Introduction to GitHub Apps
Introducing GitHub Apps

GitHub Apps are a tool to build comprehensive integrations with GitHub:

- First class actors on GitHub -- operating independently of any user identity
- Offer fine-grained permissions
- Installed on a user’s or organization’s repos
- Replace and offer many advantages over OAuth apps
- Come with built-in webhooks
- Work on GitHub.com and GitHub Enterprise Server
- Compatible with web technologies and standards, such as HTTP-based APIs and OAuth-like flows
- Rich open source tooling and libraries available, eg. octokit
Advantages for customer

- **Confidence** in granting third parties access to their assets in GitHub due to fine-grained and repo-centric permissions model
- **Convenience** through user-friendly (un)installation flow
Advantages for integrator

- Can **decouple** integration from GitHub user identities due to first class actor model of GitHub Apps.
- Can take advantage of dedicated, scalable **rate limits**, as opposed to the shared rate limit model offered by OAuth apps.
- Can utilize **modern GitHub APIs** like **Checks** and **Content Attachments**
Hands on with GitHub Apps

1. Creating a GitHub App
2. Authenticating as that app
3. Installing the app on repositories
4. Authentication as that installation
5. Receiving a webhook
6. Creating content as an installation
# Authentication overview

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Deciding which authentication type to use comes down to:

- What resource do I need to access?
- Who do I need to access it as?
Onboarding users

Users can be directed through various flows to create/update installations and identify themselves to your GitHub App.
Notable APIs for GitHub Apps

- GitHub App information
  - Get the authenticated GitHub App (JWT)
- Identify installation information
  - List installations (JWT)
  - Get an organization installation (JWT)
  - Get a user installation (JWT)
- Token creation / revocation
  - Create a new installation token (JWT)
  - Revoke an installation token (installation access token)
- Identify installation resources
  - List repositories (installation access token)
- Identify user-accessible resources
  - List installations for a user (user-to-server OAuth access token)
  - List repositories accessible to the user for an installation (user-to-server OAuth access token)
GitHub Apps best practices for integrators

✅ Do:
- Cache and re-use installation tokens
- Use webhooks for real-time data
- Throttle requests to stay within rate limits
- Consider if REST or GraphQL APIs (or both) are best for your use case
- Use conditional requests wherever possible
- Subscribe to this RSS feed for Platform updates
- Include a descriptive User-Agent header
- Save the X-GitHub-Request-Id response header value, especially for error responses
- Consider other best practices listed here

❌ Don’t:
- Depend on concurrent requests, this can trigger secondary rate limits
- Poll, use webhooks where possible
Libraries and resources

- Developer Documentation
- GitHub REST and GraphQL APIs
- API route specifications for Insomnia
- Migrating OAuth Apps to GitHub Apps
- GitHub Apps
- GitHub Webhooks
- Octokit
- Probot
- smee.io to test webhooks
- GitHub Marketplace