

# JSON Schema

Powering FINOS Architecture as Code

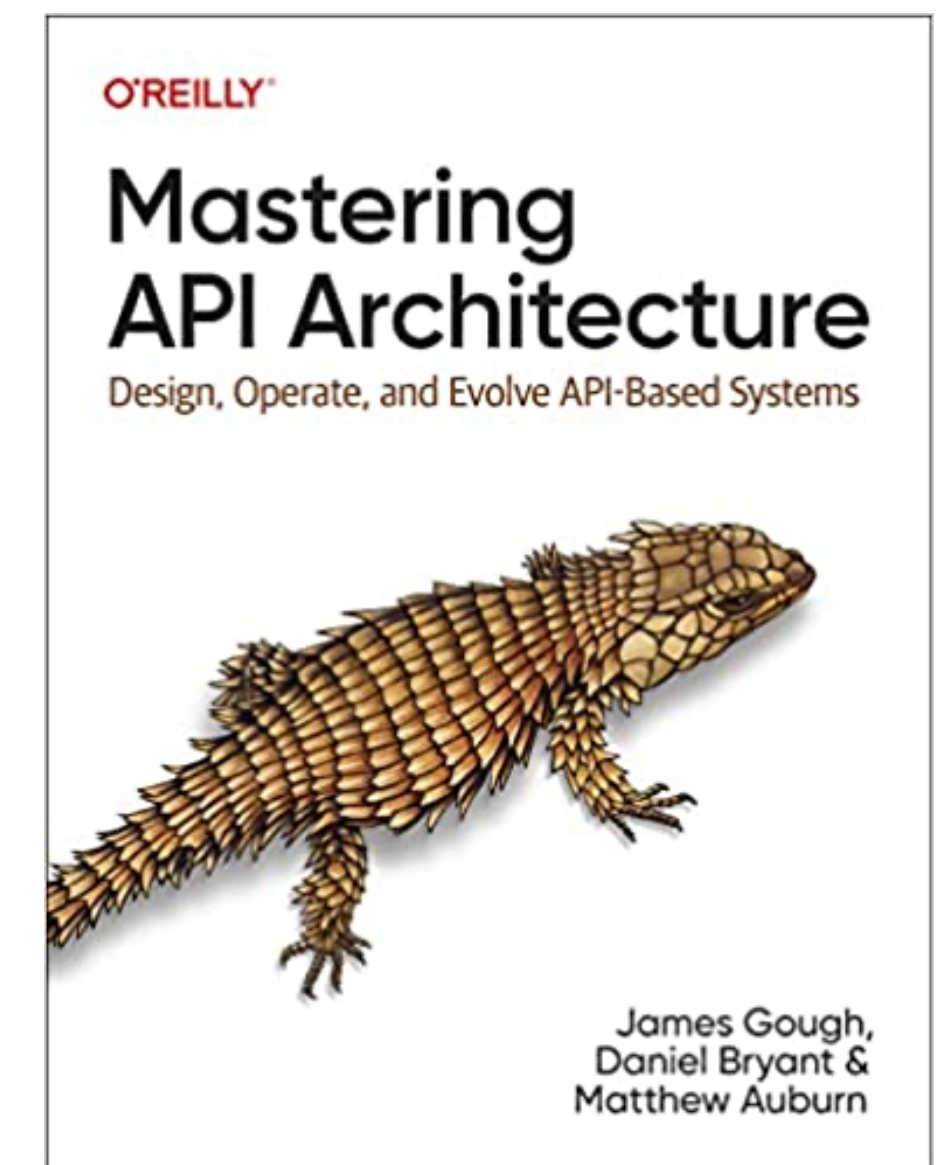
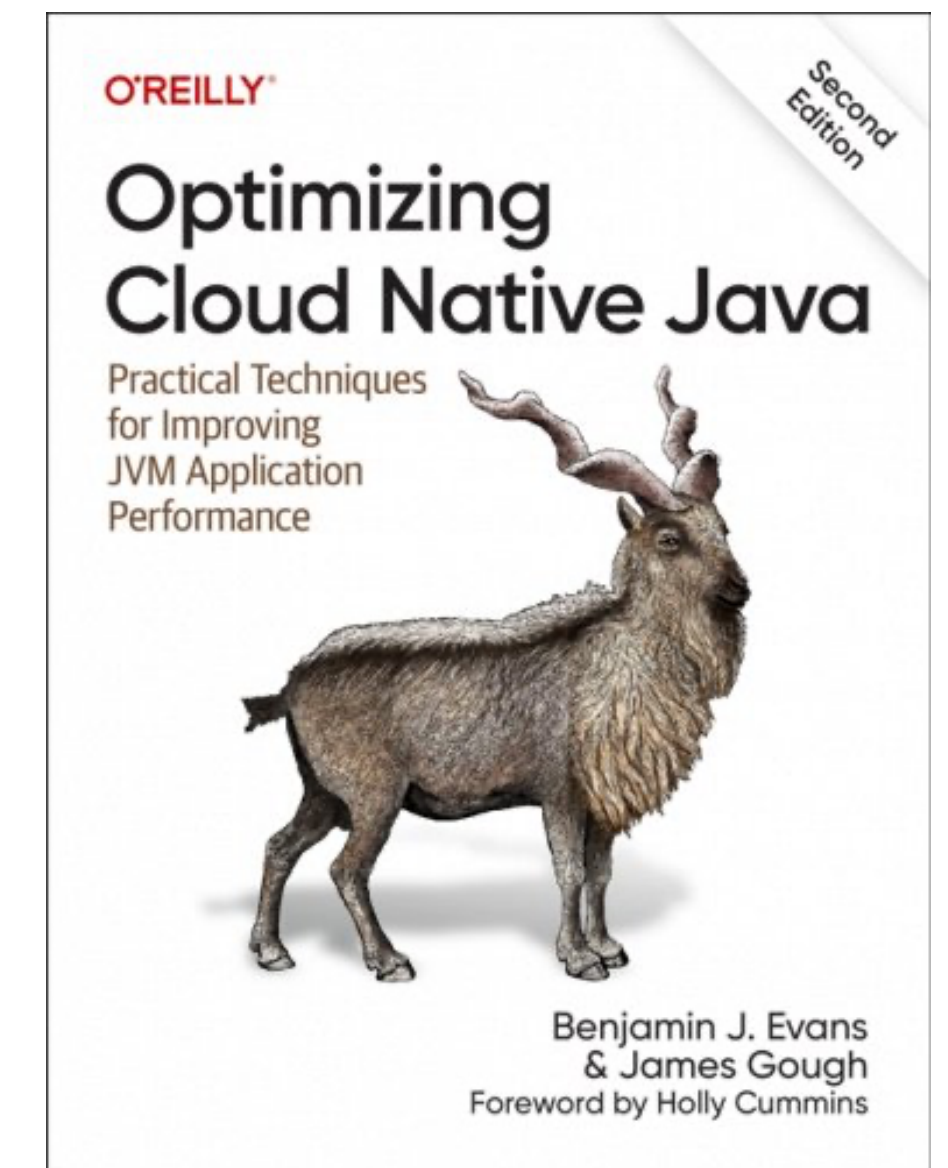
James Gough

# Agenda

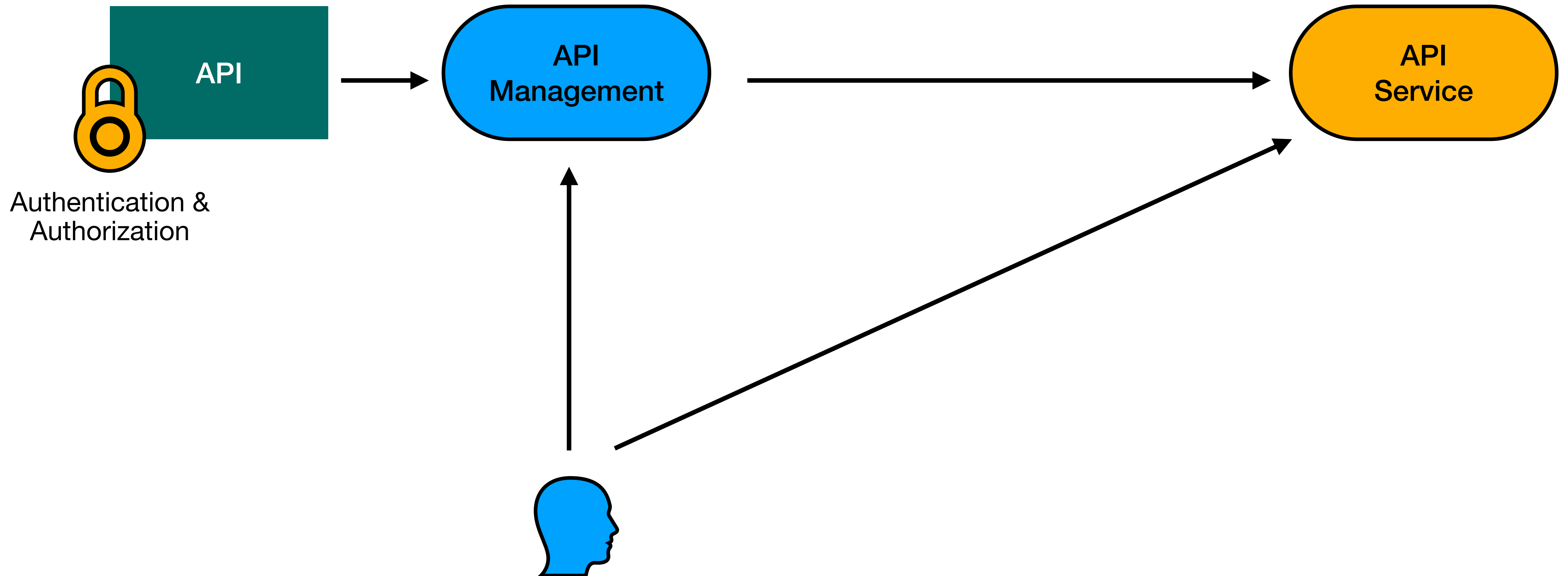
- Complexity in Platforms
- Building Effective Platforms
- Introduction to CALM Architecture as Code
- CALM CLI Demo
- Architecture Controls

# Who am I?

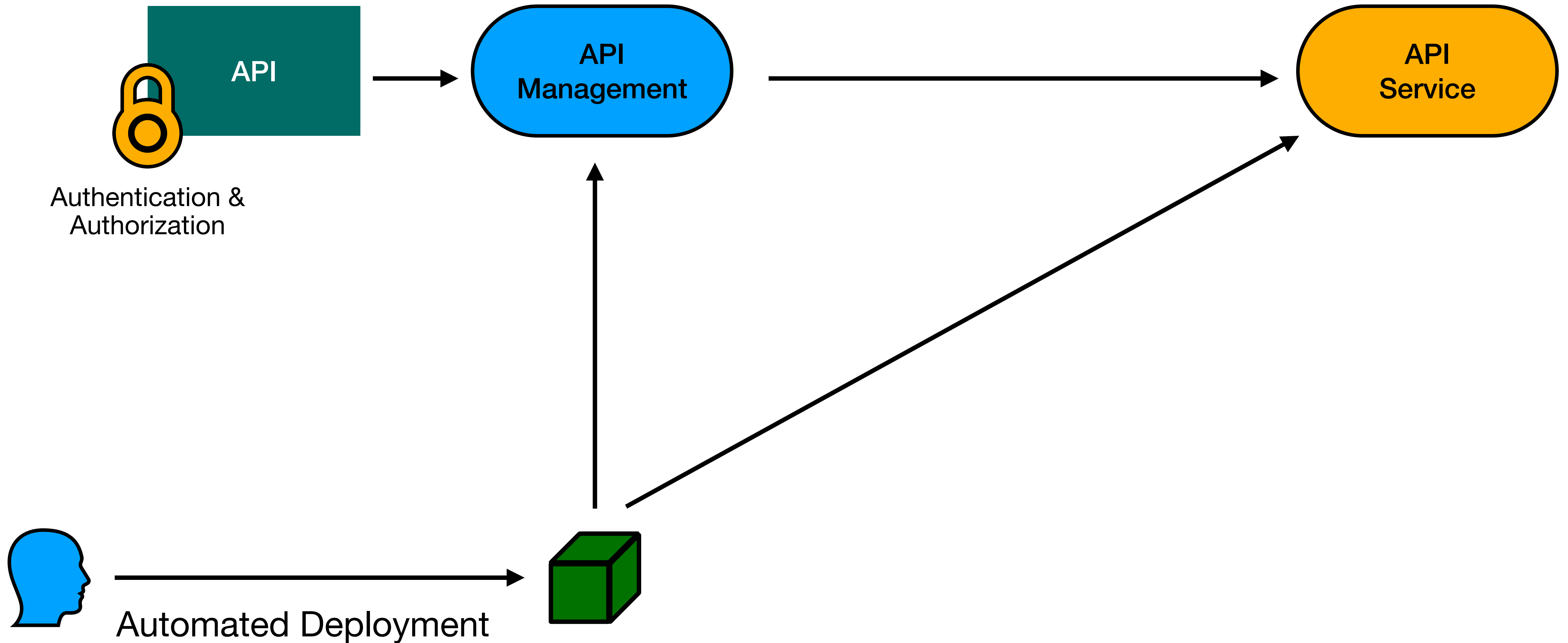
- **Jim Gough:** Distinguished Engineer
  - Architect and Owner of Morgan Stanley's API Program
  - Java Champion
  - Co-Author of Optimizing Java and Mastering API Architecture



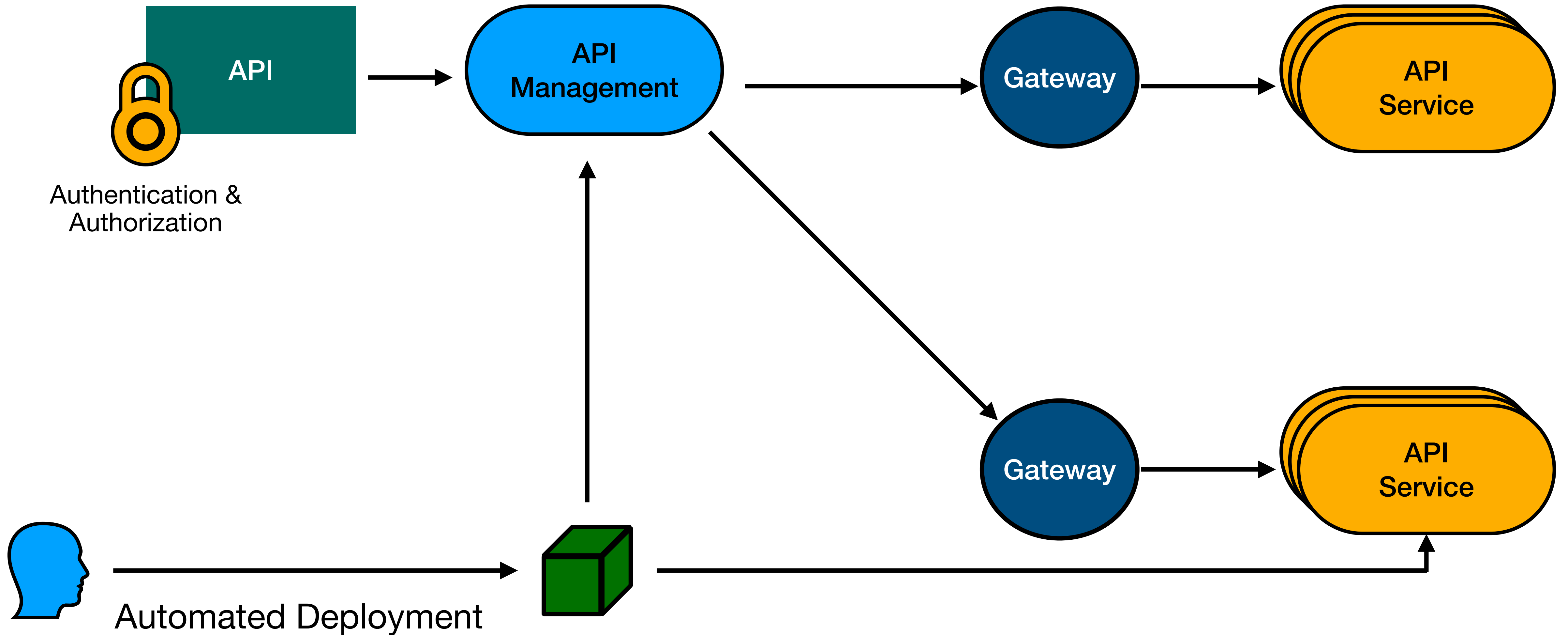
# What's the Problem: Complex Platforms



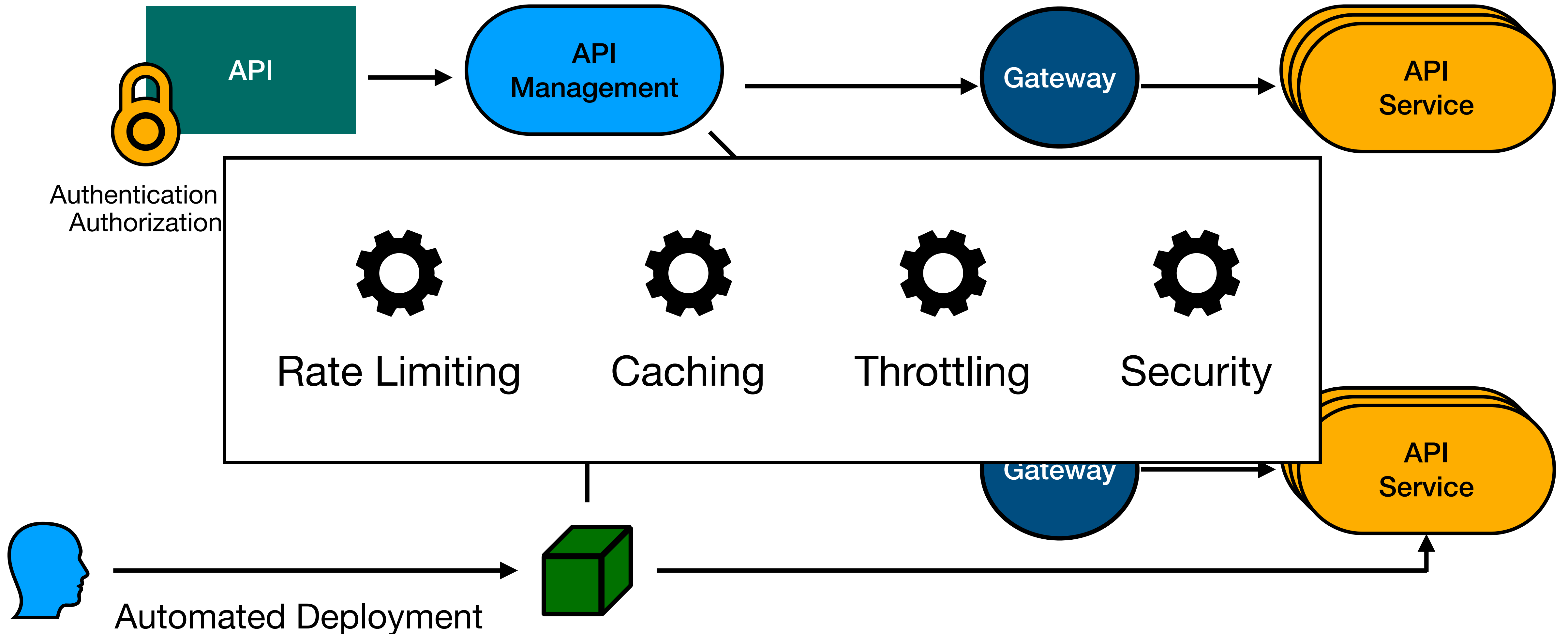
# What's the Problem: Complex Platforms



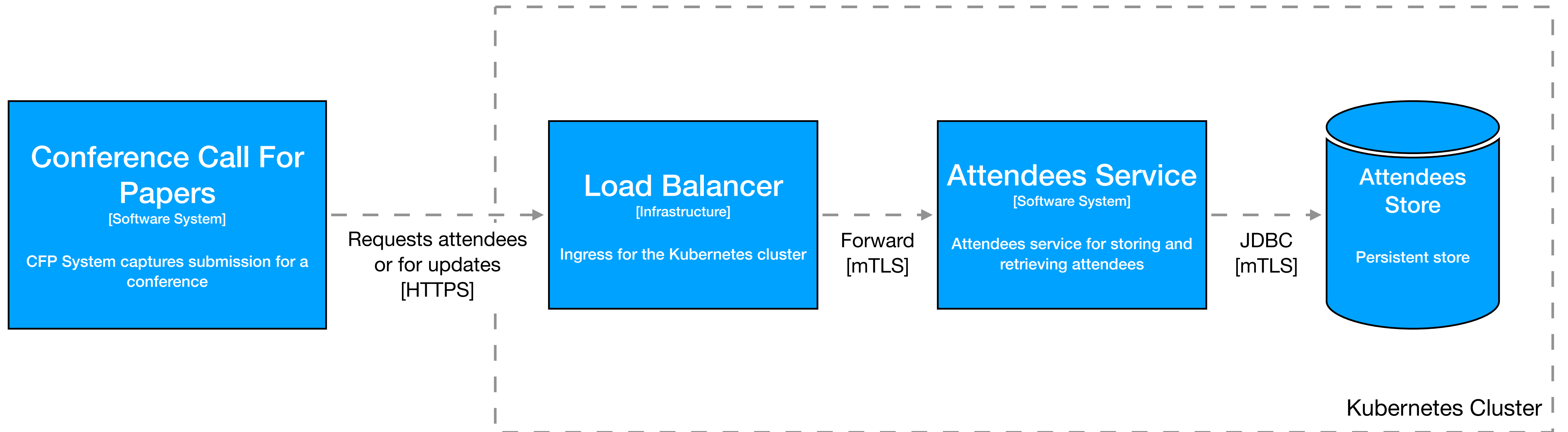
# What's the Problem: Complex Platforms



# What's the Problem: Complex Platforms



# Limitations of C4 Diagrams

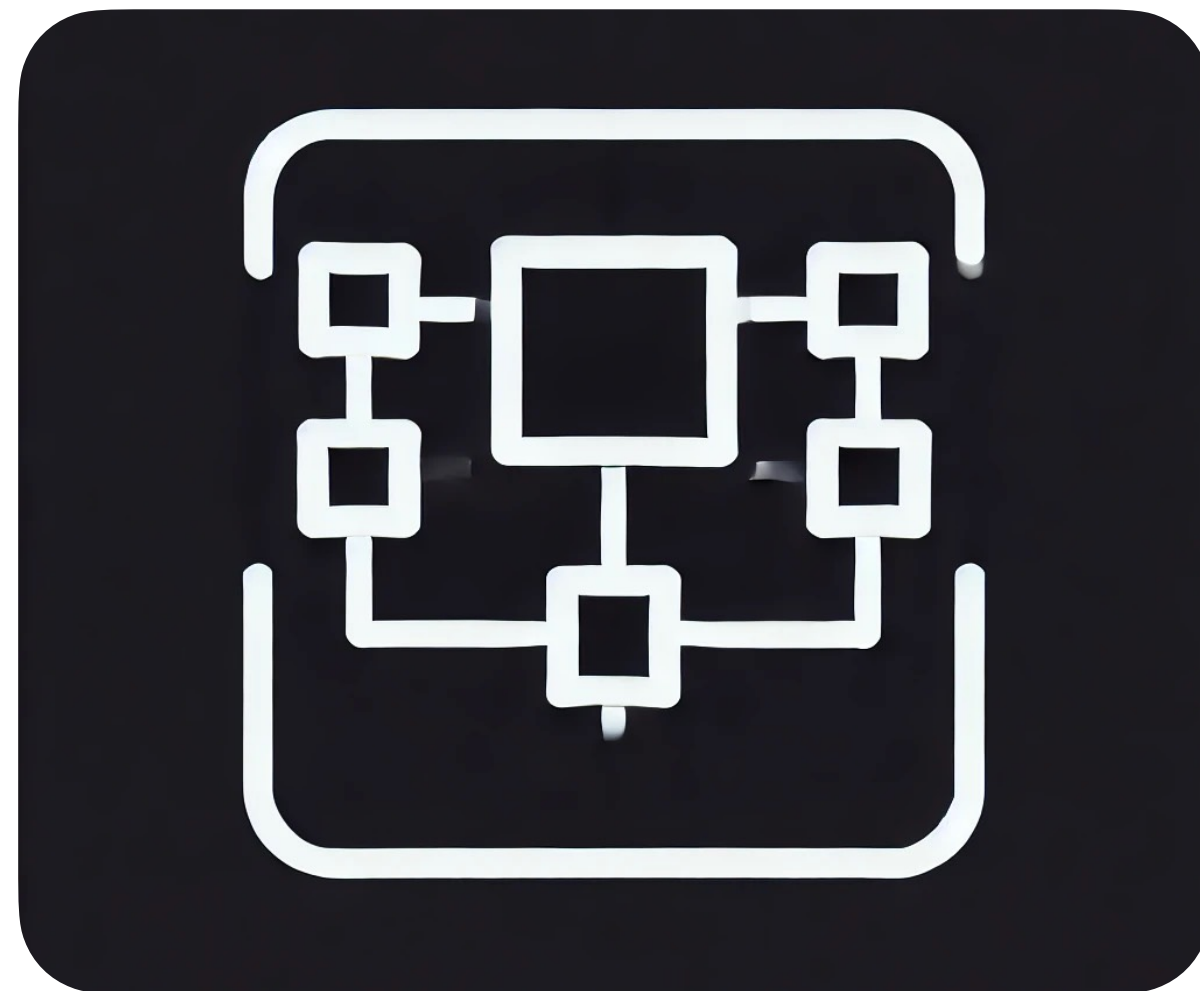




# Building Platforms with Architecture as Code

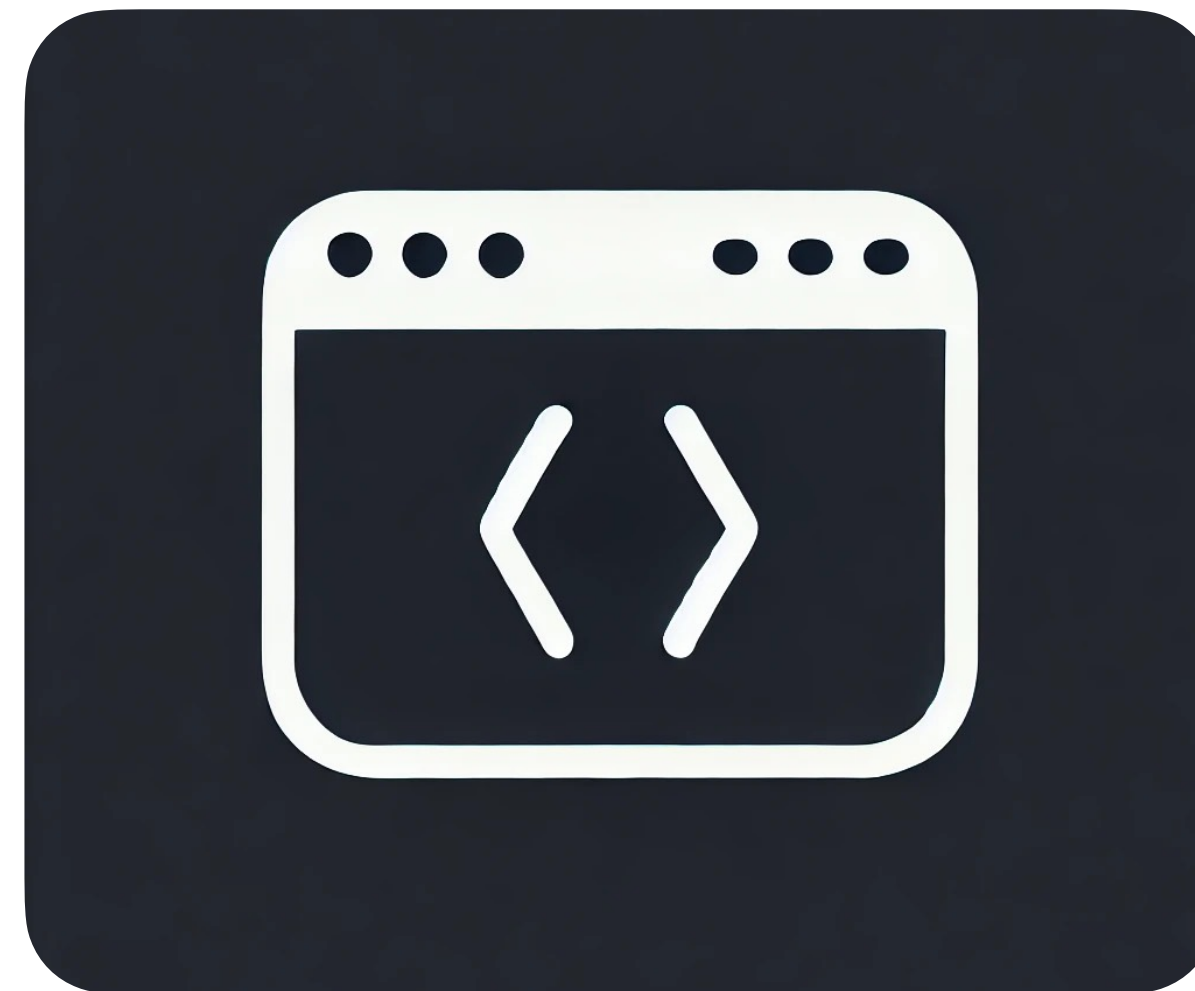


<https://www.finos.org/>



Core Model

**CALM**



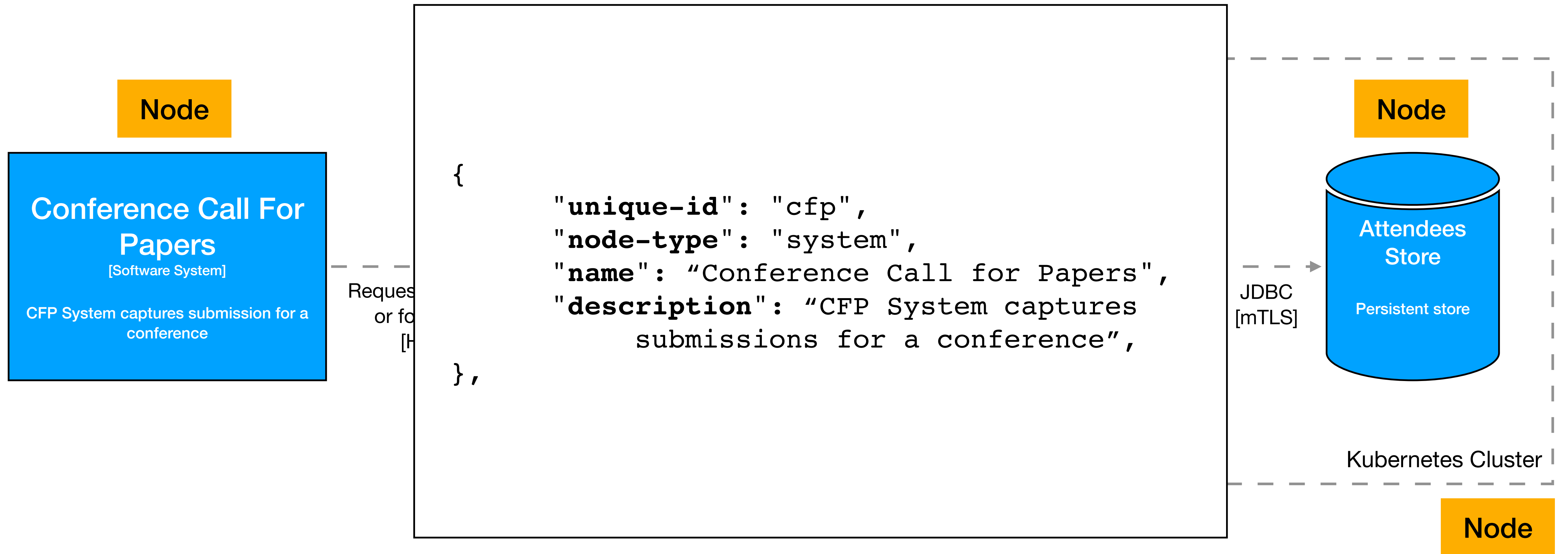
CLI Tools



Patterns, Controls and

Constraints

# Nodes



# Relationships

## Conference Call For Papers

[Software System]

CFP System captures submission for a conference

```
{
  "unique-id": "deployed-in-secure-k8s-cluster",
  "relationship-type": {
    "deployed-in": {
      "container": "secure-k8s-cluster",
      "nodes": [
        "load-balancer",
        "application",
        "postgres-database"
      ]
    }
  }
}
```

Attendees Store

Persistent store

Kubernetes Cluster

Relationship

# Patterns are a Key Feature


```
"interfaces": {
  "type": "array",
  "minItems": 2,
  "prefixItems": [
    {
      "$ref": "https://short-url/interface.json#/defs/container-image-interface",
      "type": "object",
      "properties": {
        "unique-id": {
          "const": "application-image"
        }
      }
    },
    { ... }
  ],
}
```

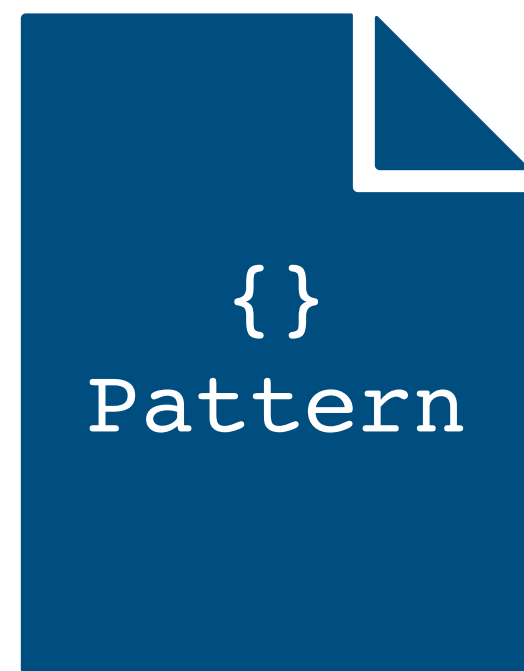
Ext

ter

# CALM Tooling

# CALM CLI Validate

 `npm install -g @finos/calm-cli`



`calm validate`




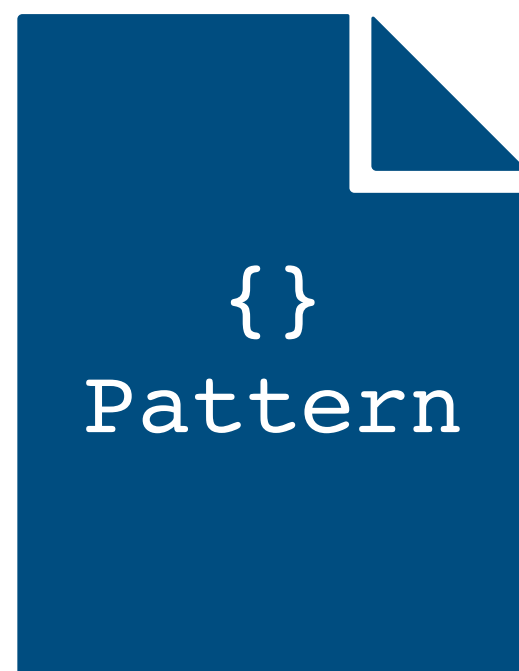
Validates against CALM JSON Schema



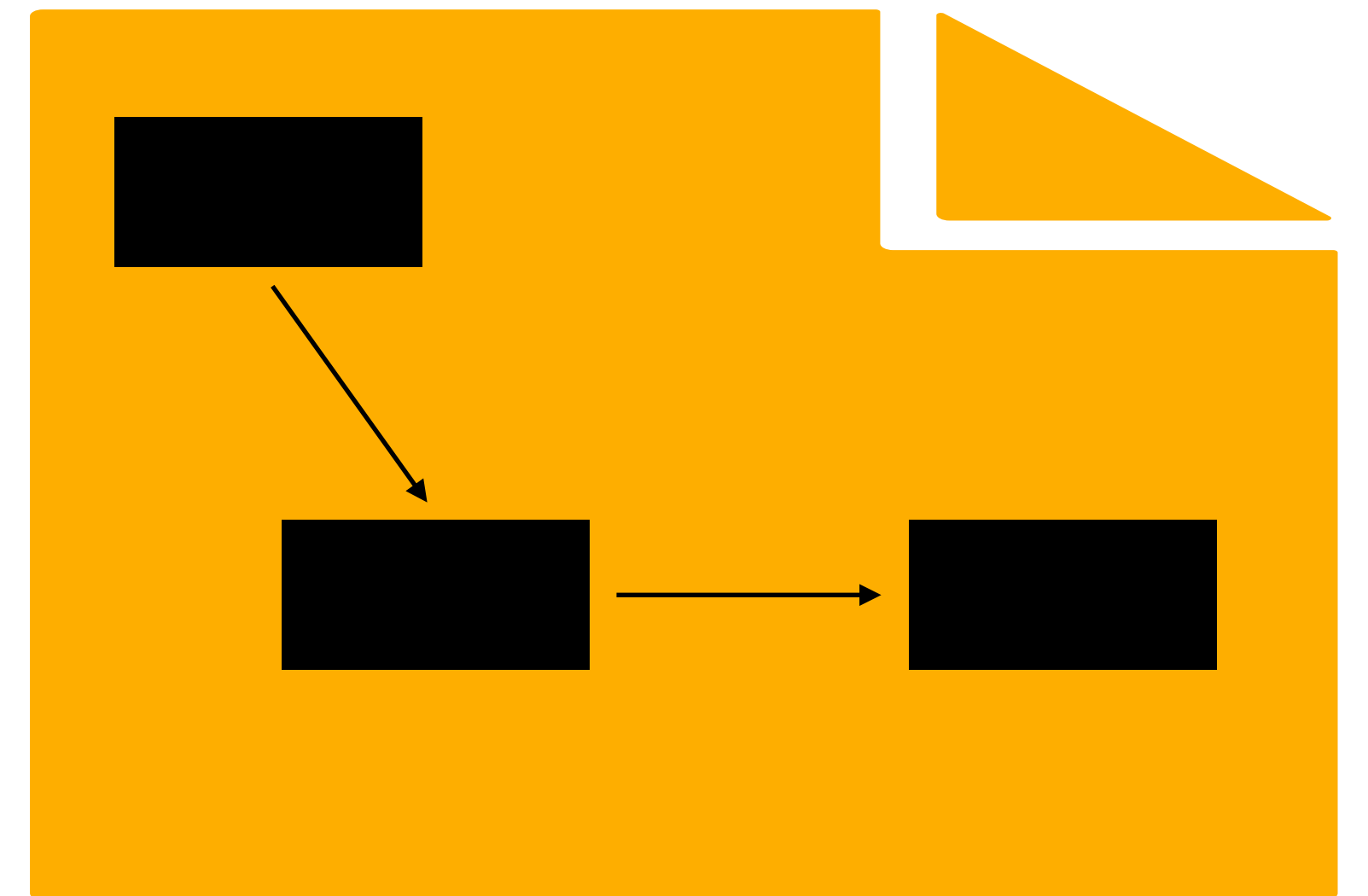
Passes semantic validation

# CALM CLI Visualize


 `npm install -g @finos/calm-cli`

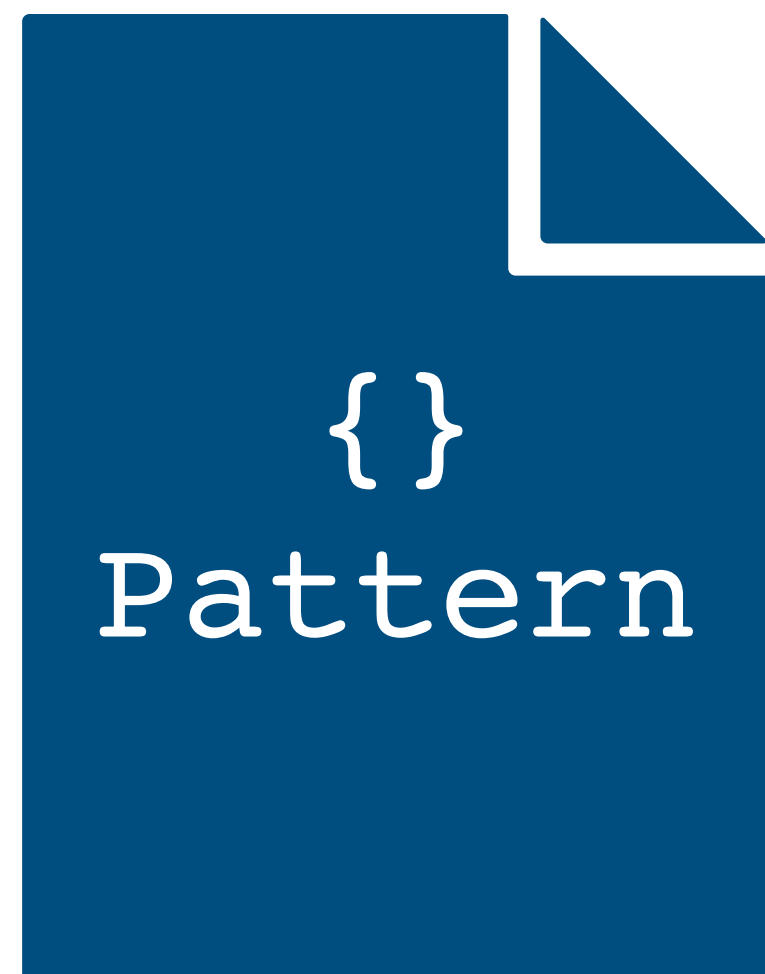


`calm visualize`



# CALM CLI Generate

 `npm install -g @finos/calm-cli`



```
calm generate
```





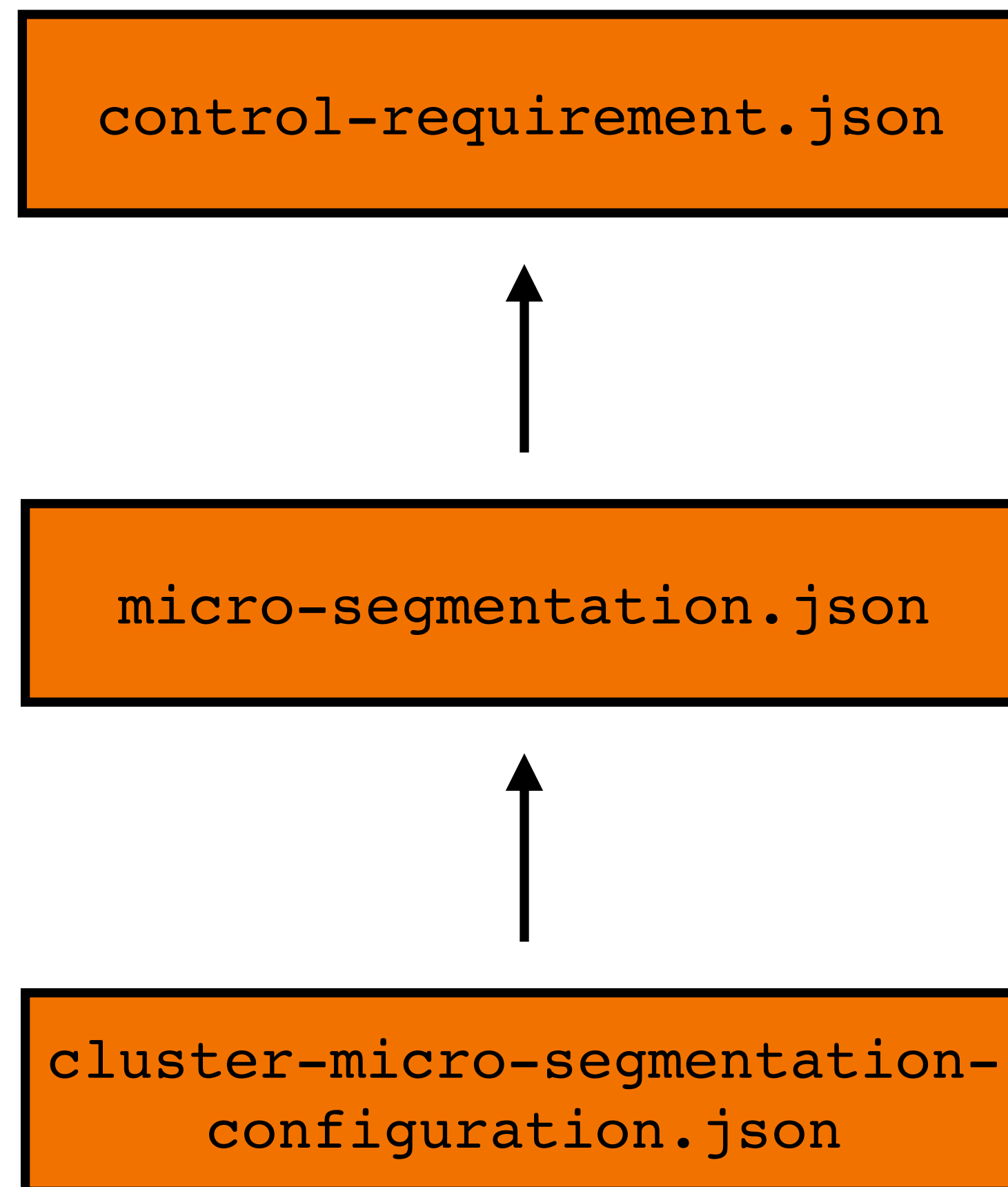
# Architecture Controls

The Power of JSON Schema

# Architecture Controls

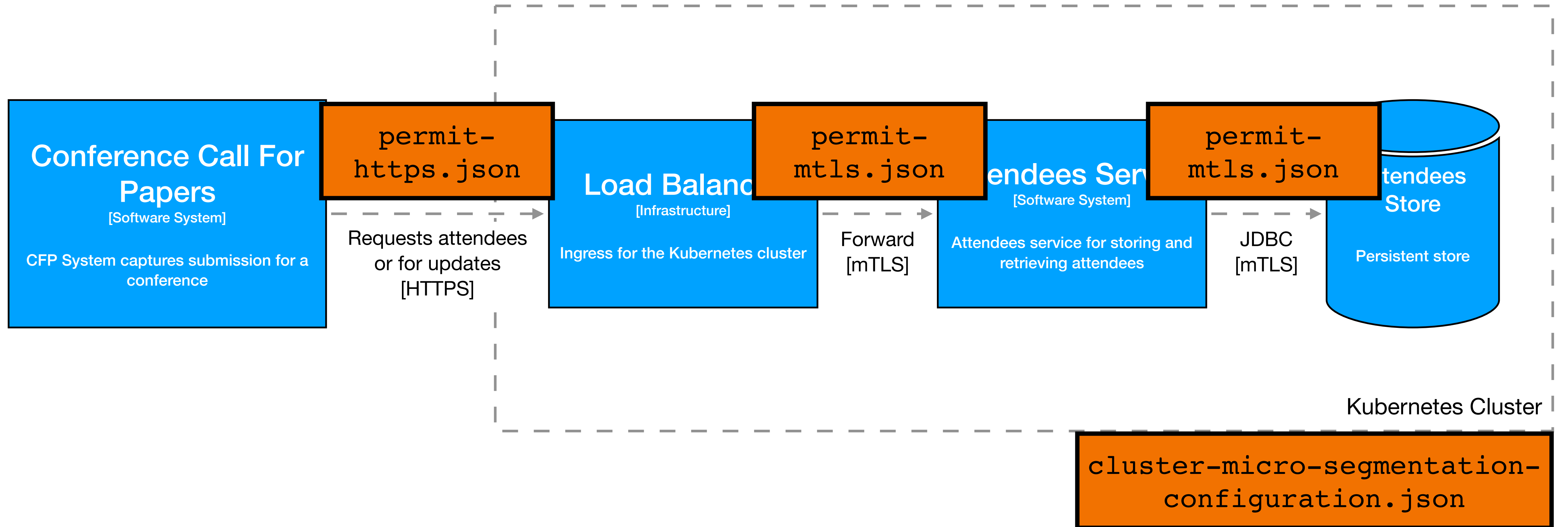
```
"unique-id": "secure-k8s-cluster",
"node-type": "system",
"name": "Secure Kubernetes Cluster",
"description": "Secure Kubernetes cluster with network micro-segmentation applied",
"interfaces": [],
"controls": {
  "security": {
    "description": "The cluster conforms to micro-segmentation control requirements",
    "requirements": [
      {
        "control-requirement-url": "https://short-url/micro-segmentation.json",
        "control-config-url": "https://short-url/cluster-micro-segmentation.json"
      }
    ]
  }
}
```

# Structure of Controls

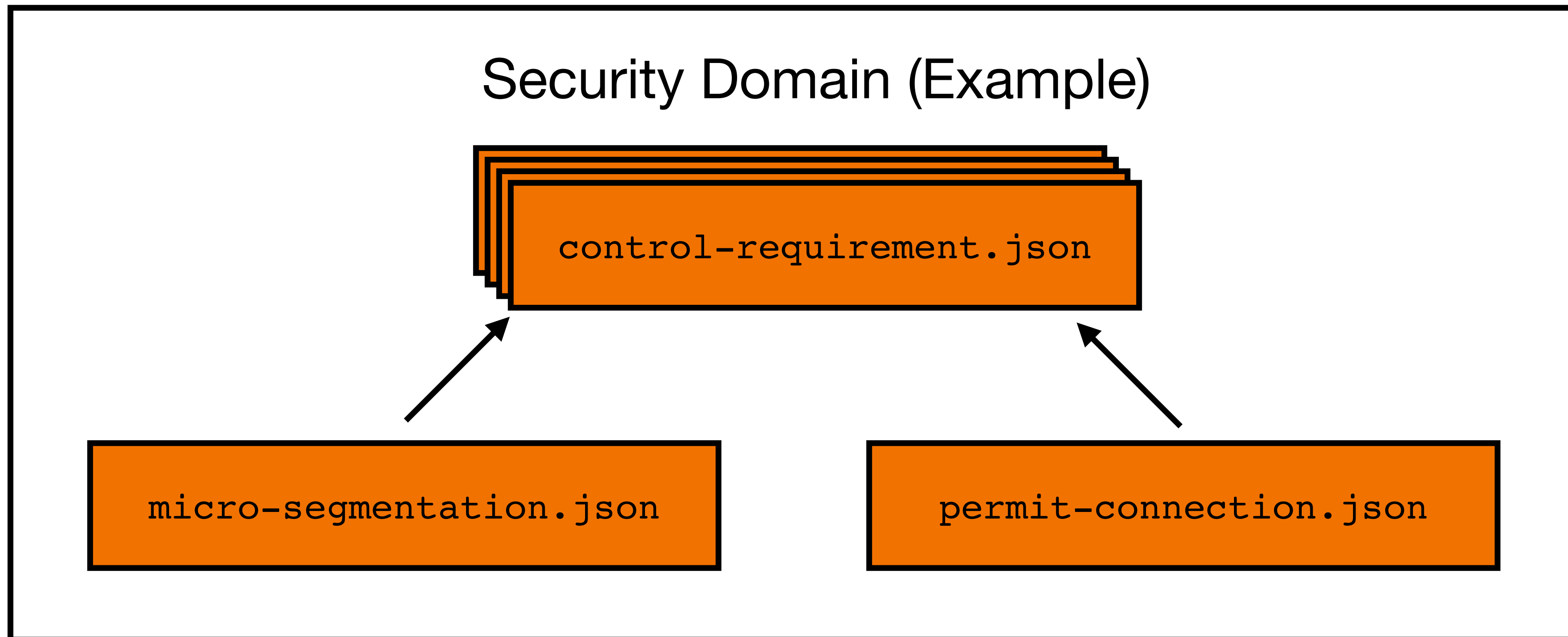


- Basis for all control requirements
  - Must have a **control-id**, **name**, and **description**
- Define the requirement and additional properties
  - Must have a *permit-egress* and *permit-ingress*
- Set the configuration for meeting the requirement

# Application of Controls



# Domains: Control Bundles



Resiliency

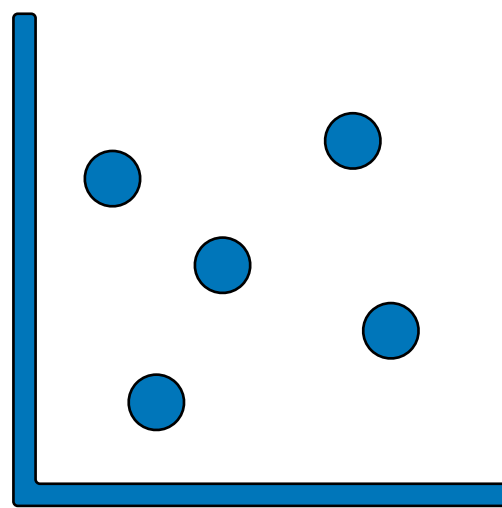
API

Observability

# Building an Observability Domain

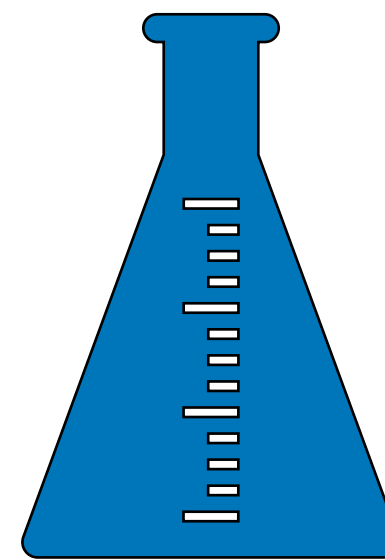
# Building an Observability Domain

`metrics.json`



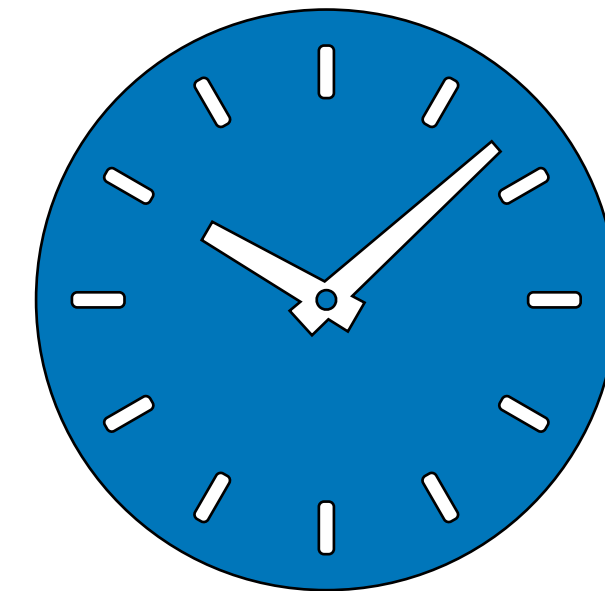
Type

`logs.json`



Units

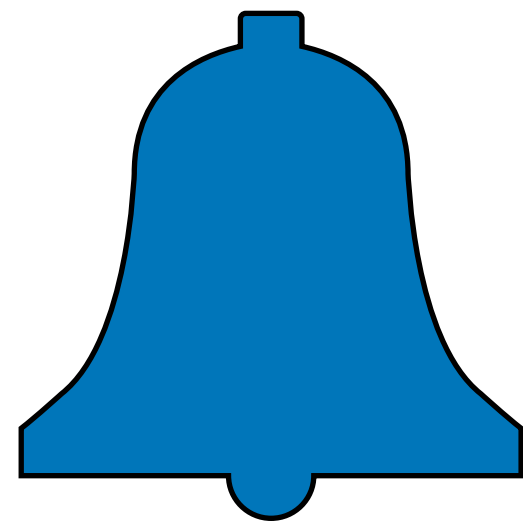
`traces.json`



Collection Frequency

# Building an Observability Domain

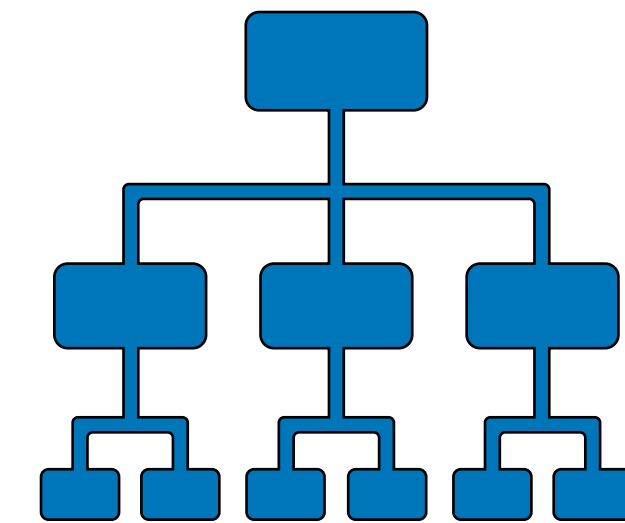
`metrics.json`



Alerts



Retention Period



Dimensions



# Building an Observability Domain

```
{
  "$schema": "https://example.com/metrics-base-schema.json",
  "$id": "https://example.com/calico-blocked-traffic-metric.json",
  "description": "Traffic paths blocked by Calico network",
  "control-id": "calico-blocked-traffic-001",
  "name": "Calico Blocked Traffic",
  "metric-type": "counter",
  "unit": "requests",
  "collection-interval": "1m",
  "thresholds": {
    "warning": 10,
    "critical": 50
  },
  "aggregation": "sum",
  "retention": "7d",
  "source": "Prometheus",
  "path": "https://metrics.example.com/calico/blocked-traffic",
}
```

# Summary

- Core model is moving to v1 early next year
- Tooling is under constant development
- Visualisation improvements
- VSCode Plugin for viewing and later editing
- CALM Hub - A store for Patterns, Architectures and Controls
- Contributing back to the JSON Schema Community

# Work with us

<https://www.finos.org/>

<https://github.com/finos/architecture-as-code>

