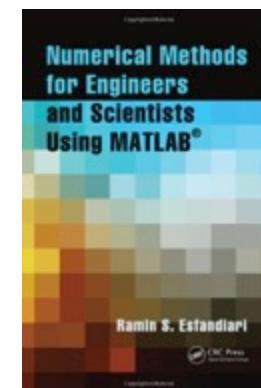
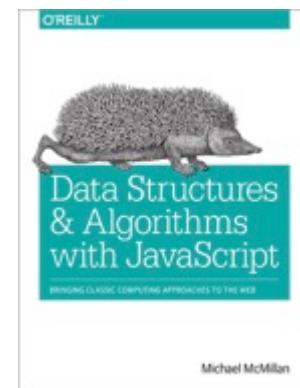
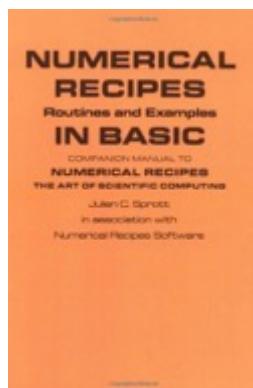
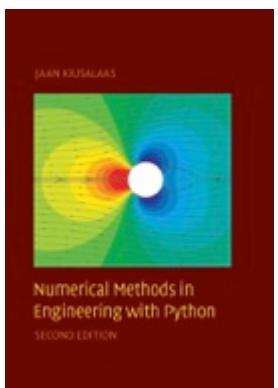
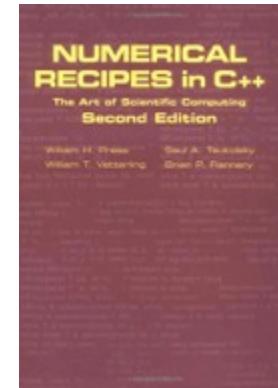
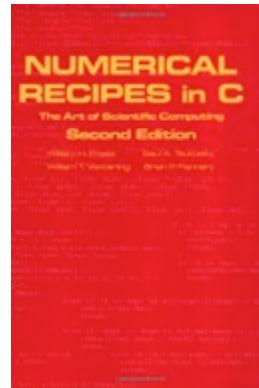
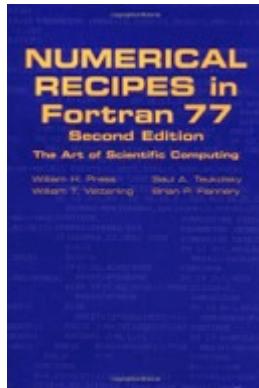
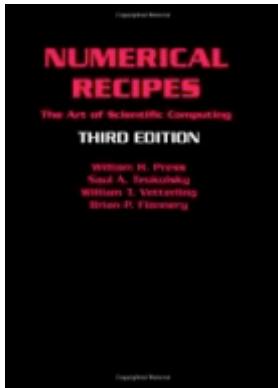


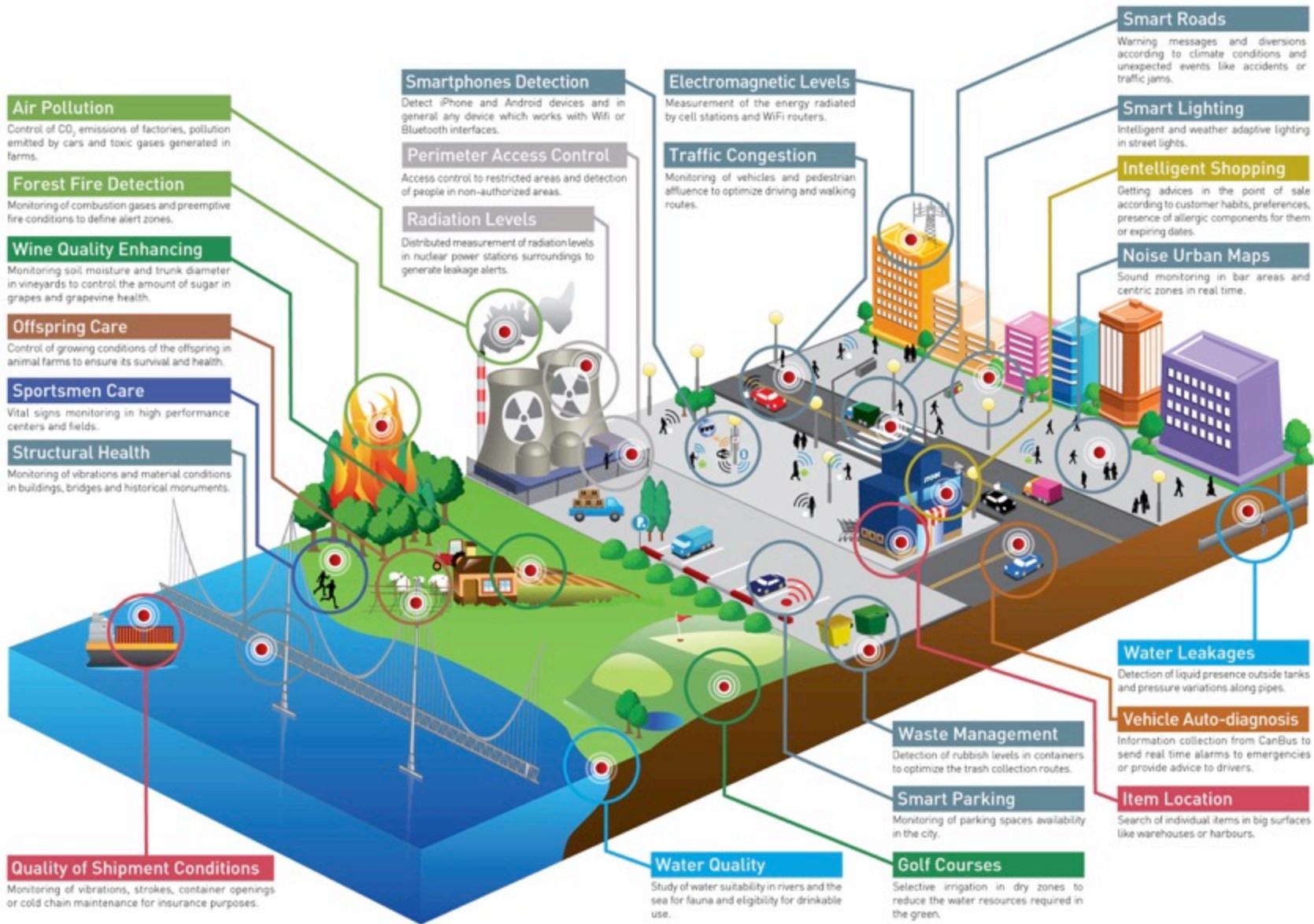
A white Westfalia van is shown from a rear three-quarter perspective, driving away from the viewer across a vast, flat landscape. The ground is a mix of dark earth and bright, glowing sand or dust. In the background, there are rolling hills or mountains under a sky transitioning from deep orange to a lighter yellow. The overall atmosphere is one of adventure and exploration.

Eng Computation & Data Science

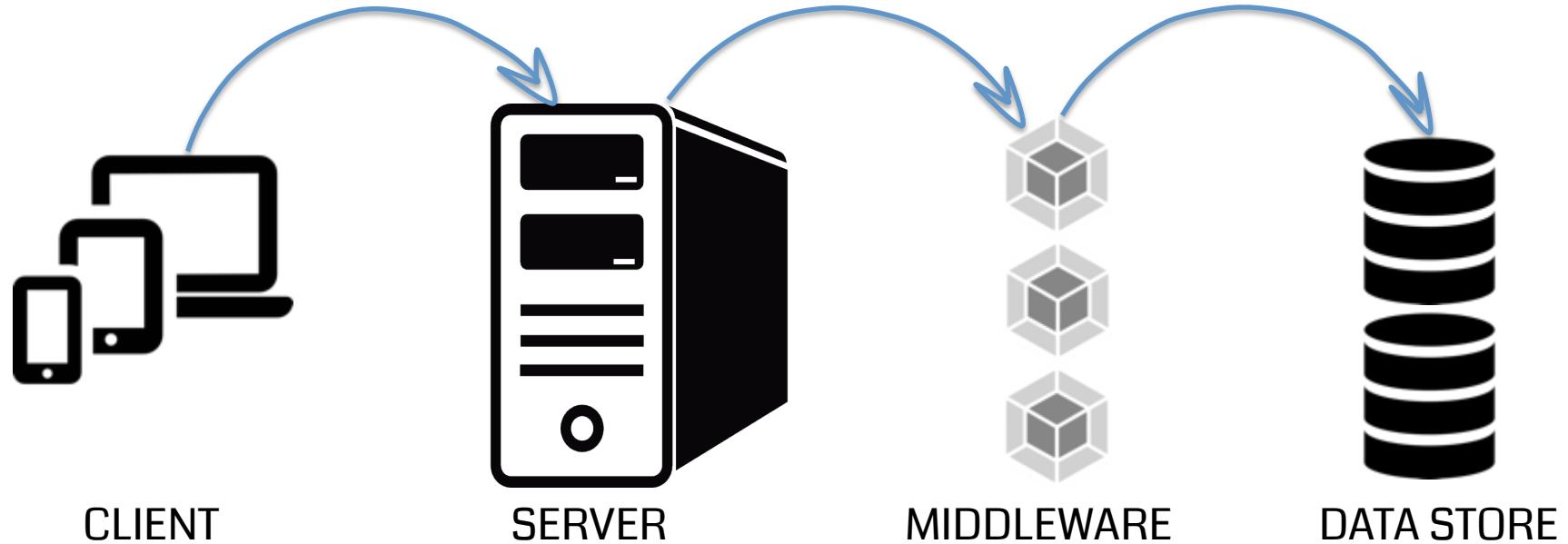
The Historical Approach



The Challenge: Complex Software Systems



N Tiers Systems



A white Westfalia van is shown from a rear three-quarter perspective, driving away from the viewer across a vast, flat landscape. The ground is a mix of dark earth and bright, glowing sand or dust. In the distance, a range of mountains is visible under a hazy, warm sky.

System Building Blocks

Application Servers:

- Small
- Easy to use
- Low Cost
- Ubiquitous
- Loosely Joined



Application Server Skills

- Service Creation
- Service Consumption
- Service Integration
- Data Transformations
- Concurrency
- Coordination



Package Management

- Registry
- Creation
- Distribution
- Scalability

Parallel Happens – Async Programs

- Non-Blocking
- Event-loop
- Callbacks
- Promises



State Management

- Record and Replay
- Predictable Containers
- Logging
- Time Travel



Event Streams

- Event Management
- Event bubbling
- Event Driven Programming
- Reactive Patterns

Coordination

- Orchestration
- Integration
- Error Handling



REST

- Microservices
- Route Mgmt.
- Token Mgmt.
- API Design



Containers

- Container Mgmt.
- Docker
- Mesos
- Kubernetes

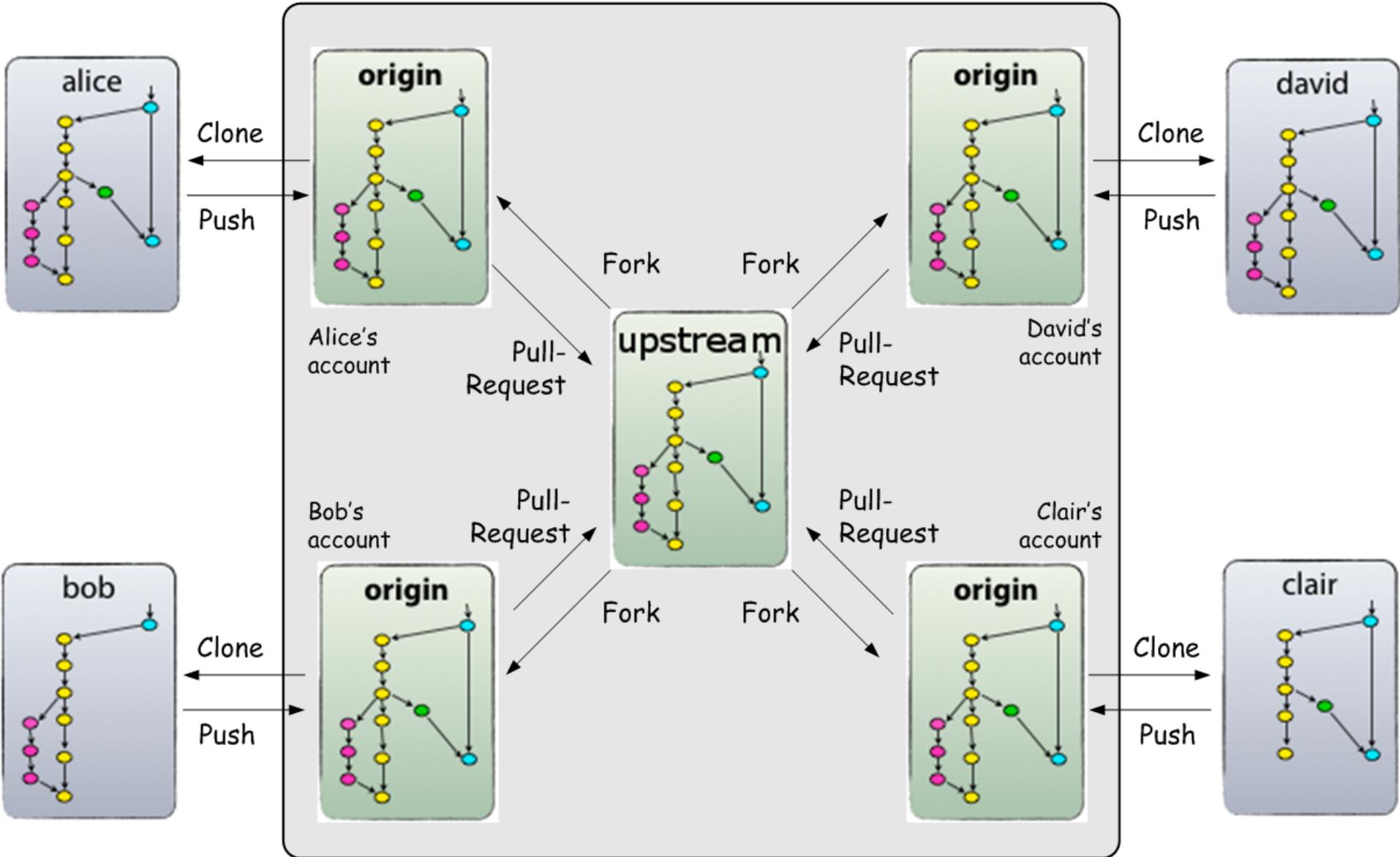


Collaboration

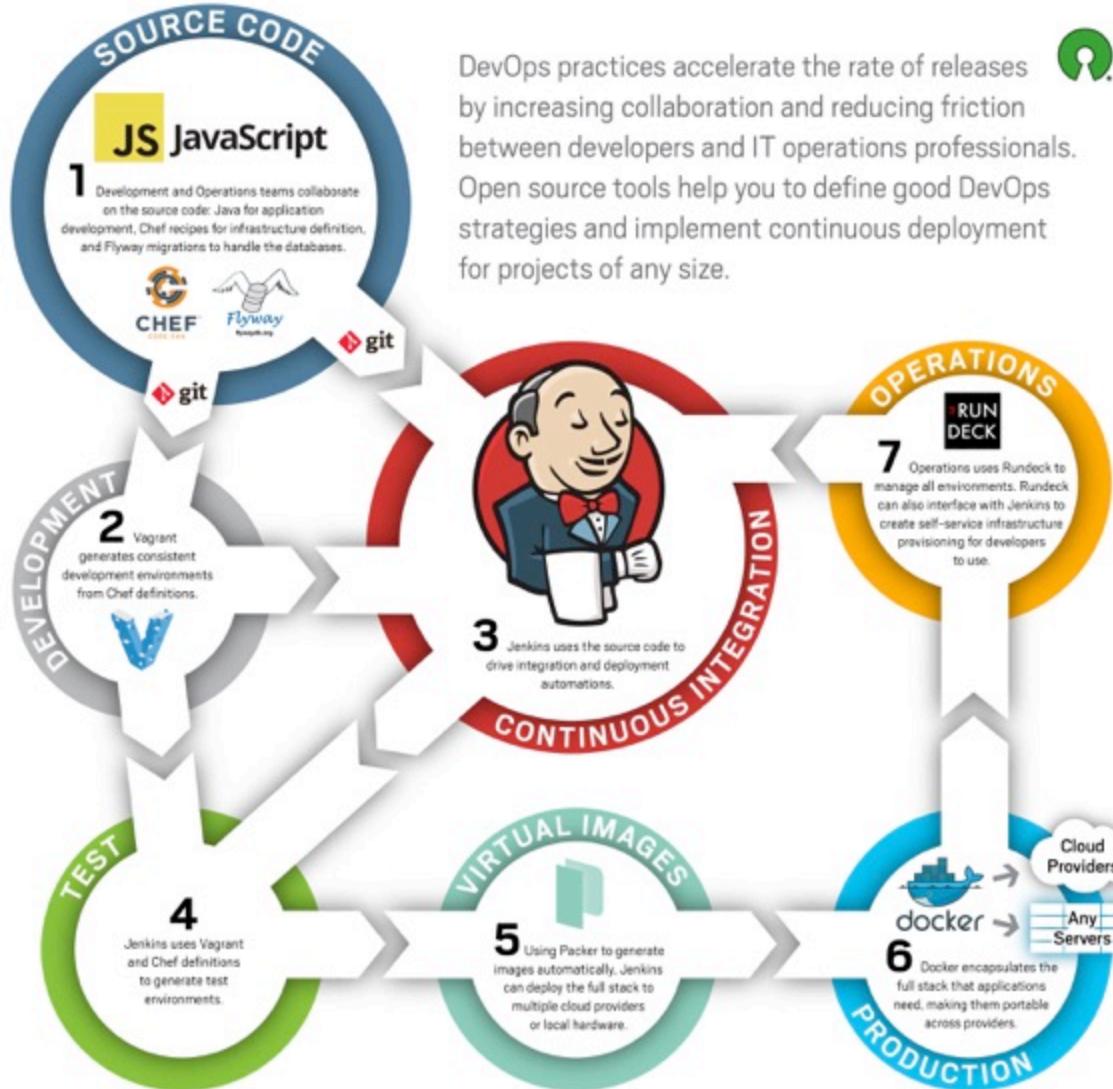
- Issues
- Tracking
- History
- Notifications
- Visualization
- Patterns



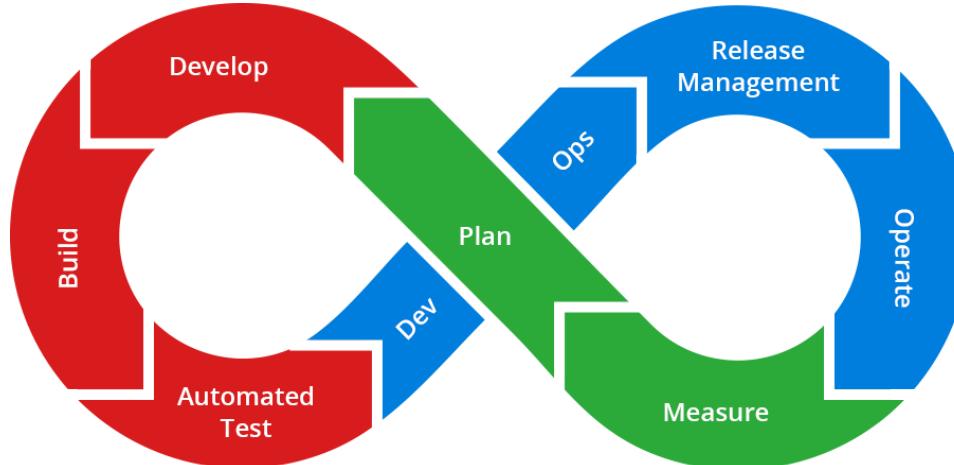
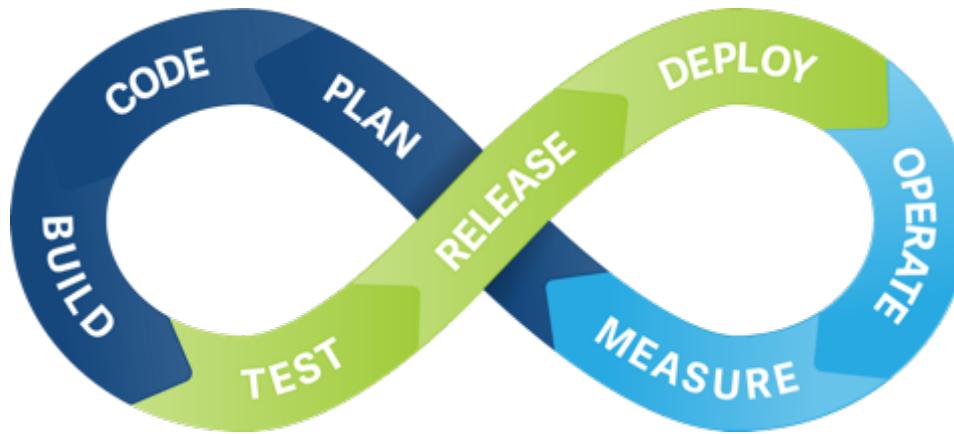
Collaboration



Continuous Integration



Continuous Integration



Continuous Integration

- Pull Requests
- Branch Select
- Notification
- Testing
- Containers
- Deployment

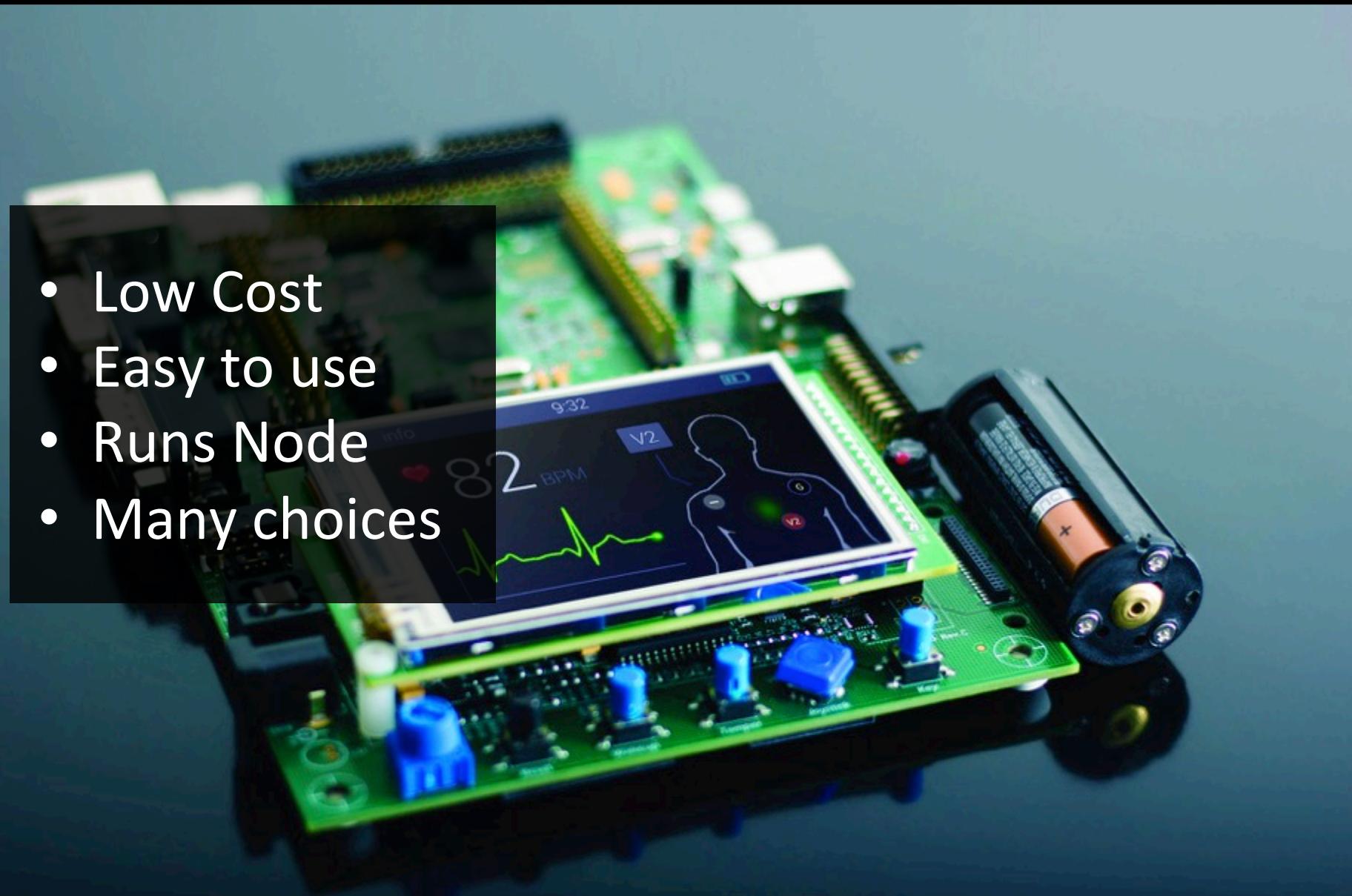


Big Data

- Volume
- Variety
- Velocity
- Transformations

Commodity Hardware

- Low Cost
- Easy to use
- Runs Node.js
- Many choices



Security

- Identify
- Protect
- Detect
- Respond
- Recover





Technology

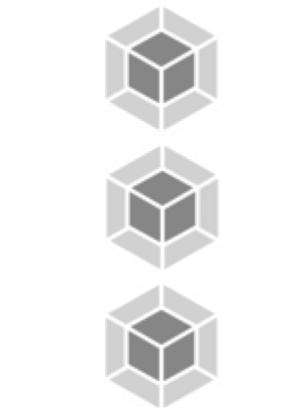
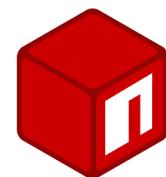
Open Source, Scalable, Large Adoption



CLIENT



SERVER



MIDDLEWARE



DATA STORE



Some of the numbers



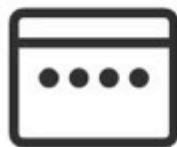
349,392

total packages



415,540,329

downloads in the last day



1,662,161,317

downloads in the last week



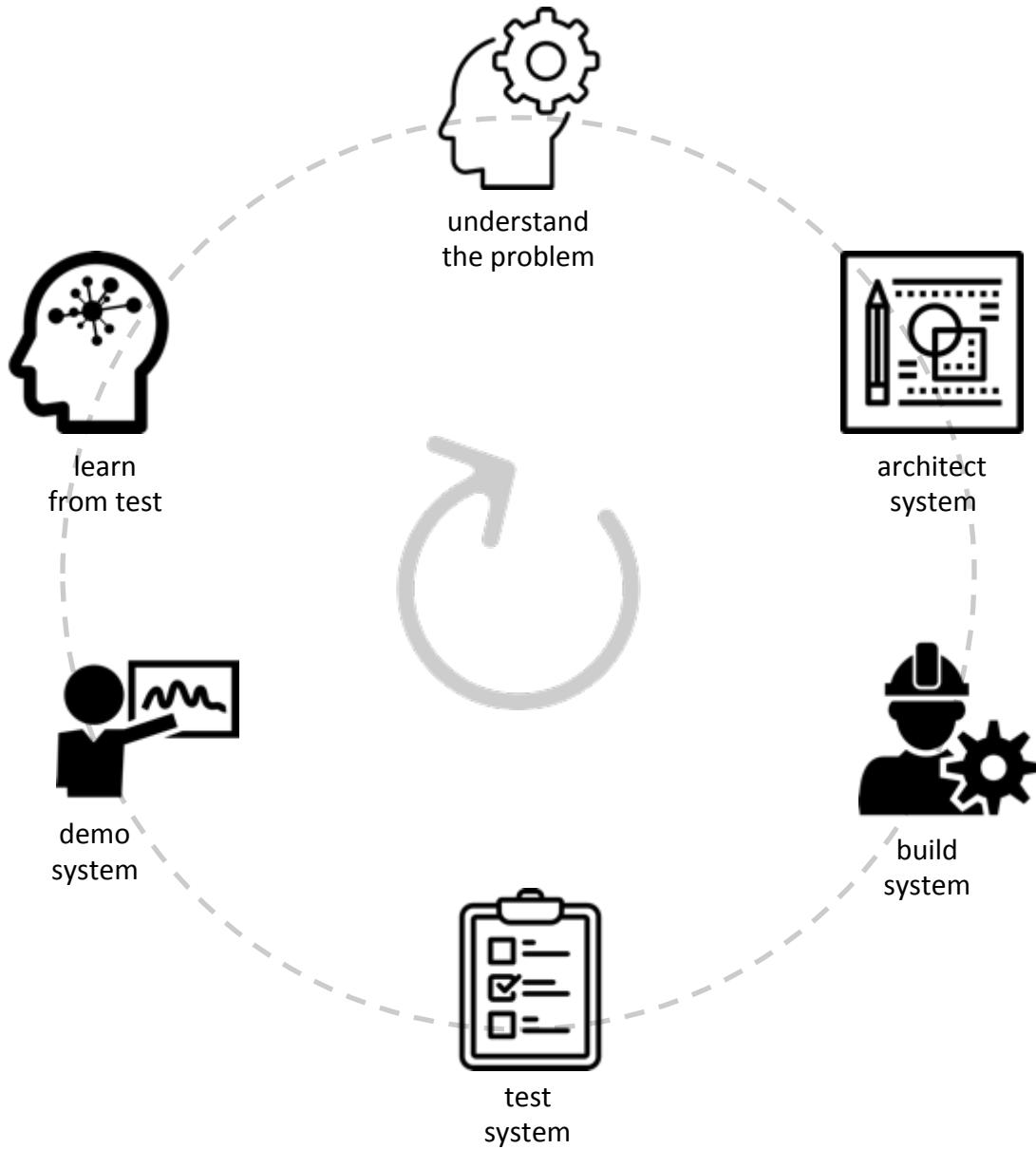
6,140,641,245

downloads in the last
month

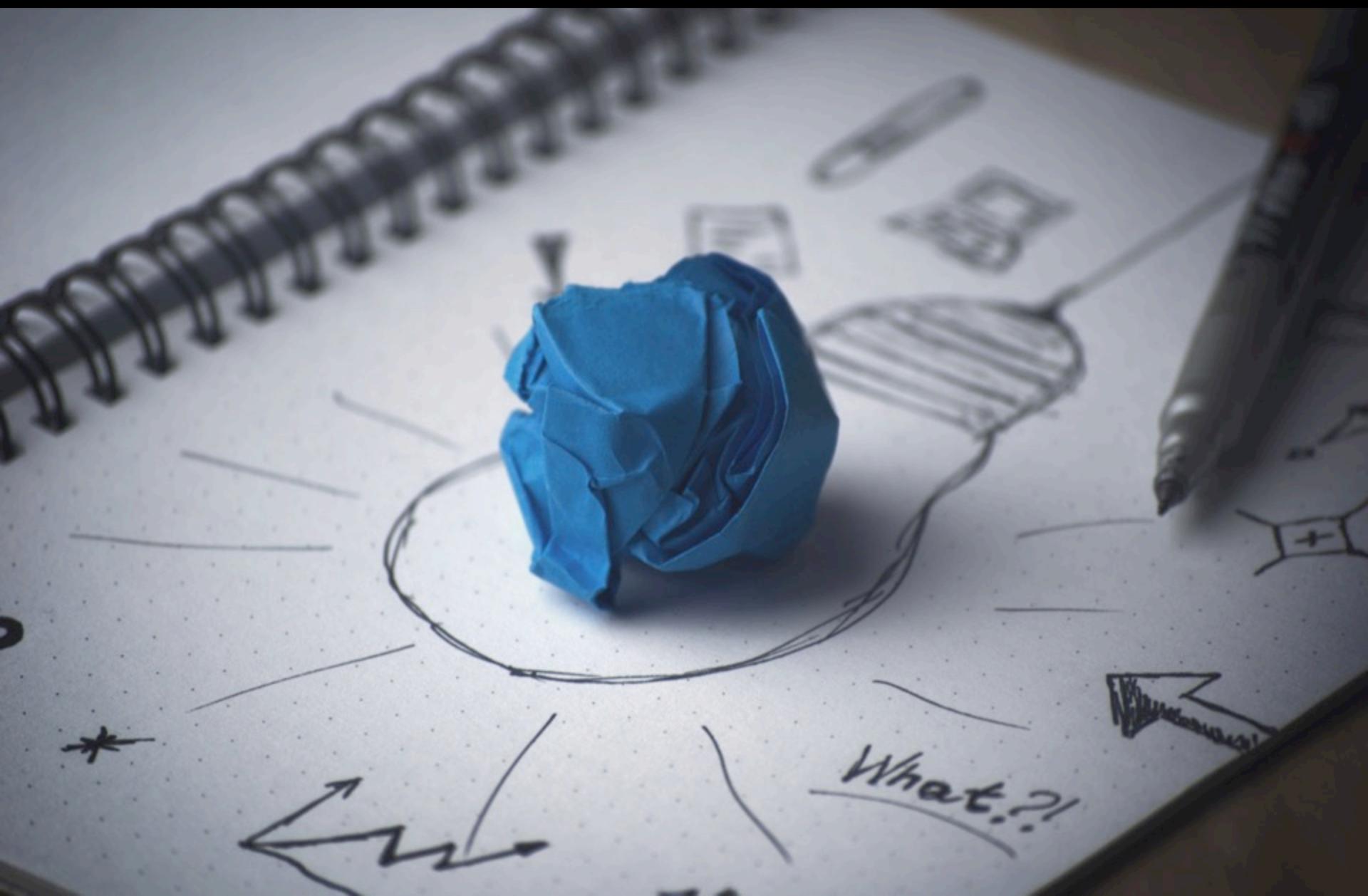
A white Westfalia van is shown from a rear three-quarter perspective, driving away from the viewer across a vast, dry, golden-brown plain. The van creates a prominent cloud of dust behind it. In the distance, a range of mountains is visible under a hazy, warm sky.

Construction Cycle

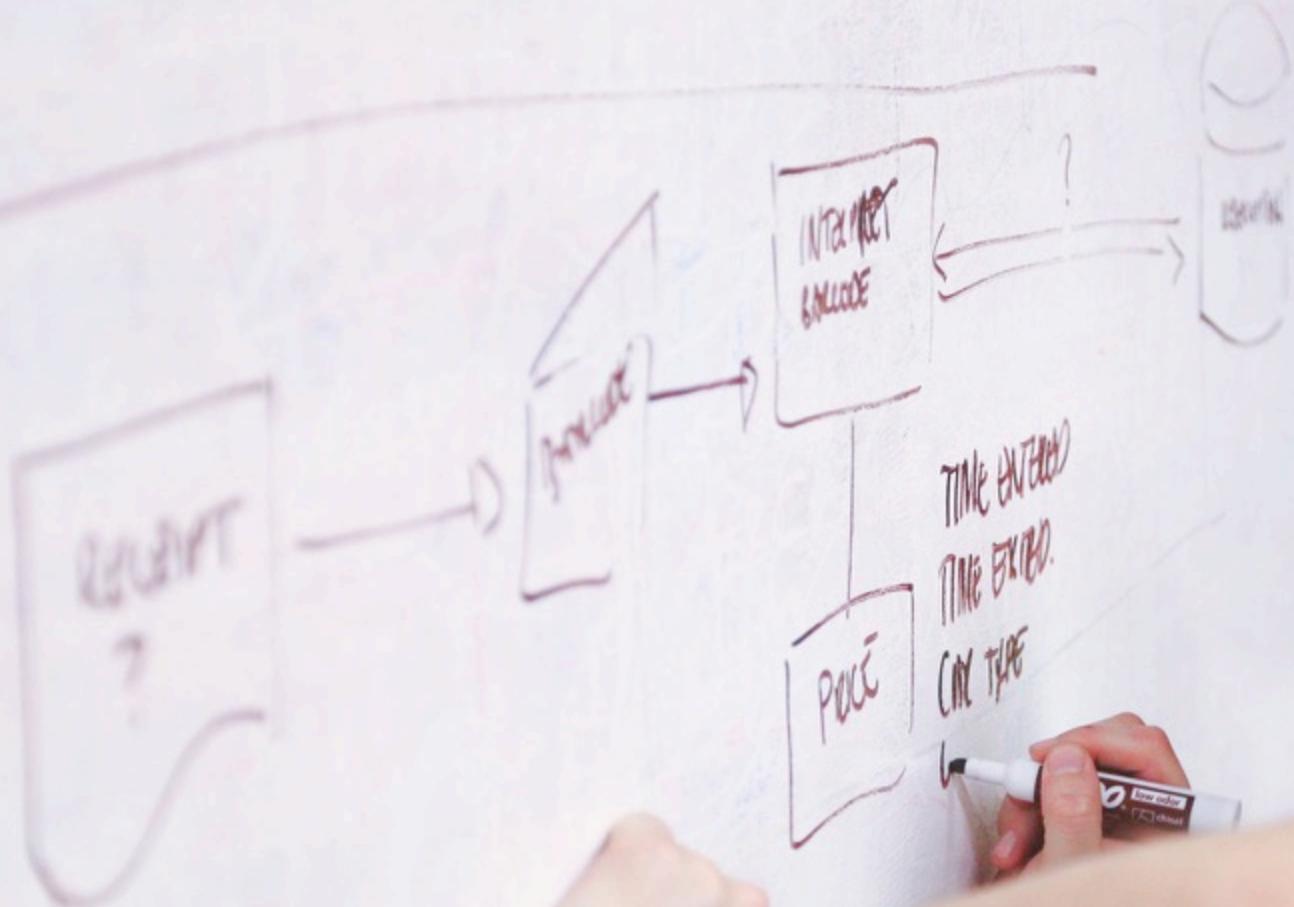
Complex Software System Cycle



Step 1: Understand the problem deeply



Step 2: Architect System



Step 3: Build System

WEEK 3 : Design

Final
Design Phase

Hosting &
Sharing Setup
Finalize API
Goals

Infrastructure Recs:
- Laravel + Backbone

WEEK 4 : Design

Initialize Database
Normalize Database
Create Fixtures
for Testing

← Create Fixtures for testing

WEEK 5 : Design

Admin Dashboard
B/E Frame work
Database API
clustering
B/E sorting
(for all
Dashboard
Views)
in partition
B/E filter
(for all views)
B/E (load for
all DB
Tables)
Exporting

← Engineering

WEEK 6 : Dev

ADMIN

API

Cron
Automated
(load)
Email
B/E

WEEK 7 : Dev

Dashboard
Comments
Suggest
Approve
Favor Post
Like
Comment
Share
Post
Create Account
Logout
Profile
Edit Profile
Delete Account
Logout

PLEASE DO NOT ERASE

Step 4: Test the System



Step 5: Demo System



Step 6: Learn



Step 7: Iterate

