Crossplane

Contribfest

https://crossplane.io

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Agenda, Goals, & Tracks

- Grow and empower a high quality contributor base
  - All projects can benefit from more great contributors
- How to Write & Test code in Crossplane
  - Walkthrough the development workflow
  - Hands-on lab to make a code change and test it
- How to Write a Composition Function
  - Accelerate your understanding and adoption of this powerful new alpha feature in v1.11

Contributing to Crossplane

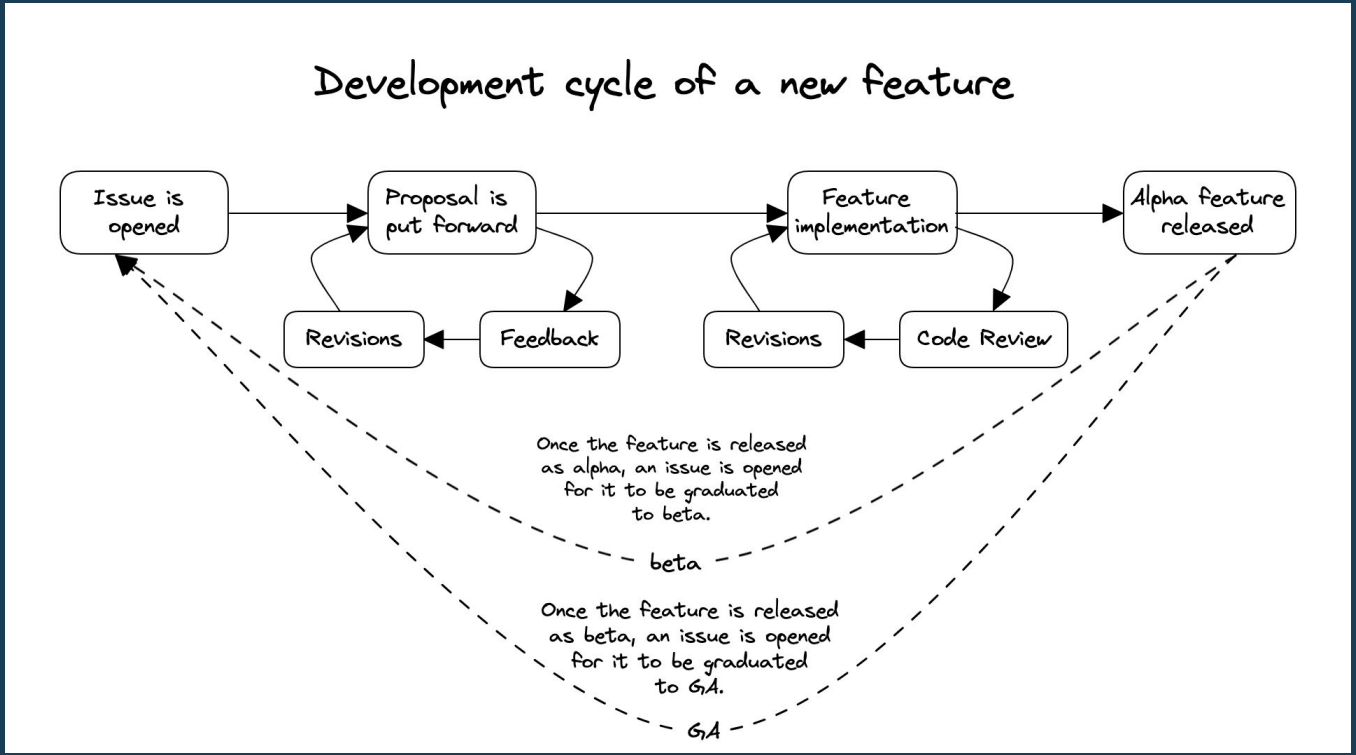
Let's kick off a build!

- This may take a bit... 🕛
- Pre-Requisites
  - docker client is running
  - go is installed
- Run these commands
  - `git clone https://github.com/crossplane/crossplane.git`
  - `cd crossplane`
  - `make`
- Long poles
  - go module dependencies
  - OCI image layers

Contributor Resources

- Contributing folder in crossplane/crossplane repo
- Main README.md has a full contributor guide
  - contributions always accepted to clarify/improve 😉
  - contribute to the contributing guide - contribution inception!
- Release process - how to release new versions of Crossplane
- Provider development guide - how to design and build your own custom providers
- Observability guide - how to add events, logging, metrics to your Crossplane core controllers and providers
- And more!

The Life of a Feature



- Feature life cycle docs

Release Cadence and Cycles

- Quarterly releases - 3 month cycle, 4 releases per year
- Development ➡️ Feature Freeze ➡️ Code Freeze ➡️ Release
- Last 3 versions are maintained with patch releases
  - Current releases table
    - e.g. v1.12, v1.11, v1.10
  - Backport PR automation with `backport release-x.y` label
- Release cadence and cycles docs

Contributor Workflow

- Contributing code workflow docs
- Communicate your intent
  - Discuss your change in a GitHub issue **before** you start
- Make your changes
  - Tell a story with your git commits and always rebase off of upstream
  - Sign-off on all Git commits by running git commit -s
  - Preempt coding style review comments
- Test your changes
  - Add or update test cases for all changes
- Update documentation and examples where appropriate
- Open a Pull Request (PR)
  - Fill out entire PR template
  - Don't force push while addressing review feedback, but do tidy up your commit history before merging

Components and Codebase

- crossplane-runtime - reusable logic across core and providers
  - Managed Reconciler - core reconciliation logic for managed resources
  - Errors, Events, Logging
  - Metadata operations
  - Resource model
- crossplane - core crossplane logic
  - main entry points
  - API definitions
  - Controllers - Compositions, Packages, RBAC

Make builds Crossplane

- All of Crossplane's build logic is implemented in `make`
- Crossplane specific Makefile and reusable build submodule
- `make build` - build all artifacts
- `make reviewable` - (`generate`, `lint`, `test`)
- `make run` - run Crossplane directly in proc
- `make` is called from Github Actions workflows for official CI and releases, e.g. build, test, and promote

Build Artifacts

- OCI images, e.g.:
  - crossplane/crossplane:v1.11.3
  - crossplane/xfn:v1.11.3
- Releases bucket (binaries) - https://releases.crossplane.io/stable/v1.11.3/bin/
- Helm charts bucket - https://charts.crossplane.io/stable/

Hands-on Lab 1

Writing & Testing Code in Crossplane

Lab 1 Content

- Content can be found in crossplane-contrib/contribfest repo
- Overview
  - Set up the dev environment
  - Build Crossplane artifacts
  - Set up a local cluster and deploy your changes
  - Make a code change, rebuild artifacts and deploy your changes
  - Running unit tests and integration tests
  - Getting changes ready for review with `make reviewable`
  - Opening a PR with your changes

Lab 1 - Let's go!

Hands on the keyboard! 

Follow along with the Lab 1 content in the contribfest repo:
crossplane-contrib/contribfest

Coding Standards

- Contributing guide's coding style section
- We're mostly following common standards in Go
  - Follow the guidelines set out by the Effective Go document
  - Preempt common Go code review comments and test review comments
- Follow Crossplane's Observability Developer Guide
  - How to use error reporting, logging, events, metrics, etc. within your code
- Explain `nolint` directives
- Use descriptive variable names sparingly
- Don't wrap function signatures
- Return early
- Wrap errors, Scope errors
- Prefer table driven tests

PRs done well

- PRs are a sensitive two sided engagement for authors and reviewers
  - Approach with kind collaboration
  - Both sides need to understand intent and context
  - Conversational style feedback, not terse instructions
  - Asking questions and suggesting changes, rather than demanding
  - Be clear about blockers and nice to haves
  - We're all here to make the project better 🤗
- Clean commit history with a rebase workflow
  - Create your own fork and branch for your work
  - When updating with new changes, always rebase your fork/branch off upstream
- Full code review process explained in contributing guide

Building a Composition Function

Crossplane

Instagram calamiyorum

Why?

```yaml
apiVersion: database.starter.org/v1alpha1
kind: XPostgreSQLInstance
metadata:
  name: my-db-hs7dy
spec:
  parameters:
    region: east
    size: small
    storage: 20
  claimRef:
    name: my-db
    namespace: default
```

Composition
Resource

```yaml
apiVersion: rds.aws.upbound.io/v1beta1
kind: Instance
metadata:
  name: my-db-hs7dy-osu78
spec:
  forProvider:
    allocatedStorage: 20
    autoGeneratePassword: true
    autoMinorVersionUpgrade: true
    backupRetentionPeriod: 14
    backupWindow: 09:46-10:16
    engine: postgres
    engineVersion: "13.7"
    instanceClass: db.t3.micro
    maintenanceWindow: Mon:00:00-Mon:03:00
    name: example
    passwordSecretRef:
      key: password
      name: example-dbinstance
      namespace: upbound-system
    publiclyAccessible: false
    region: us-east-1
    skipFinalSnapshot: true
    storageEncrypted: true
    storageType: gp2
    username: adminuser
  writeConnectionSecretToRef:
    name: example-dbinstance-out
    namespace: default
```

Why?

```yaml
apiVersion: apiextensions.crossplane.io/v1
kind: Composition
metadata:
  name: xpostgresqlinstances.aws.database.starter.org
spec:
  writeConnectionSecretsToNamespace: upbound-system
  compositeTypeRef:
    apiVersion: database.starter.org/v1alpha1
    kind: XPostgreSQLInstance
  resources:
    - name: rdsinstance
      base:
        apiVersion: rds.aws.upbound.io/v1beta1
        kind: Instance
        spec:
          forProvider:
            region: us-east-1
            instanceClass: db.t2.small
            username: adminuser
            engine: postgres
            engineVersion: "12"
            skipFinalSnapshot: true
            publiclyAccessible: false
            autoGeneratePassword: true
            passwordSecretRef:
              namespace: upbound-system
              key: password
          writeConnectionSecretToRef:
            namespace: upbound-system
```

```yaml
      patches:
        - fromFieldPath: "spec.parameters.region"
          toFieldPath: "spec.forProvider.region"
          transforms:
          - type: map
            map:
              east: us-east-1
              west: us-west-1
        - fromFieldPath: "spec.parameters.size"
          toFieldPath: "spec.forProvider.instanceClass"
          transforms:
          - type: map
            map:
              small: db.t2.small
              medium: db.t2.medium
              large: db.t2.large
        - fromFieldPath: "spec.parameters.storage"
          toFieldPath: "spec.forProvider.allocatedStorage"
```

Limitations of Composition

- No conditionals or for loops.
- List of resources is always the same.
- No advanced logic other than simple transforms.
- Random values to be generated only once.
- No ability to call external APIs to get values.
- ...
- It is not a programming language.

Composition Functions

- Released as alpha in **v1.11.0**
- Any container that can receive and return a FunctionIO object would work - no language limitation.
- Additive to the existing composition mechanisms.
- Pipeline of functions allow modularity.
- Configuration can be supplied through `Composition`.
- ...
- All the things you couldn't do with Composition!

Examples

- Render with Go templates (written in Go)
  - https://github.com/negz/xfns/pull/1
- Add a quote to every managed resource (written in Python)
  - https://github.com/negz/xfns/pull/2
- No-op function (written in Bash)
  - https://github.com/negz/xfns/tree/main/xfn-nop
- ...
- The ones we will build!
  - Make sure to add them to the list in contribfest repo readme!

Back to keyboard!

Open https://github.com/crossplane-contrib/contribfest

Community is everything

Get Involved

- Website: https://crossplane.io/
- Docs: https://docs.crossplane.io/
- GitHub: https://github.com/crossplane/crossplane
- Slack: https://slack.crossplane.io/
- Blog: https://blog.crossplane.io/
- Twitter: https://twitter.com/crossplane_io
- Youtube: Crossplane Youtube

Calling all Crossplane Adopters!

🚨 We'd love to hear about your adoption of Crossplane, please share your story in ADOPTERS.md in the crossplane/crossplane repo 🚨