CURITY

Secure your APIs & Microservices with OAuth & OpenID Connect

By Travis Spencer, CEO
@travisspencer, @curityio

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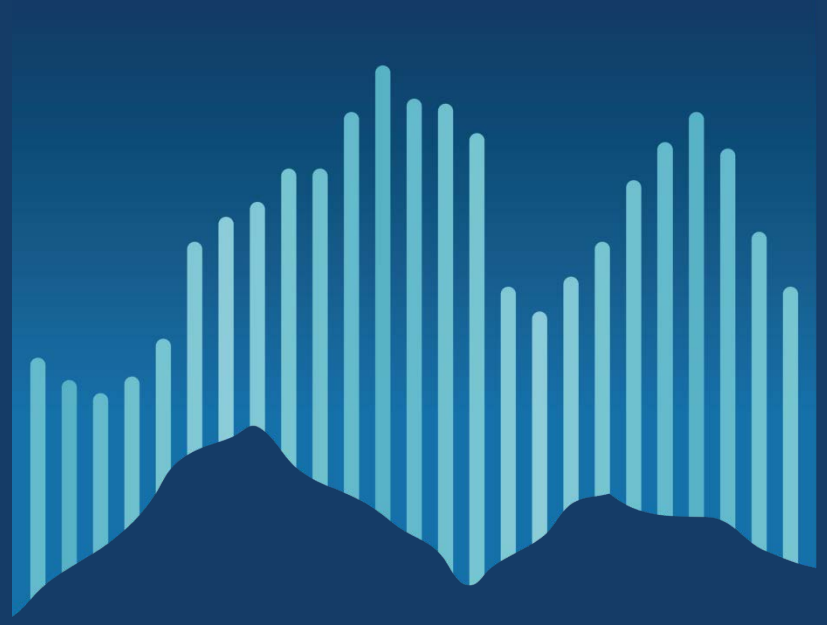

NORDIC **APIS**

Organizers and founders

- ✓ All API Conferences
- ✓ API Community
- ✓ Active blogosphere

Austin API Summit
June 11 – 13 | Austin, Texas

2018 Platform Summit
October 22 - 24 | Stockholm, Sweden

API Security == API Keys

- Problem Solved!

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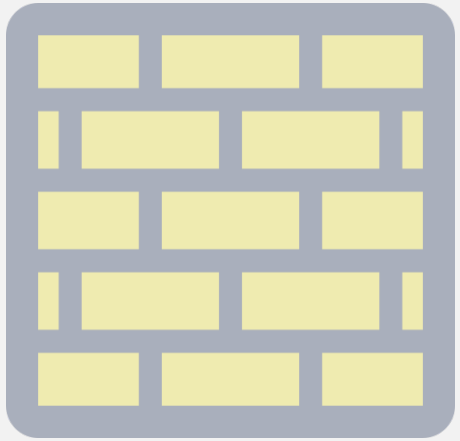
API Security != API Keys

- Revocable, non-expiring, bearer access tokens
- Symmetric keys
- Passwords!



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API Security == OAuth

- Problem solved for real this time?

Not that easy! Sorry ☹

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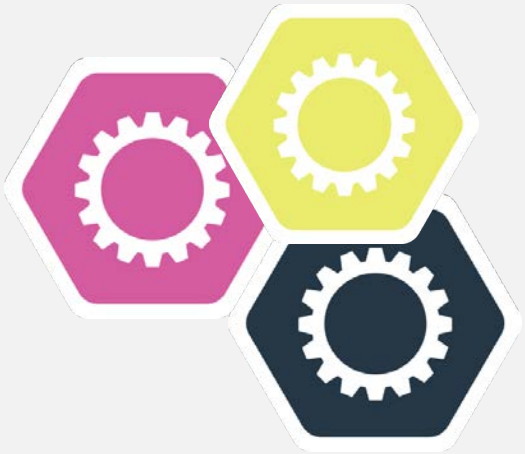
Crucial Security Concerns

Enterprise Security



API Security

Mobile Security

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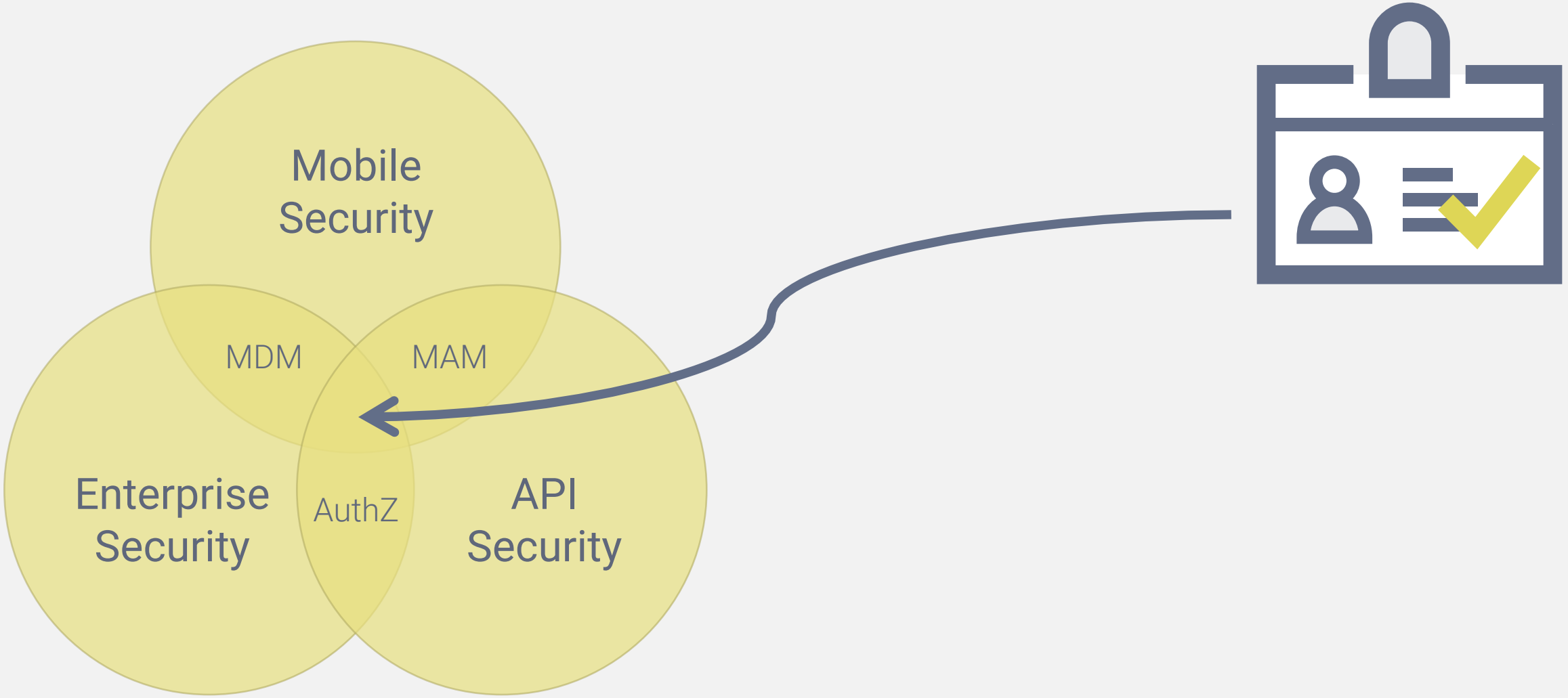
Identity is Central



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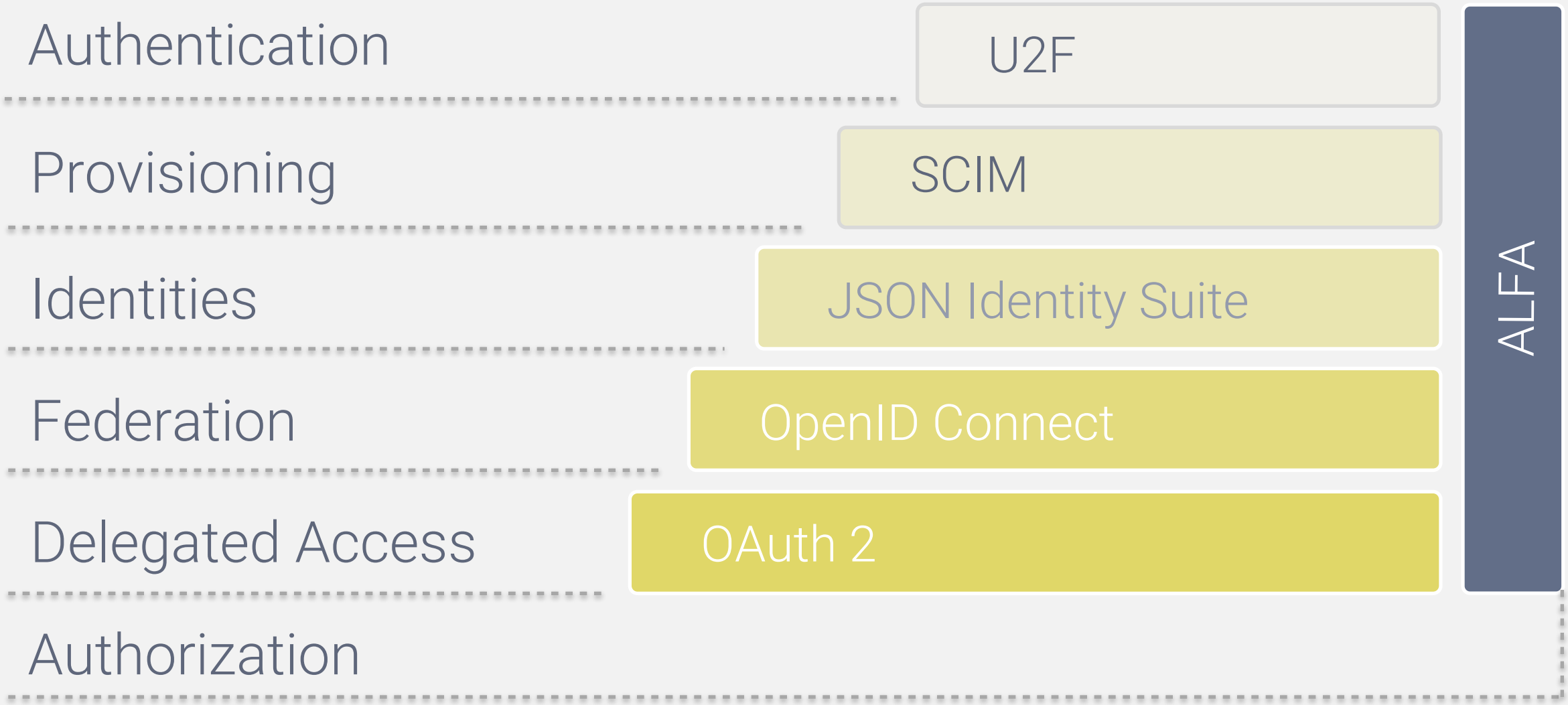
The Neo-security Stack



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OAuth

- OAuth 2 is the new protocol of protocols
  - Used as the base of other specifications
  - OpenID Connect, UMA, HEART, etc.
- Addresses some important requirements
  - Delegated access
  - No password sharing
  - Revocation of access

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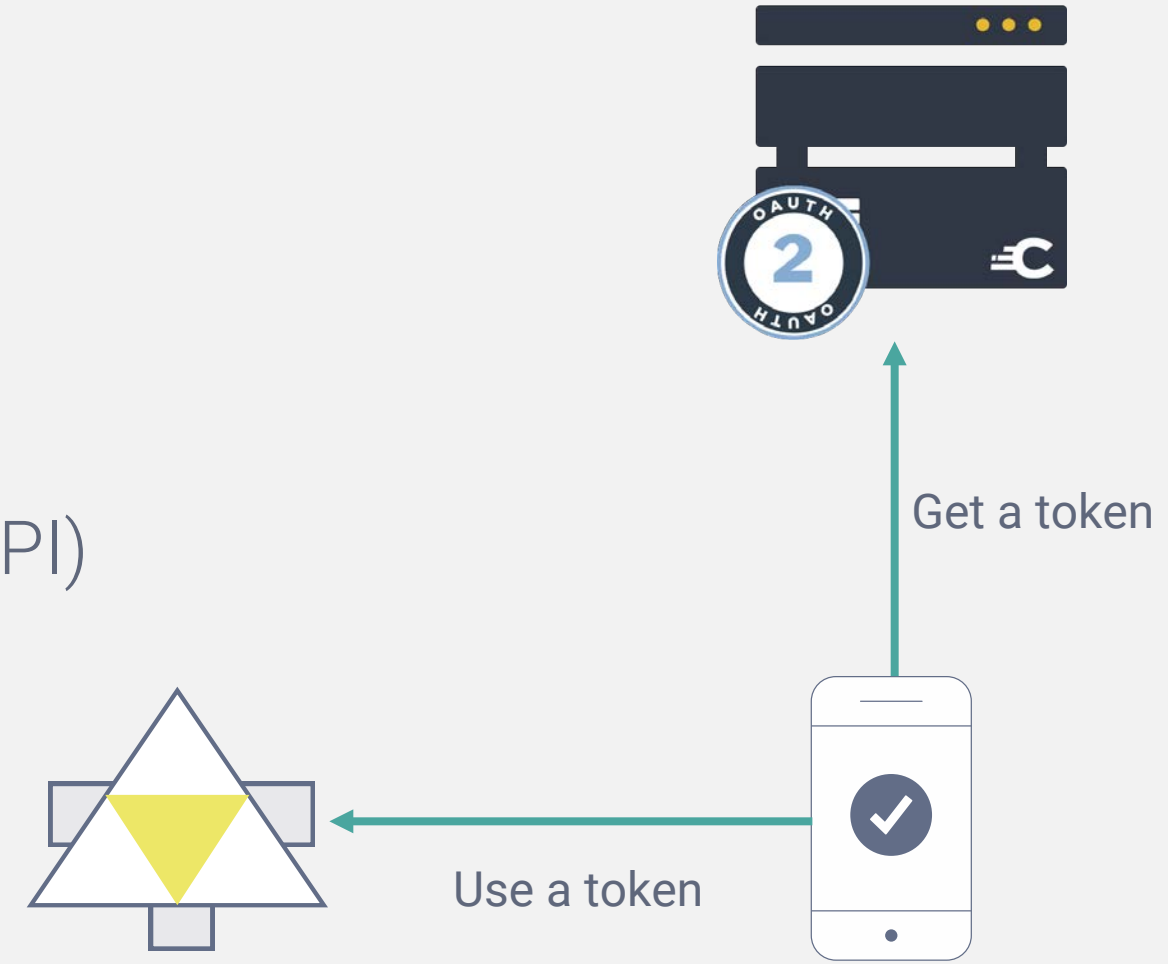
OAuth Actors

1. Resource Owner (RO)
2. Client
3. Authorization Server (AS)
4. Resource Server (RS) (i.e., API)



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Request, Authenticate & Consent

Request Access

Login

Consent

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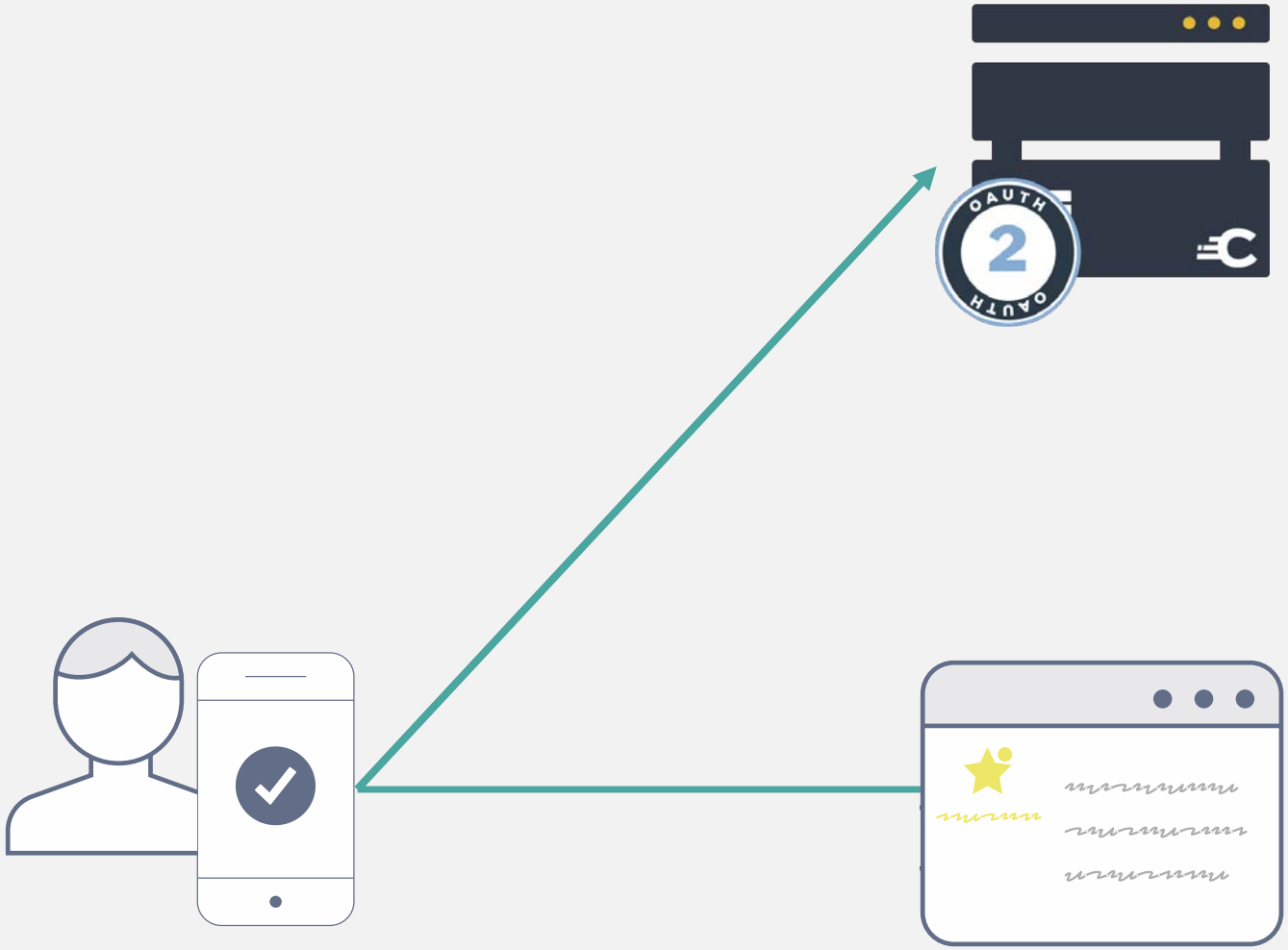
Code Flow



User is redirected to OAuth server

APIs & microservices

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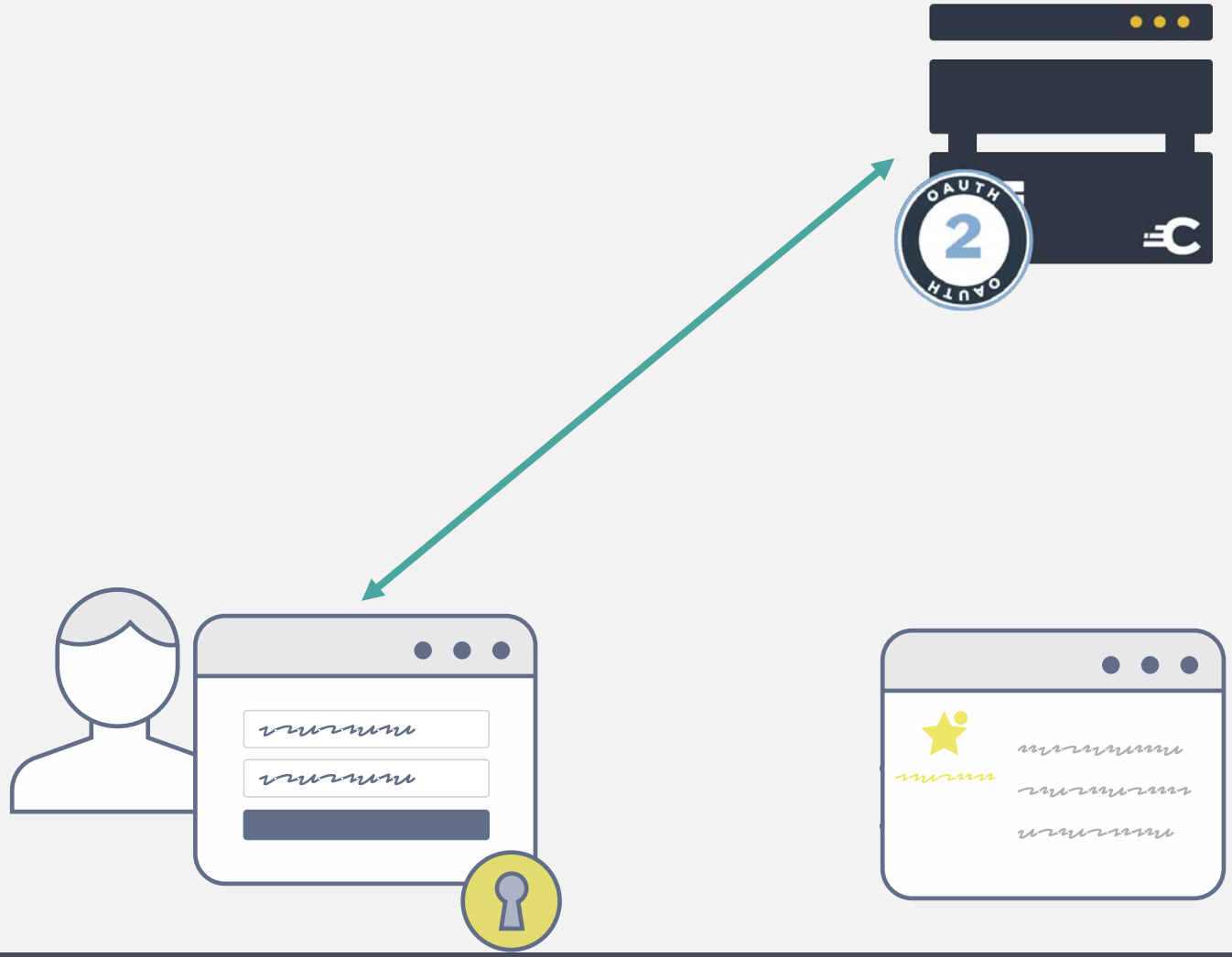
Code Flow



User logs in and delegates access

APIs & microservices

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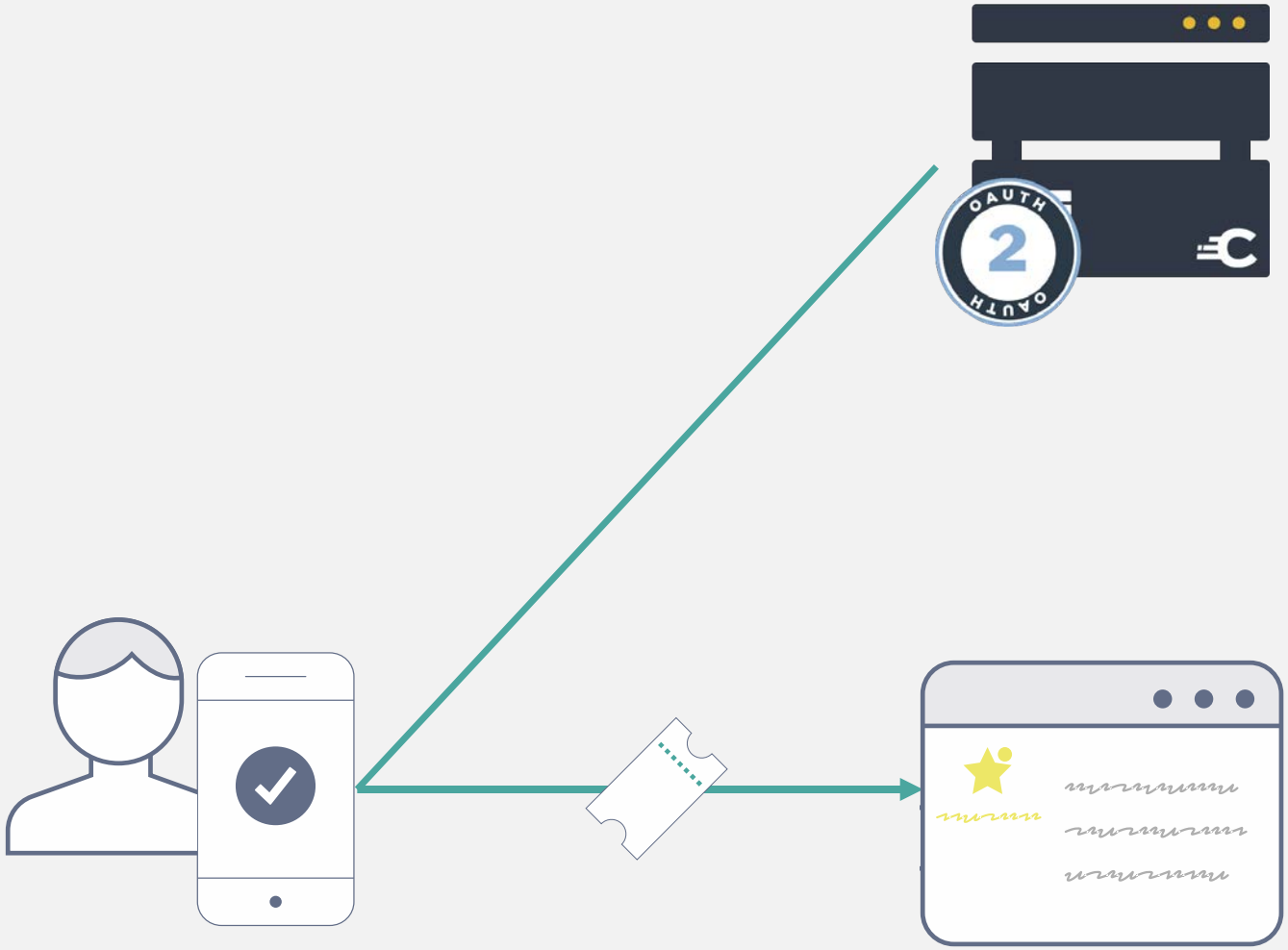
Code Flow



Short-lived access code is issued to client

APIs & microservices

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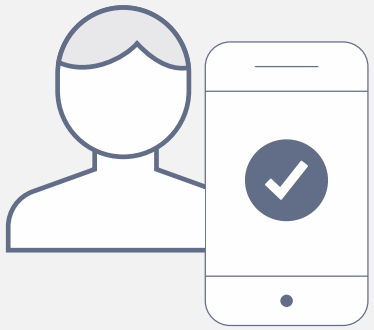
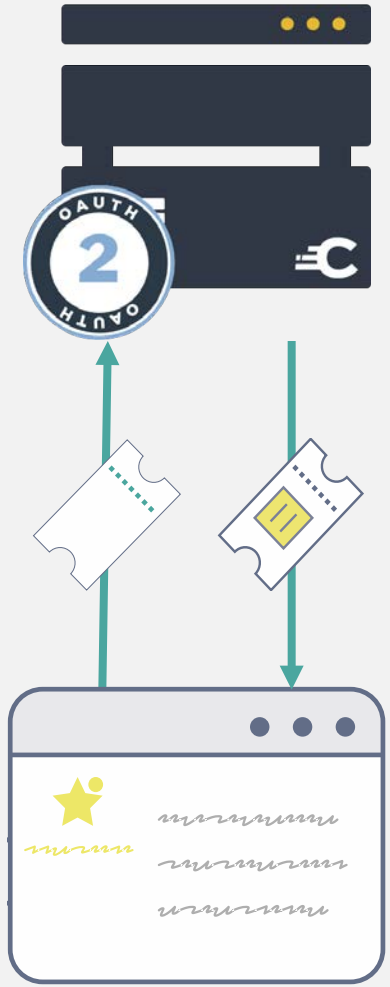
Code Flow





Code is exchanged for an access token

APIs & microservices

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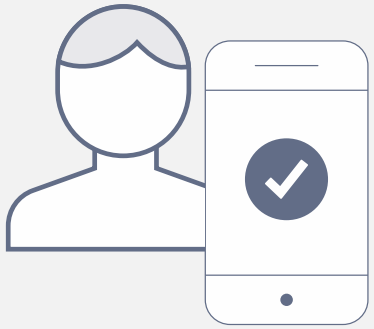
Code Flow

Access token can be used to call APIs



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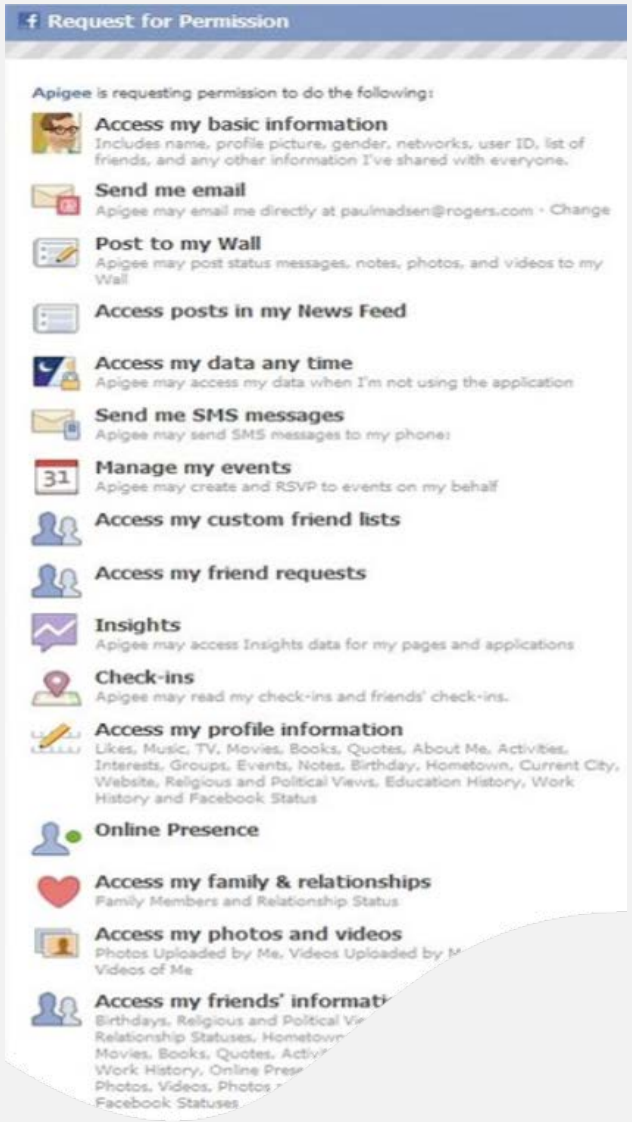
Scopes

- Like permissions
- Scopes specify extent of tokens' usefulness
- Listed on consent UI (if shown)
- No standardized scopes



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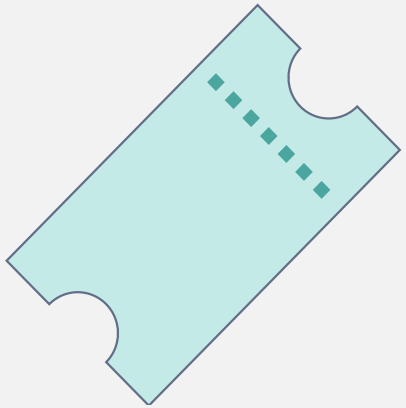
Kinds of Tokens

Access Tokens

Like a session

Used to secure API calls

Refresh Tokens



Like a Password

Used to get new access tokens

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Profiles of Tokens

Bearer

Bearer tokens are like cash

Holder of Key

HoK tokens are like credit cards

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Types of Tokens

- WS-Security & SAML
- Custom
  - Home-grown
  - Oracle Access Manager
  - SiteMinder
- CBOR Web Tokens (CWT)
- JWT

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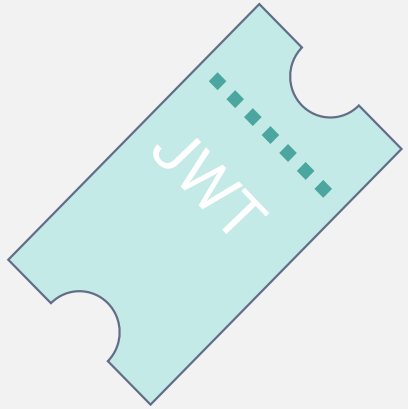
JWT Type Tokens

- Pronounced like the English word “jot”
- Lightweight tokens passed in HTTP headers & query strings
- Encoded as JSON
- Compact
- Encrypted, signed, or neither
- Not the only kind of token allowed by OAuth



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Passing Tokens

By Value

User attributes are in the token

By Reference

User attributes are referenced by an identifier

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Improper Usage of OAuth

Not for authentication

Not for federation

Not *really* for authorization

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Proper Usage or OAuth

For delegation

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OpenID Connect

- Next generation federation protocol
  - Based on OAuth 2
  - Made for mobile
  - Not backward compatible
- Client & API receive tokens
- User info endpoint provided for client to get user data

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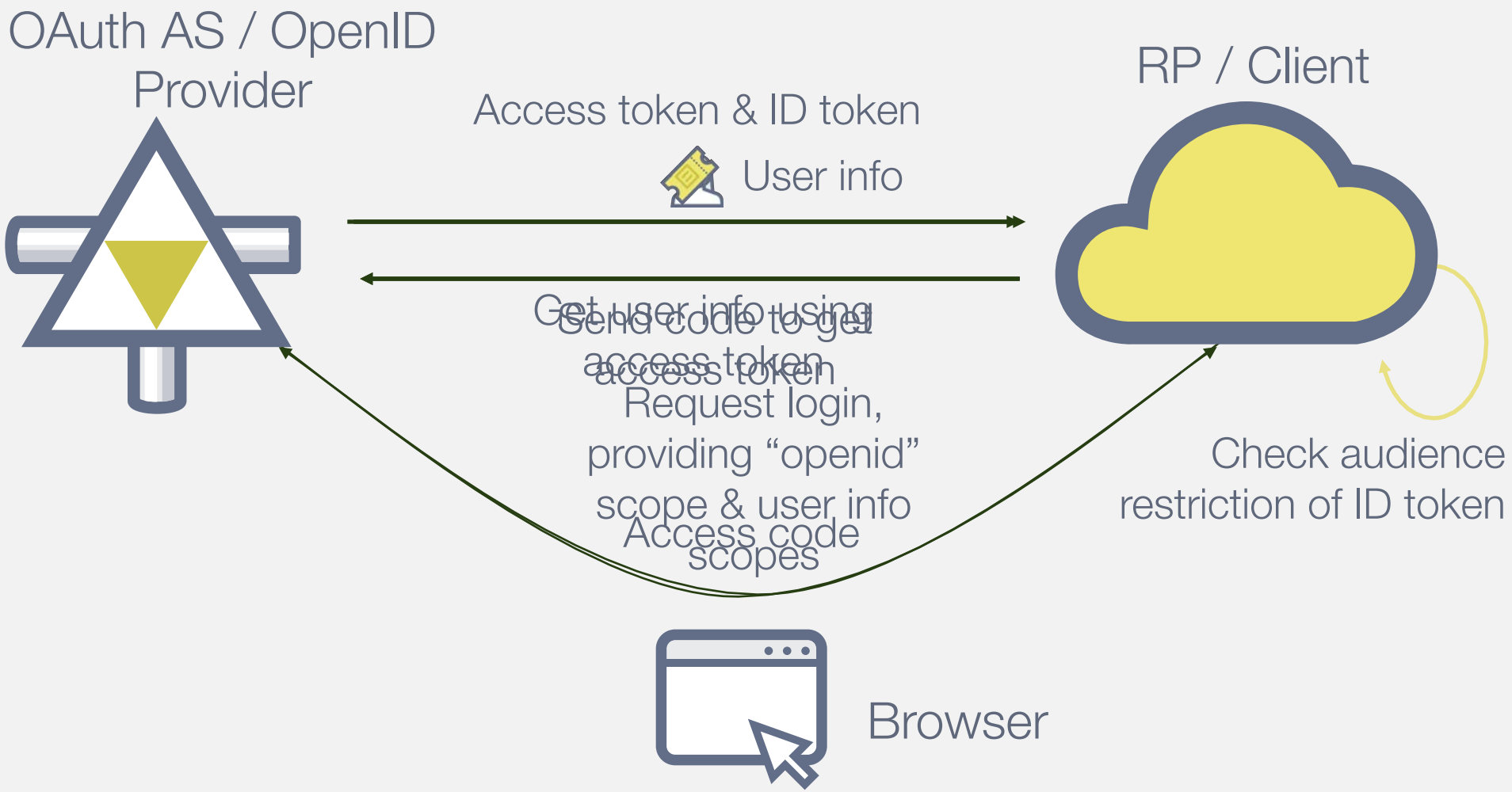
OpenID Connect Examples



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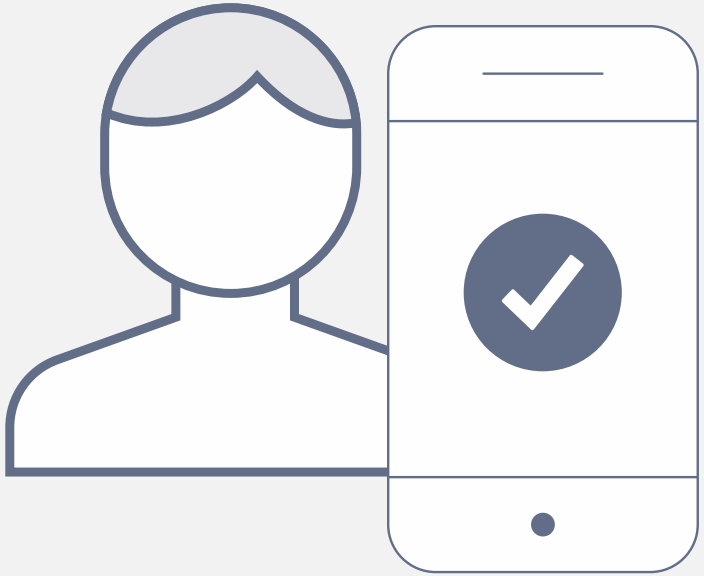
ID Token is for the Client

- Access token is for API
- ID token is for client
- ID token provides client with info about
  - Intended client recipient
  - Username
  - Credential used to login
  - Issuer of token
  - Expiration time



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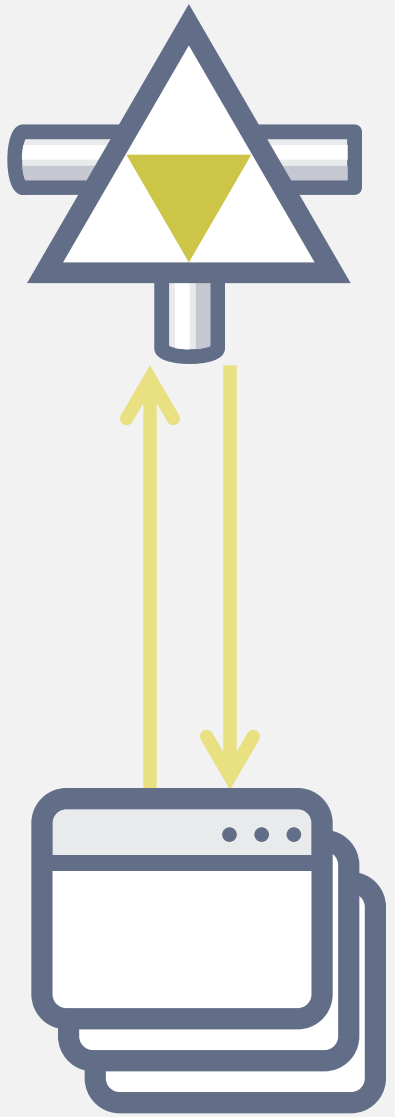
User Info Endpoint

- Token issuance and user discovery endpoint
- Authenticate using access token issued by OpenID Provider
- Output depends on requested and authorized scopes
- sub claim must match sub claim in ID token



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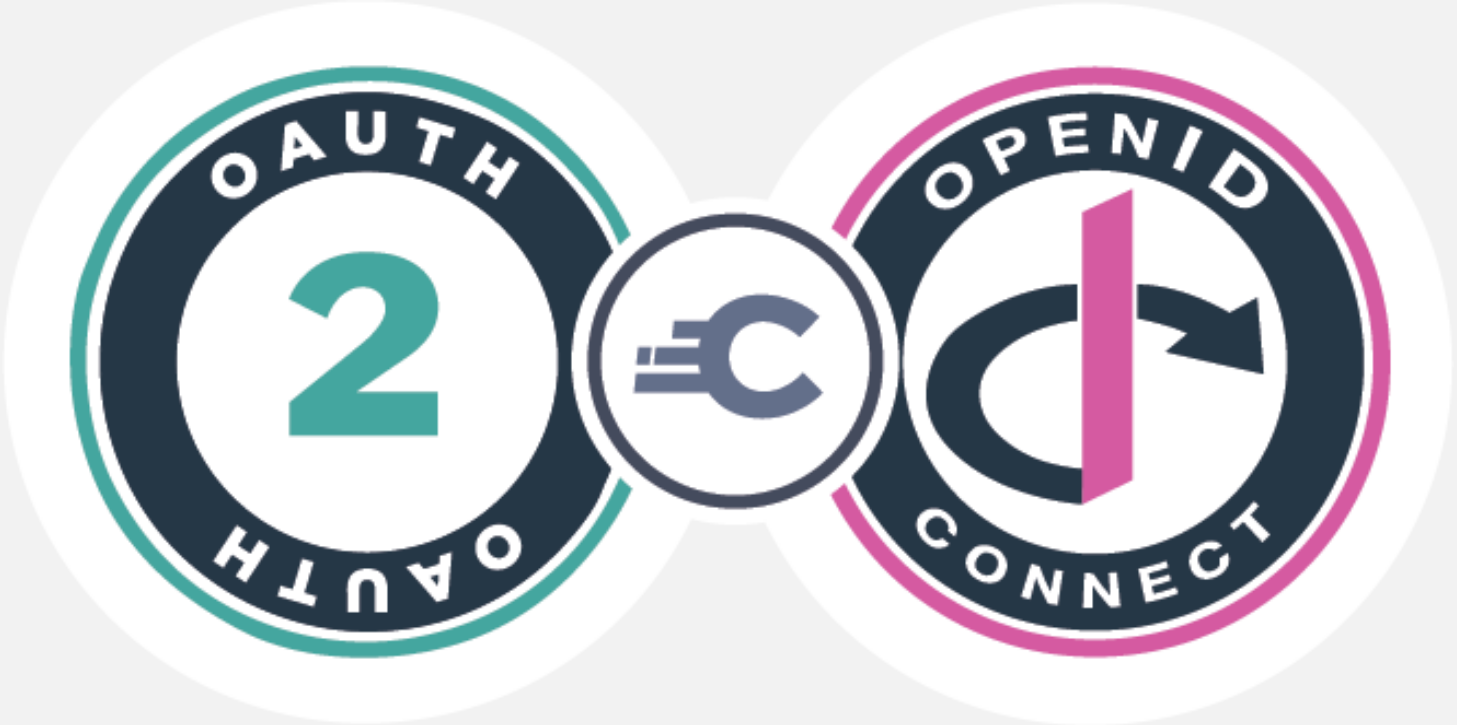
Applied to Microservices and APIs



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A Traditional Service

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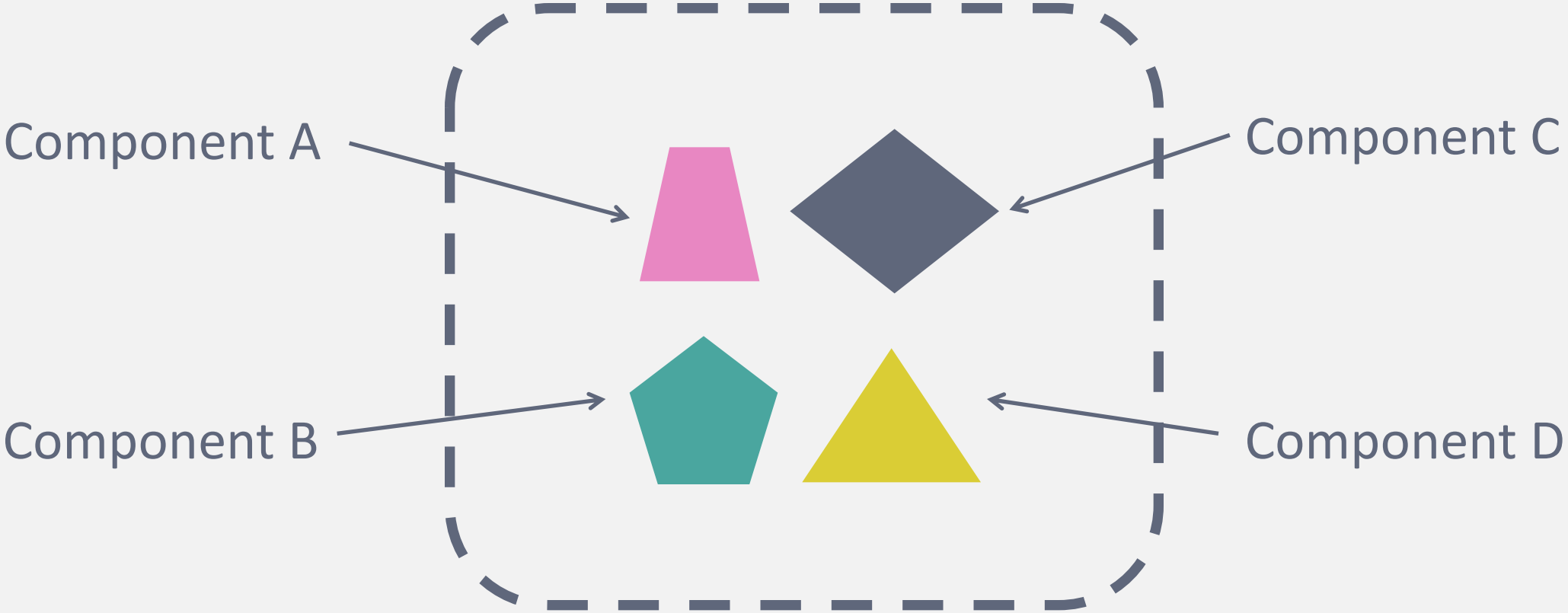
With Traditional Subsystems



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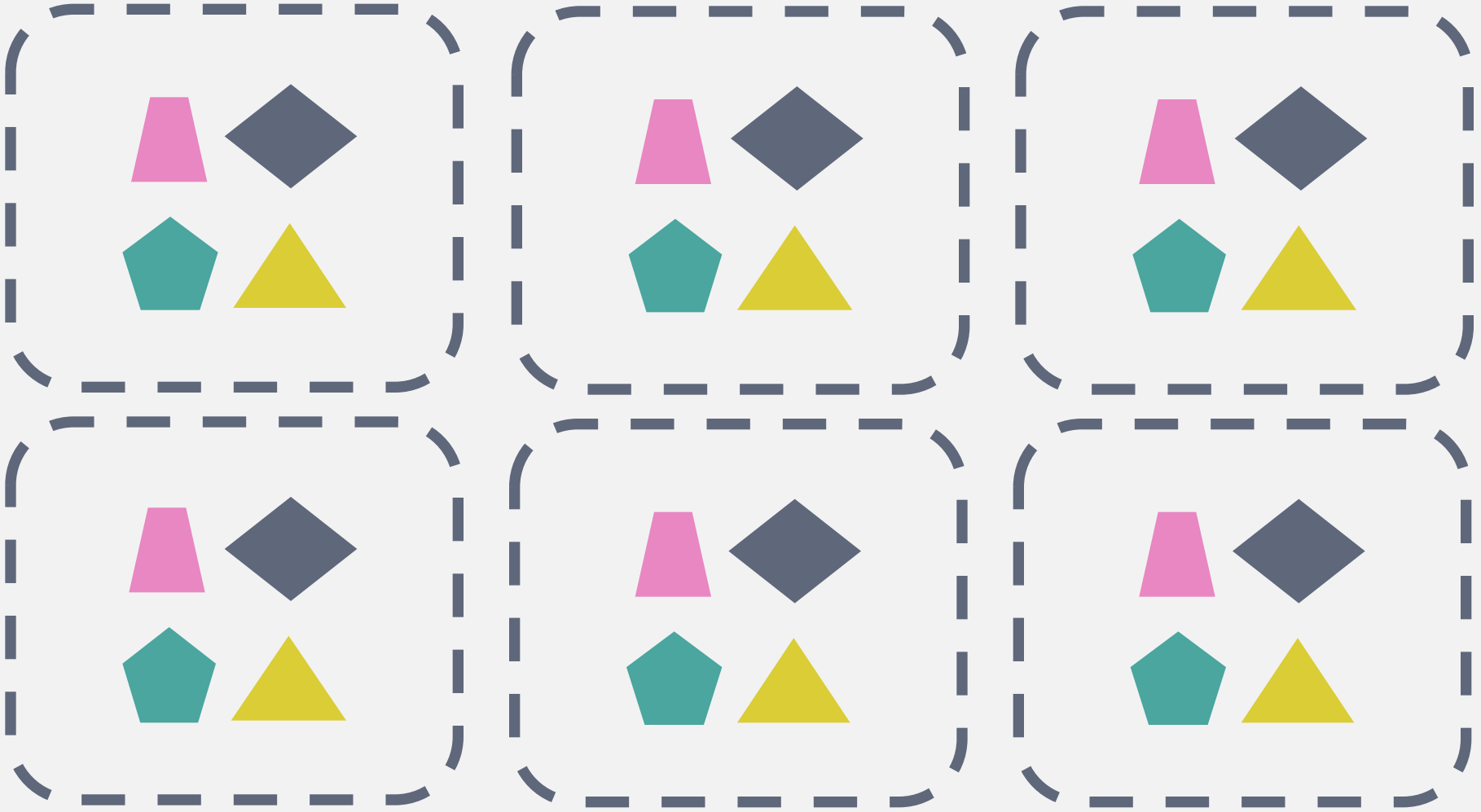
… and traditional scalability



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But this is not always how we build systems

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One Microservice

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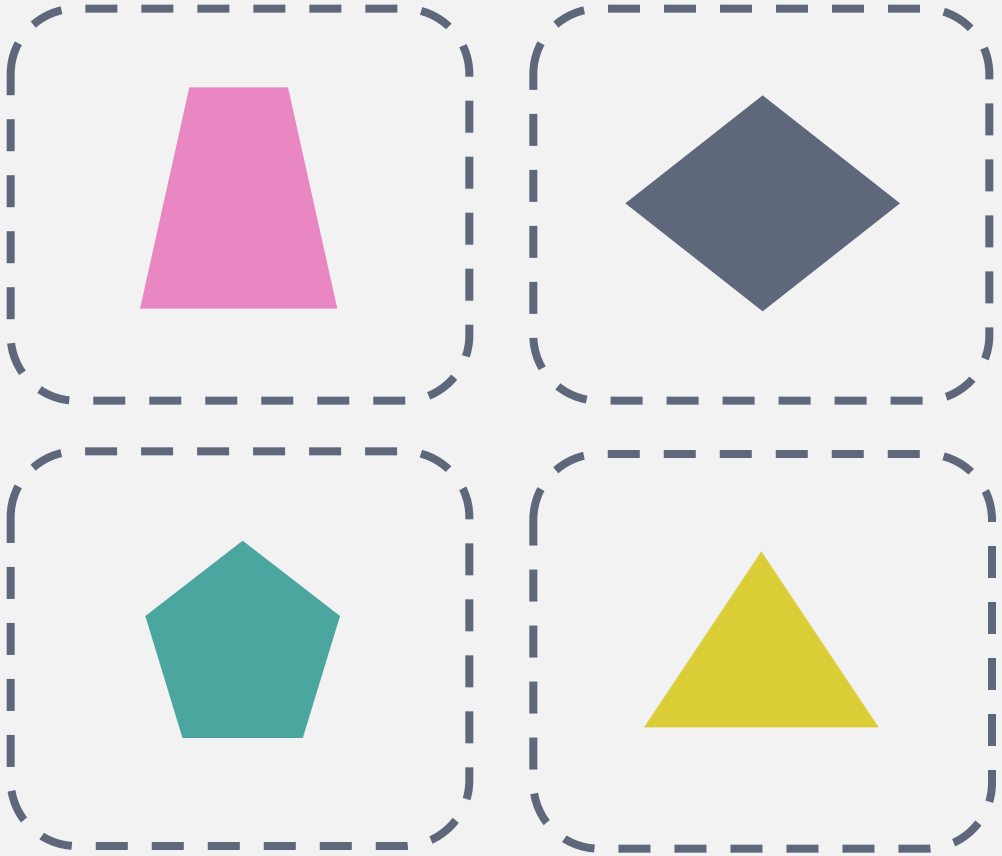
Many Microservices



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Scaling Microservices

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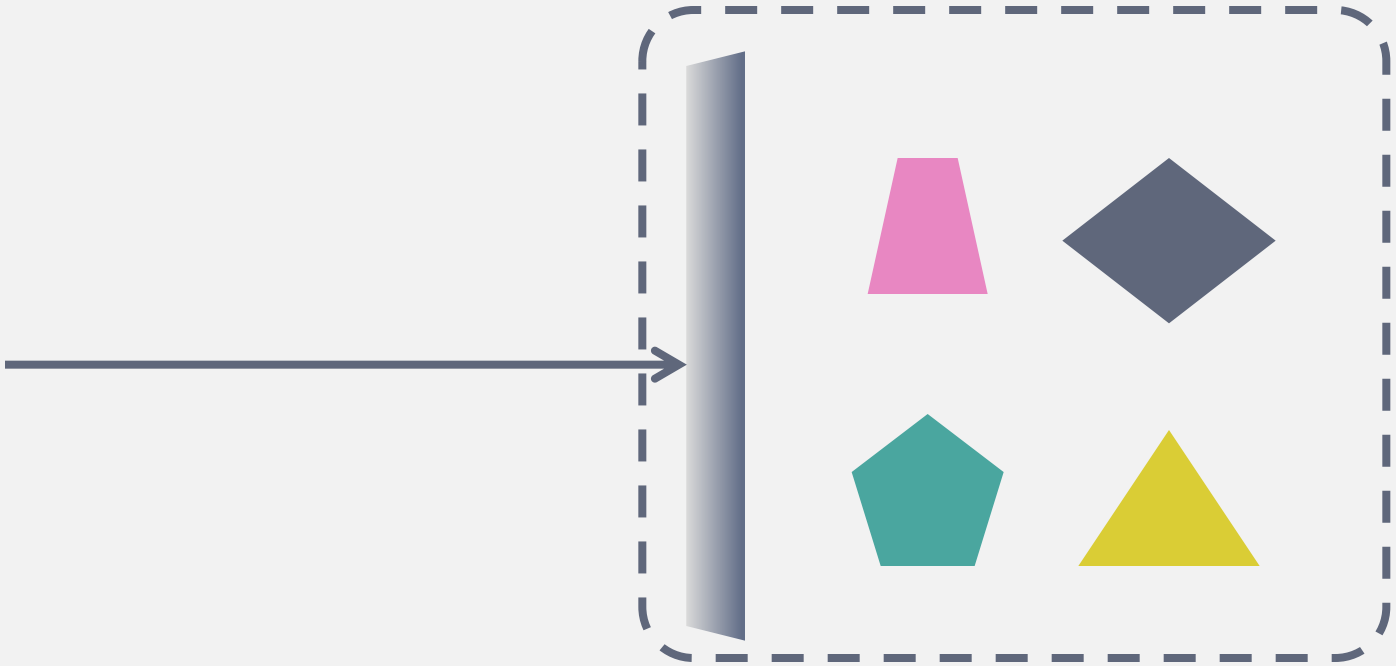
Securing Traditional Services



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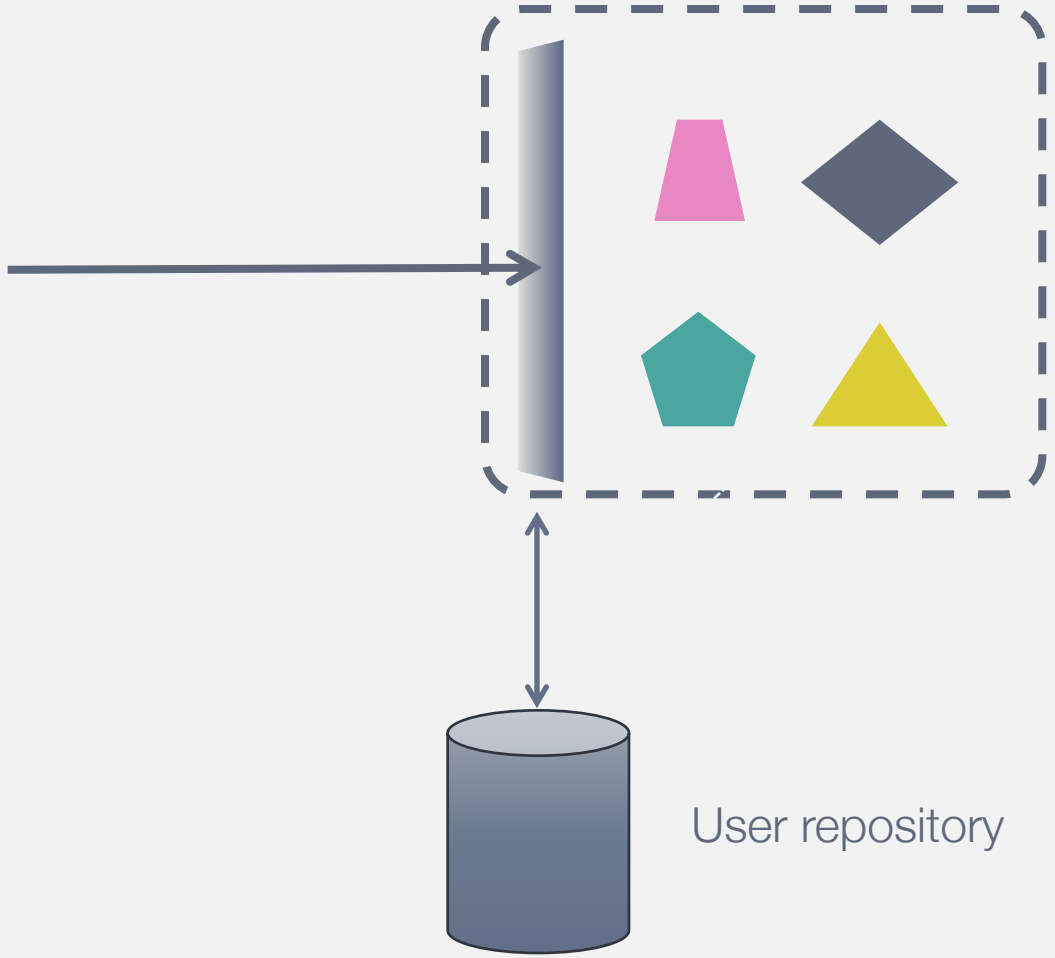
Securing Traditional Services



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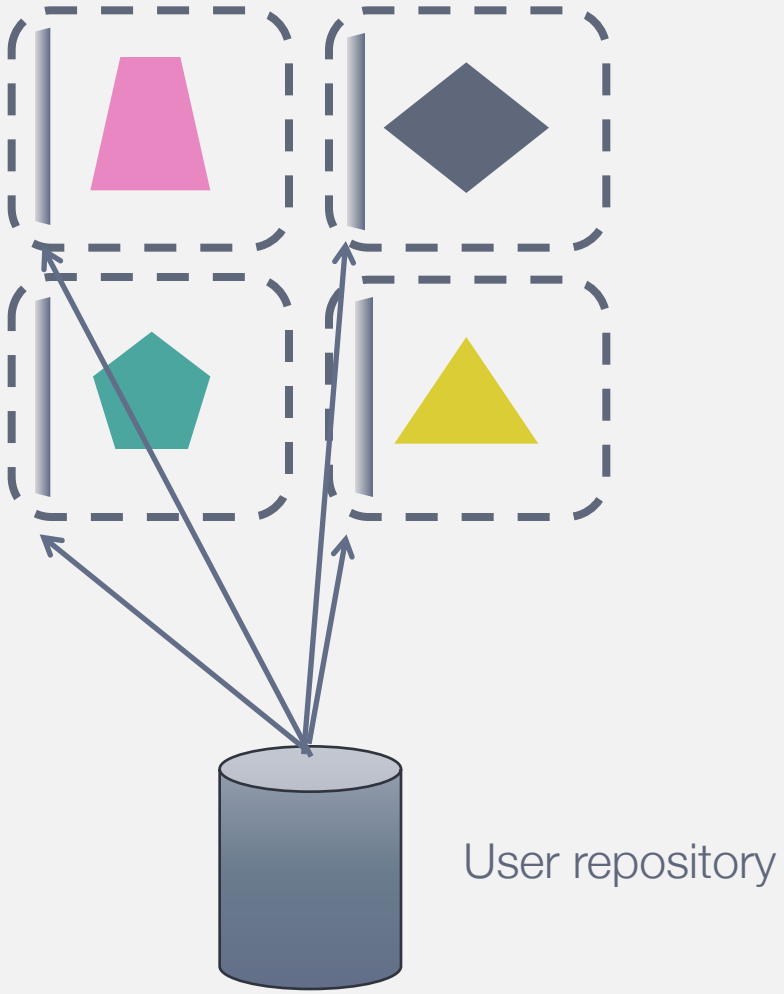
So for microservices that would mean…



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Remember our two token passing methods?

By Value

User attributes are in the token

By Reference

User attributes are referenced by an identifier

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By Reference

Contains NO information outside the network

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By Value

Contains ALL *necessary* information

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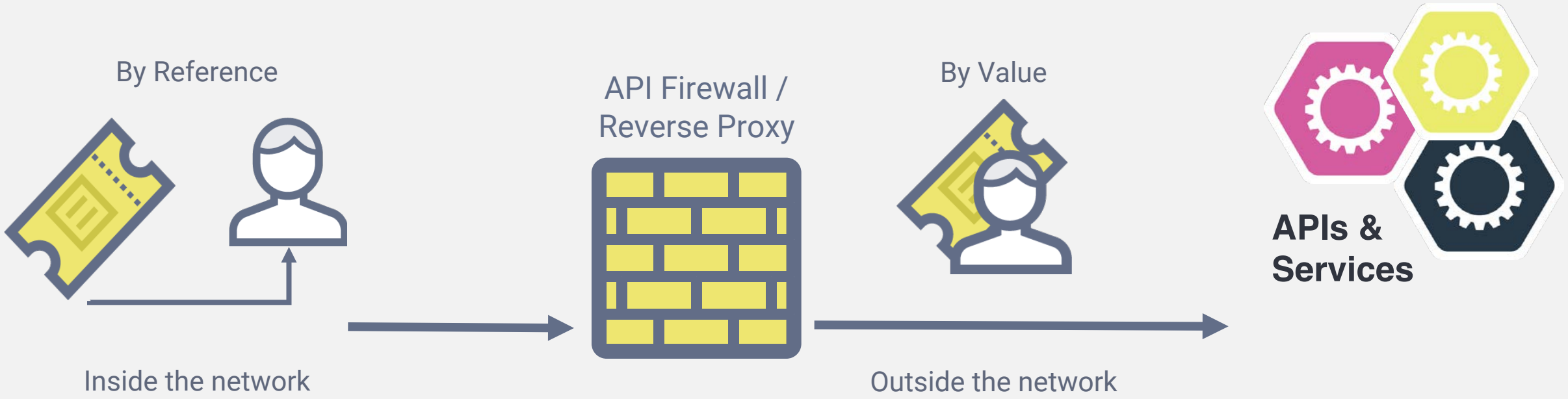
External vs. Internal



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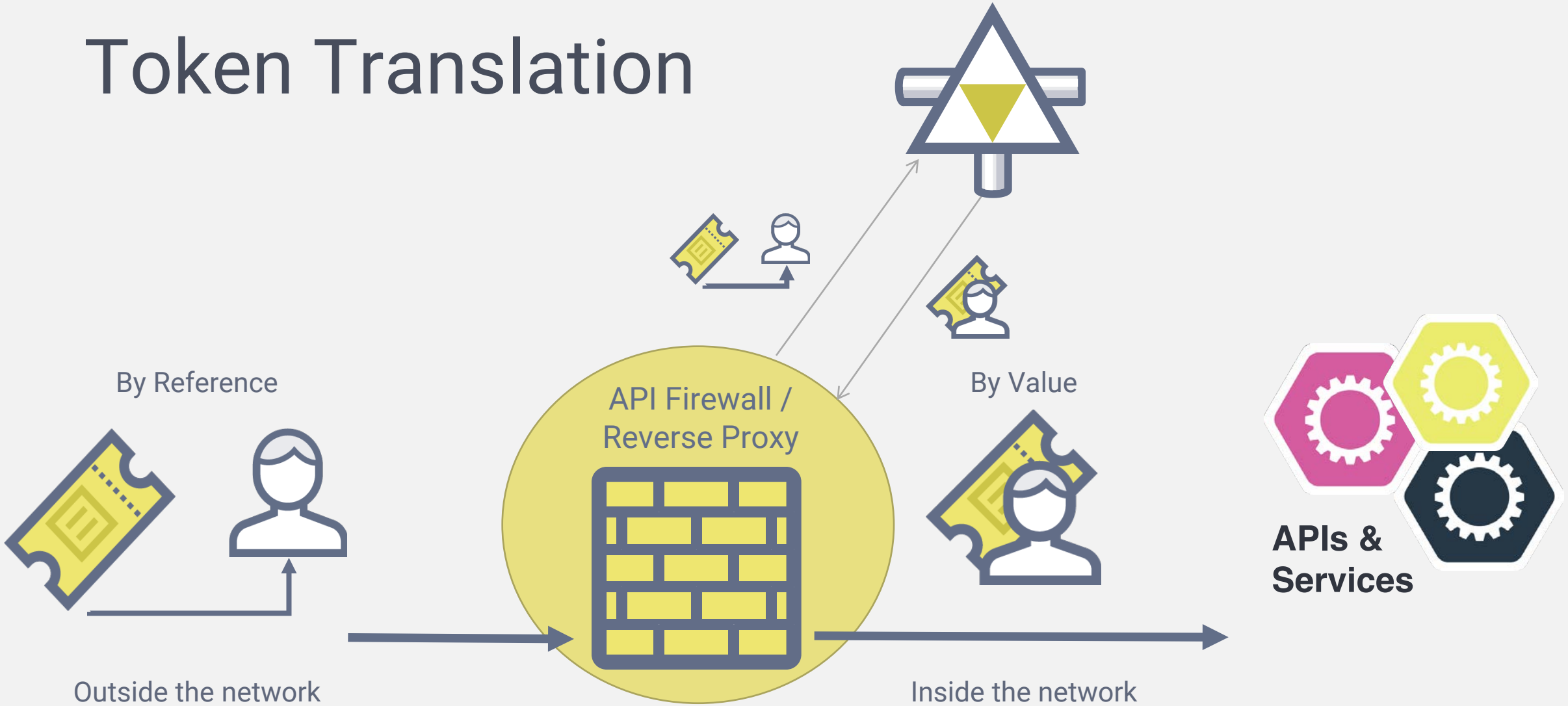
Token Translation



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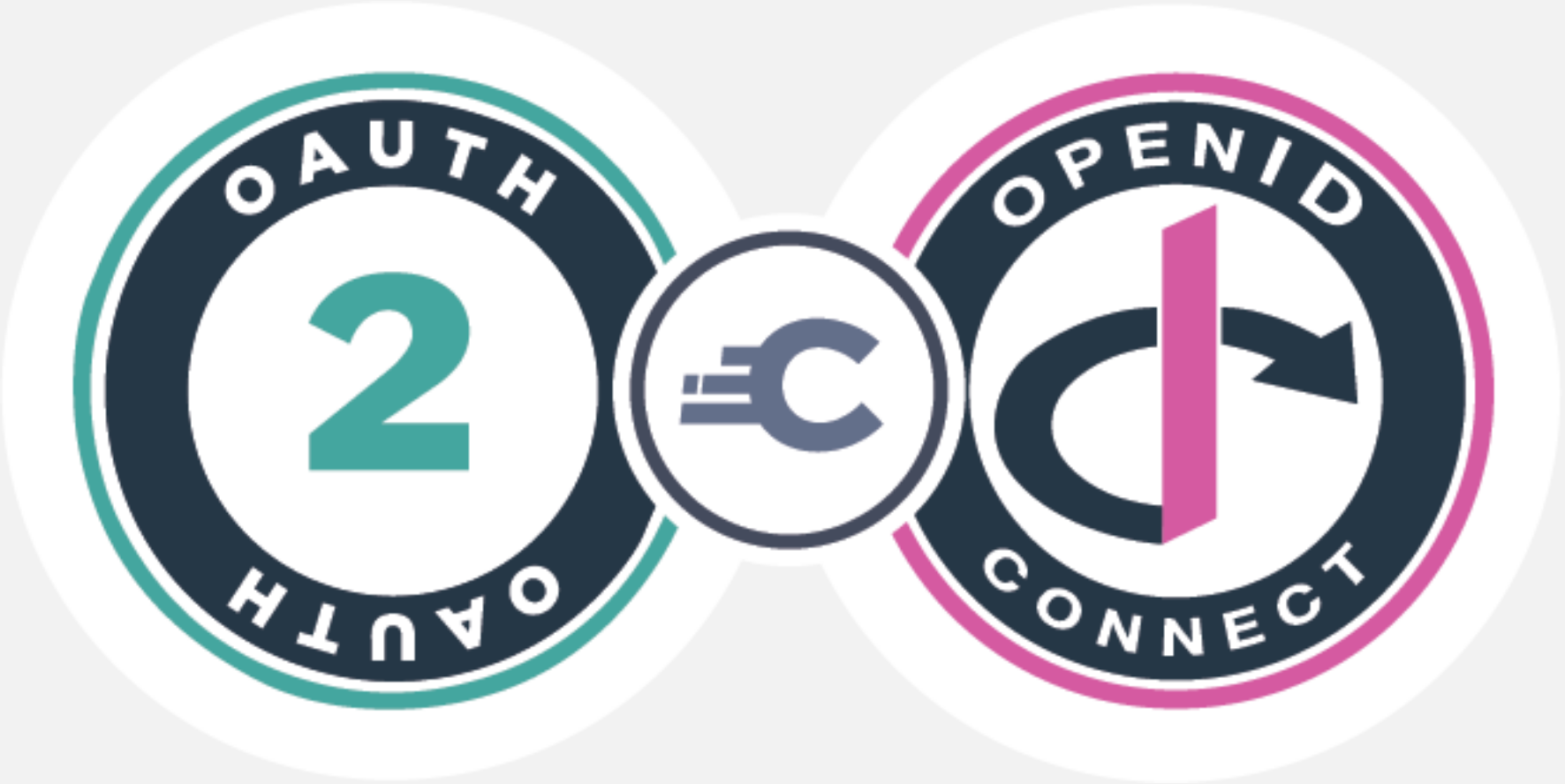
Demo



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Additional Resources

- Blog posts
  - bit.ly/oauth-deep-dive
  - bit.ly/4-api-security-defenses
  - bit.ly/building-secure-api
  - bit.ly/right-api-armor
  - https://bit.ly/2qn8Jj4

- Videos

  bit.ly/oauth-in-depth

  bit.ly/micro-services-security

  bit.ly/building-secure-api-video
- Whitepaper at our booth
- https://nordicapis.com/api-insights/security/

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Summary

- API security > API keys & OAuth
- OAuth 2 fundamentals
  - Token types
  - Profiles
  - Passing tokens
- Building OpenID Connect on OAuth
- Using those with microservices & for user-based delegation

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