KubeCon | CloudNativeCon

North America 2022

BUILDING FOR THE ROAD AHEAD

DETROIT 2022

Kubernetes SIG Architecture Intro and Update

October 26, 2022

Who Are We?

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Amazon Web Services
@dims

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Google
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Goals of the Kubernetes project

- Portable
- General-purpose
- Meet users partway
- Flexible
- Extensible
- Automatable
- Advance the state of the art

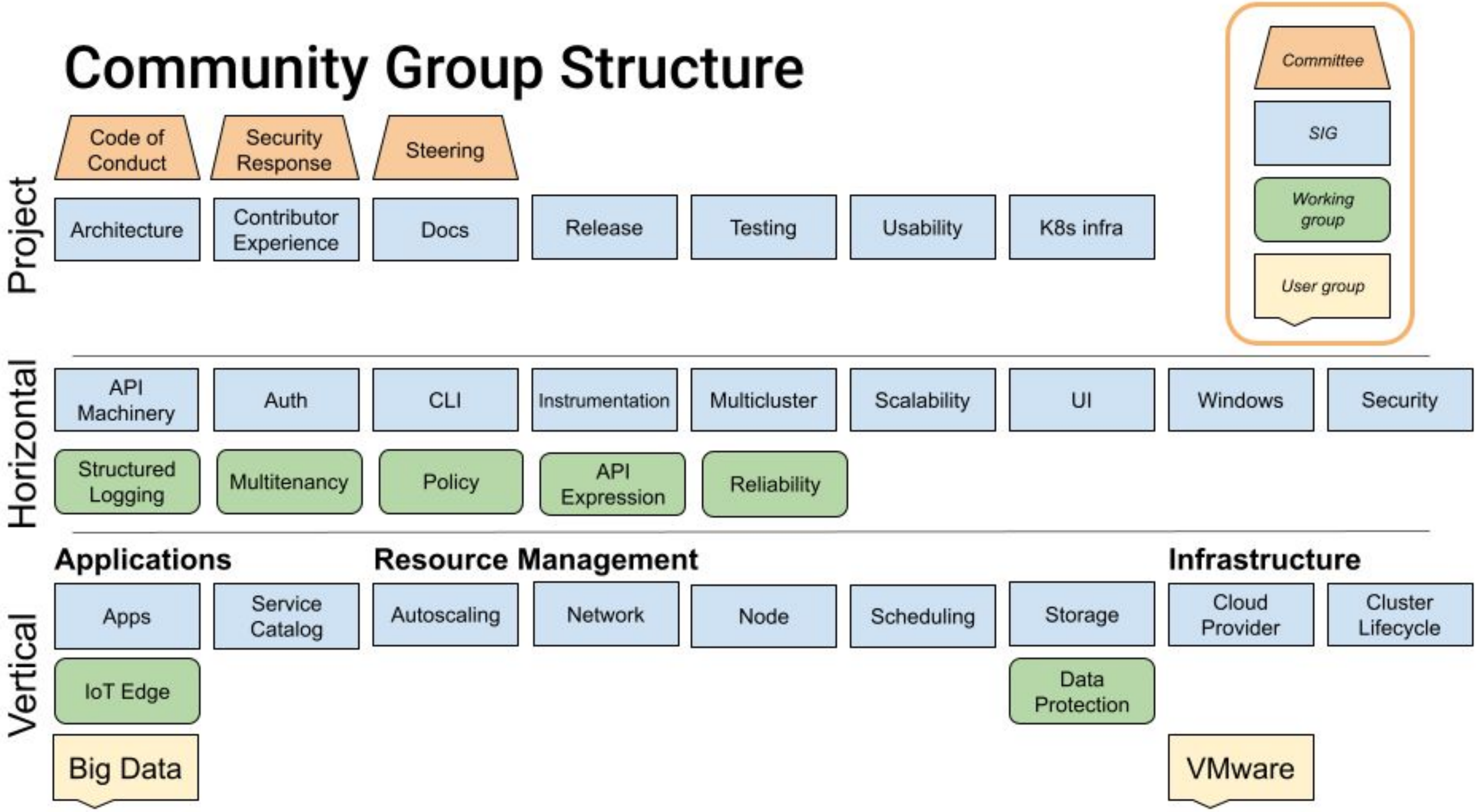
https://git.k8s.io/community/values.md

Kubernetes Community Values

- Distribution is better than centralization
- Community over product or company
- Automation over process
- Inclusive is better than exclusive
    - Your feedback is solicited
- Evolution is better than stagnation

https://git.k8s.io/community/values.md

Kubernetes Project Overview



Community Group Structure

Committee

SIG

Working group

User group

Project

Code of Conduct

Security Response

Steering

Architecture

Contributor Experience

Docs

Release

Testing

Usability

K8s infra

Horizontal

API Machinery

Auth

CLI

Instrumentation

Multicluster

Scalability

UI

Windows

Security

Structured Logging

Multitenancy

Policy

API Expression

Reliability

Vertical

Applications

Apps

Service Catalog

IoT Edge

Big Data

Resource Management

Autoscaling

Network

Node

Scheduling

Storage

Data Protection

Infrastructure

Cloud Provider

Cluster Lifecycle

VMware

SIG Architecture Scope

The Architecture SIG maintains and evolves the design principles of Kubernetes, and provides a consistent body of expertise necessary to ensure architectural consistency over time.

- *Conformance test definitions*
- *API conventions*
- *Architectural renderings*
- *Design principles*
- *Deprecation policy*
- *Production readiness criteria and reviews*
- *Kubernetes Enhancement Proposal (KEP) process*

Cross-cutting Processes

- Conformance test review and management
- API review process
  - go.k8s.io/api-review
- Design documentation management
  - git.k8s.io/enhancements/keps
- Deprecation policy management
  - k8s.io/docs/reference/using-api/deprecation-policy
  - k8s.io/docs/setup/release/version-skew-policy
- Production Readiness Reviews
  - git.k8s.io/community/sig-architecture/production-readiness.md
- Kubernetes Enhancement Proposal process

What other kinds of issues?

- Ambiguous behavioral questions
  - Inconsistencies in behavior across resources
- Unanswered questions
- Anything where TL/Chairs/Owners conflict
  - Not as escalations
  - Formulate general guidelines/principles
- Start a mailing list thread - come with KEPs and details!
  - git.k8s.io/community/sig-architecture#contact

Sub Projects

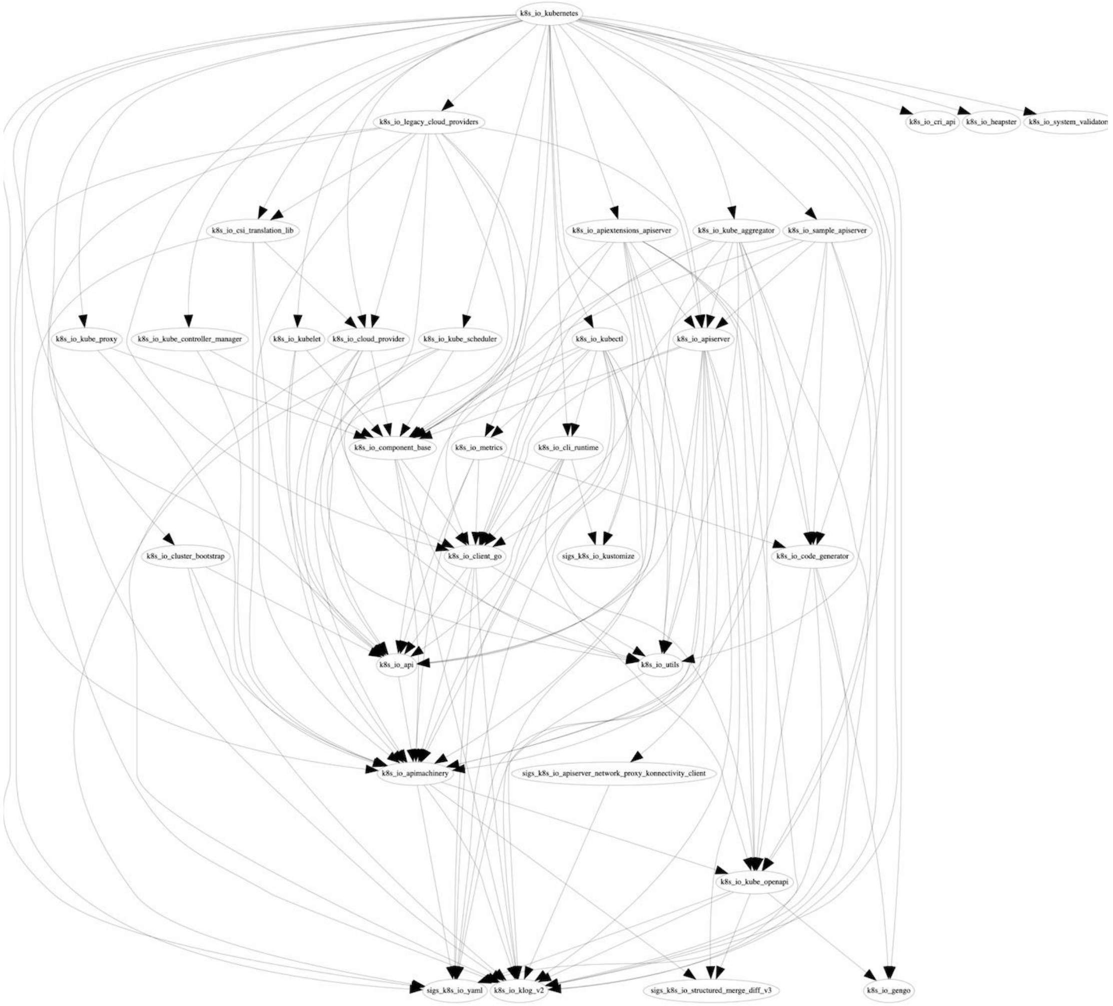
- Architecture and API
  - Document design principles
  - Document and evolve system architecture
  - Reviewing, Curating extension patterns
- Code Organization
  - Repository structure, branching, vendoring
- Enhancements
- Conformance Definition
  - Review, approve changes to conformance test suite
- Production Readiness Reviews

API Review

- Review process
    - go.k8s.io/api-review
- Project board
    - github.com/orgs/kubernetes/projects/13
- API Conventions, Guidelines
    - git.k8s.io/community/contributors/devel/sig-architecture/api-conventions.md
    - git.k8s.io/community/contributors/devel/sig-architecture/api_changes.md
    - Very relevant for in-tree API design / additions / changes
    - Some guidelines also apply to CRD development

Code Organization

- bit.ly/sig-architecture-code-org
- github.com/orgs/kubernetes/projects/27
- Dependency management
- Subrepo structure



Source: http://issue.k8s.io/76395

Enhancements

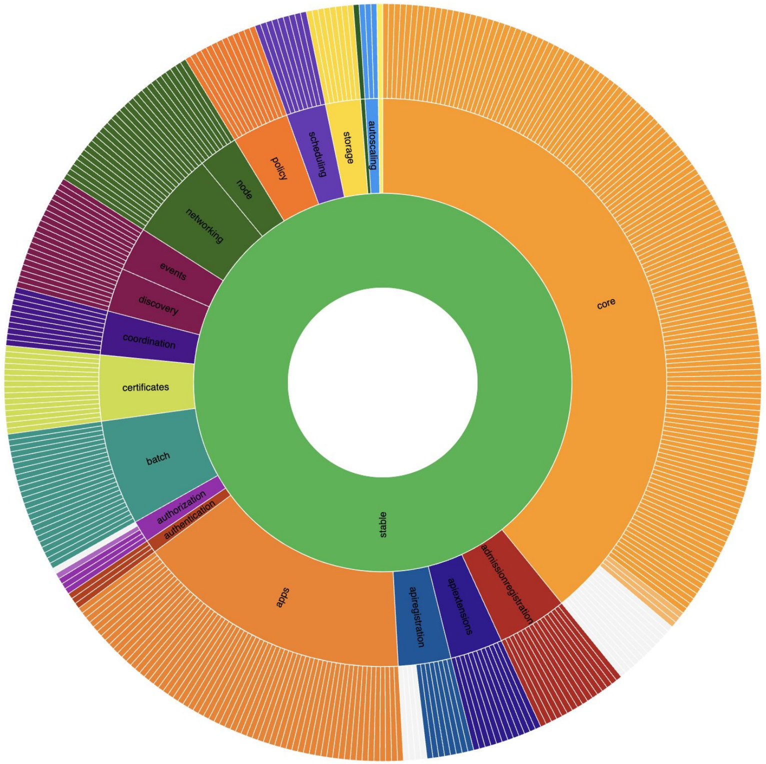
- Define and tweak process for KEPs
- Shepherd community members through KEP lifecycle
- Automate steps when possible
- Work with SIG-Release team on release boundaries
- Make it easier to find information and keep things up-to-date

Conformance Test & Promotion

- Ensuring consistent support and behavior across distributions
  - bit.ly/sig-architecture-conformance
  - github.com/orgs/kubernetes/projects/9
  - git.k8s.io/community/contributors/devel/sig-architecture/conformance-tests.md

- Visualizing current coverage
  - apisnoop.cncf.io
  - Filter by stable/beta/alpha status
  - Filter by API group
  - Filter by test

1.25 Coverage of Conformance Eligible Endpoints

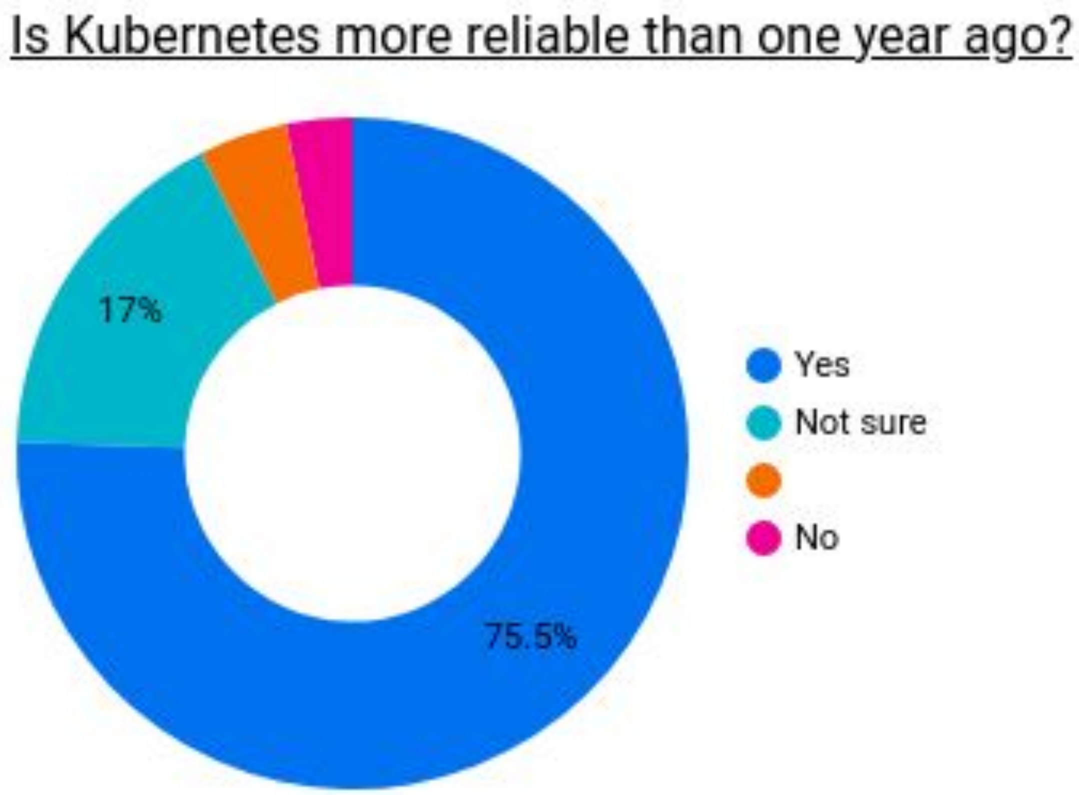


Coverage

401 total endpoints
95.76% tested (384 endpoints)
94.76% conformance tested (380 endpoints)

Production Readiness Reviews

- bit.ly/sig-architecture-prod-readiness
- Asking the question "how will people run this in production?"
- Feedback loop from cluster operators, features that went well / didn't go well
- Developing questions/processes to improve production readiness
- Examples: monitoring, admin documentation, rollout, scale, security



Source: 2022Q2 Kubernetes PRR Survey

Extensions - Design

- Avoid bottlenecks
- Increase supported use cases / capability
- … without increasing complexity
- Permission/blessing not needed
- Rapid iteration
- Distribute responsibility
- Capture best practices / consistency
- Guard rails around integrations

Extension - Examples

- API aggregation -- multiple api servers
- ThirdPartyResource/CRD/Storage -- key/value CRUD + metadata
- Admission-control extension web hooks -- pluggable policies
- Scheduler Extensions
- Built-in add-on manager -- reconcile configuration & self-hosted components
- Component registration
- Kubectl extension
- Component configuration (via ConfigMap)
- Container runtime (CRI), network plugin (CNI), volume plugin (CSI)
- External cloud provider
- External secret management (KMS)
- External controller pattern
- Extension schema validation and discovery

Where are we going?

- Focus on extensions
  - Let the ecosystem grow and distill the best patterns
  - Fewer changes to core
  - Prove out new ideas as CRD APIs
- Build out conformance
- Cleanup + Reliability (.0 releases, production readiness)
  - features *must* go GA effort
  - Ensuring follow through
- Organization Scaling
- KEPs KEPs KEPs

How you can participate?

- Attend the main and subproject meetings
- Follow along on project boards, mailing lists, and slack: git.k8s.io/community/sig-architecture#contact
- Find something of interest you can help with
- Speak up - offer your thoughts and ideas, ask questions for background/history, etc.
- Help with issue triage, PR reviews, docs

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THANK YOU
Q&A