SIP Core
Internet-Draft
Updates: 3261 (if approved)
Intended status: Standards Track
Expires: January 8, 2020

R. Shekh-Yusef, Ed.
Avaya
C. Holmberg
Ericsson
V. Pascual
webrtchacks

July 7, 2019

Third-Party Token-based Authentication and Authorization for Session Initiation Protocol (SIP)
draft-ietf-sipcore-sip-token-authnz-02

Abstract

This document defines a mechanism for SIP, that is based on the OAuth 2.0 and OpenID Connect Core 1.0 specifications, to enable the delegation of the user authentication and SIP registration authorization to a dedicated third-party entity that is separate from the SIP network elements that provide the SIP service.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on January 8, 2020.

Table of Contents

1. Introduction 2
1.1. Terminology 3
1.2. SIP User Agent Types 3
2. Authentication and Authorization flow 4
2.1. Overview 4
2.1.1. Configured AS 4
2.1.2. Discovered AS 6
2.2. Initial Registration 7
2.3. Subsequent Registrations 8
2.4. Non-Registration Requests 8
3. WWW-Authenticate Response Header Field 8
4. 'sip.token' Media Feature Tag 9
5. Security Considerations 9
6. IANA Considerations 10
6.1. SIP Media Feaure Tag 10
6.1.1. sip.token 10
7. Acknowledgments 10
8. Normative References 11
Authors' Addresses 12

1. Introduction

The SIP protocol [RFC3261] uses the framework used by the HTTP protocol for authenticating users, which is a simple challenge-

response authentication mechanism that allows a server to challenge a client request and allows a client to provide authentication information in response to that challenge.

OAuth 2.0 [RFC6749] defines a token based authorization framework to allow clients to access resources on behalf of their user.

The OpenID Connect 1.0 [OPENID] specifications defines a simple identity layer on top of the OAuth 2.0 protocol, which enables clients to verify the identity of the user based on the authentication performed by a dedicated authorization server, as well as to obtain basic profile information about the user.

This document defines an mechanism for SIP, that is based on the OAuth 2.0 and OpenID Connect Core 1.0 specifications, to enable the delegation of the user authentication and SIP registration authorization to a dedicated third-party entity that is separate from the SIP network elements that provide the SIP service.

1.1. Terminology

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].

1.2. SIP User Agent Types

[RFC6749] defines two types of clients, confidential and public, that apply to the SIP User Agents.

- Confidential User Agent: is a SIP UA that is capable of maintaining the confidentiality of the user credentials and any tokens obtained using these user credentials.

- Public User Agent: is a SIP UA that is incapable of maintainings the confidentiality of the user credentials and any obtained tokens.

2. Authentication and Authorization flow

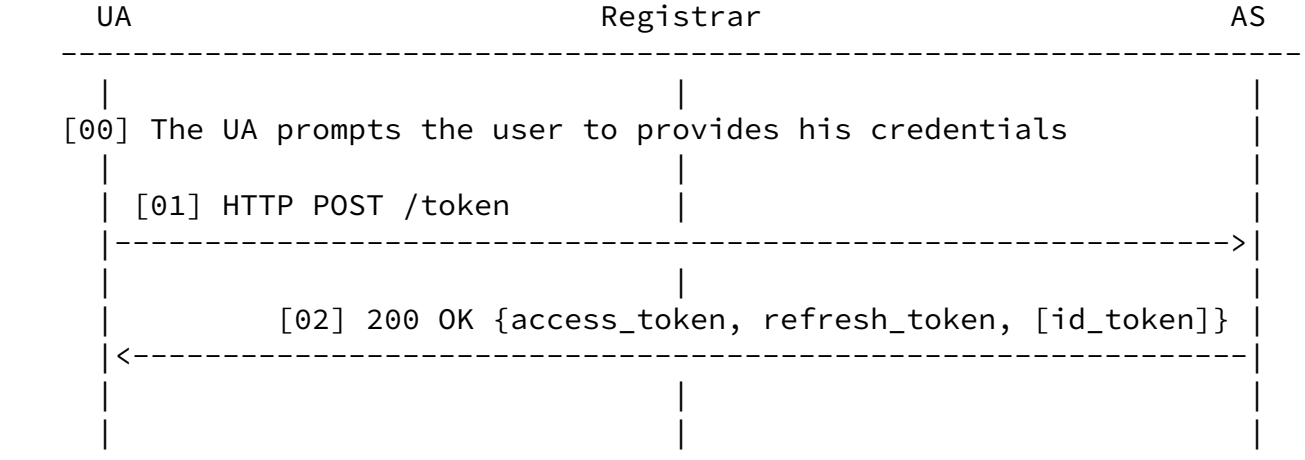
This flow is used by a Confidential UA with rich UI to authenticate to an authorization server and to directly obtain tokens to be able to register and get service from the SIP network.

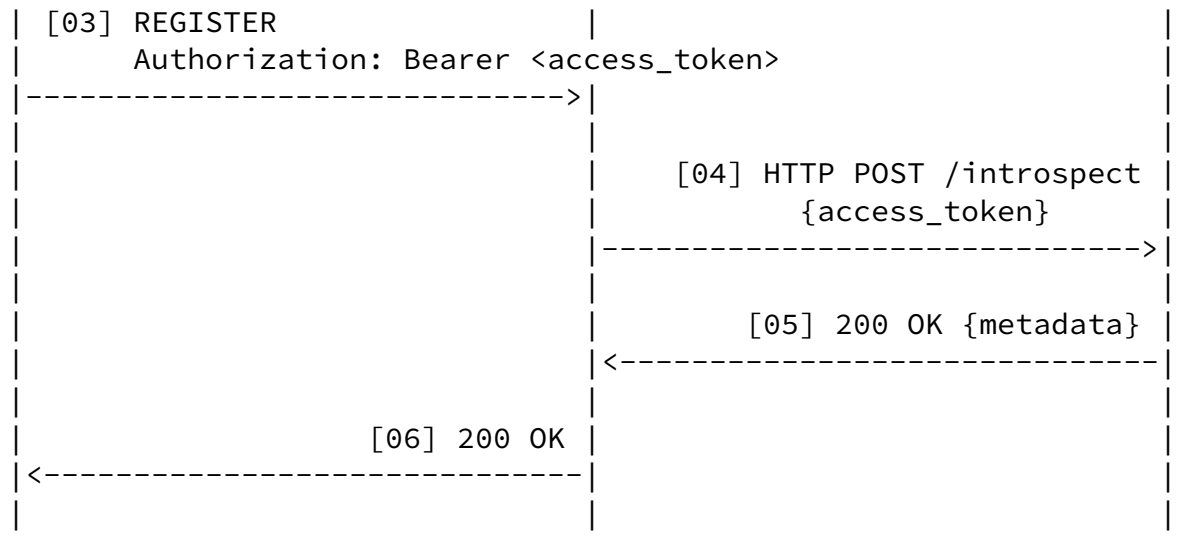
2.1. Overview

The following sections provide overview of the supported flows.

2.1.1. Configured AS

The following figure provides a high level view of flow of messages when the UA is aware of the AS ahead of time:





In step [00], the UA collects the user's credentials with the AS.

In steps [01] and [02], the UA first contacts the Authorization Server to authenticate the user and obtain tokens to be used to get access to the SIP network.

The tokens returned to the UA depend on the type of server: with an OAuth Authorization Server, the tokens provided are the access token and refresh token. With an OpenID Connect server, an additional ID-Token is returned, which contains the SIP URI of the user. The method used to authenticate the user and obtain these tokens is out of scope for this document.

In step [03], the UA starts the registration process with the SIP registrar by sending a REGISTER request with the access token it obtained previously.

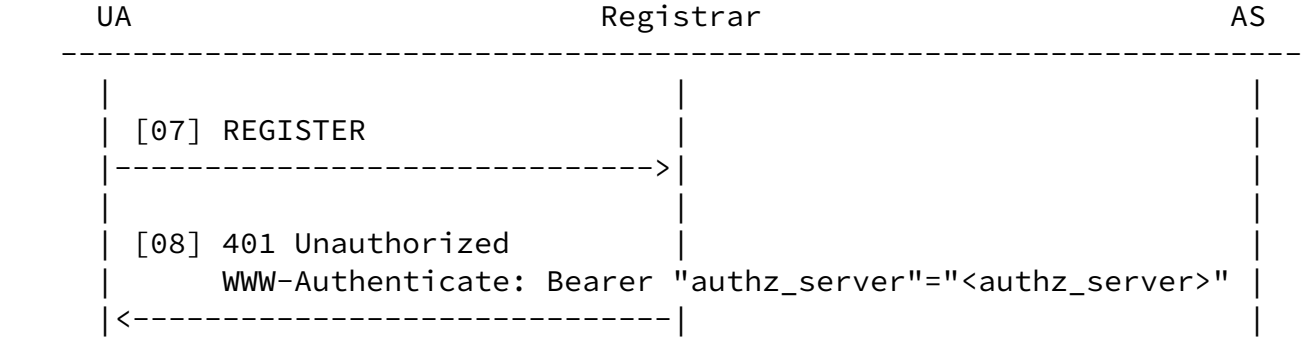
The registrar validates the access token, and if the access token provided by the UA is an opaque token, then the registrar MAY perform an introspection, steps [04] and [05], to obtain more information about the token and its scope, as per [RFC7662]. Otherwise, after the registrar validates the token to make sure it was signed by a

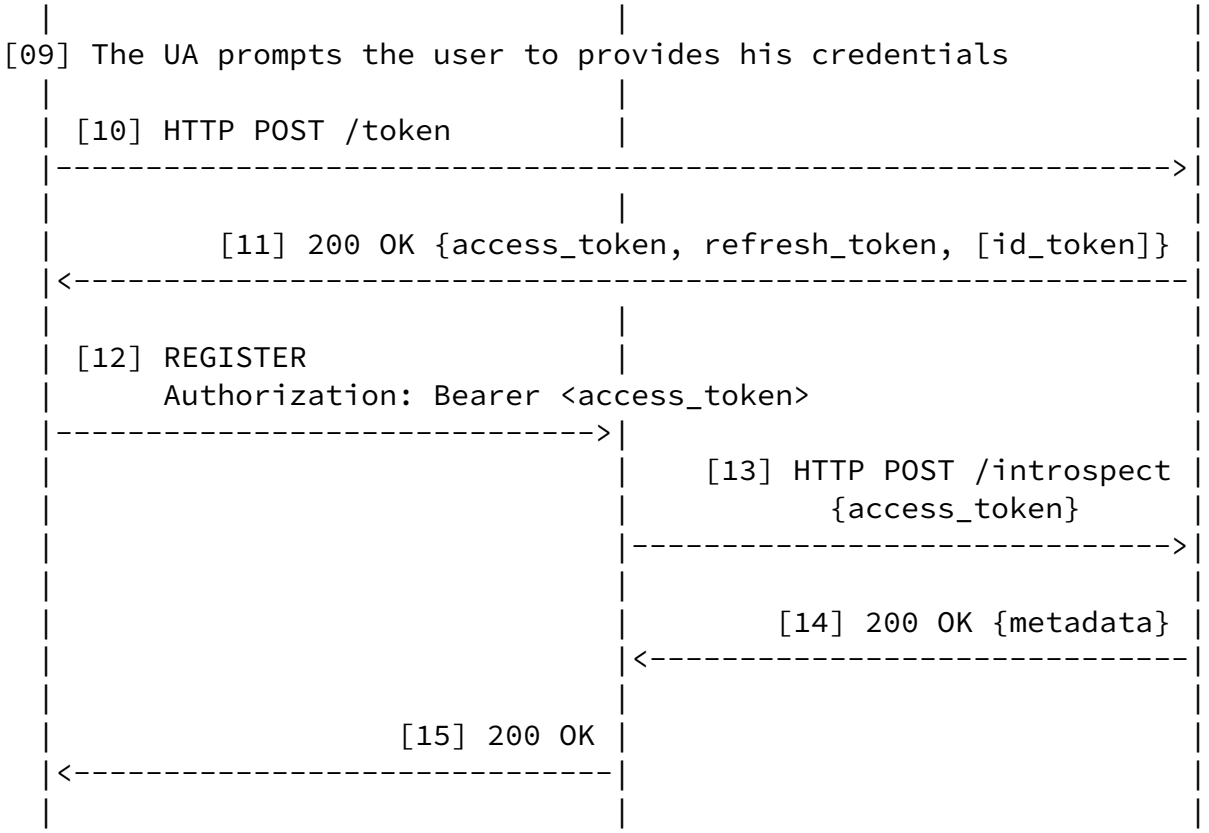
trusted entity, it inspects its claims and act upon it.

When the registrar is satisfied with the token, it then replies with the 200 OK to complete the registration process.

2.1.2. Discovered AS

The following figure provides a high level view of flow of messages when the UA discovers the AS to conatc from the registrar:





In step [07] the UA starts the registration process by sending a SIP REGISTER request to the registrar without any credentials. The REGISTER request includes an indication that the UA supports token-based autentication in the form of sip.token media feature tag. The registrar then challenges the UA, in step [08], by responding with 401 Unauthorized and includes the authorization server to contact to obtain a token.

In step [09], the UA collects the user's credentials with the AS.

In steps [10] and [11], the UA contacts the Authorization Server to authenticate the user and obtain tokens to be used to get access to the SIP network.

The tokens returned to the UA depend on the type of server: with an OAuth Authorization Server, the tokens provided are the access token and refresh token. With an OpenID Connect server, an additional ID-Token is returned, which contains the SIP URI of the user. The

method used to authenticate the user and obtain these tokens is out of scope for this document.

In step [12], the UA retries the registration process with the SIP registrar by sending a REGISTER request with the access token it obtained previously.

The registrar validates the access token, and if the access token provided by the UA is an opaque token, then then registrar MAY perform an introspection, steps [13] and [14], to obtain more information about the token and its scope, as per [RFC7662]. Otherwise, after the registrar validates the token to make sure it was signed by a trusted entity, it inspects its claims and act upon it.

2.2. Initial Registration

If the UA has already obtained a token, then the UA starts the registration process, step [03], by sending a REGISTER request, with the access token in the Authorization header, to the registrar.

If the UA does not have a token, then the UA starts the registration process, step [07], by sending a REGISTER request without an Authorization header. The registrar MUST then challenge the UA by responding with 401 Unauthorized and include the WWW-Authenticate Response Header Field which includes the server to contact to obtain a token, as specified in Section 3

The REGISTER request SHOULD include a sip.token media feature tag in the Contact header field of the request, unless it knows (e.g., by means of configuration) that the registrar supports the token authentication mechanism.

The UA MUST include an Authorization header field with the Bearer scheme in the request to carry the access token, as specified in [RFC6750].

When the registrar is satisfied with the token, it then replies with the 200 OK to complete the registration process.

2.3. Subsequent Registrations

All subsequent REGISTER requests from the UA MUST include a valid access token. The UA MUST obtain a new access token before the access token expiry period to continue to get service from the system. The method used to obtain a new fresh access tokens is out of scope for this document.

The REGISTER request SHOULD include a sip.token media feature tag in the Contact header field of the request, unless it knows (e.g., by means of configuration) that the registrar supports the token authentication mechanism.

2.4. Non-Registration Requests

The UA MUST NOT insert a token in a non-REGISTER request, unless the non-REGISTER request has been challenged, or the peer is considered a trusted entity.

If a non-REGISTER request from the UA is challenged with a WWW-Authenticate header field to provide credentials for the same realm specified in the challenge to the registration request, then the UA MUST include a valid access token in the request retry. The UA MUST include an Authorization header field with the Bearer scheme in the request to carry the access token, as specified in [RFC6750].

Challenges with WWW-Authenticate with different realm specified in the challenge to the registration request are out of scope for this document. Challenges with Proxy-Authenticate are out of scope for this document.

3. WWW-Authenticate Response Header Field

This section describes the syntax of the WWW-Authenticate Response Header Field when used with the Bearer scheme to challenge the UA for credentials.

```
challenge  =/  ("Bearer" LWS bearer-cln *(COMMA bearer-cln))
bearer-cln = realm / scope / authz-server / error /
             auth-param
authz-server = "authz_server" EQUAL authz-server-value
authz-server-value = quoted-string
```

The realm and auth-param parameters are defined in [RFC3261].

As per [RFC3261], the realm string alone defines the protection domain. [RFC3261] states that the realm string must be globally unique and recommends that the realm string contains a hostname or domain name. It also states that the realm string should be human-readable identifier that can be rendered to the user.

The scope and error parameters are defined in [RFC6749].

The scope parameter could be used by the registrar/proxy to indicate to the UAC the minimum scope that must be associated with the access token to be able to get service. As defined in [RFC6749], the value of the scope parameter is expressed as a list of space-delimited, case-sensitive strings. The strings are defined by the authorization server. The values of the scope parameter is out of scope for this document.

The error parameter could be used by the registrar/proxy to indicate to the UAC the reason for the error, with possible values of "invalid_token" or "invalid_scope".

4. 'sip.token' Media Feature Tag

The sip.token media feature tag, when inserted in the Contact header field of a SIP REGISTER request, conveys that the SIP UA associated with the tag supports a token based authentication mechanism, where the user authentication and SIP registration authorization is performed by a third party. The media feature tag has no values.

token-mt = "+sip.token"

5. Security Considerations

The UAC MUST always make sure that it is communicating with the right registrar/proxy using TLS and proper validation of the server certificate and the identifier in that certificate to protect the access token in transit.

If the token being used is a bearer token as specified in [RFC6750], then the security considration of that document apply.

If the token being used is a JWT as specified in [RFC7519], then the security considration of that document apply.

6. IANA Considerations

6.1. SIP Media Feaure Tag

6.1.1. sip.token

This section defines a new media feature tag that extends the "SIP Media Feature Tag Registration Tree" subregistry [RFC3840] under the "Media Feature Tags" registry (https://www.iana.org/assignments/media-feature-tags).

Media feature tag name: sip.token

Summary of the media feature indicated by this feature tag: This media feature tag, when inserted in the Contact header field of a SIP REGISTER request, conveys that the SIP UA associated with the tag supports a token based authentication mechanism, where the user authentication and SIP registration authorization is performed by a third party.

Values appropriate for use with this feature tag: none

Related standards or documents: RFC XXXX

Security considerations: This media feature tag does not introduce new security considerations, as it simply indicates support for a basic SIP feature. However, if an attacker manages to remove the media feature tag from a SIP REGISTER request, the SIP UA that inserted it might not be able to authenticate itself with the SIP registrar to which the SIP request is addressed, as the SIP registrar might not be aware that the SIP UA supports the feature associated with the media feature tag.

Contact: IESG (iesg@ietf.org)

7. Acknowledgments

The authors would also like to thank Paul Kyzivat for his reviews and feedback on this document.

The authors would also like to thank the following for their review and feedback of the original document that was replaced with this document:

Andrew Allen, Martin Dolly, Keith Drage, Paul Kyzivat, Jon Peterson, Michael Procter, Roy Radhika, Matt Ryan, Ivo Sedlacek, Roman Shpount, Robert Sparks, Asveren Tolga, and Dale Worley.

8. Normative References

[OPENID] Sakimura, N., Bradley, J., Jones, M., de Medeiros, B., and C. Mortimore, "OpenID Connect Core 1.0", February 2014.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC3261] Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M., and E. Schooler, "SIP: Session Initiation Protocol", RFC 3261, DOI 10.17487/RFC3261, June 2002, <https://www.rfc-editor.org/info/rfc3261>.

[RFC3840] Rosenberg, J., Schulzrinne, H., and P. Kyzivat, "Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)", RFC 3840, DOI 10.17487/RFC3840, August 2004, <https://www.rfc-editor.org/info/rfc3840>.

[RFC6749] Hardt, D., Ed., "The OAuth 2.0 Authorization Framework", RFC 6749, DOI 10.17487/RFC6749, October 2012, <https://www.rfc-editor.org/info/rfc6749>.

[RFC6750] Jones, M. and D. Hardt, "The OAuth 2.0 Authorization

Framework: Bearer Token Usage", RFC 6750,
DOI 10.17487/RFC6750, October 2012,
<https://www.rfc-editor.org/info/rfc6750>.

[RFC7231] Fielding, R., Ed. and J. Reschke, Ed., "Hypertext Transfer Protocol (HTTP/1.1): Semantics and Content", RFC 7231, DOI 10.17487/RFC7231, June 2014, <https://www.rfc-editor.org/info/rfc7231>.

[RFC7519] Jones, M., Bradley, J., and N. Sakimura, "JSON Web Token (JWT)", RFC 7519, DOI 10.17487/RFC7519, May 2015, <https://www.rfc-editor.org/info/rfc7519>.

[RFC7523] Jones, M., Campbell, B., and C. Mortimore, "JSON Web Token (JWT) Profile for OAuth 2.0 Client Authentication and Authorization Grants", RFC 7523, DOI 10.17487/RFC7523, May 2015, <https://www.rfc-editor.org/info/rfc7523>.

[RFC7662] Richer, J., Ed., "OAuth 2.0 Token Introspection", RFC 7662, DOI 10.17487/RFC7662, October 2015, <https://www.rfc-editor.org/info/rfc7662>.

Authors' Addresses

Rifaat Shekh-Yusef (editor)
Avaya
425 Legget Drive
Ottawa, Ontario
Canada

Phone: +1-613-595-9106
EMail: rifaat.ietf@gmail.com

Christer Holmberg
Ericsson
Hirsalantie 11
Jorvas 02420

Finland

EMail: christer.holmberg@ericsson.com

Victor Pascual
webrtchacks
Spain

EMail: victor.pascual.avila@gmail.com