OAuth Security Workshop 2017: ETH Zurich

OAuth Security:
Challenges with “Undefined”

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Identity @ Google

Google

OAuth Spec

- Defined protocol
- Undefined:
  - (e.g. Developer registration, Approval Page etc)

Protocol Challenges

- Already discussed a lot. Not the focus of this talk. e.g.
  - Dynamic registration
  - Safe code/token delivery on devices
  - App Auth
  - Session management
  - Token binding
  - Token revocation

Challenges with “Undefined”

- Developer registration,
- Approval Page
- Notification
- Usage
- User controls, Revocation
- Admin Controls

OAuth Life cycle

Register

Developer creates app

Grant

User grants access

Usage

Use the token to get data

Revoke

User revokes token

OAuth Challenges @ Google

- Several hundred scopes, APIs
- Different types of data
- Users with varied understanding of security
- Enterprises on Google
  - Users could grant access to malicious apps
  - Enterprise should be able to limit OAuth grants

The OAuth Phishing attack (What happened?)

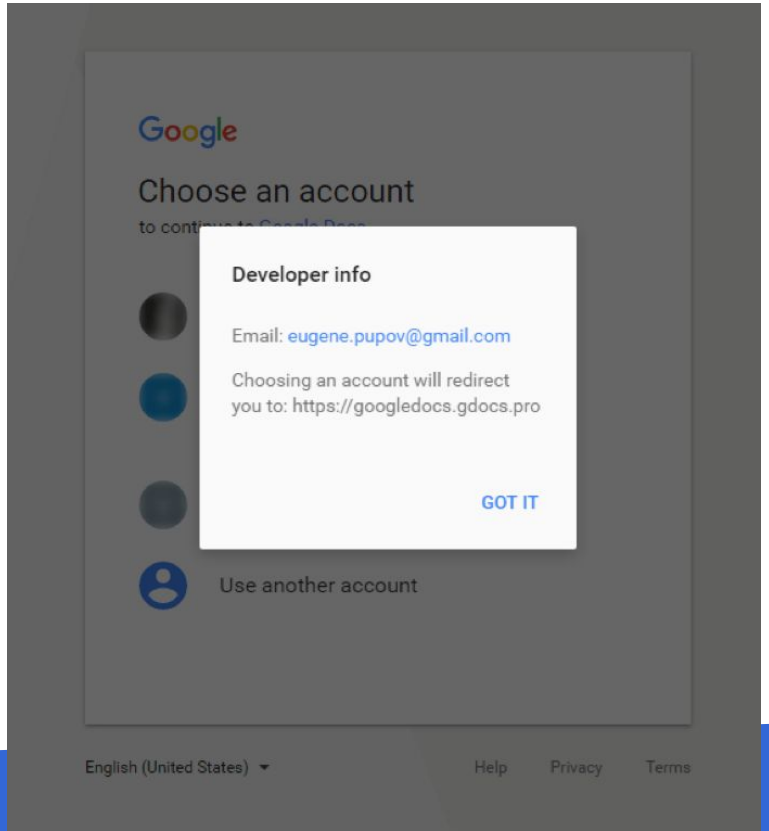
Joe Bernstein has shared a document on Google Docs with you Inbox x

joe.bernstein@buzzfeed.com

to hhhhhhhhhhhhhh., bcc: zeynep

Joe Bernstein has invited you to view the following document:

Open in Docs



Developer Registration

What is required for developer registration?

- Different info for different platforms (Web, Android, iOS, Windows)
- Developer Information
  - Domain ownership & verification (introduces friction)
- App Information (Logo, Name etc.)
  - What can be verified?
- Scopes
  - Part of the request or at registration
- Justification for the data?
- Privacy policy/ToS

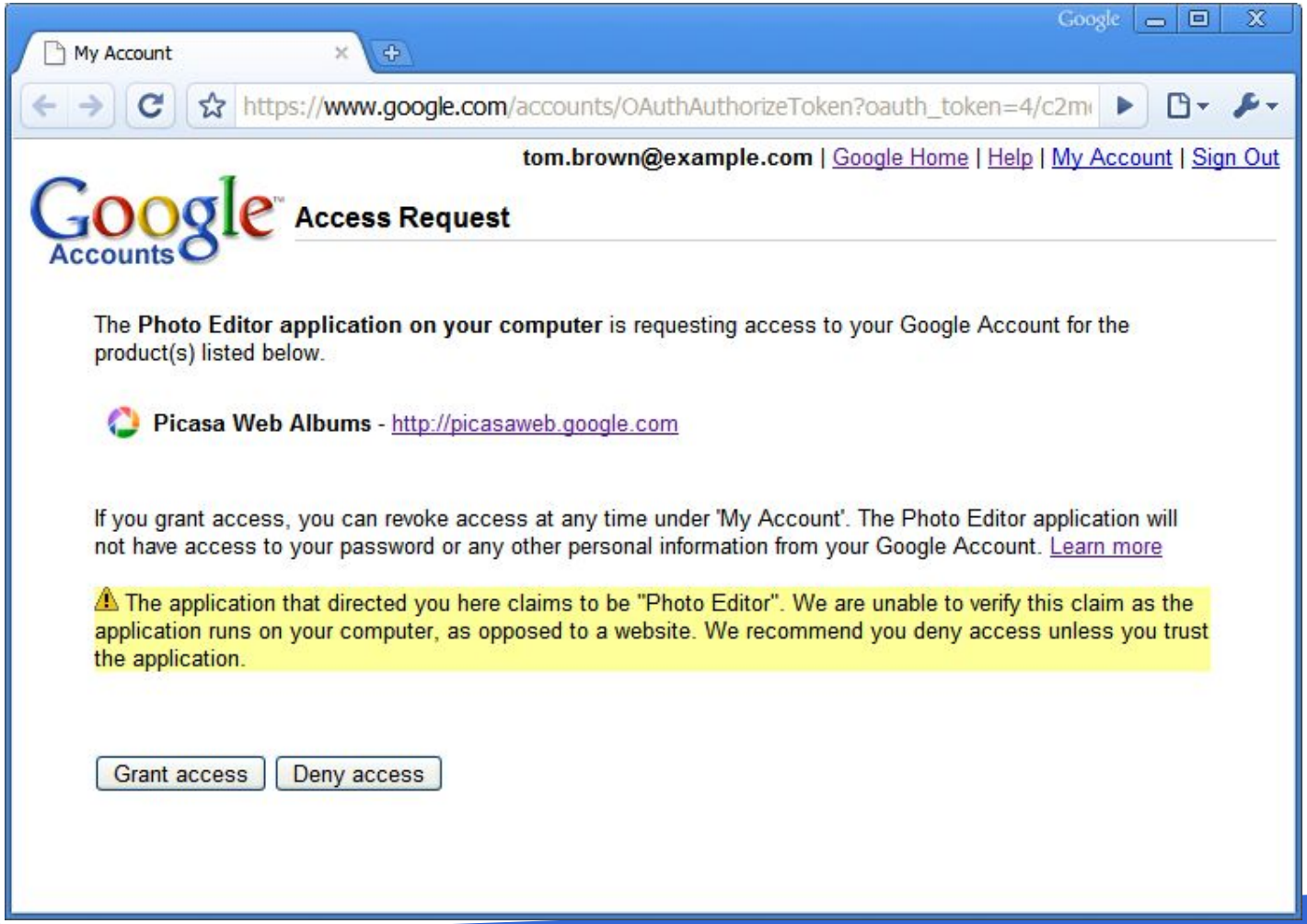
Future

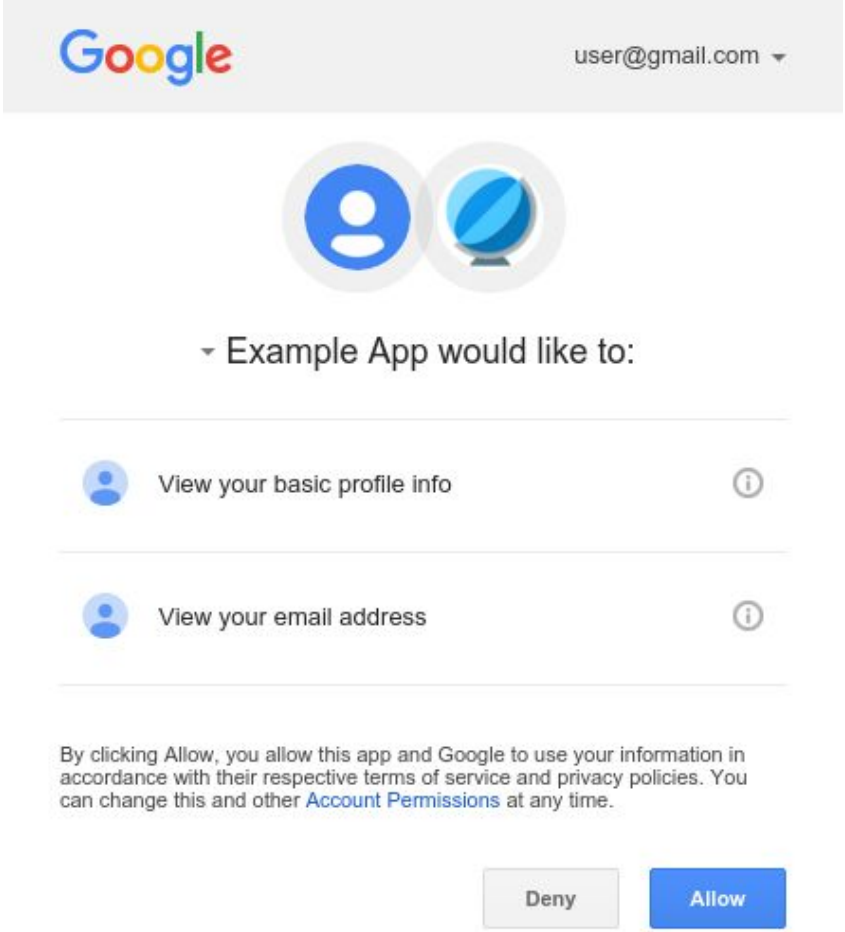
- More verification
- Justification required for sensitive data
- Manual review required
  - If exceeding certain threshold of users
- Learnings from Manual reviews

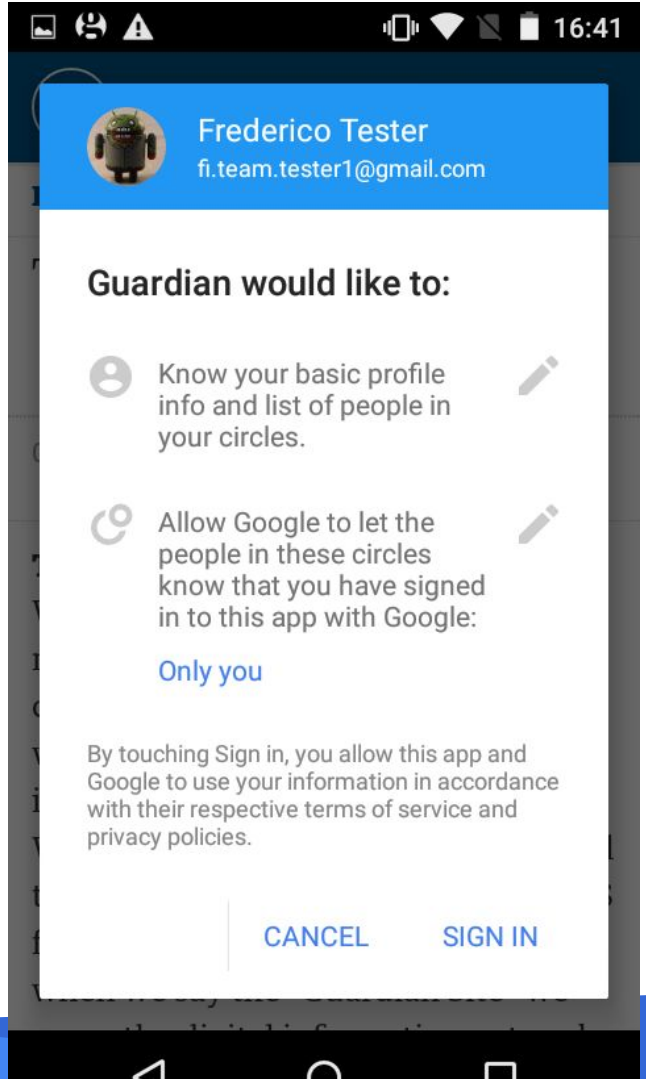
Consent Page/Grant

Approval page

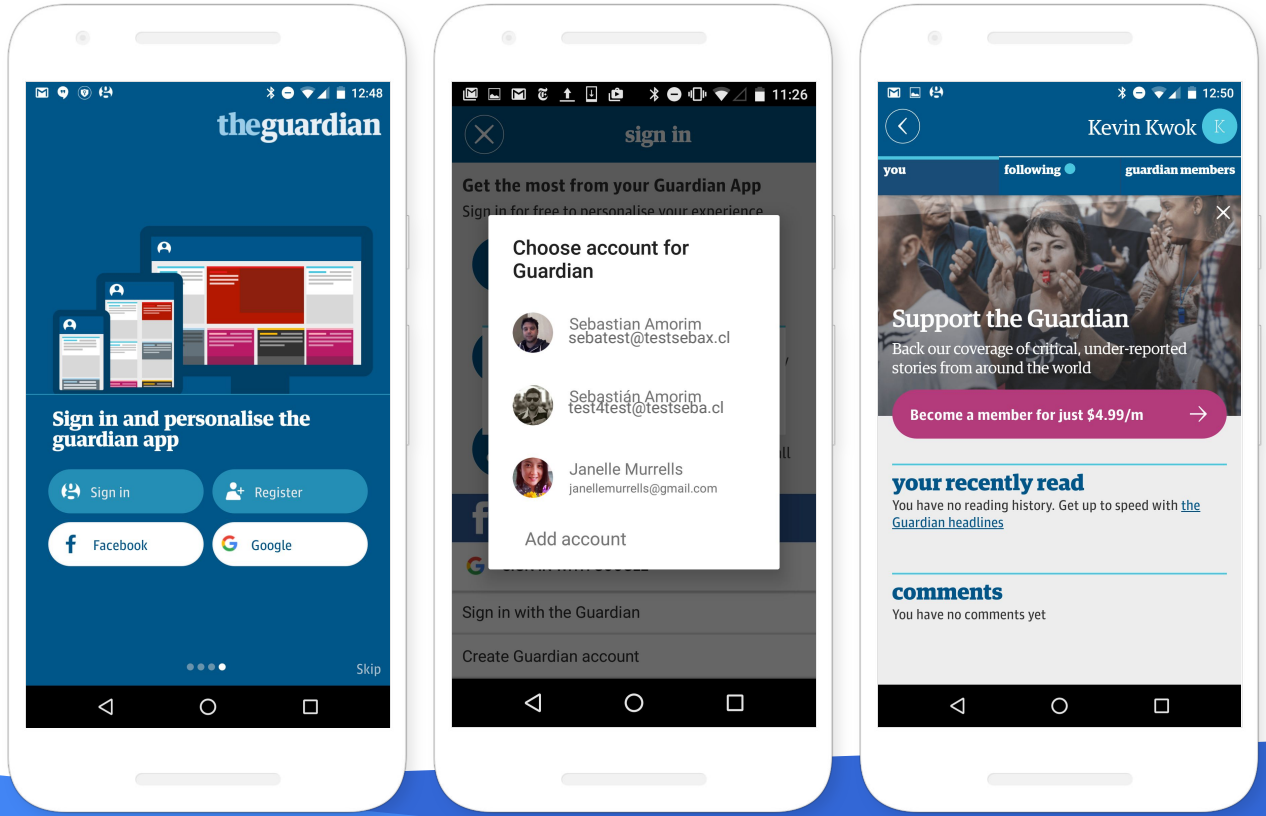
- What metrics should you optimize?
  - Approval rate?
- Amount of info/data/txt on the page
  - Most users don’t read
- Controls on the page?
- **Do users understand?**
- Design -> Study -> Launch -> Data -> Repeat

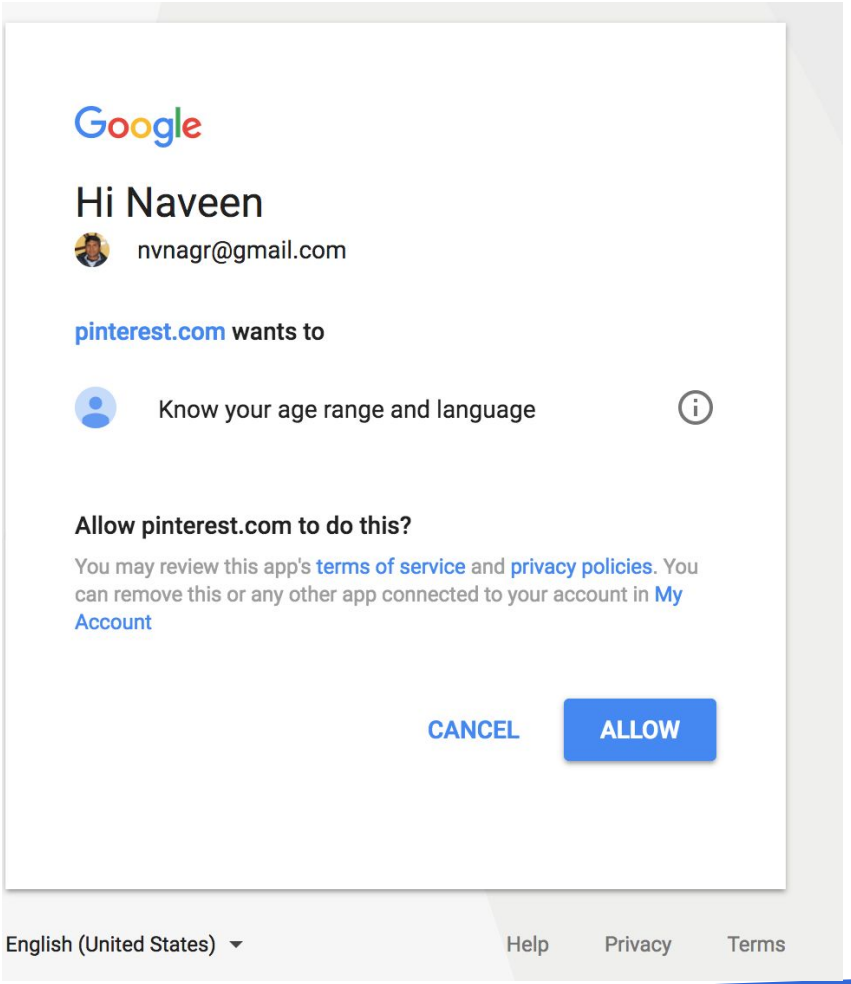

Google
My Account
https://www.google.com/accounts/OAuthAuthorizeToken?oauth_token=4/c2m
tom.brown@example.com | Google Home | Help | My Account | Sign Out
Google Accounts
Access Request
The Photo Editor application on your computer is requesting access to your Google Account for the product(s) listed below.
Picasa Web Albums - http://picasaweb.google.com
If you grant access, you can revoke access at any time under 'My Account'. The Photo Editor application will not have access to your password or any other personal information from your Google Account. Learn more
The application that directed you here claims to be "Photo Editor". We are unable to verify this claim as the application runs on your computer, as opposed to a website. We recommend you deny access unless you trust the application.
Grant access
Deny access


Google
user@gmail.com
Example App would like to:
View your basic profile info
View your email address
By clicking Allow, you allow this app and Google to use your information in accordance with their respective terms of service and privacy policies. You can change this and other Account Permissions at any time.
Deny
Allow


16:41
Frederico Tester
fi.team.tester1@gmail.com
Guardian would like to:
Know your basic profile info and list of people in your circles.
Allow Google to let the people in these circles know that you have signed in to this app with Google:
Only you
By touching Sign in, you allow this app and Google to use your information in accordance with their respective terms of service and privacy policies.
CANCEL
SIGN IN

No approval page for “Sign-in”




Google
Hi Naveen
nvnagr@gmail.com
pinterest.com wants to
Know your age range and language
Allow pinterest.com to do this?
You may review this app's terms of service and privacy policies. You can remove this or any other app connected to your account in My Account
CANCEL
ALLOW
English (United States)
Help
Privacy
Terms

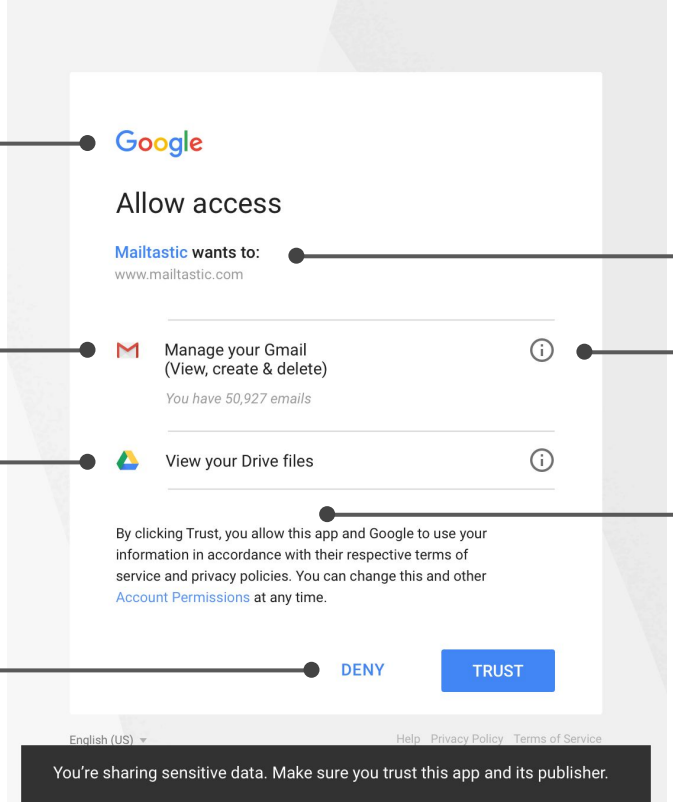
Grant confusion

It says Google, so it's safe.

Manage? Oh, I see, delete.

Files on my device?

Will it still work if I say no?



Verified? Great, it won't spam me.

Why does it want all these things?

App, like app on my phone?

Future

- Give user more guidance
  - Based on various signals
- Differentiated consent page
  - Account chip for just “sign-in”
  - Risk based e.g. Danger, warning, normal
- Quota/Limits

User Notification

Notify user

- Mitigation for hijacked user
- Sensitive data approval reminder

Usage of token

Token Usage

- What does the app actually do?
- Is the developer compromised?
- Monitor for abnormal behavior

Revocation

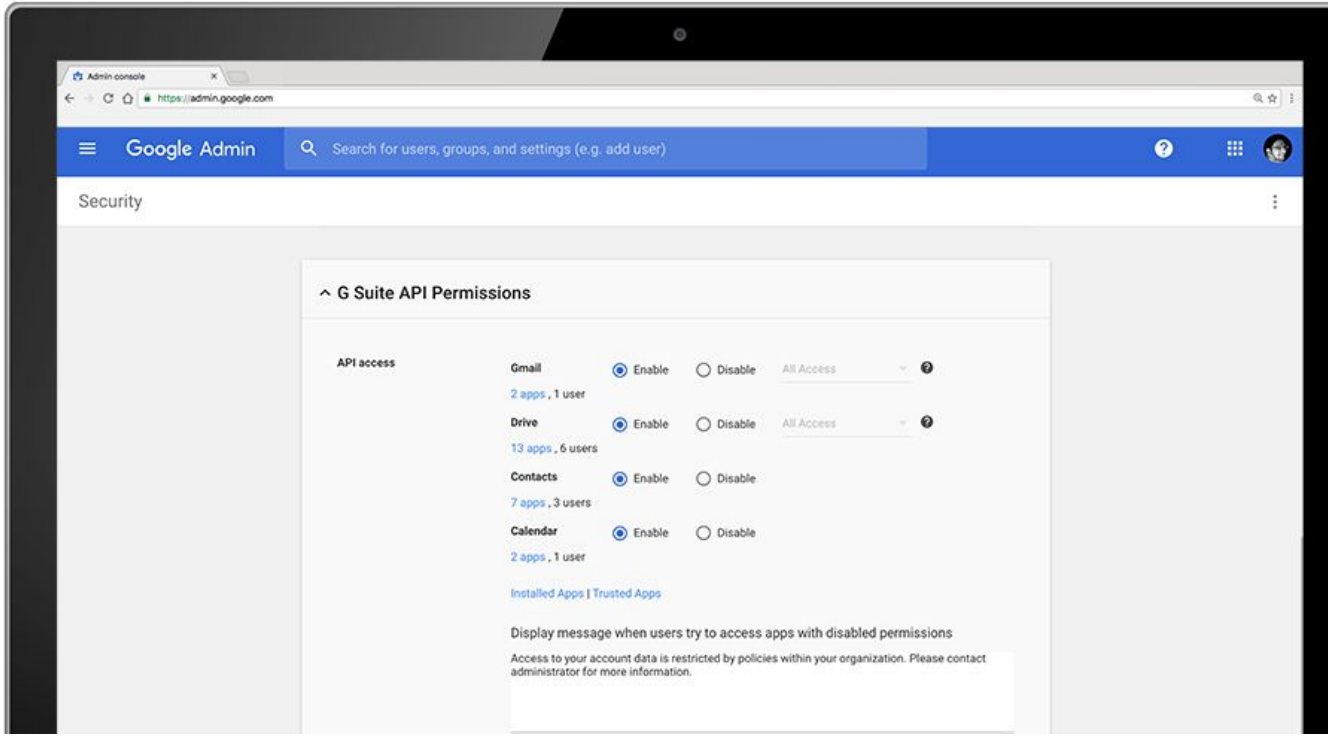
Token revocation

- Remove inactive apps
- Discovery of token revocation page
- Give more info
  - App activity
- Highlight risky apps
- Guide the user with decision

Admin Controls

Give G Suite admins more controls

- Recent Launch



Summary

- OAuth Abuse has arrived
- Verify info about the app and developer
- Guide user through the consent process
- Notify user
- Monitor activity
- Enforce Limits/Quotas
- Give users information and controls on revocation
- Build admin controls

Questions?

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