



UnifiedPush

Push notifications. Decentralized and Open Source

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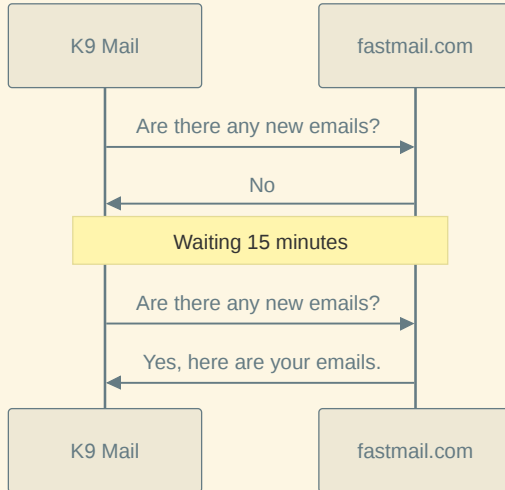
About me

- Open Standards
 - IETF
 - XMPP Standards Foundation (XSF)
- Android App Developer
 - Conversations (Jabber/XMPP client)
 - Ltt.rs (E-Mail client)

Question

How do notifications actually get to my phone?

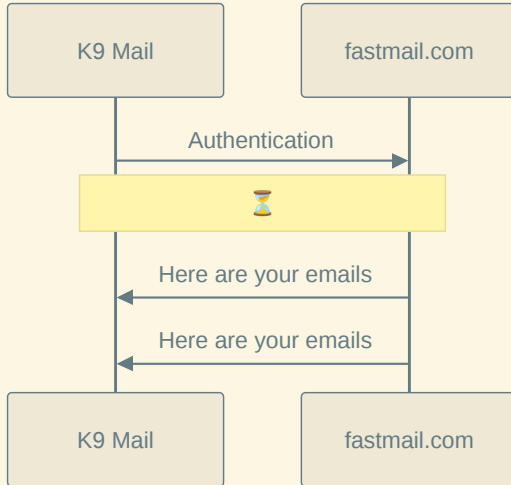
Periodic Polling



Periodic Polling: Pros & Cons

- Easy to implement
- Expensive (TLS, Login, ...)
- High latency
- Majority of connections are unnecessary

Push protocol (persistent connection)

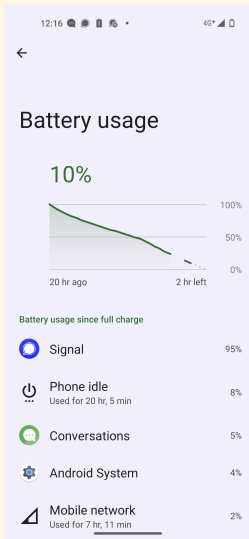


Push protocol: Theory vs Practice

- A network connection that does nothing uses no power.
- Management
 - Periodic pings
 - Re-establishing connection after a network change or disconnection
 - Not synchronized across apps

Transmit as rarely as possible, and when you do, send as much as possible at once.

Push protocol: Theory vs Practice



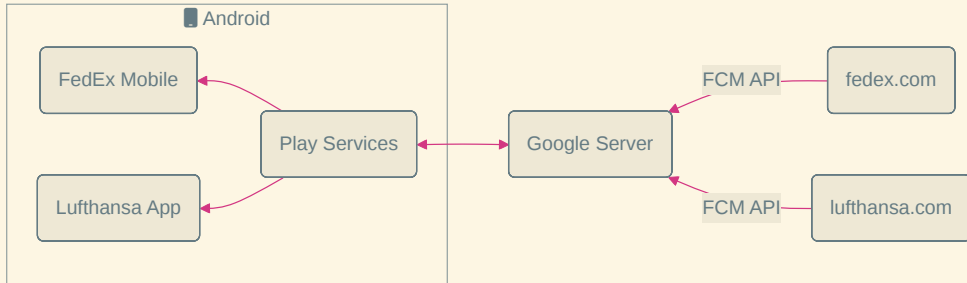
Problem
Not very simple in practice

Disclaimer: Battery usage attribution is hard

Question

Can't we combine that in one app?

Firebase Cloud Messaging



FCM: Mode of operation

- Play Services maintain a persistent connection to Google servers

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 - Relatively efficient
- Service provides a 'token' on push for correlation with app
- By default, few things work without 'Google Push'.
 - Apps need explicit user consent to maintain a persistent connection to the server.
 - Additional restrictions for apps distributed on Google Play

- *Google just wants total control*
Implementing push notifications yourself isn't easy for the average developer.
- Google doesn't necessarily see the content. Just: Which services, which app, how often.
- Google can see which Google Account the messages are sent to.

FCM: Much more criticism

- Play Services installed with system privileges
- Play Services provide unwanted *features* like Advertising ID.
- Tracking (Resulting in unnecessary traffic and battery drain)
- Google Account often tied to real world identity
- Law enforcement regularly requests push token from services (tied to Google Account)

Using microG as a replacement can alleviate some of those problems.

Law enforcement

**Bundeskriminalamt**



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DKA

Thuenstraße 11
65193 Wiesbaden

Postanschrift:
65173 Wiesbaden



www.bka.de

Auskunftsersuchen zu Bestandsdaten bei Anbietern von digitalen Diensten gemäß § 22 Abs. 1 S. 1, S. 3, Abs. 2 Nr. 1, Abs. 4 Nr. 1 TDDDG i. V. m. § 100f Abs. 1 S. 1 Nr. 2, Abs. 2 StPO

Sehr geehrte Damen und Herren,

das Bundeskriminalamt wurde im Auftrag der Generalstaatsanwaltschaft Frankfurt am Main / Zentralstelle zur Bekämpfung der Internetkriminalität (ZIT), 62 Js 215/24 ZIT ersucht, strafprozessuale Ermittlungen gem. § 4 Abs. 2 BKAG wegen 

Zur Erfüllung dieser Aufgabe wird daher gemäß § 22 Abs. 1 S. 1, S. 3, Abs. 3 Nr. 1, Abs. 4 Nr. 1 TDDDG i. V. m. § 100f Abs. 1 S. 1 Nr. 2, Abs. 2 StPO um unverzügliche Übermittlung der nachfolgend aufgeführten Bestandsdaten zu folgender Person / Kennung an die oben angegebene E-Mail-Adresse unter Angabe von Bearbeiter/in, Aktenzeichen und Datum gebeten.

Die Erhebung der nachfolgenden Bestandsdaten ist erforderlich, da zureichende tatsächliche Anhaltspunkte für eine Straftat vorliegen und die zu erhebenden Daten erforderlich sind

☒ zur Erforschung des Sachverhalts,
☒ zur Ermittlung des Aufenthaltsorts eines Beschuldigten.

**Bundeskriminalamt**



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DKA

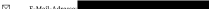
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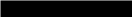
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Es wird um Auskunft zu folgender

☒ Kennung: 

☒ E-Mail-Adresse: 

ersucht und um Mitteilung folgender Daten gebeten:

☒ Welche Angaben hat der Kunde zu seiner Person gemacht?

☒ Wurden diese Angaben auf ihre Richtigkeit überprüft?

☒ Welcher Dienst wurde seit wann in Anspruch genommen?

☒ Handelt es sich hierbei um einen kostenpflichtigen Dienst?

☒ Falls ja, in welcher Form erfolgte die Bezahlung des Dienstes (Konto, Kreditkartennummer, etc.)?

☒ Sind oder waren auf diese Personen weitere Accounts registriert? Wenn ja, welche?

☒ Zugewillte Push Token, sofern der digitale Dienst über eine App genutzt wird.

☒ Sollte der Account darüber hinaus

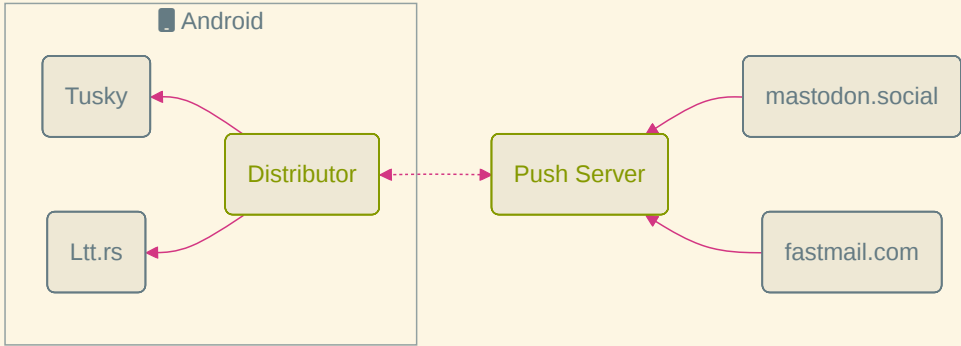
- E-Mail-Weiterleitungen oder
- Angaben zu Kontaktadressen (alternative E-Mail-Adressen, Telefonnummern)

beinhalten, wird um Mitteilung dieser sowie Auskunft dazu gebeten, ob über diese Kontakt zum Kunden aufgenommen wurde.

Question

Can't that be open source and decentralized?

UnifiedPush



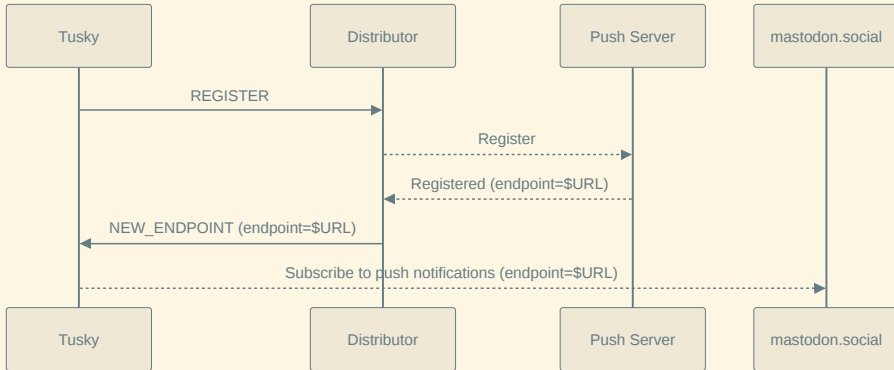
UP: Mode of operation

- App ↔ Distributor
 - Android IPC via *Broadcast Intents*
- Service ↔ Push Server
 - WebPush (RFC 8030, RFC 8292, RFC 8291)
 - Web standard supported by many services (Mastodon, JMAP, IRC, ...)
 - Most likely candidate for future support (IMAP, ...)
- **Not standardized:** Distributor ↔ Push Server

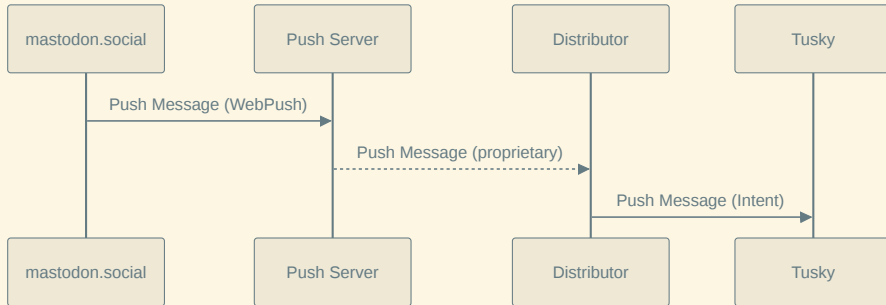
UP: Distributor ↔ Push Server

- Distributor establishes connection to *Push Server*
 - Regular Pings (NAT)
 - Re-establishing connection after a network change
- Competition between different protocols
 - WebSocket
 - Server-sent events (EventSource)
 - XMPP

Register with UnifiedPush



Push with UnifiedPush



Distributors

- Quick and easy
 - Sunup
- For self-hosting
 - NextPush
 - ntfy¹ Conversations
- Jabber/XMPP Users
 - Conversations

¹AI Slopware: github.com/binwiederhier/ntfy/blob/main/docs/releases.md

XMPP as Push Protocol

- Efficient session management
 - Fast reconnect (SM, Bind 2, SASL 2, FAST)
 - Efficient pings
- Mature, well tested, multiple implementations
- Reasonably secure (Channel Binding, etc.)

Conversations als Distributor



Push Server is called *Rewrite Proxy* in the UnifiedPush specification

Apps with UnifiedPush support

- Tusky
- Fedilab
- DAVx⁵
- Ltt.rs
- Fennec
- Molly (Signal client)
- ...

unifiedpush.org/users/apps/

UP: Coming to your app soon?

- No complicated, permanent connection
- Very easy to implement
 - *connector* library for Android IPC
 - WebPush libraries for server → push server

- D-Bus API
- Not many implementations. Knowledge is transferable.

Demo

- Self hosting: UP-Example
- *Distributor* will create a permanent notification that can be hidden
- Aggressive power saving: dontkillmyapp.com

Questions?

unifiedpush.org · [#unifiedpush:matrix.org](https://matrix.org/join/unifiedpush)