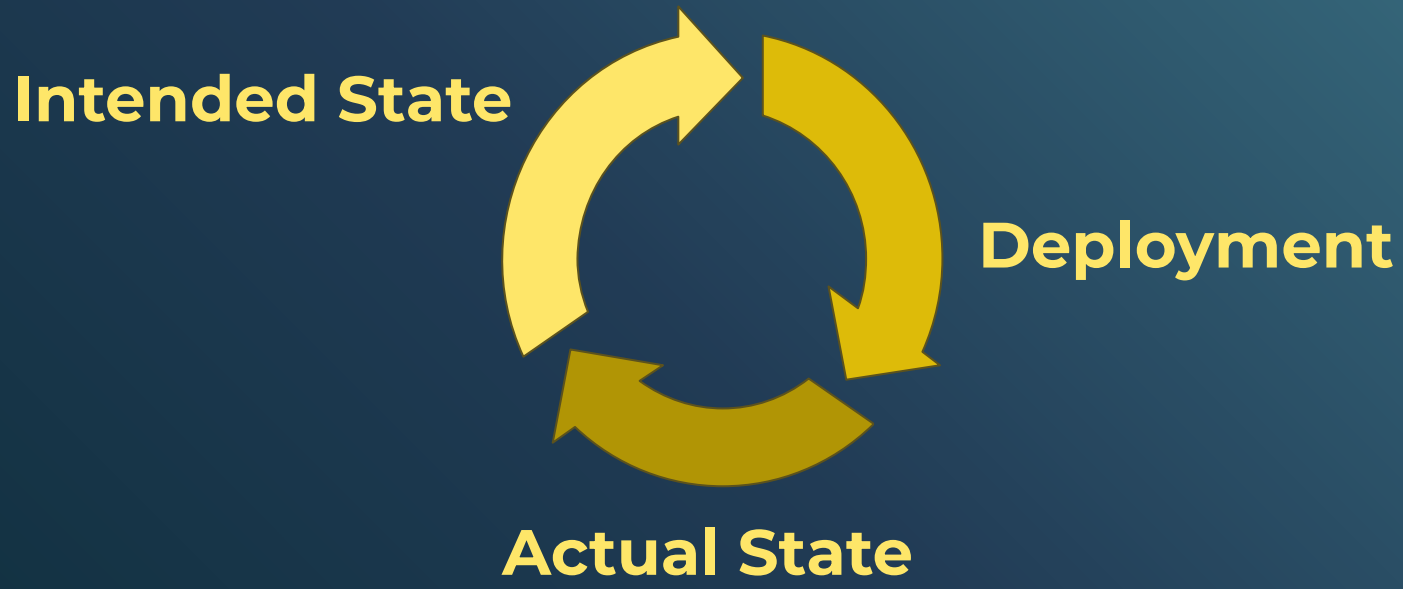
Design-Driven Automation

Obligatory Backstory

Pete Crocker
Currently @ OpsMill

- Network engineer @ large SP in the mid-90s
- Decommissioned AGS+ Serial No #3
- 2014 - DevOps sink or swim

Source of Truth?



Infrastructure Building Lifecycle

Design

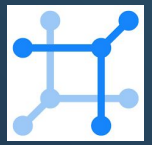
Mermaid.js

Design Documents

Diagrams & Wording

HLD

Build



Convert Design to Implementation

Configure, Allocate

LLD

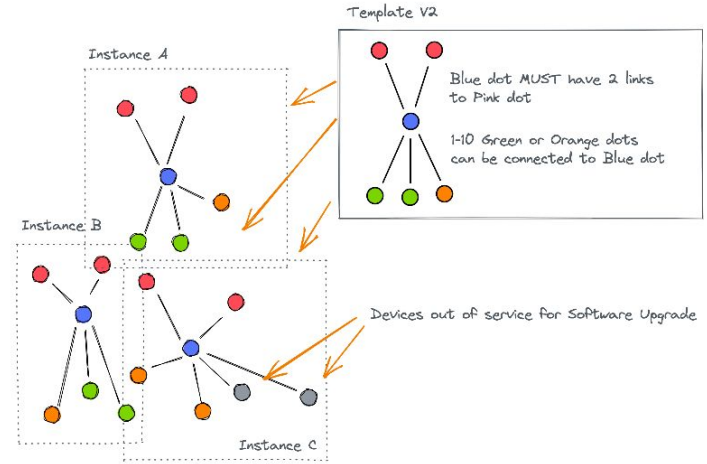
Operate

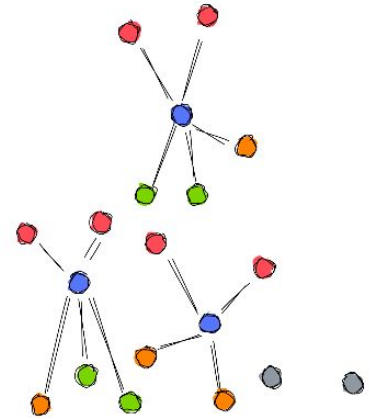
Operate, keep the lights on

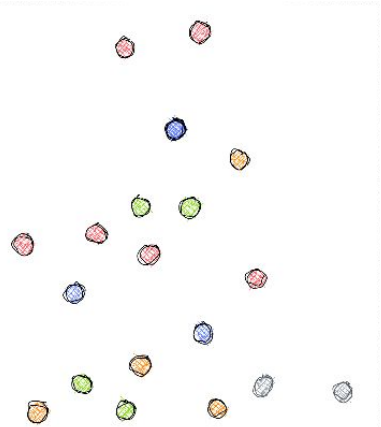
Troubleshoot

Critical Design Context is lost in the process

Design → **Build** → **Operate**





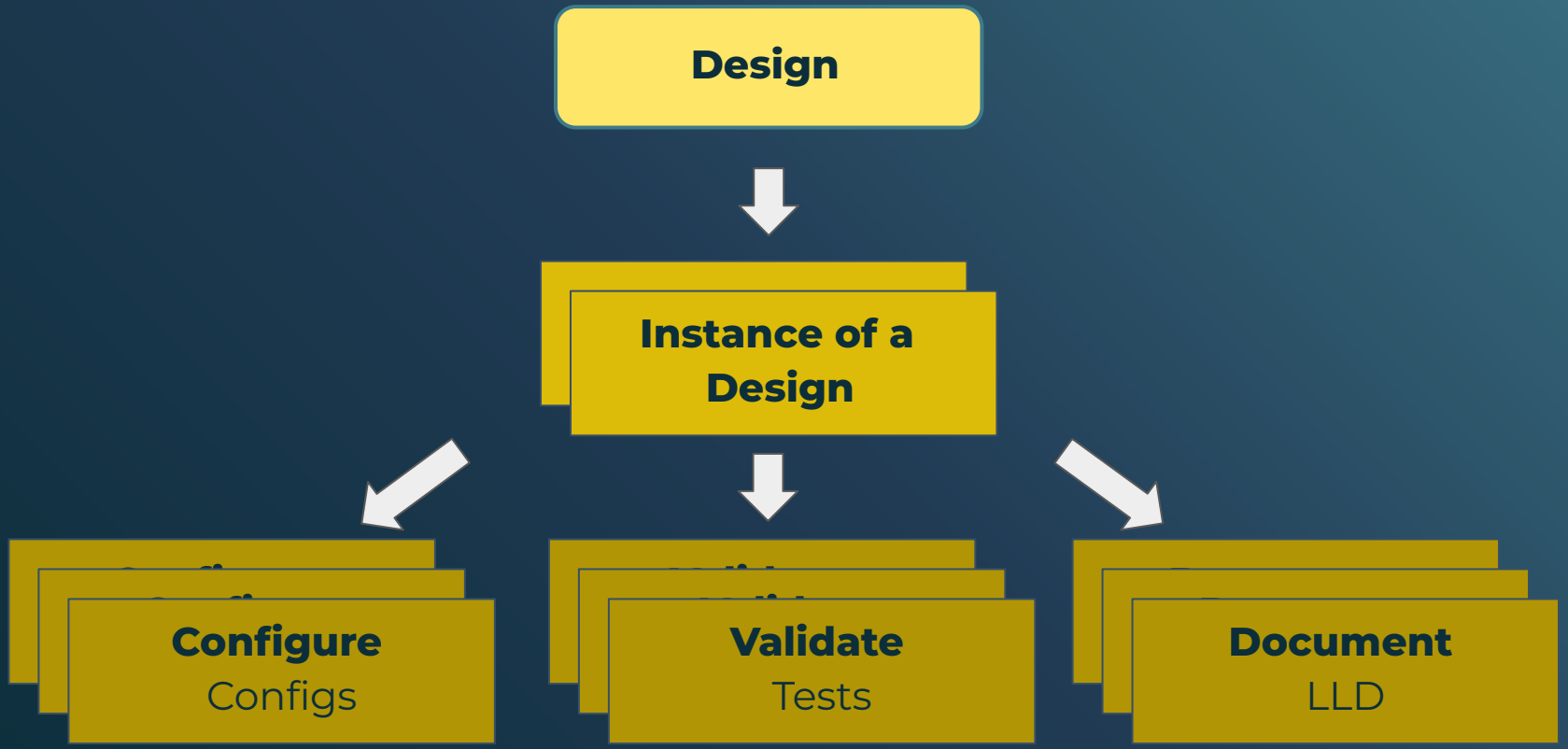


Design Documents

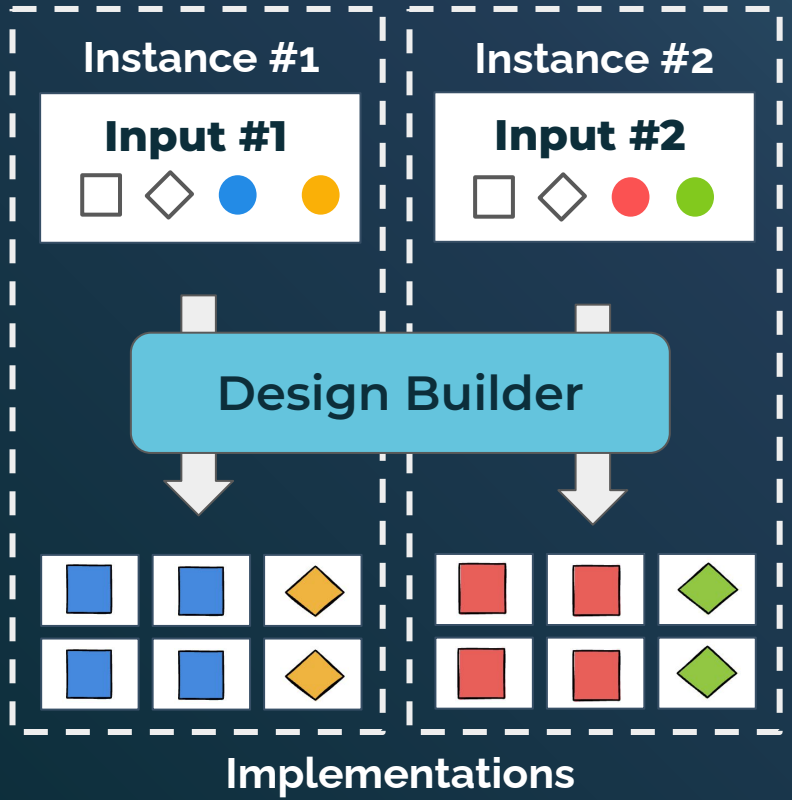
Convert Design to Implementation

Operate, keep the lights on

Design Driven Automation



From Design to Implementation



- The design is usually implemented in code or with a DSL (Design Builder)
- Each instance is defined by specific inputs

Resources & Examples of Design Driven Automation

Jeremy Schulman

Design Driven Network Assurance

Implemented at MLB

Presentations
Autocon0
NANOG88

ARISTA

AVD : Arista Validated Design

Infrastructure as Code

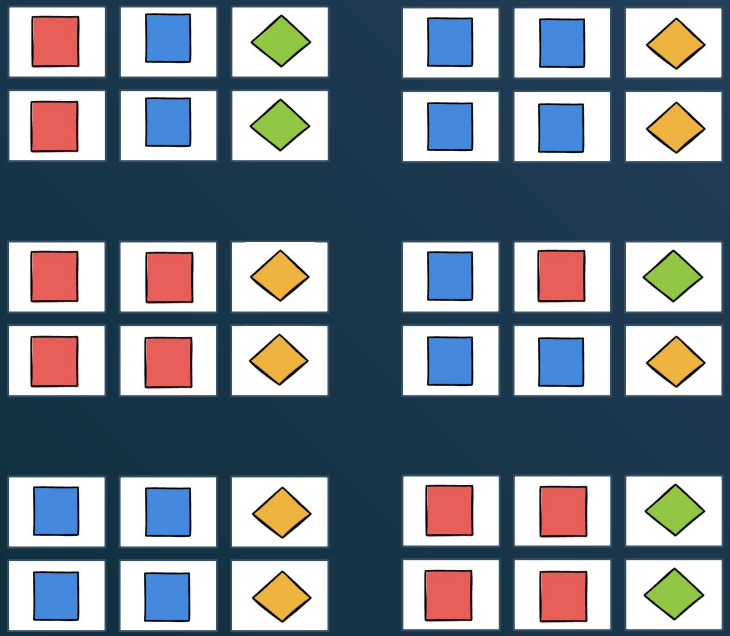
https://avd.sh/

Google

MALT : Multi Abstraction Layer Topology

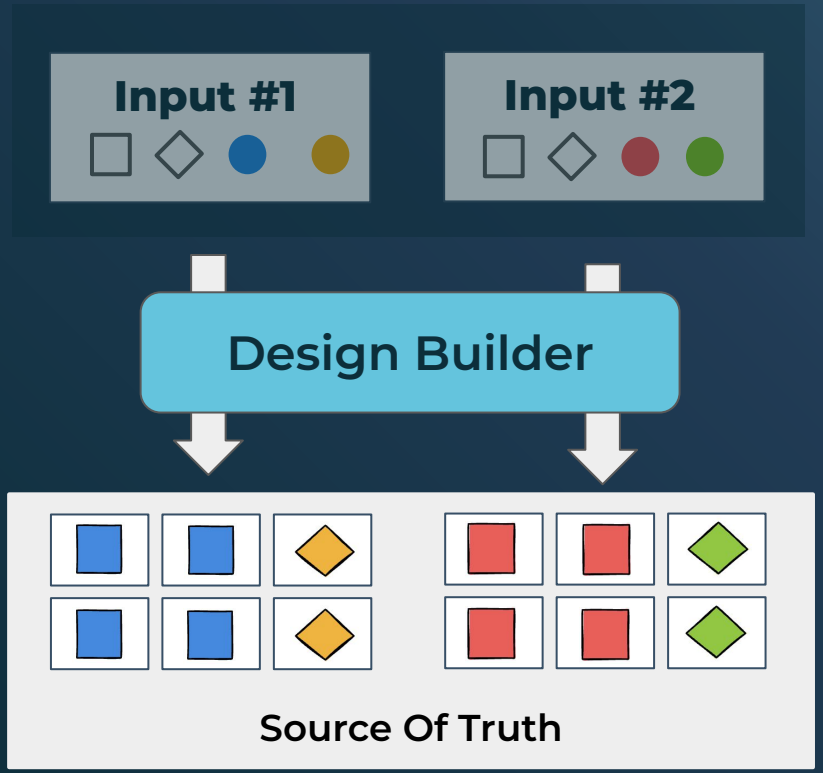
Paper & Presentations
NSDI 2020
NANOG80

Common Challenges



- How to update the implementations when a design evolve ?
- How to identify Drift from the Design ?
- How to store the information about each implementation ?

Only the implementation is stored

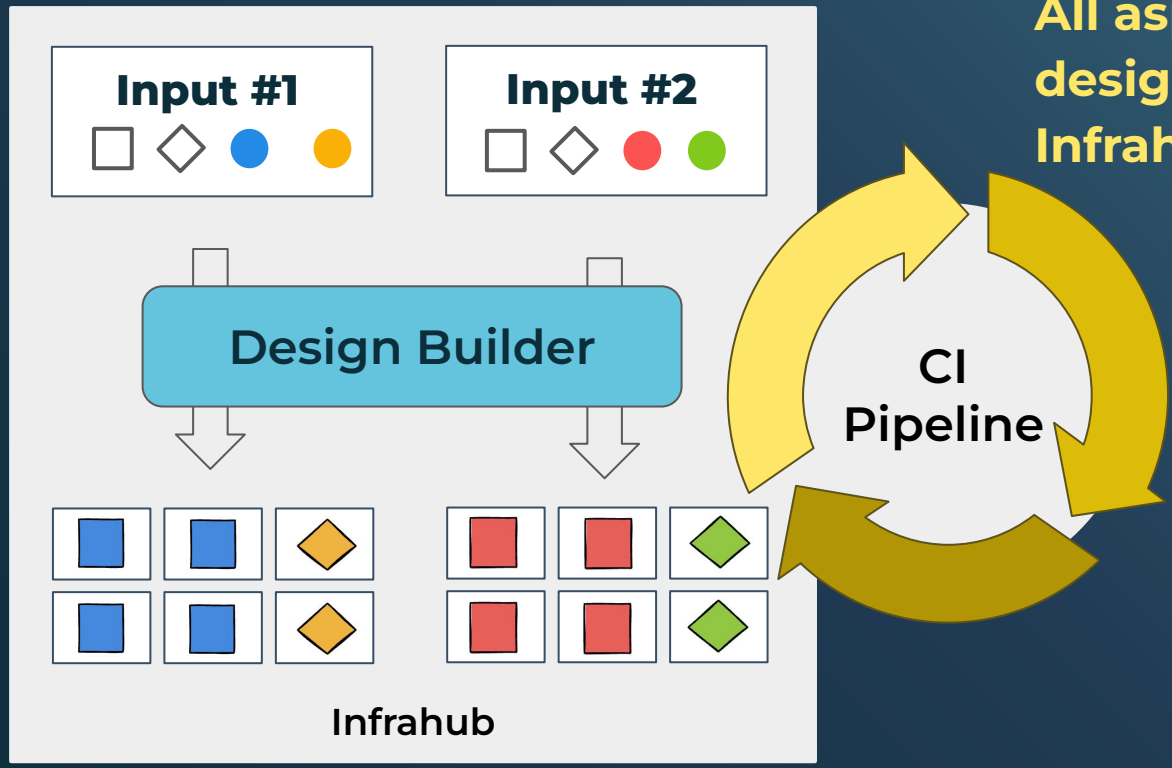


Lost, not Stored

Stored in Git

Stored in the Source of Truth

Infrahub's approach



All aspects of the design are stored in Infrahub

Design builds are idempotent

Implementations are continuous validated based on the Input and the Design

Introducing Infrahub

A centralized hub for infrastructure automation

Extensible Data Model

Graph Database

Versioning

GitOps Built In

Native CI

Validation Pipeline & Peer Review

Smart Integrations

Abstracted Transformations

Use Case - VPN Service

Design → **Build** → **Operate**

Service Catalog →

Objects:

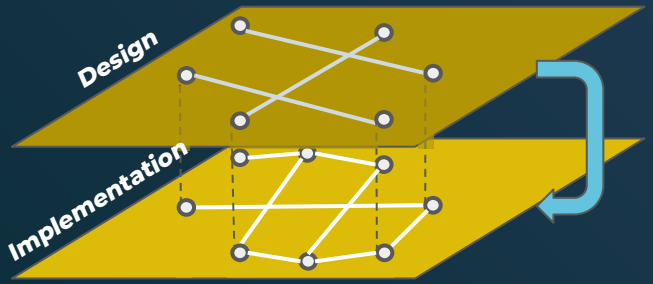
- VPN Service
- Protocols
- Interfaces

→

Vendor-Specific Configs

Validations

Documentation



Demo

Thank You

How to spark joy with Infrahub

Open Source on GitHub

Coming in 2024

Cloud SaaS

Enterprise

Getting Started

Installation

Github Codespaces
Docker-Compose
K8s Helm Chart

Data Ingestion

Native integrations
with Netbox
& Nautobot

Development

Python SDK
GraphQL

Core Architecture