

# Model-Driven DevOps

Increasing agility and security in your physical network through DevOps





STEVEN CARTER | JASON KING

with MIKE YOUNKERS and JOSH LOTHIAN

### **Model-Driven DevOps**

## Model-Driven DevOps: Increasing agility and security in your physical network through DevOps

#### **Table of Contents**

Cover

Half Title

Title Page

Copyright Page

Dedication

**Table of Contents** 

Chapter 1: A Lightbulb Goes Off

Enterprise IT as a Source of Risk to the Business

Observations of a Train Wreck

DevOps Seems Like a Better Way

What Is DevOps?

Automation

Infrastructure as Code

CI/CD

Apps vs. Infrastructure

Harnessing Automation-at-Scale

Why Are Enterprise IT Departments Not Adopting DevOps?

**Human Factors** 

**Business Factors** 

Summary

Chapter 2: A Better Way



The Goal: Business Transformation

Constraints-Based IT

**Business Transformation** 

DevOps in Action

Why Model-Driven DevOps?

Network Infrastructure Is Different

What Is Model-Driven DevOps?

What Is a Data Model?

Source of Truth

DevOps as a Framework

DevSecOps: Baked-In Security

Summary

Chapter 3: Consumable Infrastructure

**APIs** 

Why API over CLI?

**Platforms** 

Physical Hardware Provisioning

Consolidated Control Point

Northbound vs. Southbound APIs

API and Feature Normalization

Fabricwide Services

Scalability

Summary

Chapter 4: Infrastructure as Code

Why Infrastructure as Code?

Source of Truth

Data Models

Common IaC Tools



Organization

Types of Source of Truth

Code

Data Flow

Summary

#### Chapter 5: Continuous Integration/Continuous Deployment

CI/CD Overview

Applications vs. Infrastructure

CI/CD in Action

#### Source Code Management

Core Features

Collaboration Features

**SCM Summary** 

#### Continuous Integration Tools

CI Engines

How They Work

Sample Workflow

#### Infrastructure Simulation Tools

Cisco Modeling Labs

#### Test and Validation

Linting

Schema/Model Validation

**Functional Testing** 

Test and Validation Summary

Continuous Deployment

Continuous Monitoring

Summary

Chapter 6: Implementation



Model-Driven DevOps Reference Implementation

The Goal

DevOps Roadmap

Architecture

Network as an Application

Consistency

Simulation

Automation

Creating a Source of Truth

Moving Data

MDD Source of Truth

**Automation Tooling** 

MDD Data

**Automation Runner** 

Cisco Network Services Orchestrator

#### Testing

Linting

Snapshotting the Test Network

Data Validation and State Checking

**Data Validation** 

Pushing Data to the Devices

State Checking

Restore

Continuous Integration Workflow Summary

#### Deployment

Scale

Starting Workflows

Summary

Chapter 7: Human Factors



Culture and the Need for Change

Start with the Why

Organization

Leadership

Role Models

Building a Team

Break Down the Silos

Community

**New Tools** 

Summary of Organization-Level Changes

#### Individual

Programming vs. Automation

**Version Control Tools** 

**Data Formats** 

**APIs** 

Templating

Linux/UNIX

Wait! Where Do I Fit In?

Summary

Index

