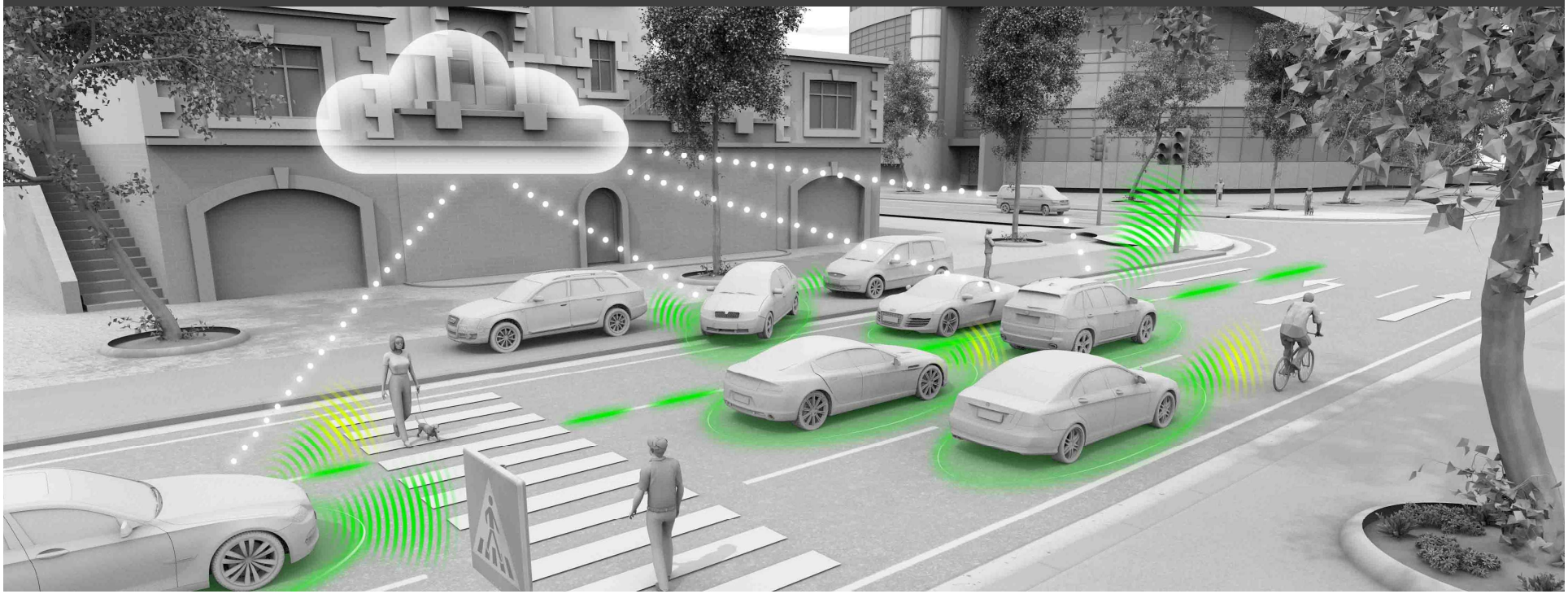
# EB Cloud behind Dirigo

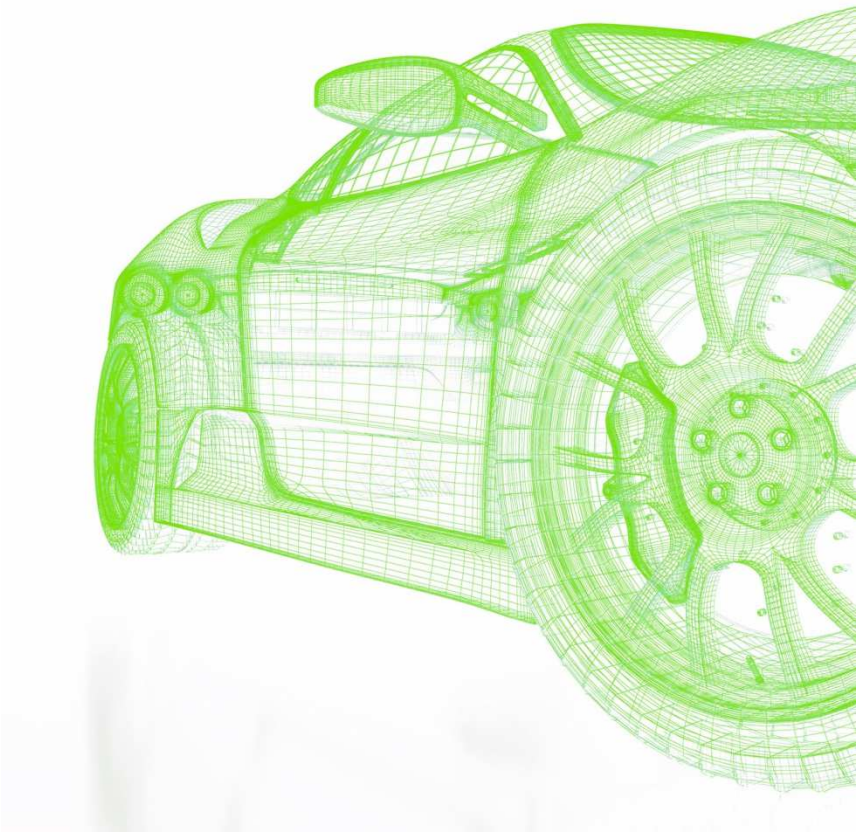
Elektrobit

Thomas Fleischmann, Rainer Hungershausen
5th June 2015



# Agenda

- EB Cloud
- How things were done in the past
- Cloud Computing
- Scalability
- Availability
- Cost & Operations
- Overview & Outlook



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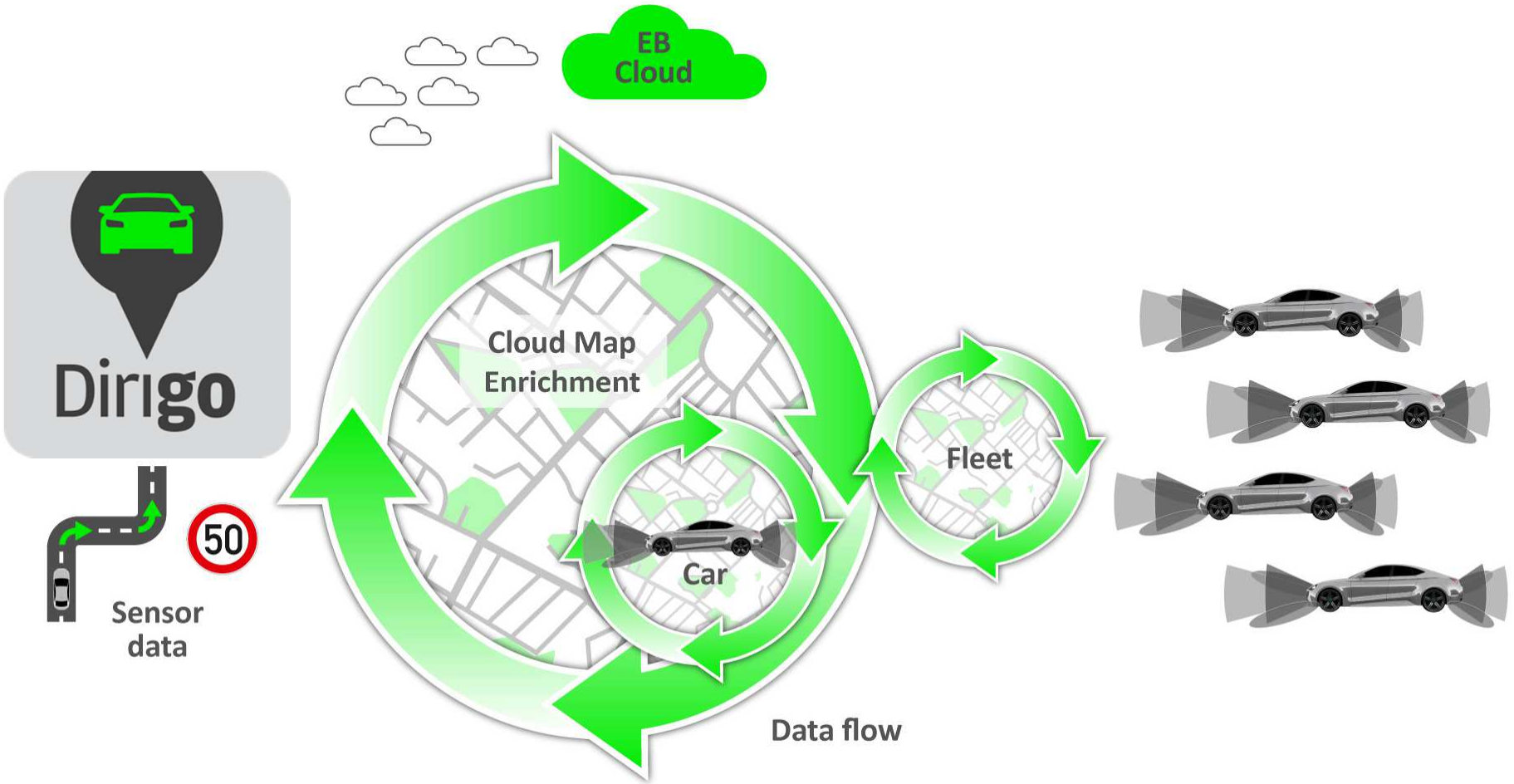
# EB Dirigo to kickstart the learning cloud

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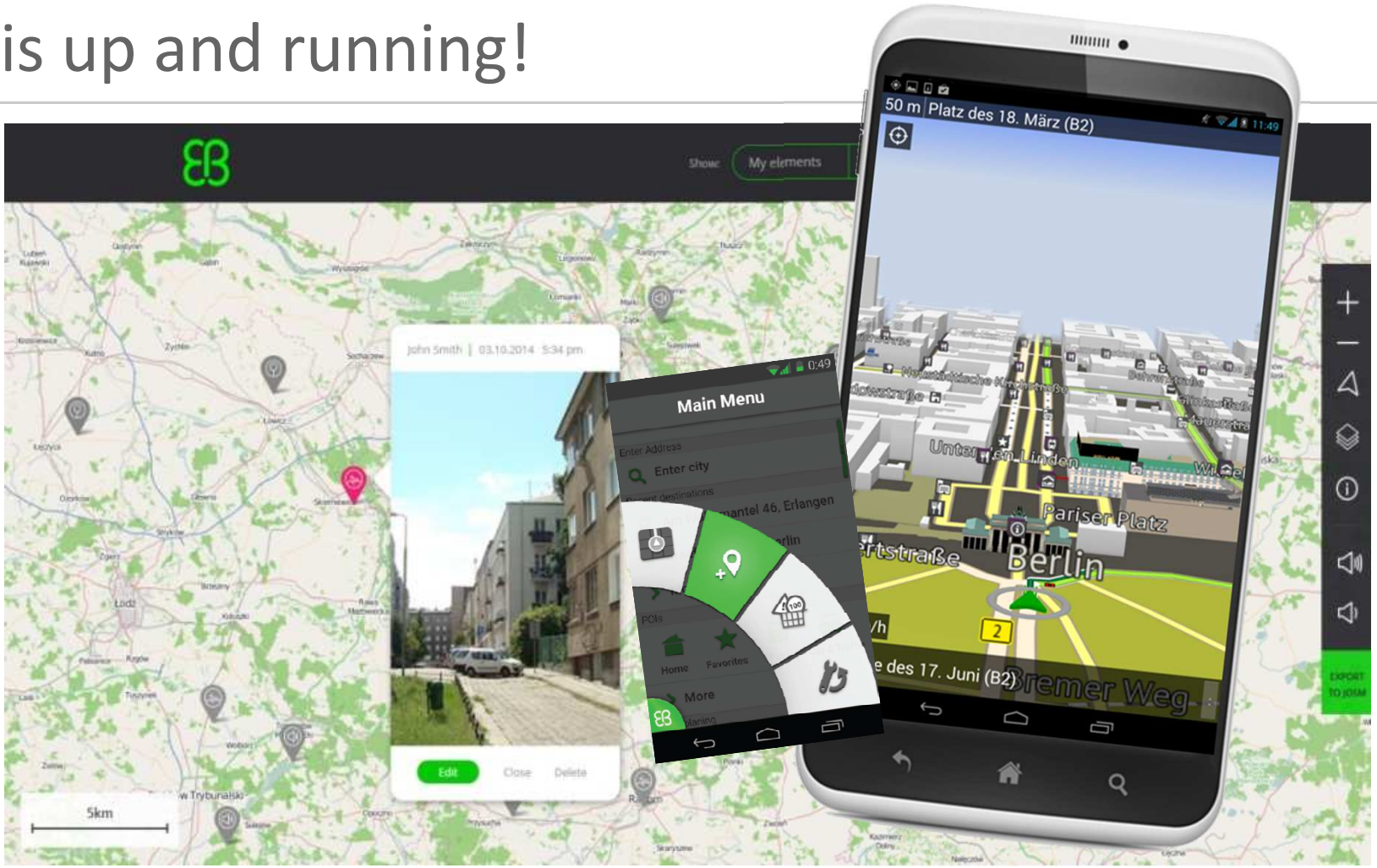
# It is up and running!




[www.ebdirigo.com](http://www.ebdirigo.com)

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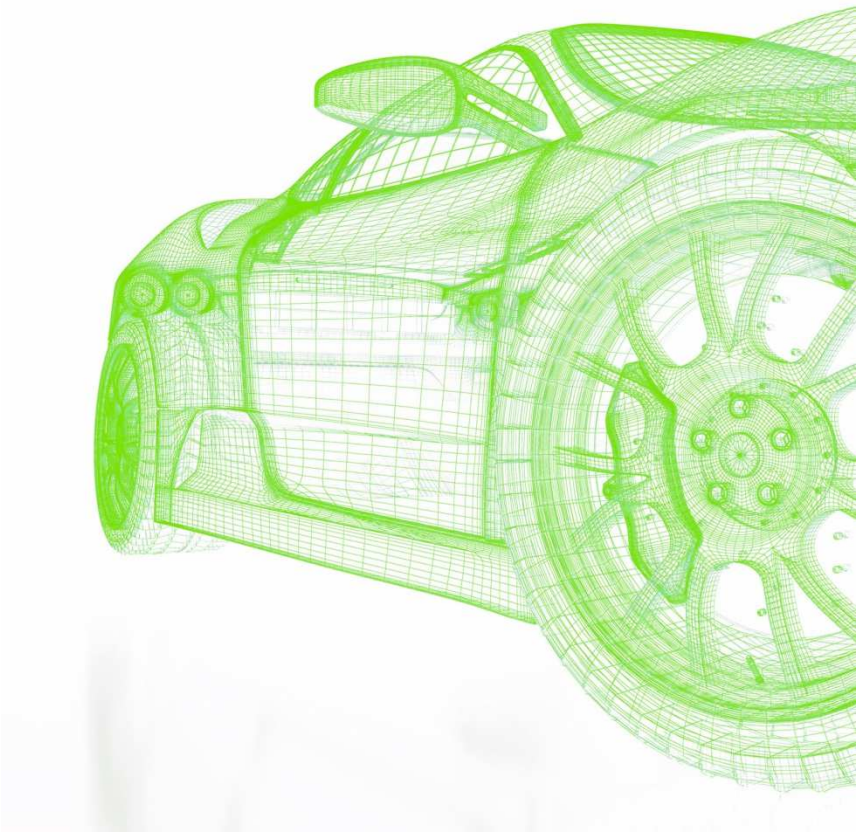

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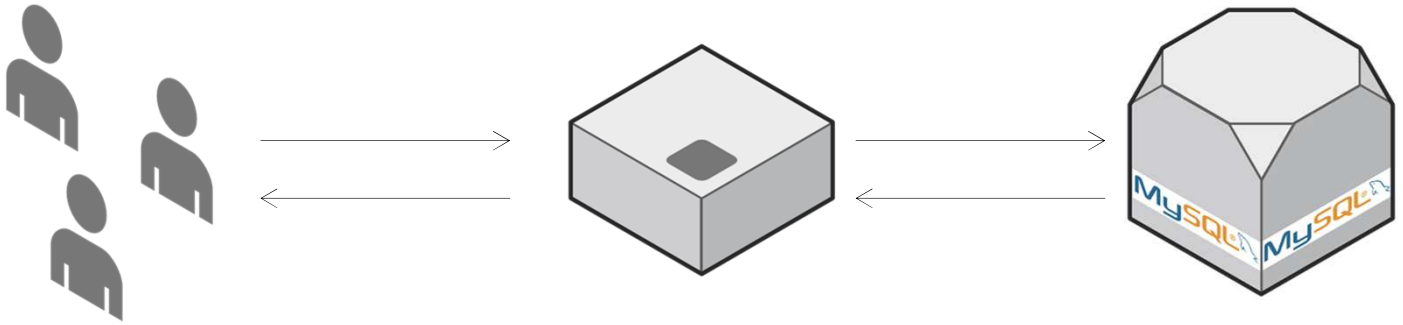
# Typical Multi-Tier Web Application




Clients

Application Server

Relational DB

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# Rollout at the customer’s site

- Maintenance window
- Migrate database
- Deliver application (.war file) to the customer
- Customer IT responsible for keeping the server alive

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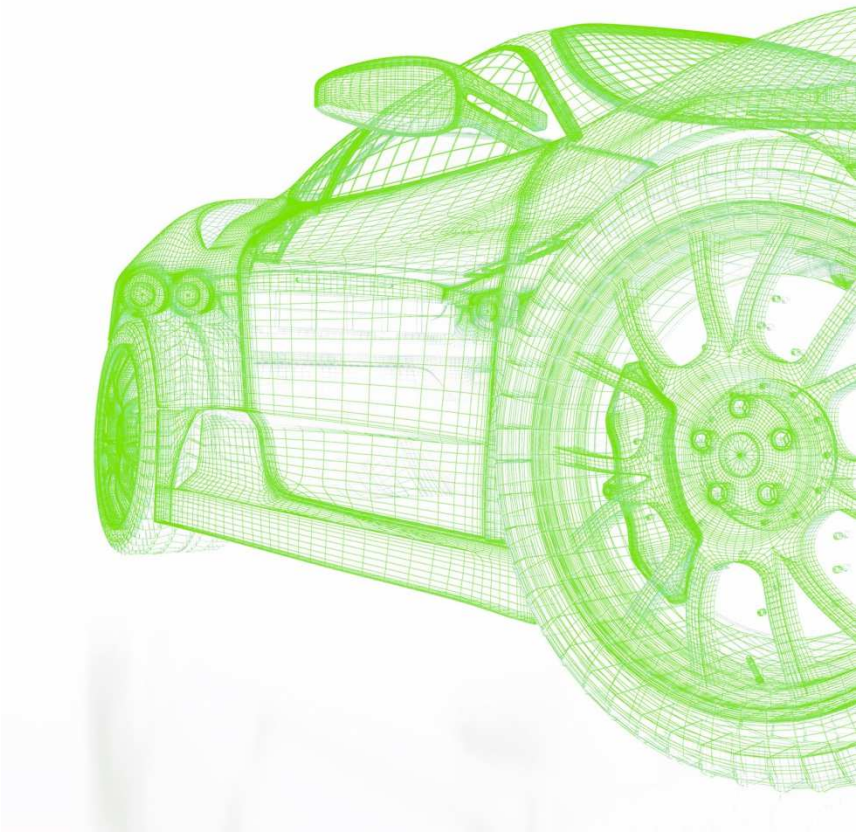

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# Cloud Computing

- Infrastructure as a Service (IaaS)
  - Virtual Machines
  - Load Balancers
  - Disk Storage
- Platform as a Service (PaaS)
  - Elastic Beanstalk/Lambda
- Software as a Service (SaaS)
  - Google Drive/Apple iCloud

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# Goals for the Dirigo cloud service

- Scalability
  - Expected a couple thousand users after launch
  - Later maybe cars in the millions
  - Fast response times for users
- Availability
  - No maintenance windows
  - Seamless software updates
  - Fault tolerance
- Cost reduction
  - Save cost in operations
  - Scale hardware costs with amount of users
- Security and Privacy

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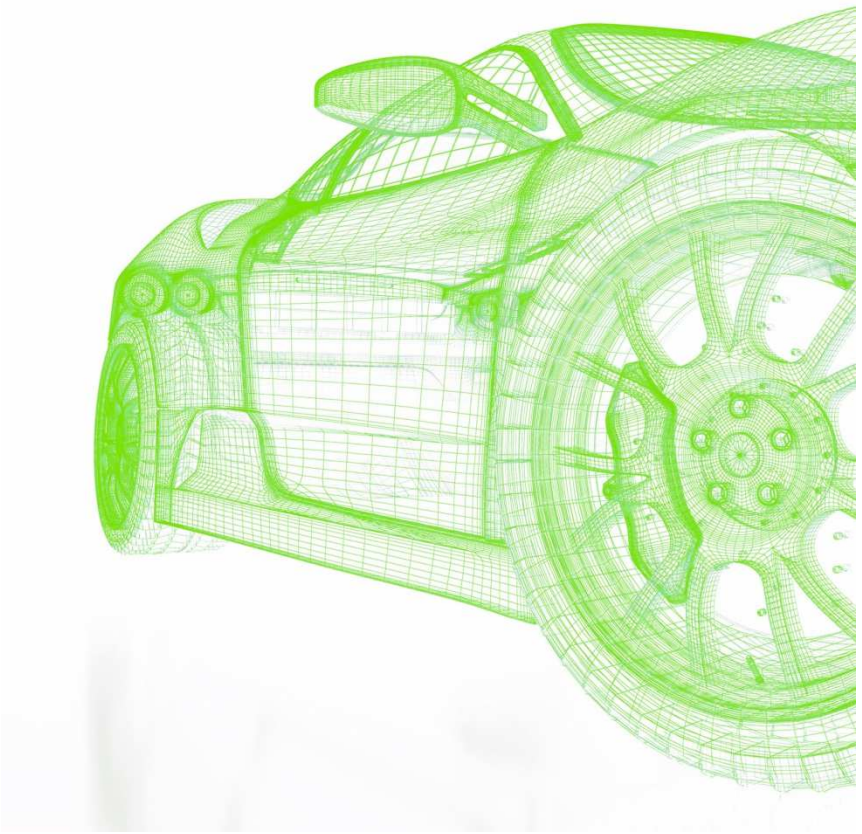

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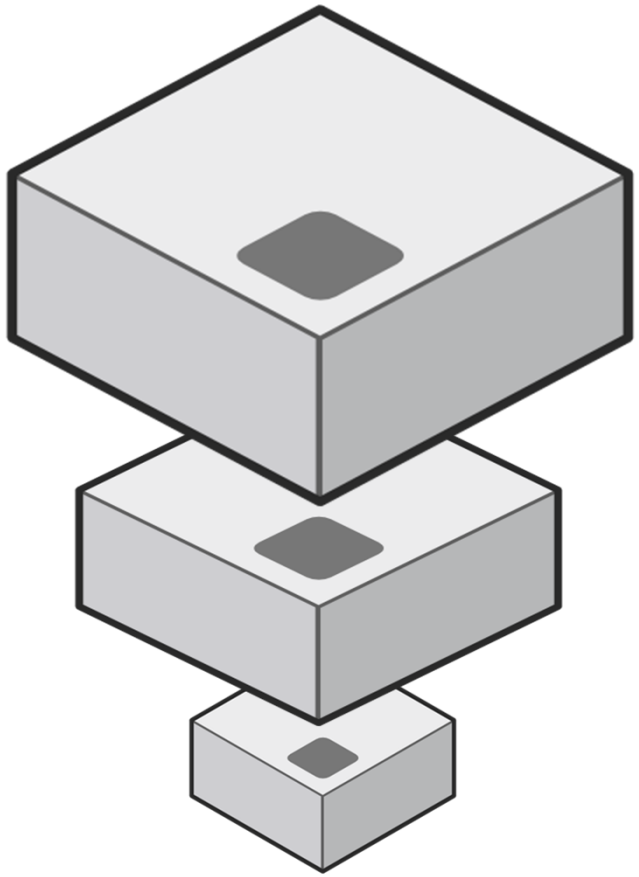
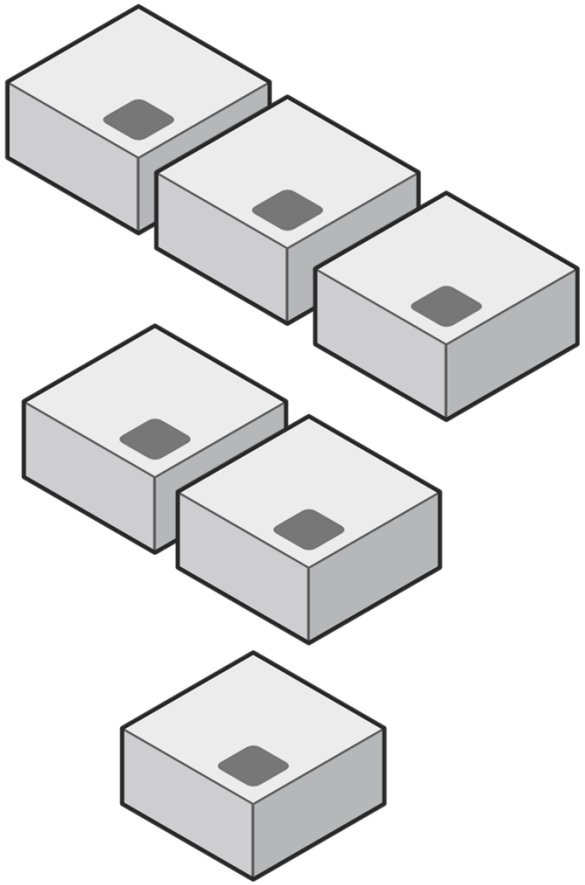
# Scaling types

Vertical / Scale up



Horizontal / Scale out



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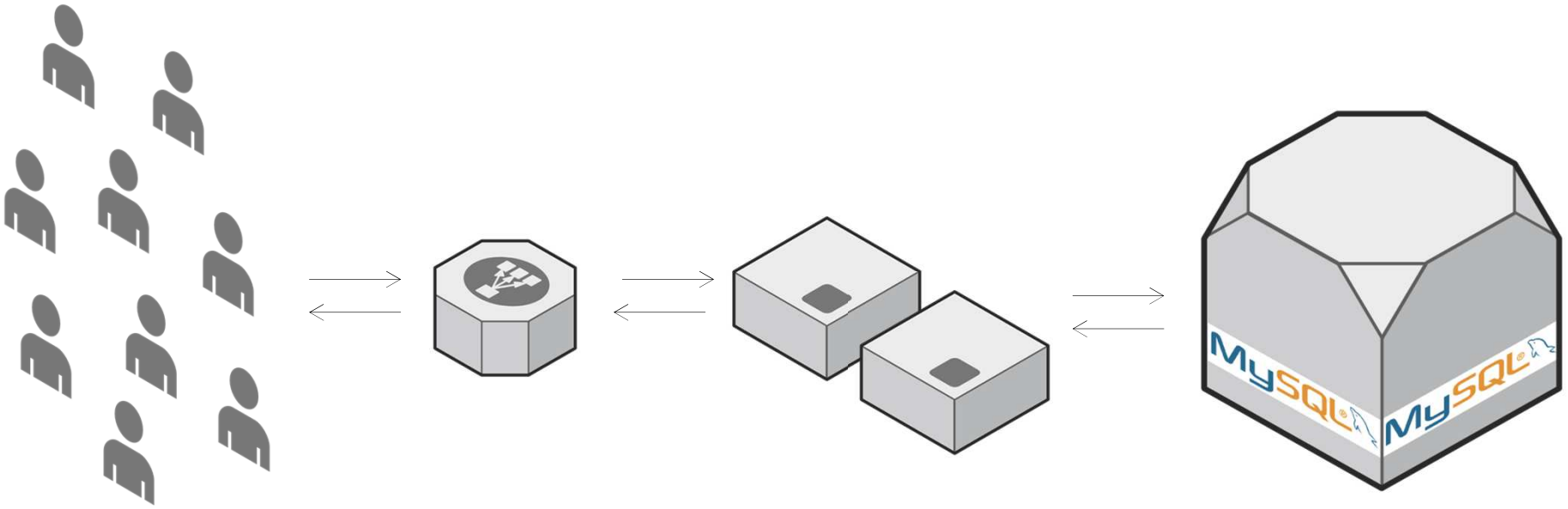
# Scaled web application




Clients

Load Balancer

Application Servers

Relational DB

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# NoSQL Databases

- Different types for different problems
- Often horizontally scalable
- Schema-less
- Think about data usage, then store for optimized access
- Good shard key is important
  - Avoid sequences
  - Pick one with a good distribution

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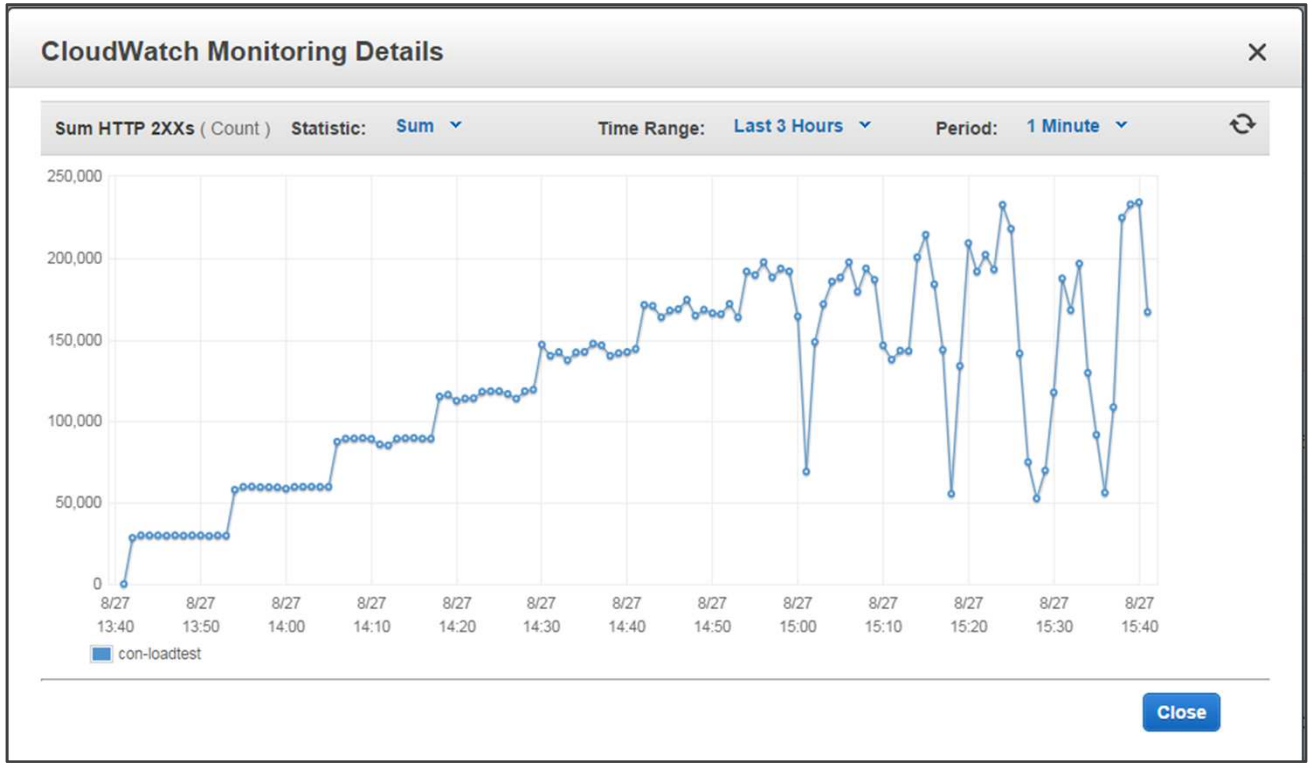
# Performance tests

- Find bottlenecks in the system
- Simulate typical workloads
- Ramp up the load until system saturates/collapses

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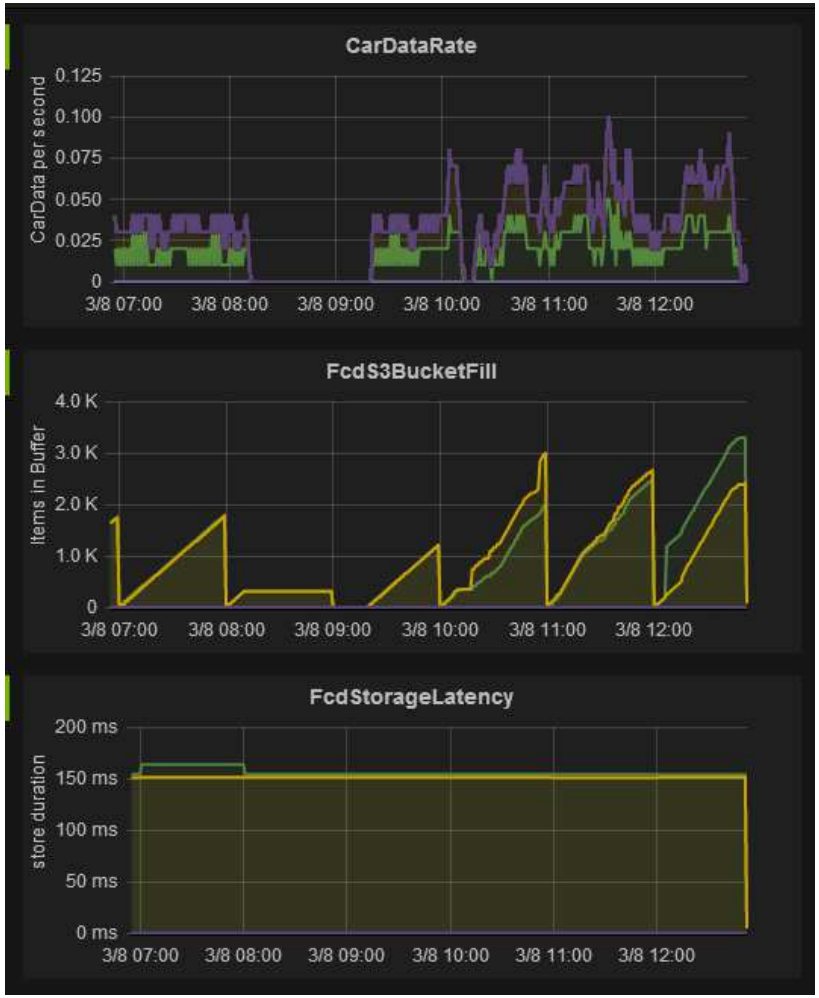
# Monitoring




- Environment
  - Amazon Cloudwatch
  - MongoDB MMS
- In-Application
  - Codahale Metrics
  - Graphite
  - Grafana
- OpsGenie for the devOps

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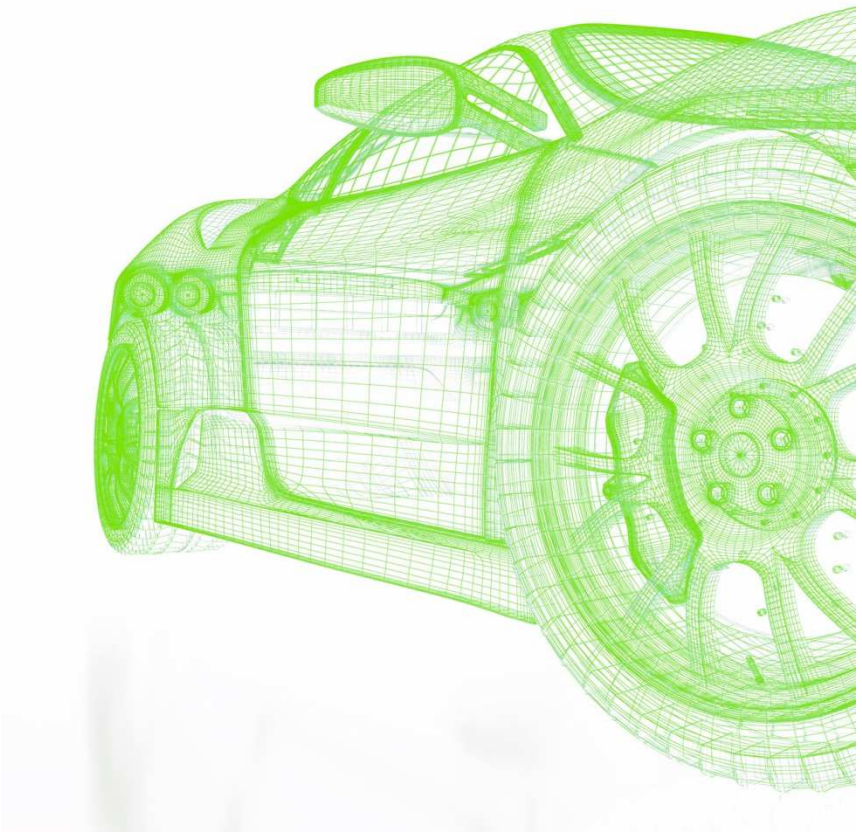

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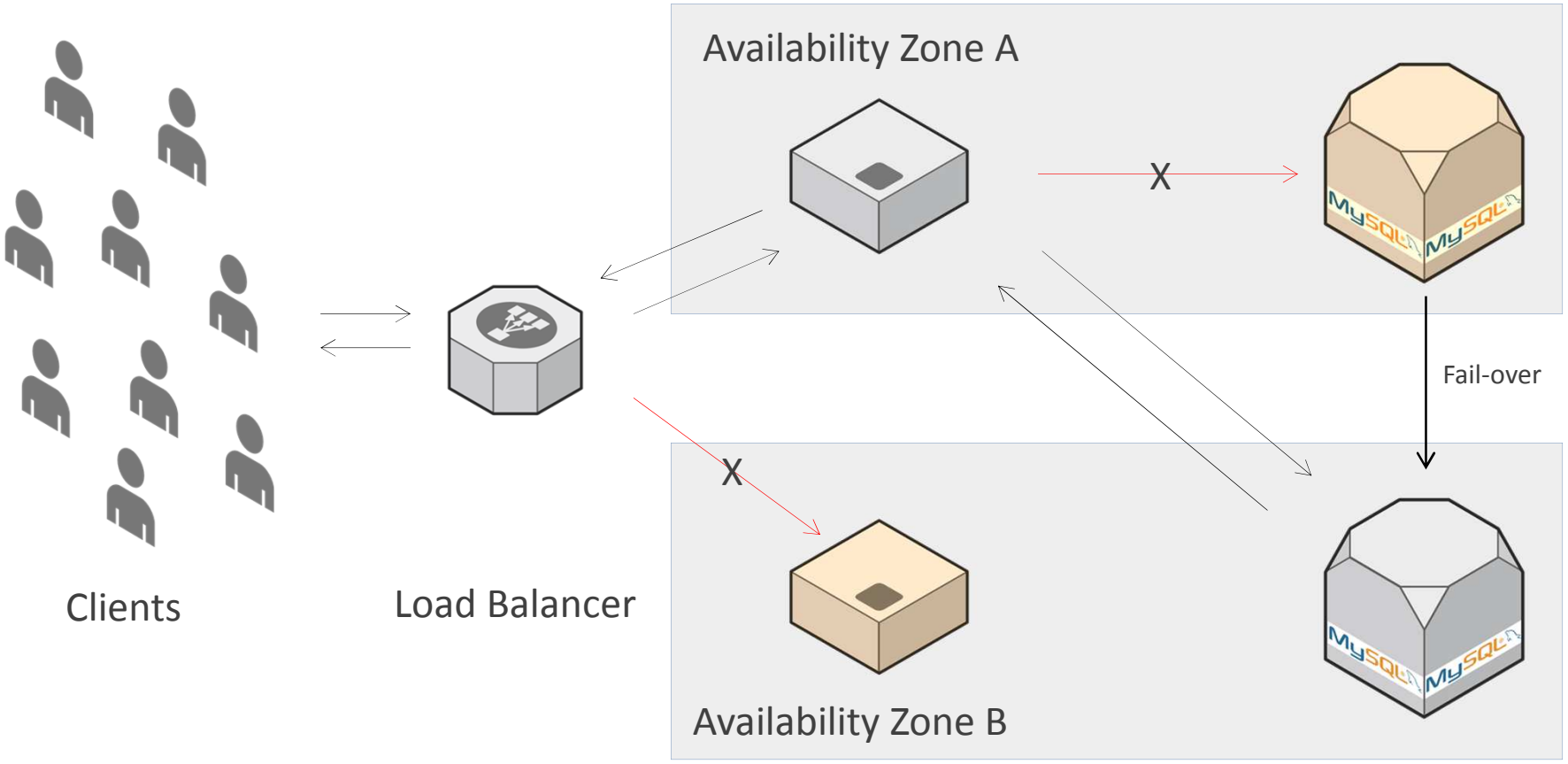
# Fault-tolerant web application

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# Avoid single points of failure

- Stateless application
- Disposable nodes
- Single LDAP server was replaced by DynamoDB
  (Multi-Master setup proved to be very difficult)
- PostgresDB was replaced by MongoDB Cluster
- WebMapper session fail-over using Hazelcast

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# Auto scaling

- Amazon automatically starts and stops nodes to match system load
- Auto scaling supports multiple availability zones
- Auto scaling even for a single instance (Watchdog for cron job node)

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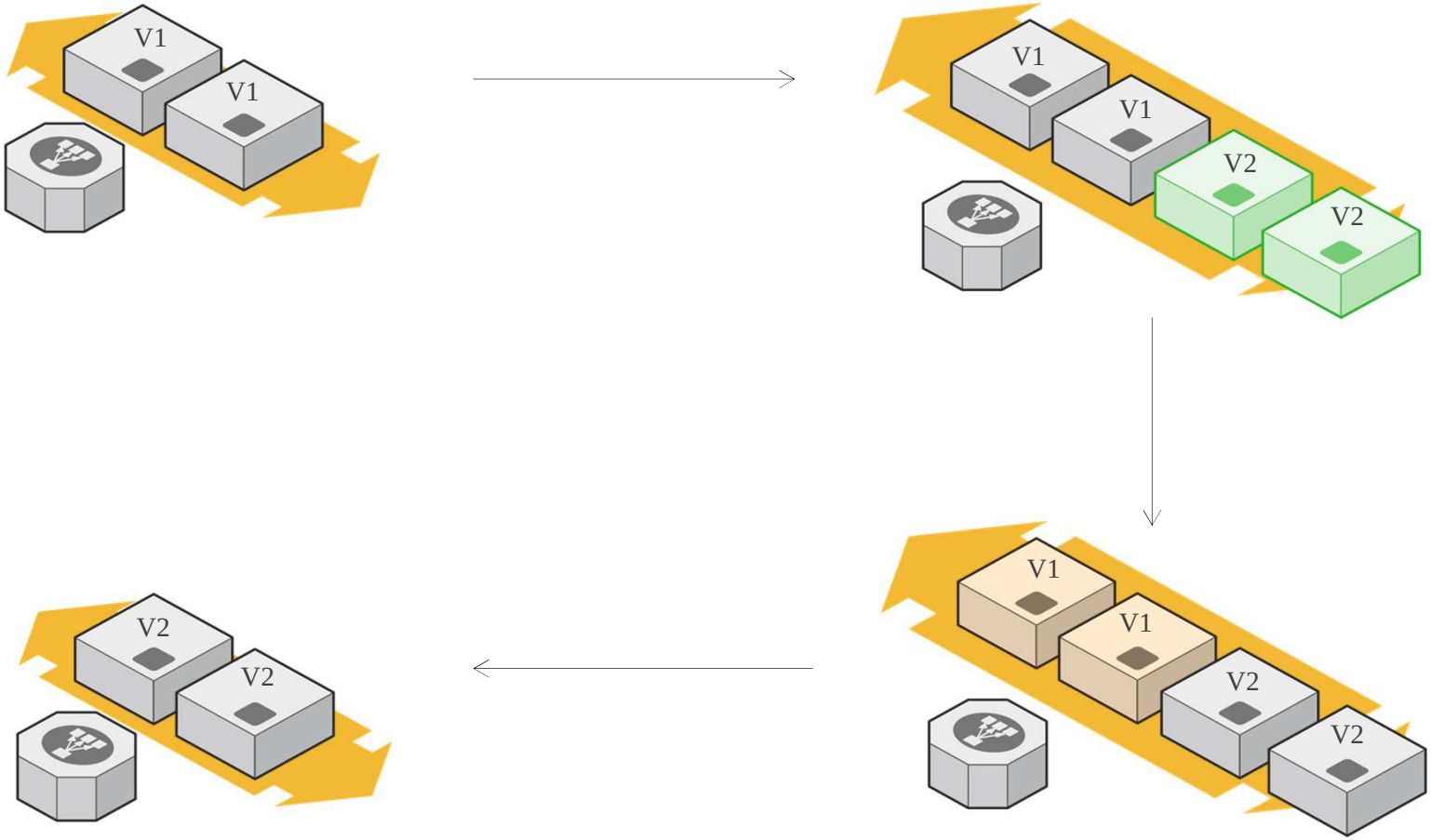
# What happened?

# Rolling Updates

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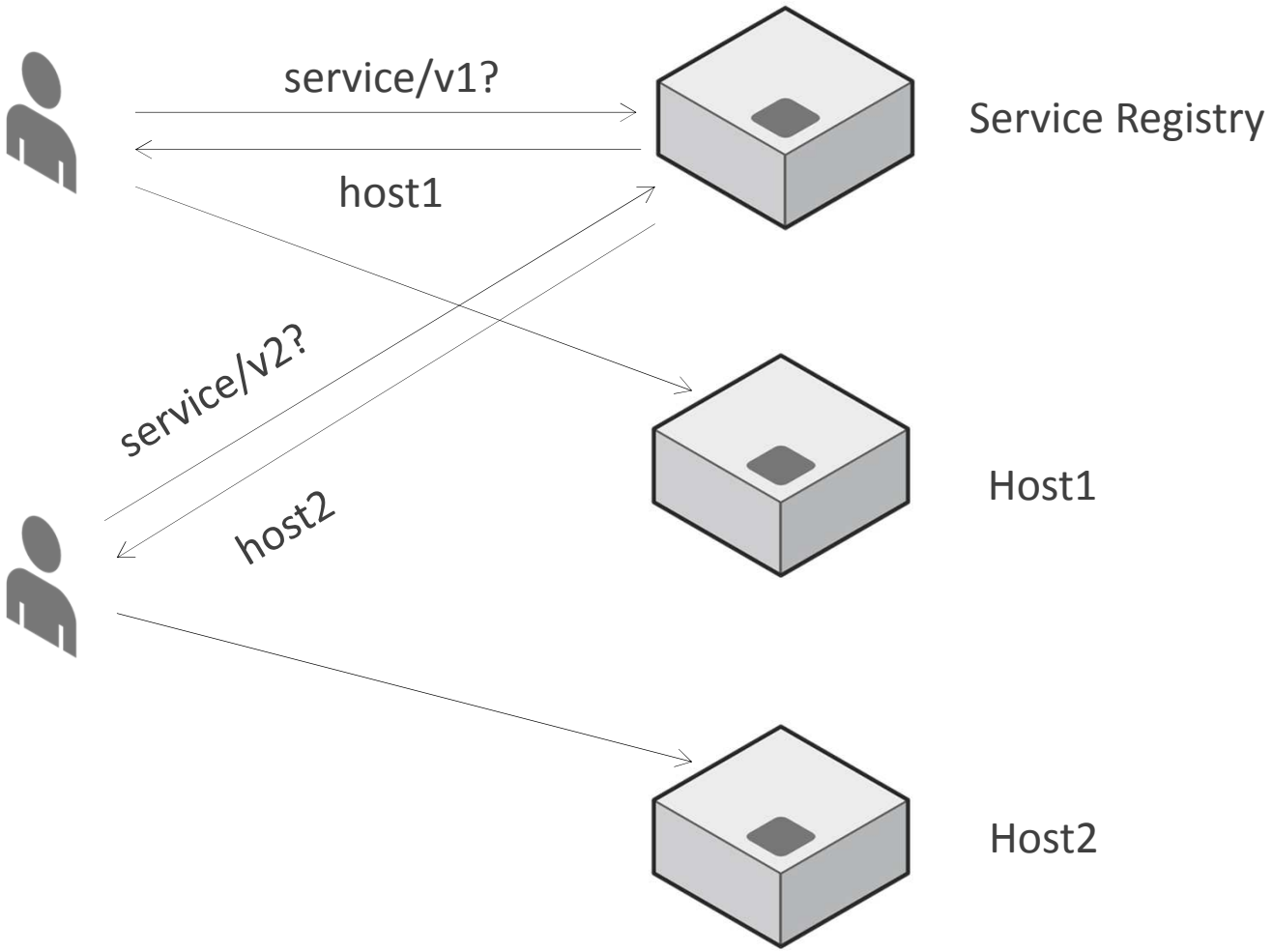
# Service Discovery

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# Global scaling and fail-over

- Cloudfront used for fast global map download
- Global request routing using DNS (Route53)
- Potential deployment in different AWS regions world wide

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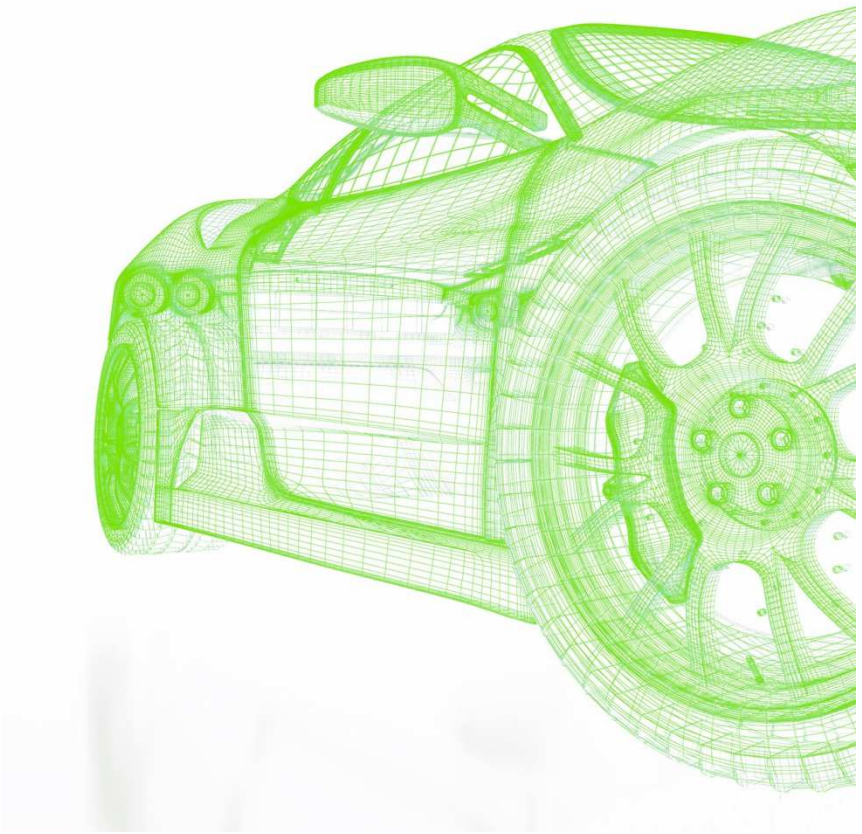

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# Deployment learnings

- Select the right machine type for the job
- Automate using auto-scaling (No manual intervention necessary)
- Use PaaS when possible (No overhead maintaining machine images)
  - Elastic beanstalk
- Avoid DIY, use managed services where possible
  (Potential drawback: Vendor lock-in)

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# Security & Operation

- Separate AWS accounts for production data
- Strict role & rights management
- External company for security audit
- Limited access to production data & DB encryption for data security

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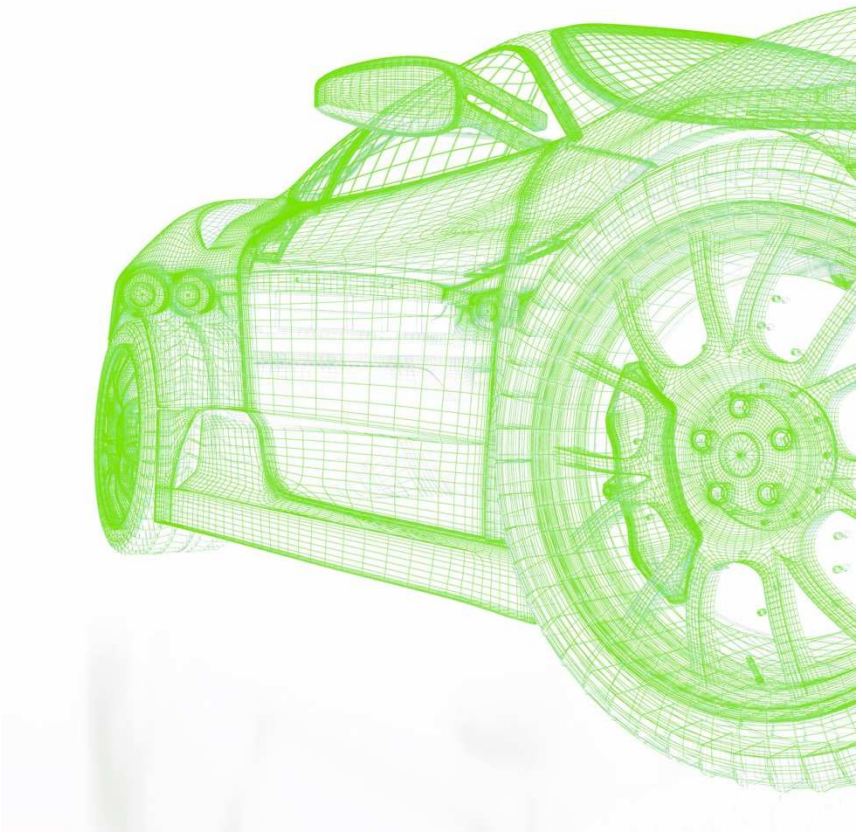

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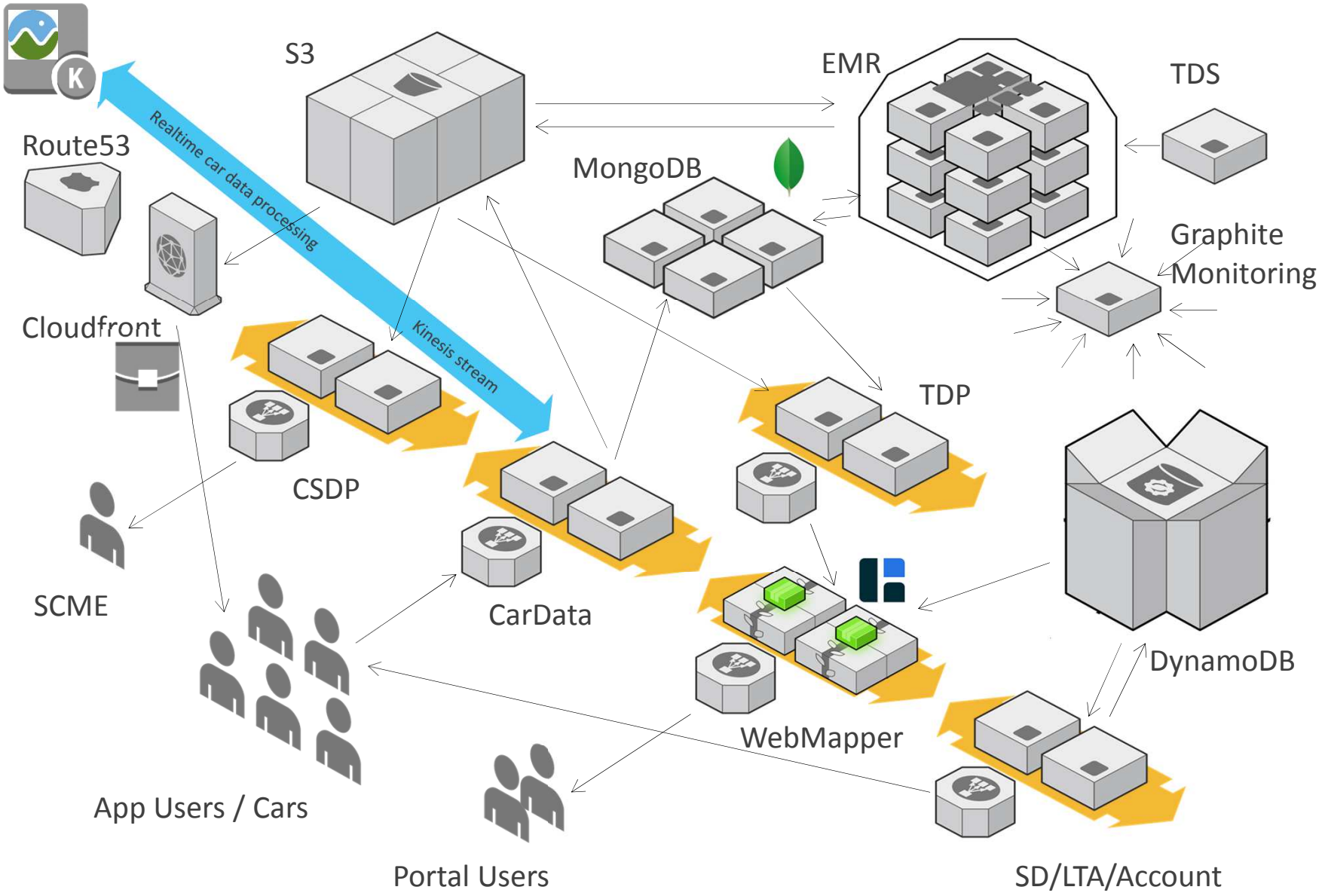


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# Contact us!

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