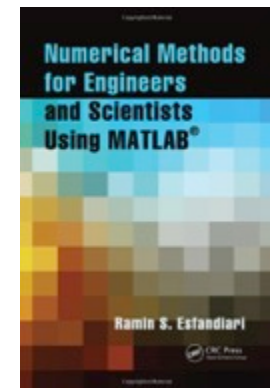
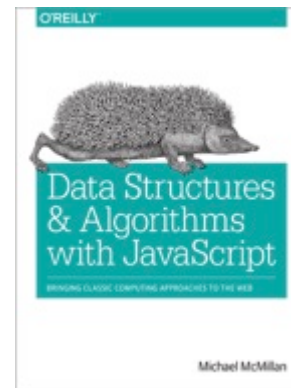
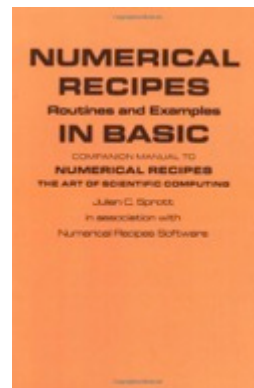
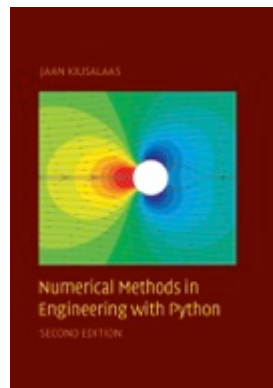
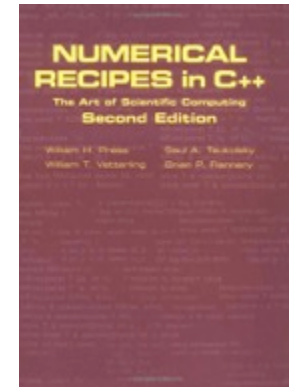
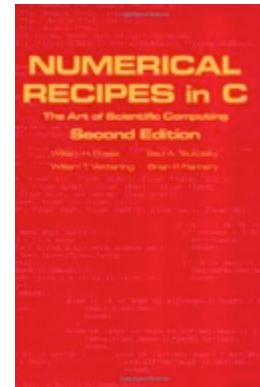
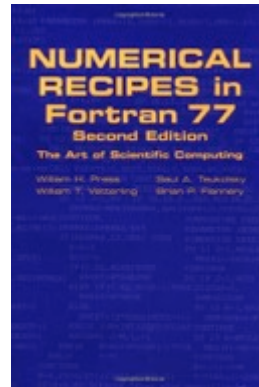
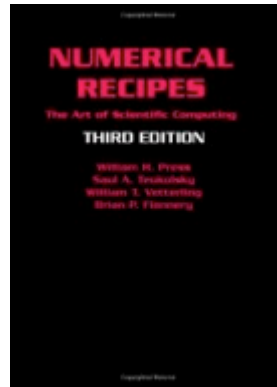


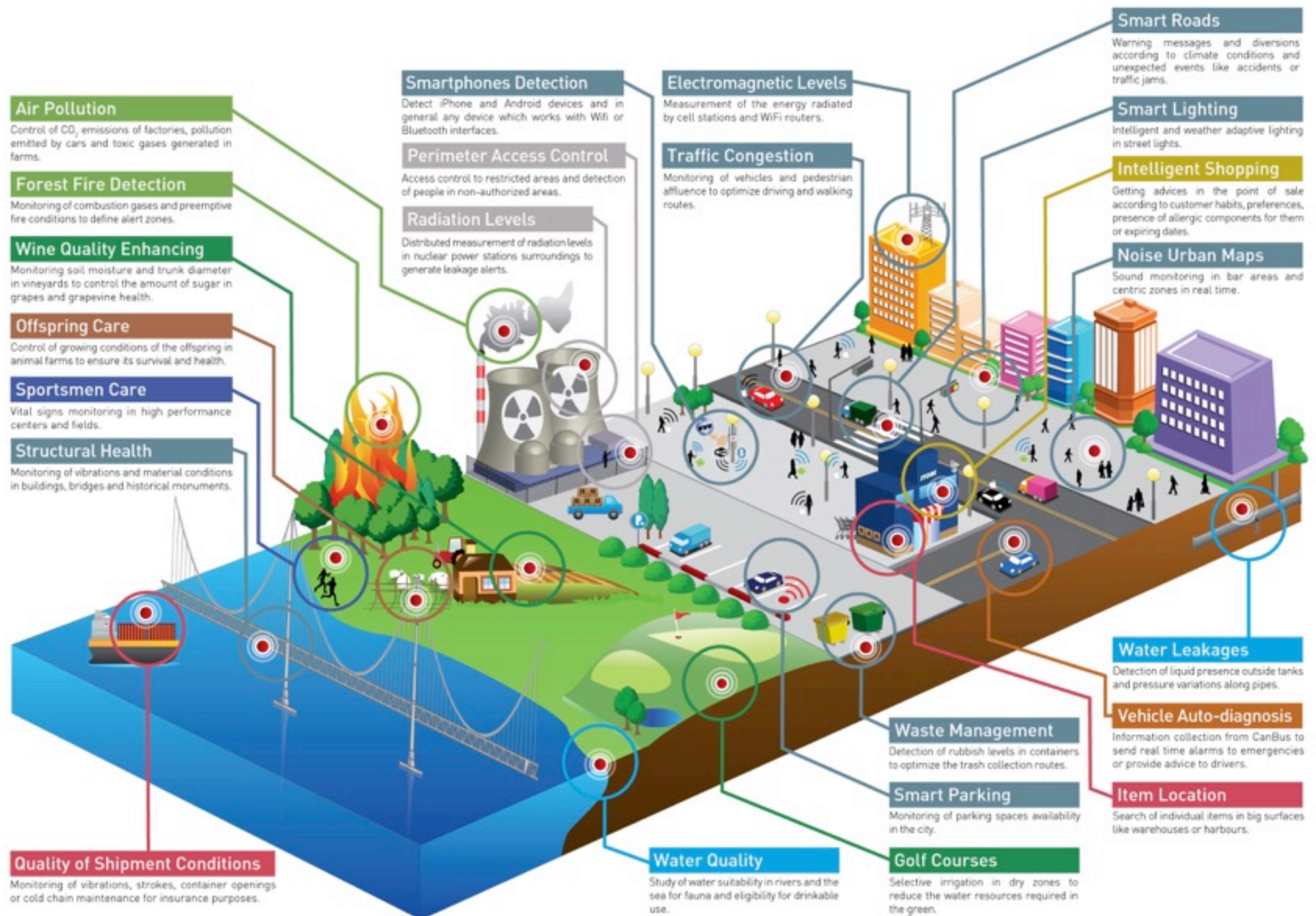
Eng Computation & Data Science



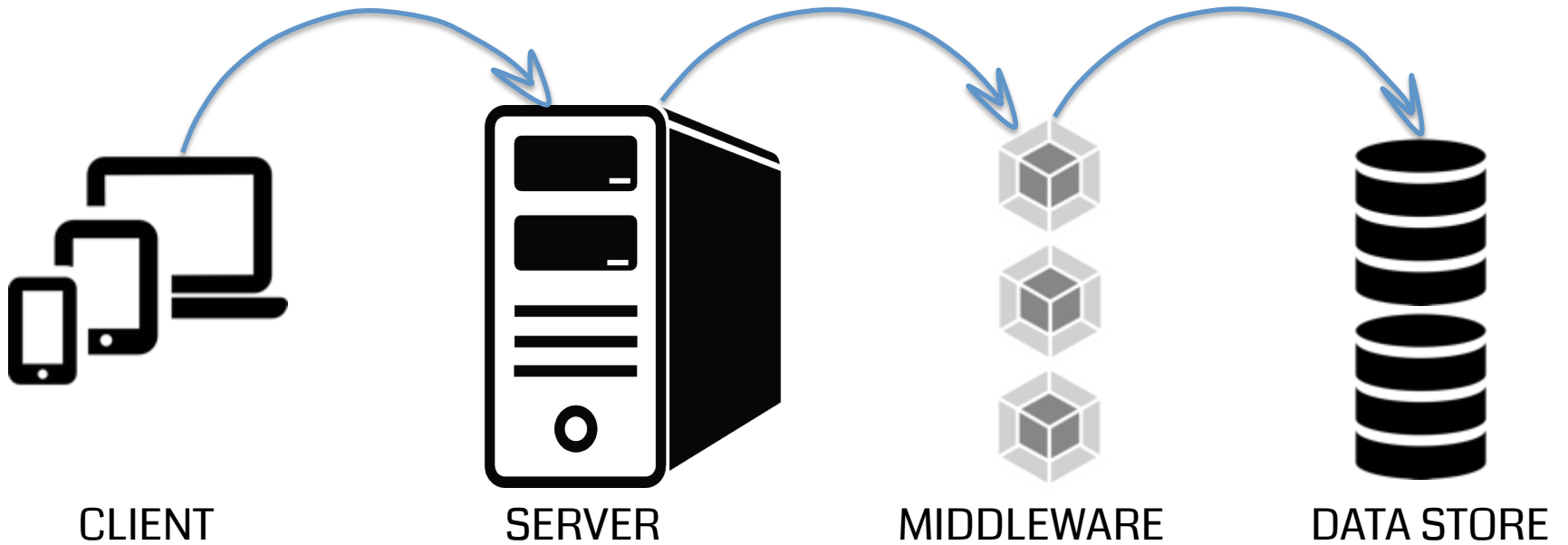
The Historical Approach



The Challenge: Complex Software Systems




N Tiers Systems



System Building Blocks

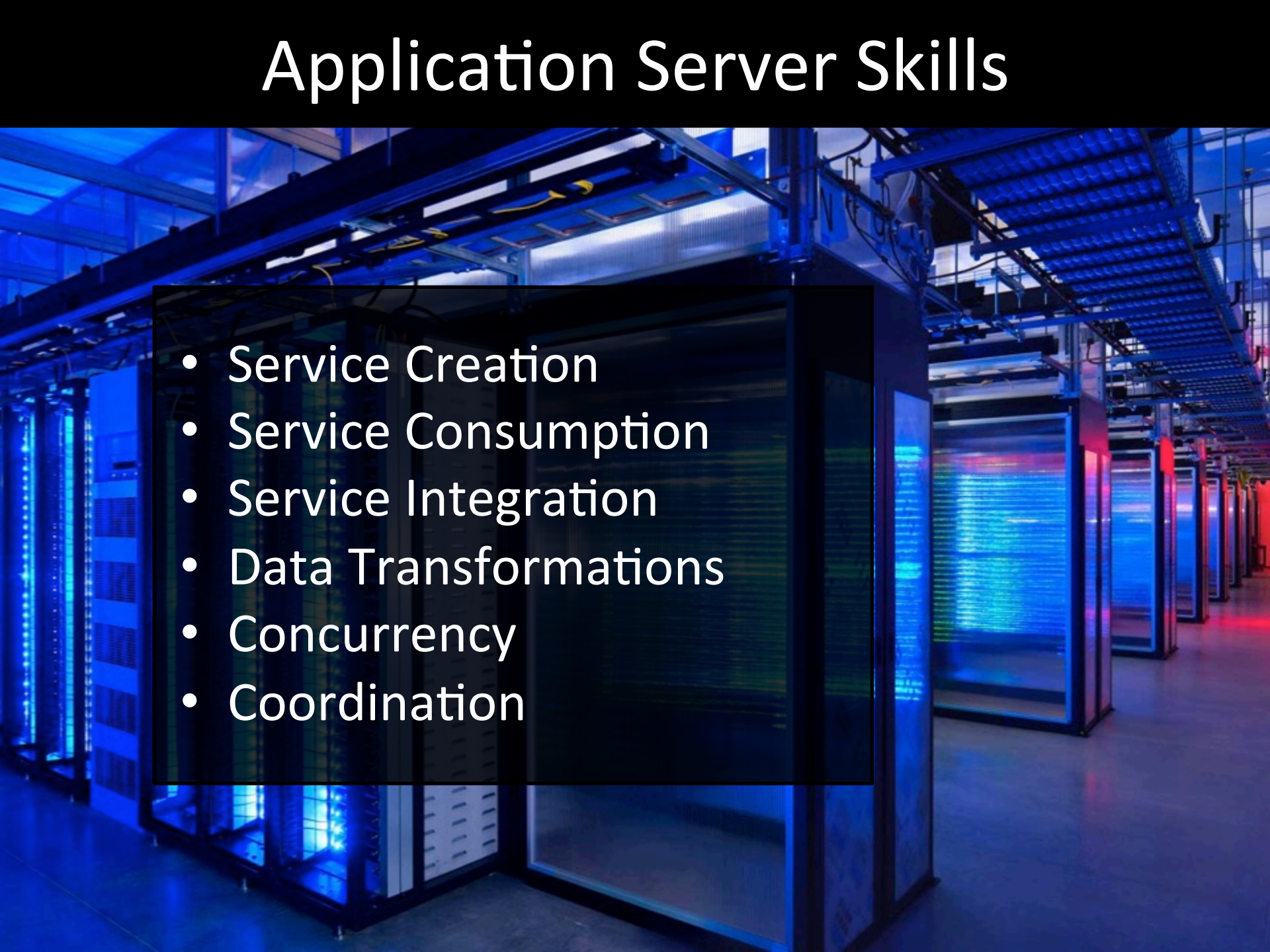


A hand with a dark skin tone is pointing its index finger upwards towards a bright, circular light source. The background is dark, and the light source is a large, glowing circle, possibly a ceiling light or a screen. The hand is positioned in the lower right quadrant of the frame.

Application Servers:

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

Application Server Skills

- 
- A photograph of a server room with blue lighting. Rows of server racks are visible, with some racks having glass doors that show internal components. The room has a high ceiling with exposed pipes and cables. The overall atmosphere is futuristic and technical.
- 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

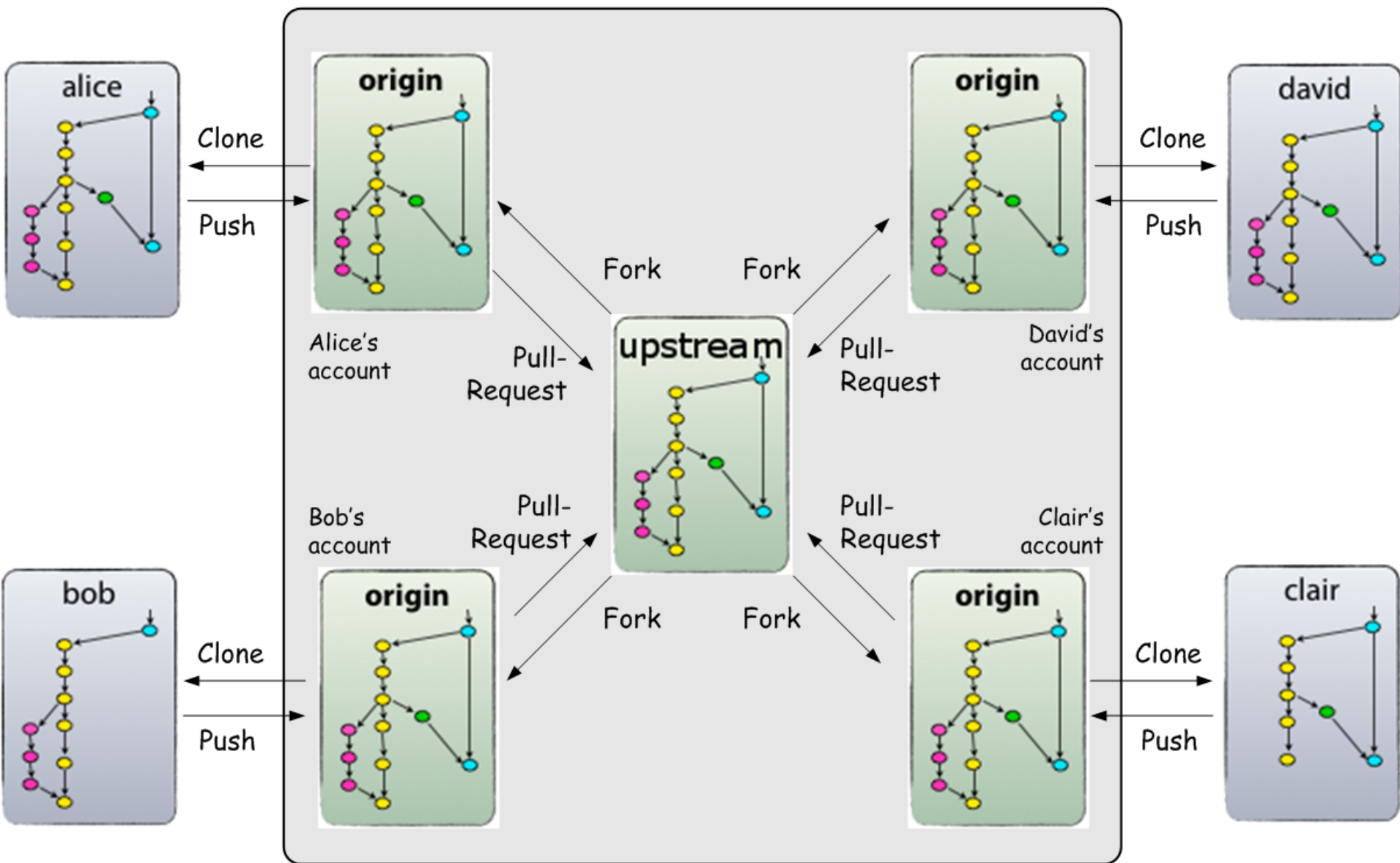


Collaboration

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



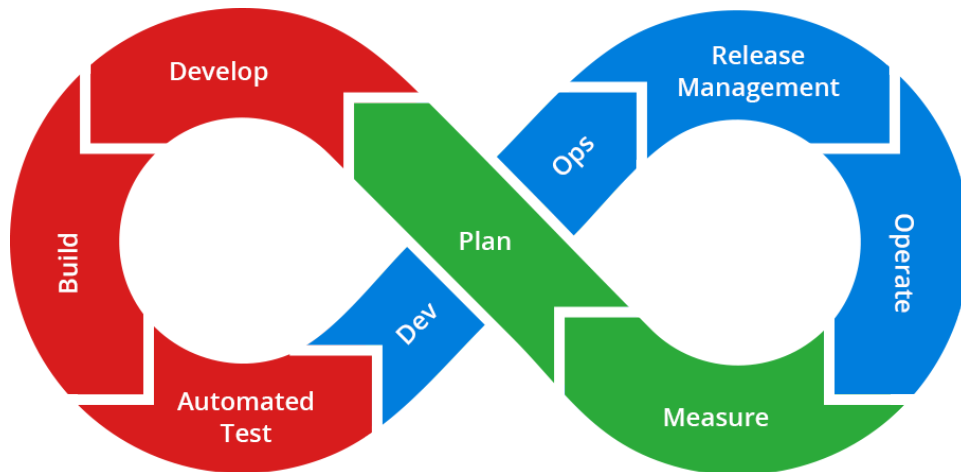
Collaboration



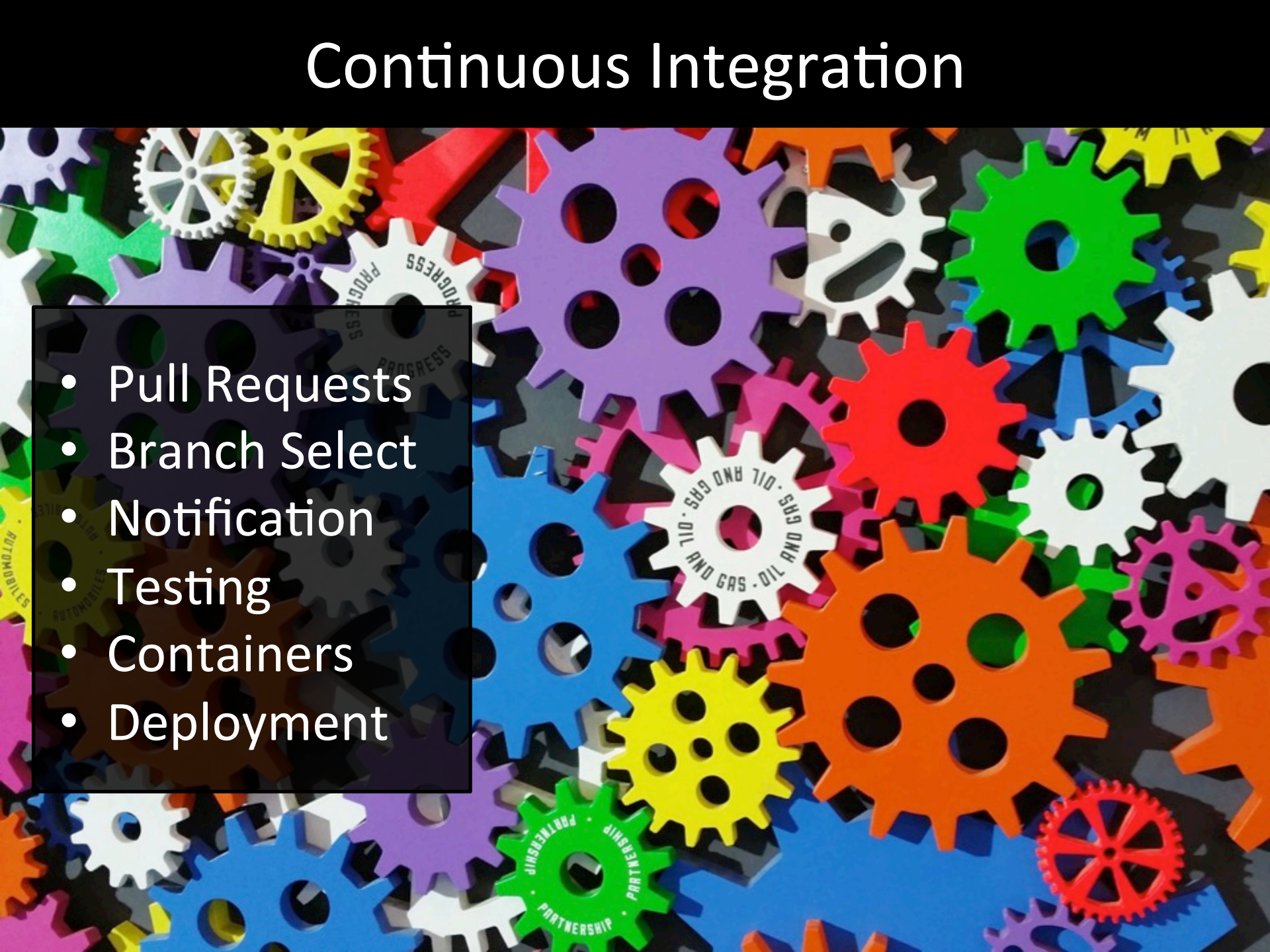
Continuous Integration



Continuous Integration



Continuous Integration

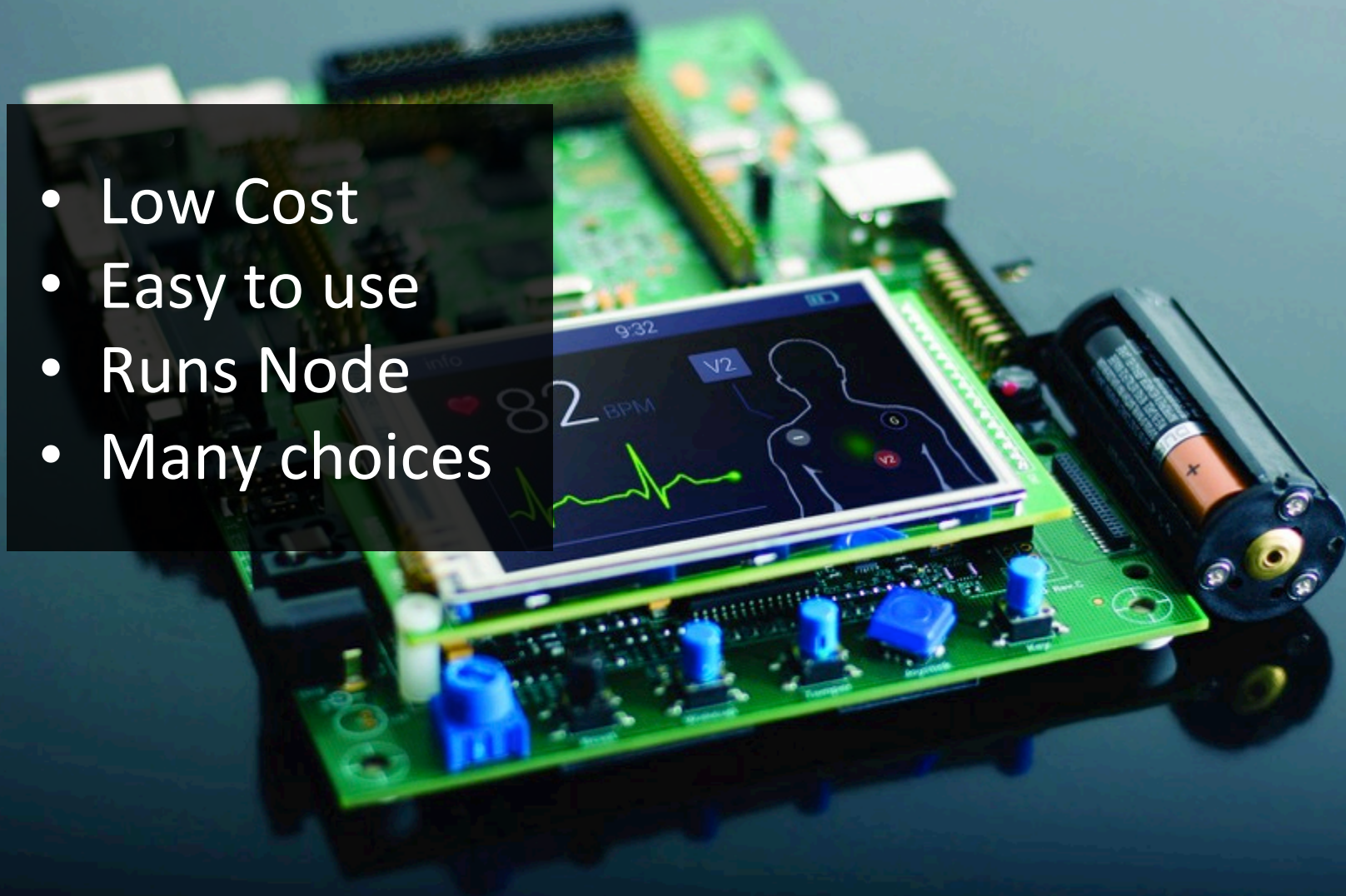
- 
- Pull Requests
 - Branch Select
 - Notification
 - Testing
 - Containers
 - Deployment

Big Data

- Volume
- Variety
- Velocity
- Transformations

Commodity Hardware

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



Security

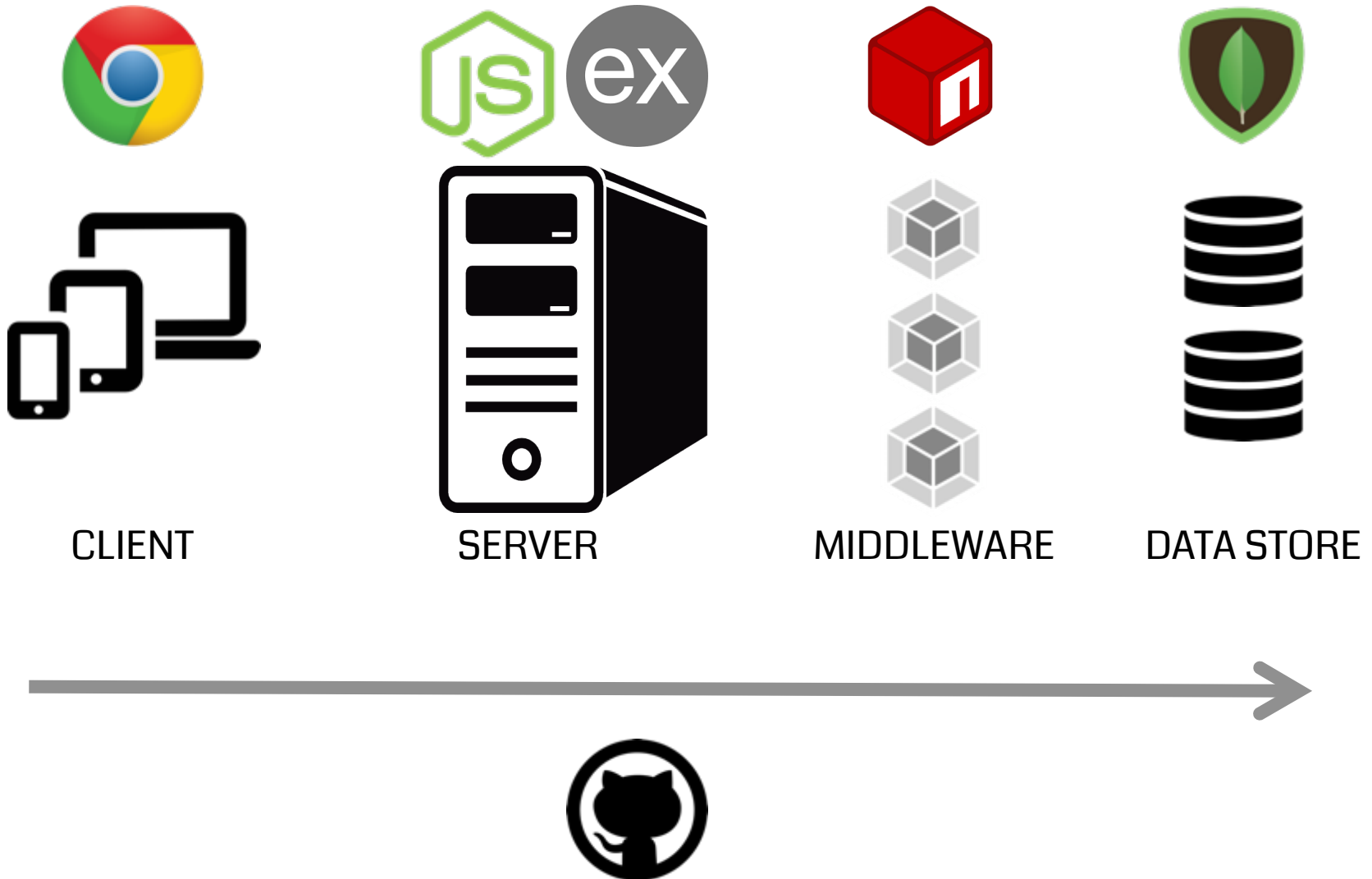
- Identify
- Protect
- Detect
- Respond
- Recover



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



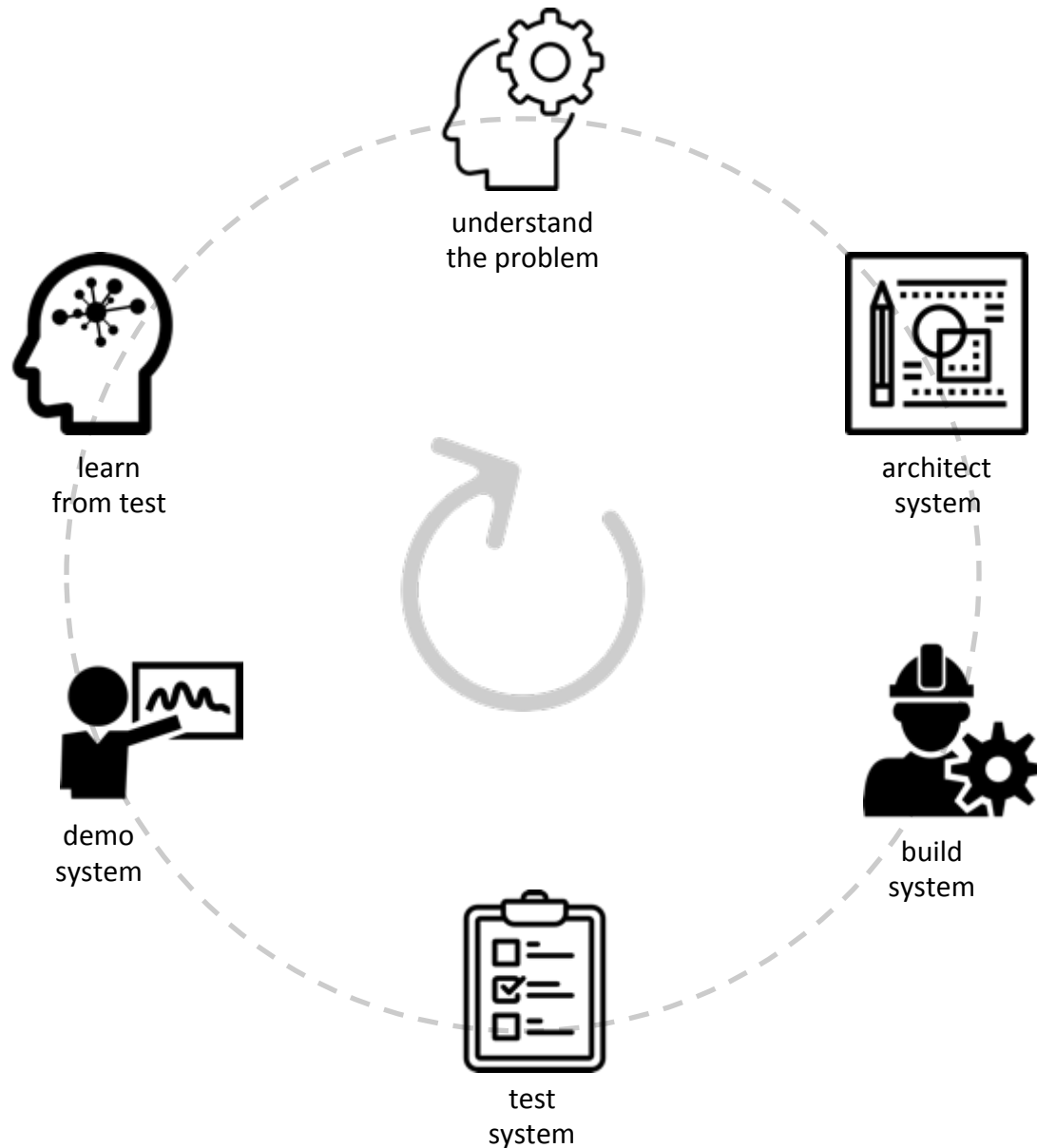
6,140,641,245

downloads in the last
month

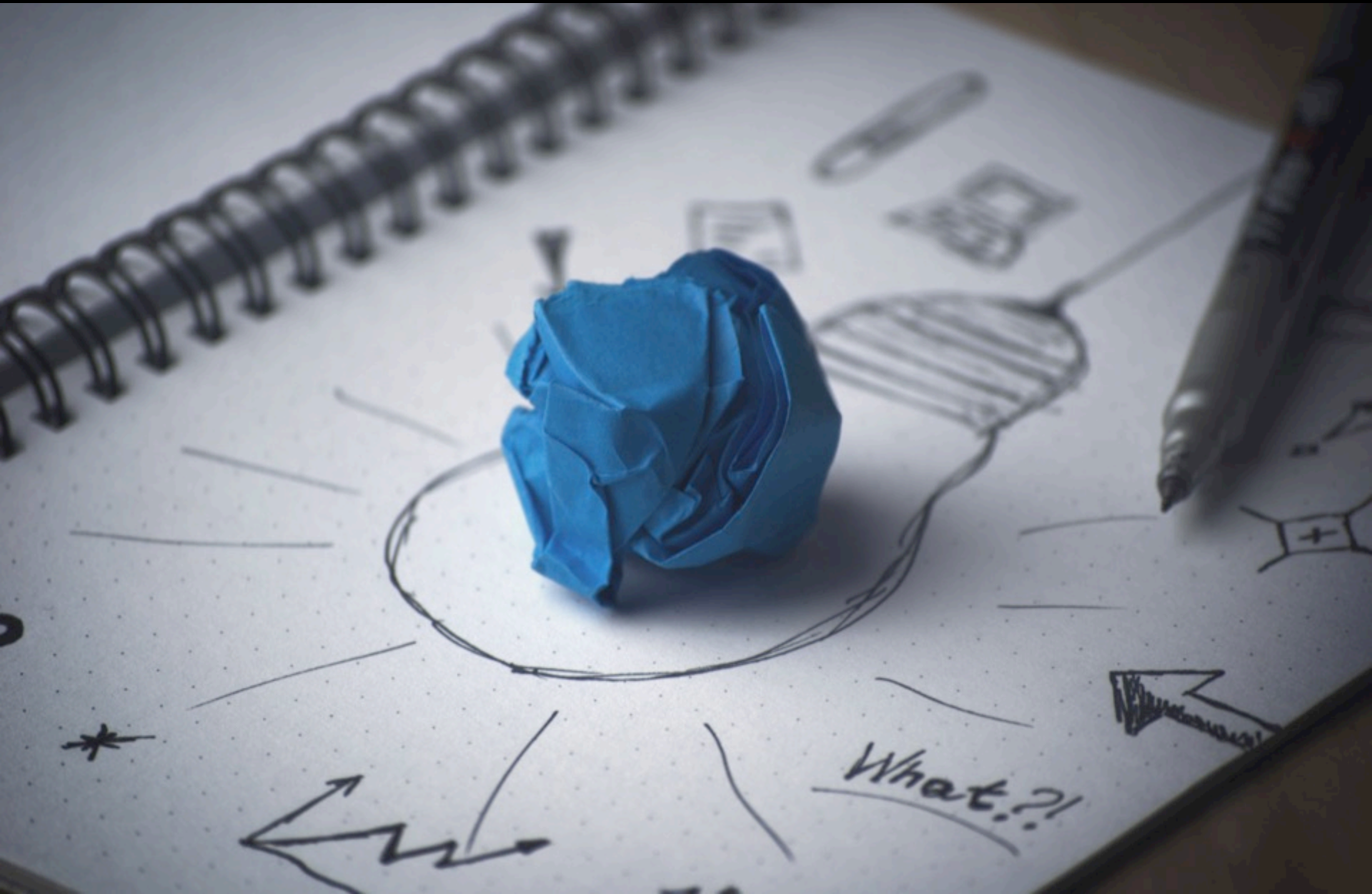
Construction Cycle



Complex Software System Cycle



Step 1: Understand the problem deeply



Step 2: Architect System



Step 3: Build System

WEEK 3: Design

4) WEEK 4: Design

16) WEEK 5: Design

3) WEEK 6: Dev

WEEK 7: DEV

Hosing & Shaping Setup

Finalize
API
Goals

Infrastructure Recs:
- Laravel + Backbone

Initialize
Declarations

Non maliziosa
Dottorabge

Crash
Fortunes
for .

← Create Fixtures for testing

Admin
Dashboard
BIE frame
work

Database
API
<(continuous)>

← Engineering

G/E Spring
(for All
Discordant
Views)
of Conclusion

(ton for
and voice)

Check all DB Tables

1

ADMIN

API

CRON

Automated
(Sand)
Crawl
B/E

Admission
Camp /
Study Year

15

11/11/11

1

1

Admission
Quintessential
Composure

1000

... (b) ...

1

100

10

Study
Date

Category	Sub-category	Value
Total	1990	100
	2000	100

1

111

1

1

10

2

115

Step 4: Test the System



Step 5: Demo System



Step 6: Learn



Step 7: Iterate

