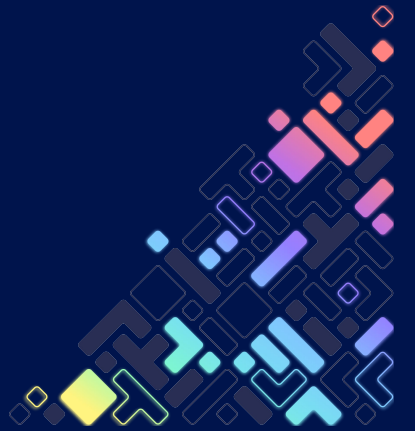
CONTAINERCON @ THE LINUX FOUNDATION OPEN SOURCE SUMMIT NORTH AMERICA

Standardizing Errors: A Practical Guide with Dapr

Cassie Coyle



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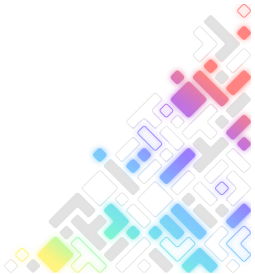
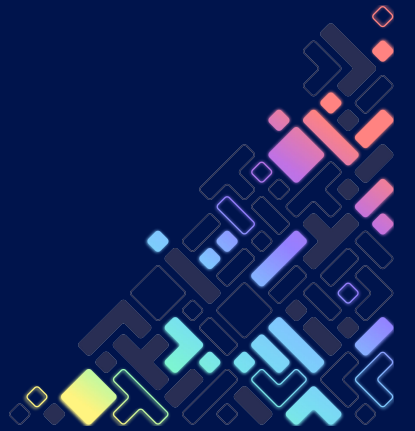


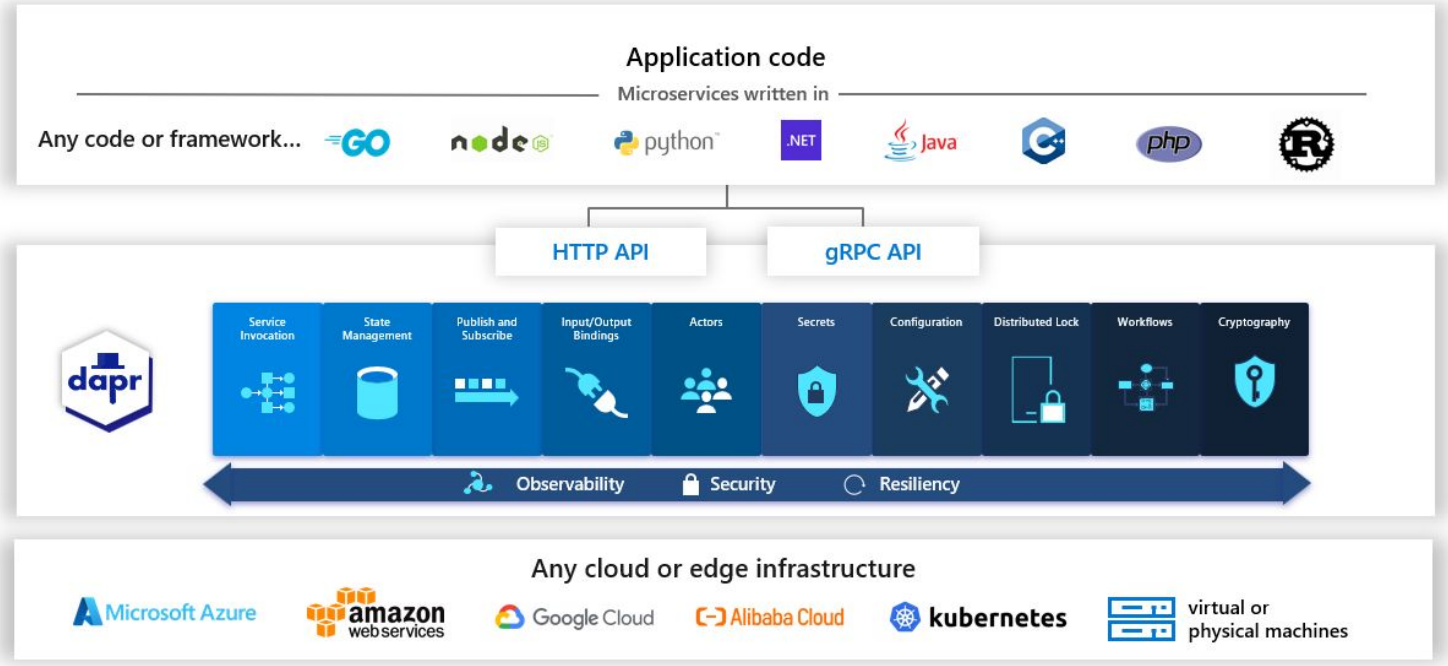
Speaker & Team

Cassie Coyle
Software Engineer

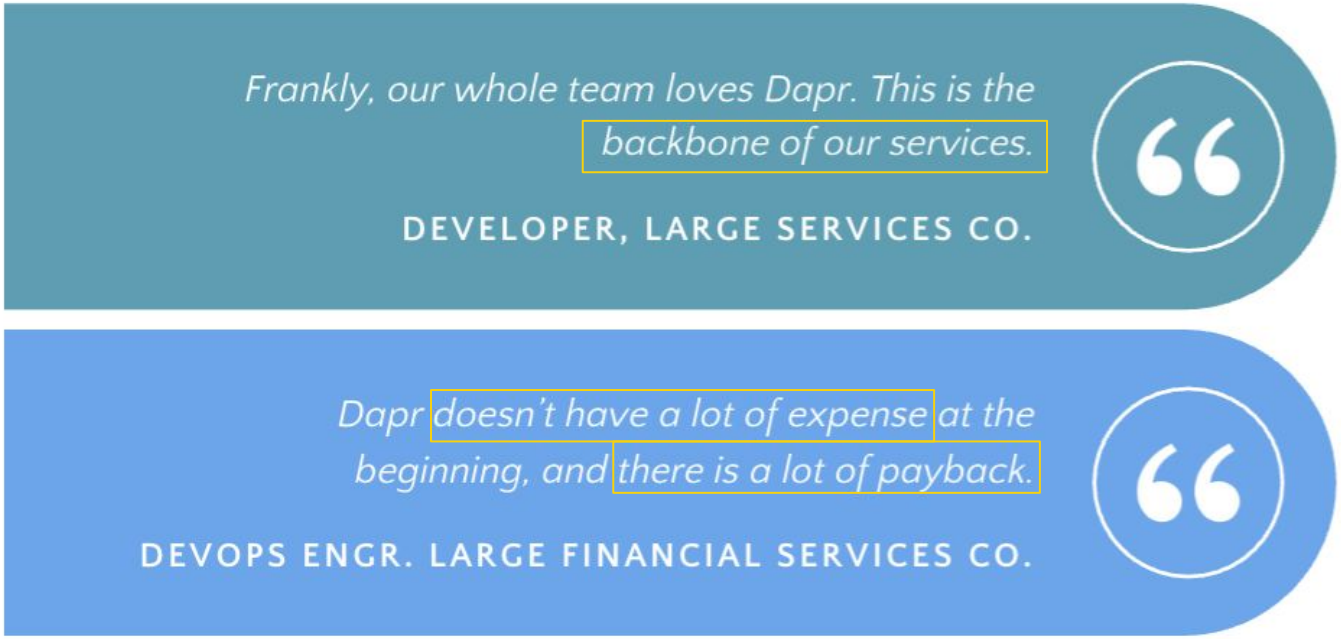
Introduction



Dapr

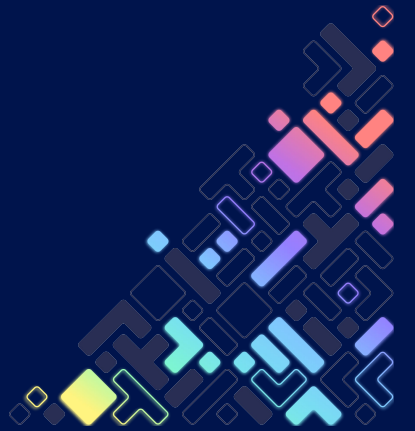

Application code
Microservices written in
Any code or framework...
HTTP API
gRPC API
dapr
Service Invocation
State Management
Publish and Subscribe
Input/Output Bindings
Actors
Secrets
Configuration
Distributed Lock
Workflows
Cryptography
Observability
Security
Resiliency
Any cloud or edge infrastructure
Microsoft Azure
amazon web services
Google Cloud
Alibaba Cloud
kubernetes
virtual or physical machines

Dapr Community Feedback

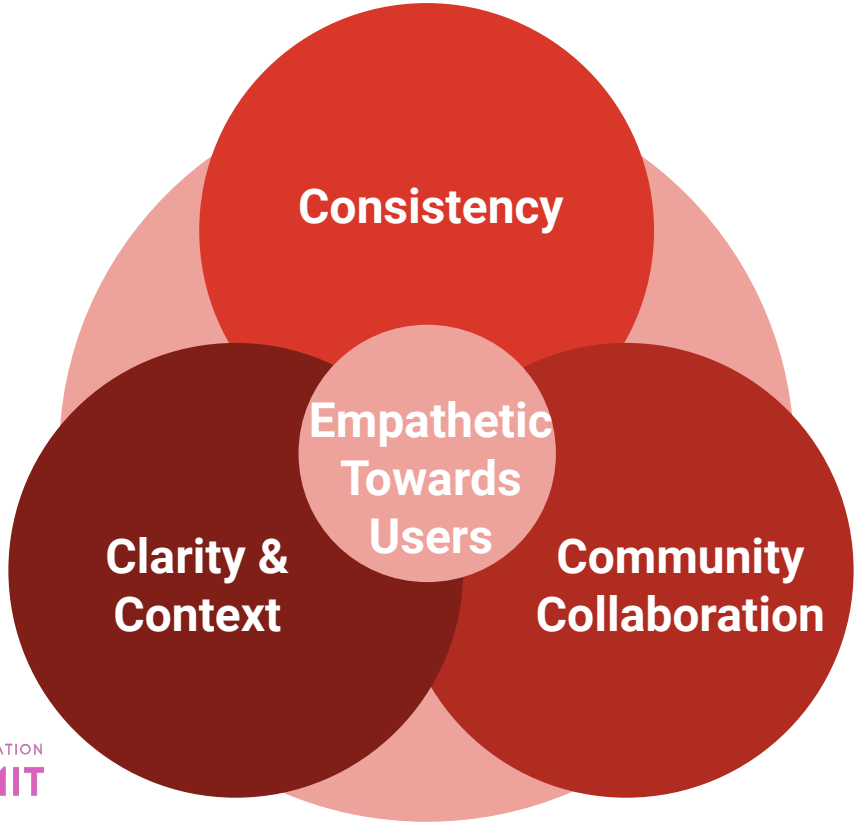


Dapr Community Feedback

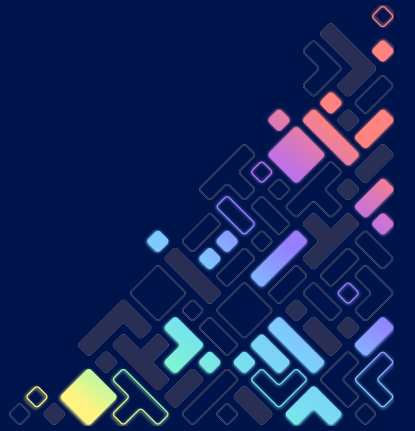
Importance of Error Standardization



The Importance of Error Standardization

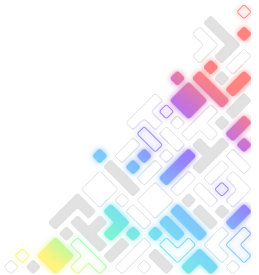


Richer Error Model



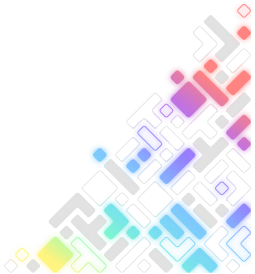
Richer Error Model

```
package google.rpc;

// The `Status` type defines a logical error model that is suitable for
// different programming environments, including REST APIs and RPC APIs.
message Status {
  // A simple error code that can be easily handled by the client. The
  // actual error code is defined by `google.rpc.Code`.
  int32 code = 1;

  // A developer-facing human-readable error message in English. It should
  // both explain the error and offer an actionable resolution to it.
  string message = 2;

  // Additional error information that the client code can use to handle
  // the error, such as retry info or a help link.
  repeated google.protobuf.Any details = 3;
}
```

Error Details

- ErrorInfo (required)
- RetryInfo
- DebugInfo
- QuotaFailure
- PreconditionFailure
- BadRequest
- RequestInfo
- ResourceInfo
- Help
- LocalizedMessage
- QuotaFailure_Violation
- PreconditionFailure_Violation
- BadRequest_FieldViolation
- Help_Link



Error Detail

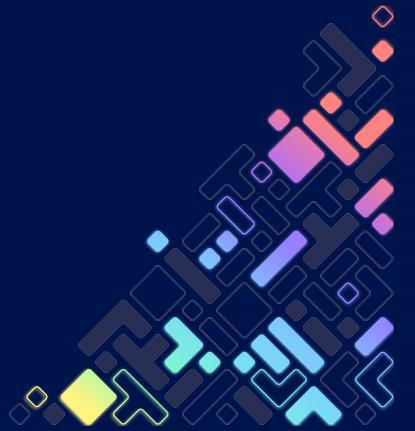
- **ErrorInfo** (required) 

Error Detail

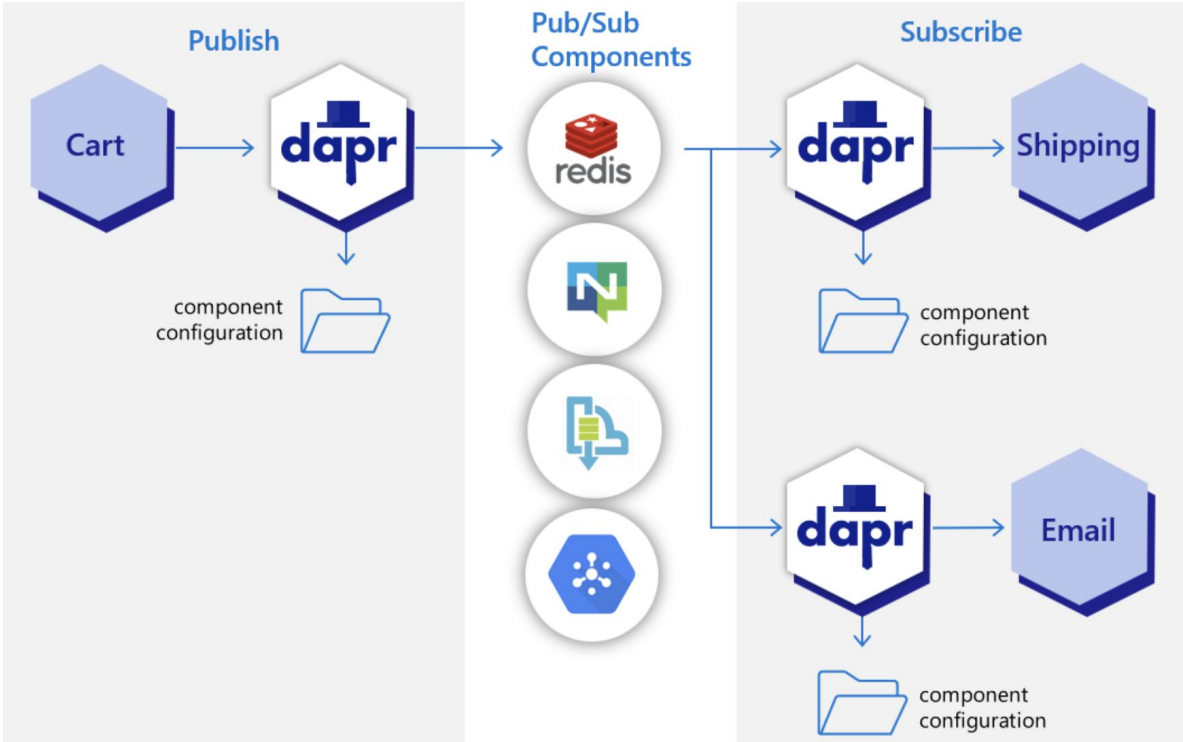
- **ErrorInfo** (required)

ErrorInfo:
- Domain: dapr.io
- Reason: <reason>
- Metadata: <metadata>

Enriched Errors Before & After



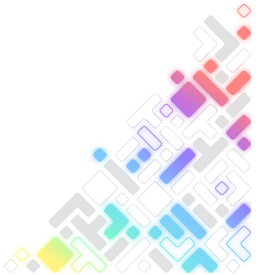
PubSub API Overview



Before Enriched Error for PubSub API

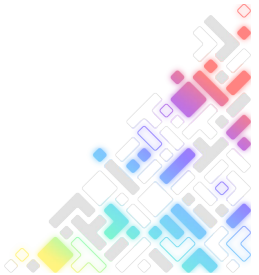
$ grpcurl -H 'dapr-app-id: sub' -d '{"pubsub_name":"**fakeKafka**", "topic":"**fakeTopic**"}' -plaintext localhost:57534 dapr.proto.runtime.v1.Dapr.**PublishEvent**

ERROR:
Code: InvalidArgument
Message: pubsub **fakeKafka not found**



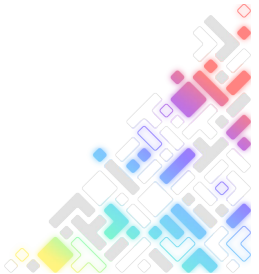
After Enriched Error for PubSub API

ERROR:
Code: InvalidArgument
Message: pubsub fakeKafka is not found
Details:
1) {
"@type": "type.googleapis.com/google.rpc.**ErrorInfo**",
"domain": "dapr.io",
"reason": "DAPR_PUBSUB_NOT_FOUND",
}
2) {
"@type": "type.googleapis.com/google.rpc.**ResourceInfo**",
"description": "pubsub fakeKafka is not found",
"resourceName": "fakeKafka",
"resourceType": "pubsub"
}



Expanded Enrichment

Details:
1) {
"@type": "type.googleapis.com/google.rpc.**HelpLink**",
"url":
"https://docs.dapr.io/developing-applications/building-blocks/pubsub/pubsub-overview",
"description": "Dapr docs pubsub overview",
}



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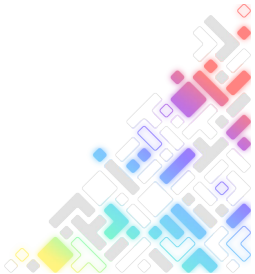
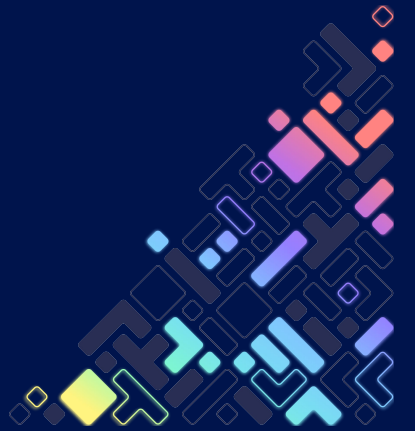
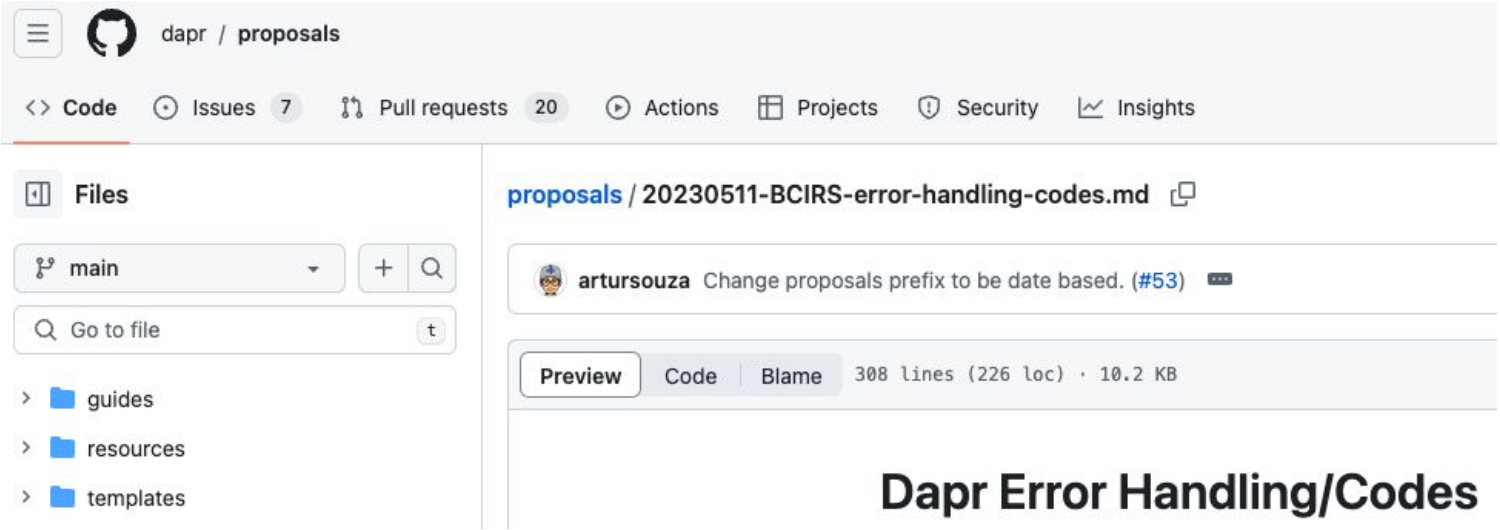


Errors pkg in the dapr/kit repo

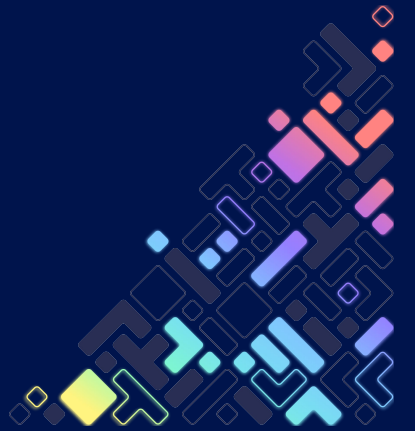


Errors pkg in the dapr/kit repo

- Builder Pattern
- Error immutable
- Backwards compatibility
- Based off the dapr/proposals

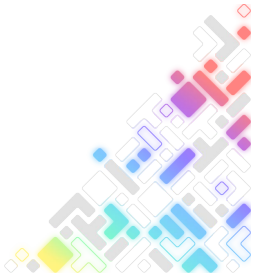


Consumption of the Errors pkg

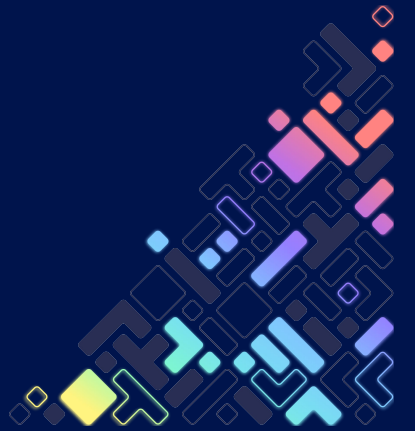


Consumption of the Errors pkg

```
err := errors.NewBuilder(grpcCode, httpCode, msg, tag)

return err.WithErrorInfo(
        errors.CodePrefixPubSub+errCode,
        p.metadata,
).Build()
```



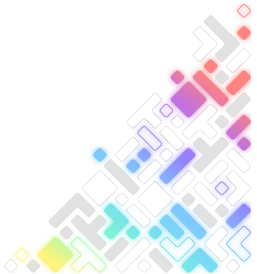
Implementation Details



Implementation Details of the Errors pkg

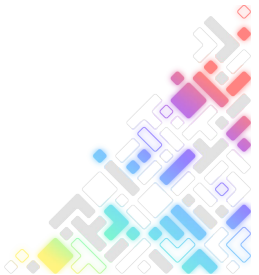
```
type Error struct {
        details []proto.Message
        grpcCode grpcCodes.Code
        httpCode int
        message string
        tag string
}
```

```
type ErrorBuilder struct {
        err Error
}
```

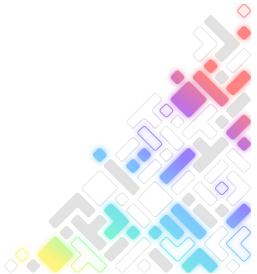
Implementation Details of the Errors pkg

```
func NewBuilder(grpcCode grpcCodes.Code, httpCode int, message string, tag
string) *ErrorBuilder {
        return &ErrorBuilder{
                err: Error{
                        details:  make([]proto.Message, 0),
                        grpcCode: grpcCode,
                        httpCode: httpCode,
                        message:  message,
                        tag:      tag,
                },
        }
}
```

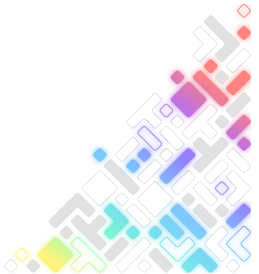
Implementation Details of the Errors pkg

```
func (b *ErrorBuilder) WithErrorInfo(reason string, metadata map[string]string)
*ErrorBuilder {
        errorInfo := &errdetails.ErrorInfo{
                Domain:   Domain,
                Reason:   reason,
                Metadata: metadata,
        }
        b.err.details = append(b.err.details, errorInfo)

        return b
}
```

Implementation Details of the Errors pkg

```
func (b *ErrorBuilder) Build() error {
        // Check for required ErrorInfo
        containsErrorInfo := false
        for _, detail := range b.err.details {
                if _, ok := detail.(*errdetails.ErrorInfo); ok {
                        containsErrorInfo = true
                        break
                }
        }
        if !containsErrorInfo {…}

        return b.err
}
```

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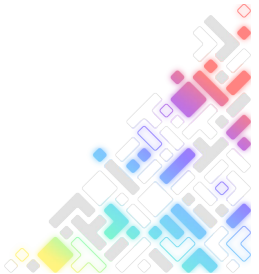
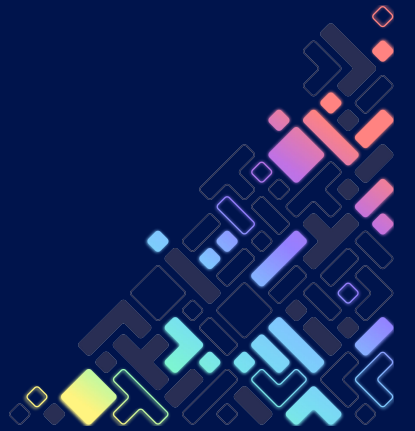
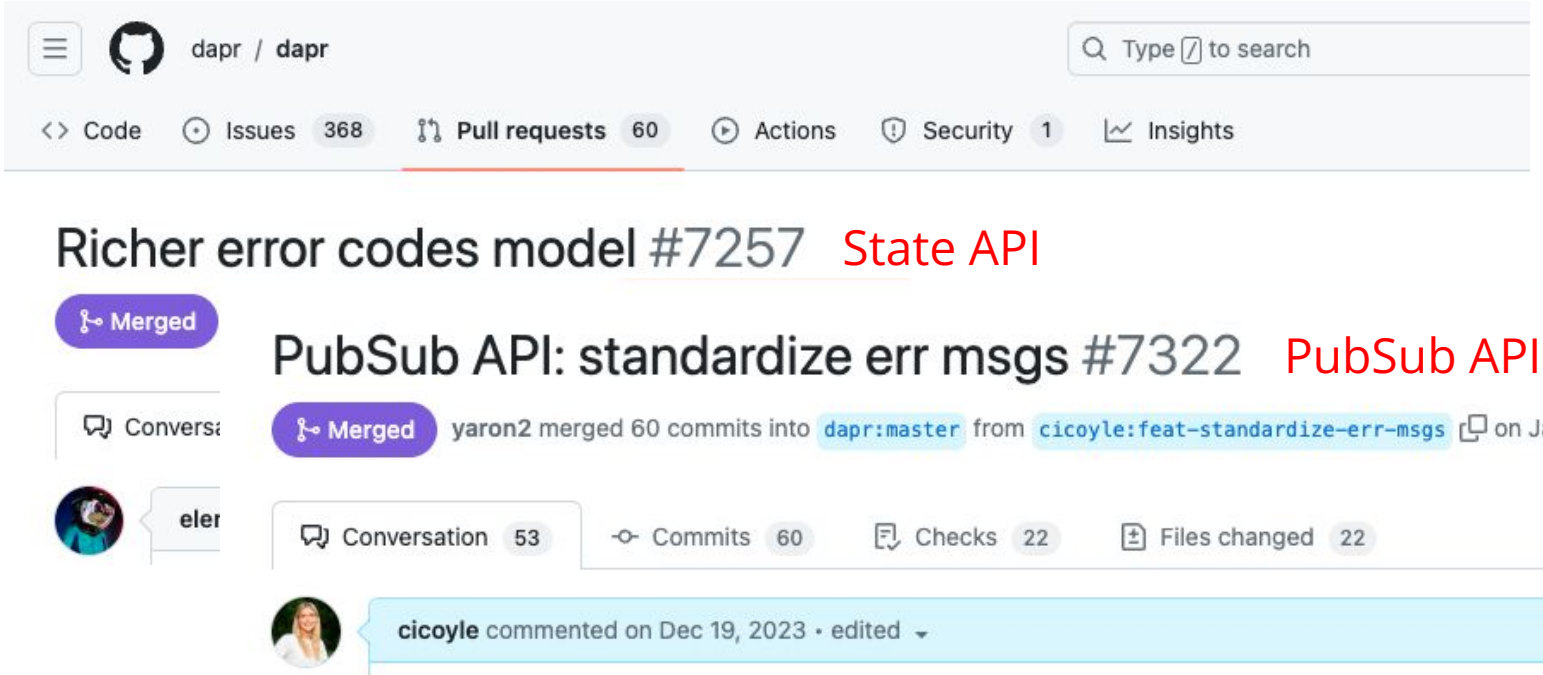


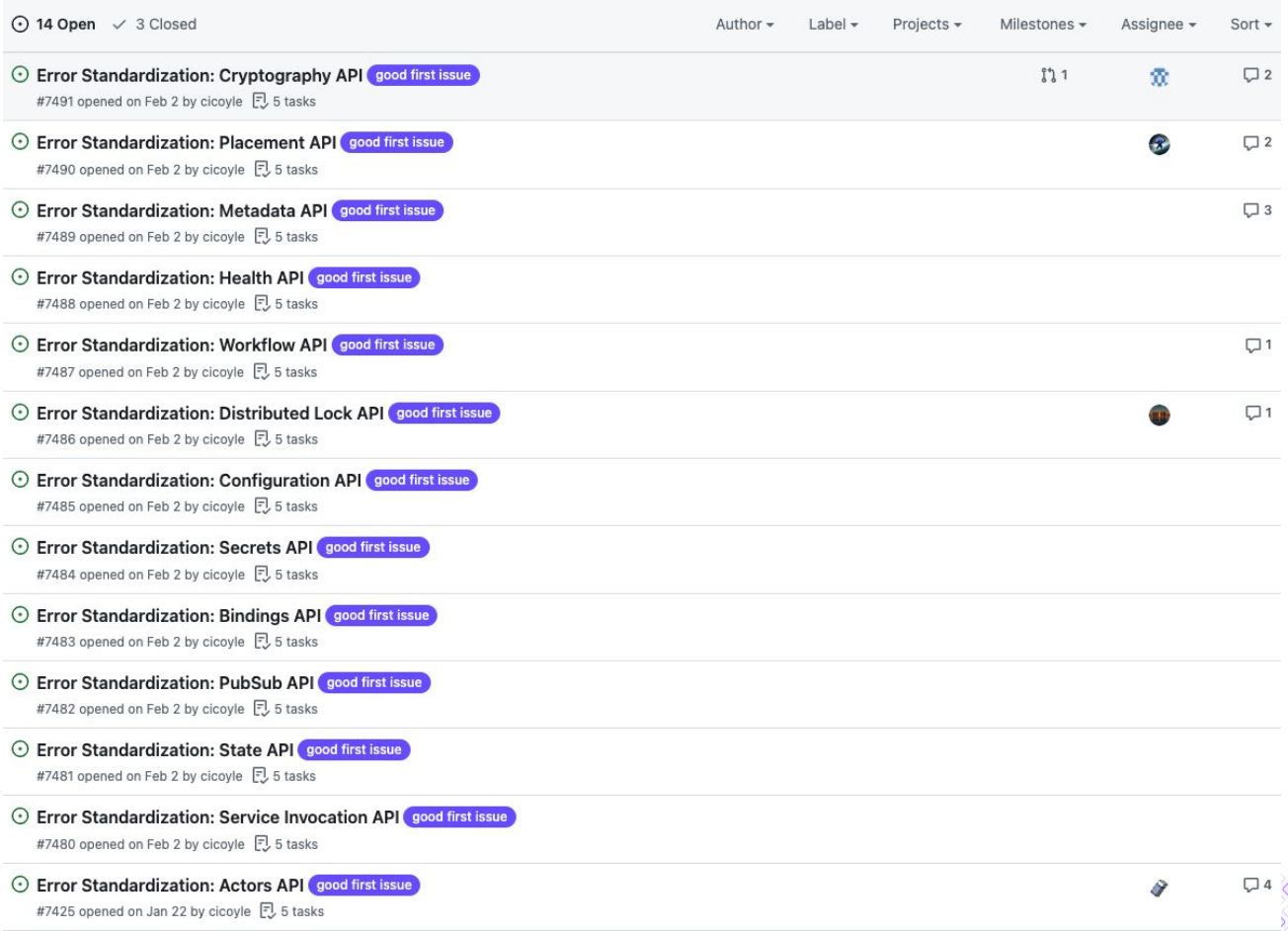
Status of Error Standardization in Dapr



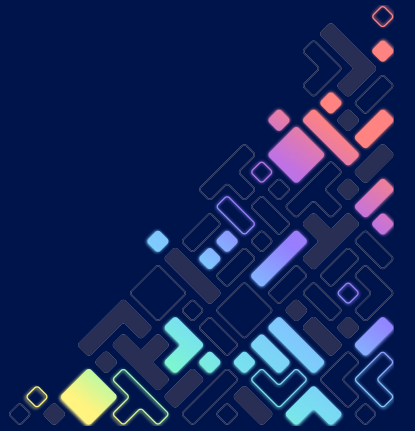
Enriched APIs



Efforts in Dapr



How To: Build the Future with us



Build the Future with us

- Errors pkg in dapr/kit repo
- Get involved in Dapr:
  - https://github.com/dapr/dapr/issues