OAuth 2.0 Incremental Auth

IETF 99 Prague, July 2017

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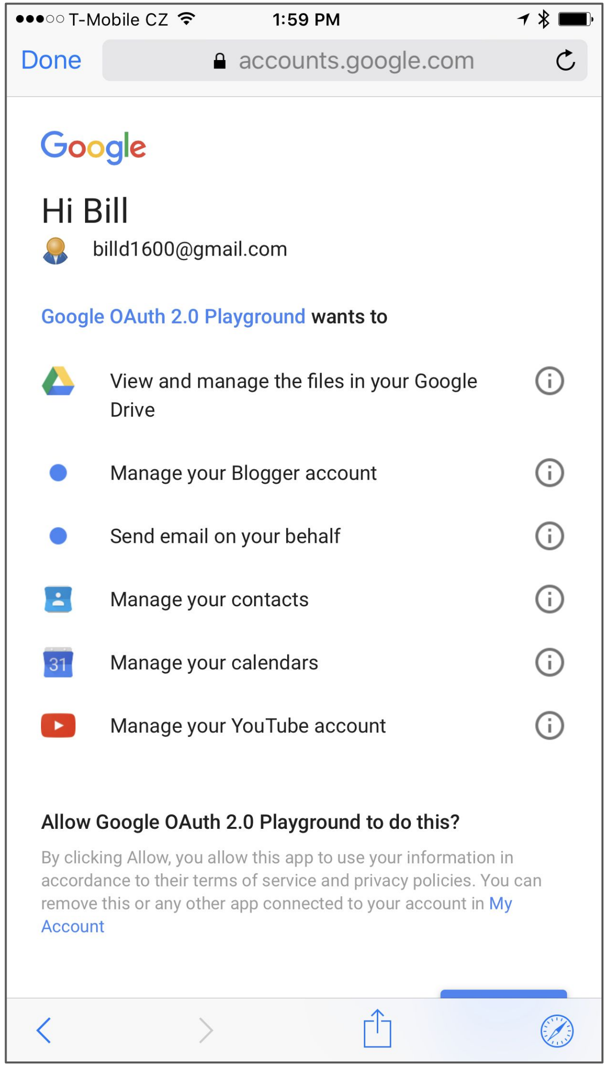
https://tools.ietf.org/html/draft-wdenniss-oauth-incremental-auth-00

Incremental Auth Problem Statement

Asking for the kitchen sink of scopes up-front is a bad thing.

Users should have the *context* of the authorization request.

E.g. Granting a calendar scope only makes sense in the context of interacting with a calendar-related feature.


●●●○○ T-Mobile CZ 1:59 PM

Done accounts.google.com

Google

Hi Bill

billd1600@gmail.com

Google OAuth 2.0 Playground wants to

- View and manage the files in your Google Drive
- Manage your Blogger account
- Send email on your behalf
- Manage your contacts
- Manage your calendars
- Manage your YouTube account

Allow Google OAuth 2.0 Playground to do this?

By clicking Allow, you allow this app to use your information in accordance to their terms of service and privacy policies. You can remove this or any other app connected to your account in My Account

Incremental Auth Definition

The ability to request additional scopes in subsequent requests resulting in a single authorization grant representing all scopes granted so far.

Typical Implementation

Consent screen should only display new scopes (or display new/existing scopes differently).

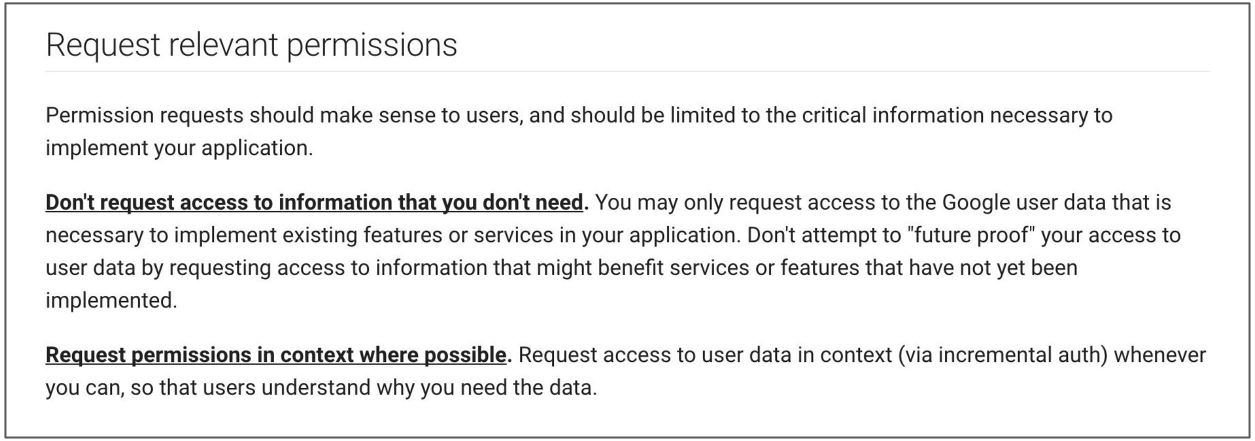
Single refresh token issued for the union of all granted scopes.

De-facto Incremental Auth for Confidential Clients

OAuth 2.0 doesn’t stop you returning an authorization grant with *more* scope, so many people have implemented this already for confidential clients.

De-facto Incremental Auth

Google's API Services User Data Policy already requires clients follow best practices around incremental auth.



Request relevant permissions

Permission requests should make sense to users, and should be limited to the critical information necessary to implement your application.

Don't request access to information that you don't need. You may only request access to the Google user data that is necessary to implement existing features or services in your application. Don't attempt to "future proof" your access to user data by requesting access to information that might benefit services or features that have not yet been implemented.

Request permissions in context where possible. Request access to user data in context (via incremental auth) whenever you can, so that users understand why you need the data.

https://tools.ietf.org/html/draft-wdenniss-oauth-incremental-auth-00

What about public clients?

Confidential client incremental auth techniques not suitable for public clients (risk of granting greater authorization to a counterfeit client than the user saw).

No standard way to implement incremental auth for public clients… until now.

OAuth 2.0 for Incremental Auth Internet-Draft

New internet draft:
draft-wdenniss-oauth-incremental-auth-00

Defines a protocol for public client (native app) incremental auth, a.k.a. “appcremental auth”.

https://tools.ietf.org/html/draft-wdenniss-oauth-incremental-auth-00

OAuth 2.0 for Incremental Auth Internet-Draft

In addition to defining a protocol for public clients, we can use this opportunity to formalize incremental auth for all client types.

Implementors of confidential clients may benefit from more detailed analysis and security considerations.

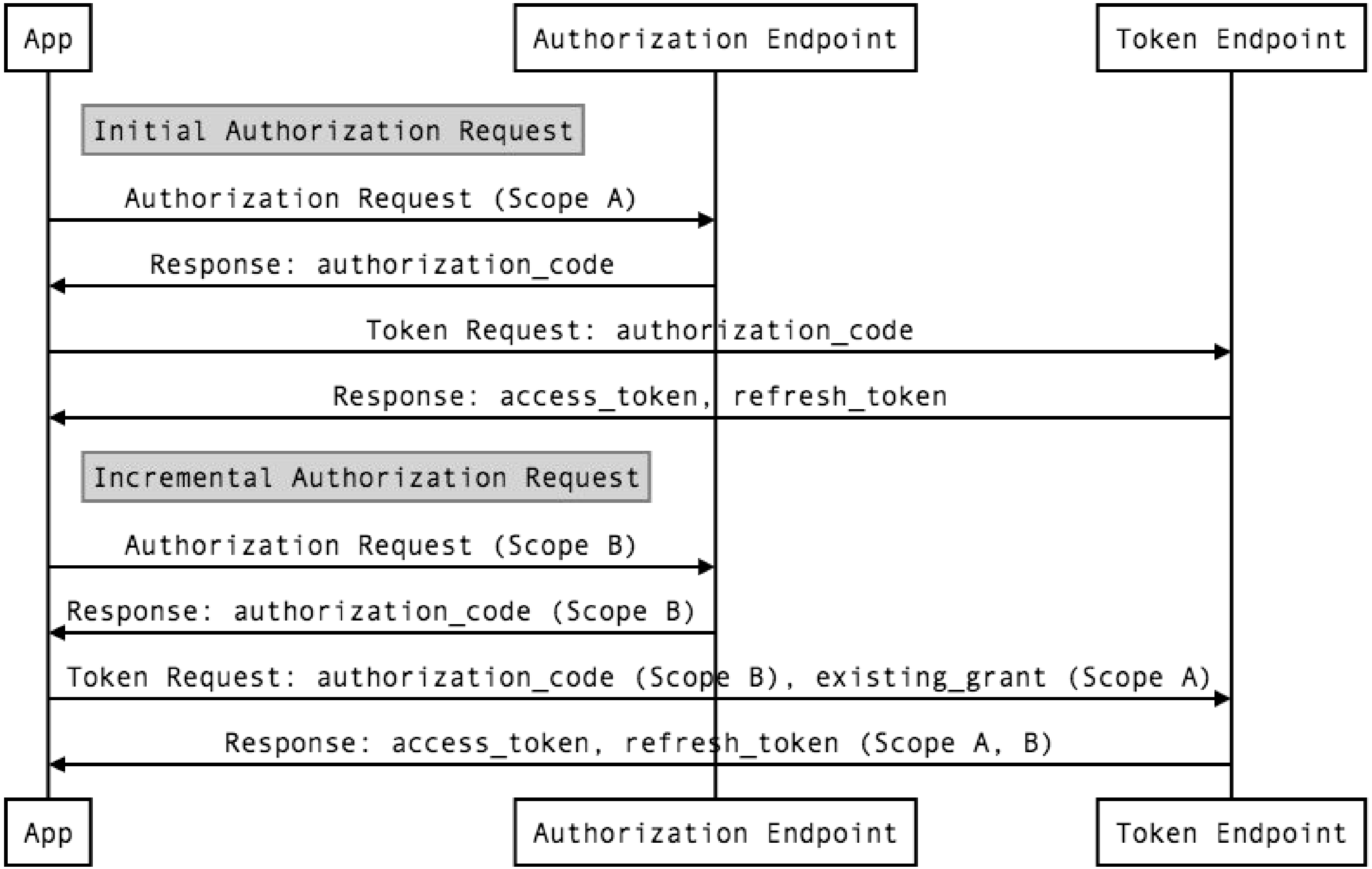
Public Client Protocol “Appcremental”

New token endpoint param: `existing_grant`.

When exchanging the authorization code from subsequent (i.e. incremental) requests, pass the previous refresh token in `existing_grant`.

Resulting access and refresh tokens will contain a union of the scope.

Incremental Auth for Native Apps


App
Authorization Endpoint
Token Endpoint
Initial Authorization Request
Authorization Request (Scope A)
Response: authorization_code
Token Request: authorization_code
Response: access_token, refresh_token
Incremental Authorization Request
Authorization Request (Scope B)
Response: authorization_code (Scope B)
Token Request: authorization_code (Scope B), existing_grant (Scope A)
Response: access_token, refresh_token (Scope A, B)
App
Authorization Endpoint
Token Endpoint

Public Client Protocol Implementation Details

Don’t just union any two grants: the existing grant must be valid in it’s own right (not expired or revoked), and `client_id` must match.

Alternatives Considered: Authorization Param not Token Param

Could also pass previous grant in the authorization request.

Benefit: authorization server can know full context ahead of time.

Drawback: Tokens passed in a GET request.

Alternatives Considered: Access Token not Refresh Token

Alternative: access token as proof of existing grant.

Benefit: Works with other flows

Drawback: More susceptible to attack.

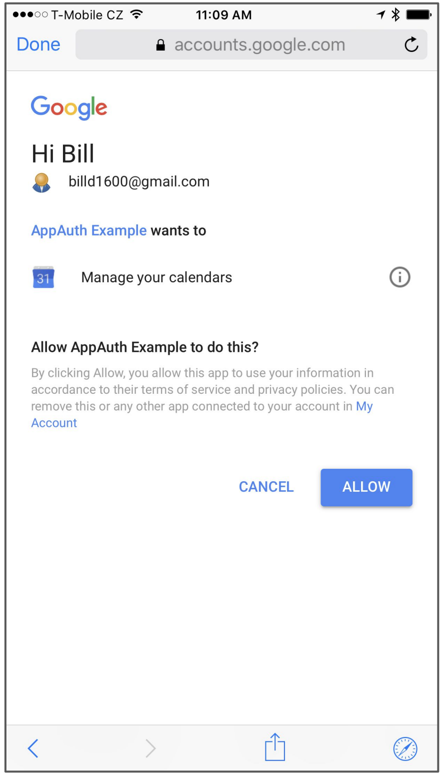
Native Apps SHOULD be using the code flow anyway.

OAuth 2.0 Incremental Auth Running Code

Google's OAuth server already supports incremental auth for public clients, as defined in this spec.

Try out my proof of concept:
https://github.com/WilliamDenniss/AppAuth-iOS/tree/appcremental

Demo



Google

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AppAuth Example wants to

31 Manage your calendars

Allow AppAuth Example to do this?

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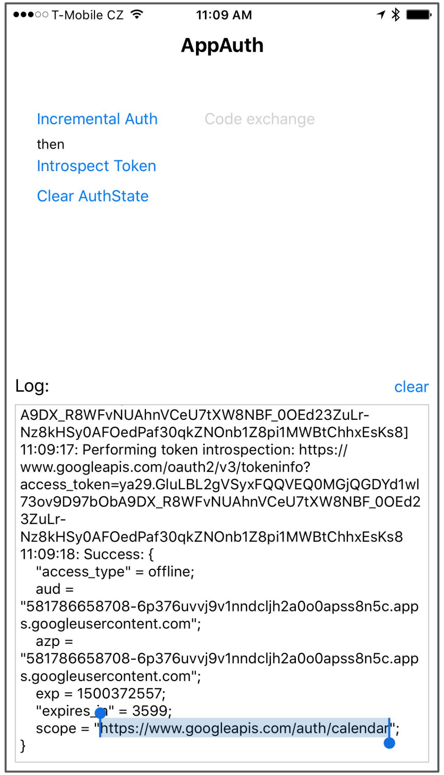
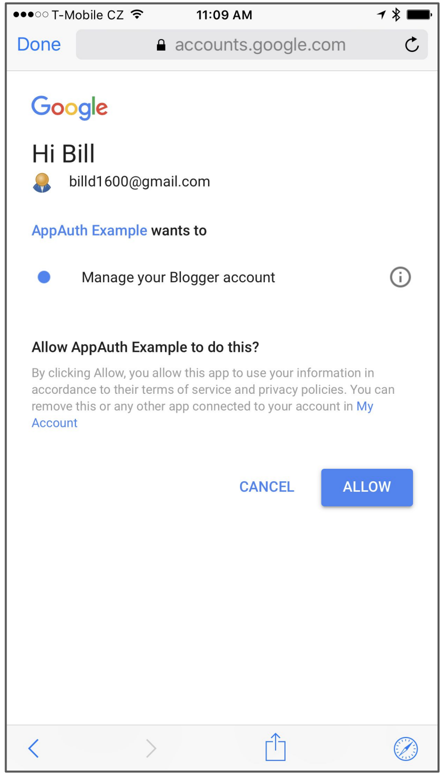


```
A9DX_R8WFvNUAhnVCeU7tXW8NBF_0OEd23ZuLr-
Nz8kHSy0AFOedPaf30qkZNOnb1Z8pi1MWBtChhxEsKs8]
11:09:17: Performing token introspection: https://
www.googleapis.com/oauth2/v3/tokeninfo?
access_token=ya29.GluLBL2gVSyxFQQVEQ0MGjQGDYd1wl
73ov9D97bObA9DX_R8WFvNUAhnVCeU7tXW8NBF_0OEd2
3ZuLr-
Nz8kHSy0AFOedPaf30qkZNOnb1Z8pi1MWBtChhxEsKs8
11:09:18: Success: {
   "access_type" = offline;
   aud =
"581786658708-6p376uvvj9v1nndcljh2a0o0apss8n5c.app
s.googleusercontent.com";
   azp =
"581786658708-6p376uvvj9v1nndcljh2a0o0apss8n5c.app
s.googleusercontent.com";
   exp = 1500372557;
   "expires_in" = 3599;
   scope = "https://www.googleapis.com/auth/calendar";
}
```



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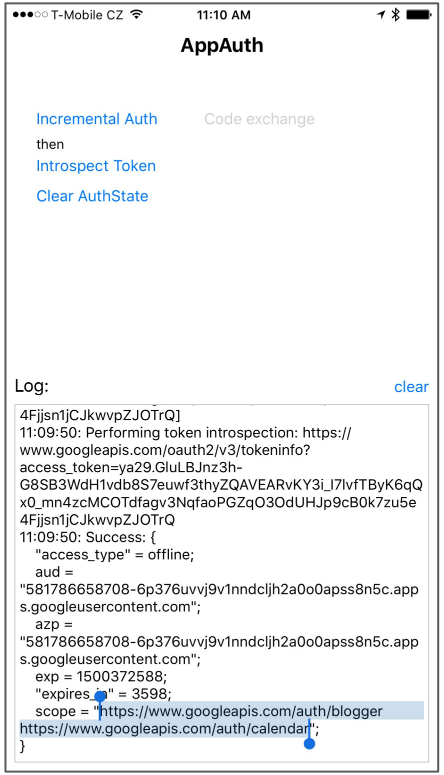

```
4FjjsnljCJkwvpZJOTrQ]
11:09:50: Performing token introspection: https://
www.googleapis.com/oauth2/v3/tokeninfo?
access_token=ya29.GluLBJnz3h-
G8SB3WdH1vdb8S7euwf3thyZQAVEARvKY3i_I7lvfTByK6qQ
x0_mn4zcMCOTdfagv3NqfaoPGZqO3OdUHJp9cB0k7zu5e
4FjjsnljCJkwvpZJOTrQ
11:09:50: Success: {
   "access_type" = offline;
   aud =
"581786658708-6p376uvvj9v1nndcljh2a0o0apss8n5c.app
s.googleusercontent.com";
   azp =
"581786658708-6p376uvvj9v1nndcljh2a0o0apss8n5c.app
s.googleusercontent.com";
   exp = 1500372588;
   "expires_in" = 3598;
   scope = "https://www.googleapis.com/auth/blogger
https://www.googleapis.com/auth/calendar";
}
```

https://youtu.be/SPSCW4NUooU

Confidential Client Specification Details

Documents best practices, security considerations, and:

New authorization endpoint parameter

`include_granted_scopes`.

Confidential Client Specification Details

Allows client to specify they want the new grant to contain all granted scopes, including ones not requested directly in the current request.

If you track your scopes (like you have to with public clients), alternative is to simply include granted scopes manually.

Confidential Client Specification Details

Google implemented `include_granted_scopes` as a convenience to confidential clients.

https://developers.google.com/identity/protocols/OAuth2WebServer#incrementalAuth

By default only requested scopes are included in the grant.

Confidential Client Specification Details

Alternative is to always or never implement this behavior, each with drawbacks:

Always: No way for client to indicate they *don’t* want the full scope.

Never: Confidential clients need to track granted scopes manually (like native ones).

OAuth 2.0 Incremental Auth

Discuss