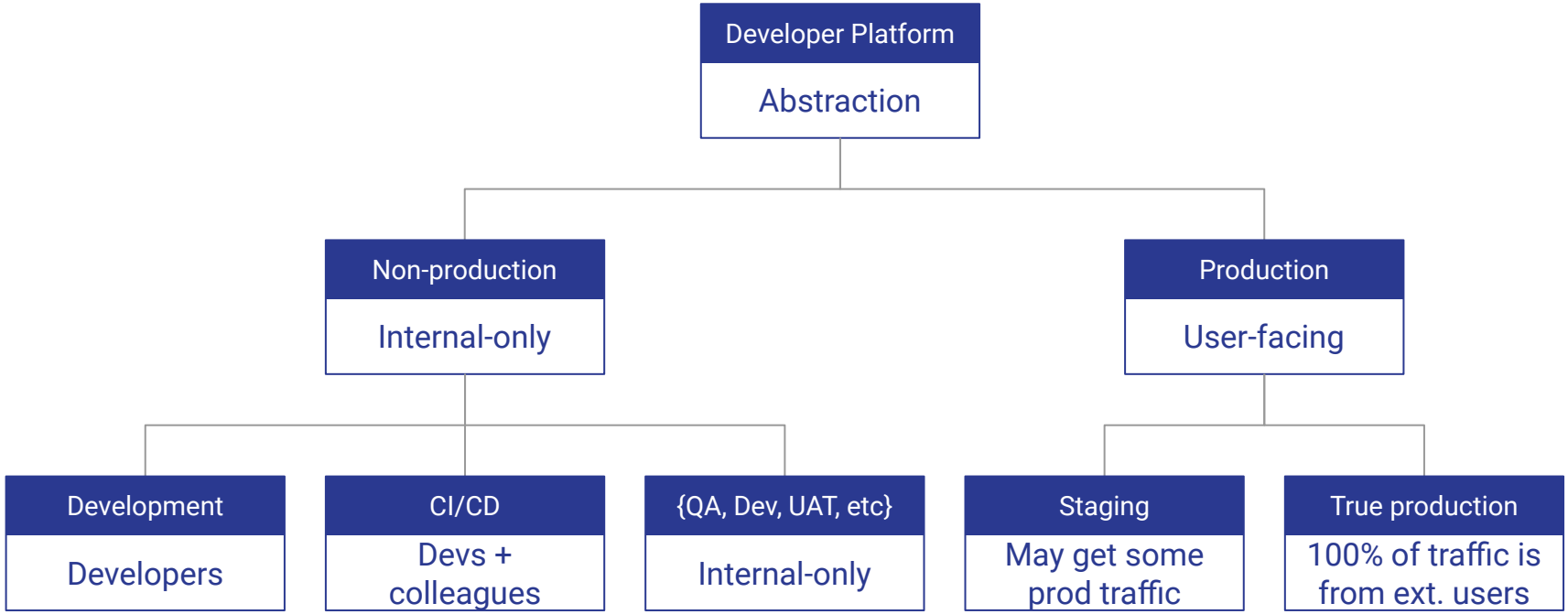
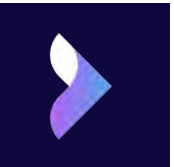
Declarative everything: a GitOps/automation-based approach to building efficient developer platforms

Conf42 DevOps 2024

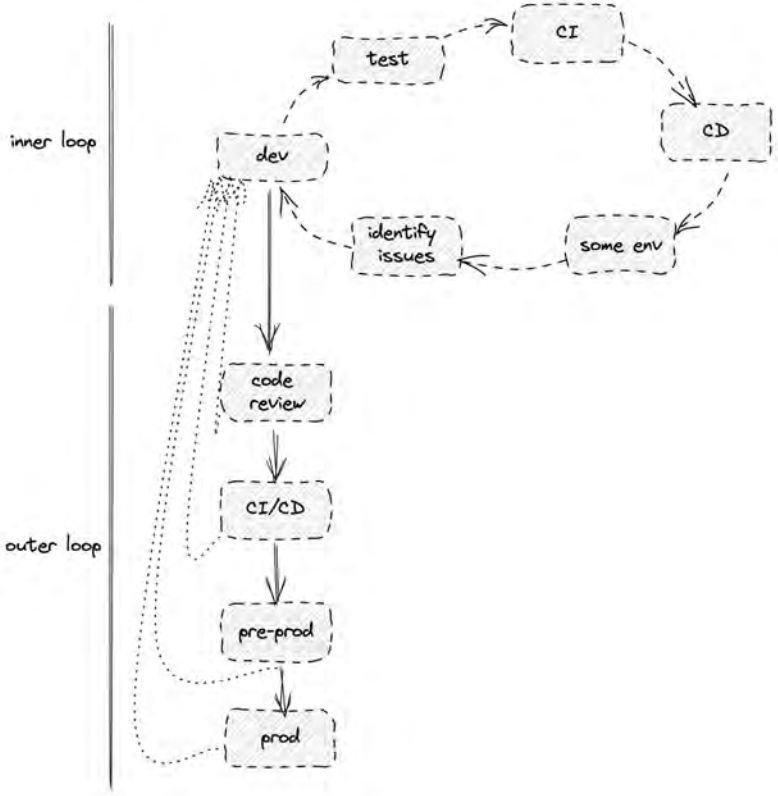
Debo Ray

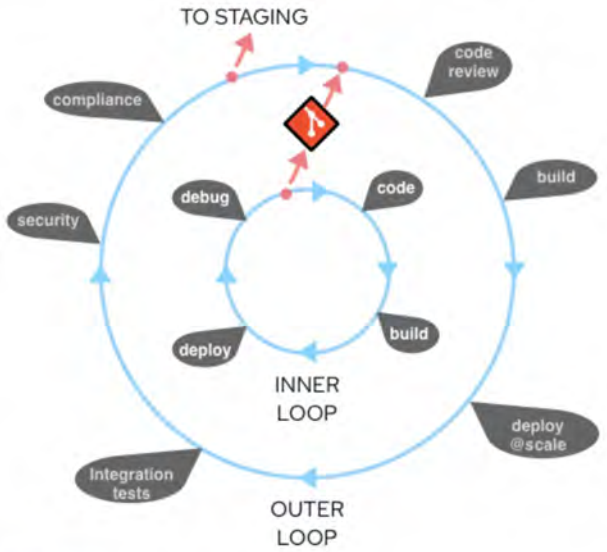
Developer platform coverage



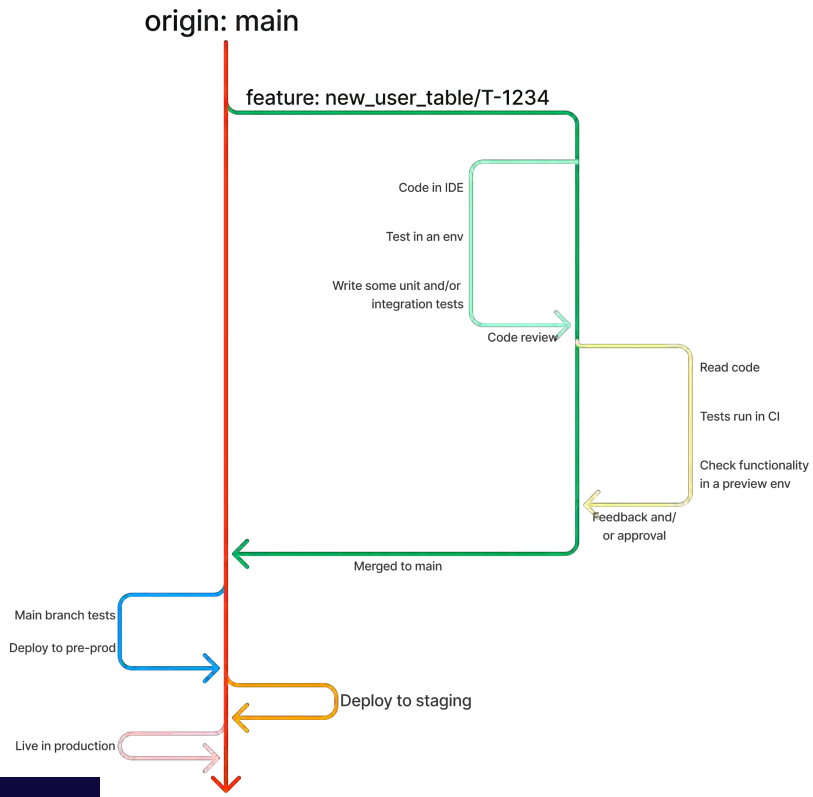


Understanding Developer Workflows

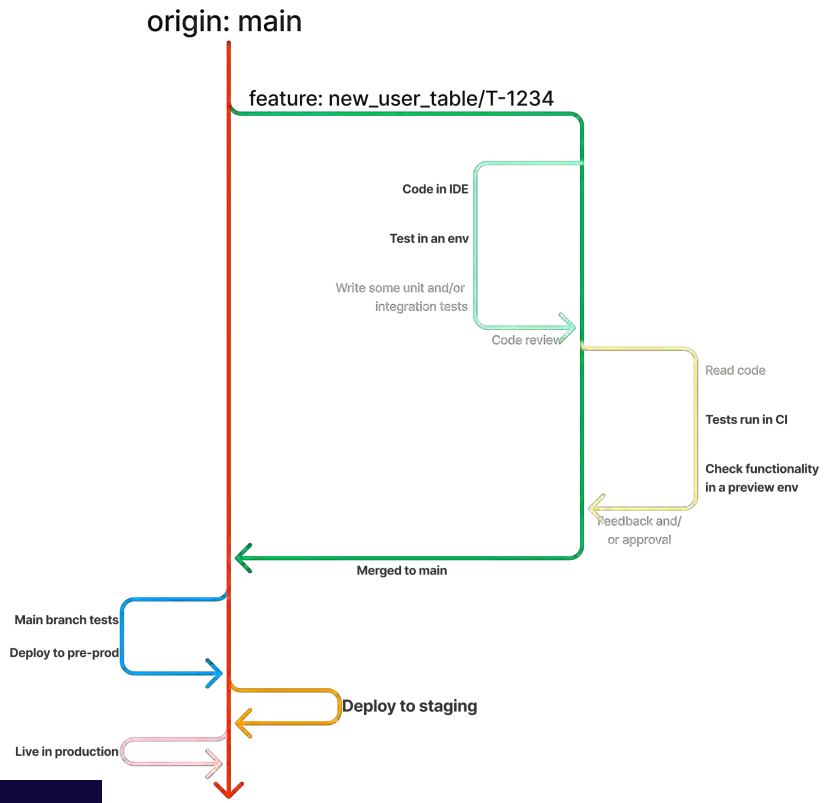




Source: Red Hat

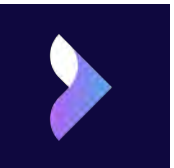


How changes get to production



Where can we benefit from having automation?

GitOps



What: DevOps best practices applied to infrastructure automation (*“golden paths”*)

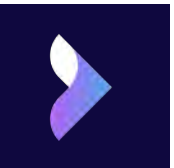
Focus: Automation/standardization improves the dev experience and helps reduces cost

How: Git-based access to consistent/symmetric environments

Why: Continuous integrations leads to faster development and deployment

An Environment

What *exactly* is it?



Application runtime

Relevant {dev, test, ..} data

Access to downstream services

Accessible from upstream services

Accessible to a human

Isolated from production (if not prod)

Source code, build tools (+ IDE)

{Shared, dedicated} tenancy

We need to rethink our general “software verification” strategies

Why does testing exist (emphasis on services, **not** libs/modules)?

Functionality → Interoperability → Confidence

Acceptance criteria

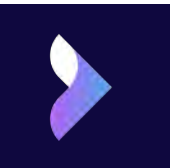
- Is my feature/module meeting product requirements?
- Am I calling downstream APIs per their contracts?

Integrate w/ existing apps/services/patterns

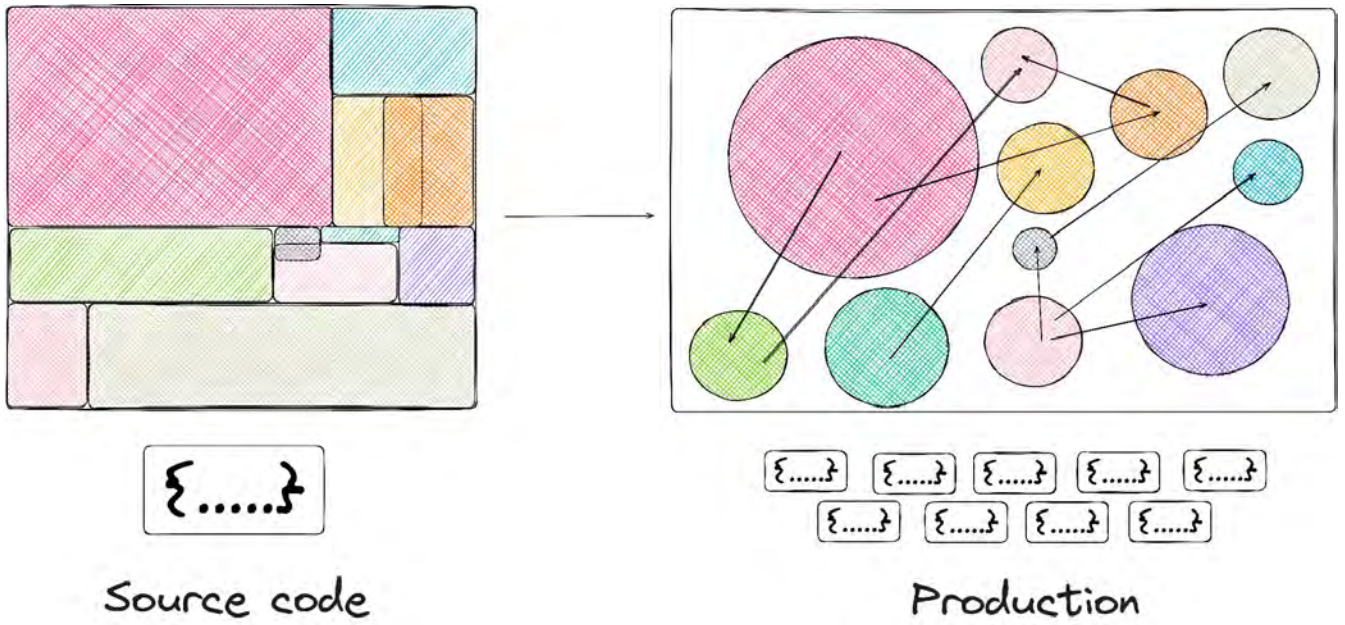
- Although API contracts are met, will these calls actually {return the data, perform the action} I need?
- Are the {latencies, request/response shapes} acceptable?

Reliability in prod

- Will this make future deployments error-prone?
- Is this reducing idempotence?

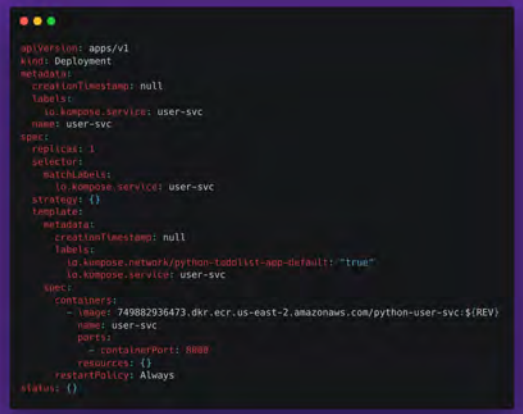


Source code …. Running in production

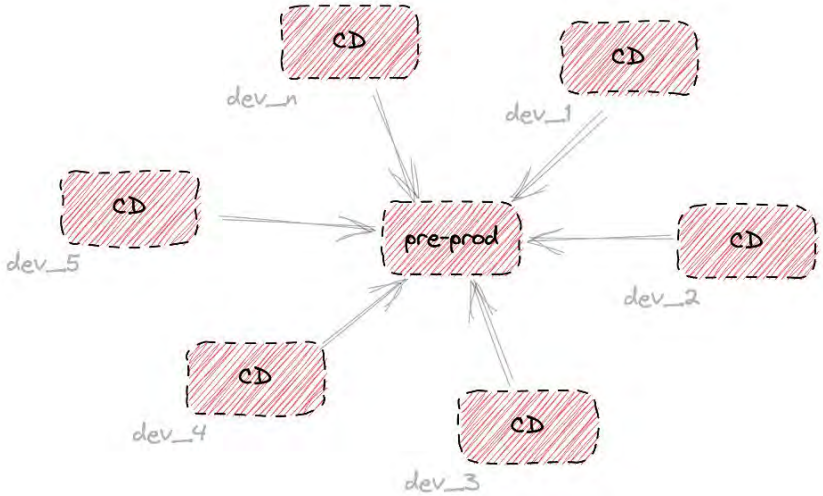


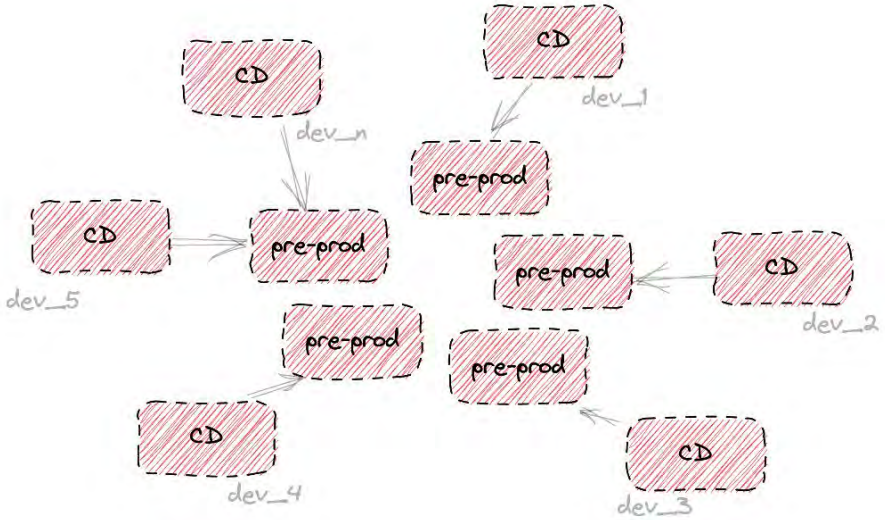
[Production] K8s Deployment YAML, Helm charts etc

```yaml
apiVersion: v1
kind: Service
metadata:
  annotations:
    kompose.cmd: kompose convert -f python-todolist-app/docker-compose.yml
    kompose.version: 1.28.0 (c4137012e)
  creationTimestamp: null
  labels:
    io.kompose.service: app
  name: todolist-app
spec:
  ports:
    - name: "6000"
      port: 6000
      targetPort: 6000
  selector:
    io.kompose.service: todolist-app
status:
  loadBalancer: {}
```



Dev -> Code Review -> CI/CD -> **Pre-Prod** -> Prod

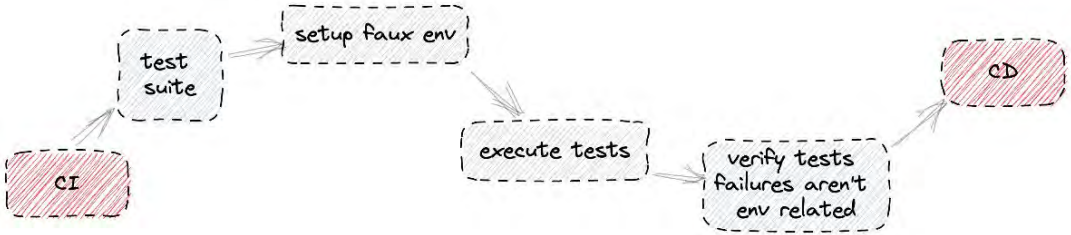


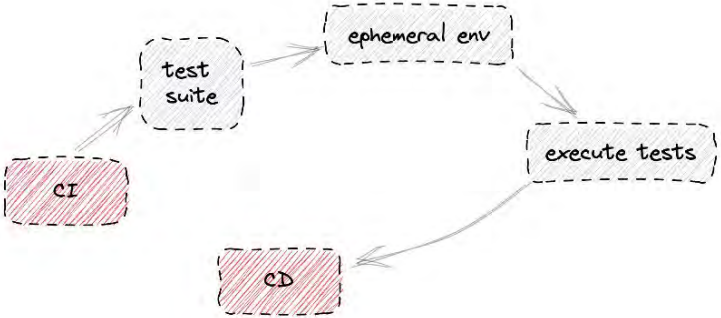


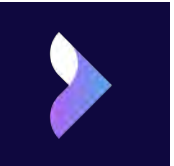
CI might have a flavor of building images, usually not

```yaml
name: Build and Deploy TodoList App
on:
  push:
    branches:
      - main

jobs:
  build-and-deploy:
    runs-on: ubuntu-latest

    steps:
    - name: Checkout code
      uses: actions/checkout@v2

    - name: Set up AWS CLI
      uses: aws-actions/configure-aws-credentials@v1
      with:
        aws-access-key-id: ${{ secrets.AWS_ACCESS_KEY_ID }}
        aws-secret-access-key: ${{ secrets.AWS_SECRET_ACCESS_KEY }}
        aws-region: us-east-1

    - name: Login to Amazon ECR
      uses: aws-actions/amazon-ecr-login@v1

    - name: Build and Push Docker Image
      run: |
        docker build -t your-ecr-repo-uri:latest .
        docker push your-ecr-repo-uri:latest

    - name: Deploy to Kubernetes
      run: |
        aws eks --region us-east-1 update-kubeconfig --name your-eks-cluster

        kubectl apply -f path/to/kubernetes/deployment.yaml
        kubectl apply -f path/to/kubernetes/service.yaml
```

Dev -> Code Review -> **CI/CD** -> Pre-Prod -> Prod







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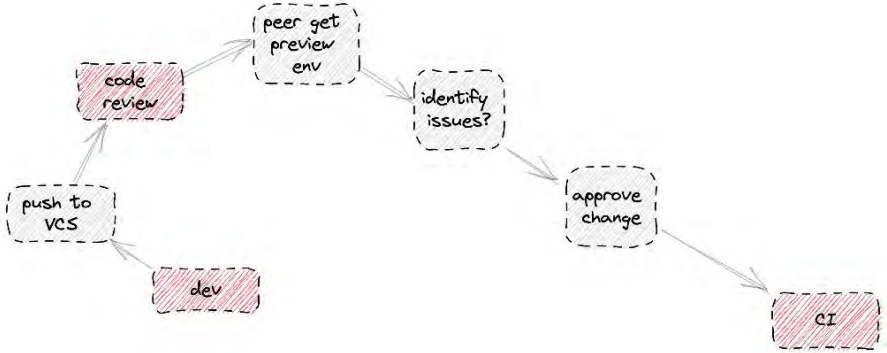
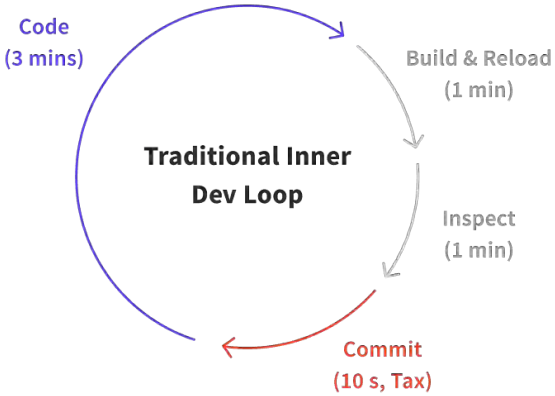


Dev (and CI) usually resorts to docke

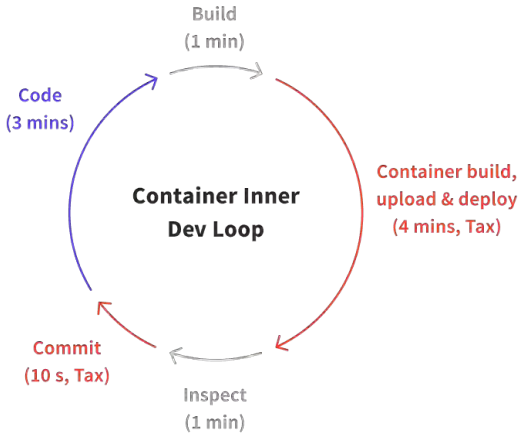
```yaml
version: "2"
services:
  todolist-backend:
    build: ./app
    links:
      - db
      - user-svc
    ports:
      - "6000:6000"
    environment:
      USER_SVC_HOSTPORT: http://user-svc:8000
  db:
    image: mysql:5.7.28
    ports:
      - "32000:3306"
    environment:
      MYSQL_ROOT_PASSWORD: root
    volumes:
      - ./db:/docker-entrypoint-initdb.d/:ro
  user-svc:
    build: ../python-user-svc/app
    links:
      - db
    ports:
      - "8000:8000"
  todolist-web:
    build: ../web-client
    links:
      - user-svc
      - todolist-backend
    environment:
      USER_SVC_HOSTPORT: http://user-svc:8000
      TODOLIST_APP_SVC_HOSTPORT: http://todolist-app:6000
    ports:
      - "8088:8080"
```

```yaml
version: "2"
services:
  app:
    build: ./app
    links:
      - db
    ports:
      - "8000:8000"
  db:
    image: mysql:5.7.28
    ports:
      - "32000:3306"
    environment:
      MYSQL_ROOT_PASSWORD: root
    volumes:
      - ./db:/docker-entrypoint-initdb.d/:ro
```

Deep-dive: Inner-loop of SDLC



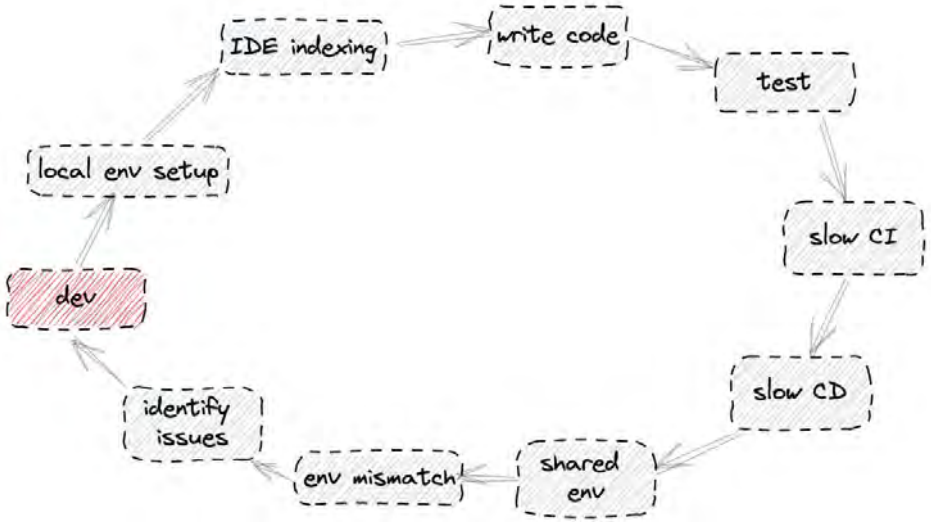
~5 mins

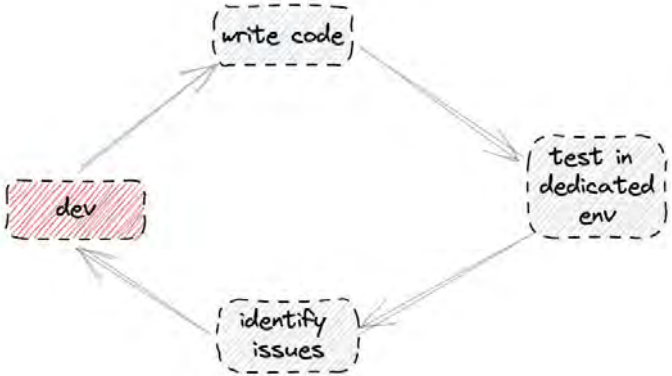


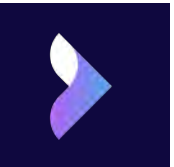
~9 mins

+45%

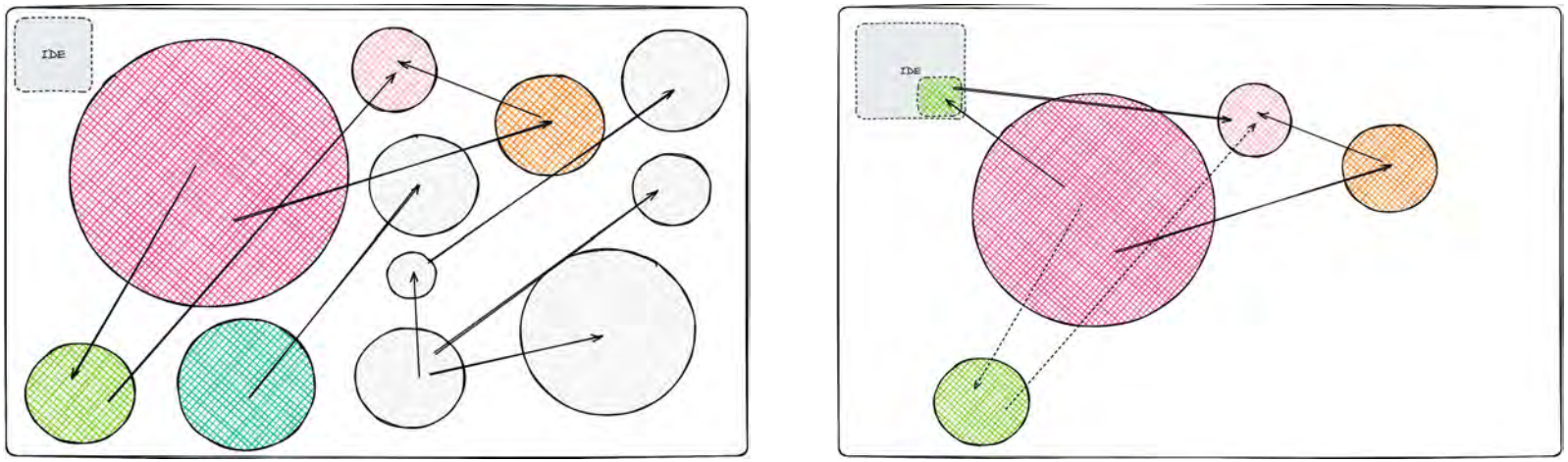
Dev -> Code Review -> CI/CD -> Pre-Prod -> Prod



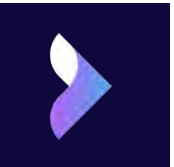




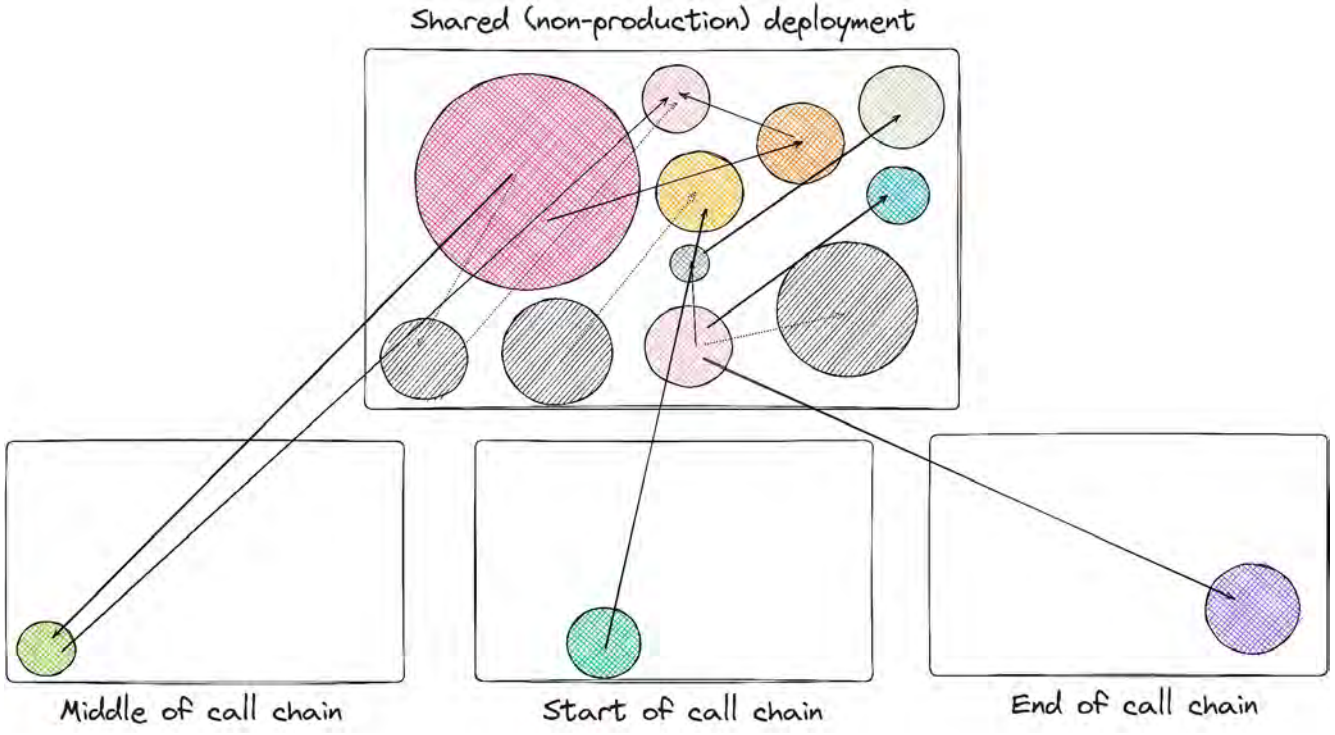
Development purposes (“local dev”, IDE etc)

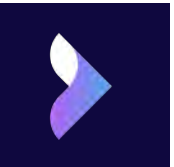


When service dependencies are somewhat isolated



Testing purposes (“local dev”, CI, etc)



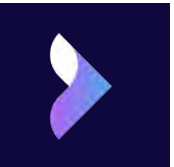


Takeaways

Focus: Issues are always easier to fix when caught before production

How: Easier access to production-symmetric environments

Why: Remove drift between SDLC stages w/ better dev ergonomics



3-up Context Slide

Company

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Context

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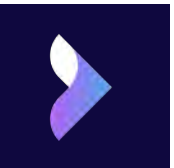
- Duis aute irure dolor in reprehenderit in voluptate velit

Problem statement

Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.



3-up Flow Slide

Challenge 1

Expand audience

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Challenge 2

Up 30-day actives

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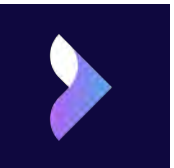
- Duis aute irure dolor in reprehenderit in voluptate velit

Challenge 3

Increase conversion

Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.



Thing

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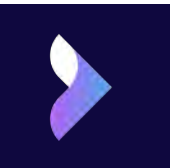

Big Thought/Idea

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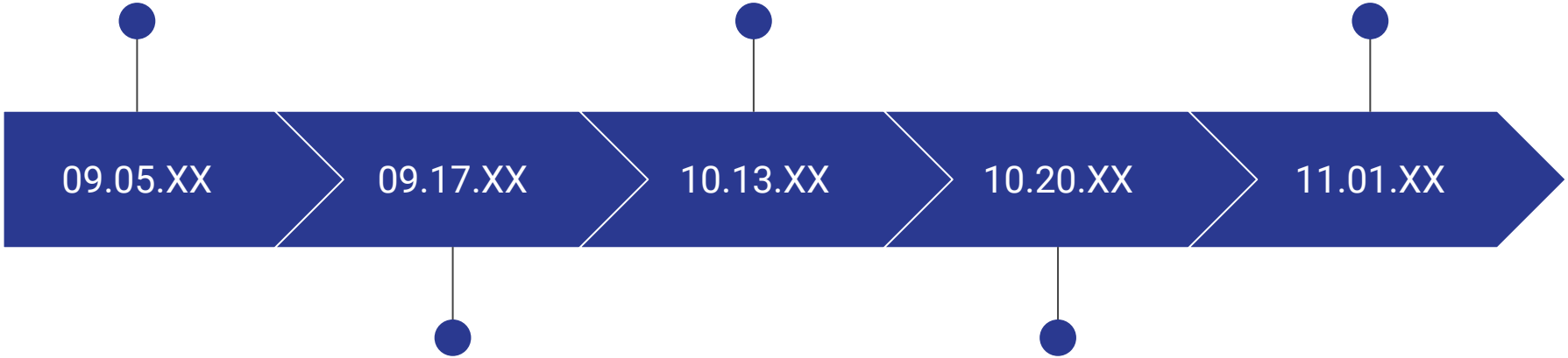

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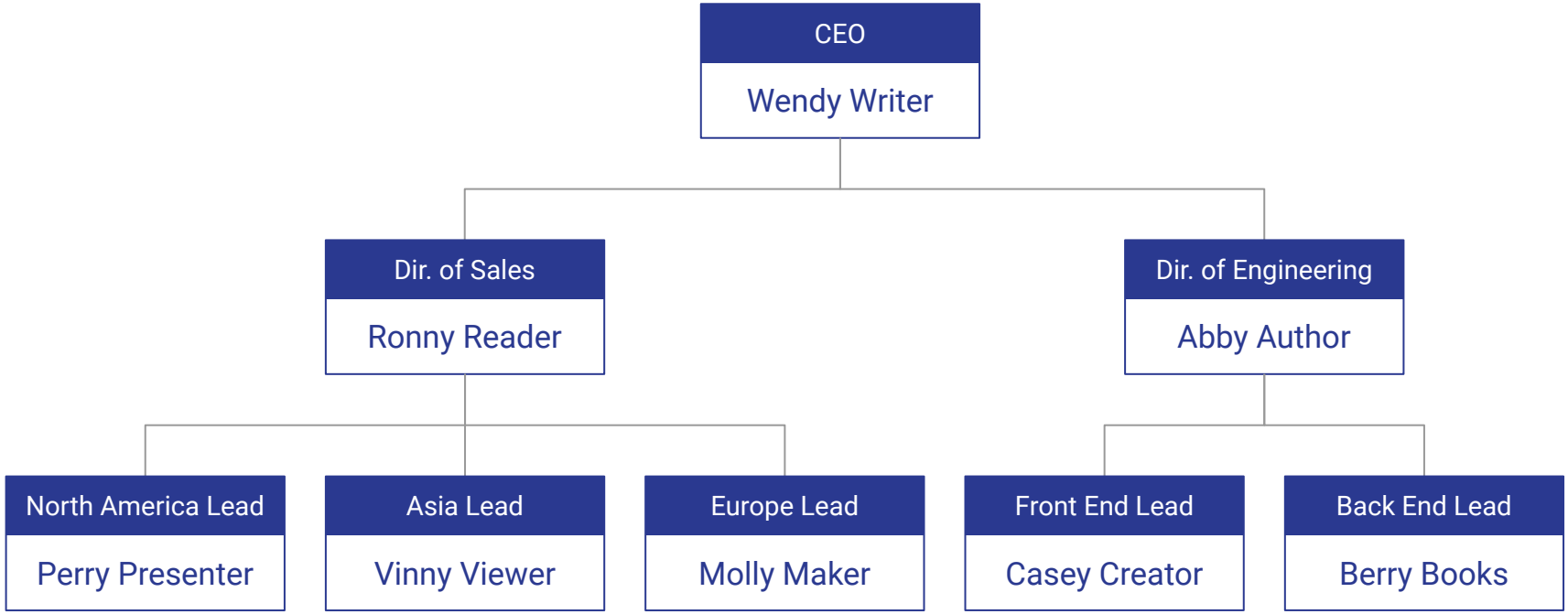
A tree of people



Impact

XX% sales increase