OAuth Token Introspection
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Abstract

This specification defines a method for a client or protected resource to query an OAuth authorization server to determine meta-information about an OAuth token.

Requirements Language

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 RFC 2119 [RFC2119].

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1. Introduction

In OAuth, the contents of tokens are opaque to clients. This means that the client does not need to know anything about the content or structure of the token itself, if there is any. However, there is still a large amount of metadata that may be attached to a token, such as its current validity, approved scopes, and extra information about the authentication context in which the token was issued. These pieces of information are often vital to Protected Resources making authorization decisions based on the tokens being presented. Since OAuth2 defines no direct relationship between the Authorization Server and the Protected Resource, only that they must have an agreement on the tokens themselves, there have been many different approaches to bridging this gap.

This specification defines an Introspection Endpoint that allows the holder of a token to query the Authorization Server to discover the set of metadata for a token. A Protected Resource may use the mechanism described in this draft to query the Introspection Endpoint in a particular authorization decision context and ascertain the relevant metadata about the token in order to make this authorization decision appropriately.

2. Introspection Endpoint
The Introspection Endpoint is an OAuth 2 Endpoint that responds to HTTP POST requests (and optionally HTTP GET requests) from token holders, particularly including Resource Servers and Clients. The endpoint takes a single parameter representing the token (and optionally further authentication) and returns a JSON document representing the metadata information surrounding the token.

The endpoint MUST be protected by TLS or equivalent.

2.1. Introspection Request

token  REQUIRED. The string value of the token.

resource_id  OPTIONAL. A service-specific string identifying the resource that the client doing the introspection is asking about.

token_type_hint  OPTIONAL. A hint about the type of the token submitted for revocation. Clients MAY pass this parameter in order to help the authorization server to optimize the token lookup. If the server is unable to locate the token using the given hint, it MUST extend its search across all of its supported token types. An authorization server MAY ignore this parameter, particularly if it is able to detect the token type automatically. Values for this field are defined in OAuth Token Revocation [Revocation].

The endpoint MAY allow other parameters to provide context to the query. For instance, an authorization service may need to know the IP address of the Client in order to determine the appropriateness of the token being presented.

The endpoint SHOULD also require some form of authentication to access this endpoint, such as the Client Authentication as described in OAuth 2 Core Specification [RFC6749] or a separate OAuth 2.0 Access Token. The methods of managing and validating these authentication credentials are out of scope of this specification.

2.2. Introspection Response

The server responds with a JSON object [RFC4627] in "application/json" format with the following top-level members. Specific implementations MAY extend this structure with their own service-specific pieces of information.

active  REQUIRED. Boolean indicator of whether or not the presented token is currently active.
exp  OPTIONAL.  Integer timestamp, measured in the number of seconds
since January 1 1970 UTC, indicating when this token will expire.

iat  OPTIONAL.  Integer timestamp, measured in the number of seconds
since January 1 1970 UTC, indicating when this token was
originally issued.

scope  OPTIONAL.  A space-separated list of strings representing the
scopes associated with this token, in the format described in
Section 3.3 of OAuth 2.0 [RFC6749].

client_id  OPTIONAL.  Client Identifier for the OAuth Client that
requested this token.

sub  OPTIONAL.  Local identifier of the Resource Owner who authorized
this token.

aud  OPTIONAL.  Service-specific string identifier or list of string
identifiers representing the intended audience for this token.

token_type  OPTIONAL.  Type of the token as defined in OAuth 2.0
section 5.1.

2.3.  Non-normative Example

For example, a Protected Resource accepts a request from a Client
carrying an OAuth2 Bearer Token.  In order to know how and whether to
serve the request, the Protected Resource then makes the following
request to the Introspection Endpoint of the Authorization Server.
The Protected Resource is here authenticating with its own Client ID
and Client Secret as per OAuth2 [RFC6749] Section 2.3.1.

Following is a non-normative example request (with line wraps for
display purposes only):

POST /register HTTP/1.1
Accept: application/x-www-form-urlencoded
Host: server.example.com
Authorization: Basic czZCaGRSa3F0Mzo3RmpmcDBaQnIxS3REUmJuZlZkbUl3

token=X3241Affw.4233-99JXJ

The Authorization Server validates the client credentials and looks
up the information in the token.  If the token is currently active,
it returns the following JSON document.
Following is a non-normative example active token response (with line wraps for display purposes only):

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

{
  "active": true,
  "client_id": "s6BhdRkqt3",
  "scope": "read write dolphin",
  "sub": "2309fj32kl",
  "aud": "http://example.org/protected-resource/**"
}

If the token presented is not currently active (but the authentication presented is valid), it returns the following JSON document.

Following is a non-normative example response to an inactive or invalid token (with line wraps for display purposes only):

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

{
  "active": false
}

If the client credentials are invalid or there is another error, the Authorization Server responds with an HTTP 400 (Bad Request) as described in OAuth 2.0 section 5.2 [RFC6749].

3. IANA Considerations

This document makes no request of IANA.

4. Security Considerations

If left unprotected and un-throttled, the Introspection Endpoint could present a means for an attacker to poll a series of possible token values, fishing for a valid token. Therefore, the Authorization Server SHOULD issue special client credentials to any protected resources or clients that need to access the introspection endpoint. These credentials may be used directly at the endpoint, or
they may be exchanged for an OAuth2 Access token scoped specifically for the Introspection Endpoint.

Since the introspection endpoint takes in OAuth2 tokens as parameters, it MUST be protected by TLS or equivalent. A server MAY require an HTTP POST method only to the endpoint.

5. Acknowledgements

Thanks to the OAuth Working Group and the UMA Working Group for feedback.

6. Normative References


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