Unlocking the True Power of Feature Flags!

KCD

GROWING CLOUD NATIVE TOGETHER

@jhuspek, KCD Czech & Slovak 2024, 2024-06-07

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What is not a feature flag?

```python
COOL_FEATURE = True


def do_something():
    if COOL_FEATURE:
        print("New feature is enabled!")
    else:
        print("New feature is disabled.")
```

Feature Flags (often also refered to as **Feature Toggles**) are a powerful technique, allowing teams to modify system behavior **without changing code**.

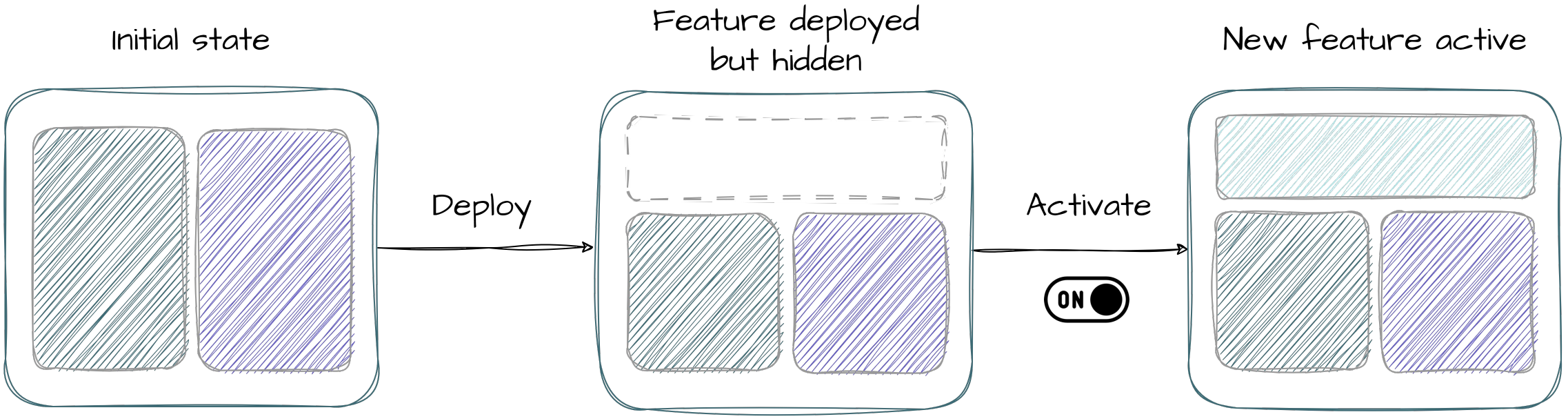
Martin Fowler, Feature Toggles

What is a feature flag?

```
client = FeatureFlagClient.initialize()


def do_something():
    if client.is_enabled("COOL_FEATURE")
        print("New feature is enabled!")
    else:
        print("New feature is disabled.")
```

What is a feature flag?



allow_darkmode

〔 on / off 〕

enable_customer_chat

〔 on / off 〕

〔 customer_type = B2B 〕

〔 language = cz 〕

A bit of general theory, but everyone can have a different motivation or different needs.

Why should you care?

From more practical cases:

- Independent (Quicker) release cycle
- Rollback / Kill-switch
- Testing in production
- Early / Block access
- Calendar driven launches

To more *theoretical ones:

- Maintenance
- Canary releases
- Incremental roll outs
- Hypothesis driven development (A/B)
- Newbie / Advanced users

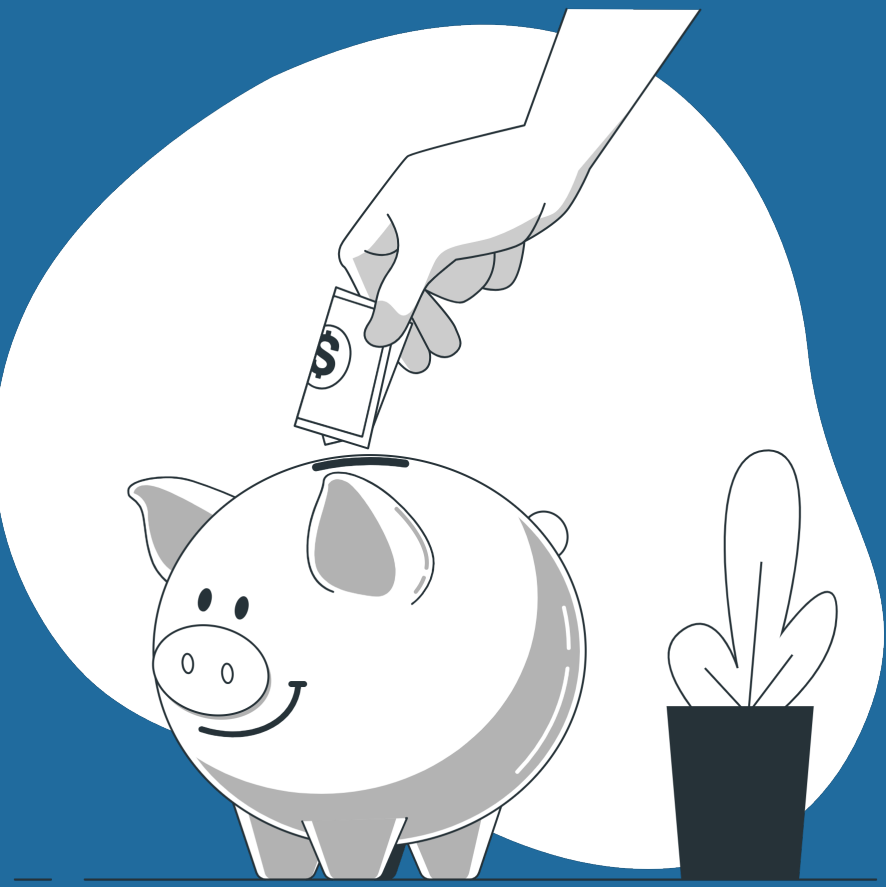
*) My perspective only, as I have experience from not so much dynamic environment.

It is still one of many methods to deal with these situations. Sometimes you need to change the process around it as well for effective use.

Feature flags does not replace branching, it is complementary.

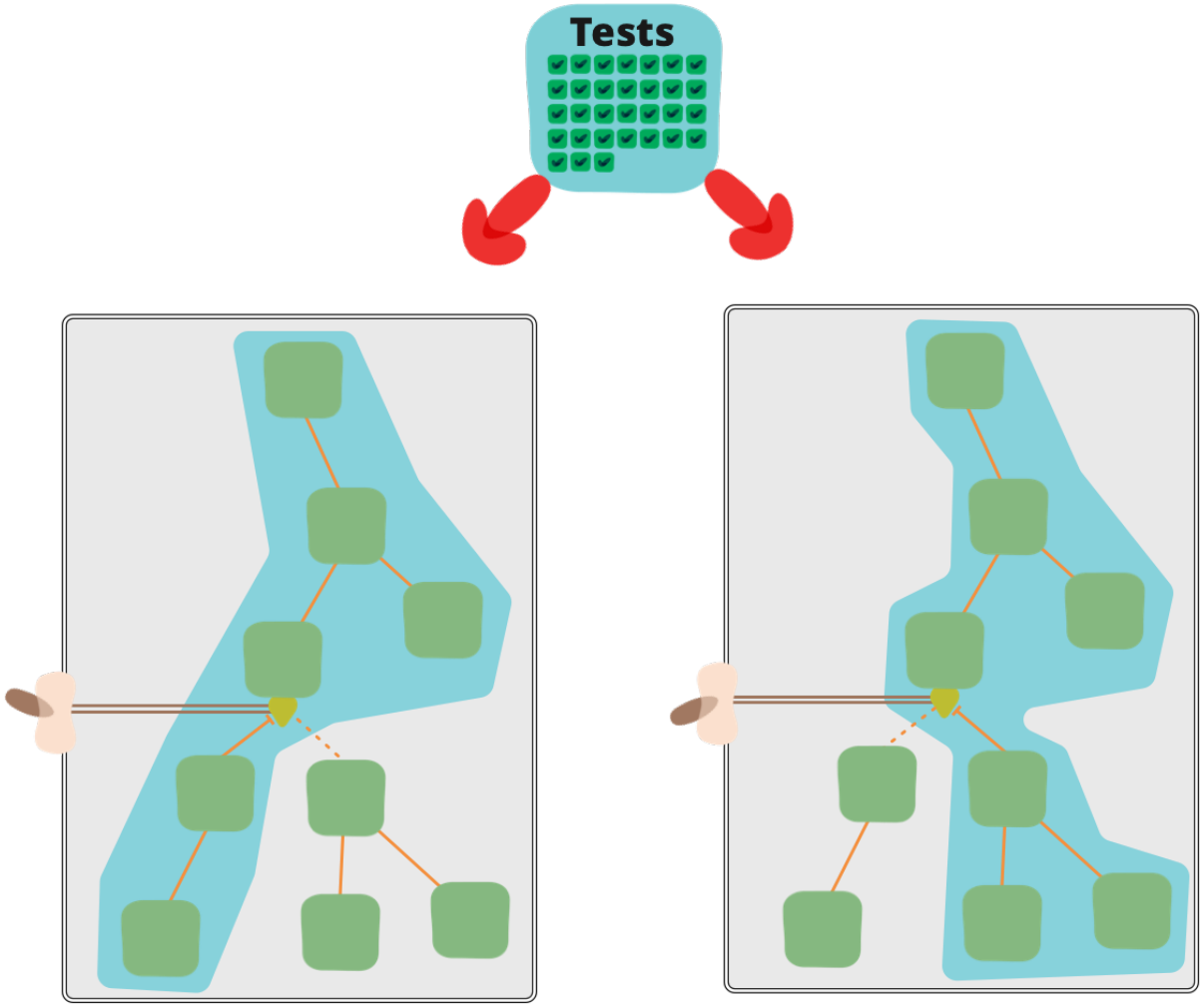
And how to benefit?

- Flexibility in feature release
- Reduced risk of deploying new features
- Separation of deployment from release
- Ability to perform closed testing and experimentation, even in production
- Shorter development cycle
- Simplified version control
- One of the gates to continues deployments



But it’s not all roses.

Validation complexity



Source: martinfowler.com/articles/feature-toggles.html

Any other pitfalls?

- Testing and validation complexity
- Tech. depts if not managed correctly and FF accumulate
- Flags proliferation can clutter the codebase (dependencies)
- Badly selected level of flagging
- Carrying costs of feature flags
- Insufficient management and monitoring

So there must be some recommendations?

How to lose half a billion dollars with bad feature flags

The demise of Knight Capital

Vineeth Madhusudanan · Follow

Published in Statsig · 2 min read · Jul 13, 2021

Knight Capital was the largest trader in US equities in 2012 (~$21b/day) thanks to their high frequency trading algorithms. They also executed trades on behalf of retail brokers like TD Ameritrade and ETrade.

Their demise came in 2012 when they developed a new feature in their Smart Market Access Routing system to handle transactions for a new NYSE program.

PowerPeg

For testing purposes only

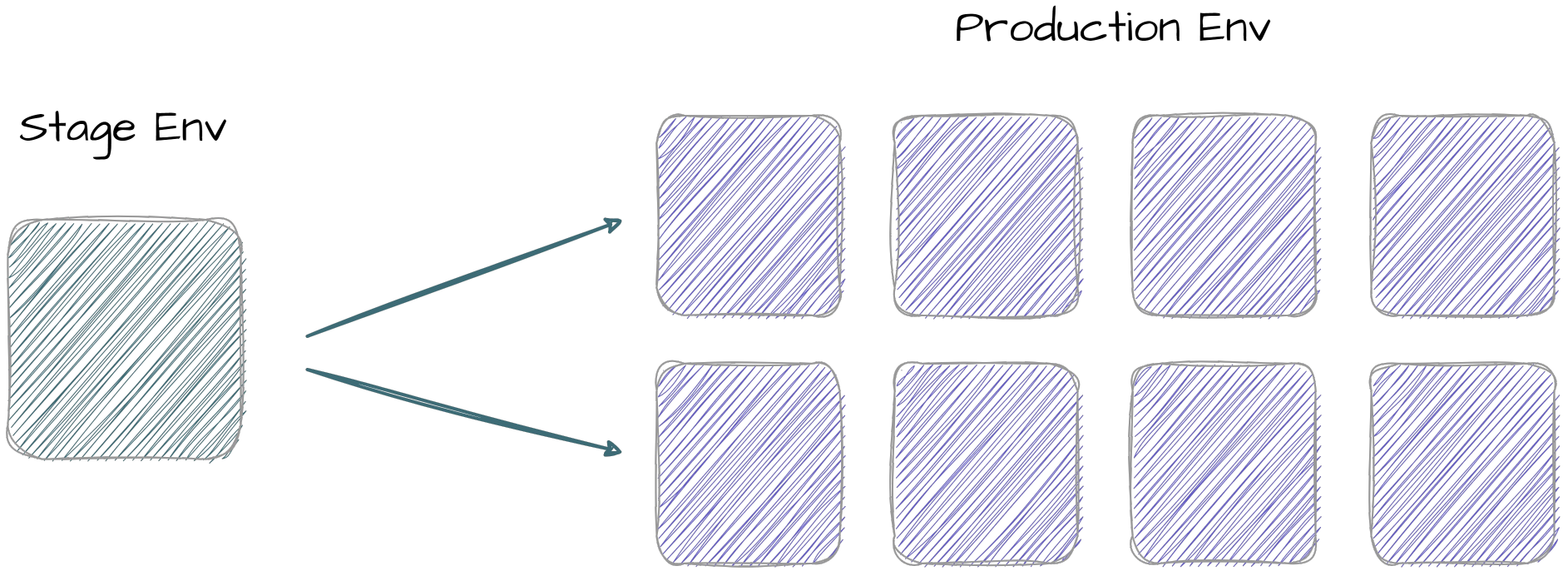
Unused since 2003 (8 years)

Validation algorithm for another component, buy high sells low

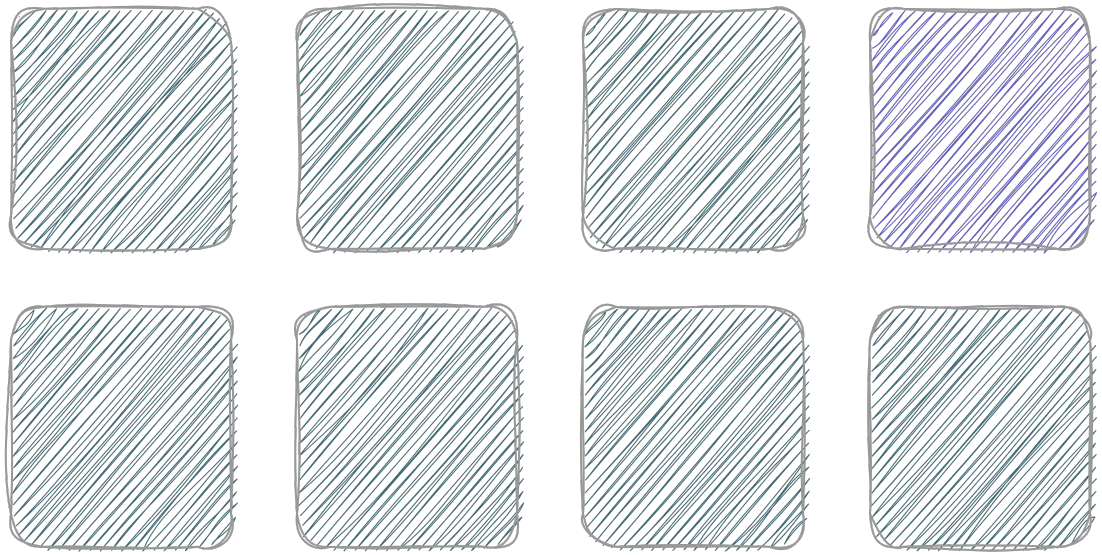
SMARS

Newly build core algorithm for routing the orders

Uses same FF as PowerPeg


Production Env
Stage Env
Current Code
New Code

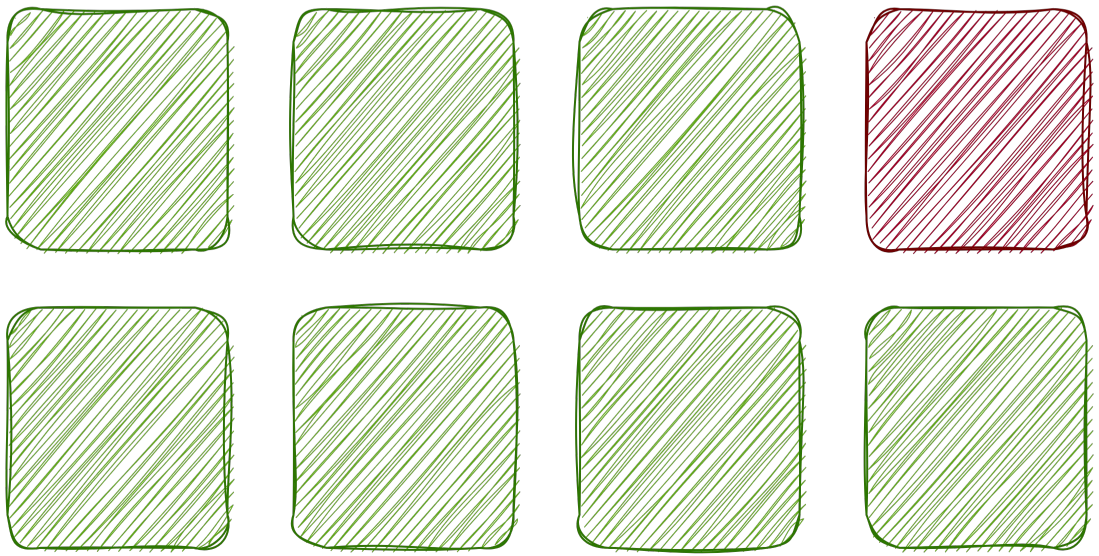
Production Env
(FF OFF)



Current Code

New Code

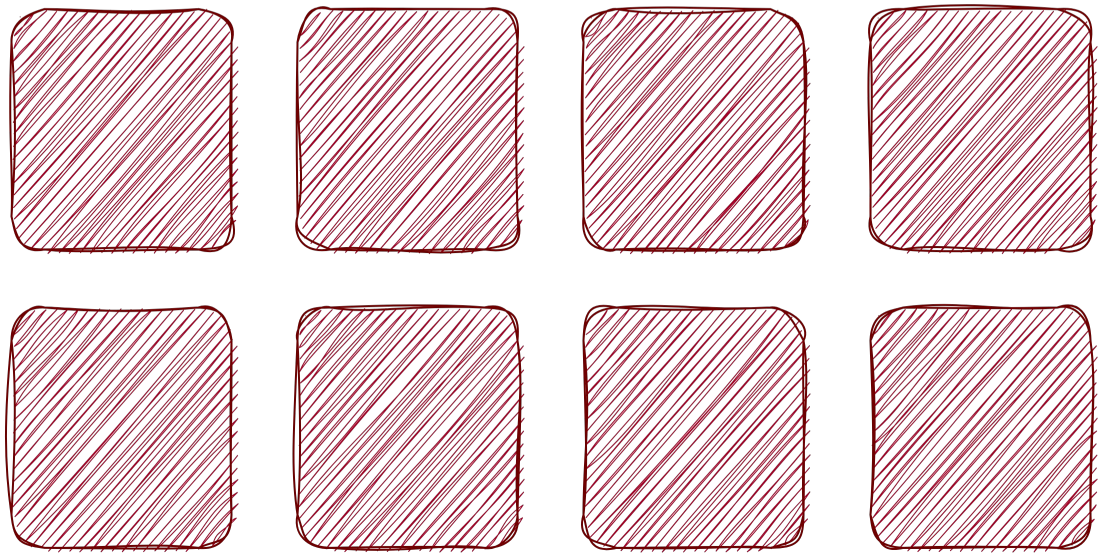
Production Env
(FF ON)



Old Code Activated

New Code Activated

Production Env -
Rollback (FF ON)



Old Code Activated

New Code Activated

Recommendation No. 1

Never reuse old feature flags.

Recommendation No. 2

Be proactive in removing feature flags that are no longer needed.

Recommendation No. 3

Choose descriptive names for your flags.

Recommendation No. 3

Choose descriptive names for your flags.

enable_power_peg

activate_smars_algorithm

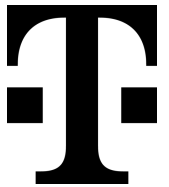
feature_test_8

feature_jira_1867

And now together

- Ensure consistency (especially data) by destructive changes
- Be proactive in removing old flags
- All new features must be tested
- Choose right level of flagging
- Use them with measure, can get out of control
- Keep lifespan of flags short (weeks)
- Choose descriptive names
- Setup proper logging and monitoring

Why we started to implement



In "legacy" world:

- **more frequent releases** of new changes that we can enable/disable without outage
- allow other teams to **independently develop & test** our applications
- **mitigate the risk associated** with releases by delivering small changes we can turn off
- allow **testing** the changes on **selected set of users** on the production environment

In "new" world:

- fully support the **trunk-based development** on multiple environments
- fully support **short-lived** feature branches approach

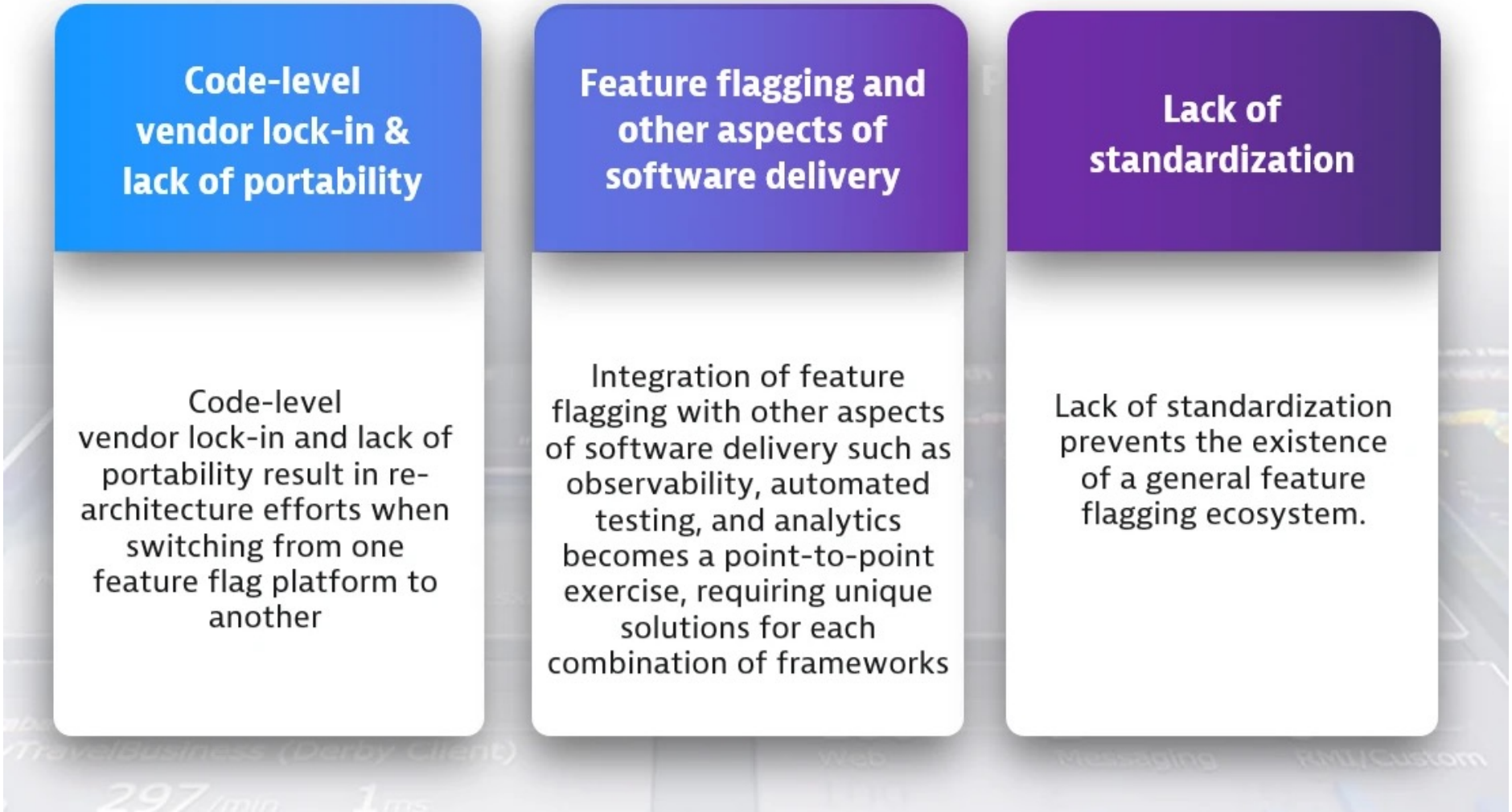
Toggles introduce complexity.

We can keep that complexity in check by using smart toggle implementation practices and appropriate tools to manage our toggle configuration.

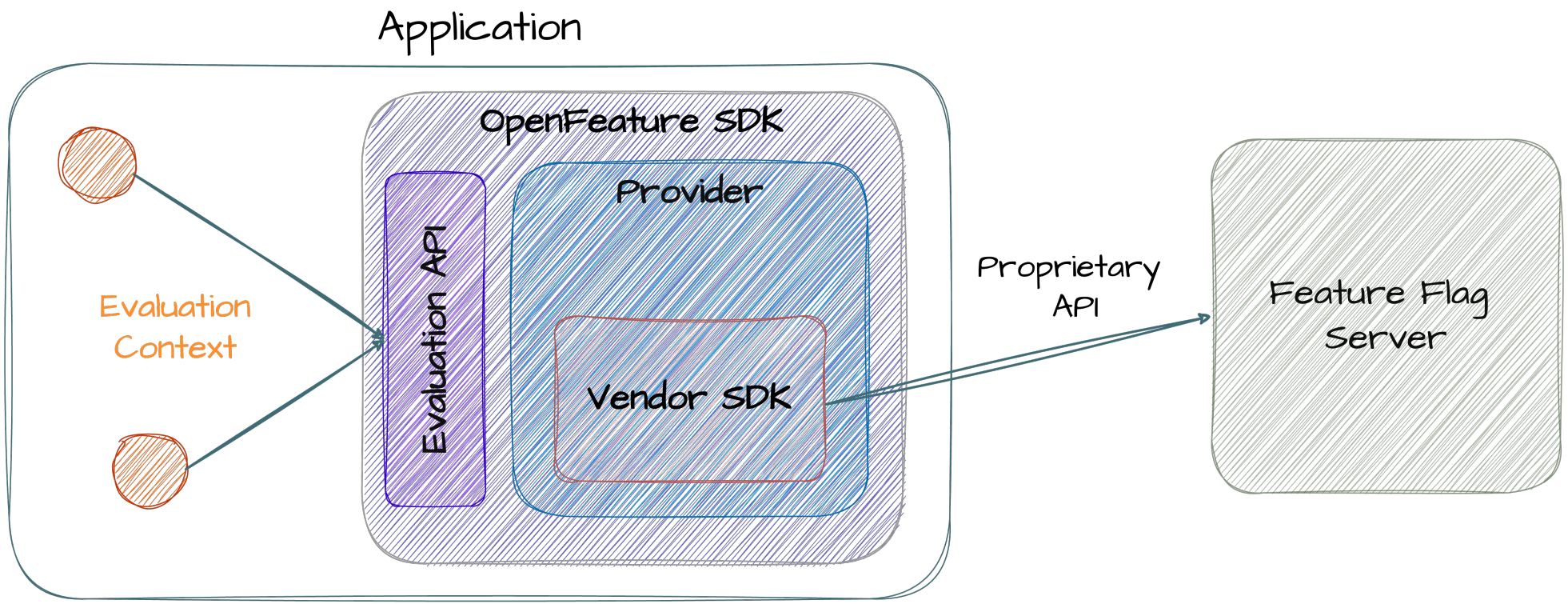
Standardizing Feature Flagging for Everyone

OpenFeature was accepted to CNCF on June 17, 2022 and moved to the **Incubating** maturity level on November 21, 2023.

VISIT PROJECT WEBSITE

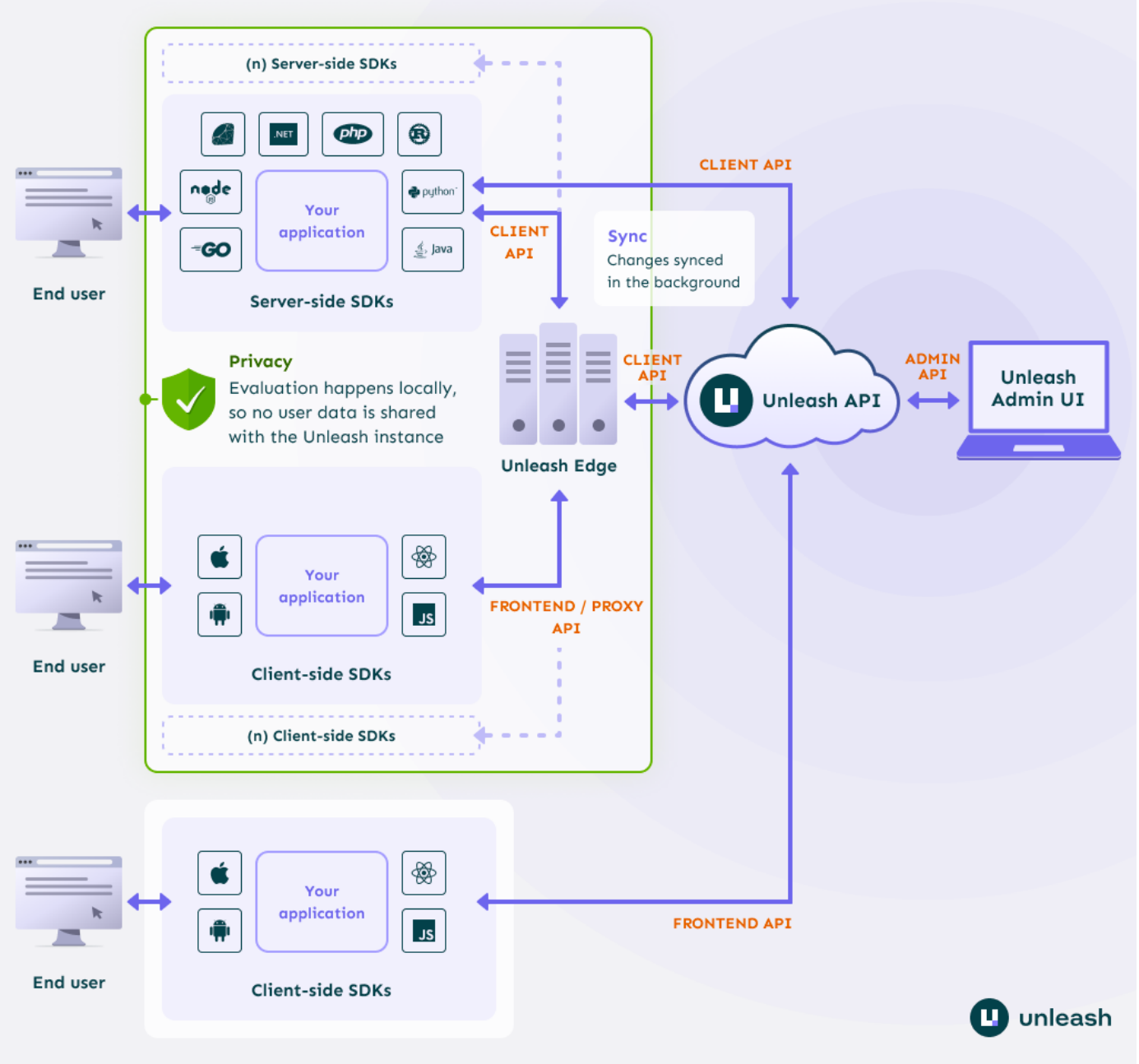


Source: dynatrace.com/news/blog/new-openfeature-standard-for-feature-flagging/


Application
OpenFeature SDK
Provider
Evaluation API
Vendor SDK
Evaluation Context
Proprietary API
Feature Flag Server

Unleash

- Feature flag management tool
- Open-source, no vendor lock in
- Fully transparent lifecycle, communication, open to contributions
- Free and Enterprise plan available
- On-premise and hosted solution possible
- Very active community and development
- A lot of languages already supported by SDKs
- Several deployment methods available



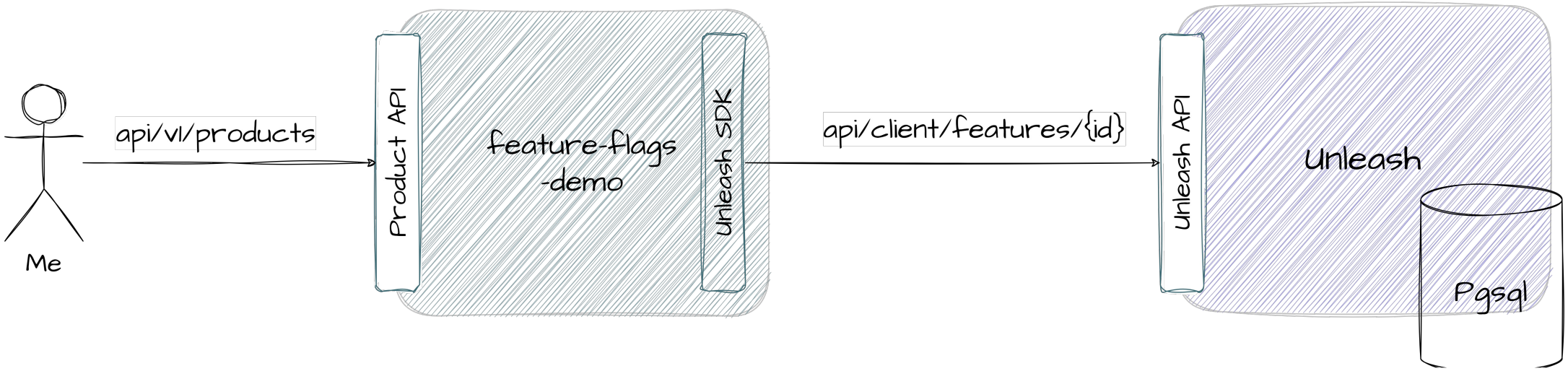
Server-side SDKs:

- Go SDK
- Java SDK
- Node.js SDK
- PHP SDK
- Python SDK
- Ruby SDK
- Rust SDK
- .NET SDK

Client-side SDKs:

- Android SDK
- Flutter Proxy SDK
- iOS Proxy SDK
- Javascript SDK
- React Proxy SDK
- Svelte Proxy SDK
- Vue Proxy SDK

DEMO – Involved components



`GET /api/v1/products`

```
[
  {
    "id": "P-123",
    "status": "Active",
    "price": null
  },
  {
    "id": "P-456",
    "status": "Inactive",
    "price": null
  }
]
```

Feature Flags Demo

`GET /api/client/features/product_with_price`

```
{
  "name": "product_with_price",
  "type": "release",
  "enabled": false,
  "project": "default",
  "stale": false,
  "strategies": [
    {
      "name": "default",
      "constraints": [],
      "parameters": {},
      "variants": []
    }
  ],
  "variants": [],
  "description": null,
  "impressionData": false
}
```

Unleash