 7. The Authorization Server MUST verify that all the REQUIRED

 parameters are present and their usage conforms to this

 specification.

 As specified in OAuth 2.0 [RFC6749], Authorization Servers SHOULD

 ignore unrecognized request parameters.

 If the Authorization Server encounters any error, it MUST return an

 error response, per Section 3.1.2.6 on [OpenID.Core].

4.3. Successful Authentication Request Acknowledgement

 If the Authentication Validation Request is OK, the Authorization

 Server will return an HTTP 200 OK response to the RP to indicate that

 the authentication request has been accepted and it is going to be

 processed. The body of this response will contain:

 auth\_req\_id REQUIRED. It is a unique id to identify the

 authentication request (transaction) made by the RP. The

 "auth\_req\_id" will be sent too in the token through the

 "client\_notification\_endpoint" to allow the RP to correlate the

 authentication request and the received tokens.

 expires in REQUIRED. Expiration time of the Authentication in

 seconds since the auth\_request was received.

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 interval OPTIONAL. The minimum amount of time in seconds that the

 client SHOULD wait between polling requests to the token endpoint.

 This parameter will only be present in case of the authentication

 request doesn't take the "client\_notification\_endpoint" parameter

 or there are not any callback URI registered as

 "client\_notification\_endpoint" for the RP.

 If the Authentication Validation Request is NOK, the Authorization

 Server MUST return an error response, per Section 3.1.2.6.

 The following is a non-normative example from an authentication

 response

 HTTP/1.1 200 OK

 Content-Type: application/json

 Cache-Control: no-store

 Pragma: no-cache

 {

 "auth\_req\_id": "1c266114-a1be-4252-8ad1-04986c5b9ac1",

 "expires\_in": 3600,

 "interval": 2

 }

4.4. Authentication Request Acknowdlegment Validation

 If the client (RP) receives an HTTP 200 OK, it MUST validate that all

 the required parameters are received. The RP should keep the

 authentication request identifier "auth\_req\_id" and the expiration

 time in order to match it with token response.

 The client will have to keep the expiration time as well to be able

 to discard the authentication request acknowdlegment.

5. Authorization Server Obtains End-user Consent/Authorization

 Once the End-User is authenticated, the Authorization Server MUST

 obtain an authorization decision before releasing information to the

 Relying Party. When using the Client initiated Backchannel

 Authentication flow, there is not any interactive dialogue between

 the Authorization Server and the end-user through the consumption

 device, so the consent establishing only can take place via the

 authentication device or by establishing consent via conditions for

 processing the request or other means (for example, via previous

 administrative consent). Sections 2 and 5.3 of [OpenID.Core]

 describe information release mechanisms.

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 NOTE: the current version of the Client initiated Backchannel

 Authentication Flow spec. does not specify any mechanism to use the

 authentication device to obtain the end-user consent.

6. Getting The Transaction Result

6.1. Token Request Using Polling Mechanism

 When the authentication request doesn't include the

 "client\_notification\_endpoint" parameter or there are not any

 callback URI registered for this notification endpoint for this RP in

 the Identity Provider, the client must poll the token endpoint until

 the end-user grants or denies the request.

 The client polls at reasonable interval which MUST NOT exceed the

 minimum interval provided by the authorization server via the

 "interval" parameter (if provided).

 The client makes a "POST" request to the token endpoint by sending

 the following parameters using the "application/x-www-form-

 urlencoded" format with a character encoding of UTF-8 in the HTTP

 request entity-body:

 grant\_type REQUIRED. Value MUST be set to

 "urn:openid:params:modrna:grant-type:backchannel\_request".

 auth\_req\_id REQUIRED. It is a unique id to identify the

 authentication request (transaction) made by the RP. The

 "auth\_req\_id" will be sent too in the Successful Token Polling to

 allow the RP to correlate the authentication request and the

 received tokens (id\_token and access\_token).

 The following is a non-normative example of a token request (with

 line wraps within values for display purposes only).

 POST /token HTTP/1.1

 Host: server.example.com

 Content-Type: application/x-www-form-urlencoded

 Authorization: Basic czZCaGRSa3F0MzpnWDFmQmF0M2JW

 {

 grant\_type="urn:openid:params:modrna:grant-type:backchannel\_request"

 &auth\_req\_id=1c266114-a1be-4252-8ad1-04986c5b9ac1

 }

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6.2. Successful Token Polling

 If the "client\_notification\_endpoint" is not present the

 Authorization Server will return the token as an HTTP response to the

 RP's poll request. If the user is well authenticated, the

 Authorization Server will returns a succesful response that includes

 an ID Token and an Access Token. Otherwise it responses with an

 error as defined in Token Error Response.

 The following is a non-normative example of a token response sending

 as an HTTP 200 OK Response to the RP's poll request (with line wraps

 within values for display purposes only).

 HTTP/1.1 200 OK

 Content-Type: application/json

 Cache-Control: no-store

 Pragma: no-cache

 {

 "access\_token": "SlAV32hkKG",

 "token\_type": "Bearer",

 "refresh\_token": "8xLOxBtZp8",

 "expires\_in": 3600,

 "id\_token": "eyJhbGciOiJSUzI1NiIsImtpZCI6IjFlOWdkazcifQ.ewogImlzc

 yI6ICJodHRwOi8vc2VydmVyLmV4YW1wbGUuY29tIiwKICJzdWIiOiAiMjQ4Mjg5

 NzYxMDAxIiwKICJhdWQiOiAiczZCaGRSa3F0MyIsCiAibm9uY2UiOiAibi0wUzZ

 fV3pBMk1qIiwKICJleHAiOiAxMzExMjgxOTcwLAogImlhdCI6IDEzMTEyODA5Nz

 AKfQ.ggW8hZ1EuVLuxNuuIJKX\_V8a\_OMXzR0EHR9R6jgdqrOOF4daGU96Sr\_P6q

 Jp6IcmD3HP99Obi1PRs-cwh3LO-p146waJ8IhehcwL7F09JdijmBqkvPeB2T9CJ

 NqeGpe-gccMg4vfKjkM8FcGvnzZUN4\_KSP0aAp1tOJ1zZwgjxqGByKHiOtX7Tpd

 QyHE5lcMiKPXfEIQILVq0pc\_E2DzL7emopWoaoZTF\_m0\_N0YzFC6g6EJbOEoRoS

 K5hoDalrcvRYLSrQAZZKflyuVCyixEoV9GfNQC3\_osjzw2PAithfubEEBLuVVk4

 XUVrWOLrLl0nx7RkKU8NXNHq-rvKMzqg"

 }

6.3. Token Notification

6.3.1. Successful Token Notification

 When the client is registered for client notifications (through

 "client\_notification\_endpoint"), the Authorization Server will send

 the token response making a "POST HTTP Request" to the RP's

 client\_notification\_endpoint. If the user is well authenticated, the

 Authorization Server returns a successful response that includes an

 ID Token and an Access Token and a Refresh Token. If the request

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 failed client authentication or is invalid, the authorization server

 sends an error\_message as described in Token Error Response.

 All the parameters in the successful response are defined in

 Section 4.1.4 of OAuth 2.0 [RFC6749] except the new one "auth\_req\_id"

 that will be the same received in the request as defined in

 Successful Authentication Response (Section 4.3). The response uses

 the application/json media type.

 The following is a non-normative example of a token response sending

 as a HTTP POST request to the callback uri specified in the

 "client\_notification\_endpoint" parameter by the RP (with line wraps

 within values for display purposes only). The request is

 authenticated through a bearer token that is the value of the

 "client\_req\_id" provided by the RP in the Authentication Request.

 POST /cb HTTP/1.1

 Host: client.example.com

 Authorization: Bearer 8d67dc78-7faa-4d41-aabd-67707b374255

 Content-Type: application/json

 {

 "auth\_req\_id": "1c266114-a1be-4252-8ad1-04986c5b9ac1",

 "access\_token": "SlAV32hkKG",

 "token\_type": "Bearer",

 "refresh\_token": "8xLOxBtZp8",

 "expires\_in": 3600,

 "id\_token": "eyJhbGciOiJSUzI1NiIsImtpZCI6IjFlOWdkazcifQ.ewogImlzc

 yI6ICJodHRwOi8vc2VydmVyLmV4YW1wbGUuY29tIiwKICJzdWIiOiAiMjQ4Mjg5

 NzYxMDAxIiwKICJhdWQiOiAiczZCaGRSa3F0MyIsCiAibm9uY2UiOiAibi0wUzZ

 fV3pBMk1qIiwKICJleHAiOiAxMzExMjgxOTcwLAogImlhdCI6IDEzMTEyODA5Nz

 AKfQ.ggW8hZ1EuVLuxNuuIJKX\_V8a\_OMXzR0EHR9R6jgdqrOOF4daGU96Sr\_P6q

 Jp6IcmD3HP99Obi1PRs-cwh3LO-p146waJ8IhehcwL7F09JdijmBqkvPeB2T9CJ

 NqeGpe-gccMg4vfKjkM8FcGvnzZUN4\_KSP0aAp1tOJ1zZwgjxqGByKHiOtX7Tpd

 QyHE5lcMiKPXfEIQILVq0pc\_E2DzL7emopWoaoZTF\_m0\_N0YzFC6g6EJbOEoRoS

 K5hoDalrcvRYLSrQAZZKflyuVCyixEoV9GfNQC3\_osjzw2PAithfubEEBLuVVk4

 XUVrWOLrLl0nx7RkKU8NXNHq-rvKMzqg"

 }

6.3.2. Client Notification Endpoint

 The Client Notification Endpoint is set by the RP during the

 registration phase. This endpoint is intended to receive the result

 of the authentication (id\_token, access\_token and refresh token) and

 it requires the request to be authenticated using a "bearer token"

 created by the RP and sent to the OP in the Authentication request as

 the value of the parameter "client\_req\_id".

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 Communication with the Client Notification Authentication Endpoint

 MUST utilize TLS. See Section 16.17 [OpenID.Core] for more

 information on using TLS.

6.4. Token Error Response

 If the Token Request is invalid or unauthorized, the Authorization

 Server constructs the error response according to the section 3.1.3.4

 Token Error Response of [OpenID.Core]. In addition to the error

 codes defined in Section 5.2 of [RFC6749], the following error codes

 are specific for the Client Initiated Backchannel flow:

 authorization\_pending The authorization request is still pending as

 the end-user hasn't yet been authenticated.

 slow\_down The client is polling too quickly and should back off at a

 reasonable rate.

6.5. Authentication Error Response

 TBD

7. Security Considerations

 The login hint token SHOULD be digitally signed by the issuer. This

 ensures authenticity of the data and reduces the threat of an

 injection attack. The signature allows the OP to authenicate and

 authorize the sender of the hint and prevent collecting of phone

 numbers by rogue clients.

8. Privacy Considerations

 The login hint token is encrypted in order to protect the user's

 MSISDN from being revealed to the client unintentionally.

9. References

9.1. Normative References

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Appendix A. Acknowledgements

 The following have contributed to the development of this

 specification.

Appendix B. Notices

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 The technology described in this specification was made available

 from contributions from various sources, including members of the

 OpenID Foundation and others. Although the OpenID Foundation has

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Appendix C. Document History

 [[ To be removed from the final specification ]]

 -01

 o Initial draft

 o Added OIDF Standard Notice

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