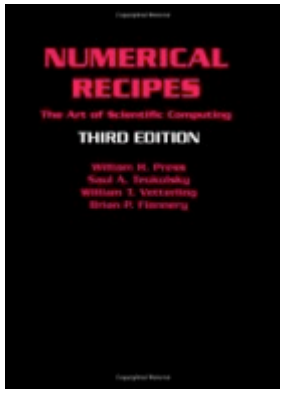
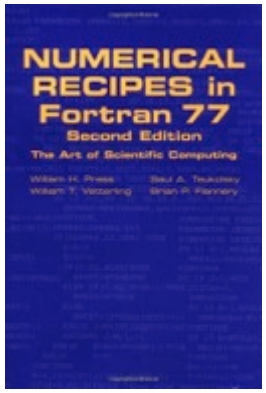
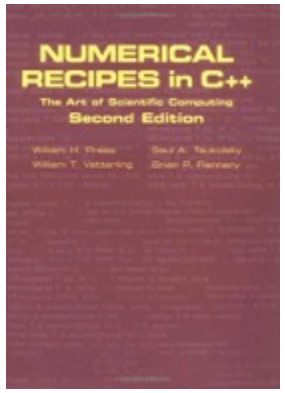
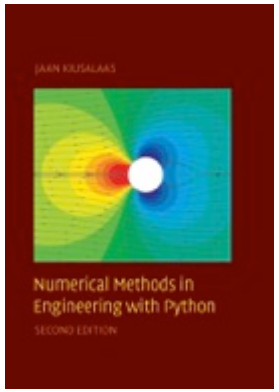

Eng Computation
& Data Science

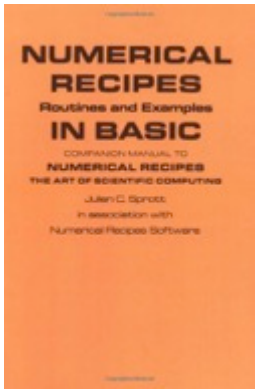
The Historical Approach

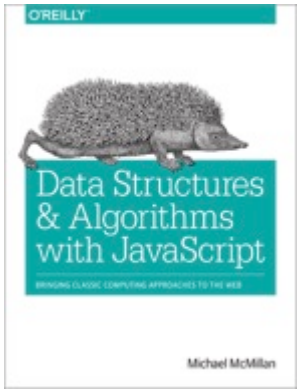


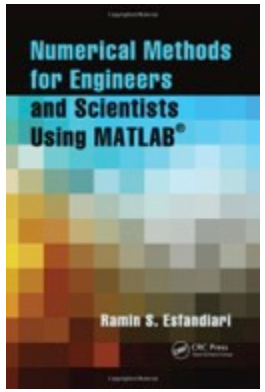




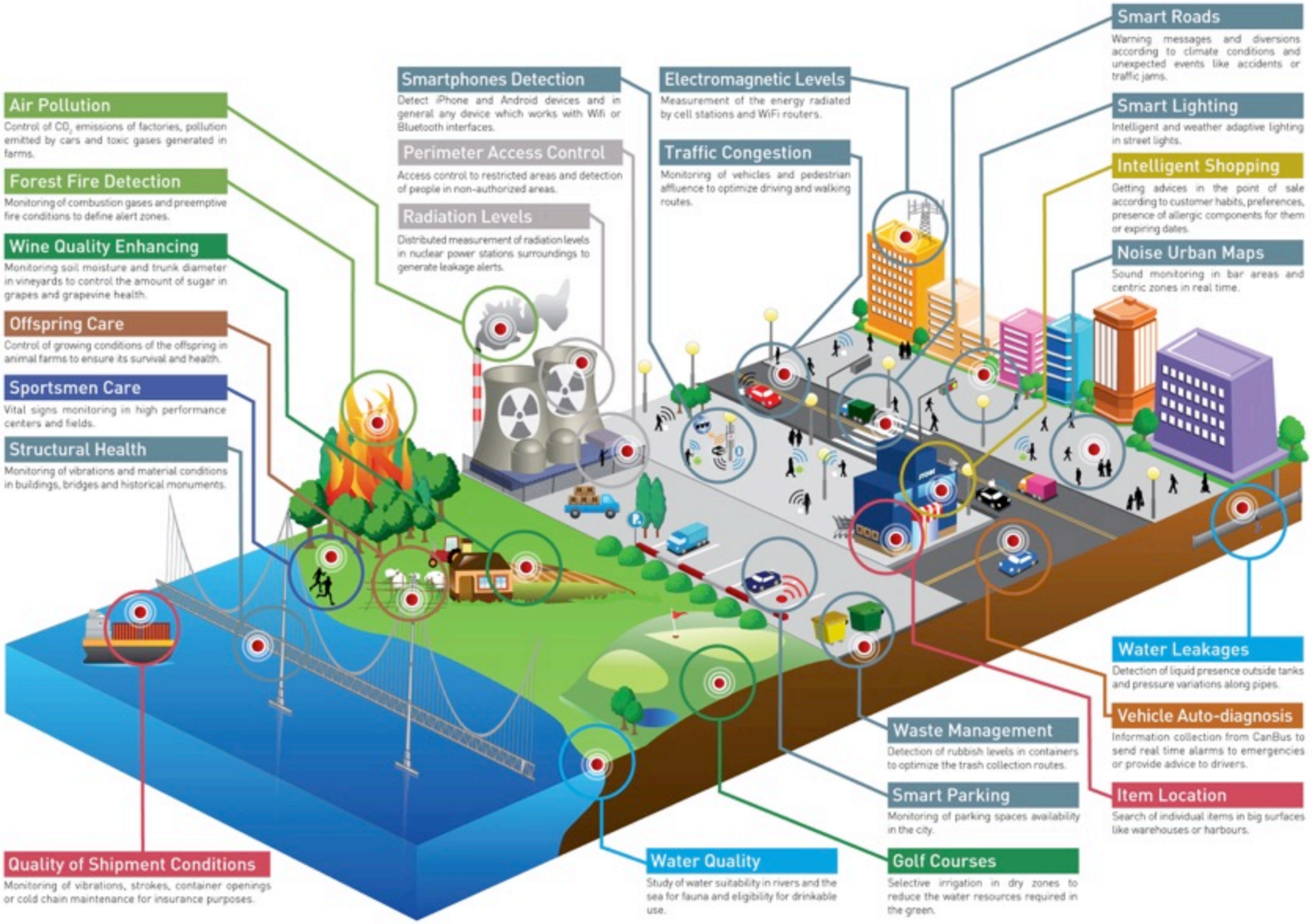




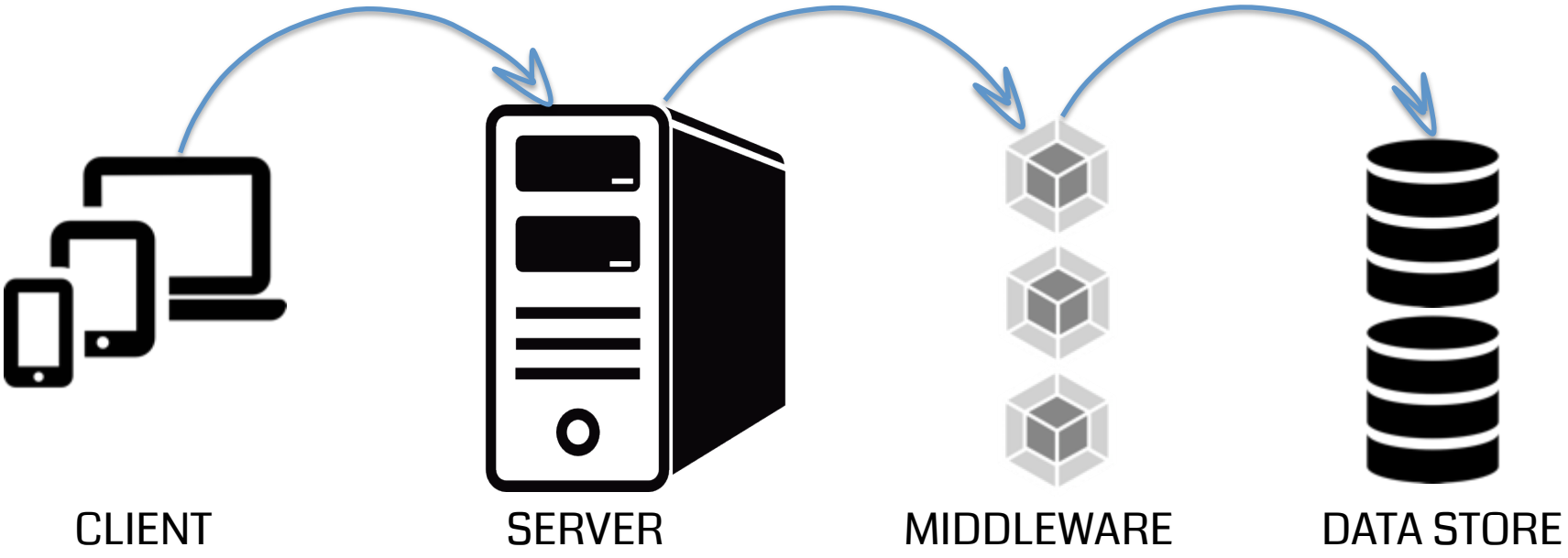




The Challenge: Complex Software Systems



N Tiers Systems




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

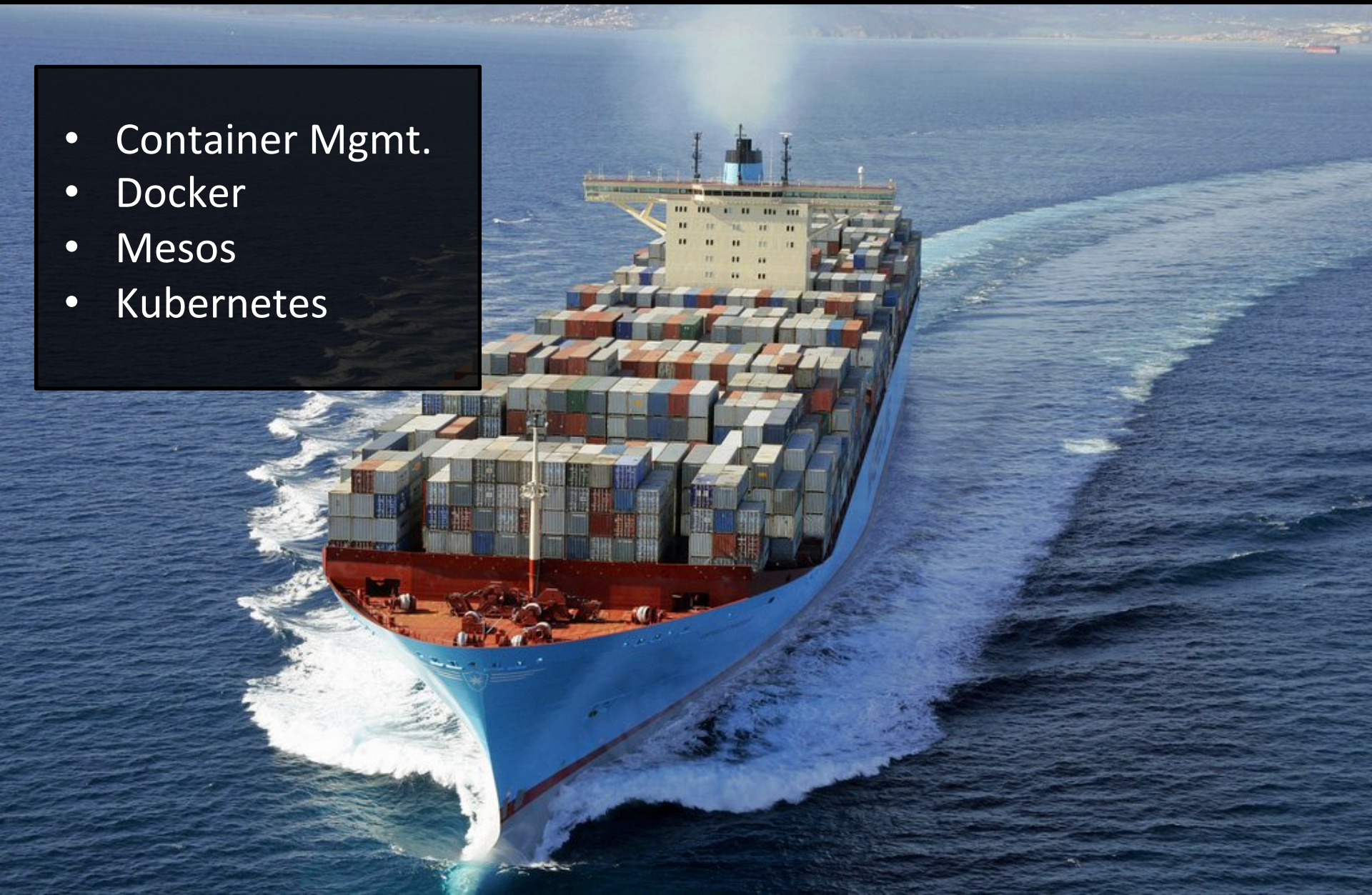
Coordination

- Orchestration
- Integration
- Error Handling

REST

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

Containers

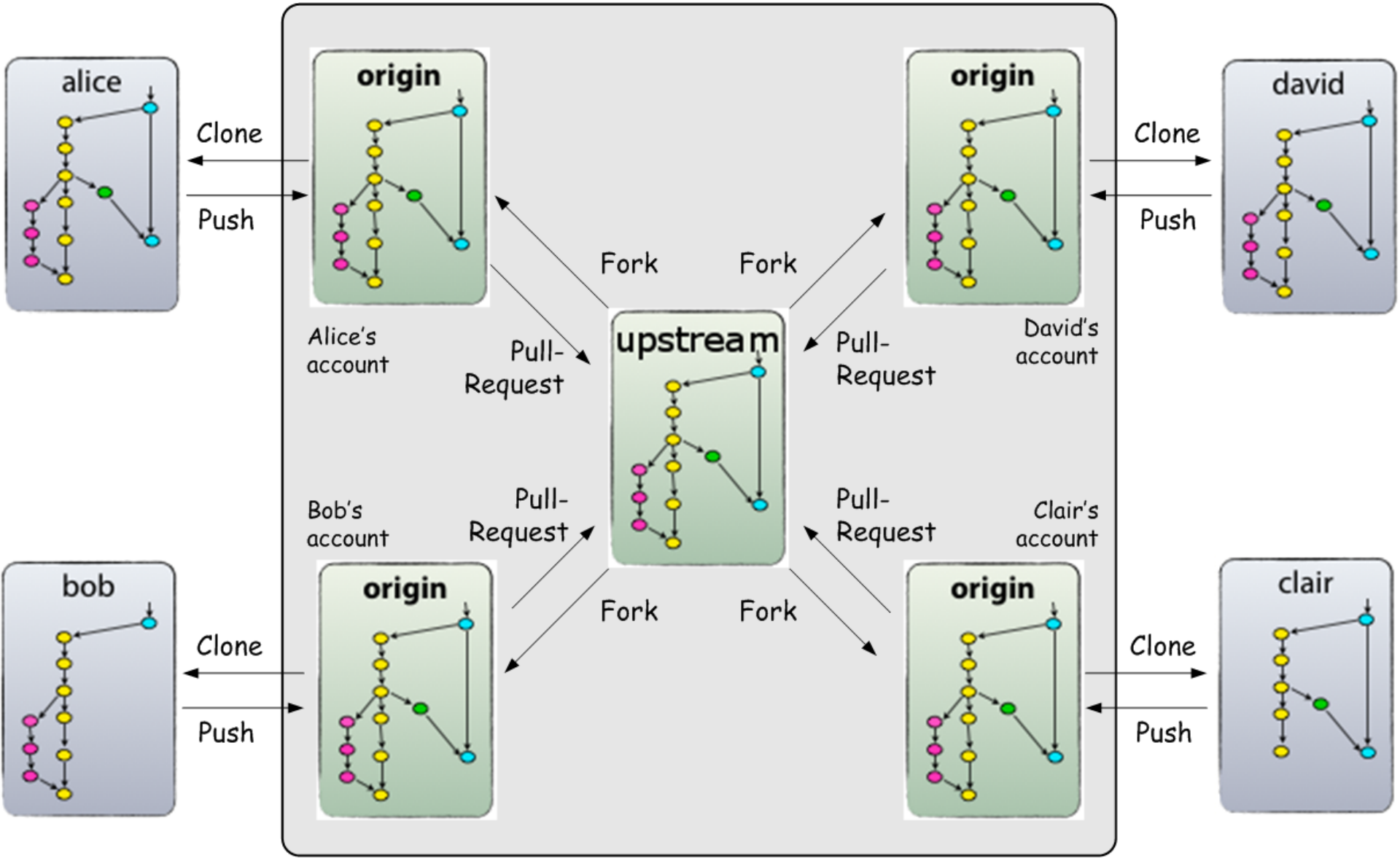


- Container Mgmt.
- Docker
- Mesos
- Kubernetes

Collaboration

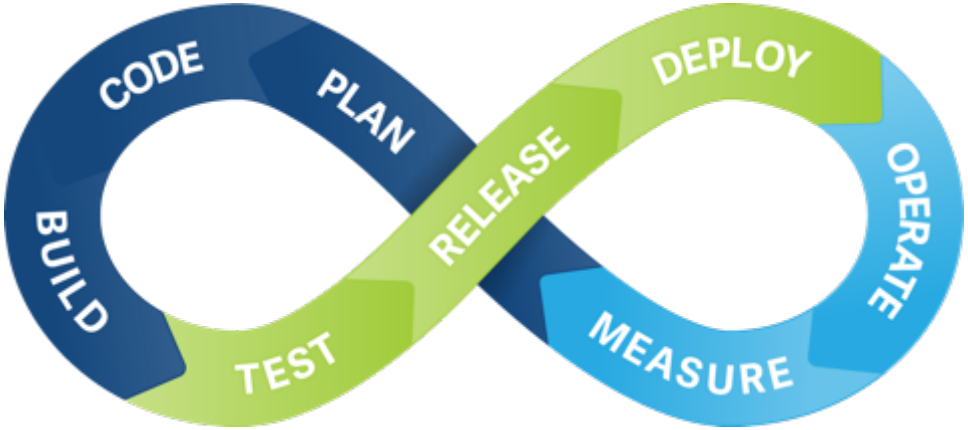
- Issues
- Tracking
- History
- Notifications
- Visualization
- Patterns

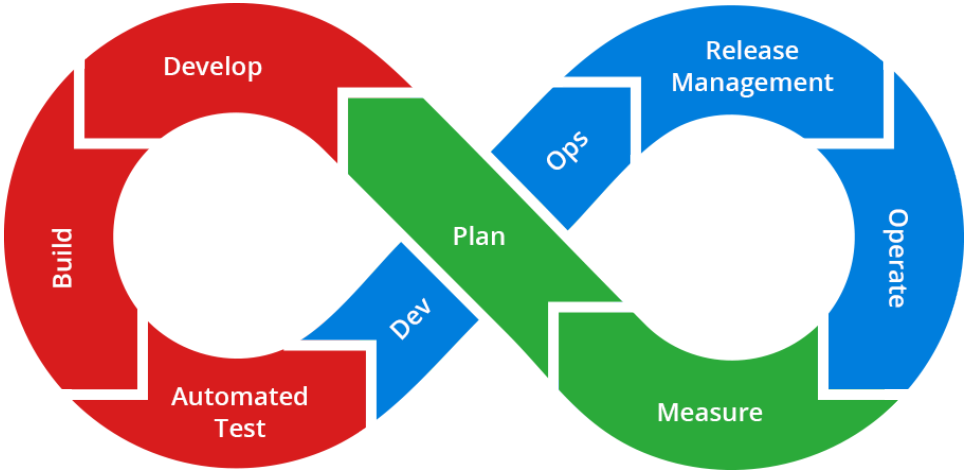
Collaboration



Continuous Integration

Continuous Integration





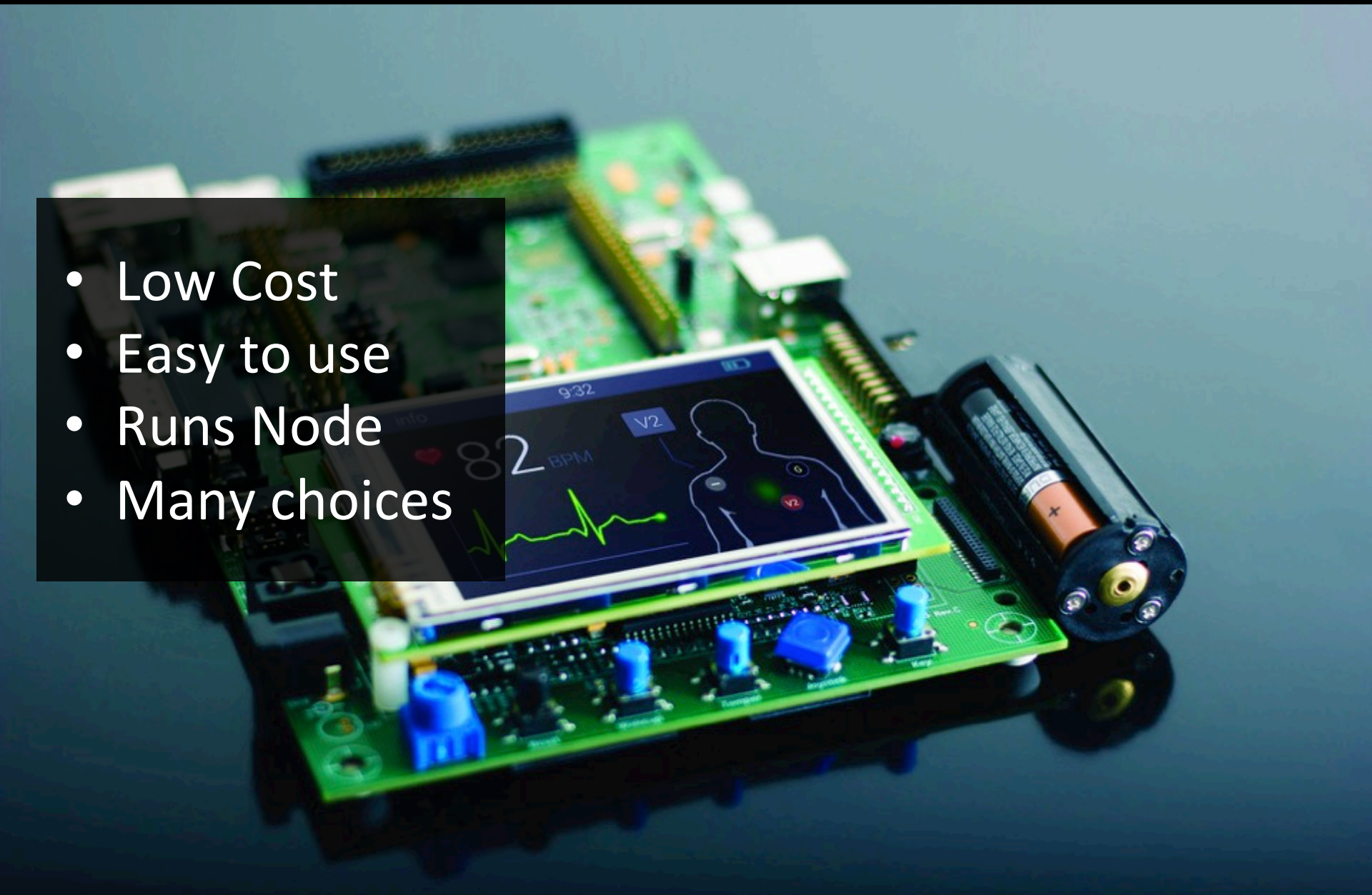
Continuous Integration

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

Big Data

- Volume
- Variety
- Velocity
- Transformations

Commodity Hardware



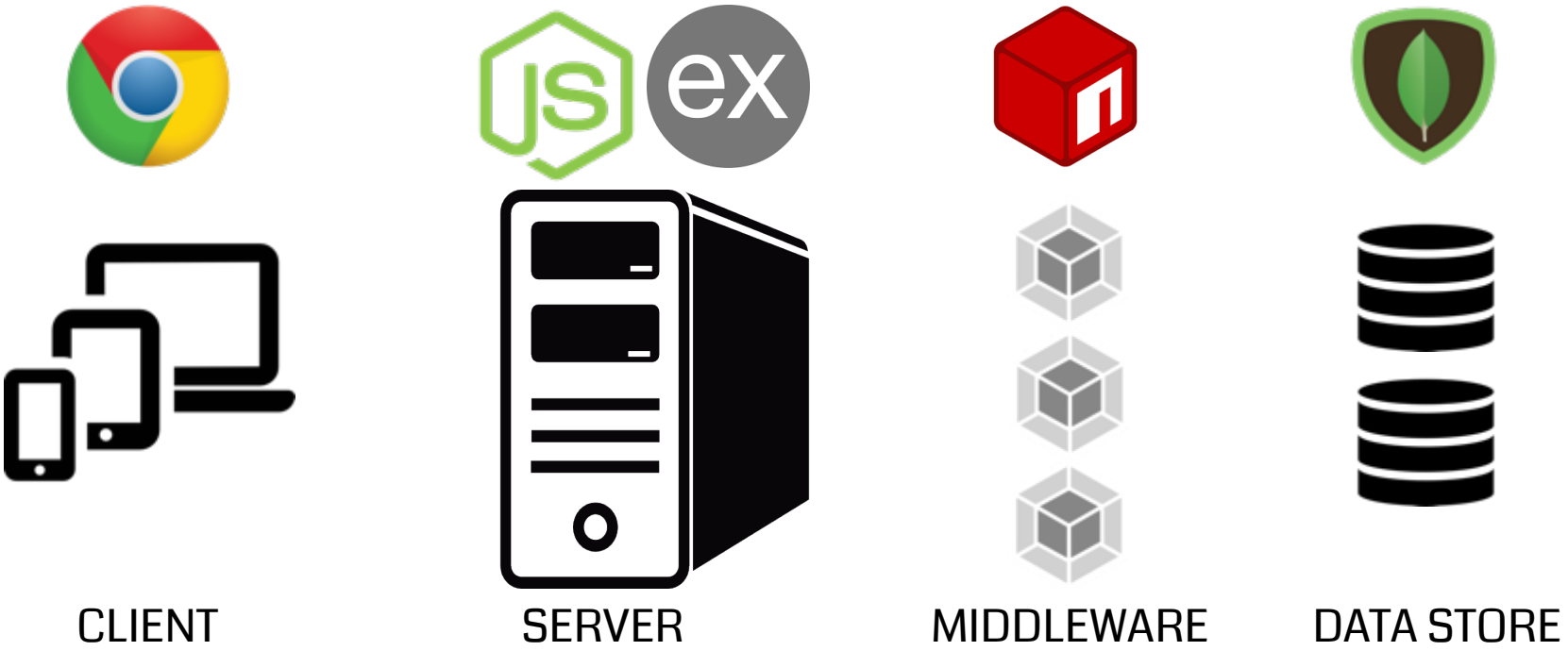
- Low Cost
- Easy to use
- Runs Node
- Many choices

Security

- Identify
- Protect
- Detect
- Respond
- Recover


Technology

Open Source, Scalable, Large Adoption



Some of the numbers

349,392

total packages

415,540,329

downloads in the last day

1,662,161,317

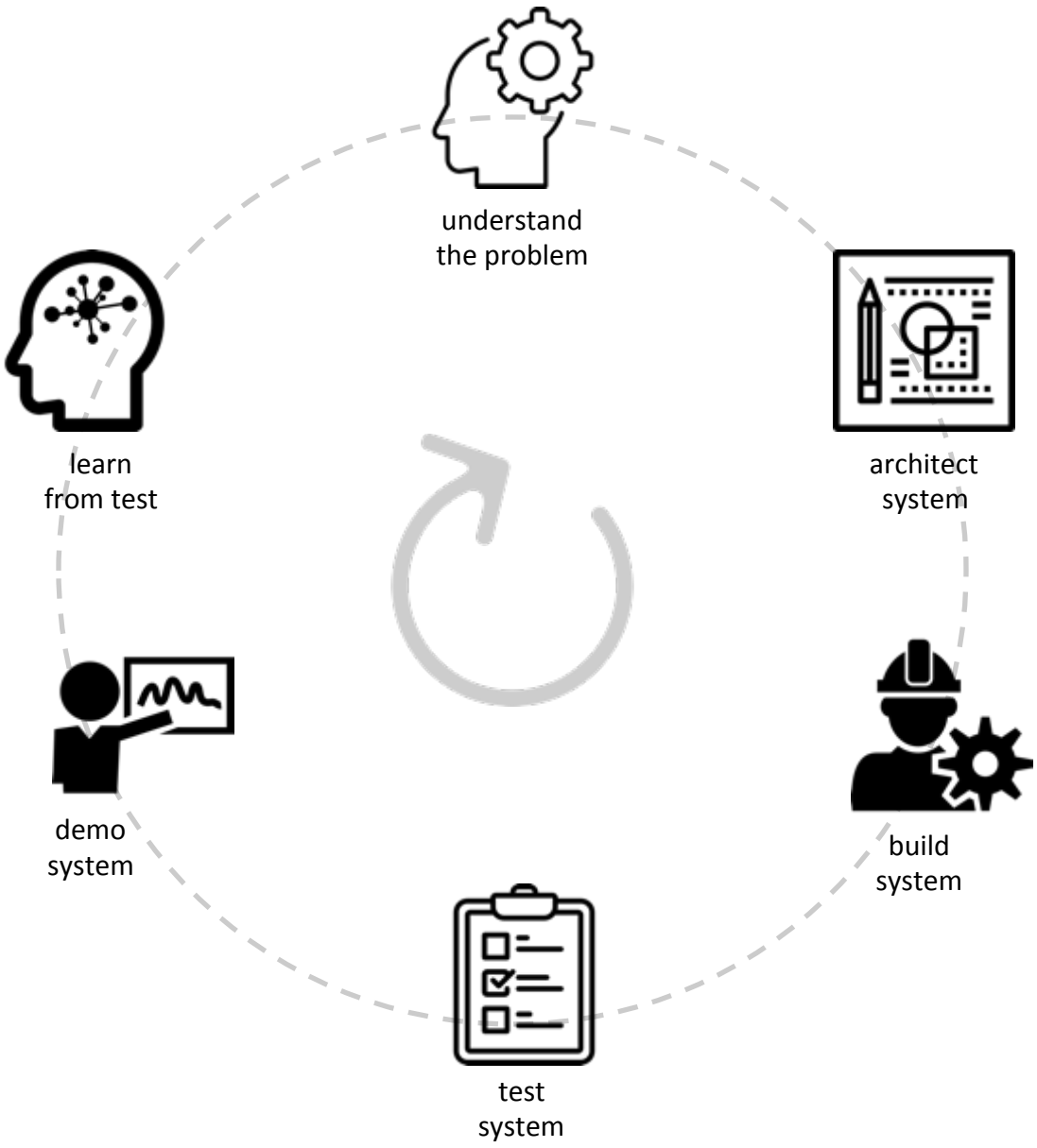
downloads in the last week

6,140,641,245

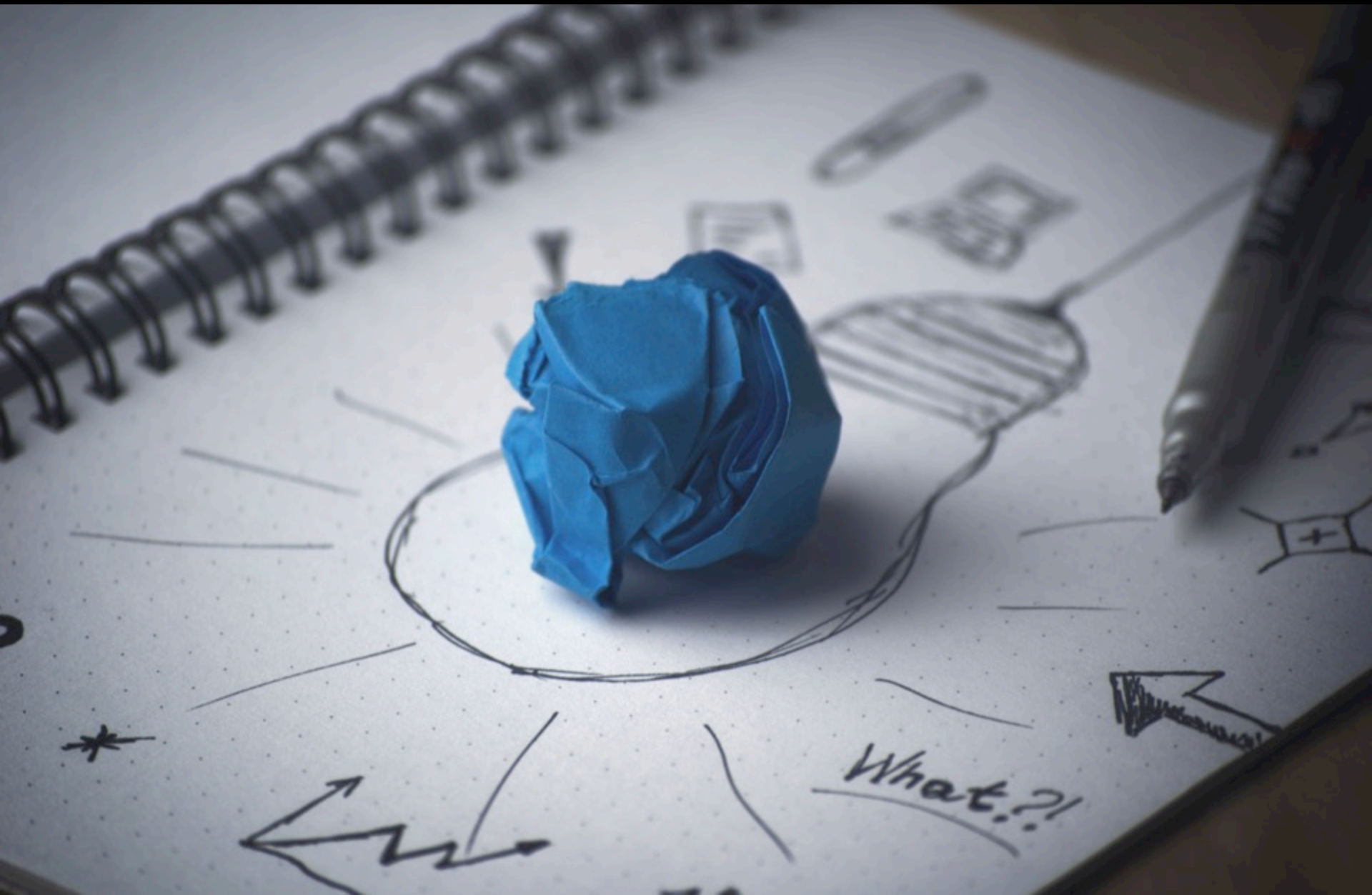
downloads in the last month


Construction
Cycle

Complex Software System Cycle

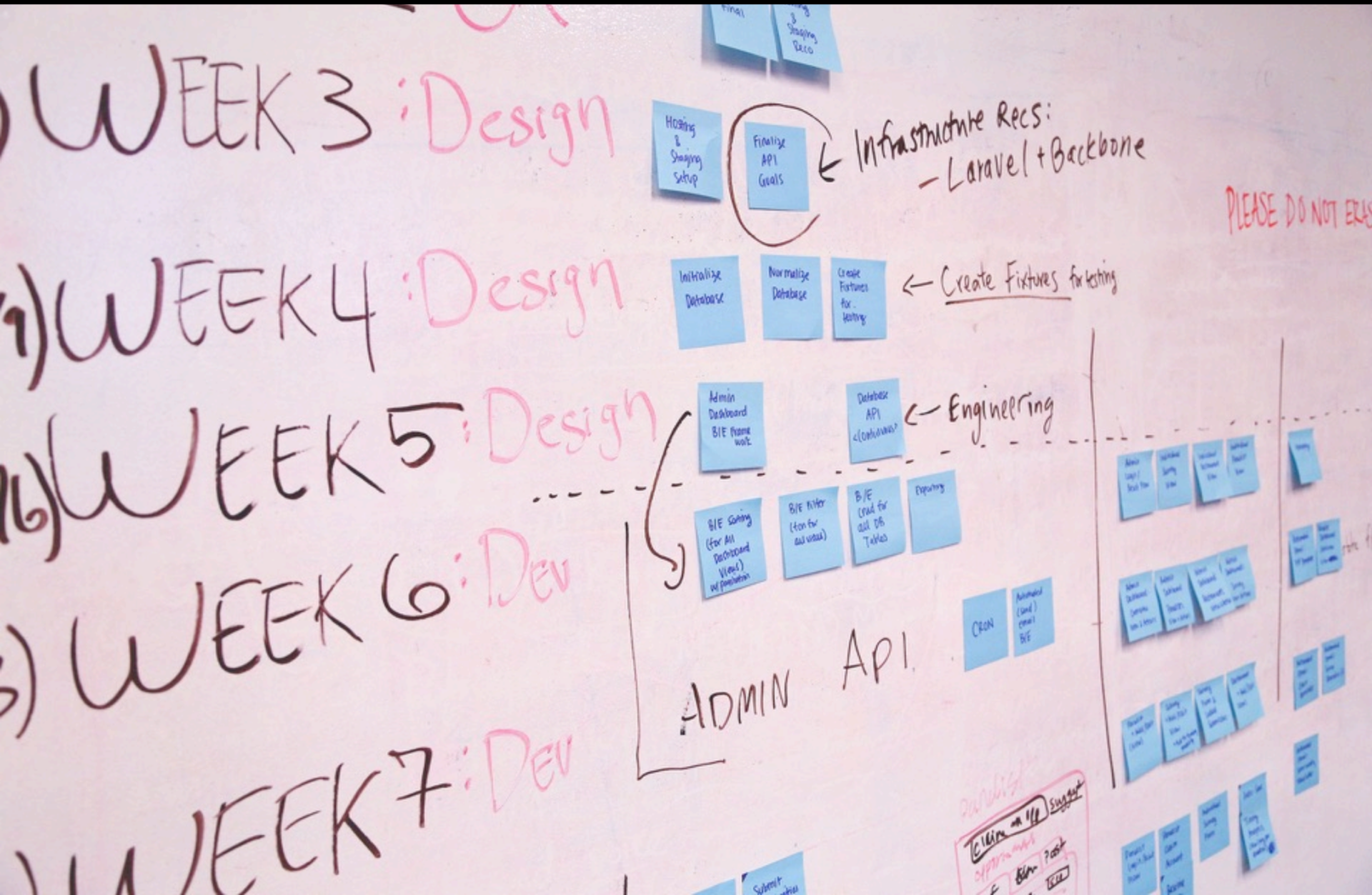


Step 1: Understand the problem deeply



Step 2: Architect System

Step 3: Build System



Step 4: Test the System

Step 5: Demo System

Step 6: Learn

Step 7: Iterate