MicroService Challenges

Fred George

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Fred George

- Programmer
  - Since 1968 (Basic)
  - 65,000 hours experience
  - 70+ languages
  - Computer Science Degree 1973
- Manager
  - 17 years IBM
  - Business degree, MIT Sloan School 1986
  - Product Owner, IBM
  - VP, ThoughtWorks
  - Co-founder, Outpace (Silicon Valley)
  - Senior Advisor to 3 tech companies

- Technologist
  - Computer networks – 70's
  - Token Ring LAN – 80's
  - GUI's – late 80's
  - OO – late 80's
  - Agile – late 90's
  - MicroServices – mid-2000's

Fred George

Consulting Roles

- Change Agent
- Disruptor
- "Hand grenade I am throwing into development"
  - CTO describing Fred to his Vice President

Why Now?

Lean startup

Managerless process

Cassandra

Programmer anarchy

MicroServices

Docker

Go Faster

Dev/Ops

Cloud

Full-stack developer

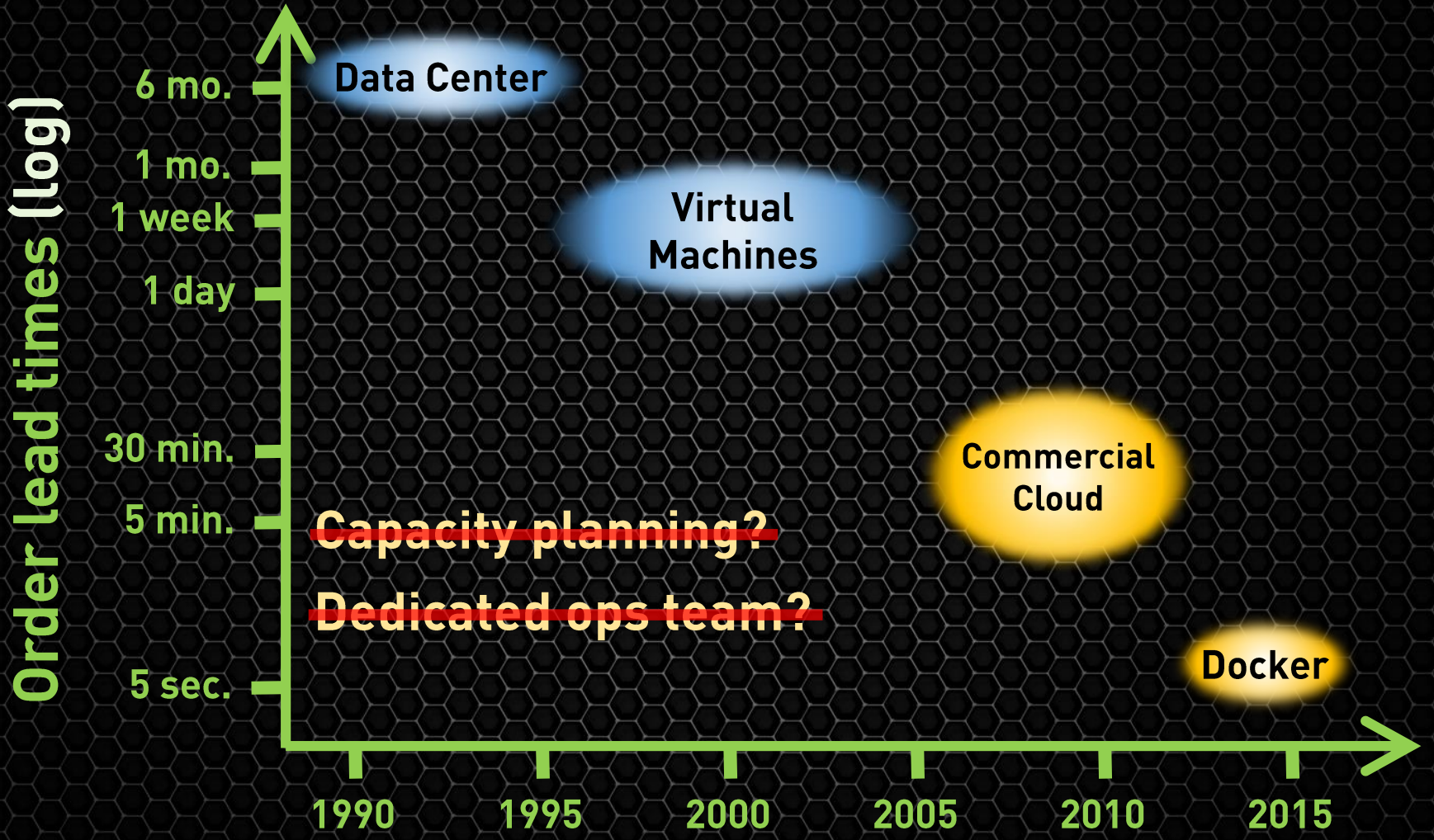
Agile

Event bus

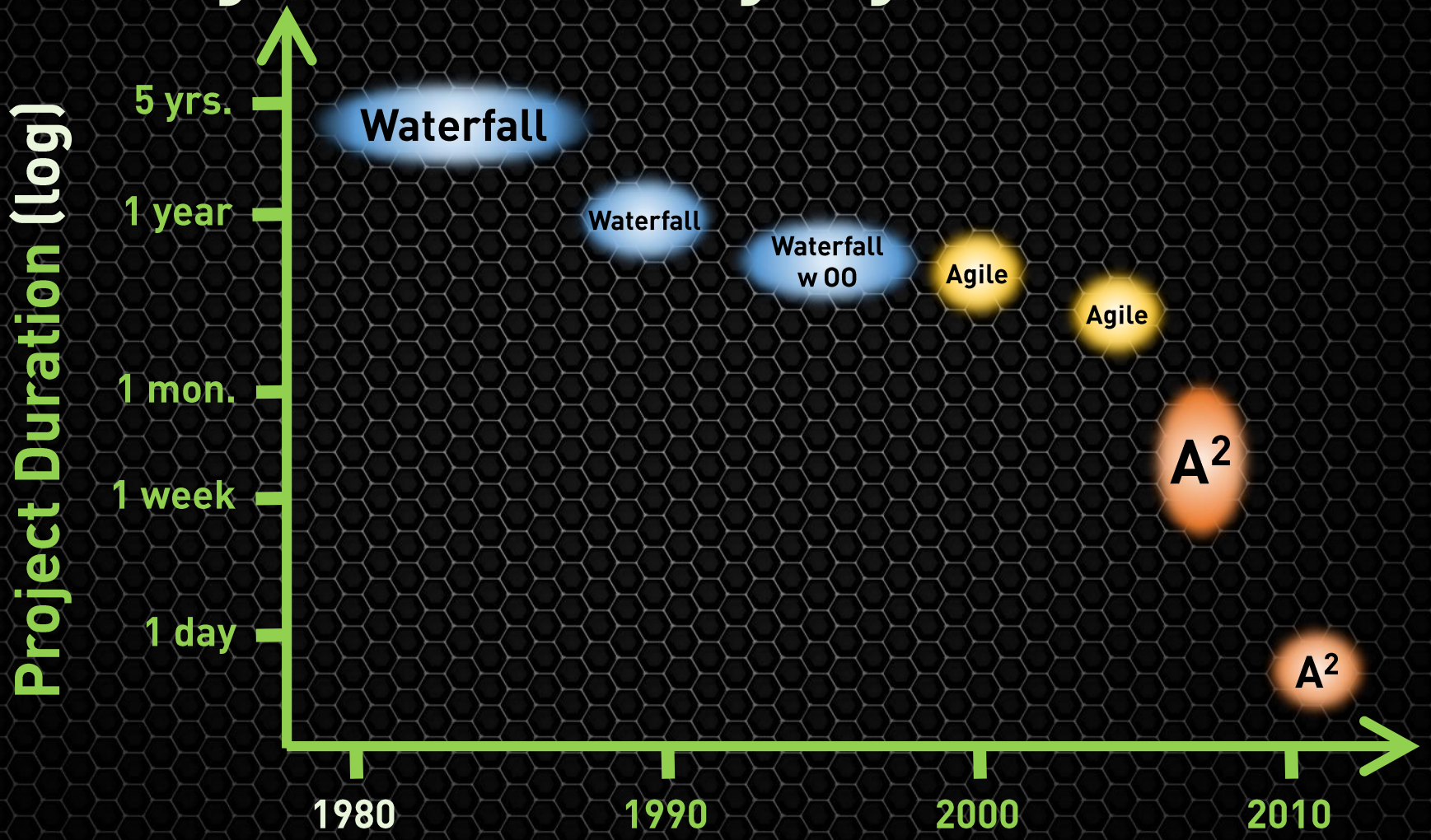
MVP (minimum viable product

No-SQL

Hardware Lead Times



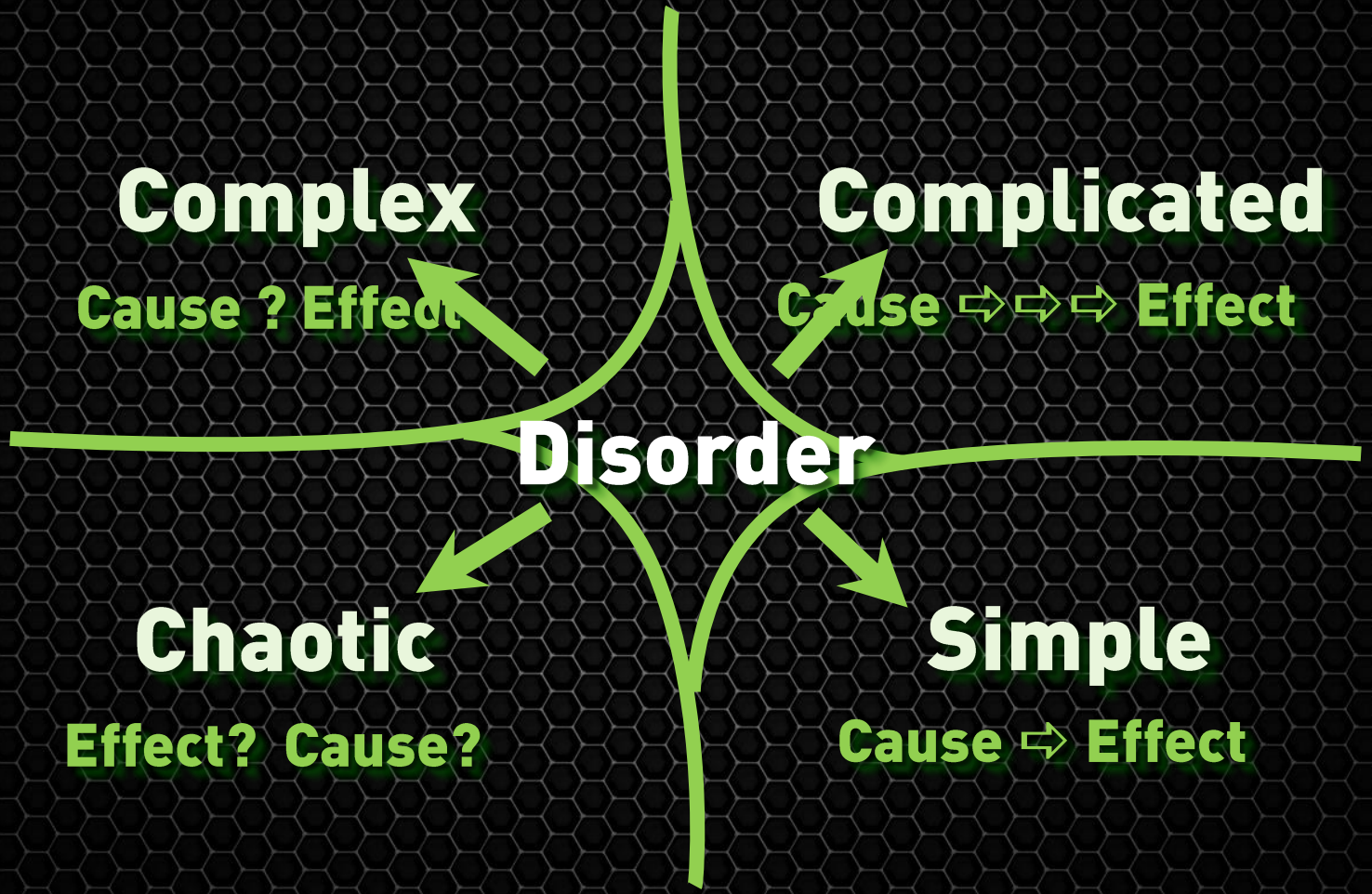
Project Delivery Cycles



How Fast Can You Go?

Deployment to Production Every 3.5 minutes

Why: New Problem Domains: The Cynefin Framework



Why: Competition is coming

- Enablement through technologies
  - Cloud computing
  - Ubiquitous, high bandwidth
  - Languages (and supporting frameworks)
- Recognition of business opportunities
  - Silicon Valley innovators as role models
  - Accelerating business needs
  - Few inhibitors for global competitors
  - Reduction of entry barriers for niche competitors

Summary Principles of MicroServices

- Very, very small
- Team size of one to develop/maintain
- Loosely coupled (including flow)
- Multiple versions acceptable (encouraged?)
- Self-monitoring of each service
- Publish interesting "stuff" (w/o explicit requirements)
- "Application" seems to be a poor conceptualization

Common Theme of All Challenges:

Inexperience!

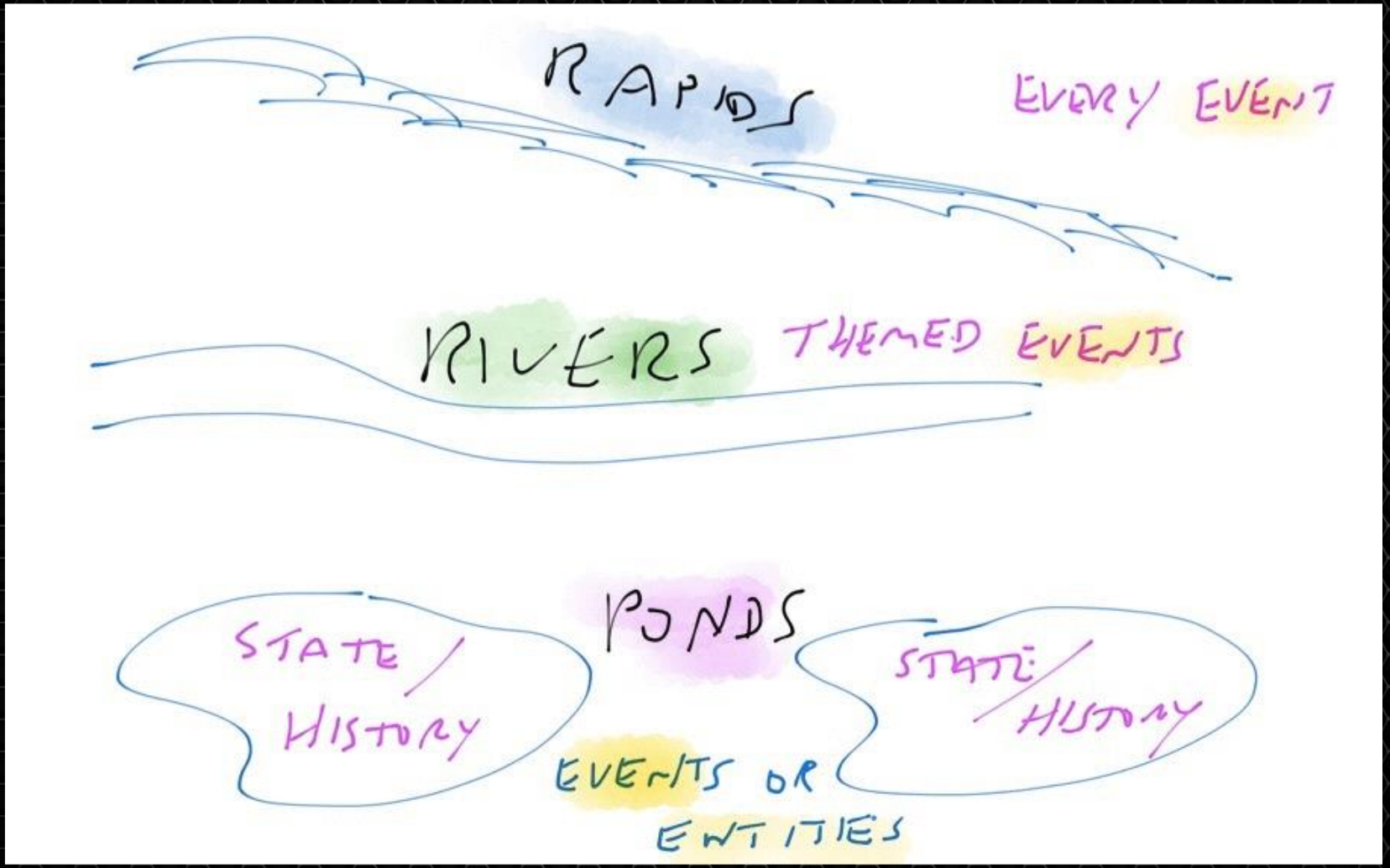
Challenge 1

Deconstructing the Databases

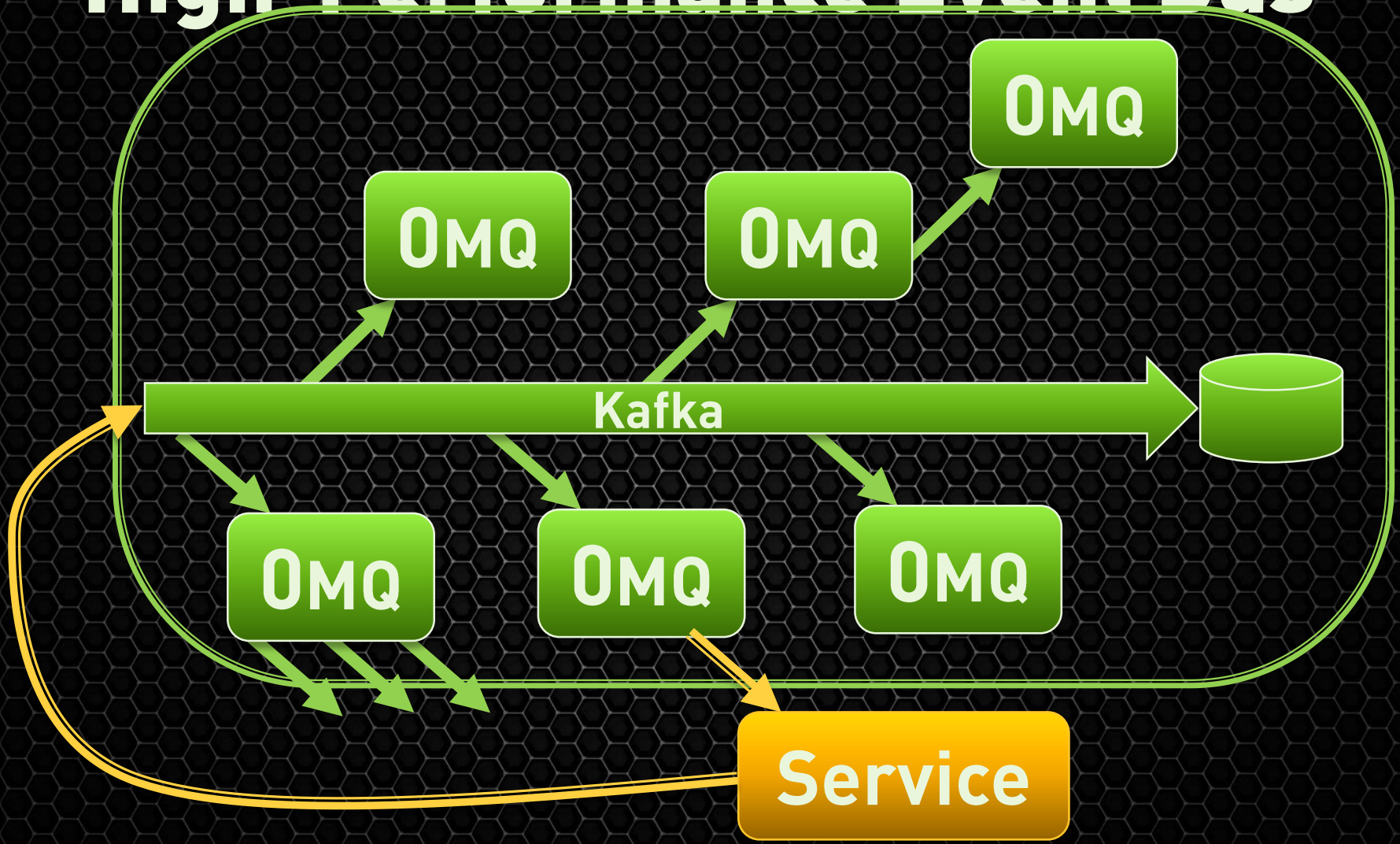
How Many Databases?

- Fortune 100 view:
  - Entity-oriented; consistency essential
  - As few as possible
- MicroService view:
  - Event bus replaces operational database
  - DB per MicroService (if persistence needed)
  - Poly-glot (various NoSQL, SQL)
  - Few (10%) writable; even fewer transactional

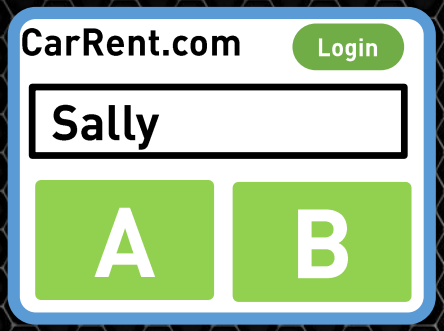
Rapids, Rivers, and Ponds



High-Performance Event Bus



Incremental Applications



Car rent

Rental offers

Legacy server

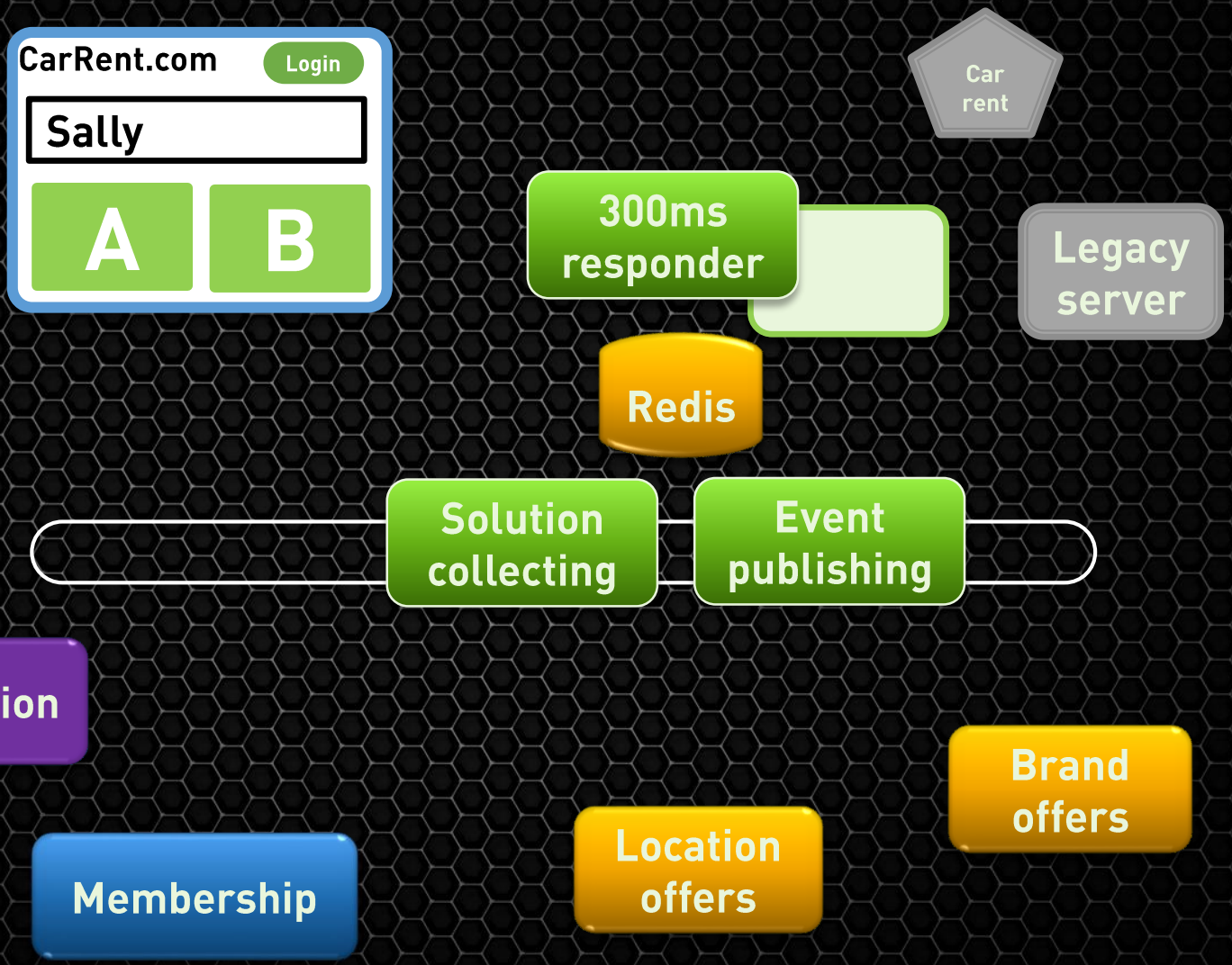
Event Bus

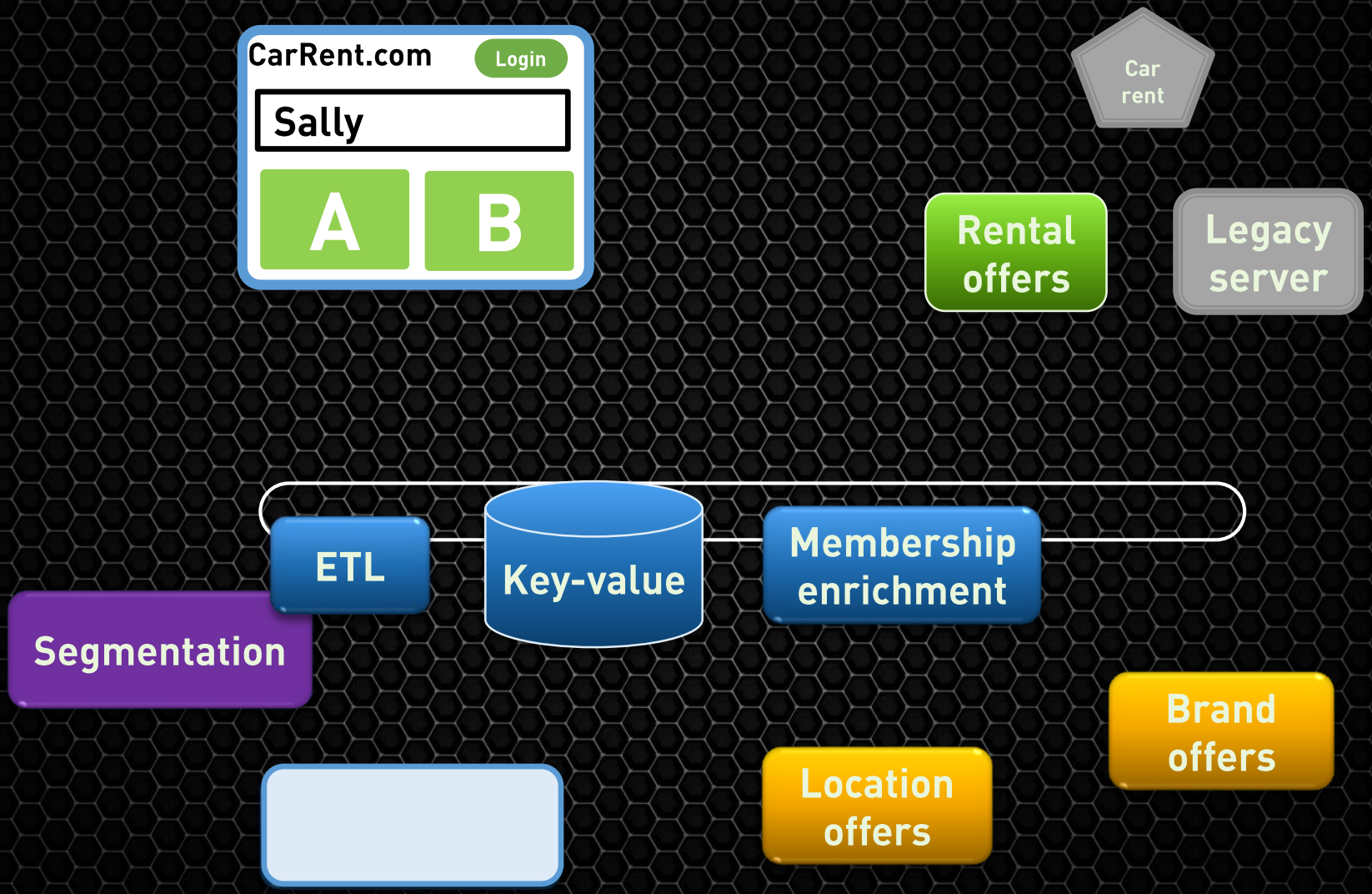
Segmentation

Membership

Location offers

Brand offers





Challenge 2

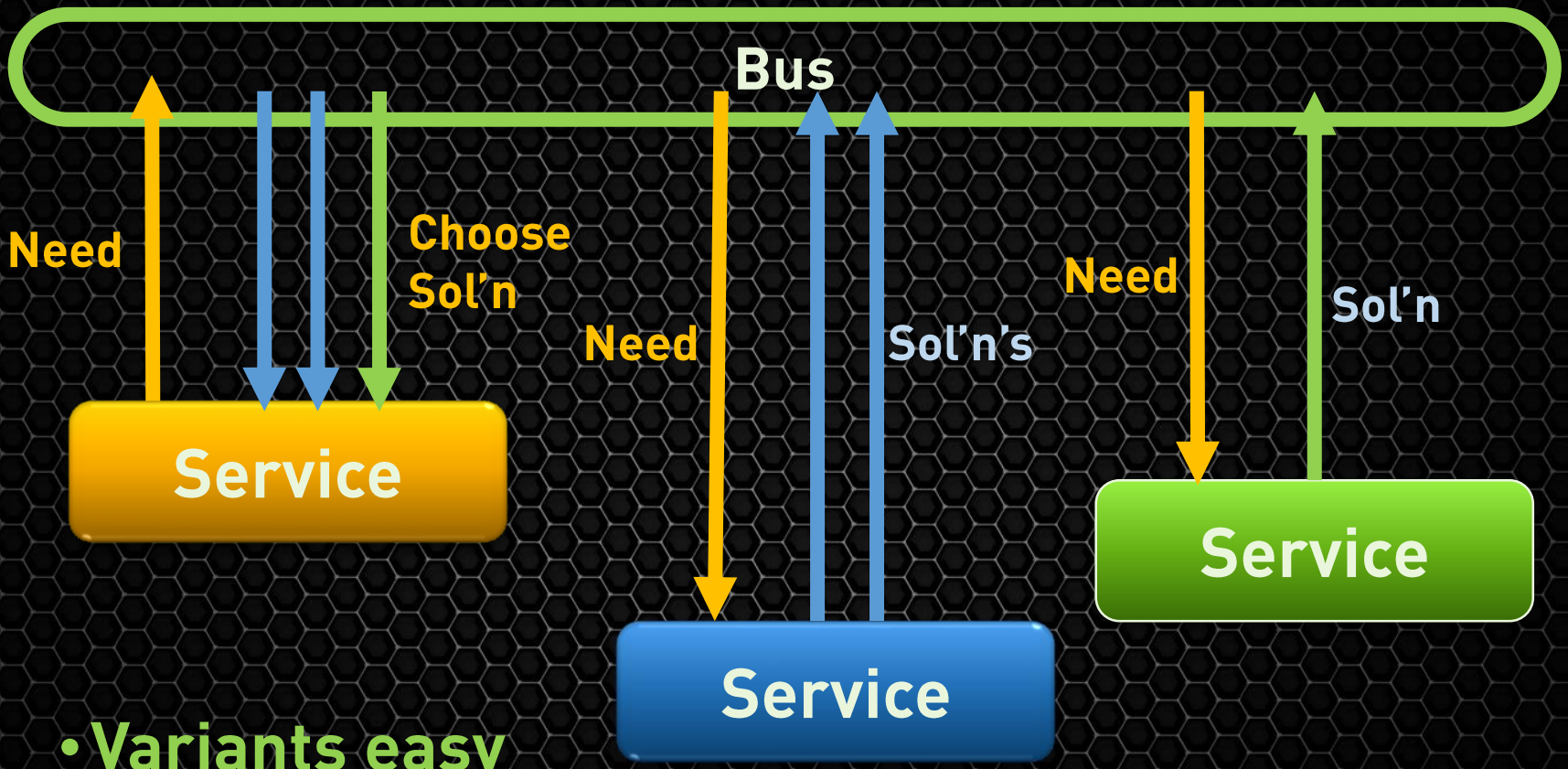
Synchronous or

Asynchronous

Chad Fowler vs. Fred George

- Chad: Use Synchronous as default
  - Algorithms typically described serially
  - Programmer understanding / productivity
- Fred: Use Asynchronous as default
  - Robustness should be primary goal
  - Supports better de-coupling
  - Teach the programmers!

Need Asynchronous Pattern



- Variants easy
- Graceful degradation

Asynchronous Services Example

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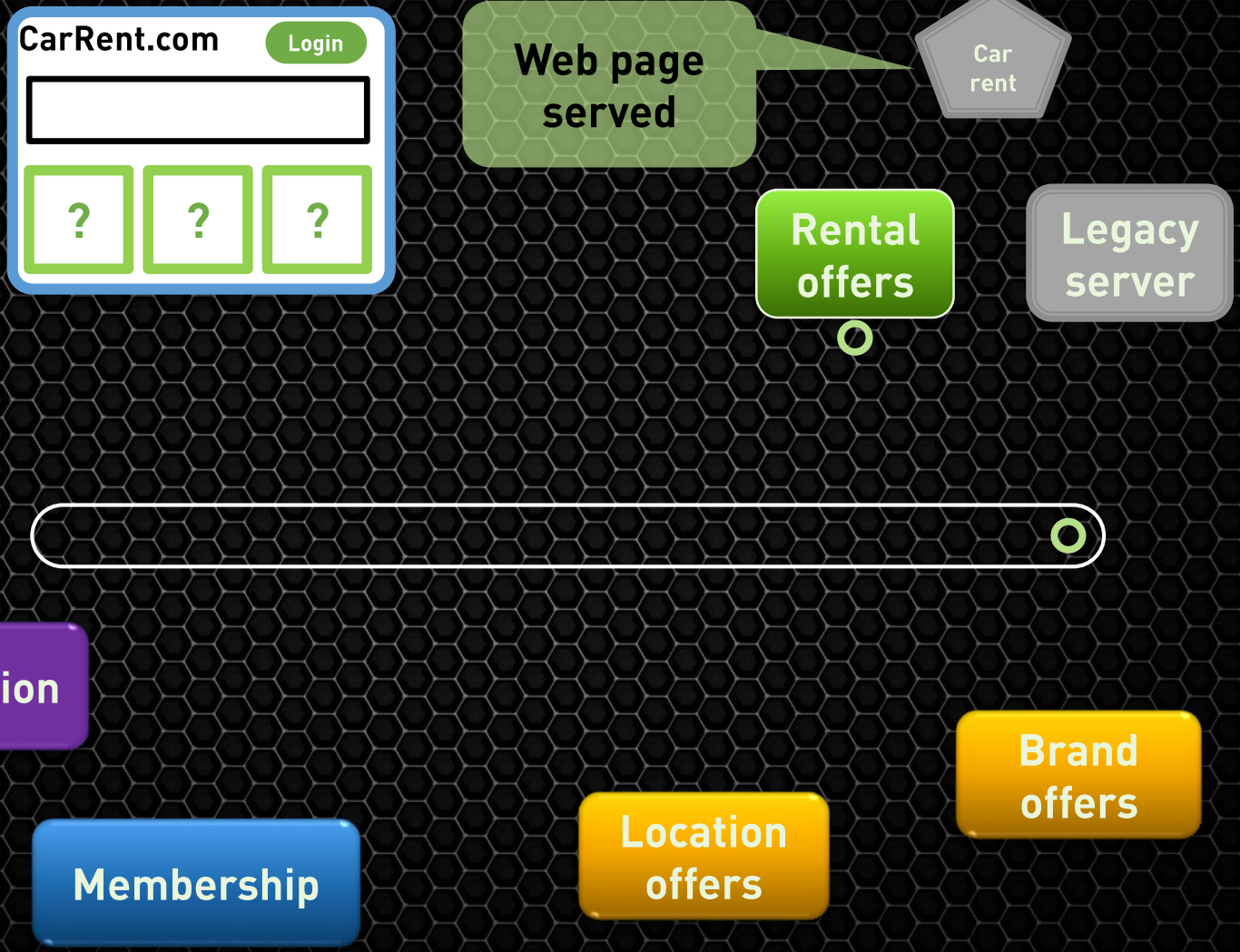

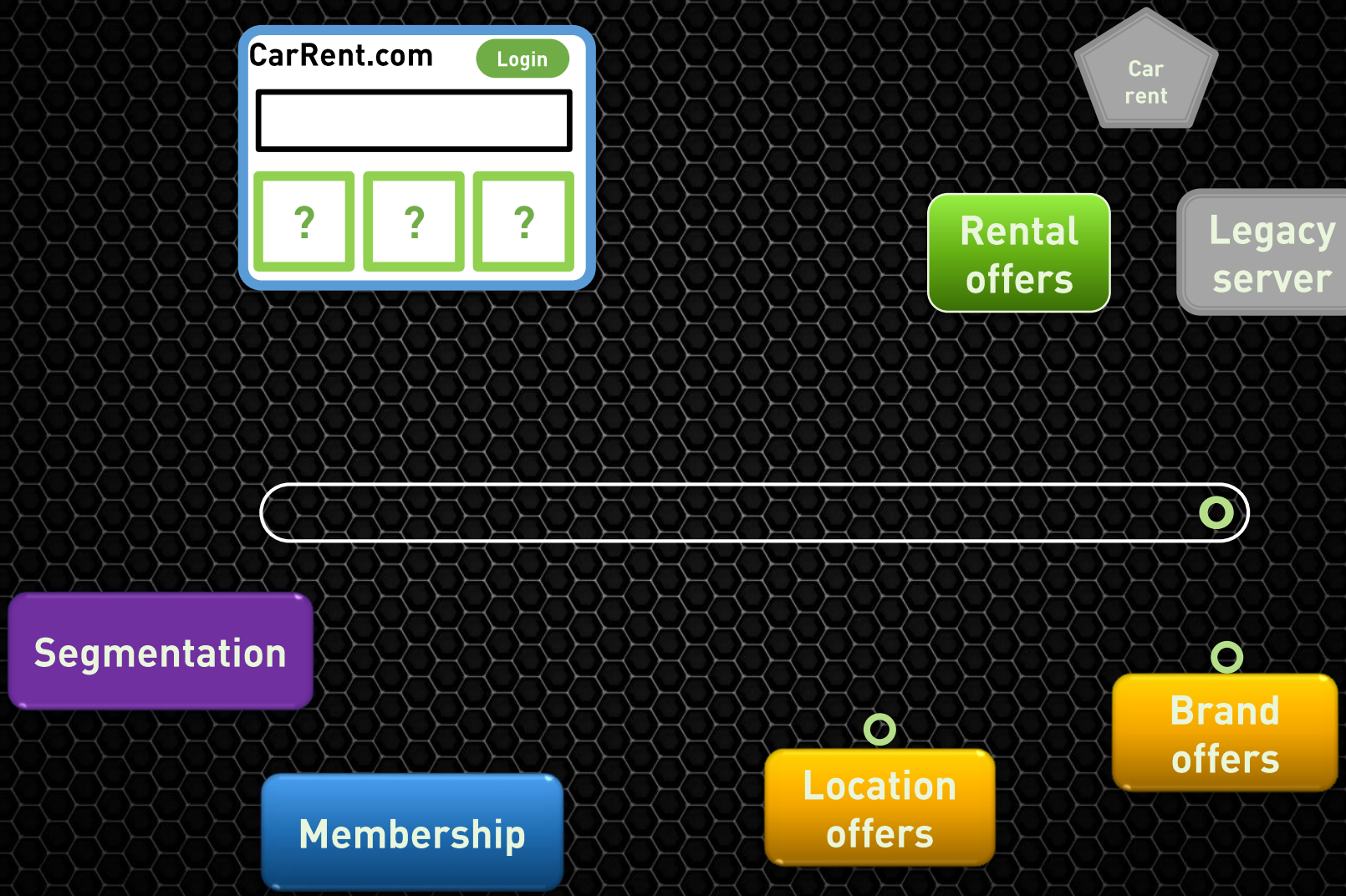

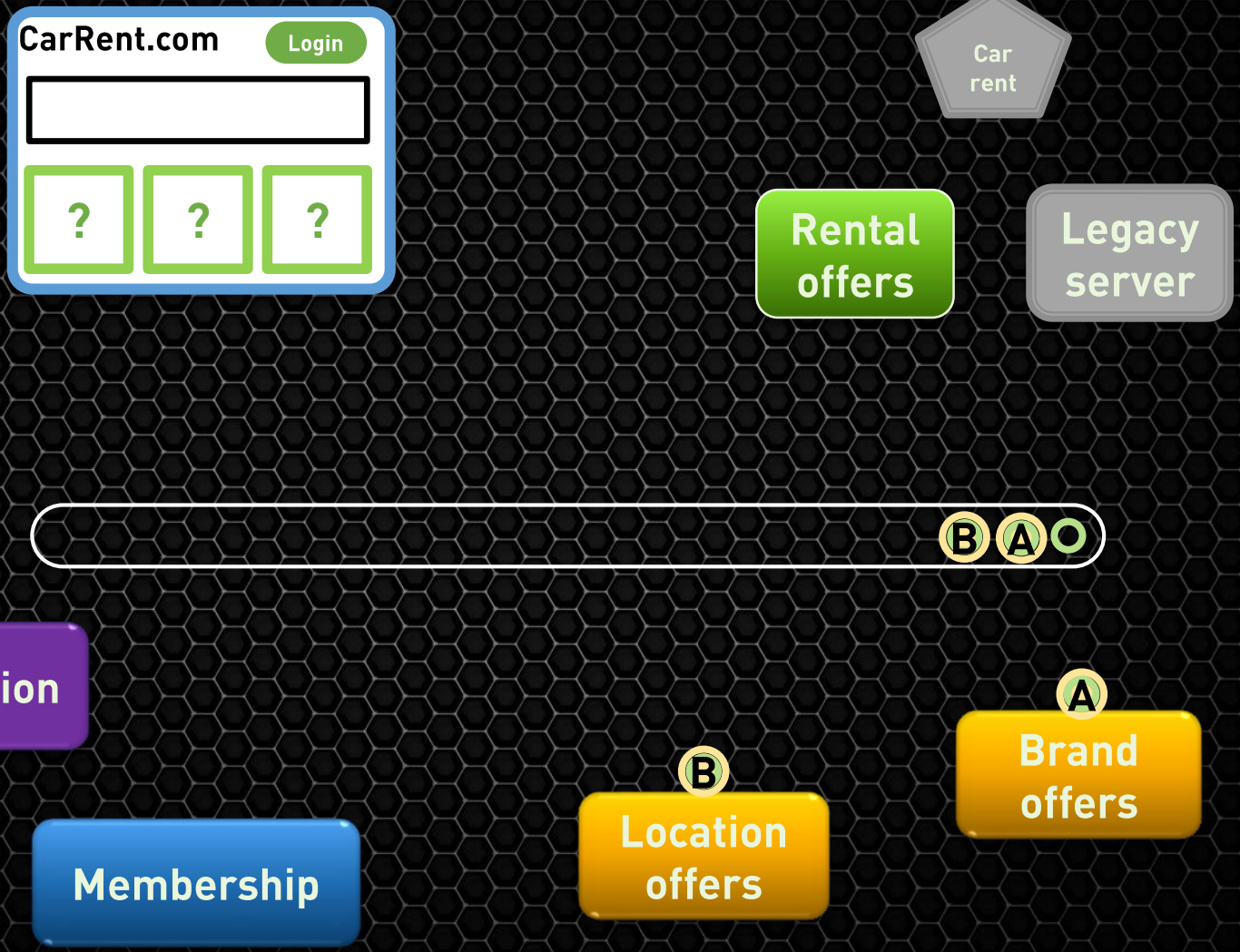

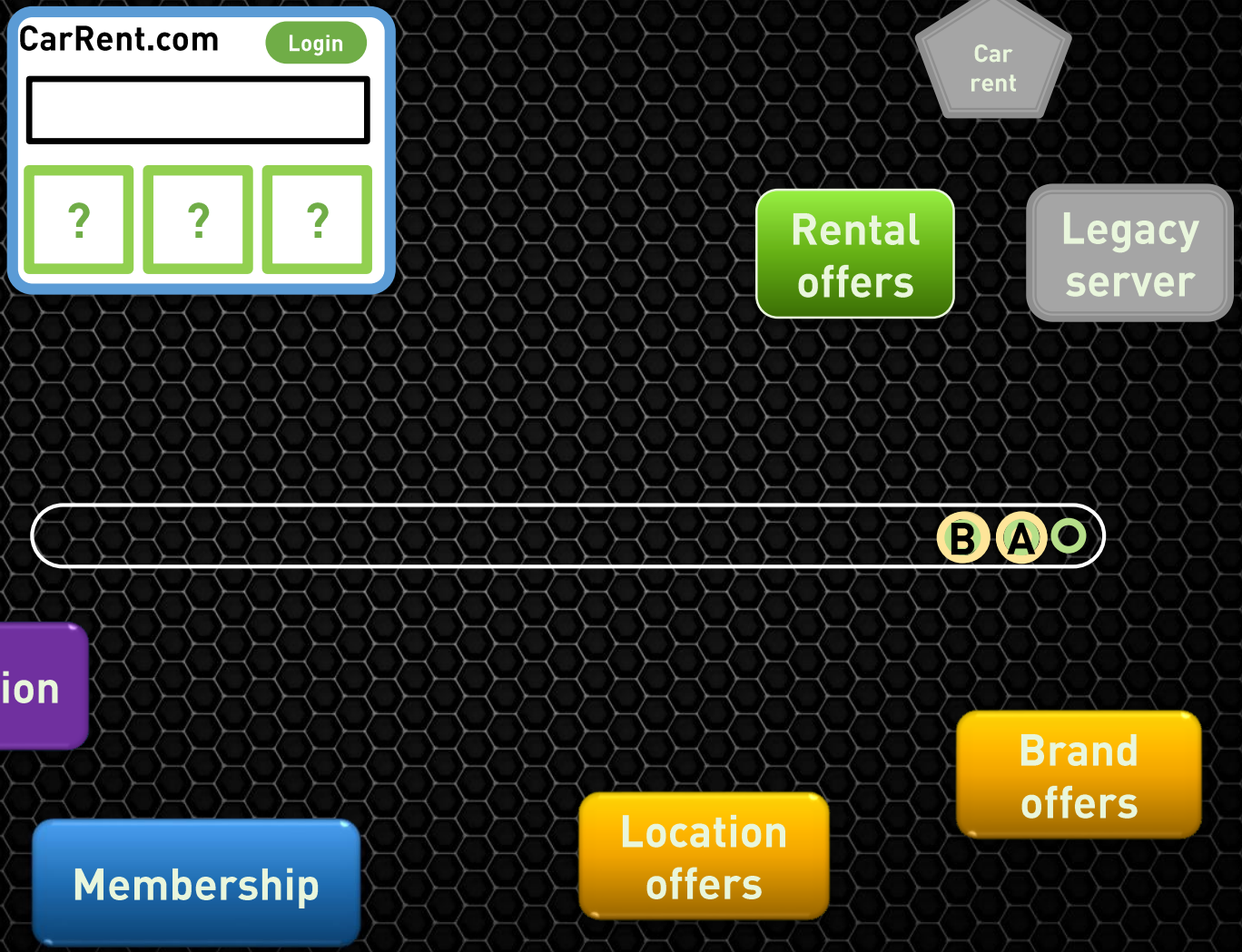

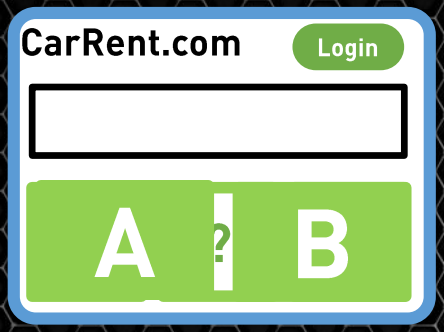

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Rental offers

B A

Legacy server

B A O

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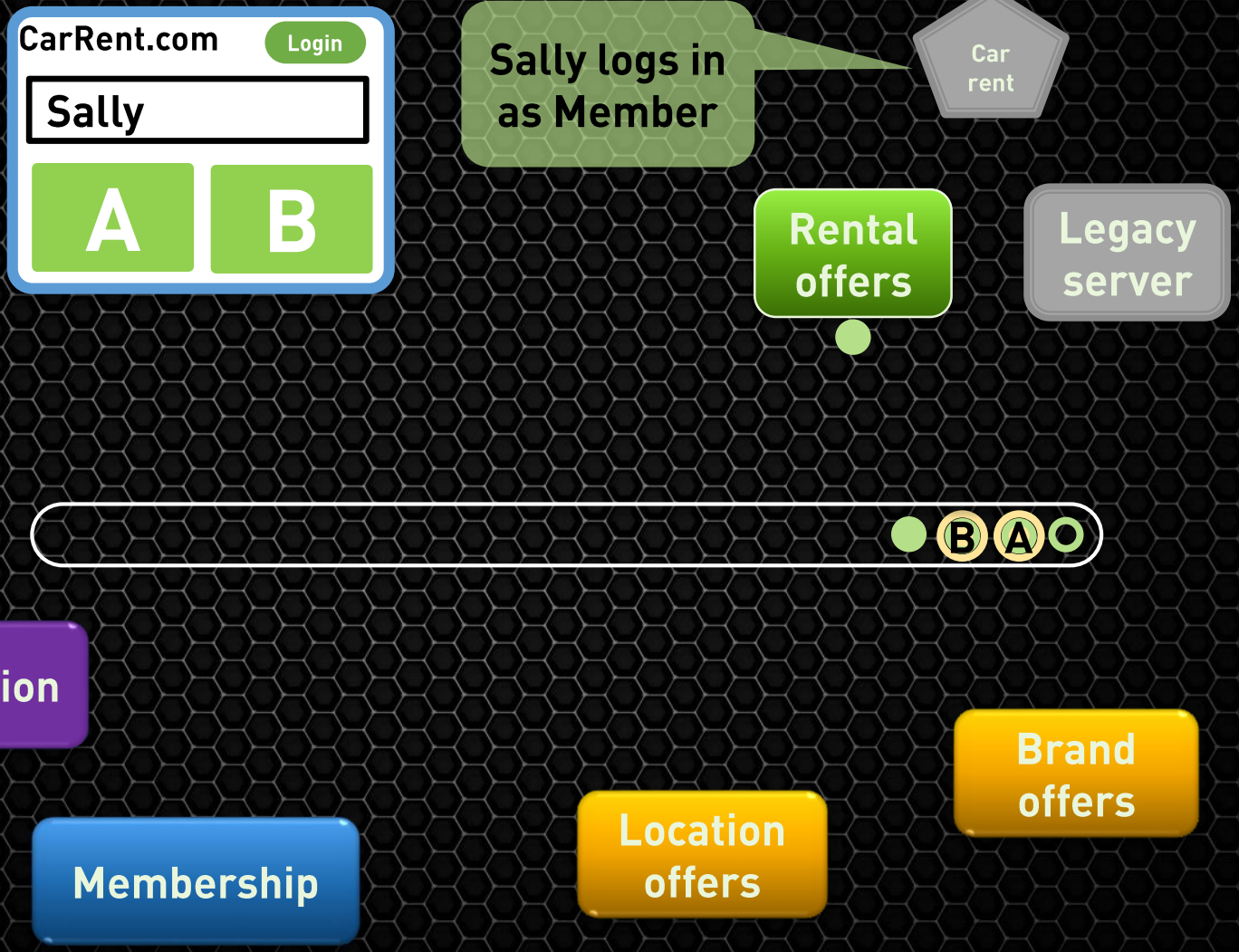
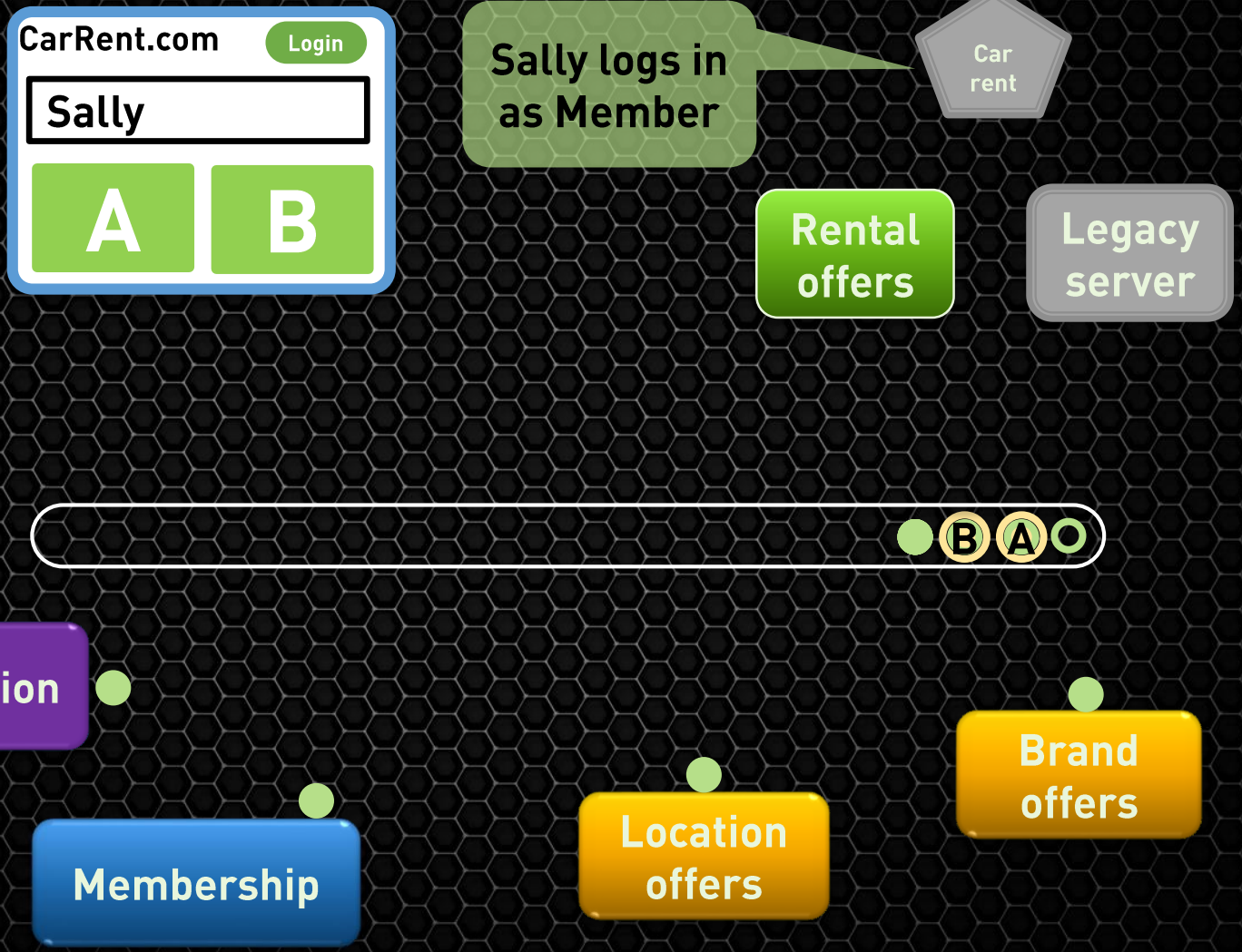
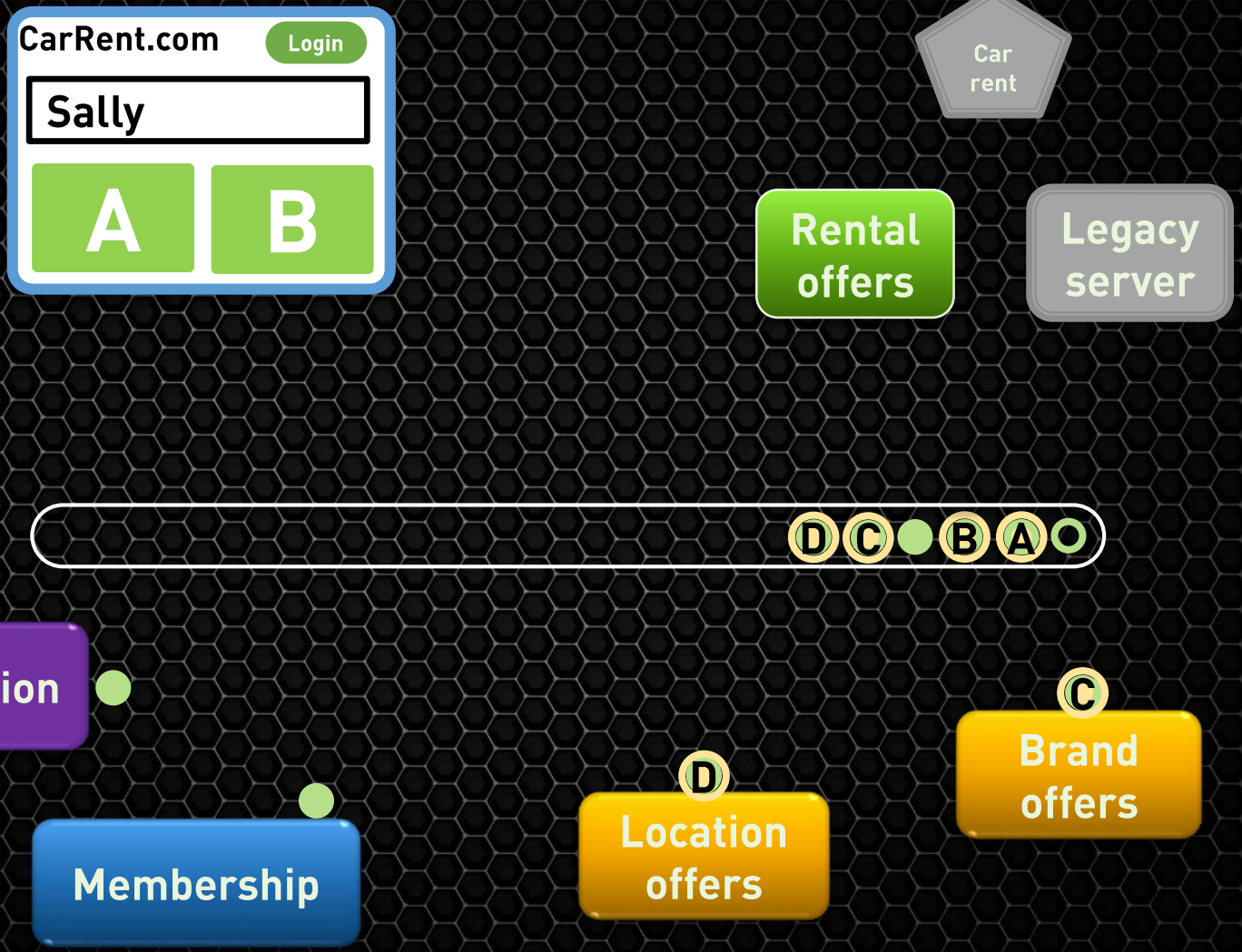
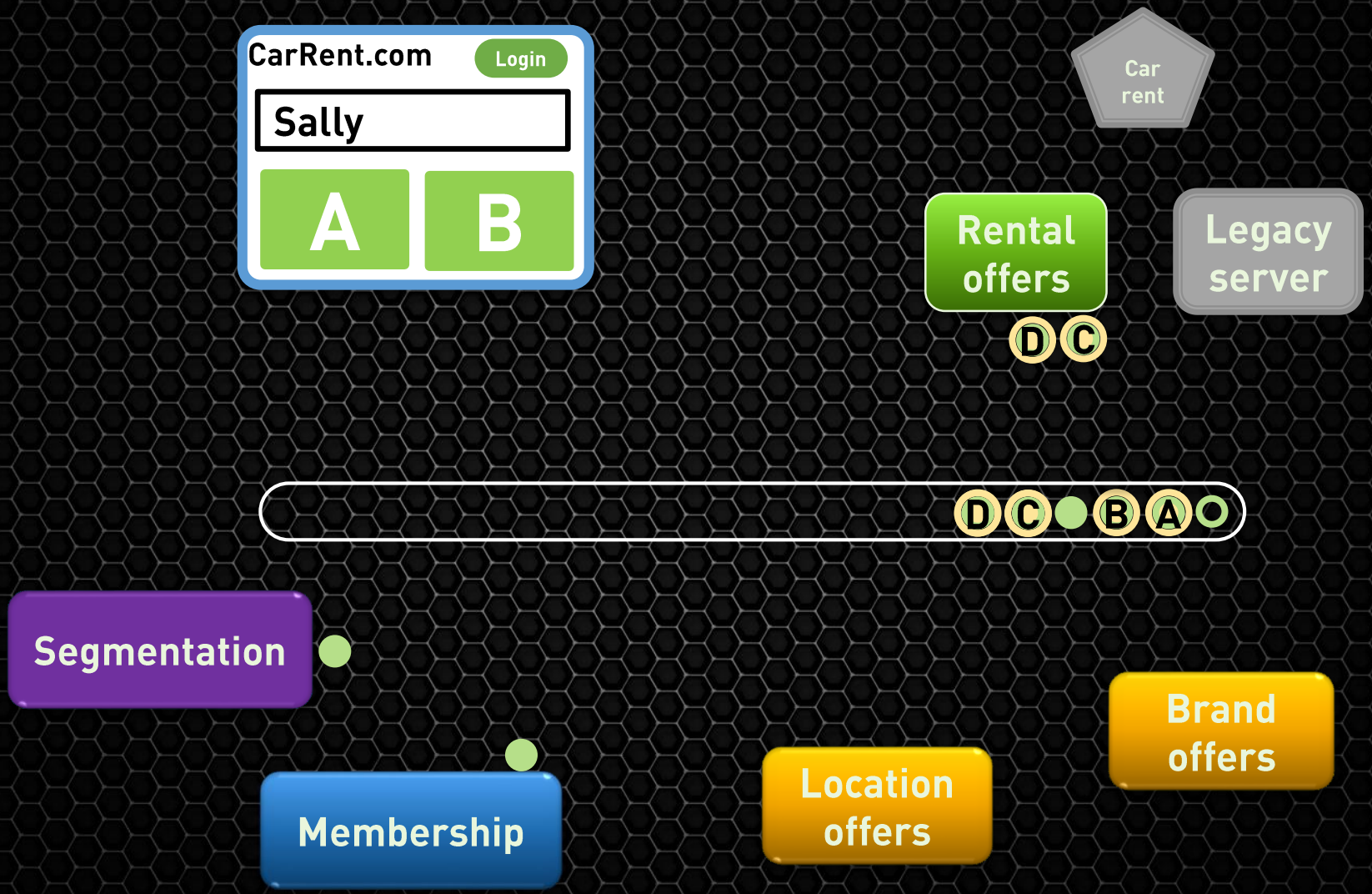
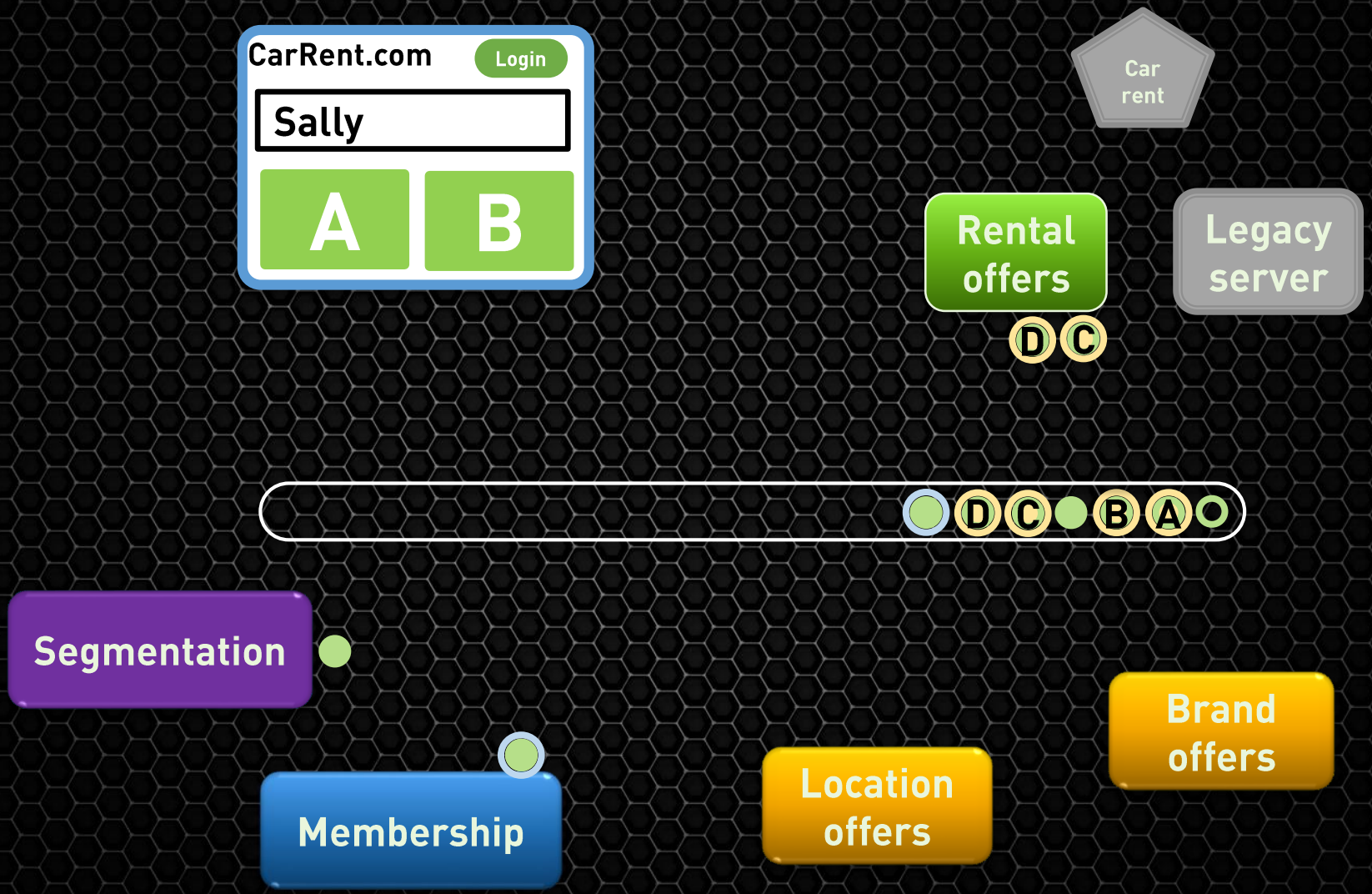
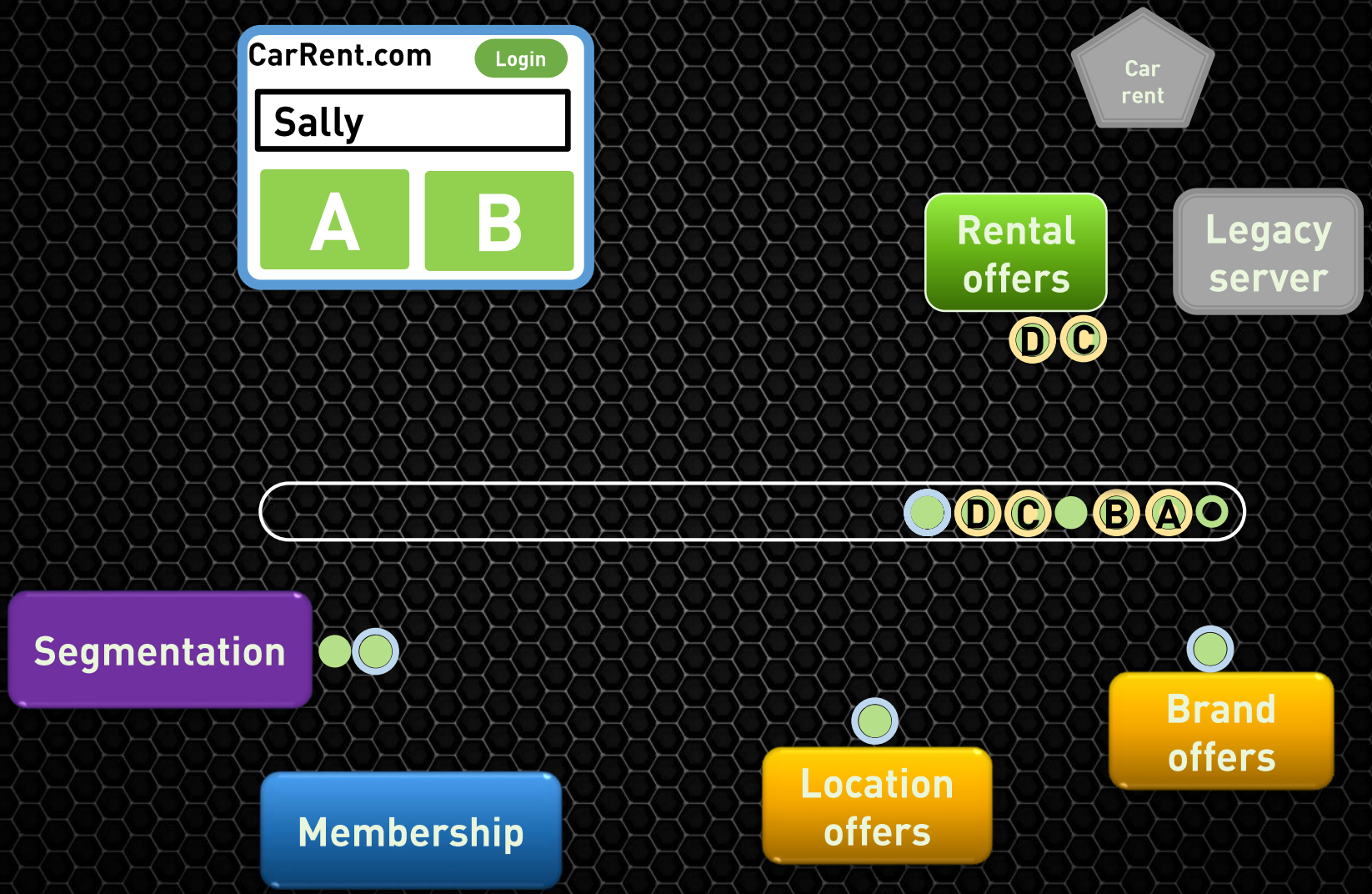


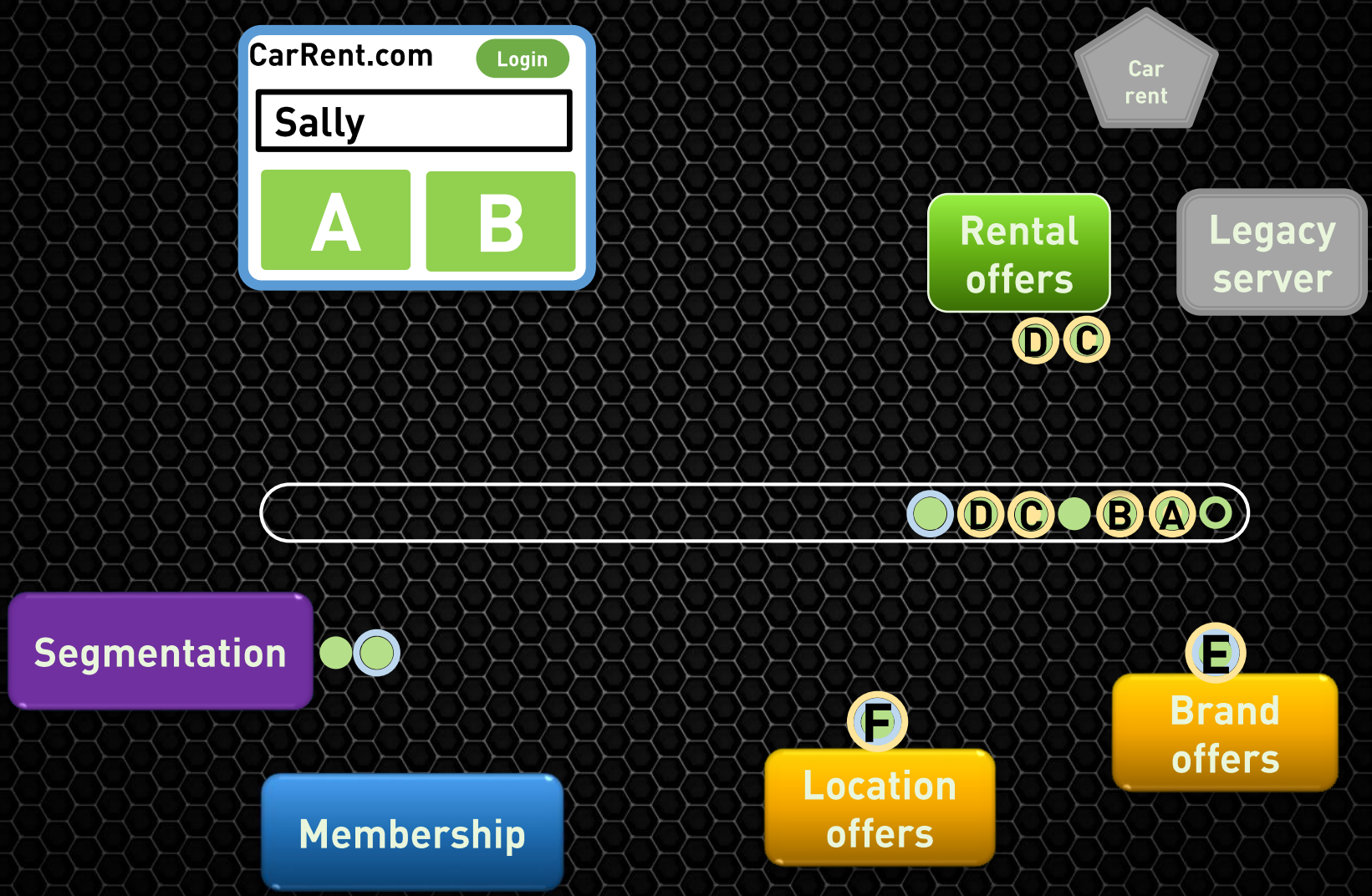




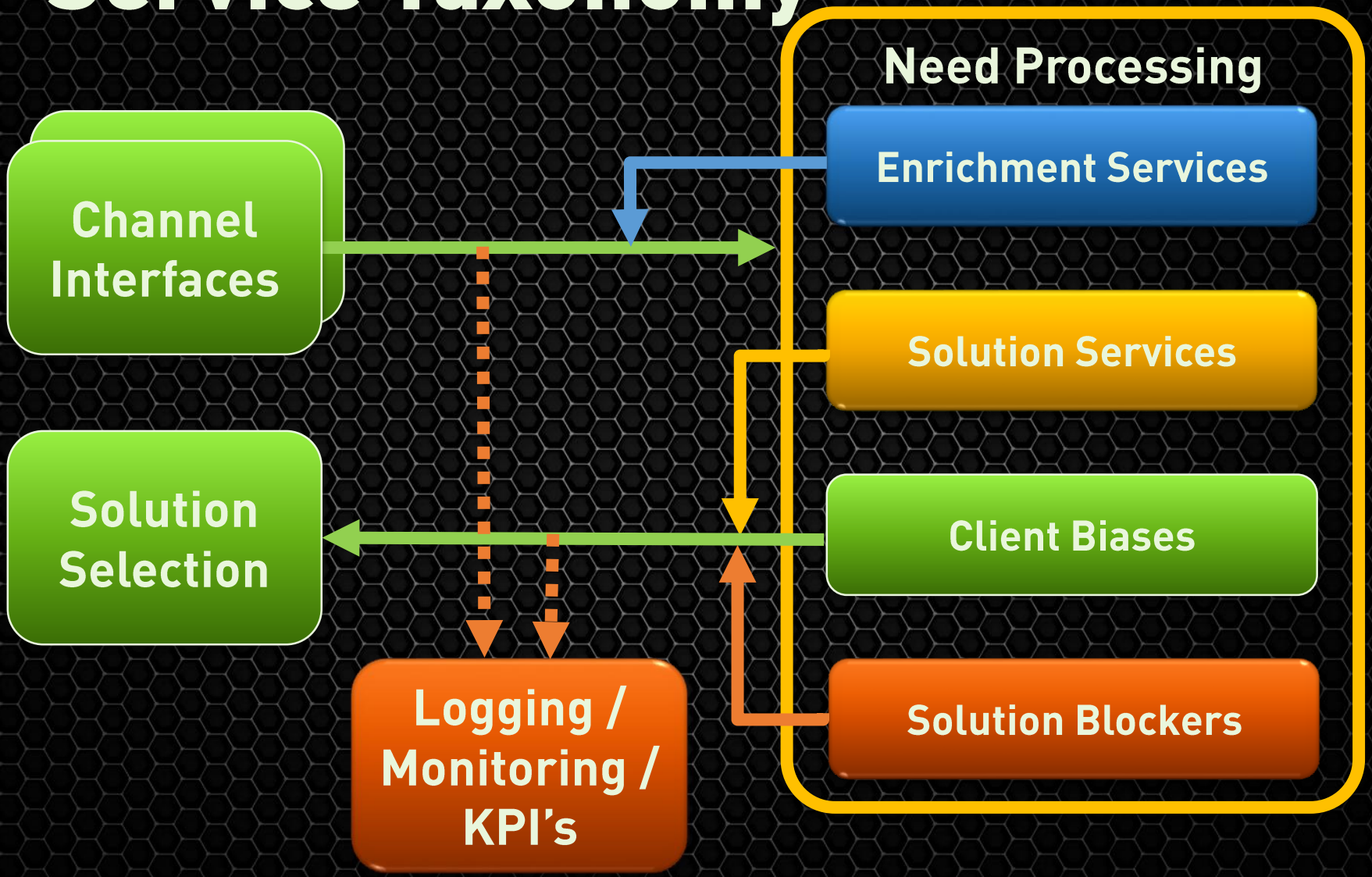








Service Taxonomy



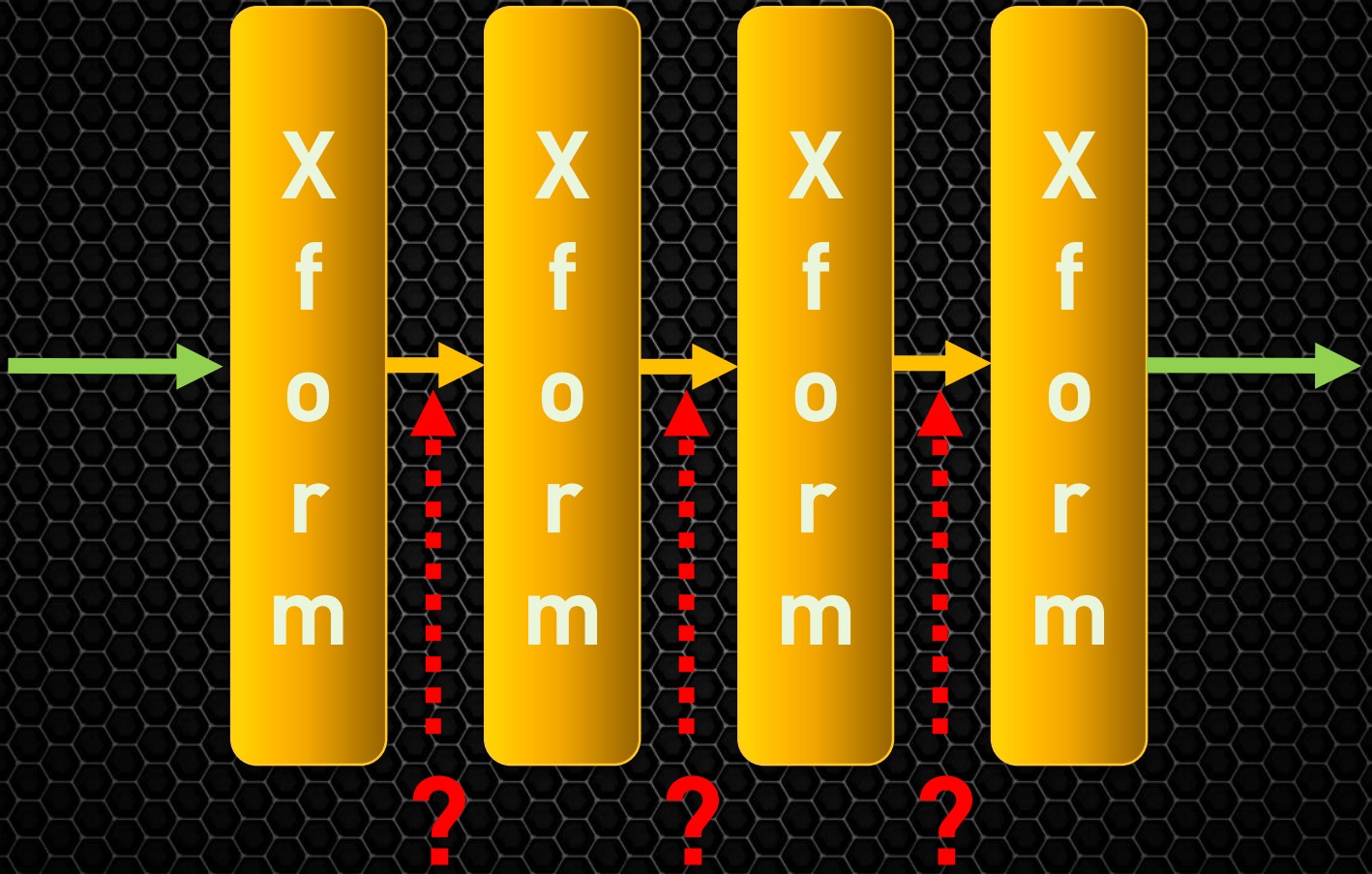
Challenge 3

MicroServices or Clojure

MicroServices Like OO

- Conceptualization (Job)
  - Every service has one job
  - If two jobs, make two services
- Communication
  - Minimize messages (whether RESTful or Events)
- Encapsulate
  - Service has its own persistence
  - If sharing persistence, just one logical service

Clojure Loves Shared Data



3 Companies – 3 Variants

Number	
Languages	
Coupling	

3 Companies – 3 Variants

	Forward 2008-now
Number	300+
Languages	Ruby, Node.js, Clojure, R, ...
Coupling	DB w cron, RESTful, Kafka bus

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	Forward 2008-now	Daily Mail 2012-now
Number	300+	3 + dozens
Languages	Ruby, Node.js, Clojure, R, ...	Clojure, Node.js
Coupling	DB w cron, RESTful, Kafka bus	RabbitMQ

3 Companies – 3 Variants

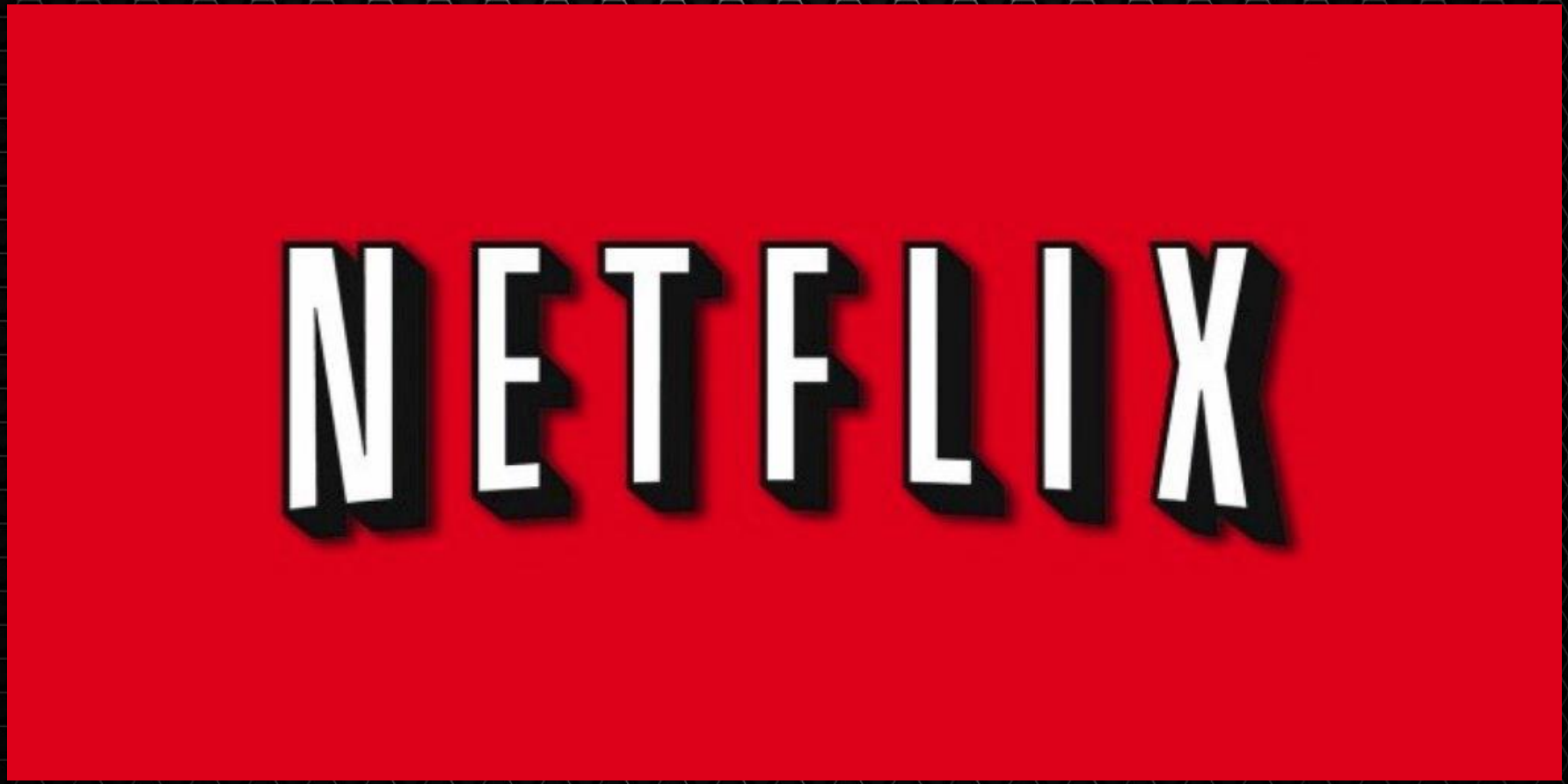
	Forward 2008-now	Daily Mail 2012-now	Outpace 2013-now
Number	300+	3 + dozens	25
Languages	Ruby, Node.js, Clojure, R, ...	Clojure, Node.js	Clojure
Coupling	DB w cron, RESTful, Kafka bus	RabbitMQ	Orchestration, RabbitMQ

A New Hope...

Challenge 4

Choosing Architectures and Frameworks

Open Source Frameworks



Node.js Very Active

PIGATO

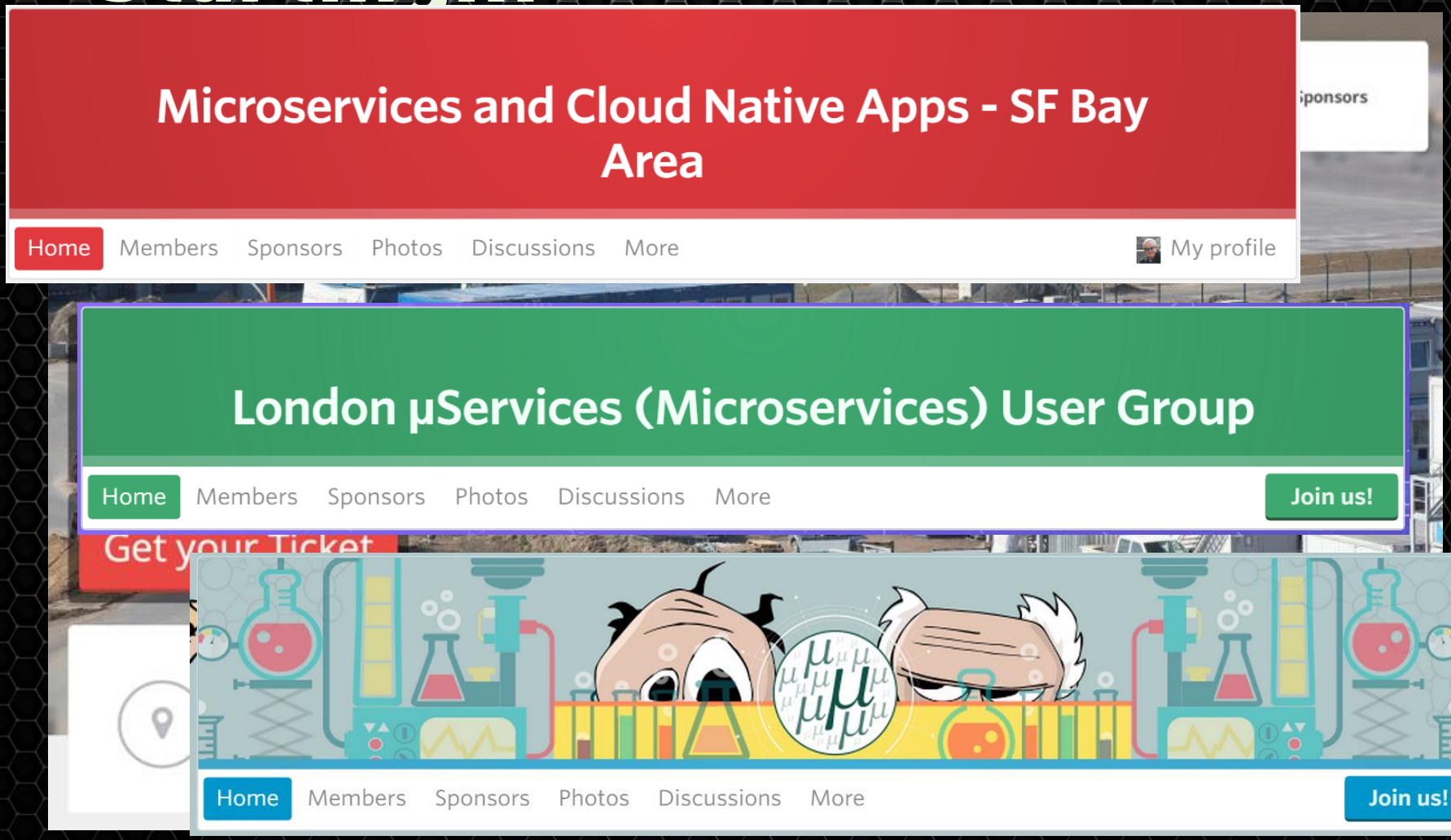
PIGATO - an high-performance microservices framework based on ZeroMQ

Challenge 5

No Design Patterns

Book Yet

Conferences / Meetups Starting...



Challenge 6

Corequisite Technology, Processes, and Organization

Managerless process

Lean startup

Cassandra

Programmer anarchy

MicroServices

Docker

Go Faster

Dev/Ops

Cloud

Full-stack developer

Agile

Event bus

MVP (minimum viable product

No-SQL

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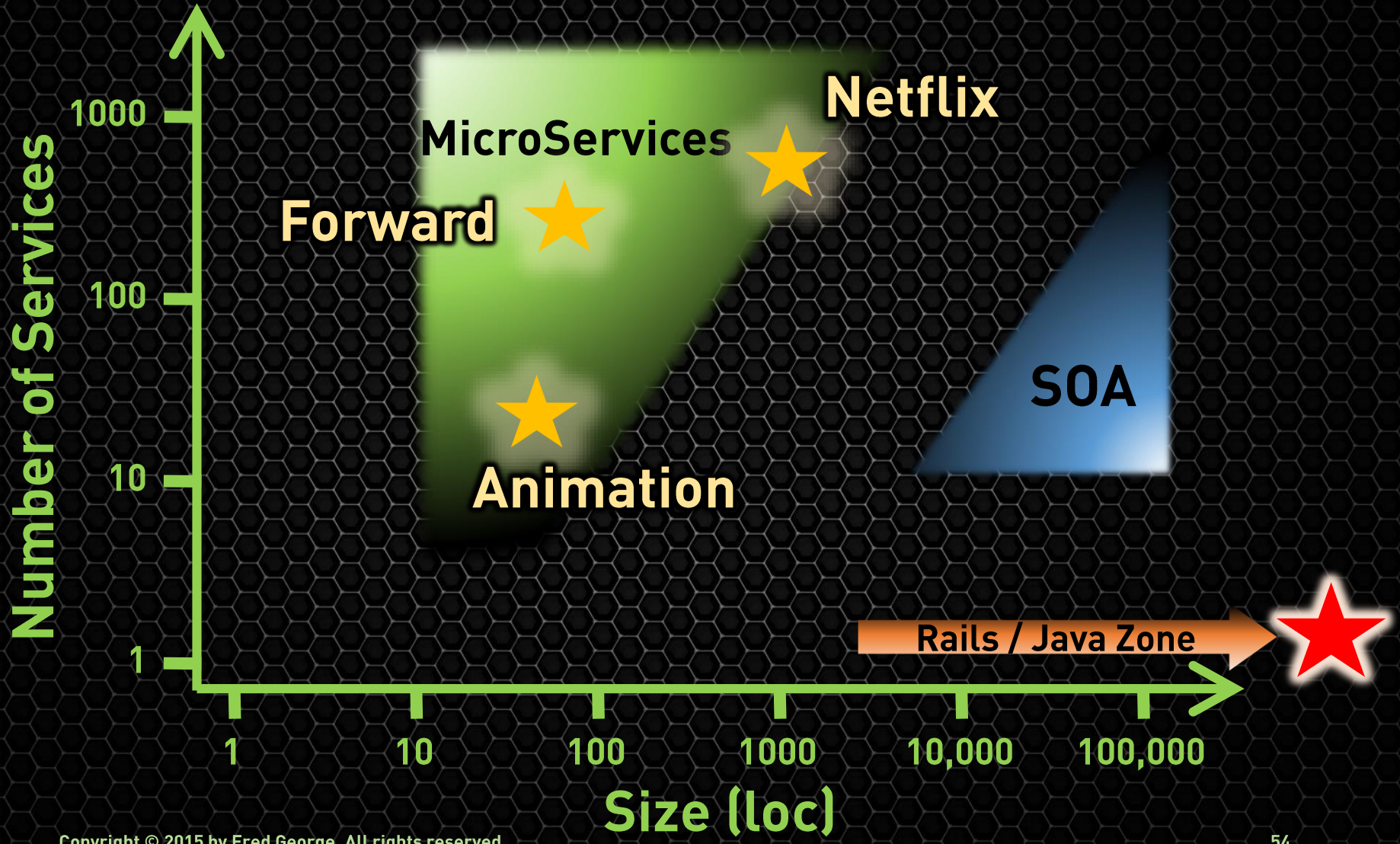
Challenge 7

What is a MicroService?

Taxonomy May be Useful (before it's too late)

- Synchronicity degree
  - Primary API access to services
- Ratio of number of services and average size
  - Zones for clarity
- DB / service ratio
  - Expose potential DB hindrances to rapid deployment

Count / Size Ratio



More Information...

- Google:
  - MicroService Architecture for videos
  - MicroXchg 2015 conference
- Complementary topic:
  - Google for Programmer Anarchy

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