

Architecture Katas

Private Event February 2024

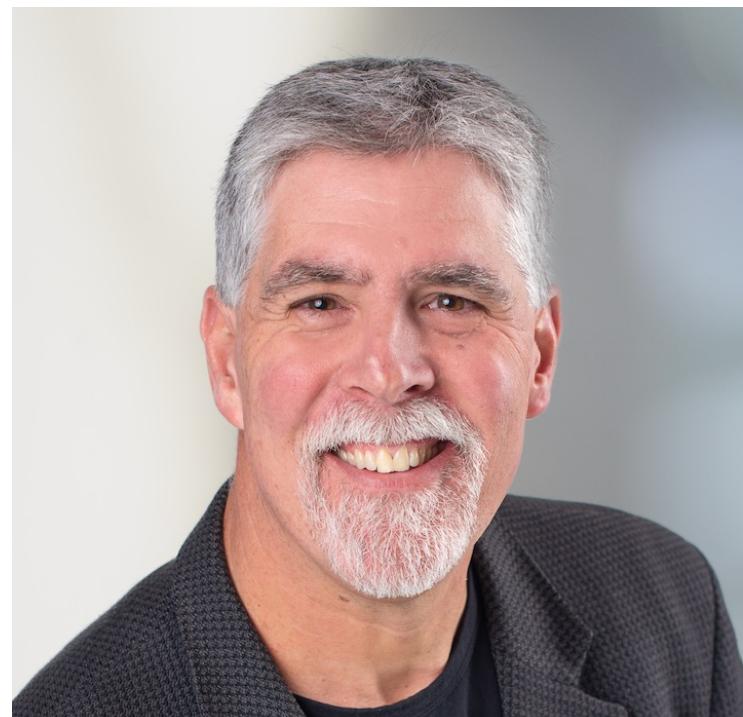


Neal Ford

Thoughtworks

Director / Software Architect / Meme Wrangler

<https://www.nealford.com>



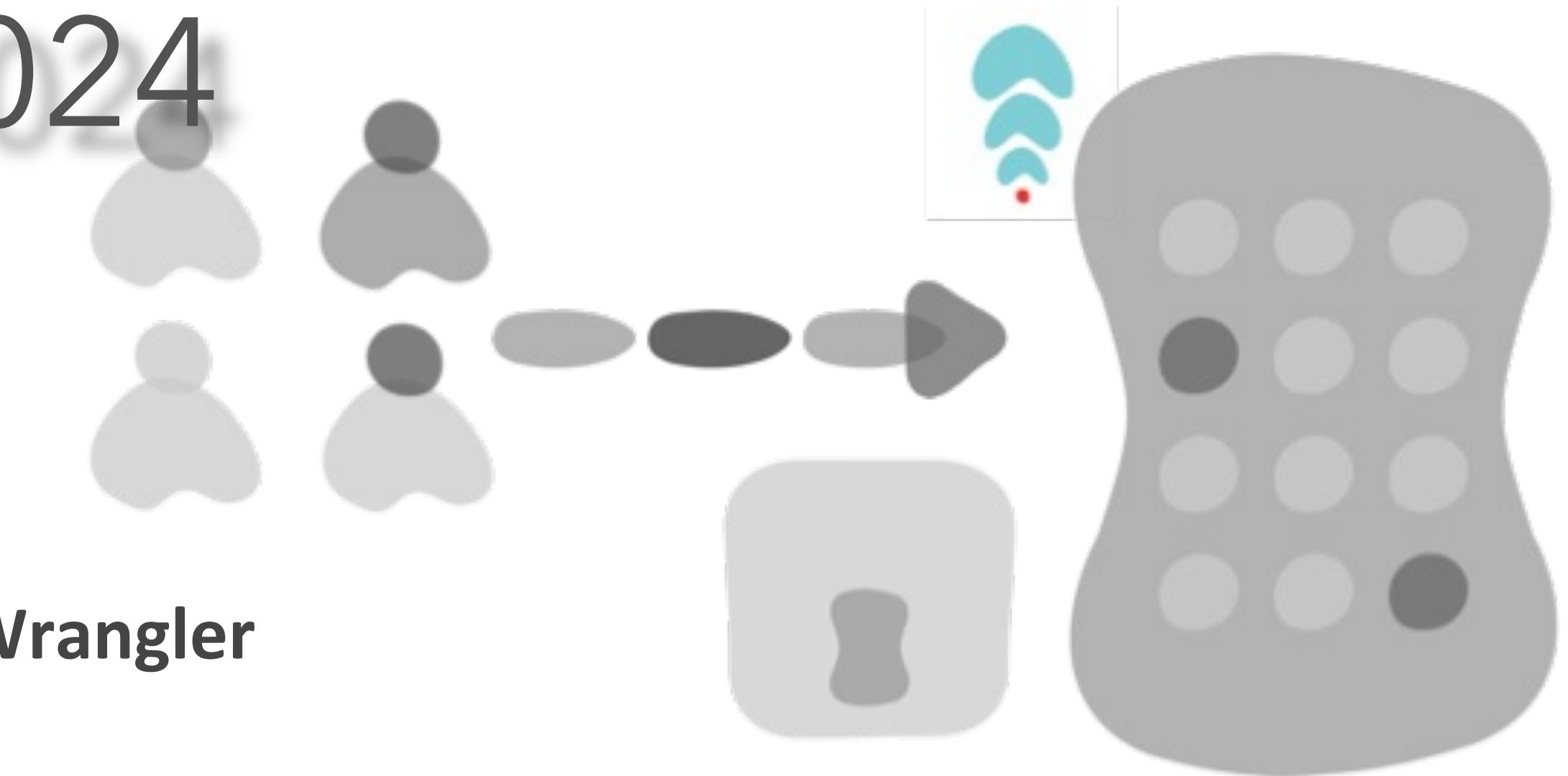
Mark Richards

Independent Consultant

Hands-on Software Architect, Published Author

Founder, DeveloperToArchitect.com

@markrichardssa



Contest Kickoff

Introduction

Where did this
idea come from?

The screenshot shows a web browser window with the URL `archkatas.herokuapp.com` in the address bar. The page title is "Architectural Katas". Below the title is a quote by Fred Brooks: "How do we get great designers? Great designers design, of course." --Fred Brooks. Another quote follows: "So how are we supposed to get great architects, if they only get the chance to architect fewer than a half-dozen times in their career?" --Ted Neward. A blue button labeled "Do one! »" is visible. The main content area is divided into several sections: "About", "Rules", "Contribute", "Invite", "Lead", and "Join". Each section has a brief description and a call-to-action button.

Architectural Katas

"How do we get great designers? Great designers design, of course." --Fred Brooks

"So how are we supposed to get great architects, if they only get the chance to architect fewer than a half-dozen times in their career?"
--Ted Neward

[Do one! »](#)

About

The Architectural Katas started as a presentation workshop by Ted Neward. They've taken on a life of their own.

[Learn more »](#)

Invite

Want an experienced Architectural Kata moderator to run the workshop at your place of business?

[Contact »](#)

Rules

Doing an Architectural Kata requires you to obey a few rules in order to get the maximum out of the activity.

[Read rules »](#)

Lead

Want to run the Architectural Katas yourself? There's only a few things you need to know before you do.

[Learn how »](#)

Contribute

New Kata problems/proposals are always welcome.

[Send ideas »](#)

Join

Want to find a group near you that's running the Architectural Katas?

[Find groups »](#)

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Architectural Katas

Home About Rules Contribute Invite Lead Join Contact

Architectural Katas

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Want to find a group near you that's running the Architectural Katas?

...and then...

<http://fundamentalsofsoftwarearchitecture.com/katas/>

The screenshot shows a web browser window with the URL <http://fundamentalsofsoftwarearchitecture.com/katas/> in the address bar. The page content includes a header with navigation links for 'Architectural Katas', 'Updated Fundamentals of Software Architecture Images', 'Architectural Katas', 'Fundamentals of Software Architecture', and 'List of Architecture Katas'. Below this is a section titled 'Architectural Katas' with a quote by Fred Brooks: "How do we get great designers? Great designers design, of course." attributed to Fred Brooks. Another quote by Ted Neward follows: "So how are we supposed to get great architects, if they only get the chance to architect fewer than a half-dozen times in their career?" attributed to Ted Neward. The page also contains an 'About' section describing the purpose of Architectural Katas and a note about project requirements.

fundamentalsofsoftwarearchitecture.com

Architectural Katas Updated Fundamentals of Software Architecture Images Architectural
Katas Fundamentals of Software Architecture List of Architecture Katas

Architectural Katas

inspired by Ted Neward's original [Architectural Katas](#)

"How do we get great designers?
Great designers design,
of course."
Fred Brooks

"So how are we supposed to get great architects, if
they only get the chance to architect fewer than
a half-dozen times in their career?"
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About

Architectural Katas are intended as a small-group (3-5 people) exercise, usually as part of a larger group (4-10 groups are ideal), each of whom is doing a different kata. A Moderator keeps track of time, assigns Katas (or allows this website to choose one randomly), and acts as the facilitator for the exercise.

Each group is given a project (in many ways, an RFP—Request For Proposal) that needs development. The project team meets for a while, discovers requirements that aren't in the original proposal by

...and then...
.





LIVE ONLINE TRAINING

Architectural Katas

Topic: Software Development



NEAL FORD



Late 2020...

October 20, November 17 & December
3, 2020

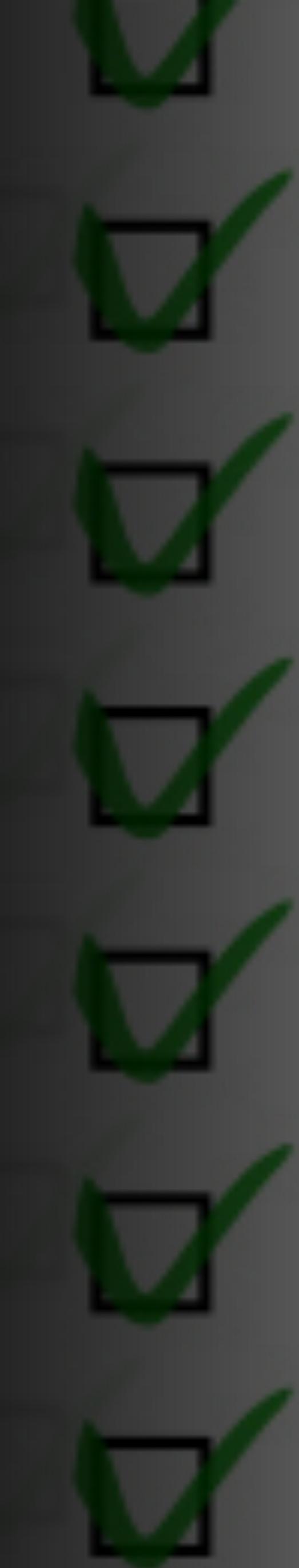
10:00am – 12:00pm EST

This course has ended.

[What you'll learn](#) [Instructor](#) [Schedule](#)

New information after 10/20 kickoff:

Meet the Judges



Jacqui Read

Jacqui Read is an internationally recognized solution and enterprise architect and author of *Communication Patterns: A Guide for Developers and Architects*. She specializes in helping businesses create and enhance architecture practices, construct evolutionary architectures, and untangle and extract value from data and knowledge. Jacqui also teaches public and private workshops and speaks at international conferences on topics such as architecture practices, technical communication, and architecture decisions. Her professional interests include collaborative modeling, knowledge management, domain-driven design, sociotechnical architecture, and modernizing enterprise architecture practices. In her free time, Jacqui enjoys gardening and attempting to strum her ukulele and sing at the same time. Her website is <https://jacquiread.com>.



Andrew Harmel-Law

Andrew Harmel-Law is a tech principal at Thoughtworks, an author, and an instructor on the O'Reilly learning platform. He specializes in domain-driven design, Java/JVM technologies, agile delivery, and organization design and has extensive experience delivering large-scale software solutions across government, banking, and ecommerce sectors. Passionate about open source software, Andrew actively contributes to OSS communities and shares his expertise through consulting, mentoring, blogging, and speaking at conferences.



Diana Montalion

Diana Montalion has more than 17 years of experience delivering transformative initiatives, independently or as part of a professional services group, to clients including Stanford University, the Gates Foundation, and Teach For All. She's the founder of Mentrif Group, a consultancy that provides technology architecture, systems leadership, and workshops on nonlinear approaches. Previously, she served as principal architect for *The Economist* and the Wikimedia Foundation. Writing, teaching, and thinking about thinking are her favorite hobbies.

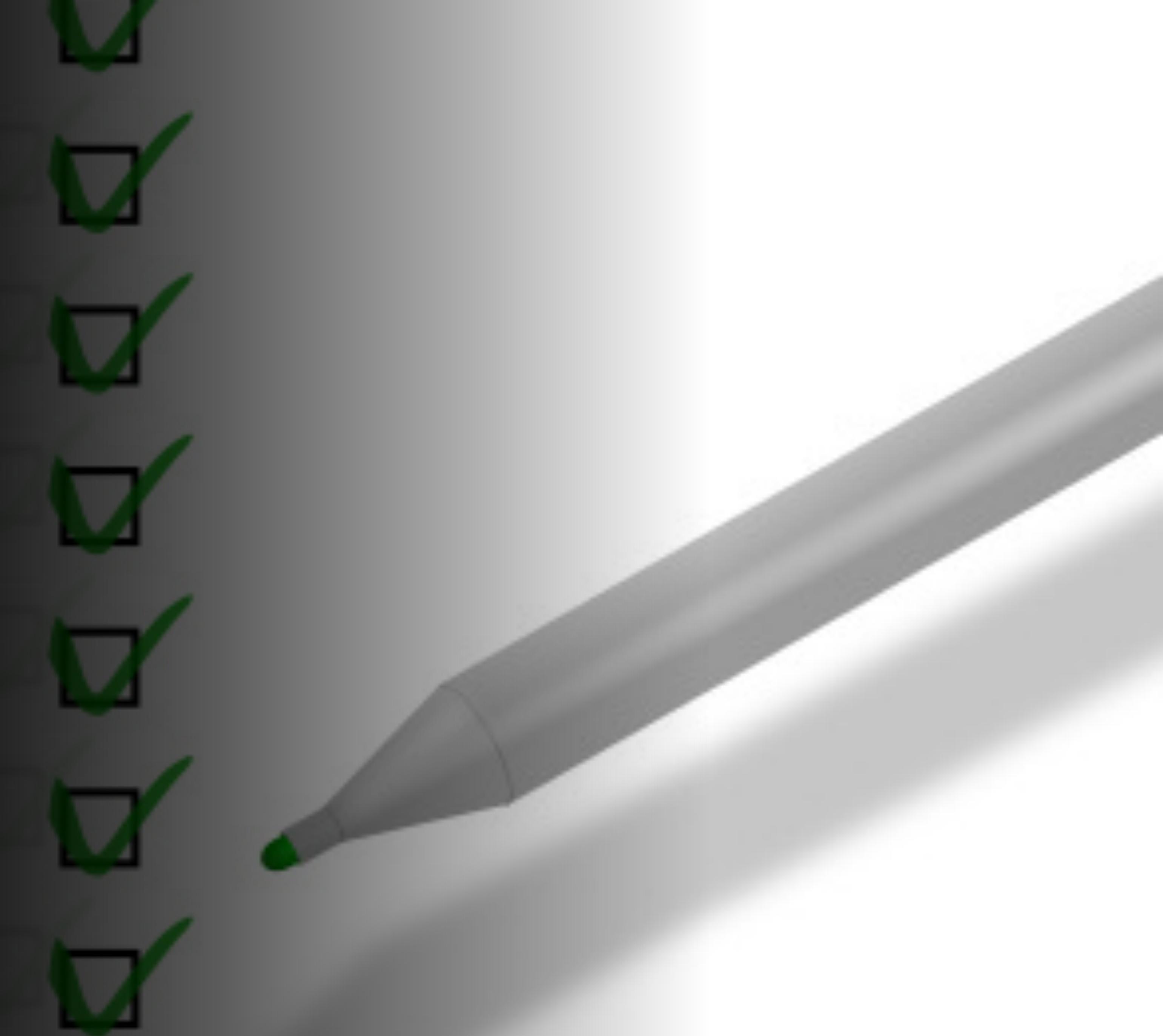


Sergey Zinchenko

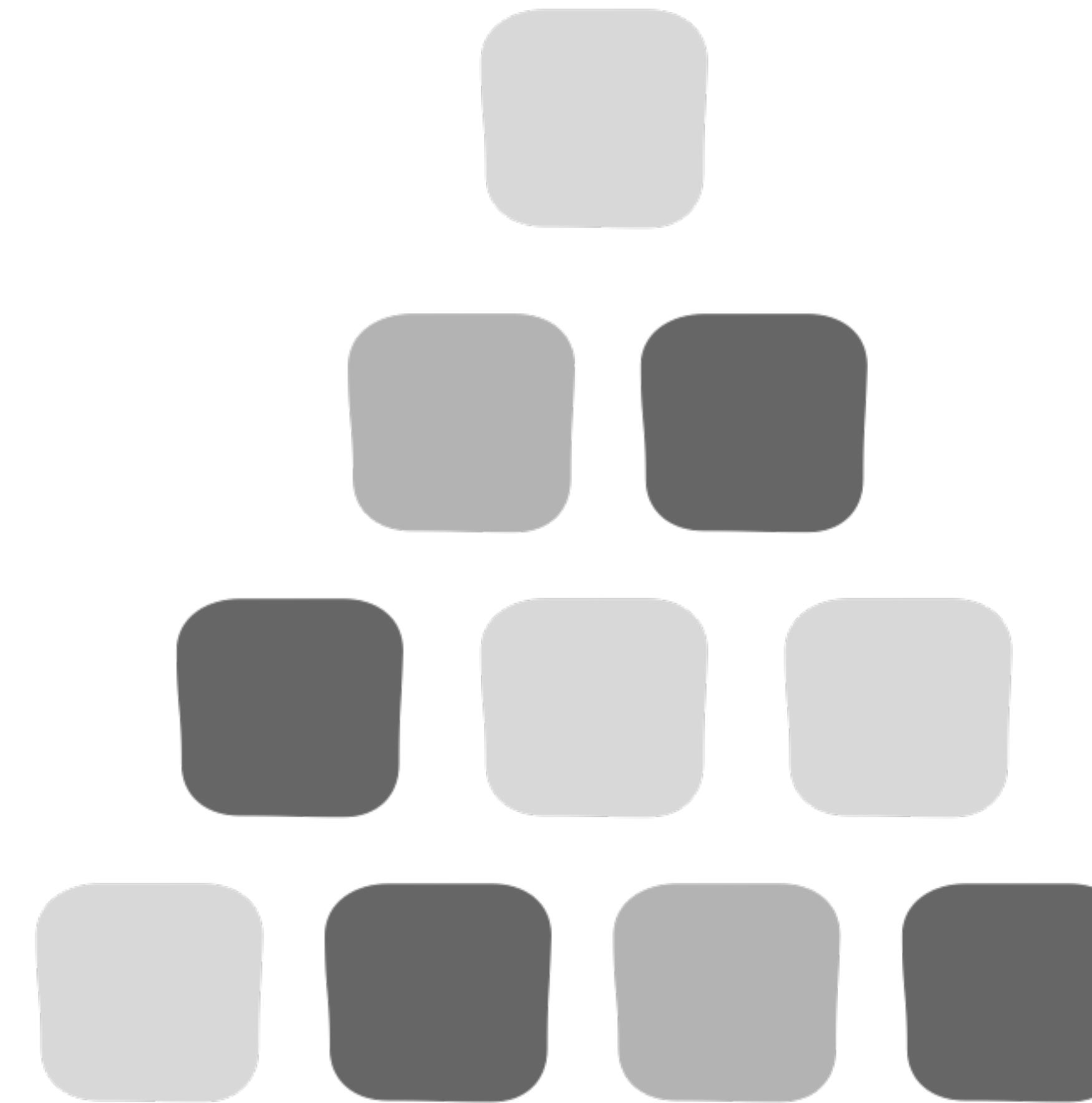
Sergey Zinchenko is technical director at SD Interra in Toronto. An experienced technical leader and software architect with a history of leading teams to deliver working solutions, he's seasoned in application, solution, and enterprise architecture with a range of experience from building systems from scratch for startups to modernizing mainframe-based banking giants. His native language is "C."

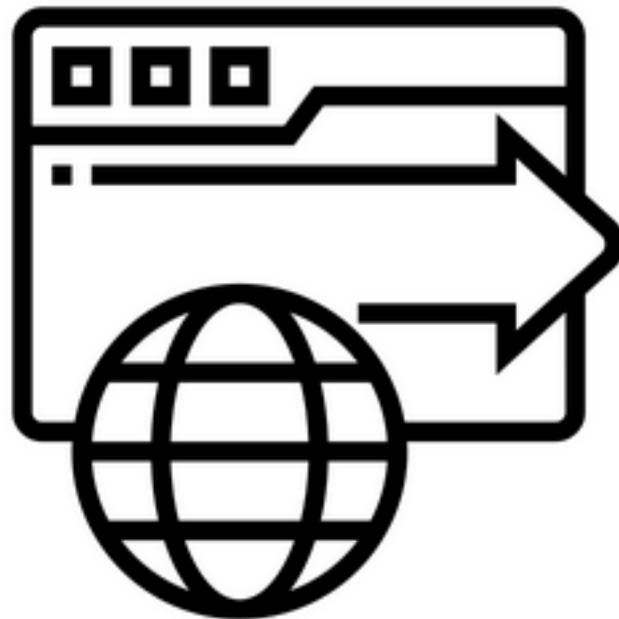


The Process



structural design in architecture





requirements | use cases | story cards | DDD event-storm output | ?

performance

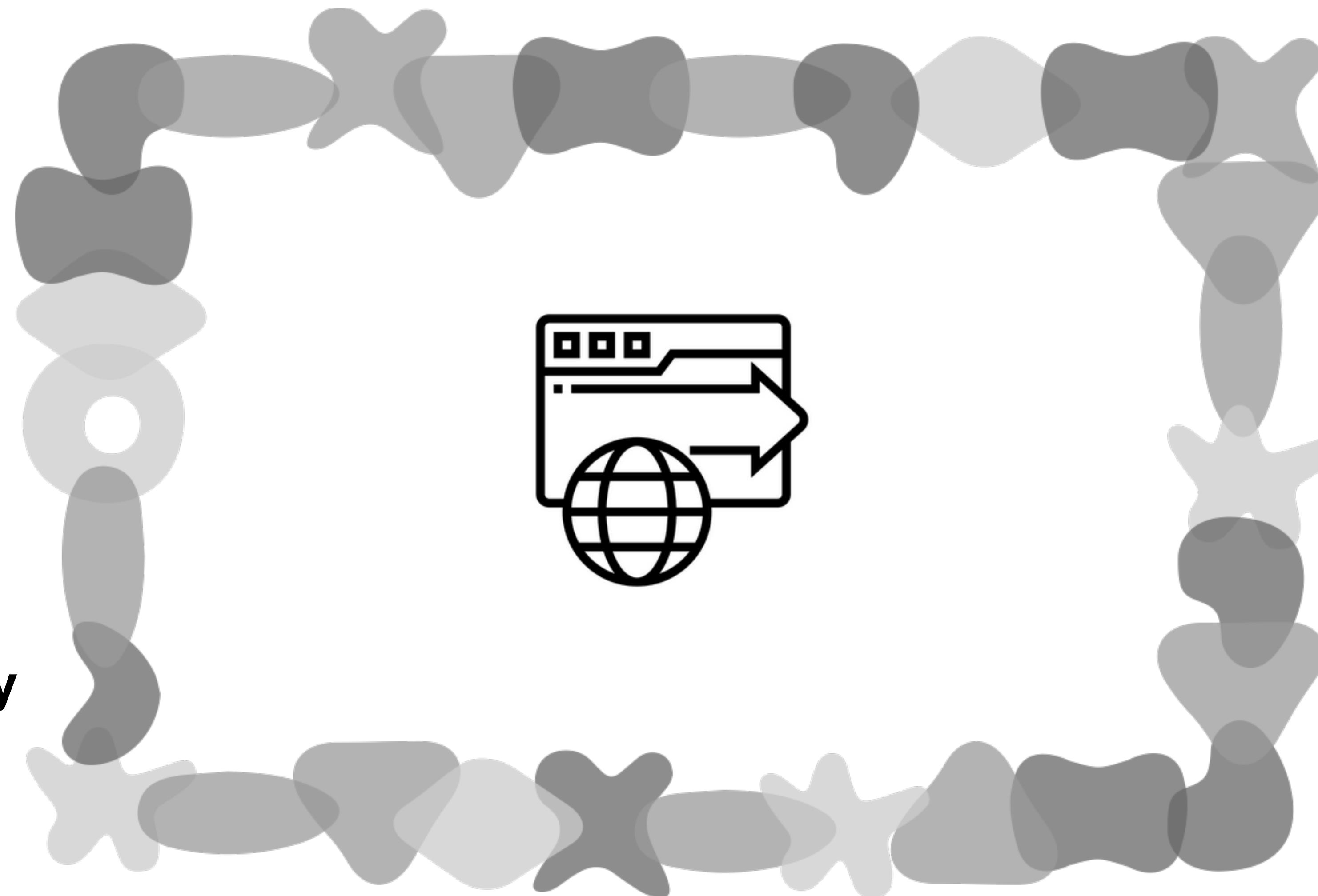
reliability

security

deployability

scalability

elasticity



performance

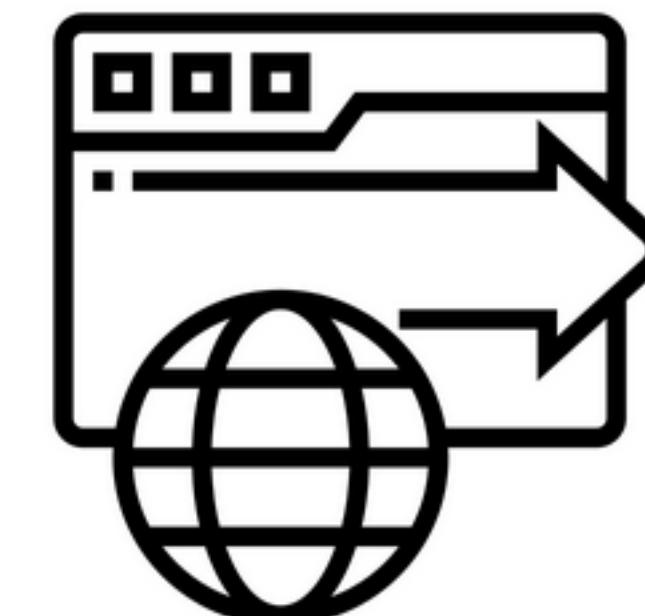
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Your Architectural Kata is...

Going Going Gone!

An auction company wants to take their auctions online to a nationwide scale--customers choose the auction to participate in, wait until the auction begins, then bid during the live auction as if they were there in the room, with the auctioneer.

- **Users:** scale up to hundreds of participants (per auction), potentially up to thousands of participants, and as many simultaneous auctions as possible
- **Requirements:**
 - bidders can see a live video stream of the auction and see all bids as they occur
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 - auction company is expanding aggressively by merging with smaller competitors
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availability reliability performance

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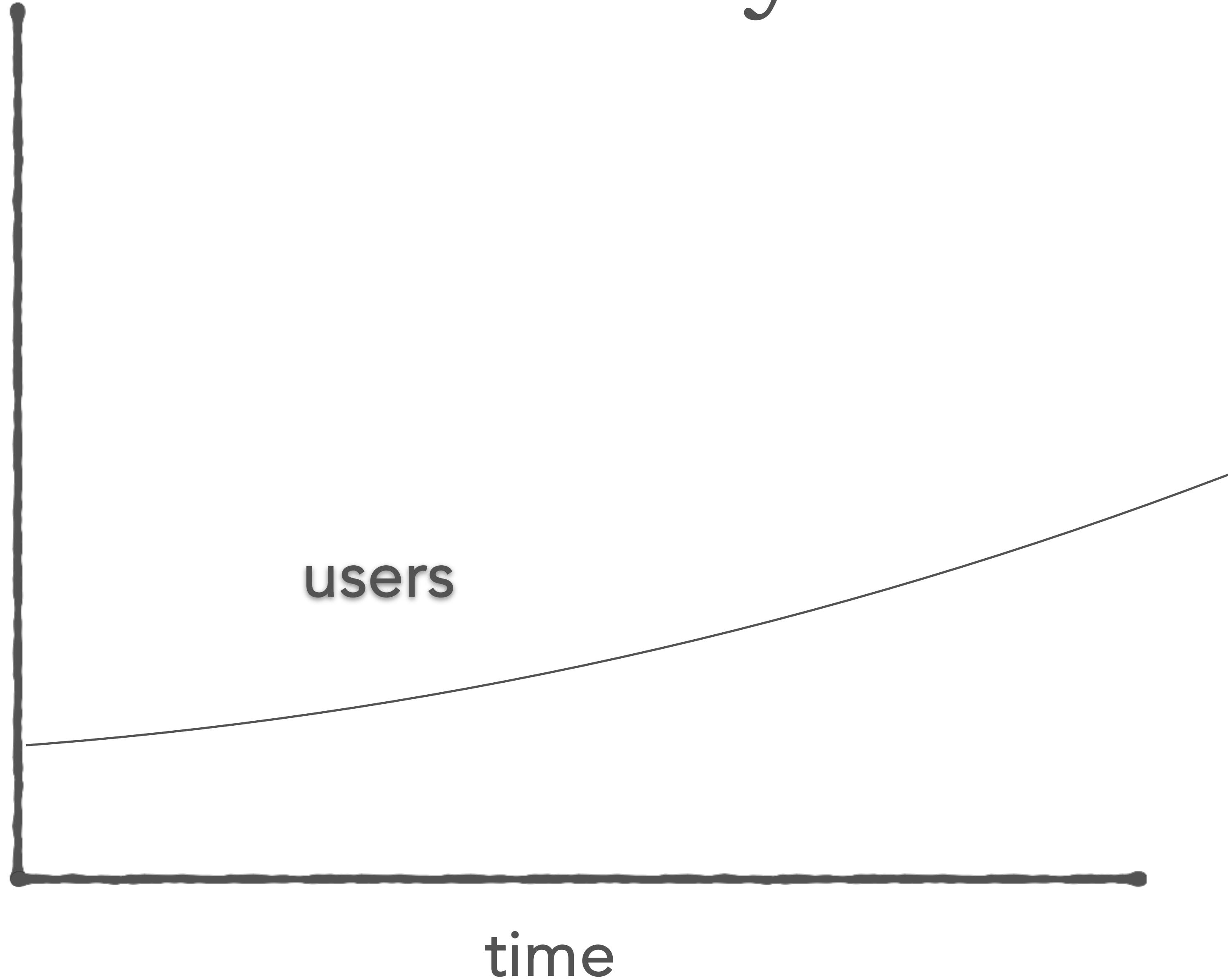
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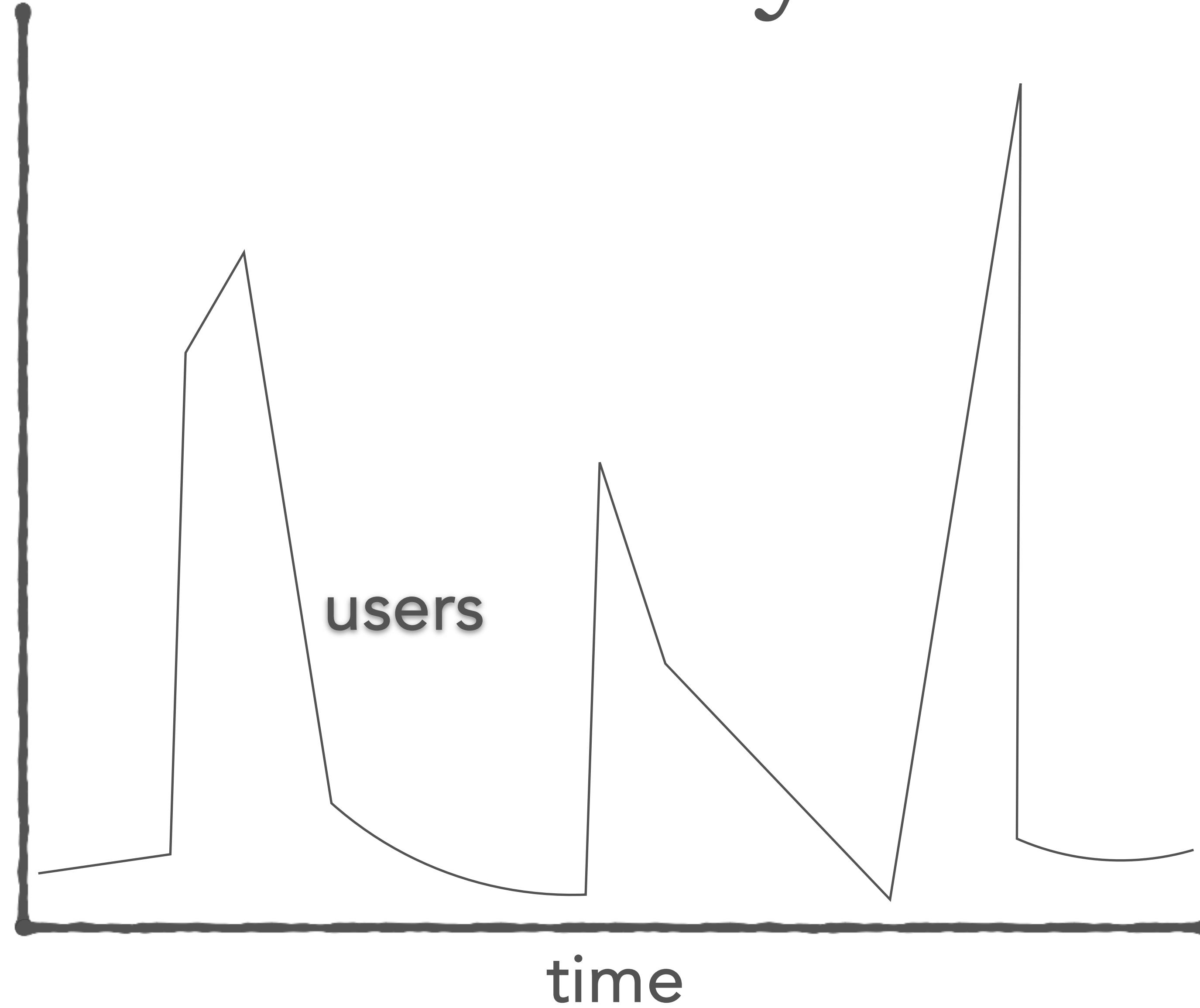
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availability reliability performance scalability elasticity

scalability:



elasticity:



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availability reliability performance scalability elasticity (security)

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concurrency

availability reliability performance scalability elasticity (security)

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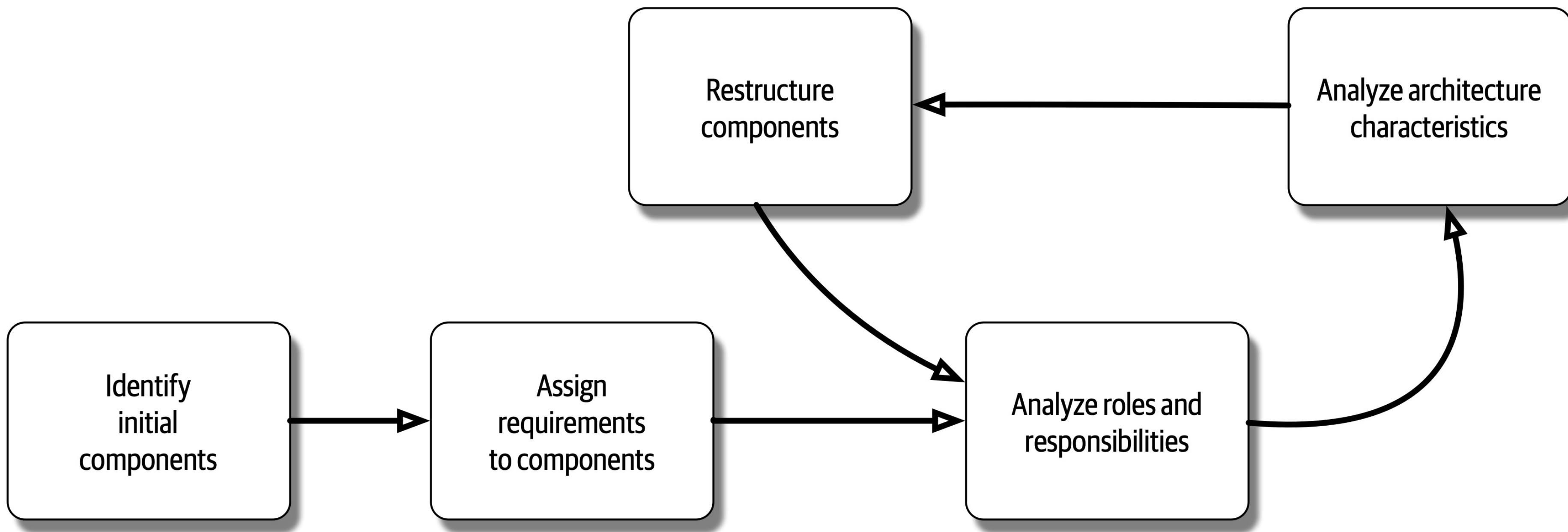
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concurrency

availability reliability performance scalability elasticity (security)

component identification



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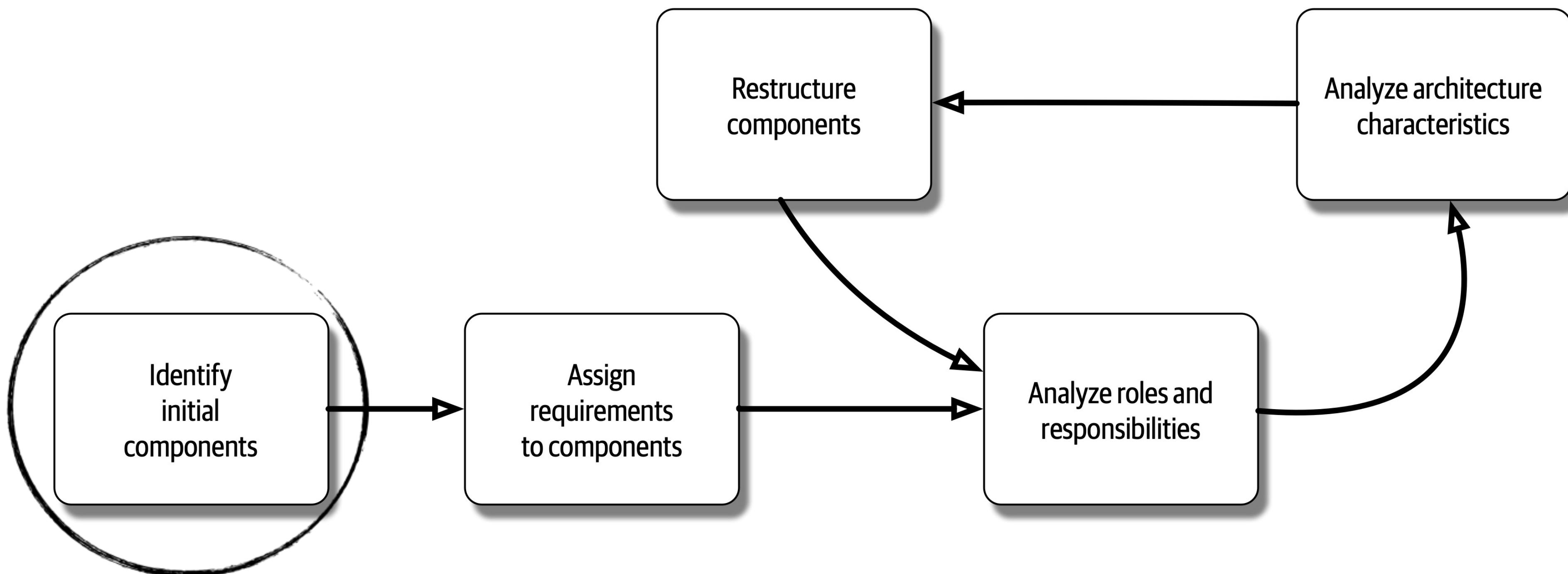
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Going Going Gone!

the “entity trap”

auctions

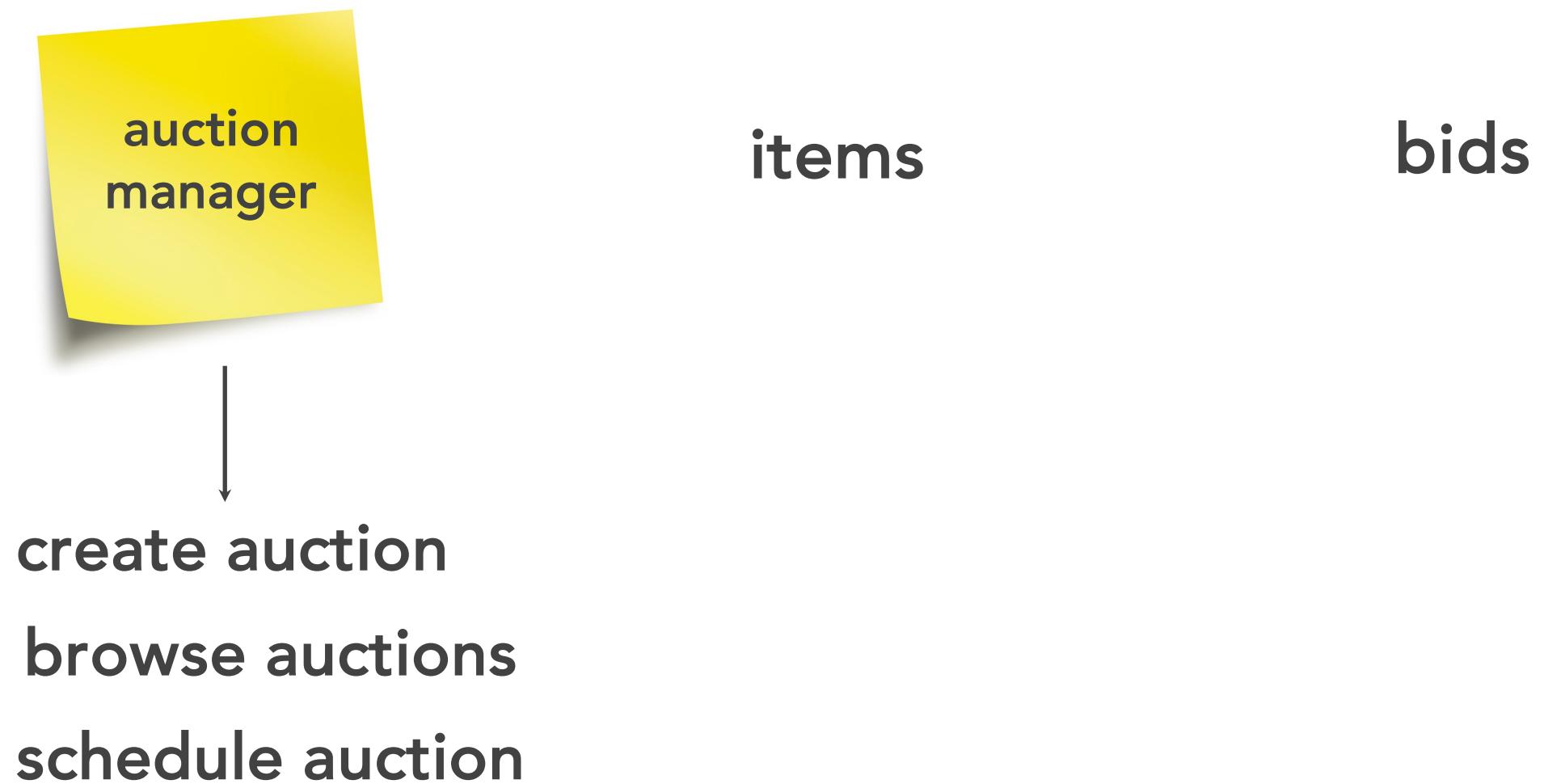
items

bids

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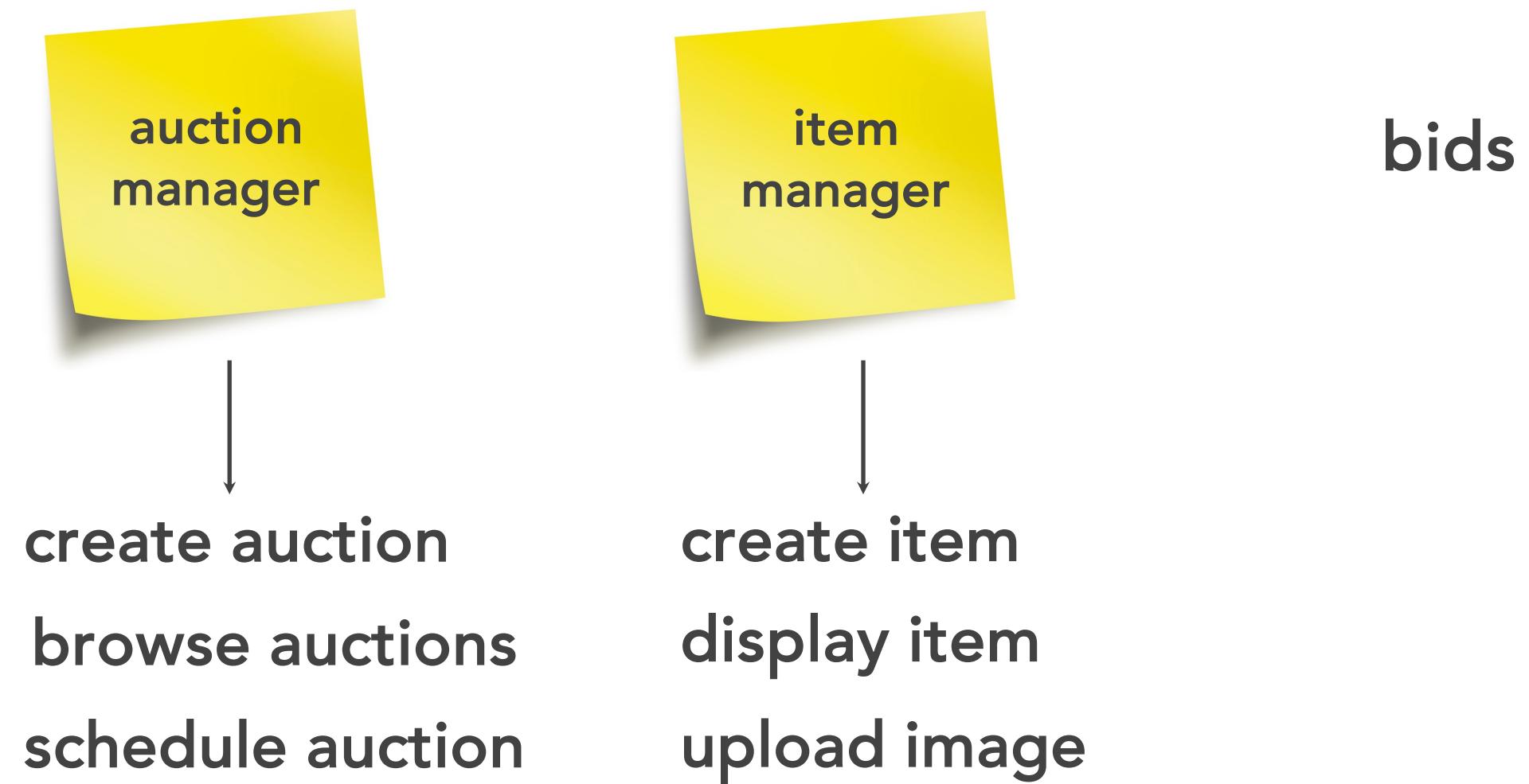
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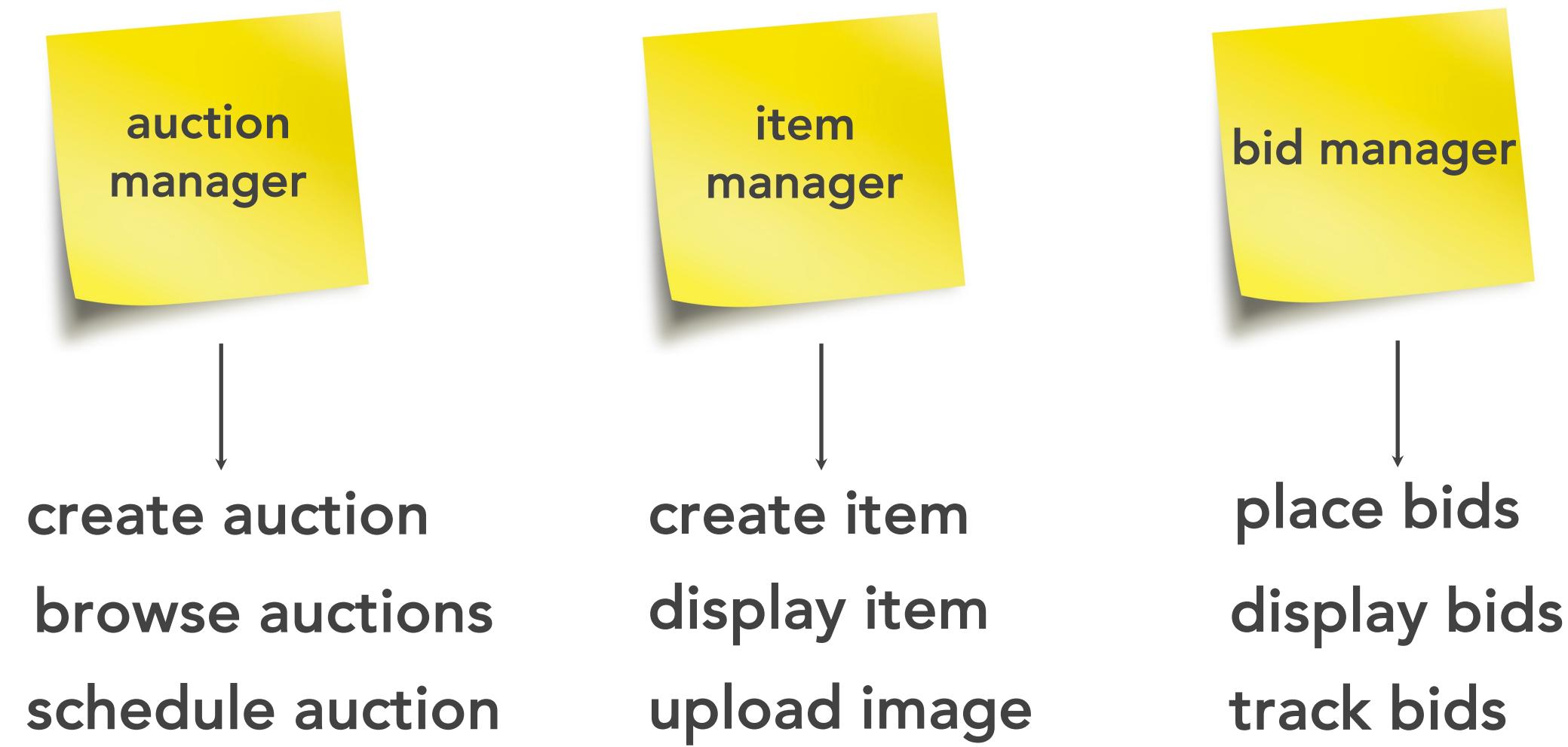
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Your Architectural Kata is...

Going Going Gone!

workflow approach

create auction —> find auction —> sign up —> watch auction —> place bid

Your Architectural Kata is...

Going Going Gone!

workflow approach

create auction —→ find auction —→ sign up —→ watch auction —→ place bid



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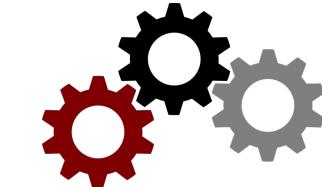
actor/action approach



bidder



auctioneer



system

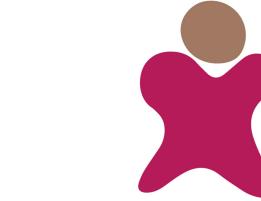
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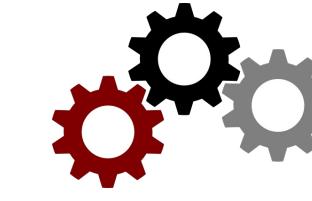
actor/action approach



bidder



auctioneer



system



view live video stream

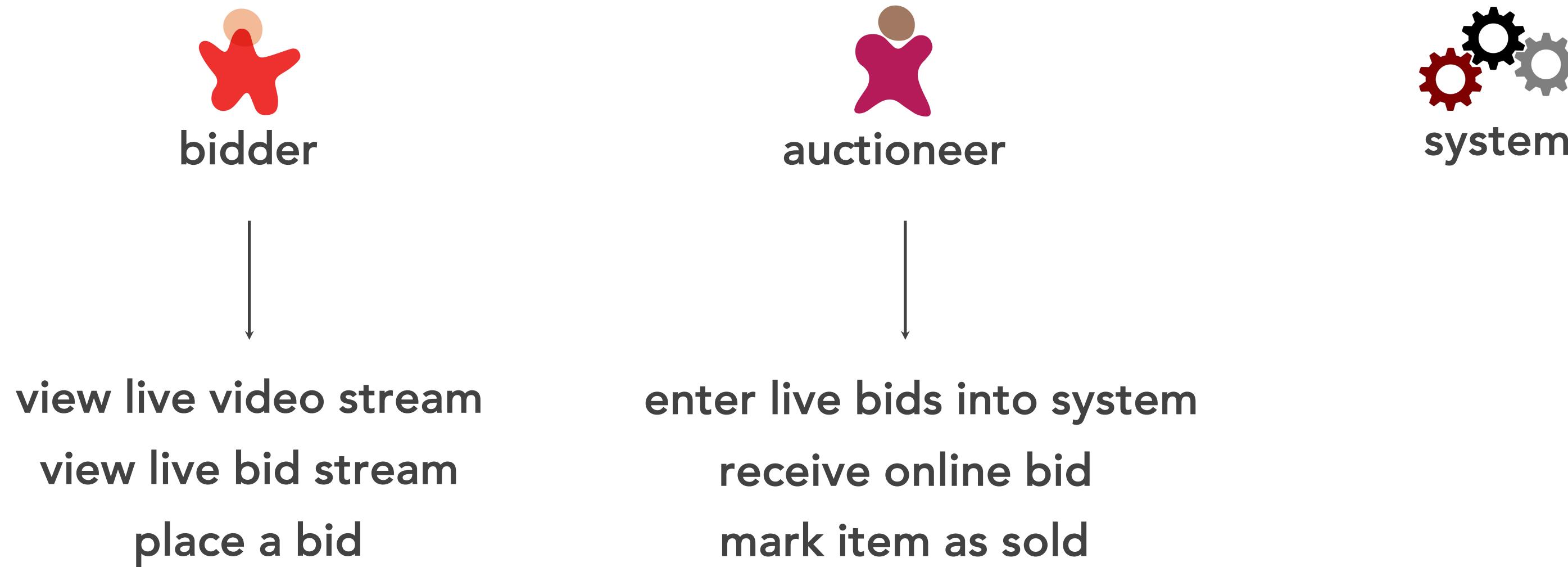
view live bid stream

place a bid

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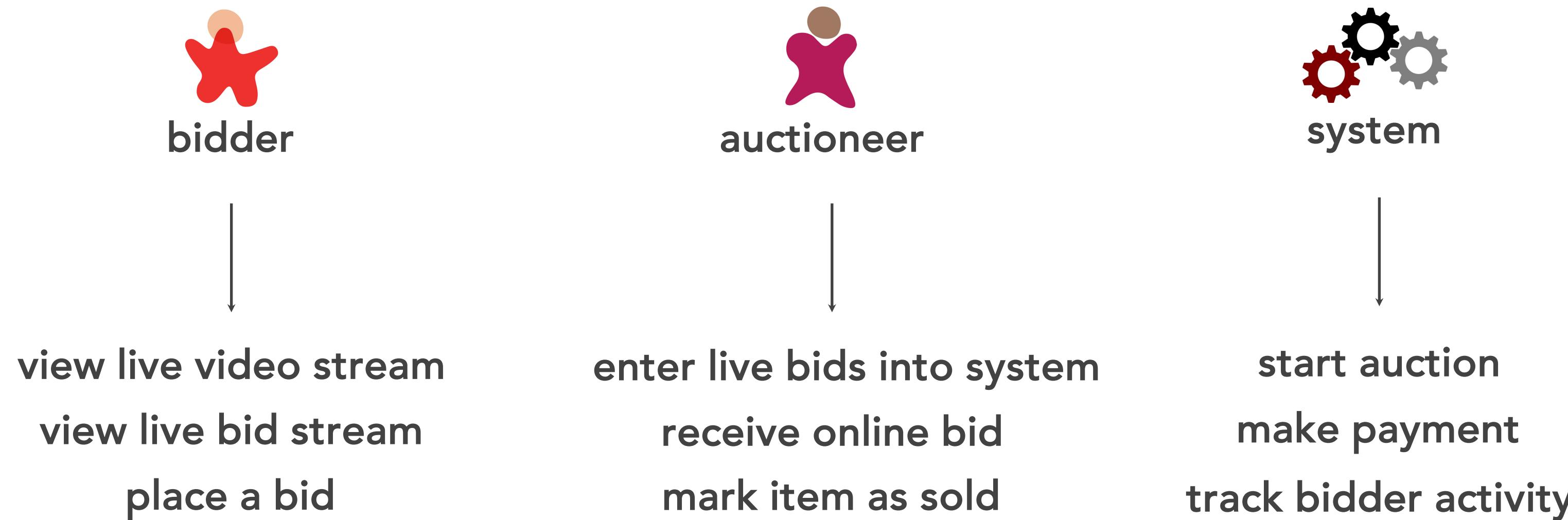
actor/action approach



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actor/action approach



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bidder

- view live video stream
- view live bid stream
- place a bid



auctioneer

- receive online bid
- enter live bids into system
- mark item as sold



system

- start auction
- make payment
- track bidder activity

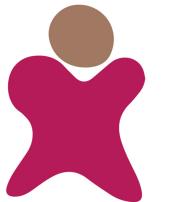
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- receive online bid
- enter live bids into system
- mark item as sold



system

- start auction
- make payment
- track bidder activity



Your Architectural Kata is...

Going Going Gone!



bidder

- view live video stream
- view live bid stream
- place a bid



auctioneer

- receive online bid
- enter live bids into system
- mark item as sold



system

- ✓ start auction
- make payment
- track bidder activity



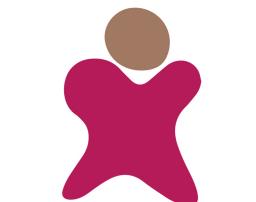
Your Architectural Kata is...

Going Going Gone!



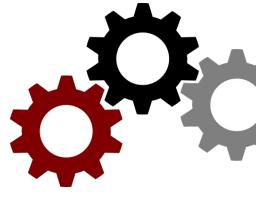
bidder

- view live video stream
- view live bid stream
- place a bid



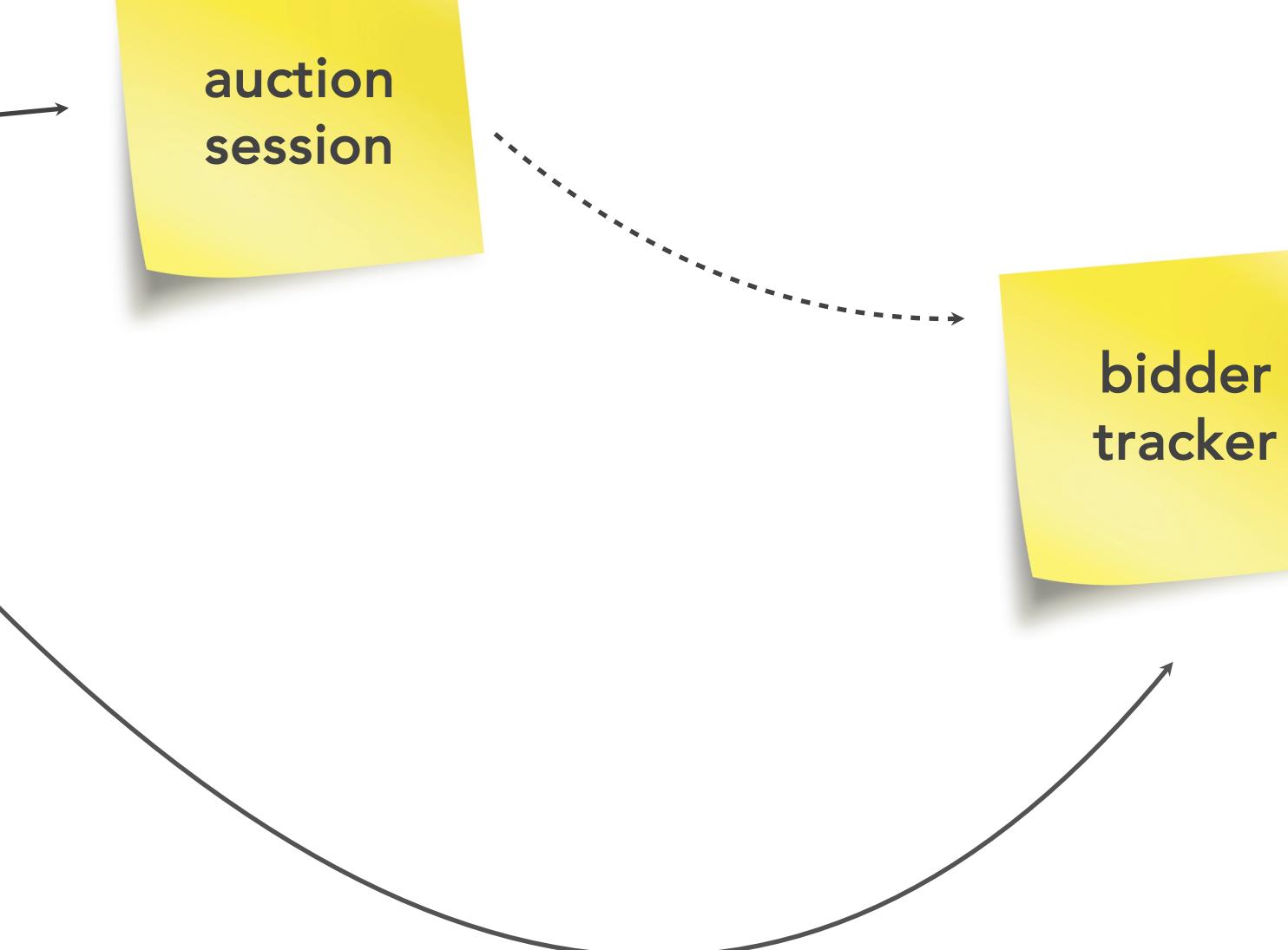
auctioneer

- receive online bid
- enter live bids into system
- mark item as sold



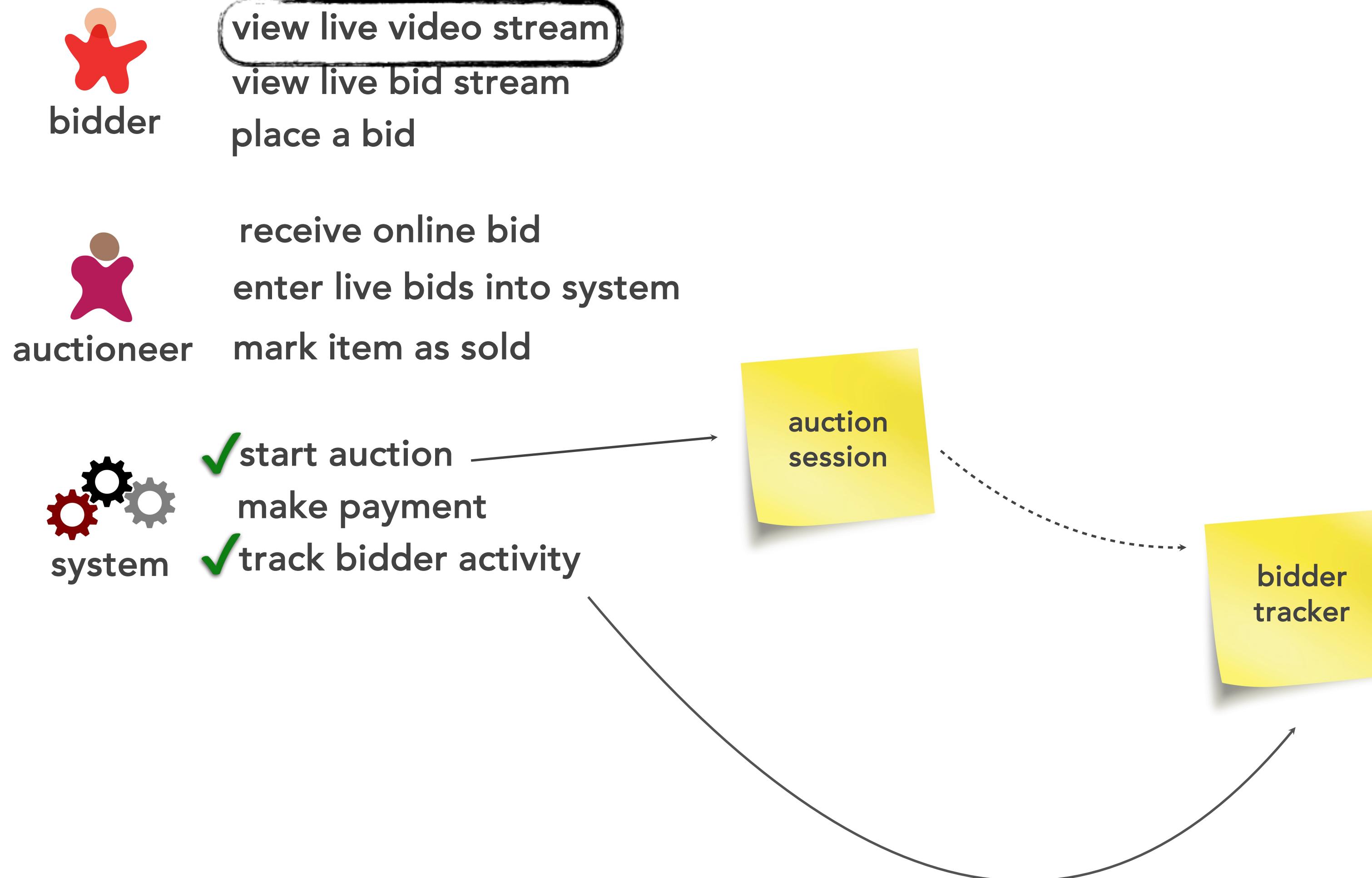
system

- ✓ start auction
- make payment
- track bidder activity**



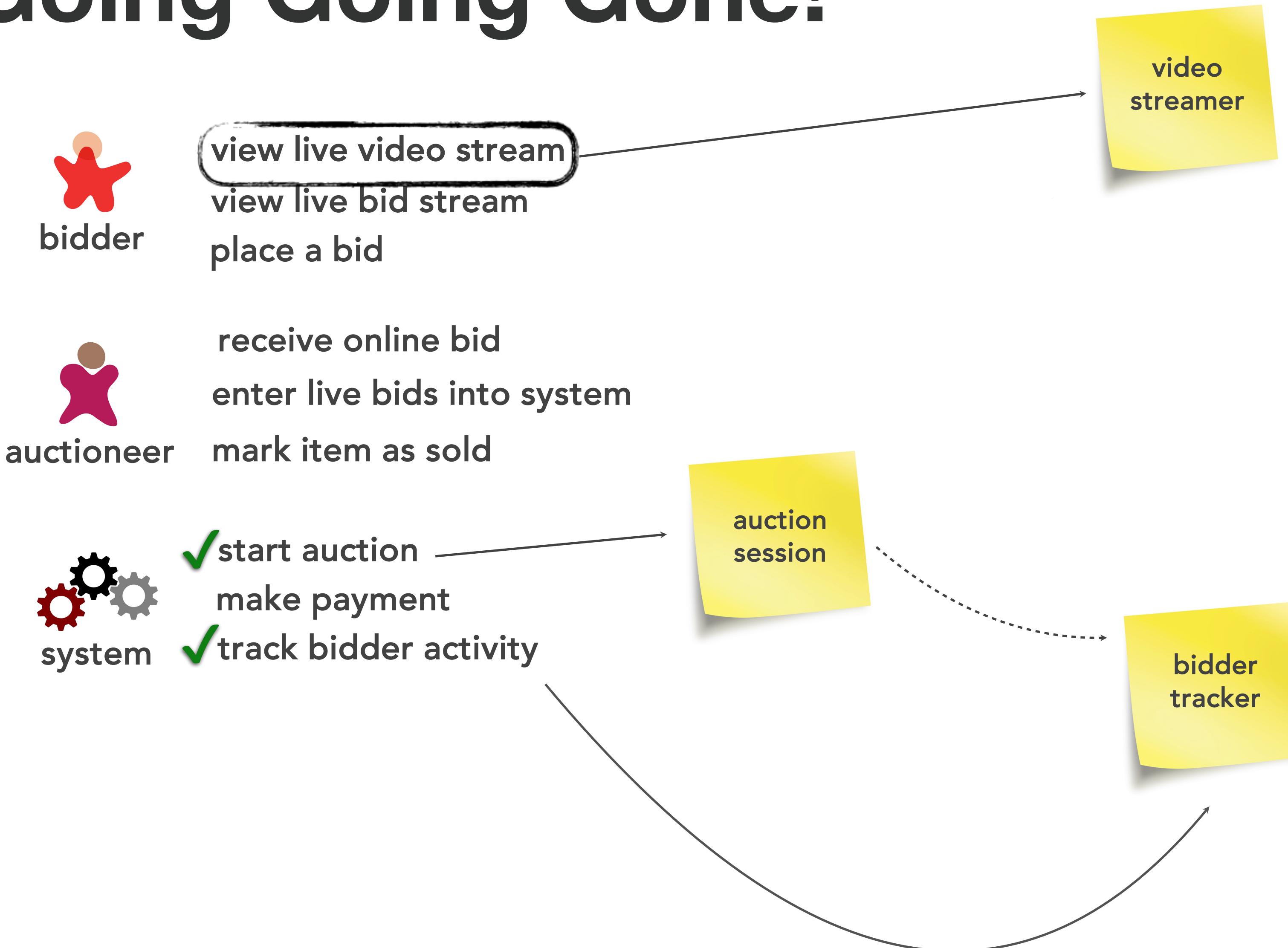
Your Architectural Kata is...

Going Going Gone!



Your Architectural Kata is...

Going Going Gone!



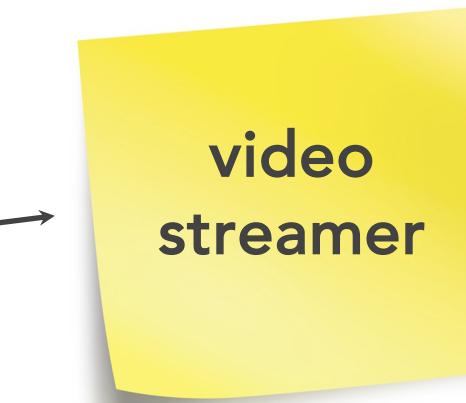
Your Architectural Kata is...

Going Going Gone!



bidder

- ✓ view live video stream
- view live bid stream**
- place a bid

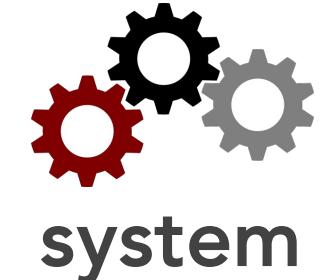


video
streamer



auctioneer

- receive online bid
- enter live bids into system
- mark item as sold



system

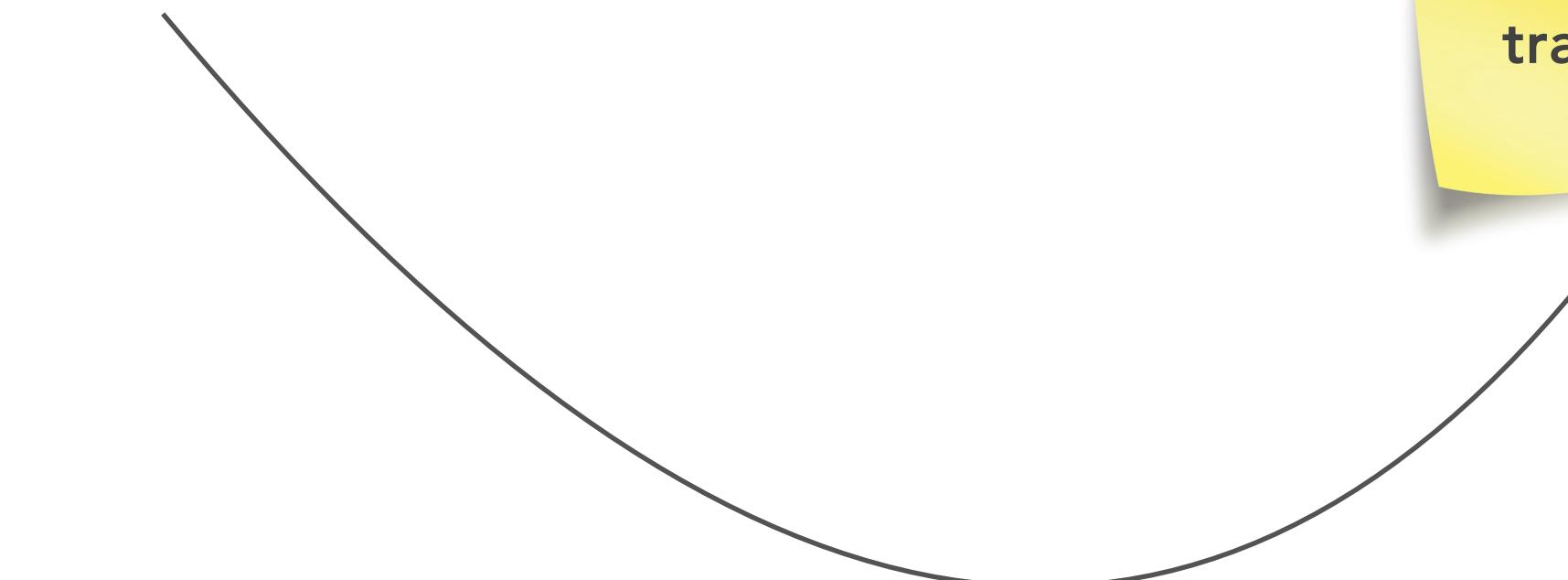
- ✓ start auction
- make payment
- ✓ track bidder activity



auction
session

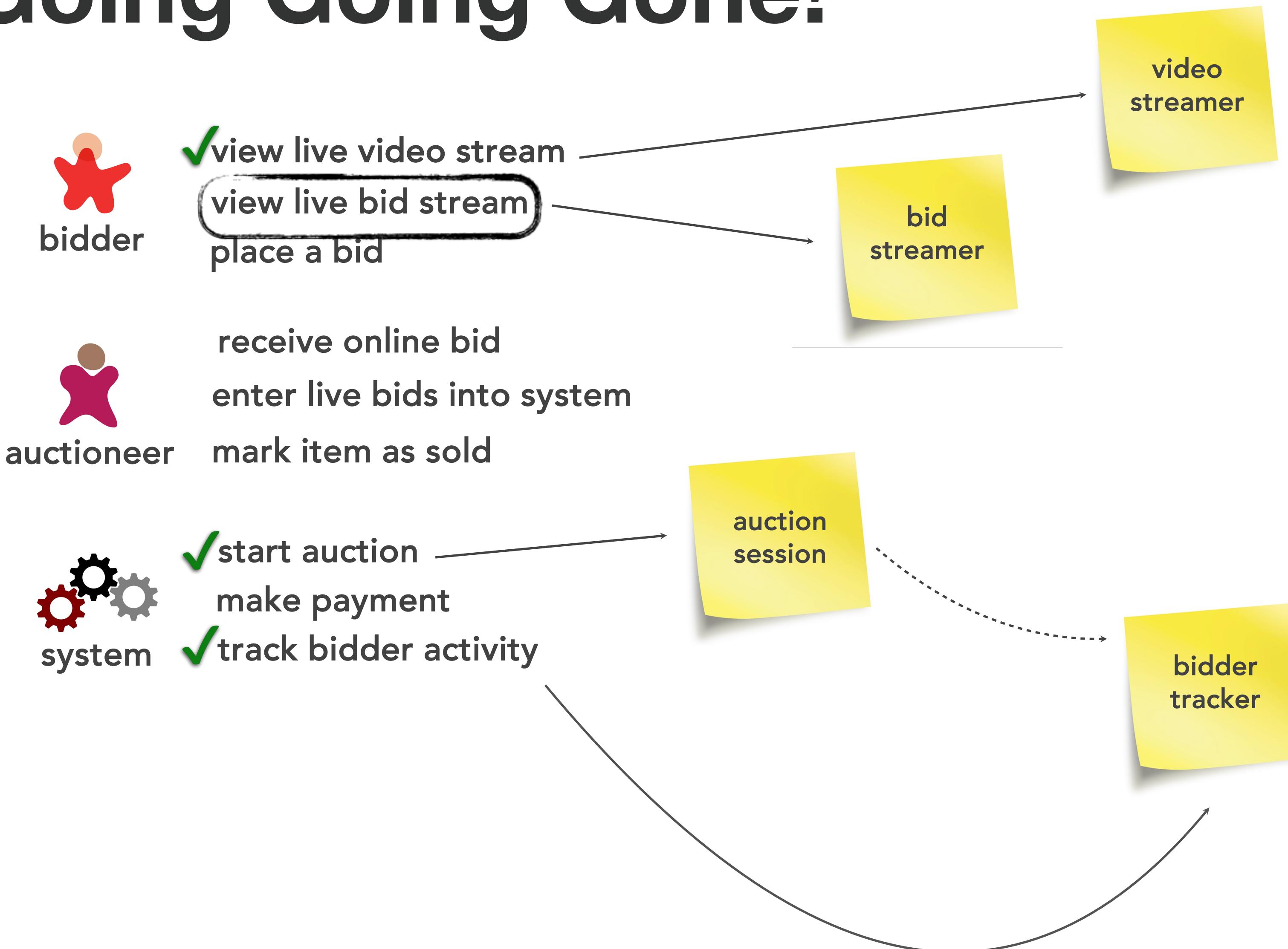


bidder
tracker



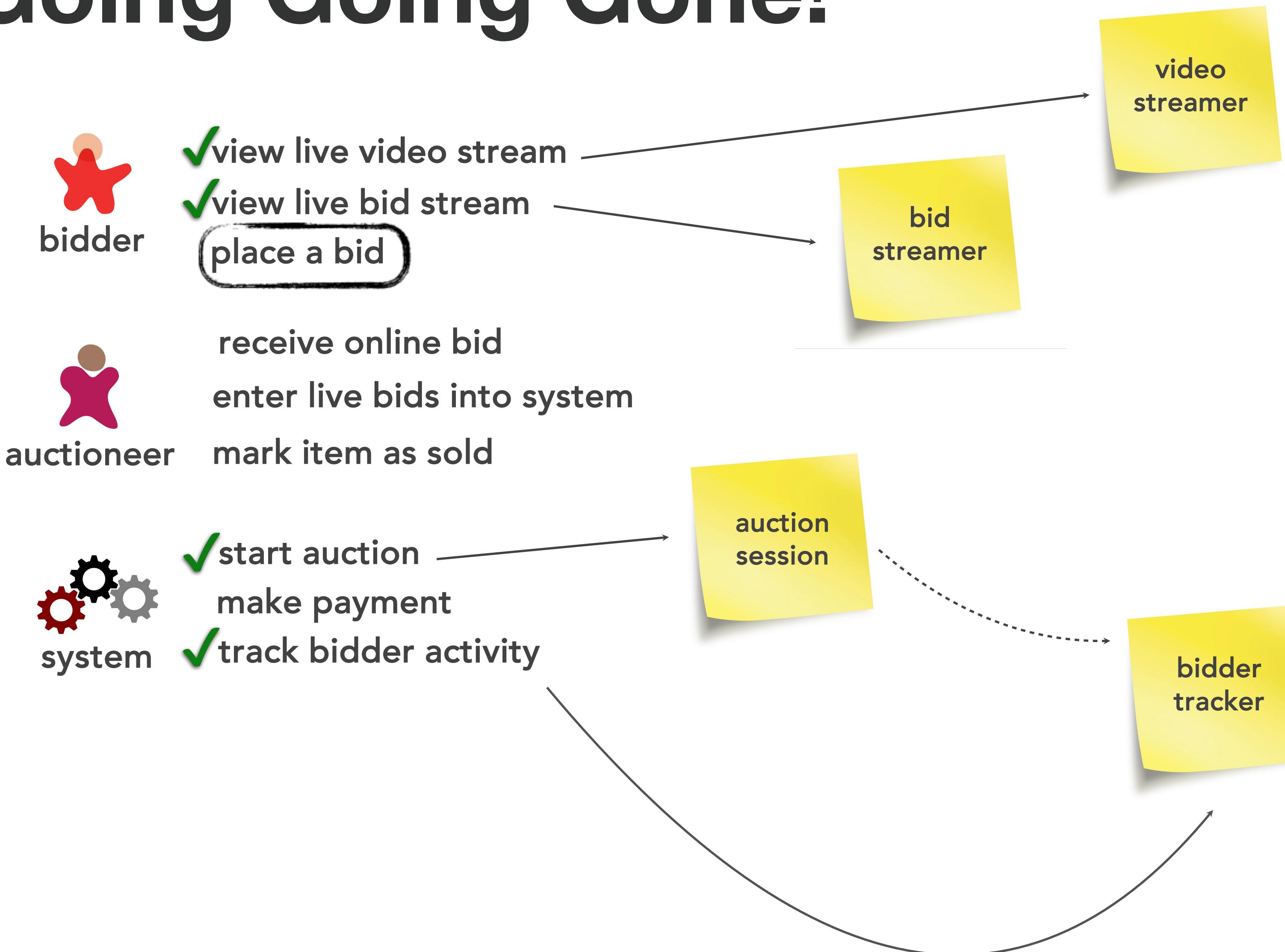
Your Architectural Kata is...

Going Going Gone!



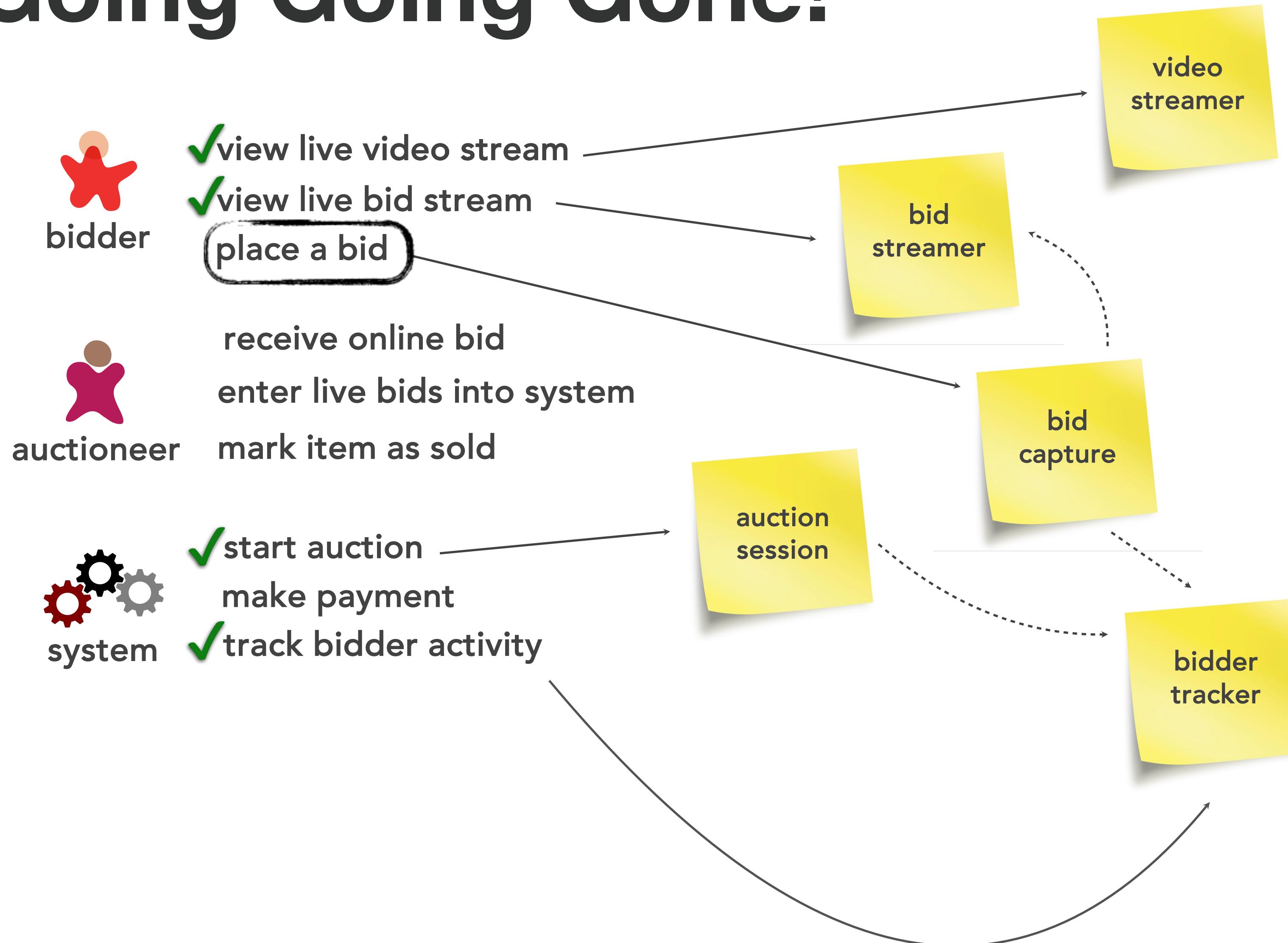
Your Architectural Kata is...

Going Going Gone!



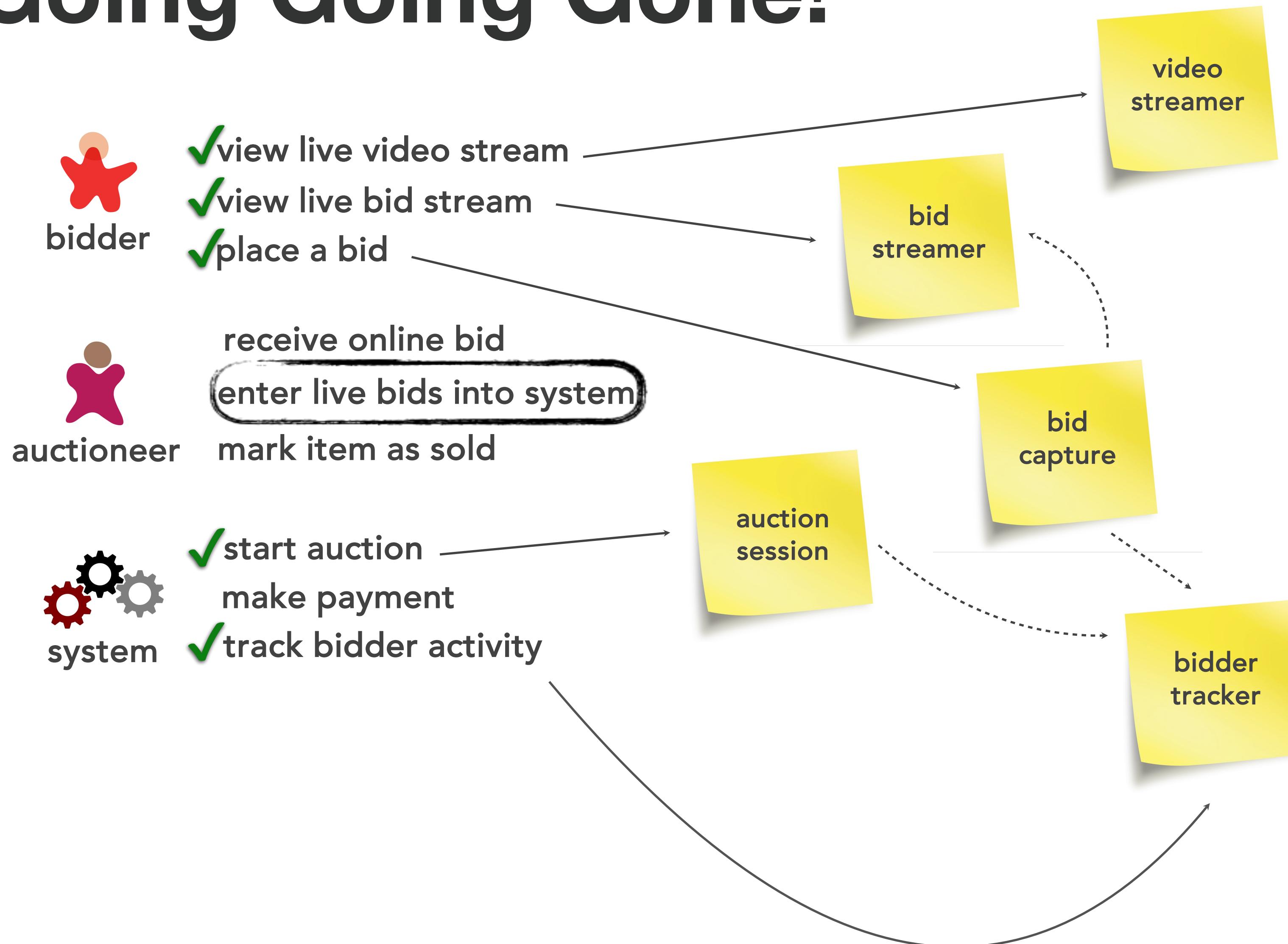
Your Architectural Kata is...

Going Going Gone!



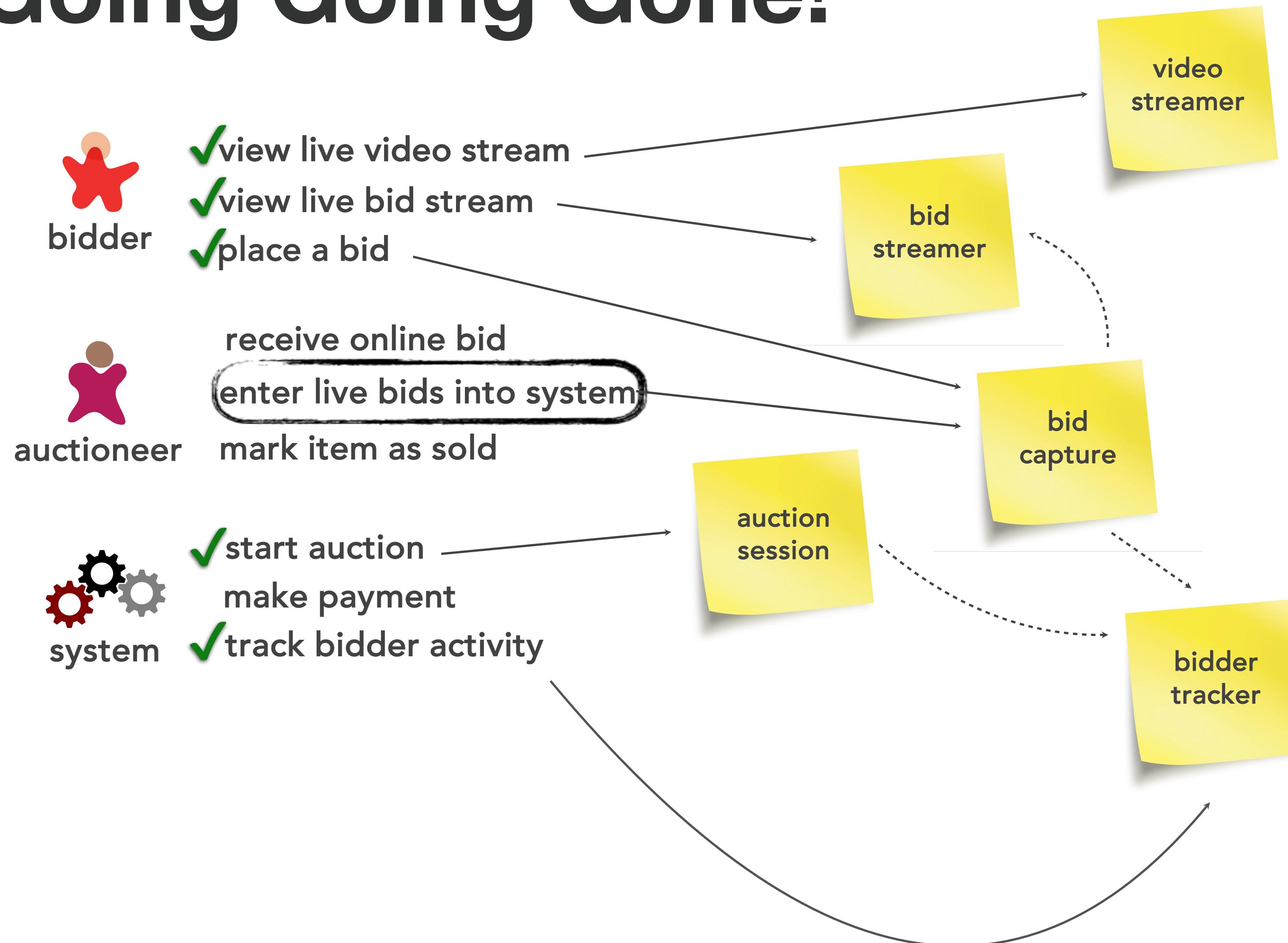
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Going Going Gone!



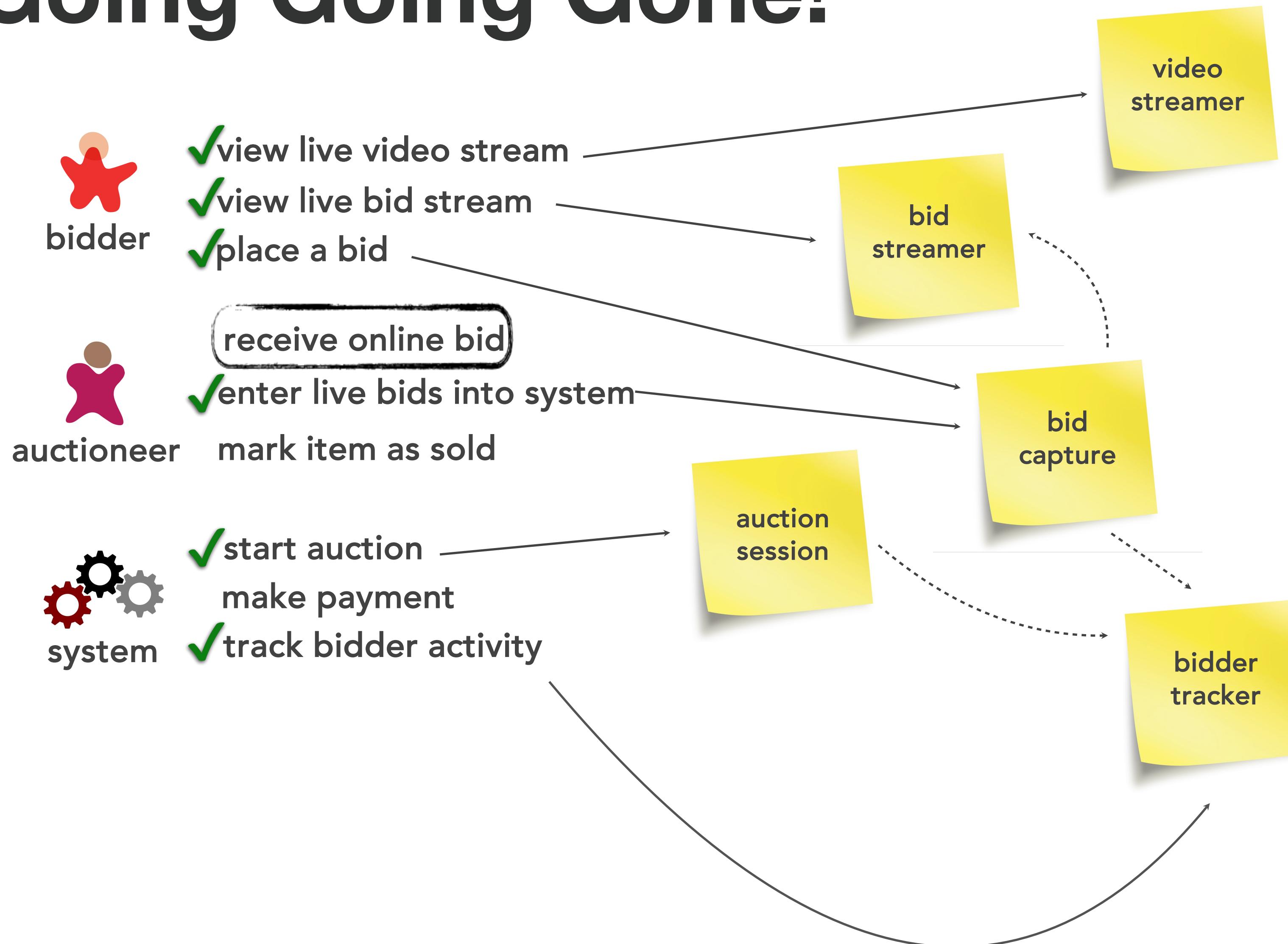
Your Architectural Kata is...

Going Going Gone!



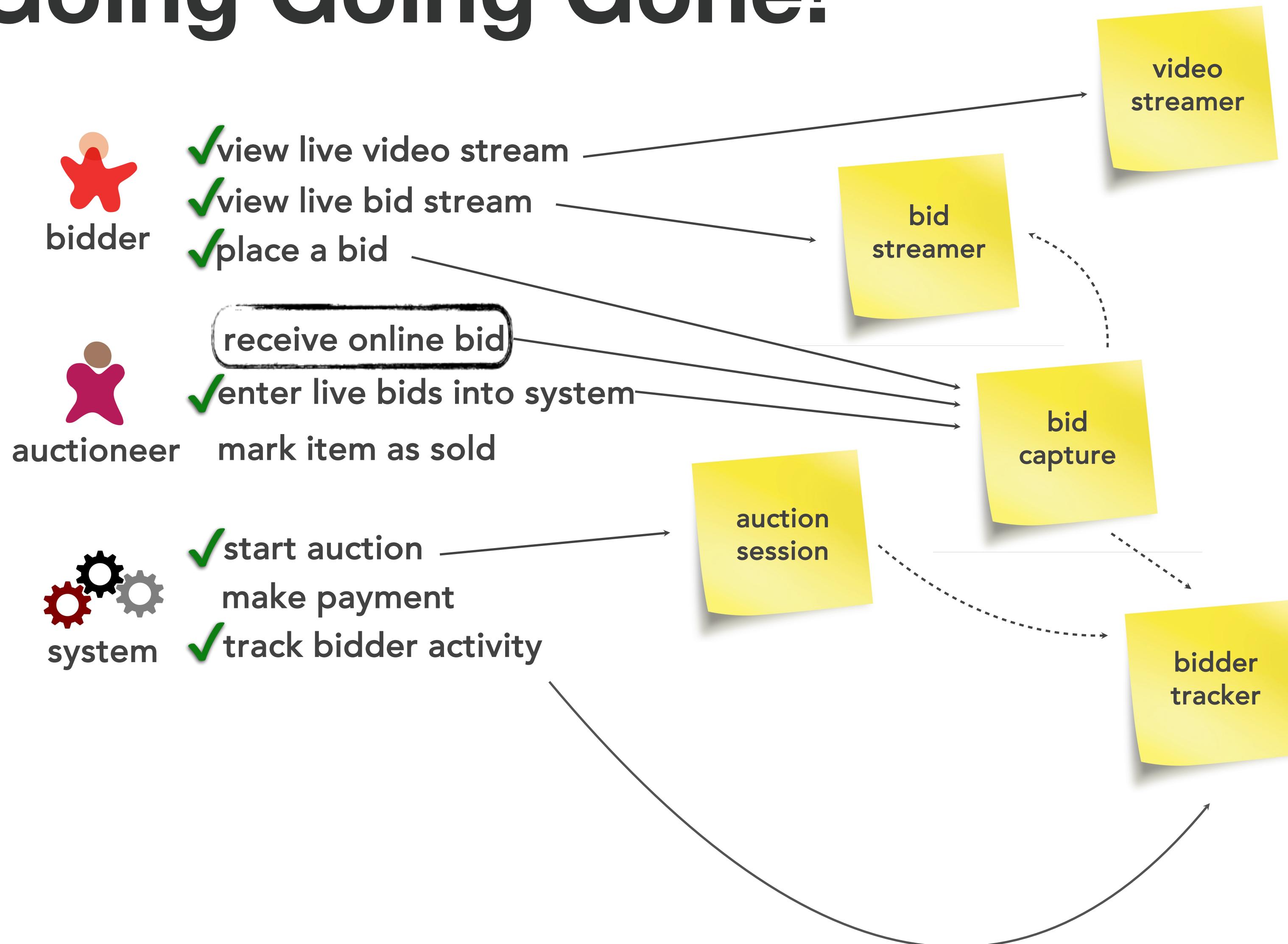
Your Architectural Kata is...

Going Going Gone!



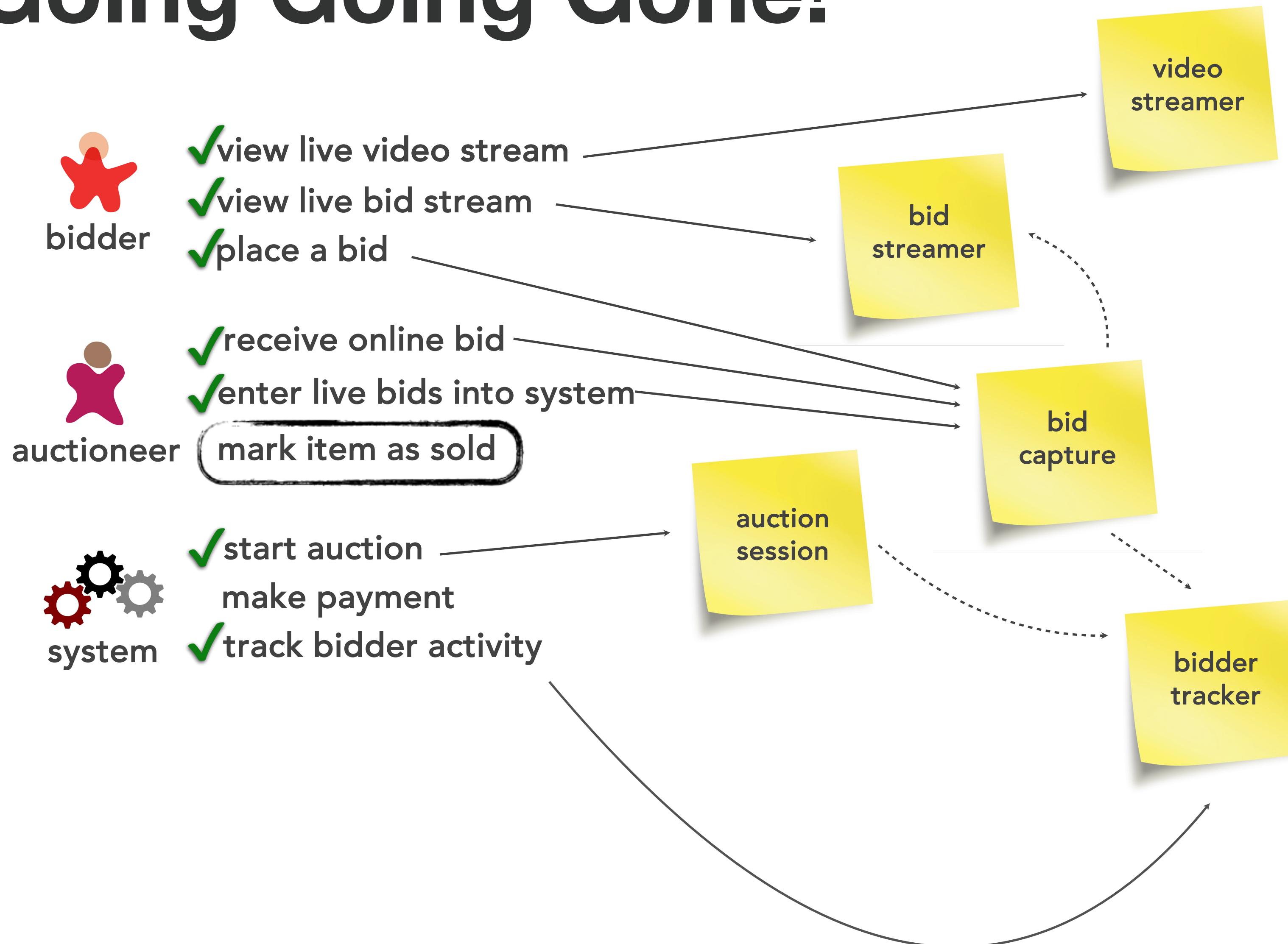
Your Architectural Kata is...

Going Going Gone!



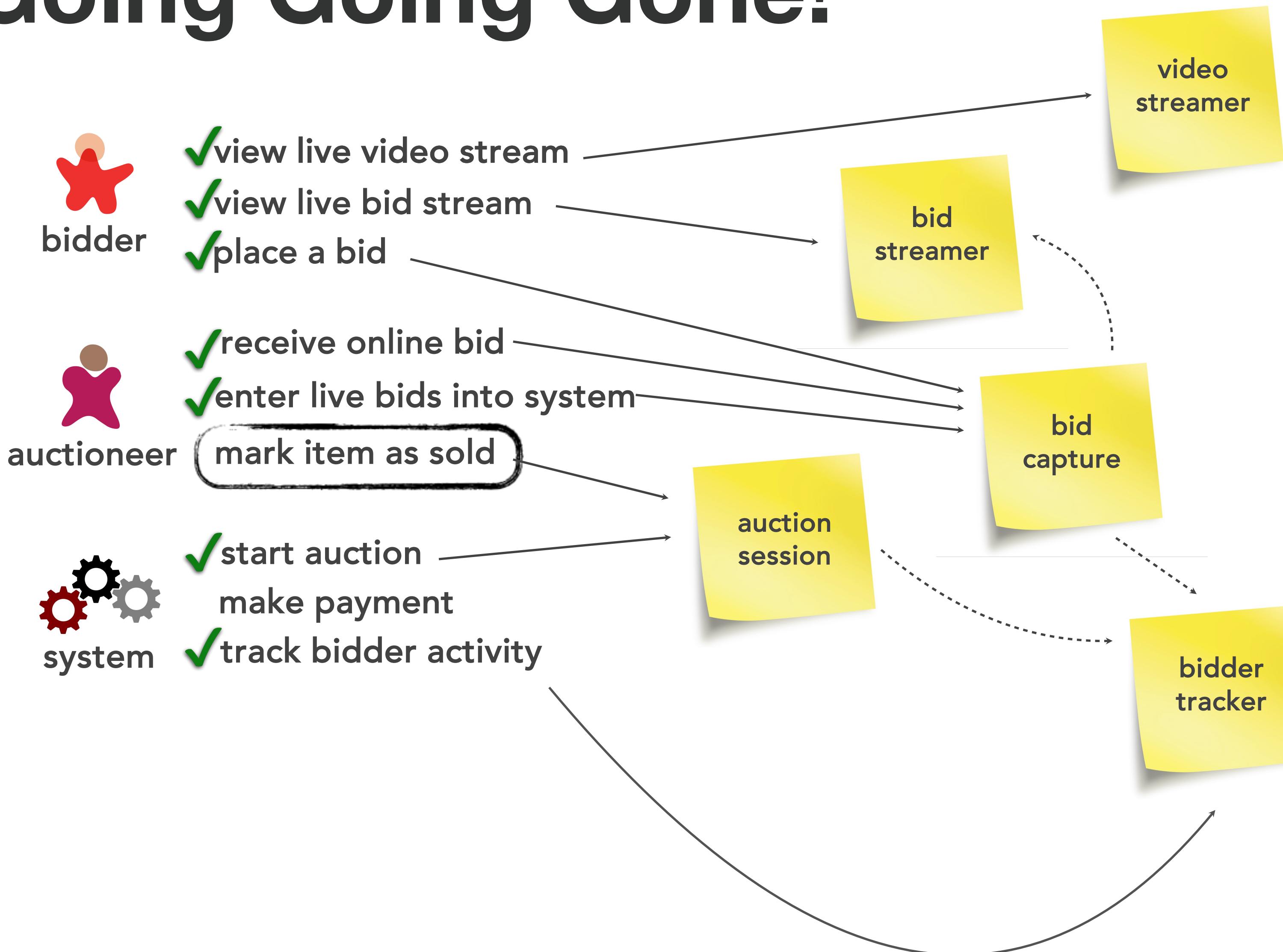
Your Architectural Kata is...

Going Going Gone!



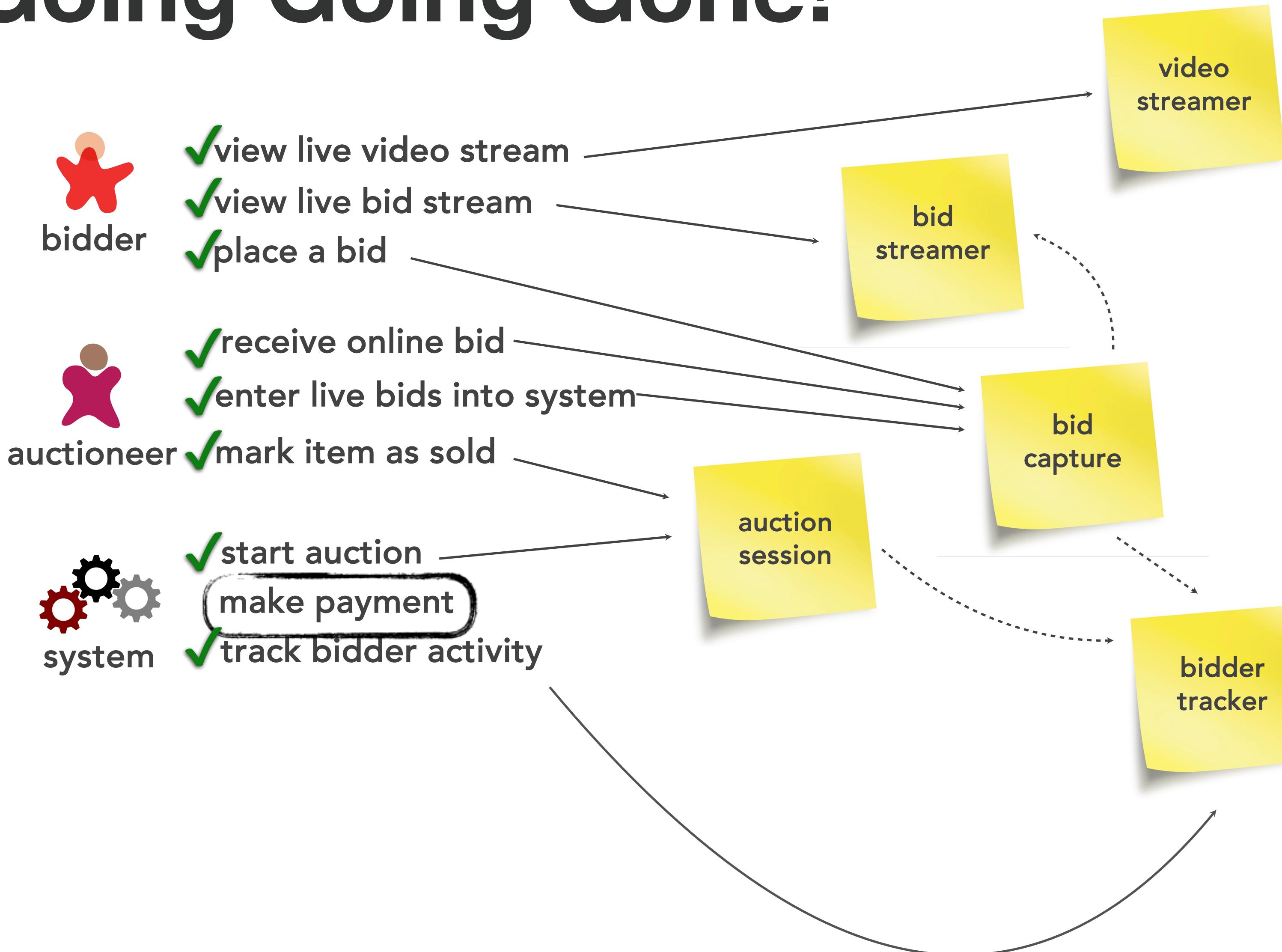
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Going Going Gone!



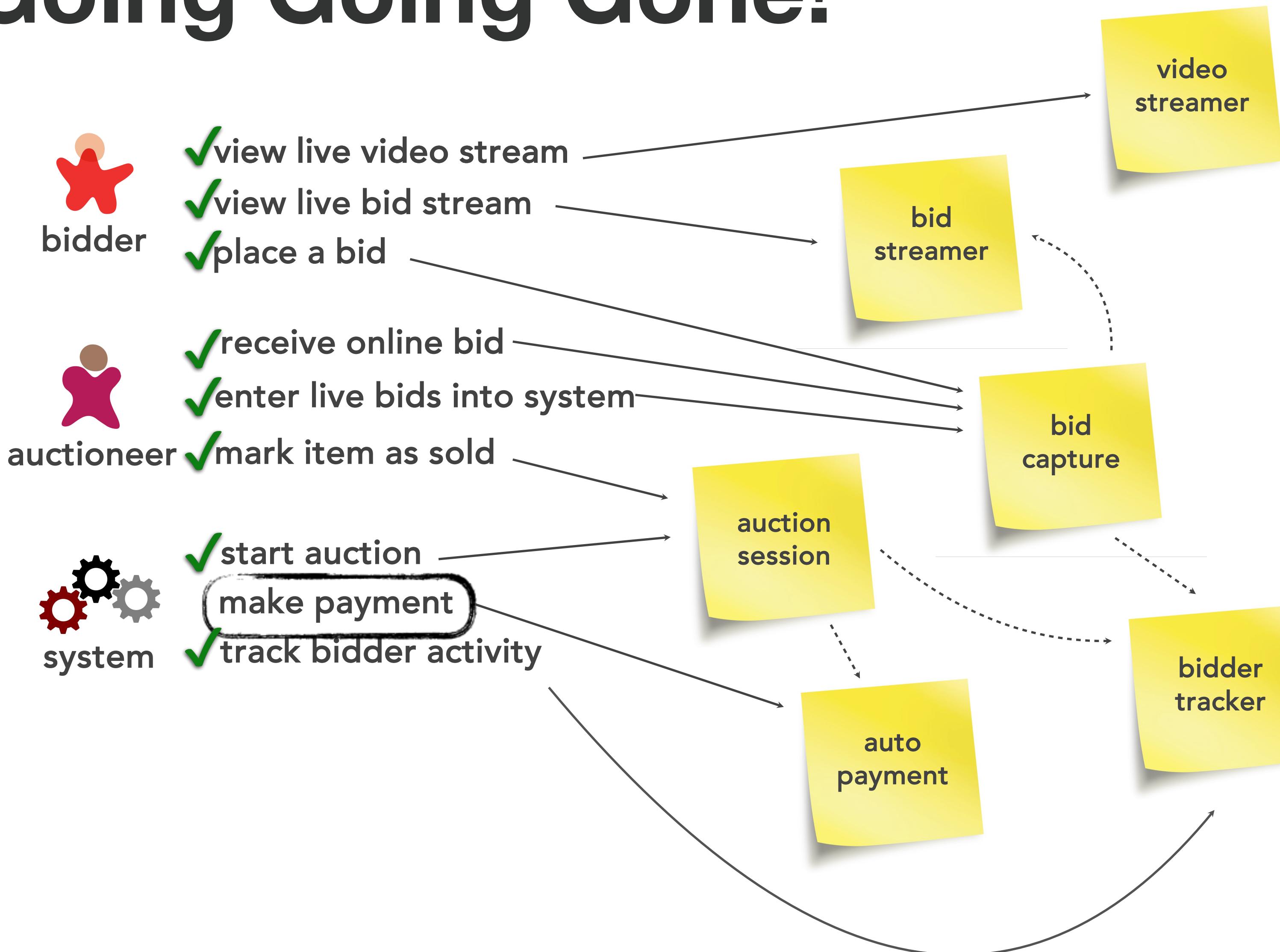
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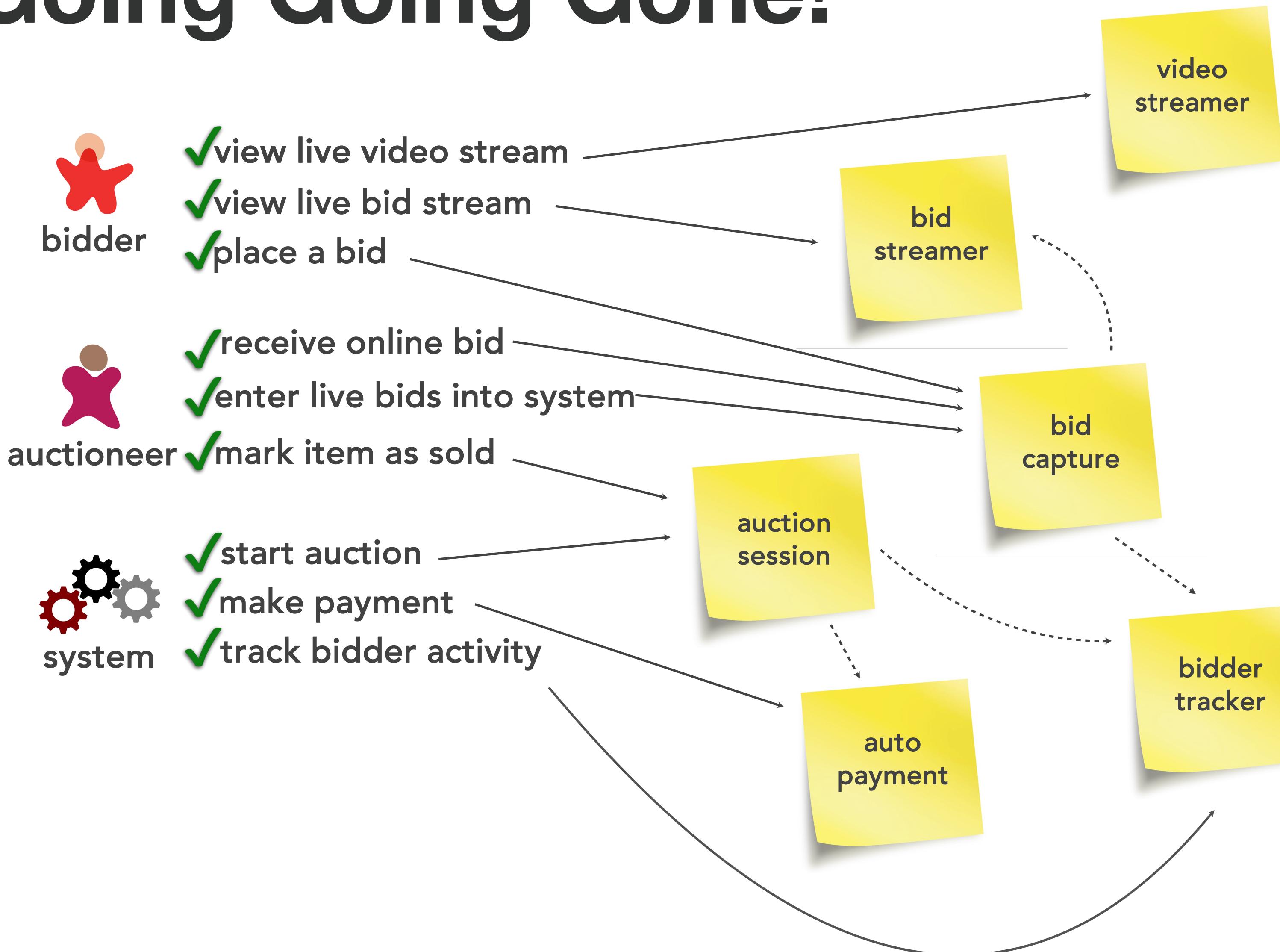
Your Architectural Kata is...

Going Going Gone!



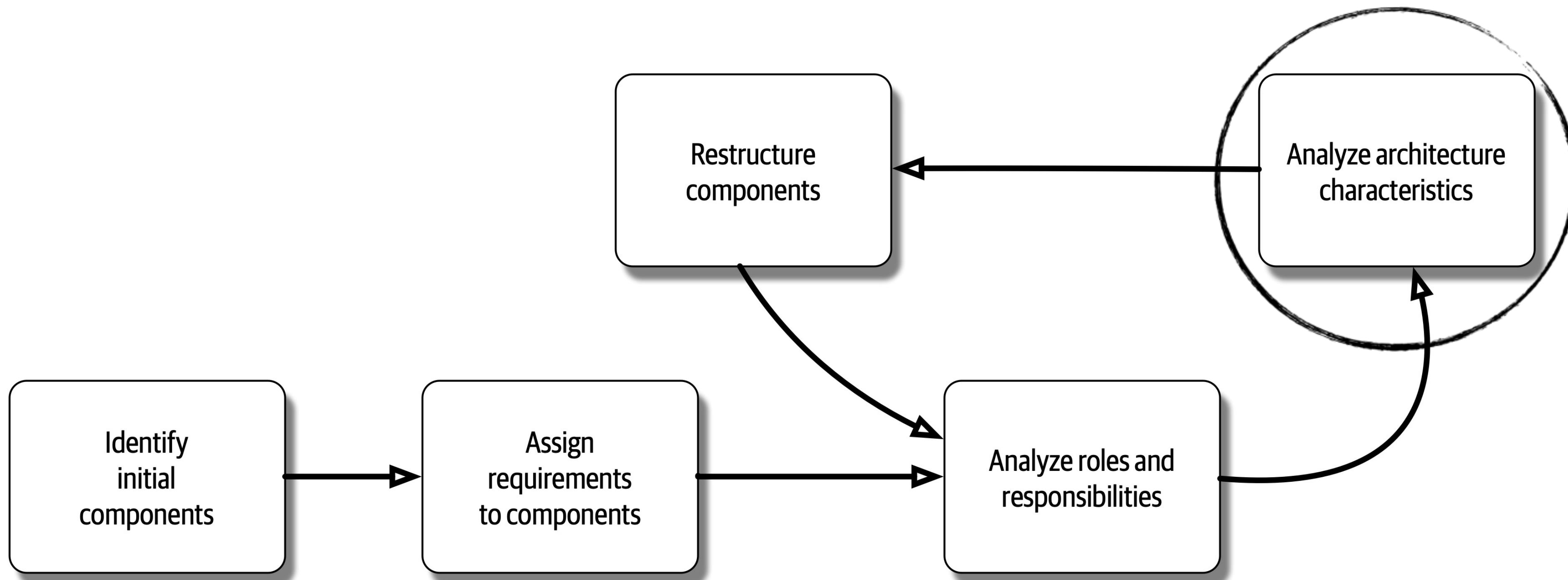
Your Architectural Kata is...

Going Going Gone!



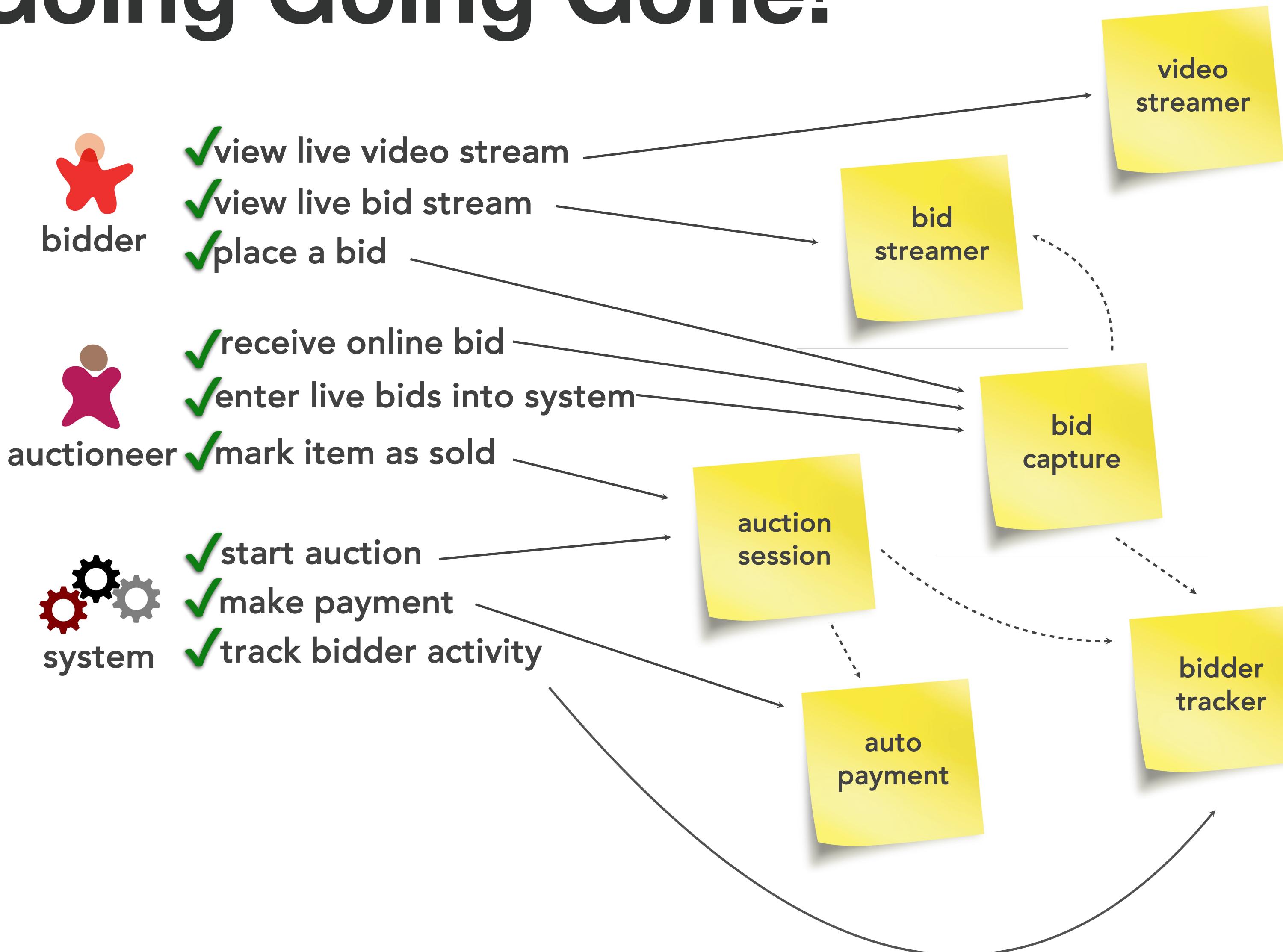
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Going Going Gone!



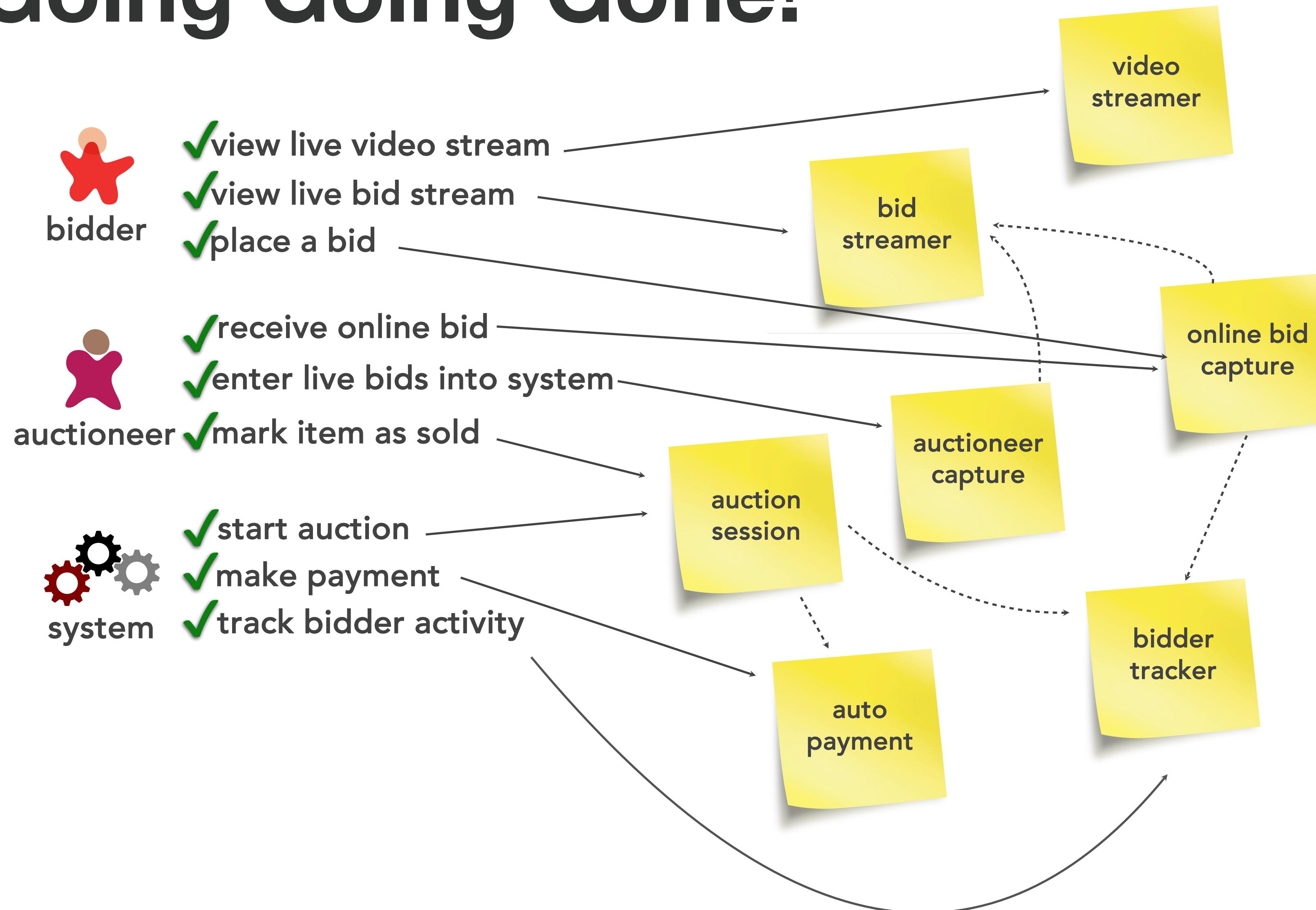
Your Architectural Kata is...

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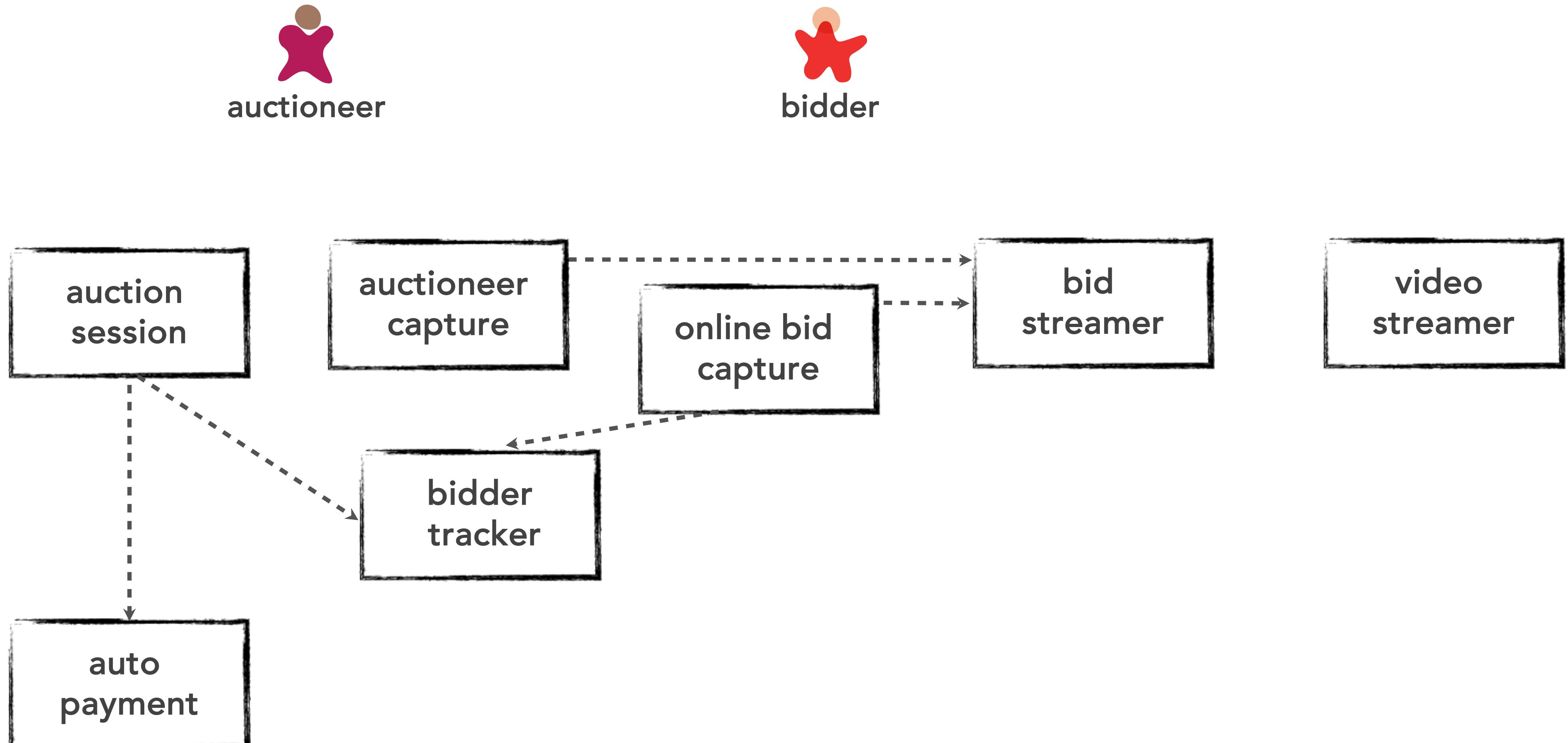
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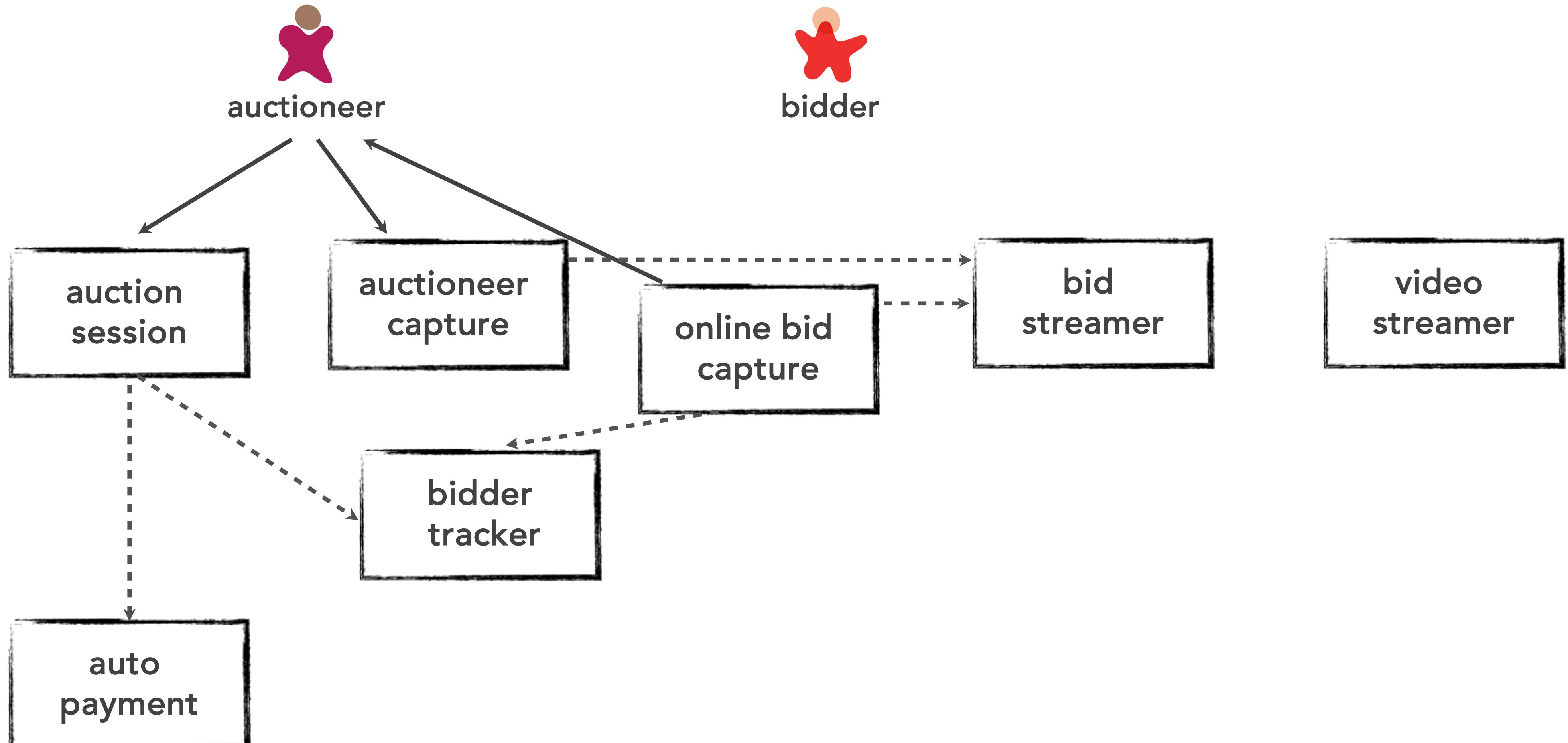
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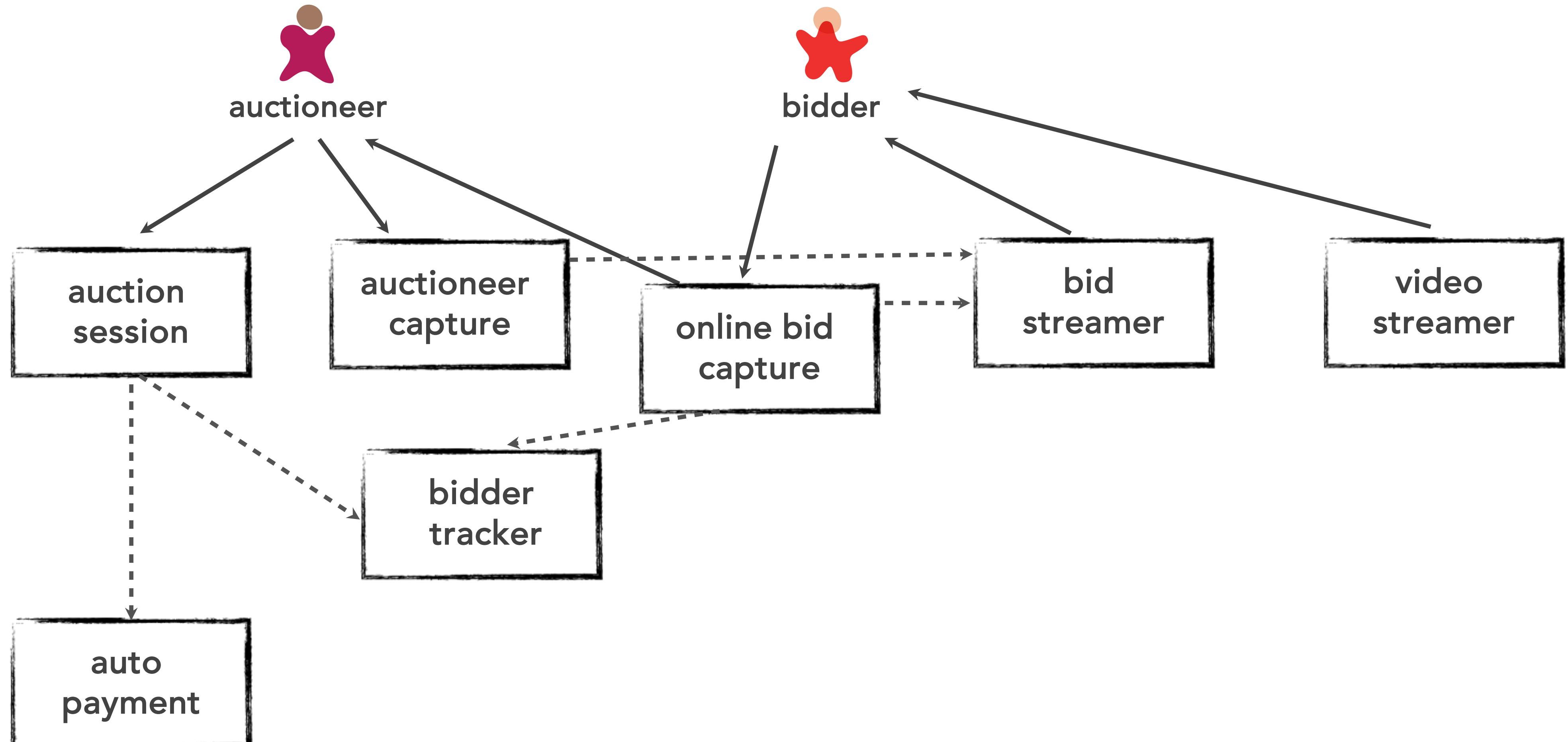
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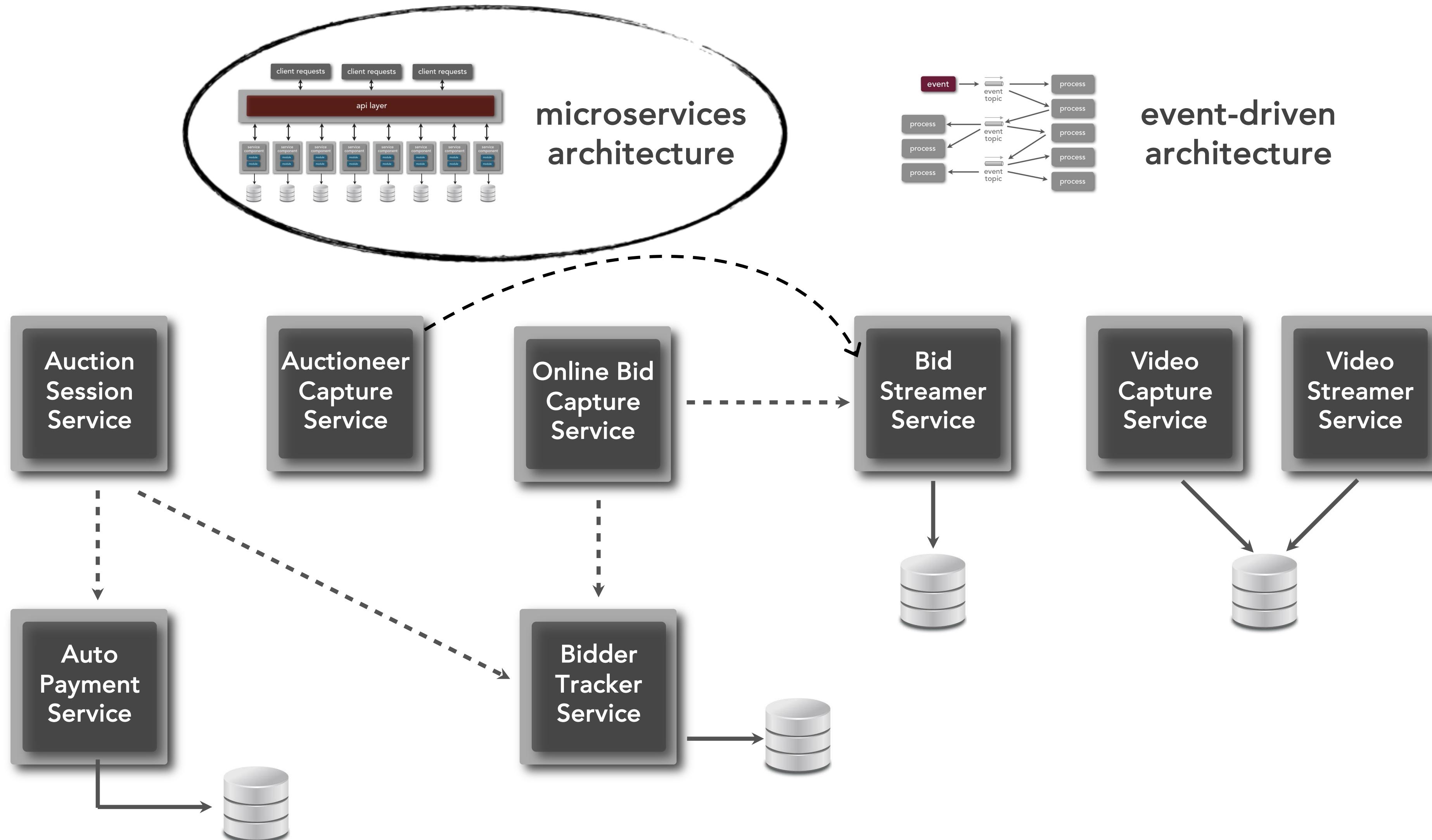
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Going Going Gone!



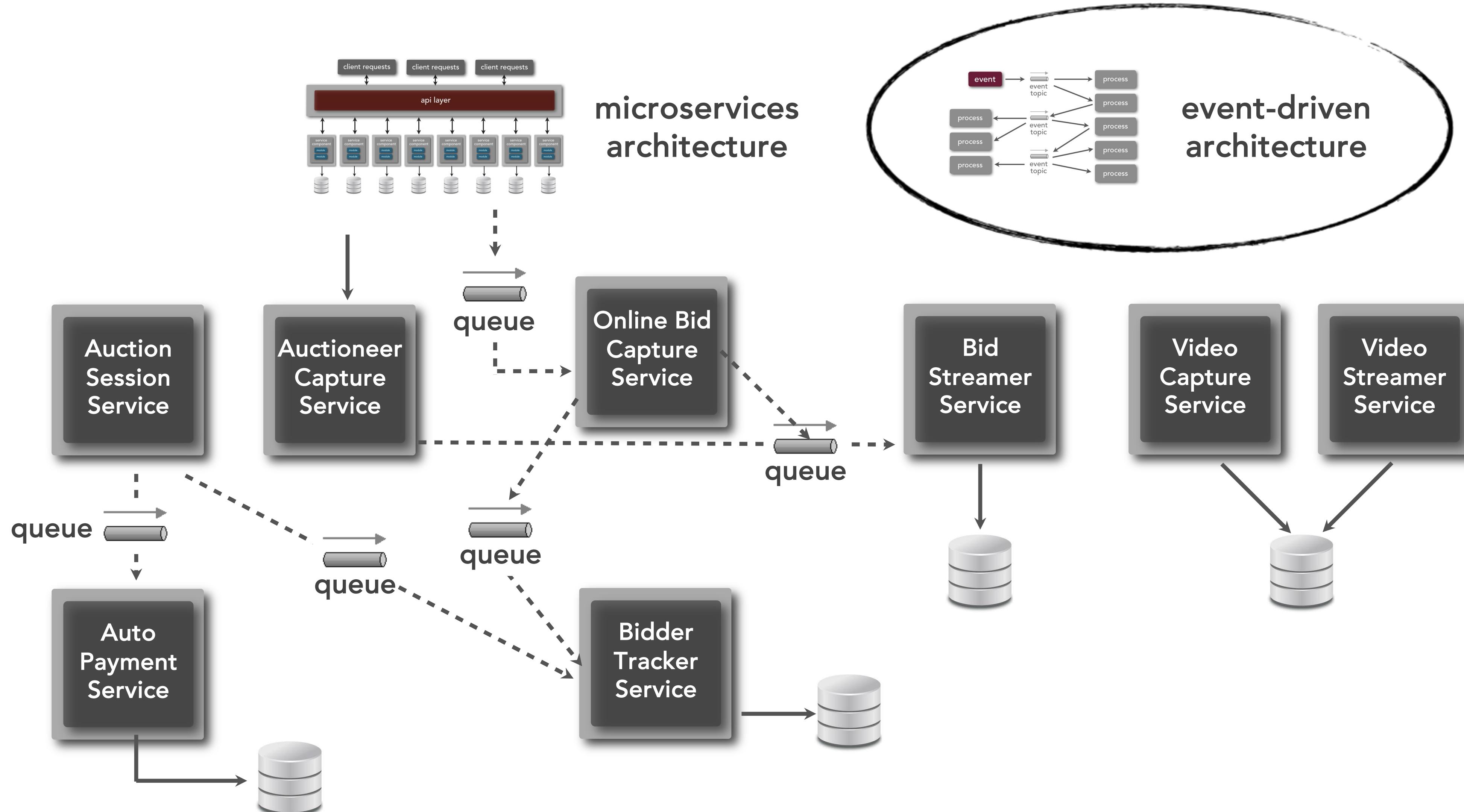
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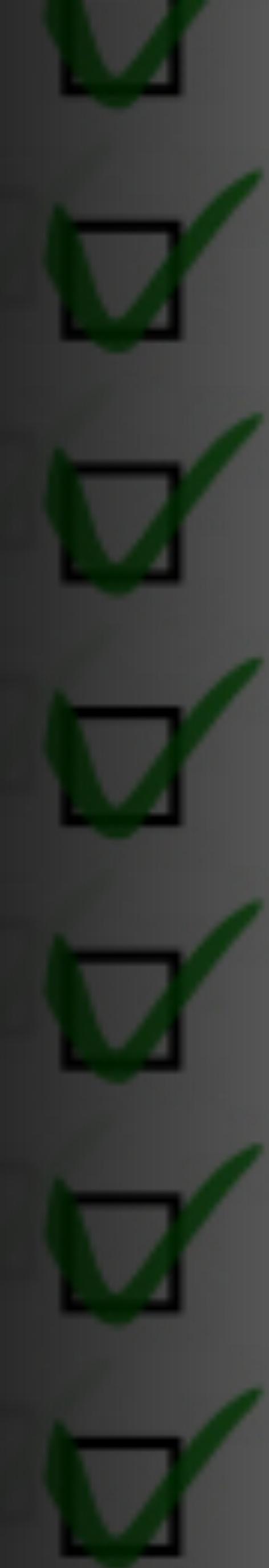


Your Architectural Kata is...

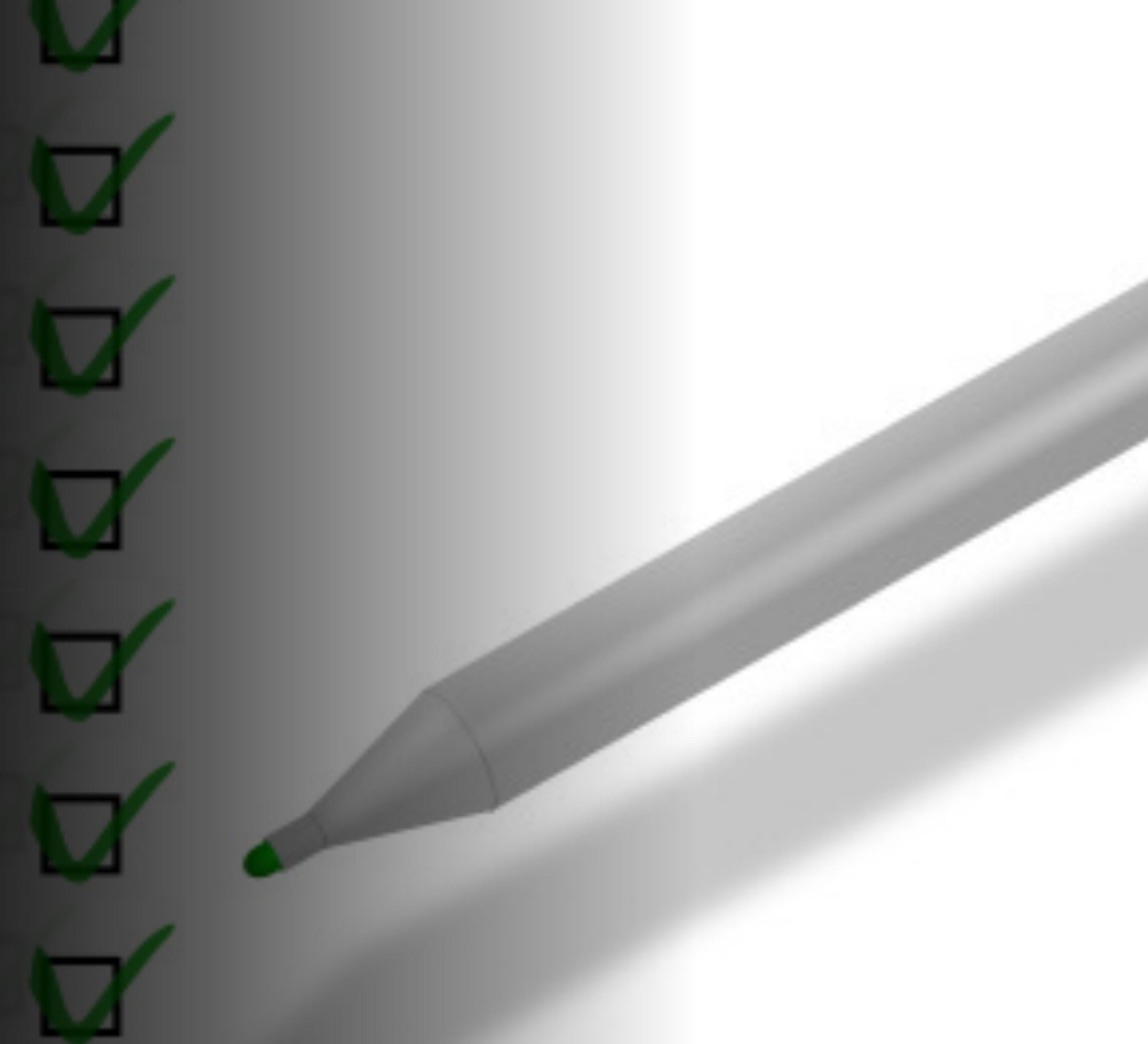
Going Going Gone!



Judges Criteria



Clarity of narrative, organization, and supporting documentation



Narrative and Organization

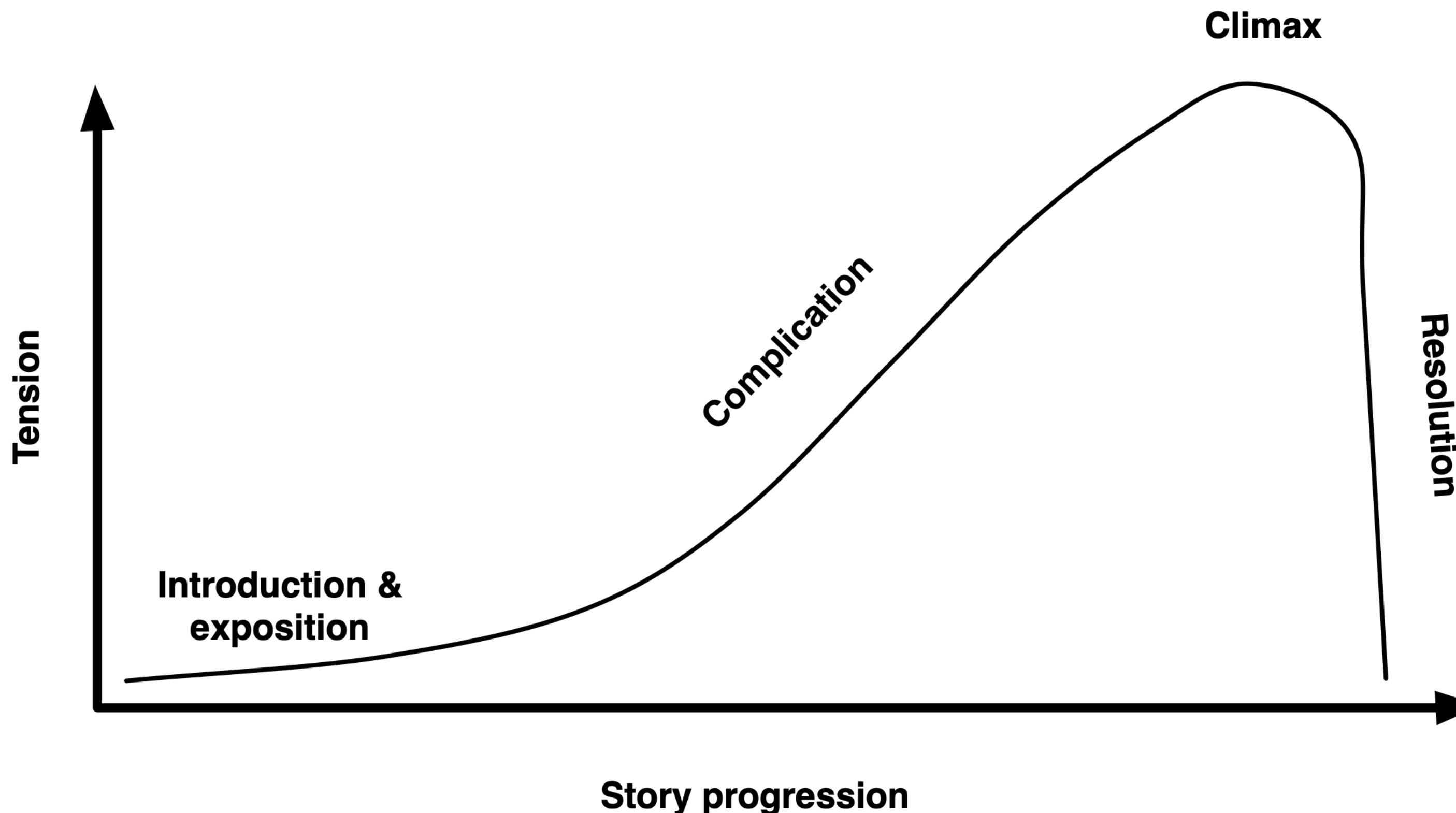
A narrative tells the story of the architectural solution



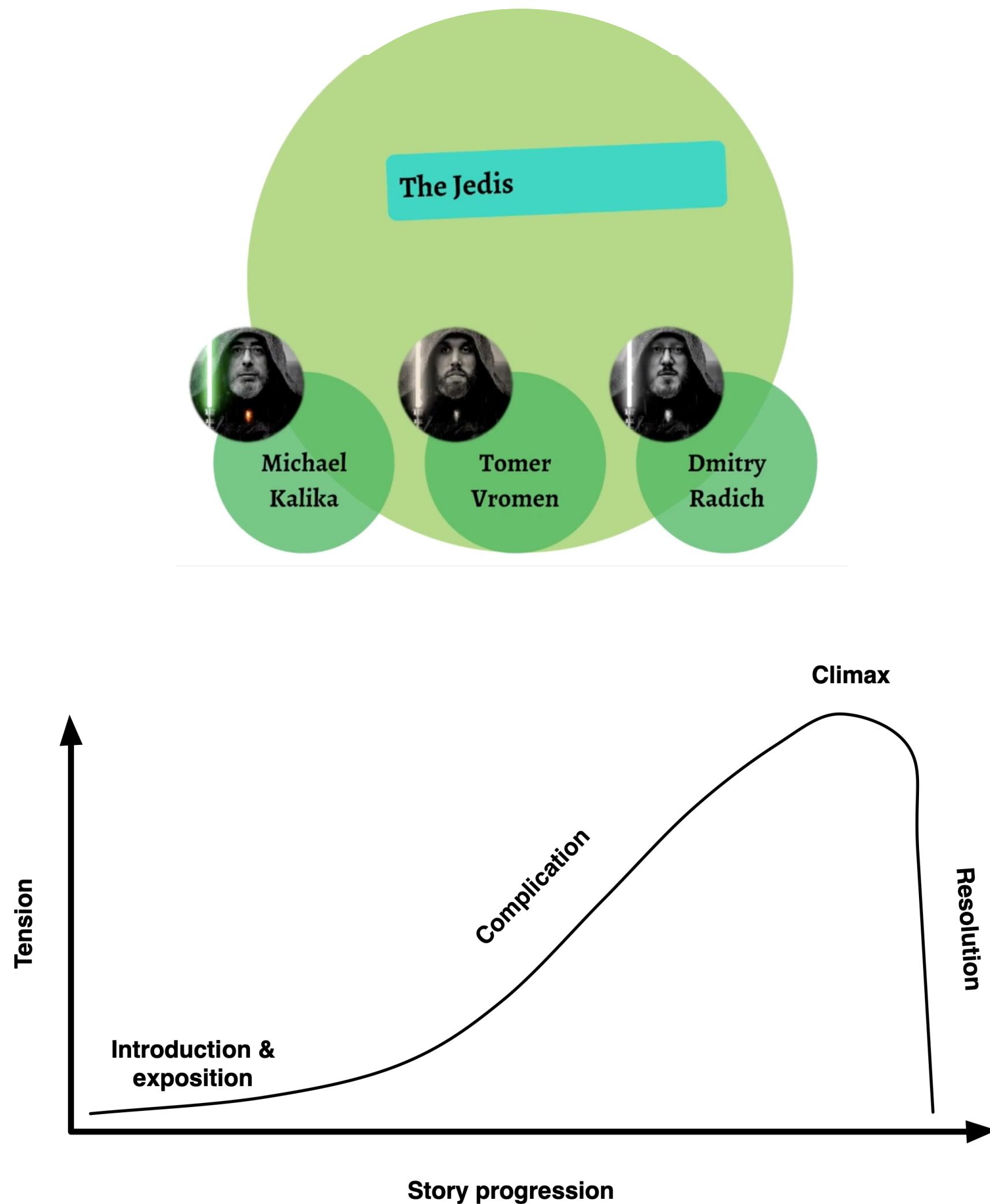
narrative
/'nerətiv/
noun
a spoken or written account of connected events; a story.

Narrative and Organization

A *narrative arc* a literary term for the path a story follows. It provides a backbone by providing a clear beginning, middle, and end of the story



https://github.com/TheJedis2020/arch_katas_2020



Prelude

The Vision

The Final Video Presentation

Business Requirements

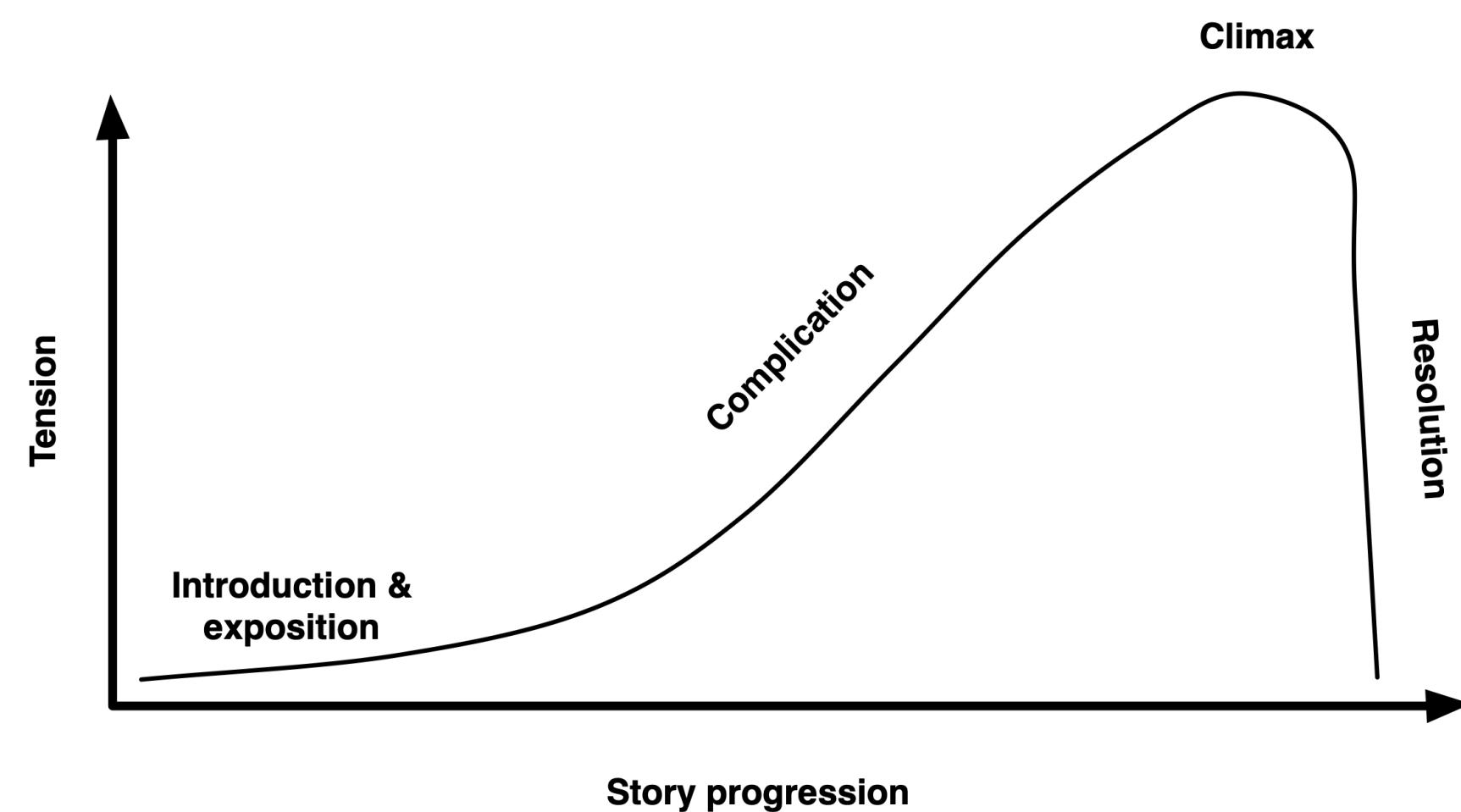
The Strategy

The Architecture

Sequence Diagrams

Architectural Desision Records (ADRs)

<https://github.com/miyagis-forests/farmacy-food-kata>



Requirements

This section contains the requirements, distilled from the [provided user stories](#), the interview with the PO, Kwaku Osei, but also with some assumptions and educated guesses. These are the main drivers for the design decisions in this proposal.

- [Functional requirements](#)
- [Quality attribute requirements](#), aka architecture characteristics

Architecture

Here you find the documentation of the software architecture that fulfills the requirements.

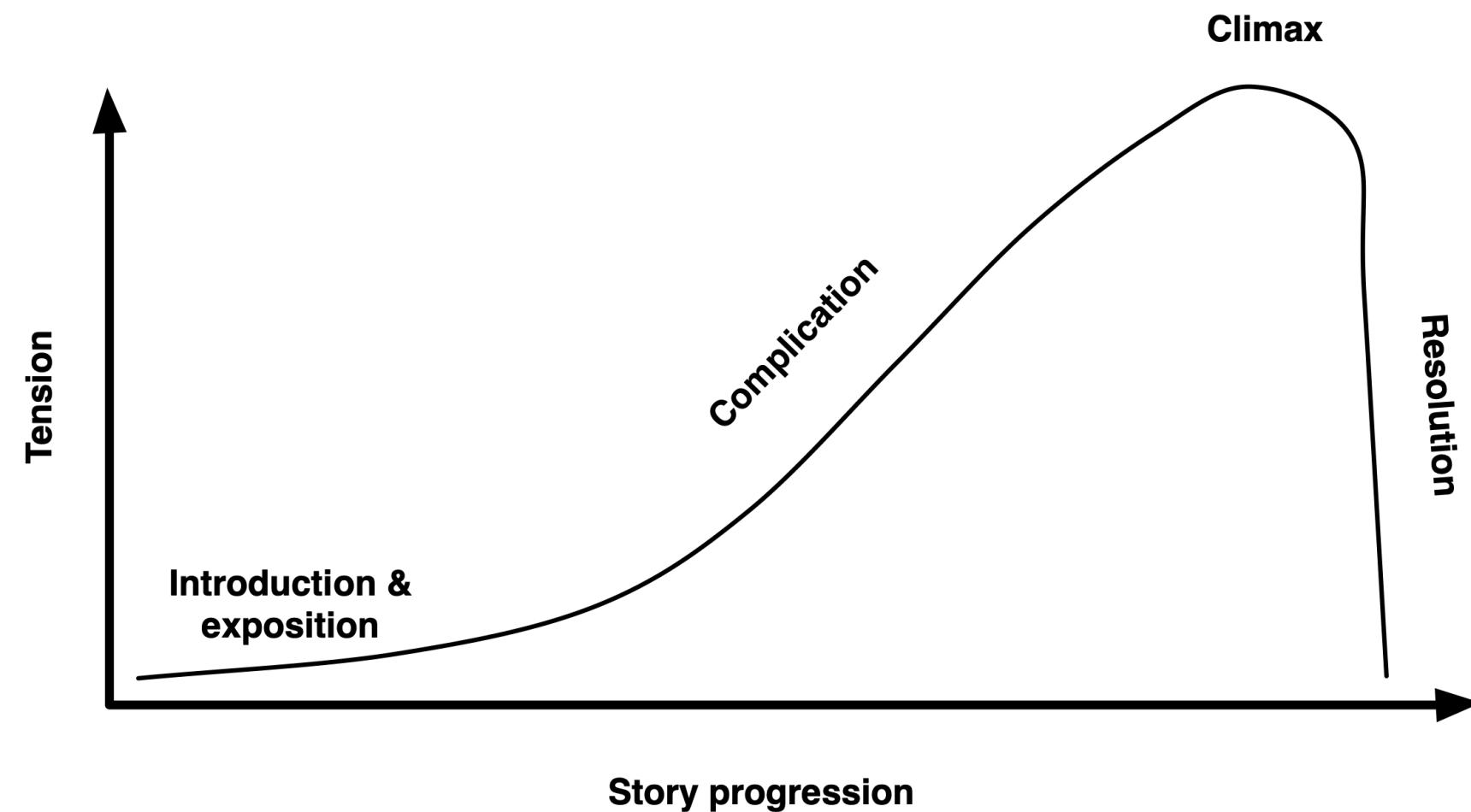
As a starting point, there's a context diagram that gives an overview of the system boundaries. The central part is what we called the *Farmacy Food System*, which is the scope of this proposal.

ADRs

The linked ADRs below record the main architecture decisions relevant to the system boundaries, their context and rationale.

- ADR 001 - [Microservice style](#)
- ADR 002 - [Payment gateway](#)

<https://github.com/lookfwd/archkata>



Overview

Vision

Goals and Opportunities

Use Cases

Architecture Characteristics

Design Constraints

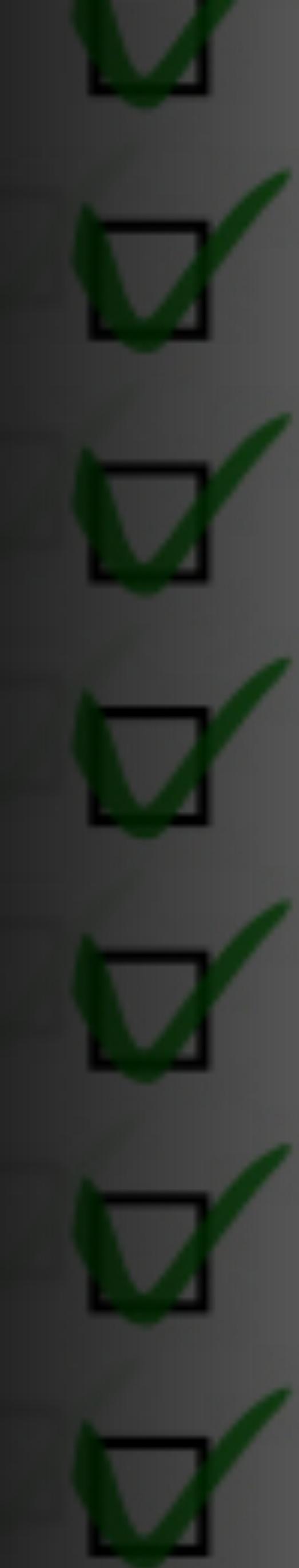
High-Level Architecture

Mid-Level Architecture

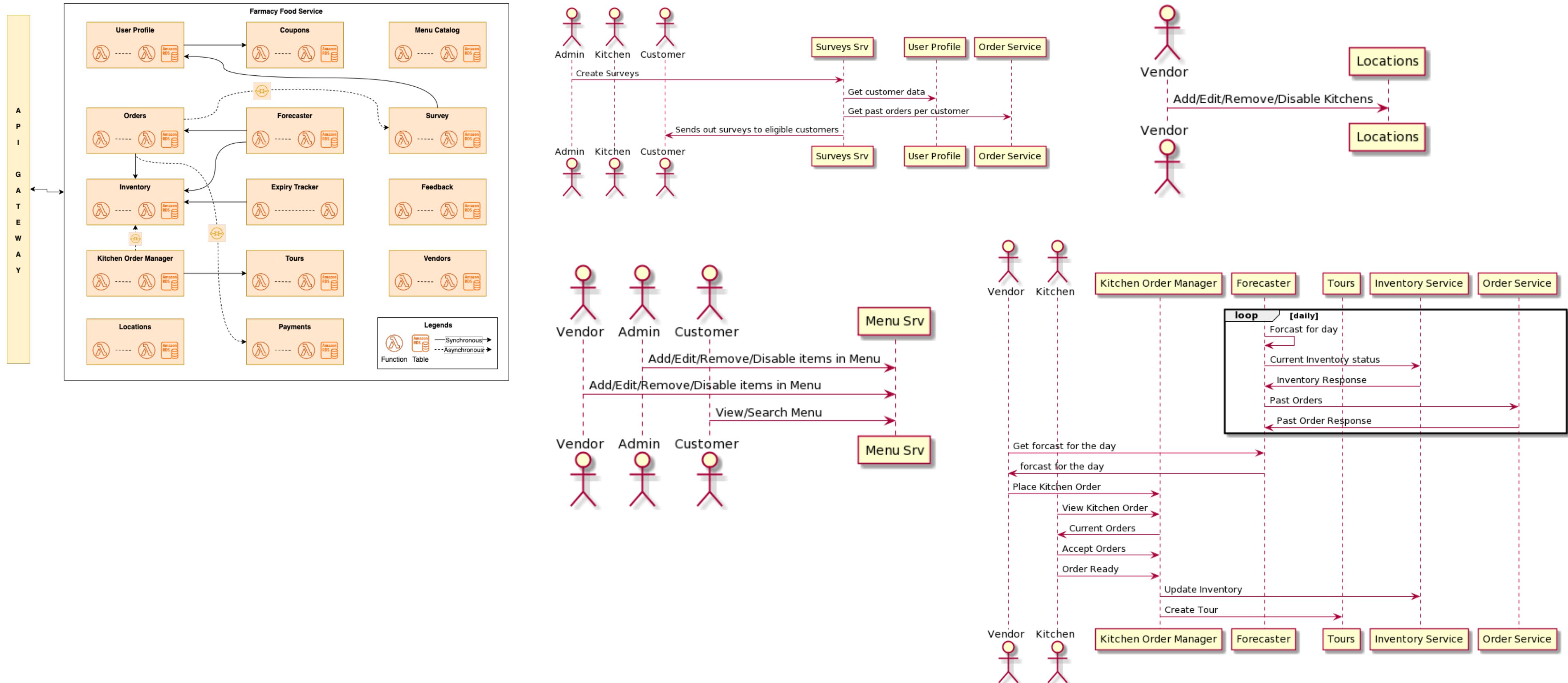
Milestones

ADRs

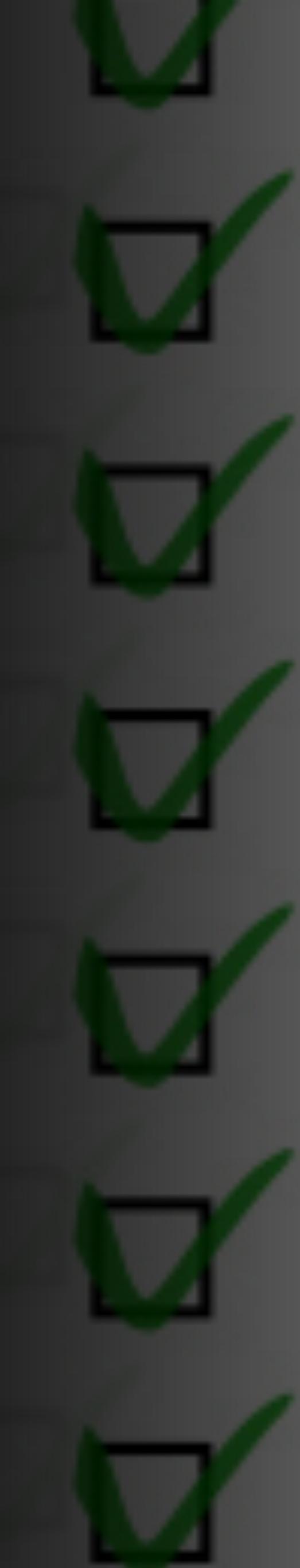
Completeness of solution



Completeness of Solution

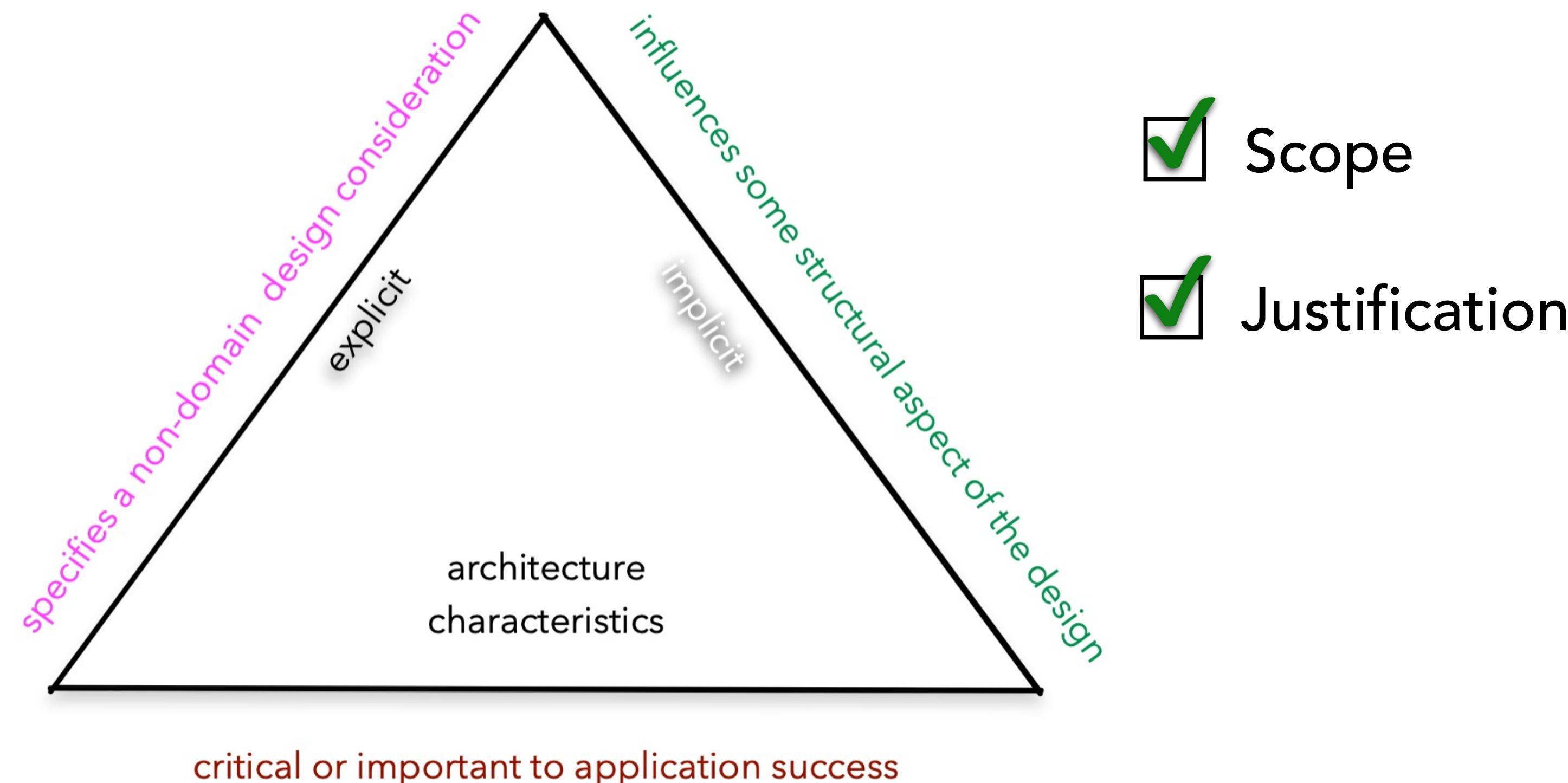


Identification of supporting architecture characteristics



Architecture Characteristics

Architecture characteristics form the foundational aspects of the architecture and are required for proper trade-off analysis and decision making



<https://www.developertoarchitect.com/downloads/worksheets.html>

<https://www.developertoarchitect.com/lessons/lesson112.html>

Architecture Characteristics Worksheet

System/Project: _____

Architect/Team: _____ Date: _____

Candidate Architecture Characteristics		
performance	data integrity	deployability
responsiveness	data consistency	testability
availability	adaptability	abstraction
fault tolerance	extensibility	workflow
scalability	interoperability	configurability
elasticity	concurrency	recoverability
others: _____ _____		

Top 3 Driving Characteristics

<input type="checkbox"/>	1. _____	Implicit Characteristics feasibility (cost/time)
<input type="checkbox"/>	2. _____	security
<input type="checkbox"/>	3. _____	maintainability
<input type="checkbox"/>	4. _____	simplicity
<input type="checkbox"/>	5. _____	
<input type="checkbox"/>	6. _____	Others Considered
<input type="checkbox"/>	7. _____	

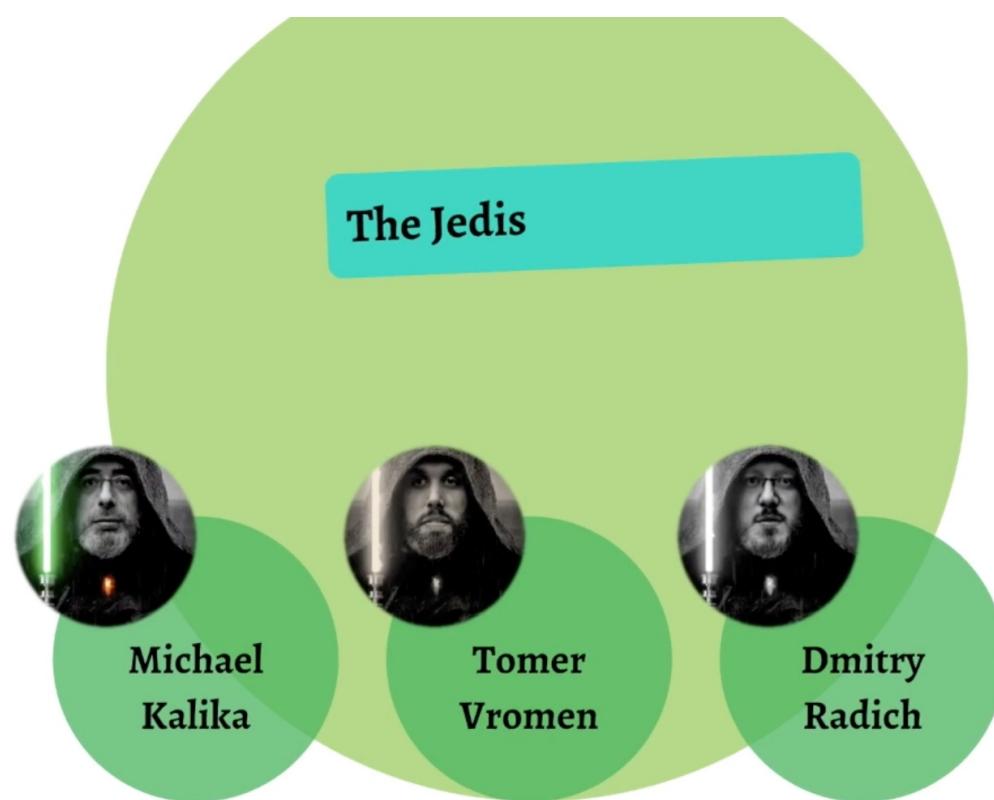
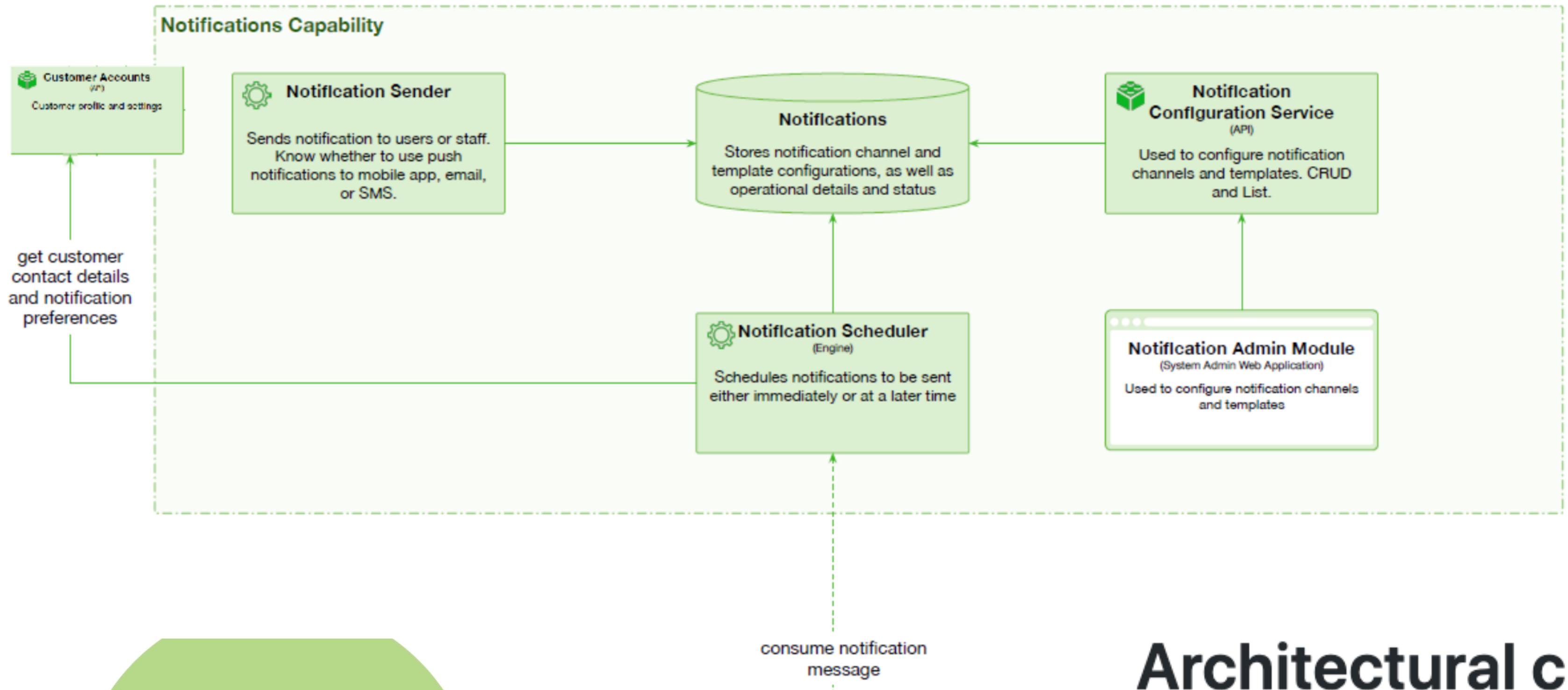
Instructions

- Identify no more than 7 driving characteristics.
- Pick the top 3 characteristics (in any order).
- Implicit characteristics can become driving characteristics if they are deemed *structural* concerns.
- Add additional characteristics identified that weren't deemed as important as the list of 7 to the *Others Considered* list.

^a denotes characteristics that are related; some systems only need one of these, other systems may need both



Notifications Capability



Architectural characteristics

- Elasticity.
- Fault tolerance.
- Plugin support.



1. Enable Discovery - Agility

The customer experience in acquisition channels (mobile, web and even SMS) must be seamless. This requires custom experimentation and optimization. The architecture must provide ways to capture customer behaviour with comprehensive analytics and support A/B testing. It's a plus if it can also provide rich experiences like smart recommendations powered by AI/Machine Learning. Those features must be immediately available on pay-as-you go basis, instead of requiring significant upfront investments in development or technology.

2. Affordable DevSecOps - Viability

The startup must be able to implement the architecture given budget and time constraints. More specifically this is framed as an integration project where solutions from Software as a Service (SaaS) vendors are integrated using minimal software development. The architecture must be able to be built by delivering features that address the most immediate growth pain points of the business. Complex features that require custom software development must be postponed to as late as possible.

Diagrams - types, level of detail, and completeness



Diagrams

An effective architecture picture is worth more than a 1,000 words.
Architecture represents topology, which benefits from visual representations.

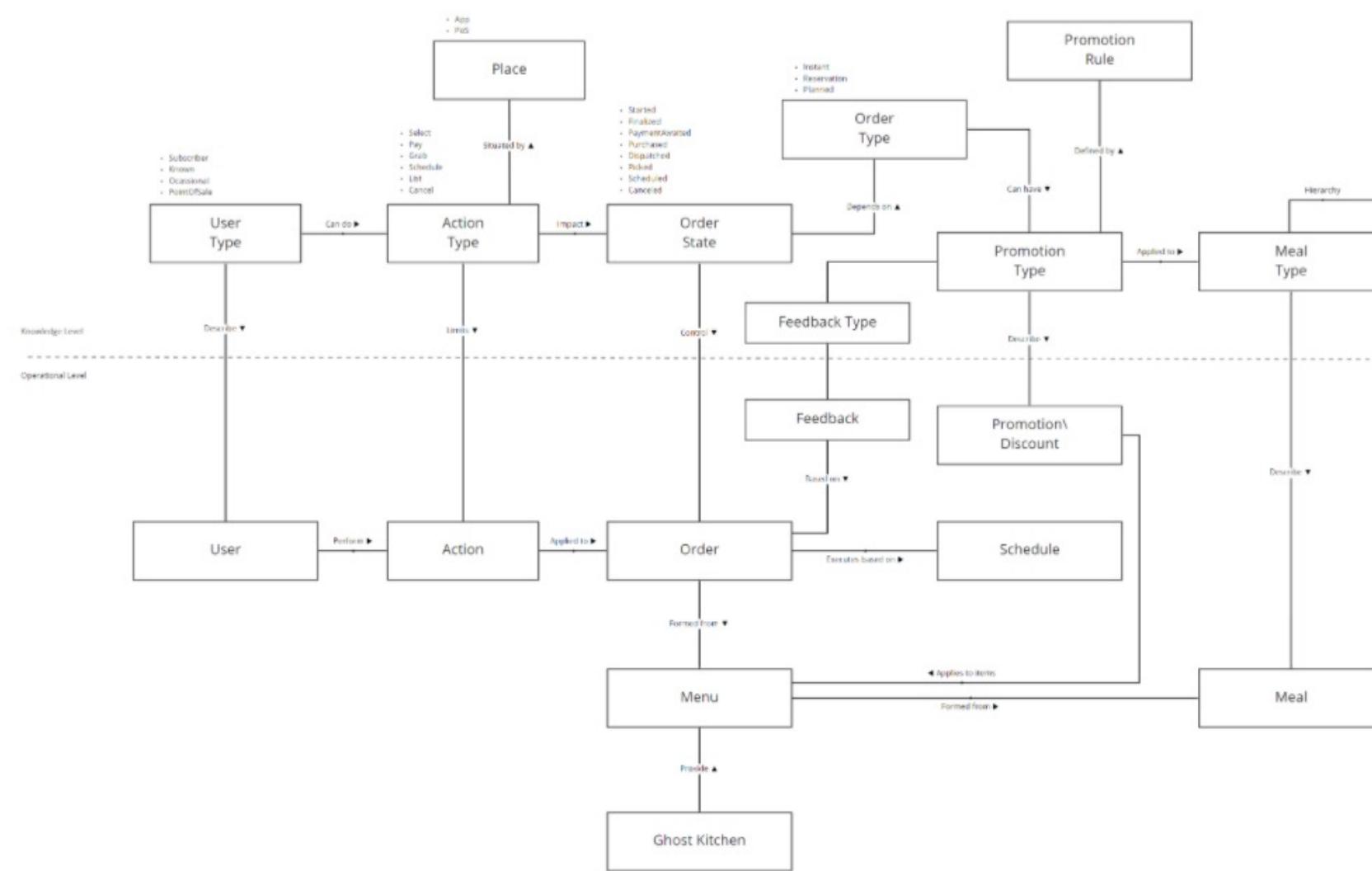


“The goal of a diagram is to convey a clear and shared understanding of the architecture”

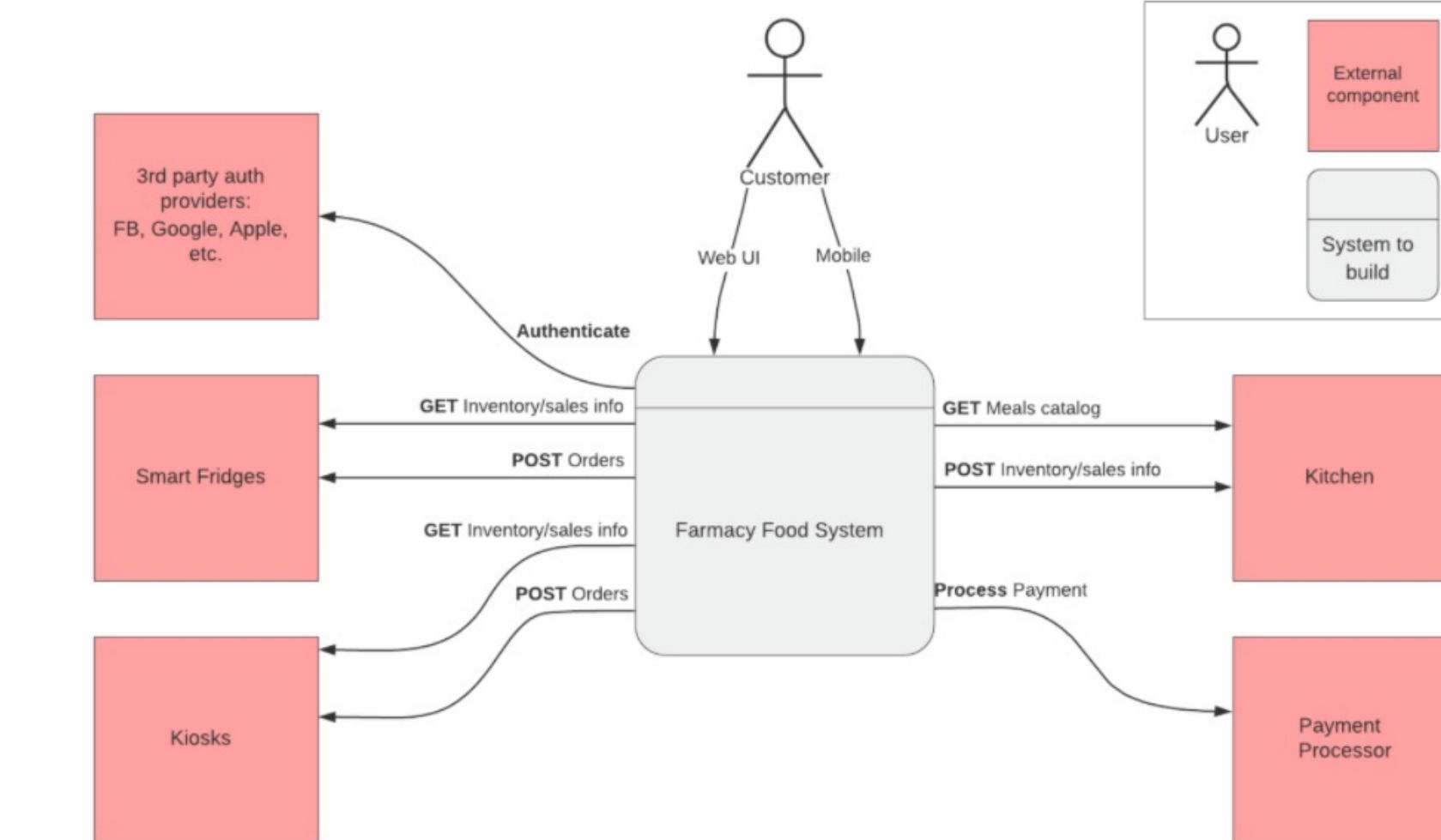
- Neal Ford

Diagrams

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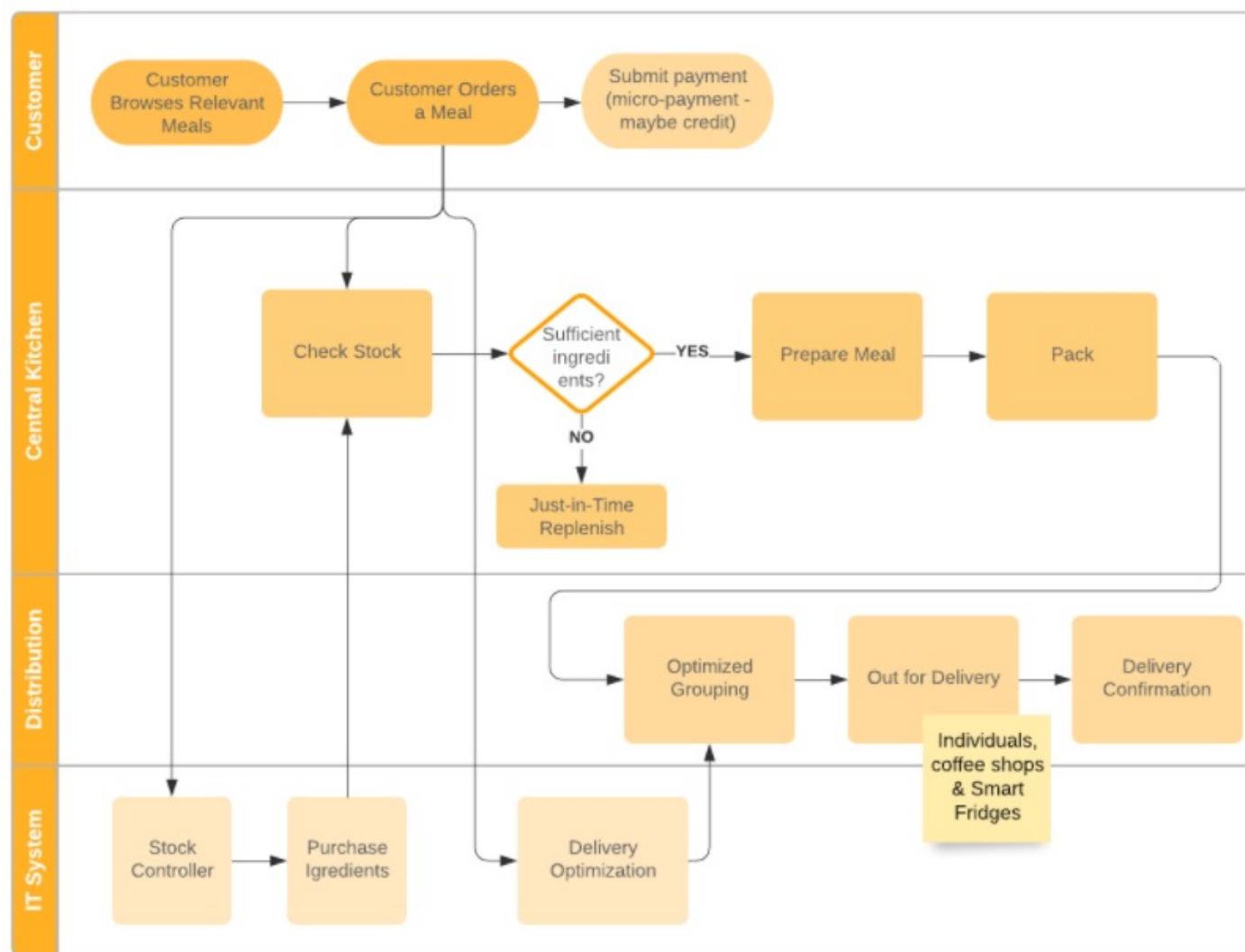
component diagrams



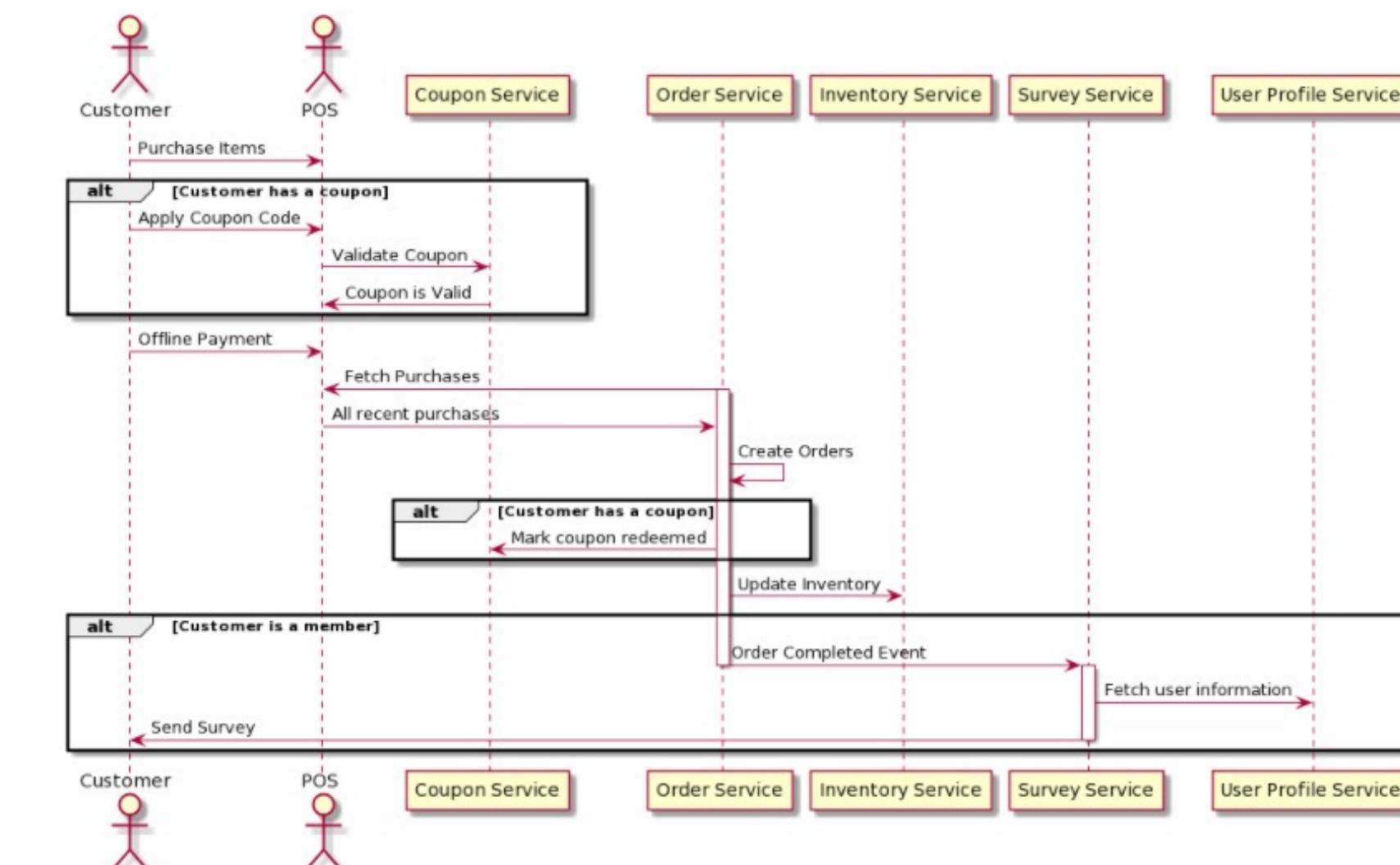
context diagrams

Diagrams

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Architecture represents topology, which benefits from visual representations.



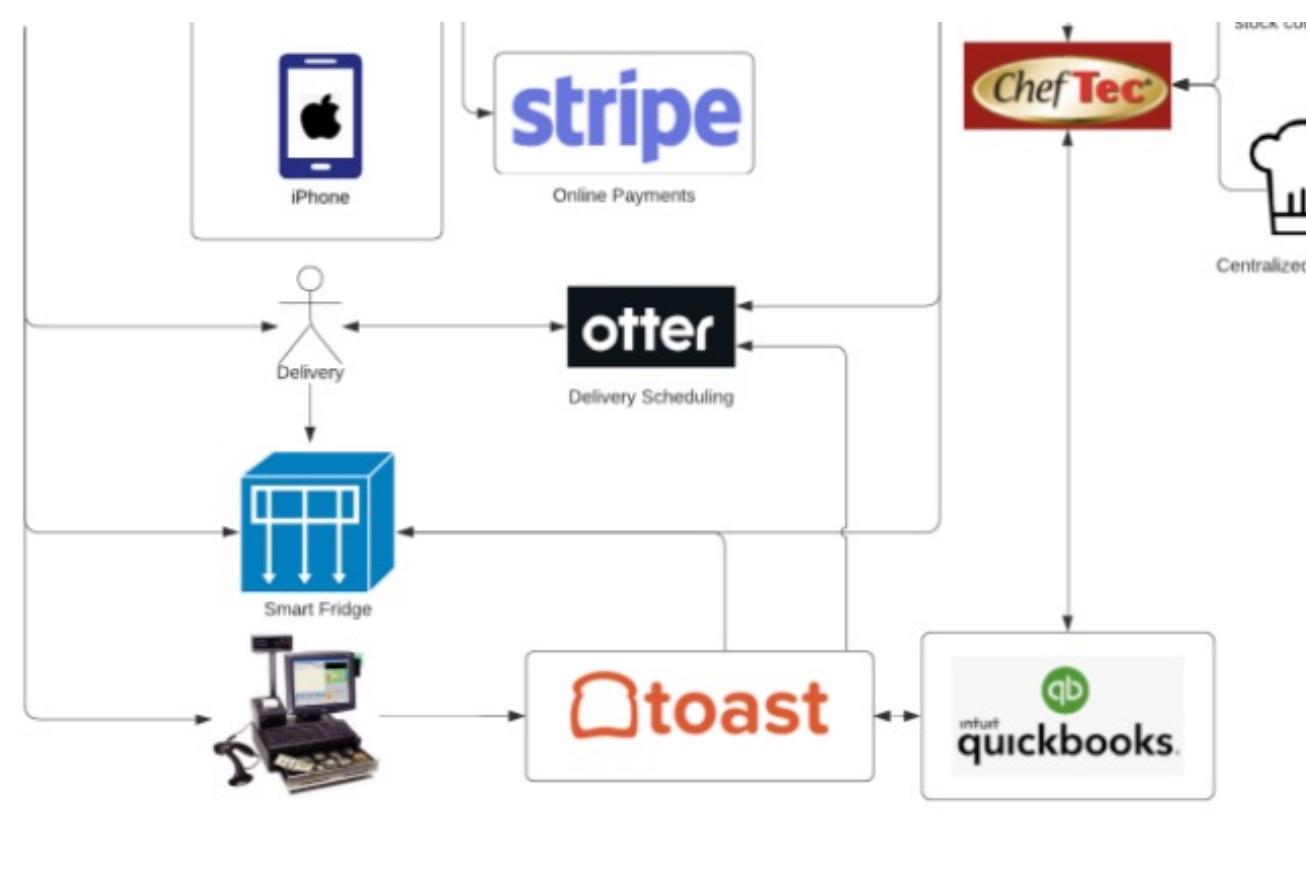
user journey diagrams



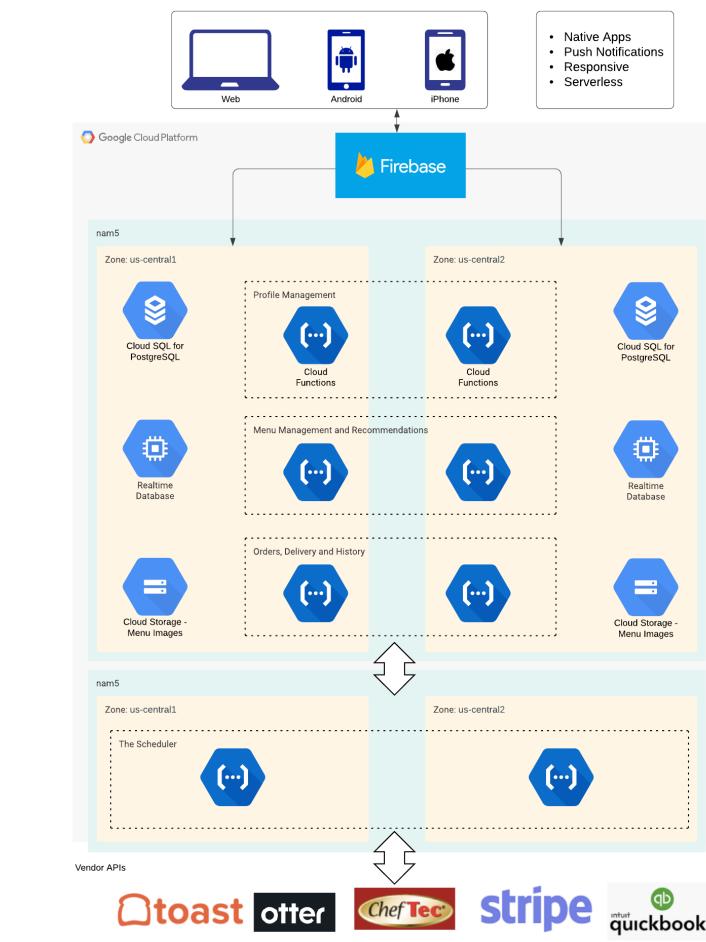
sequence diagrams

Diagrams

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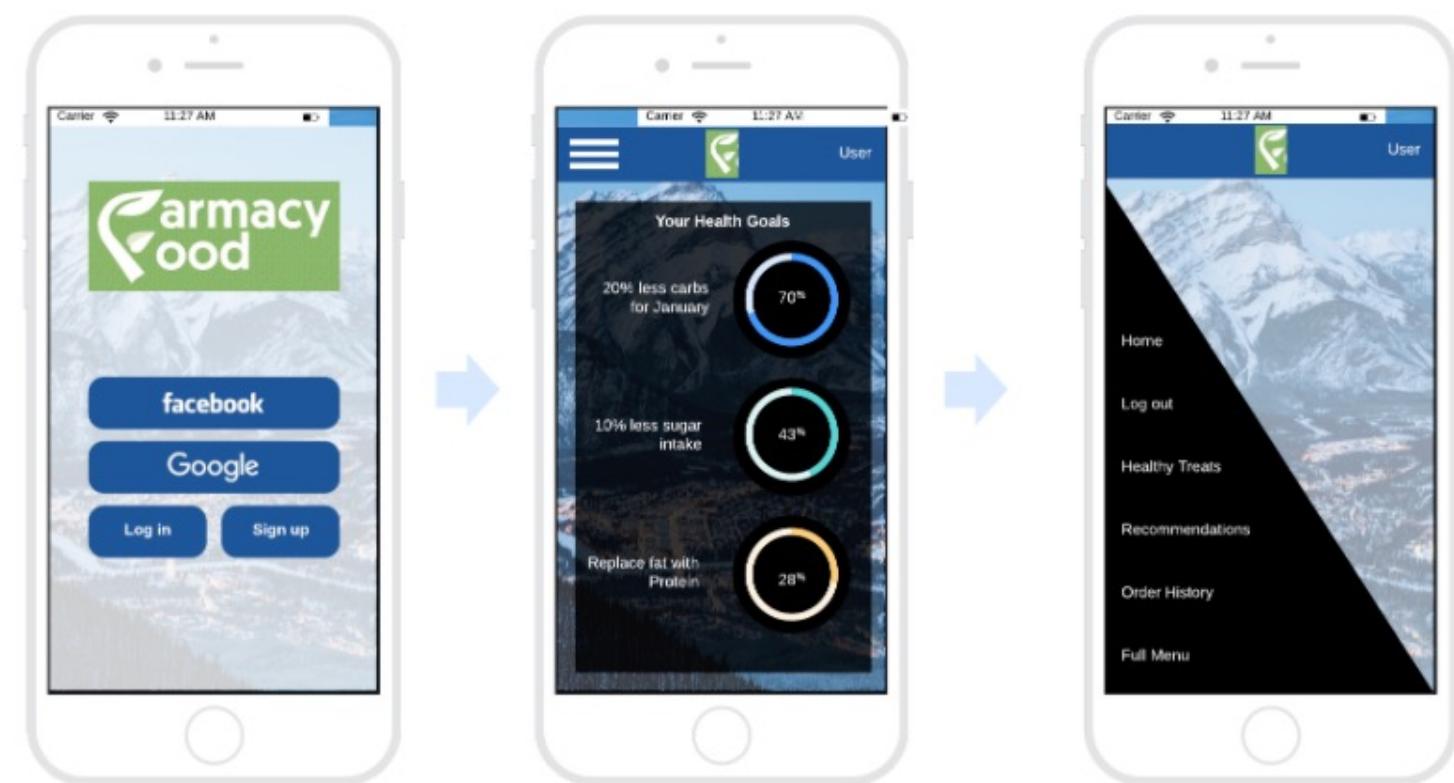
system-level diagrams



deployment diagrams

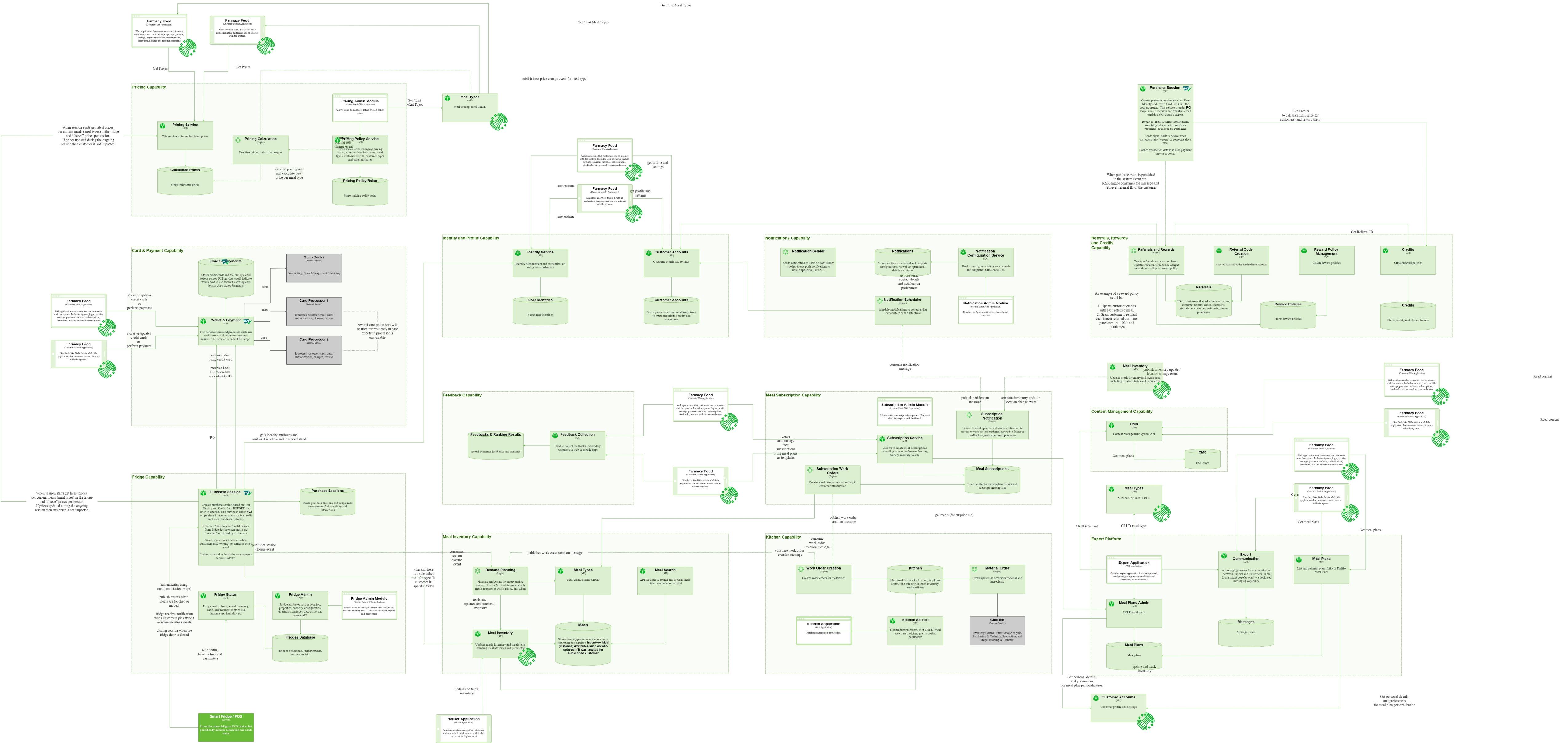
Diagrams

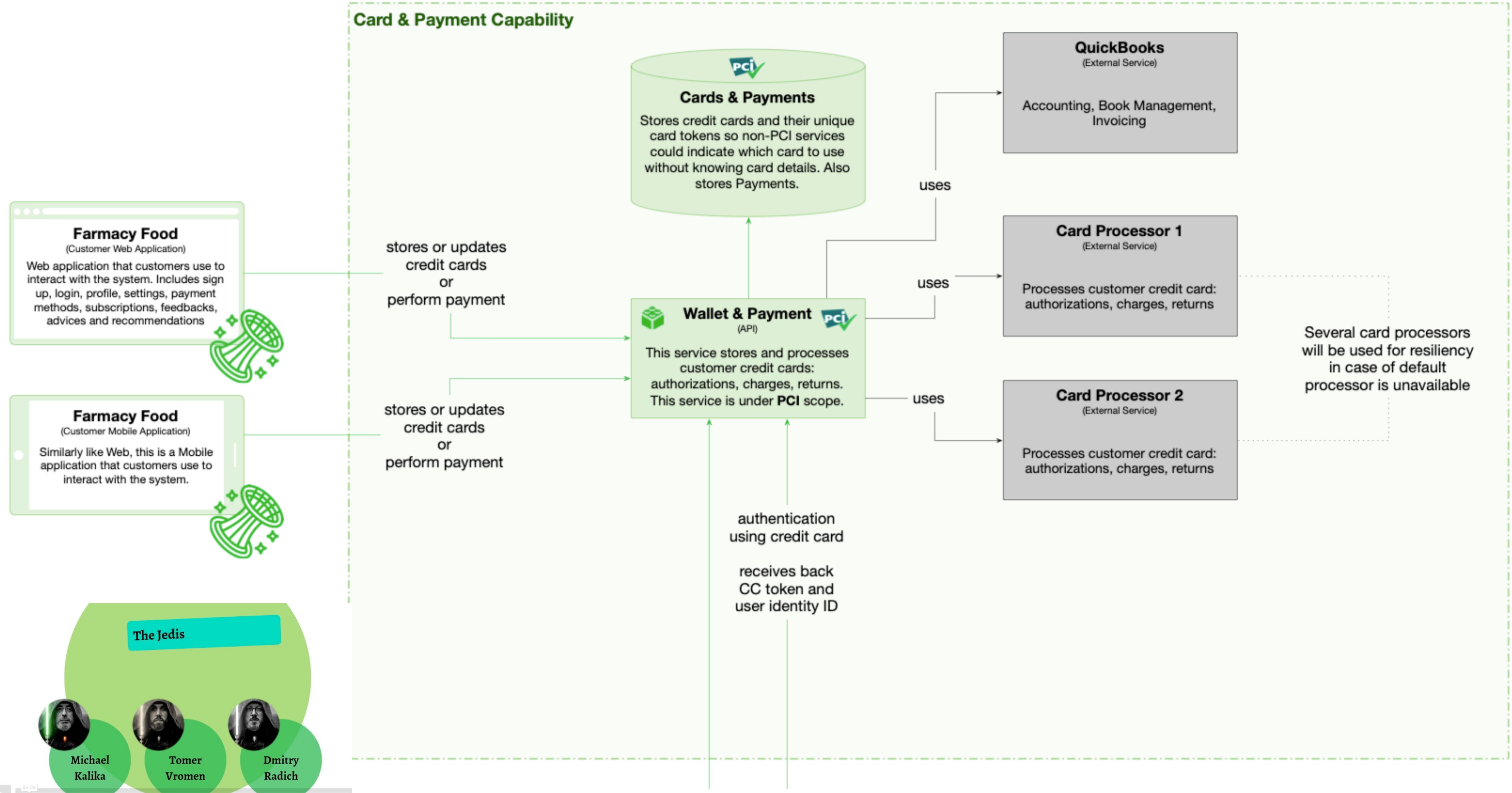
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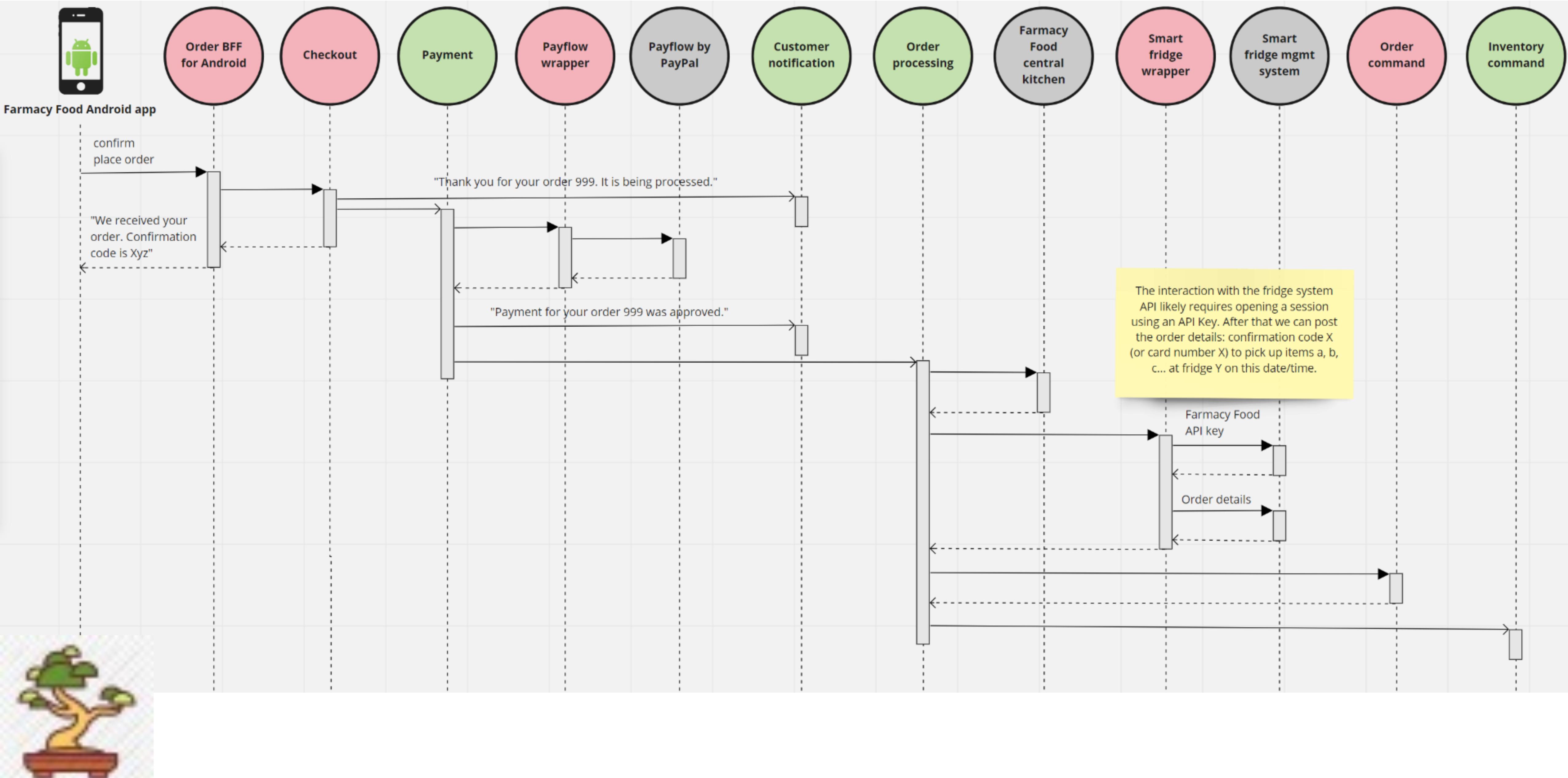
user interface mockups

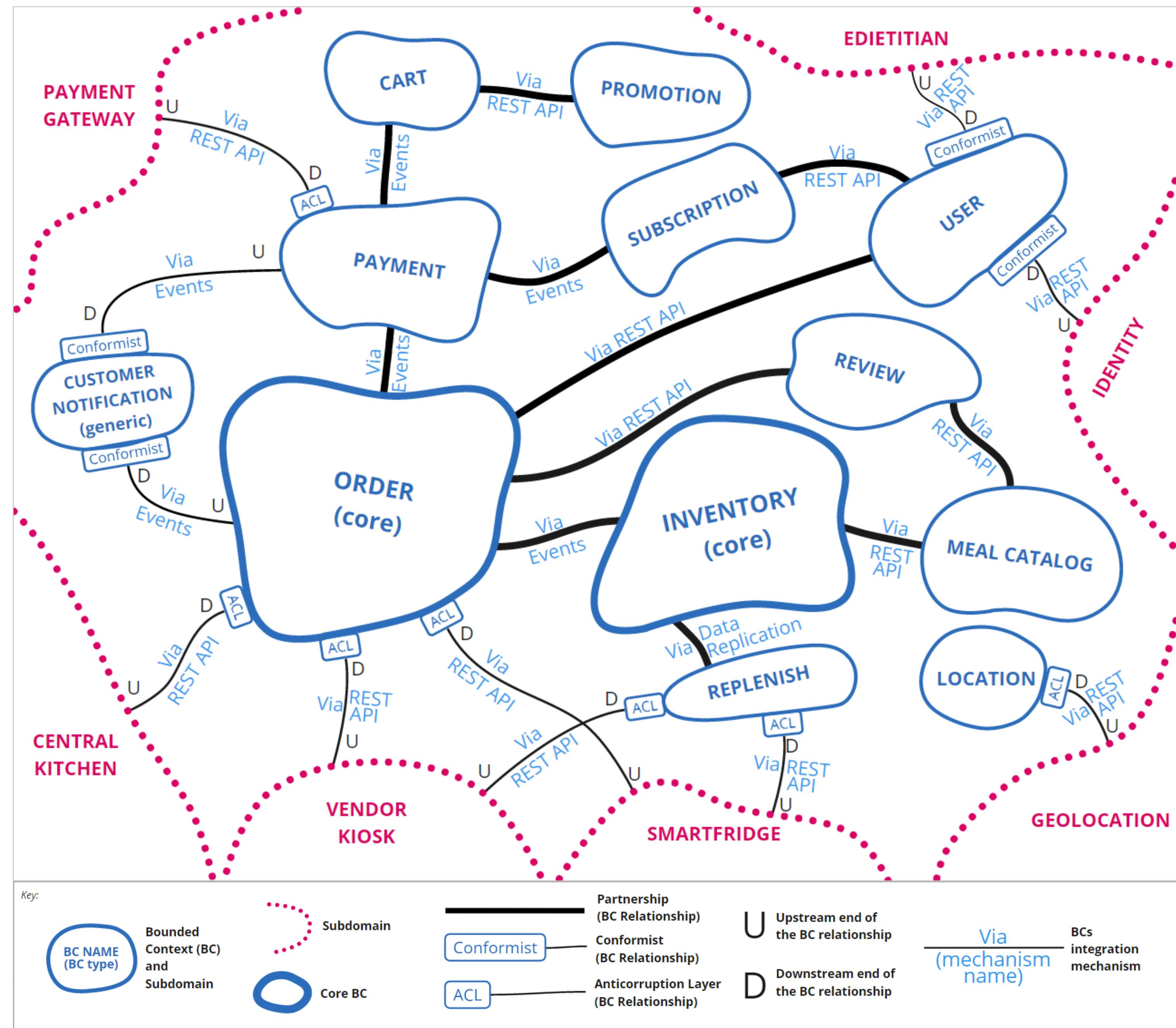
System Component Diagram



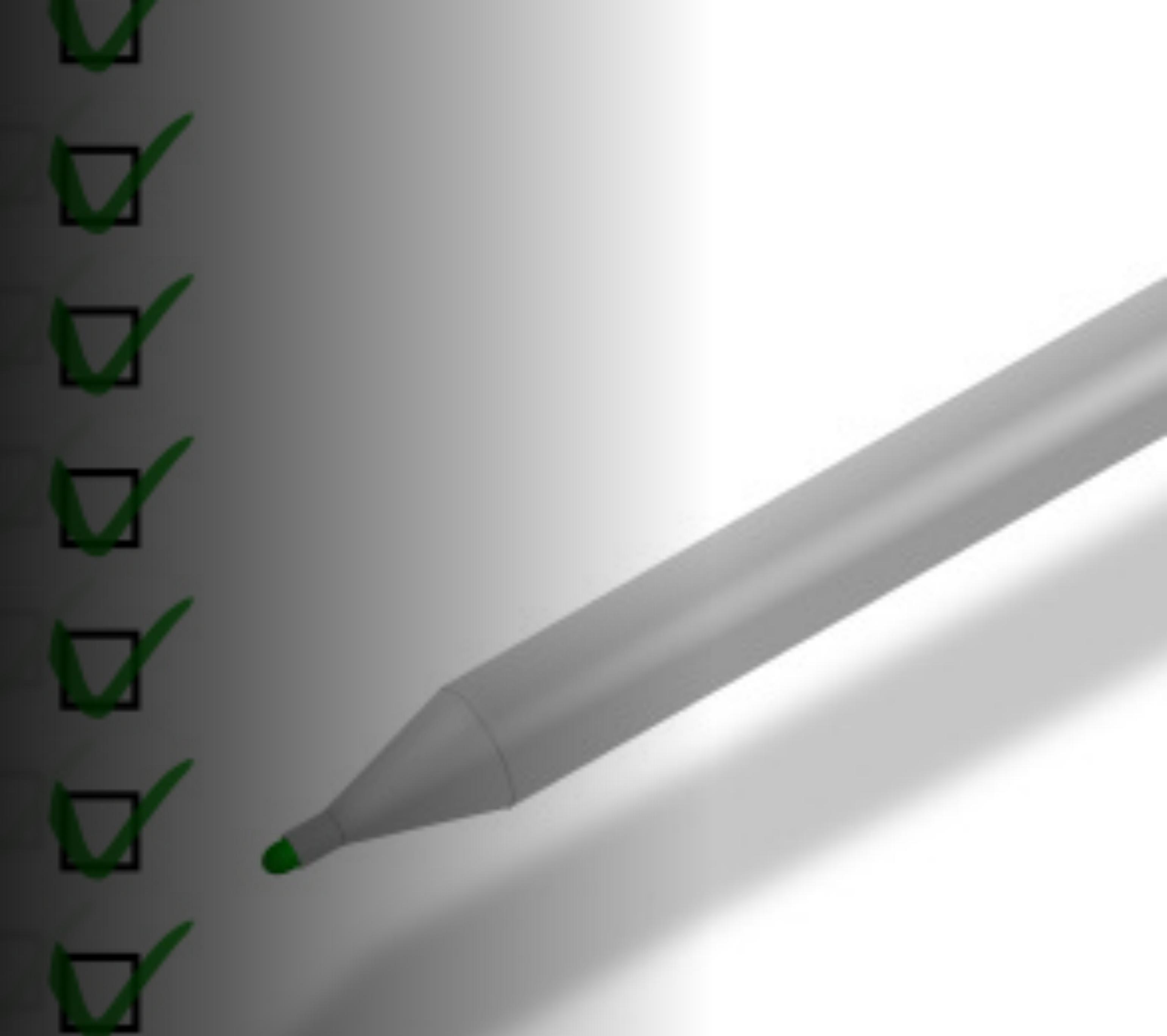


Behavior





Architecture decision records - documentation and justification



O'REILLY®



Fundamentals of Software Architecture

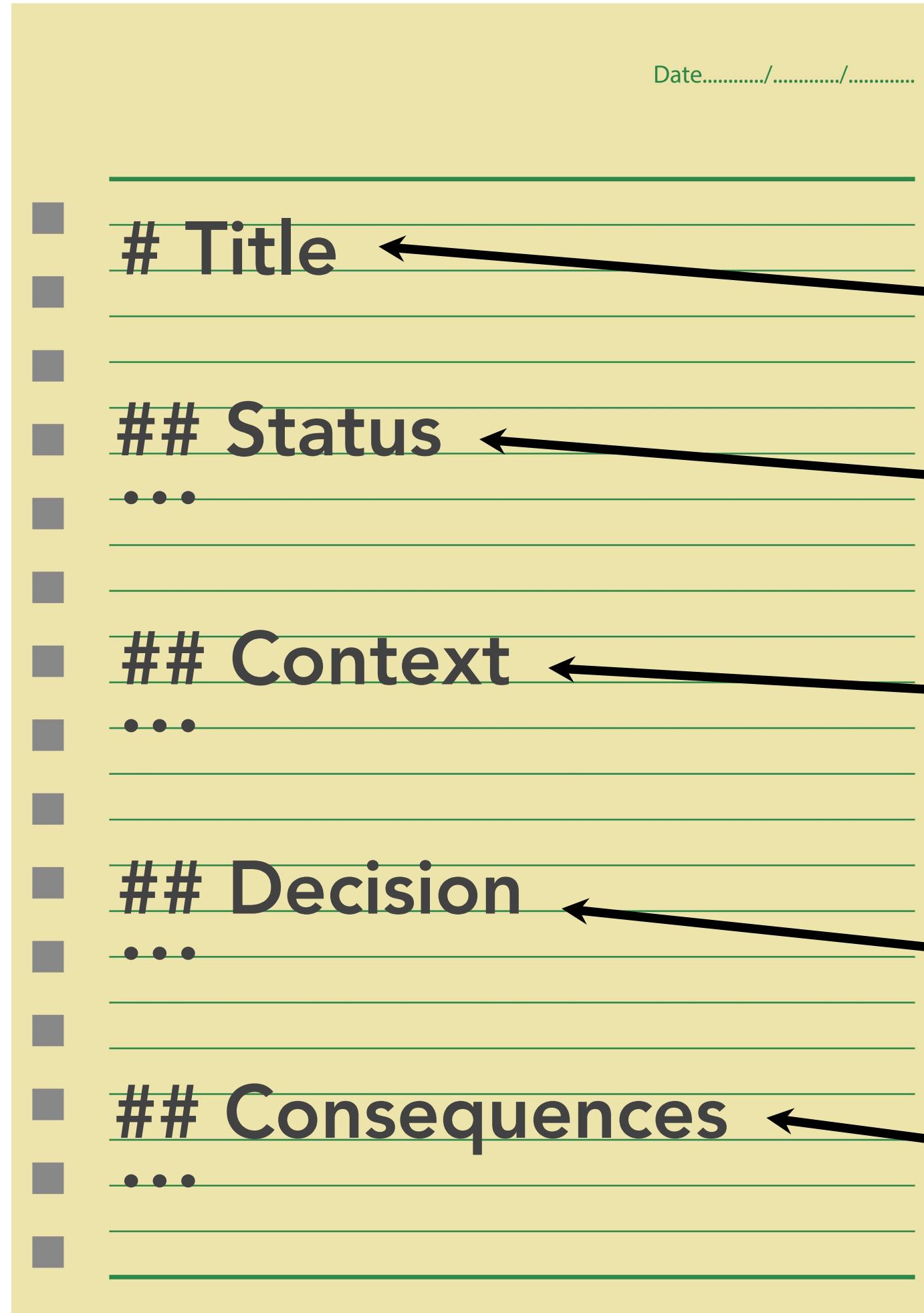
An Engineering Approach

Mark Richards & Neal Ford

Second Law of Software Architecture

*"Why is more
important than how"*

architecture decision records



short text file; 1-2 pages long, one file per decision
markdown, textile, asciidoc, plaintext, etc.

short noun phrase

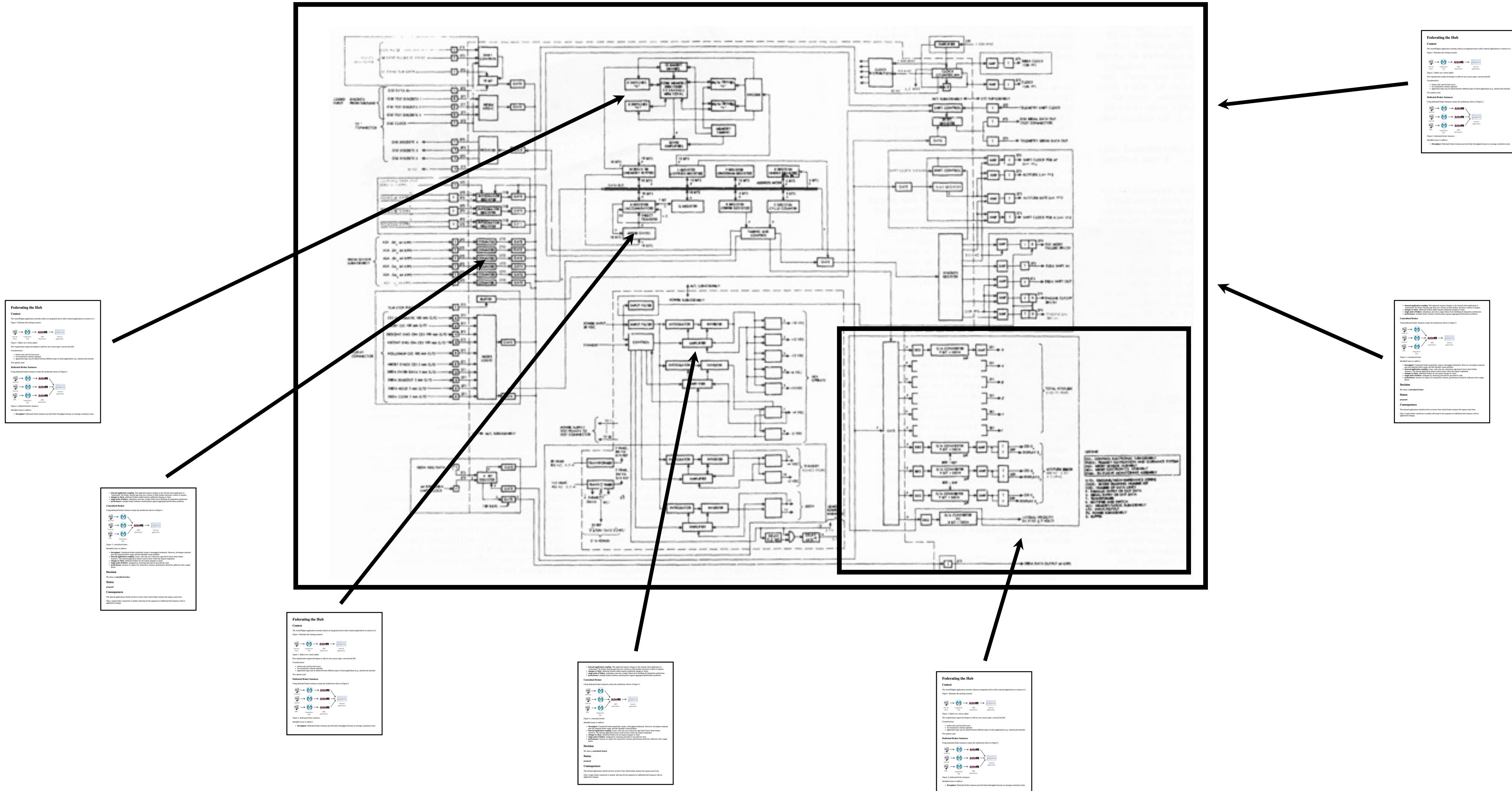
proposed, accepted, superseded

description of the problem and alternative
solutions available (documentation)

decision and justification (the “why”)

trade-offs and impact of decision

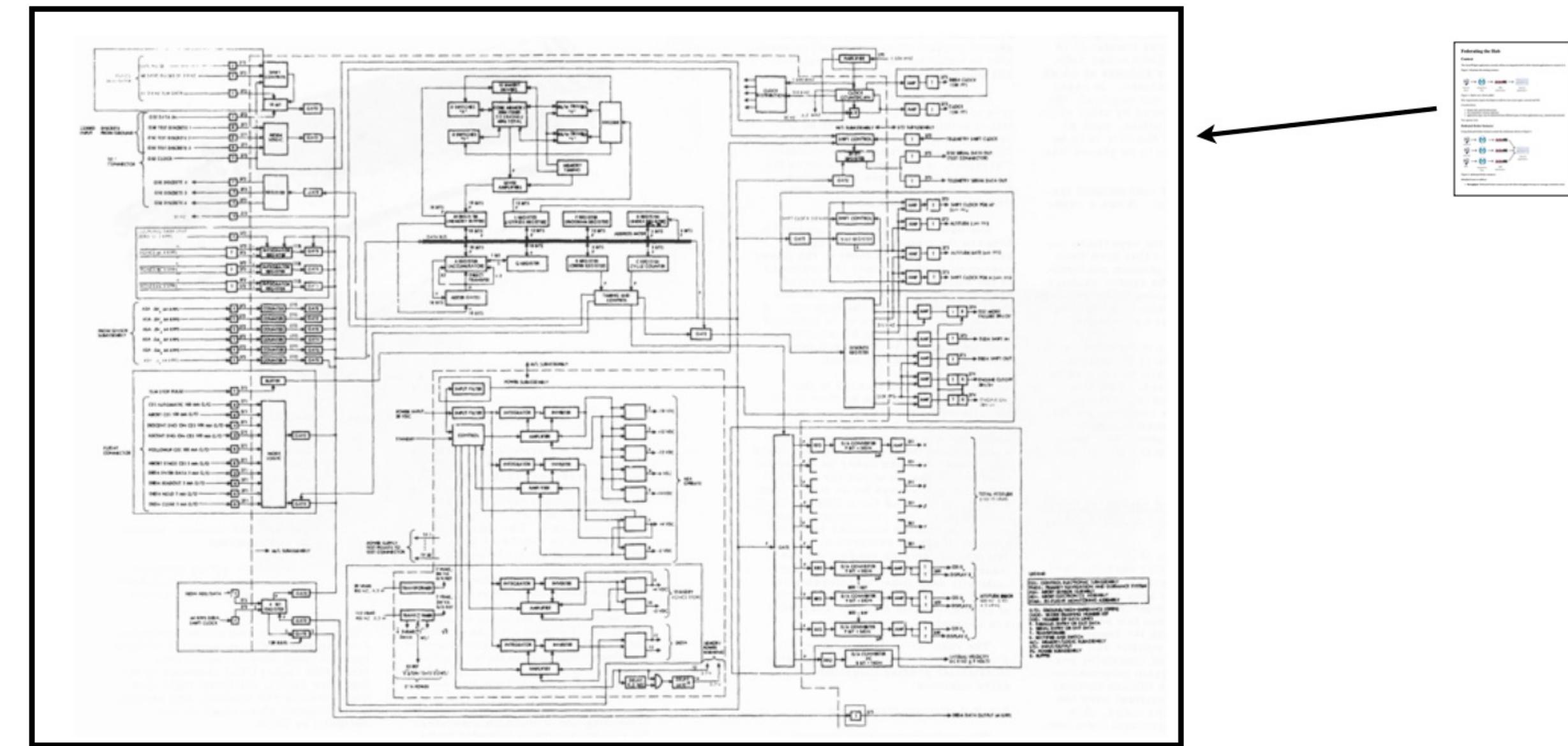
architecture decision records



architecture decision records

ADR 001: Use the microservice architecture style with containerization

Farmacy Food is a start up company and does not have a sizeable team of experienced developers available. The overarching architecture style for the Farmacy Food system should be simple, easy to create, maintain and **evolve**. Finding developers that can create and evolve the system, as well as tools and frameworks that support the system should not require heaps of money. In other words, Farmacy Food is not in a position to be an *early adopter*, and should hence adopt an established architecture style that supports evolution.



architecture decision records

ADR_004 Use a centralized notification for external communication

Context

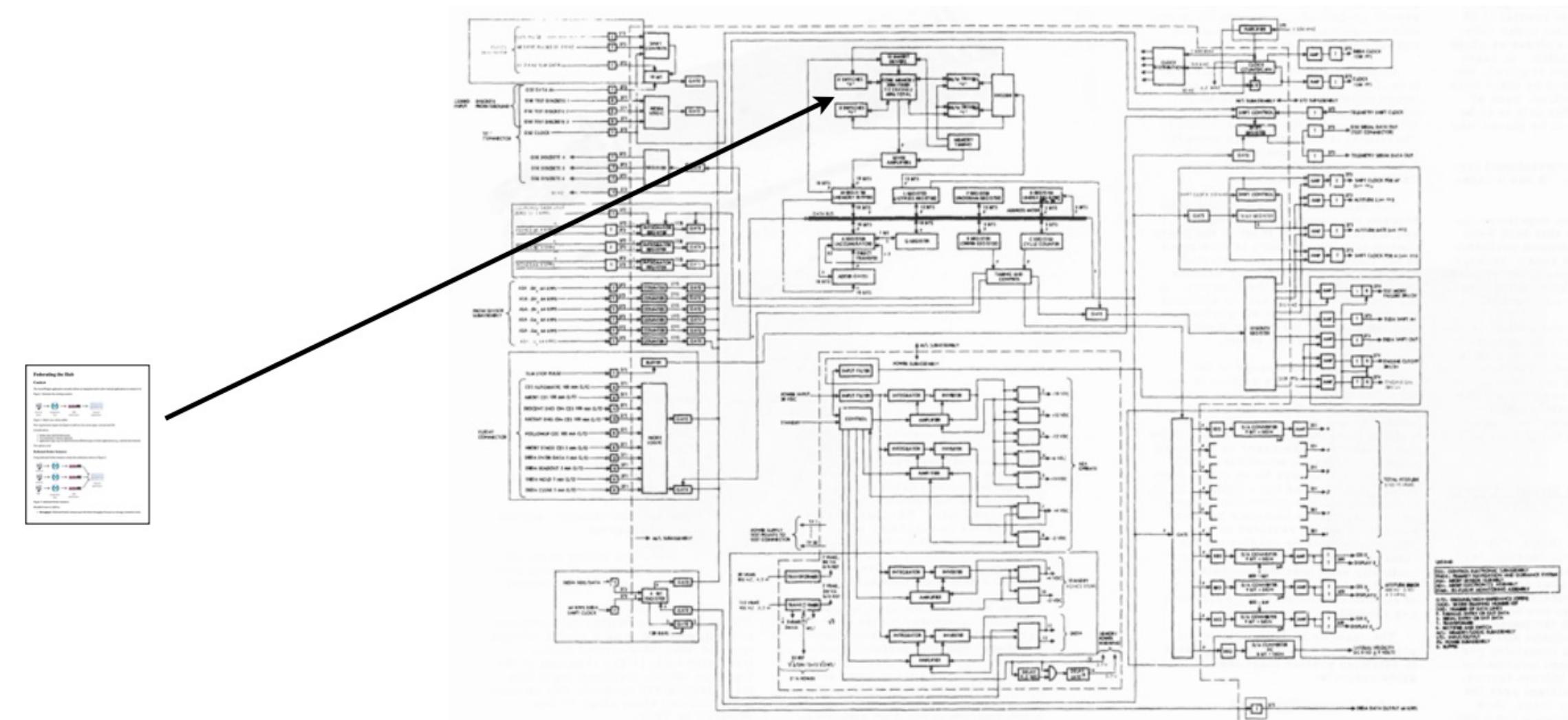
There was some confusion around the purpose of the notification component. Specifically, is this component an event bus for **all** communication or is it a shared component for communicating externally.

Decision

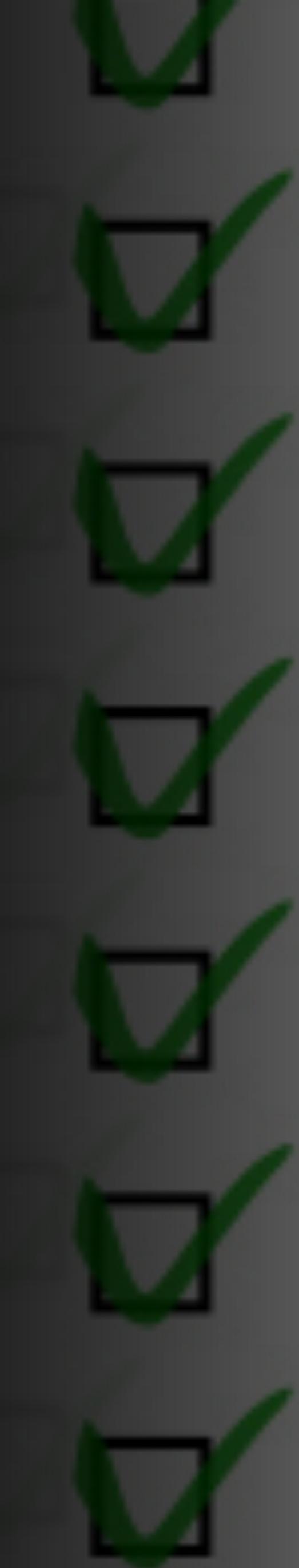
We decided to have a dedicated notification system responsible of sending external notification. The reasons include:



[selfdriveteam](#)

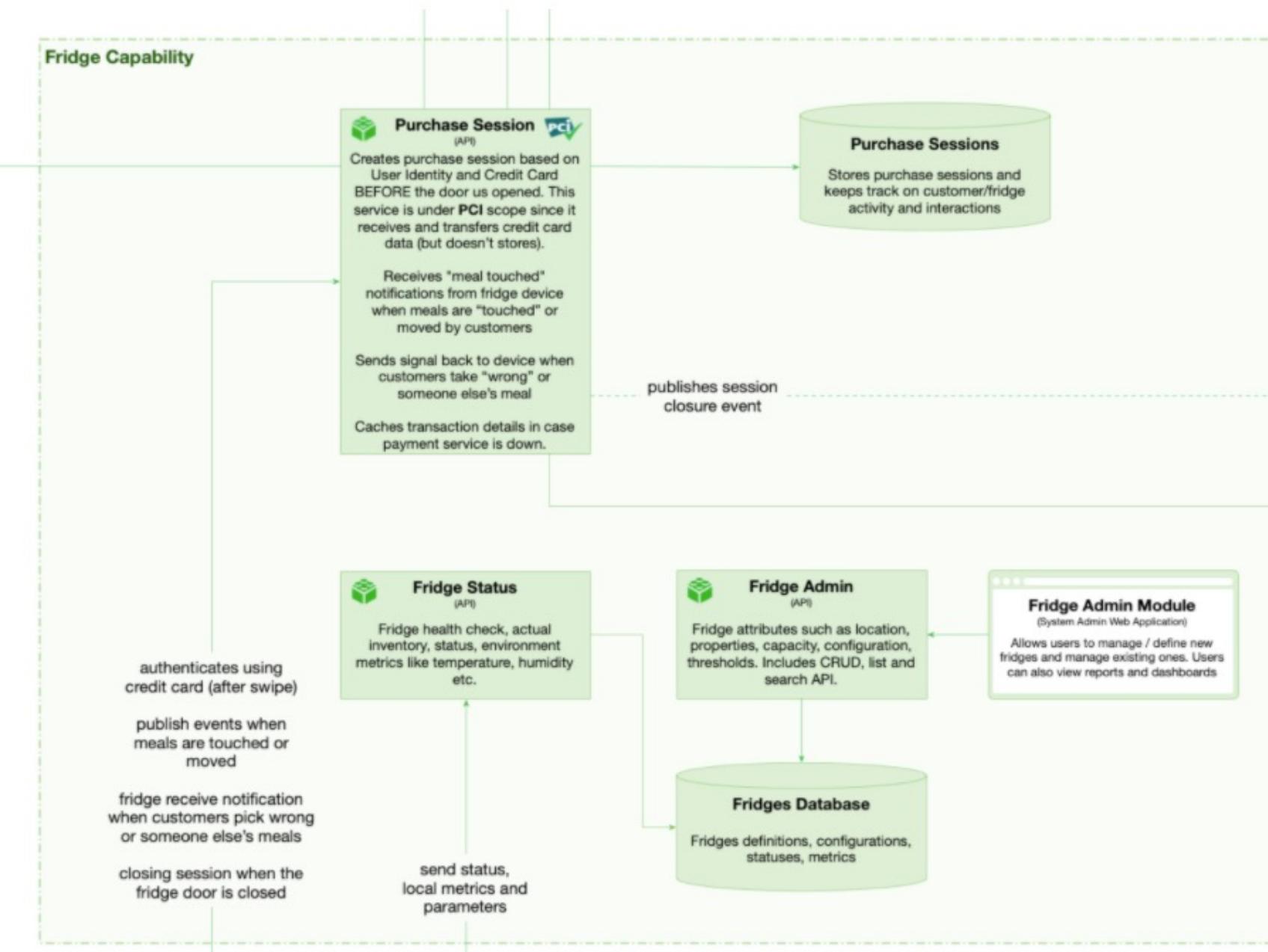


Overall solution



Overall Solution

The architecture solution describes the overall structure of the system and how it will be constructed



- Are the architecture characteristics demonstrated in the solution?
- Is the solution appropriate and feasible given the project constraints?
- Are the architecture styles selected represented in the solution?

Integration

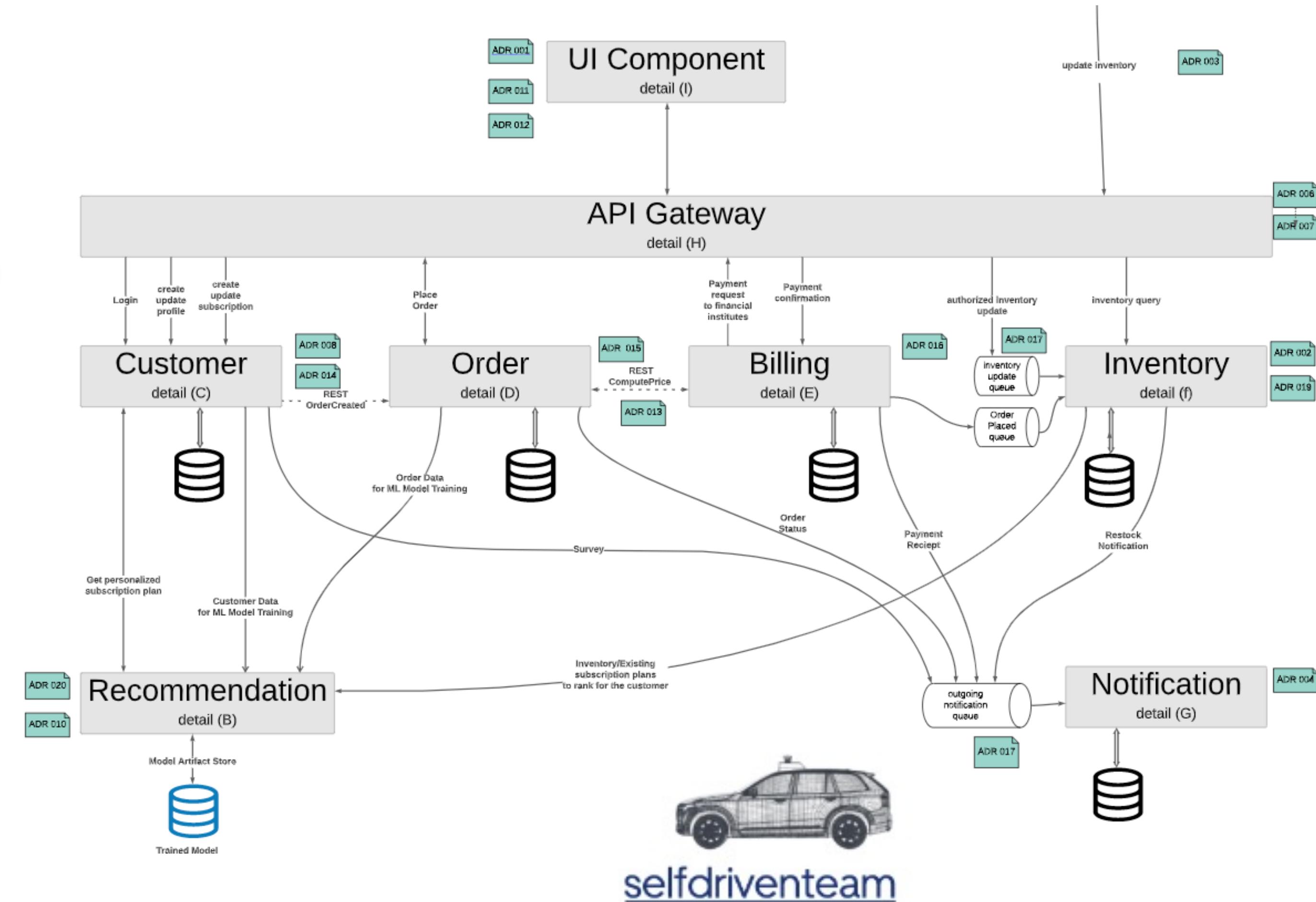
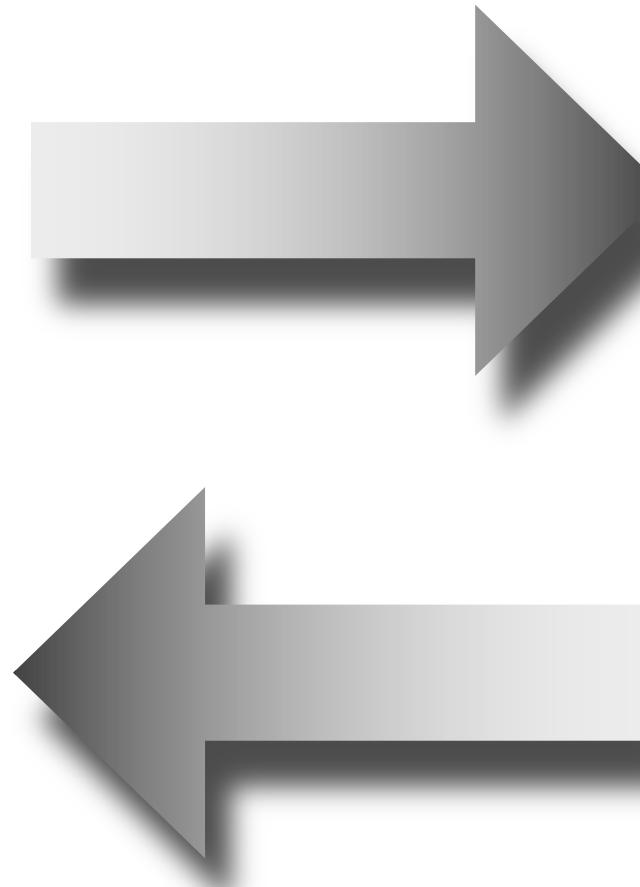
Feasibility

Agility

Availability

Security

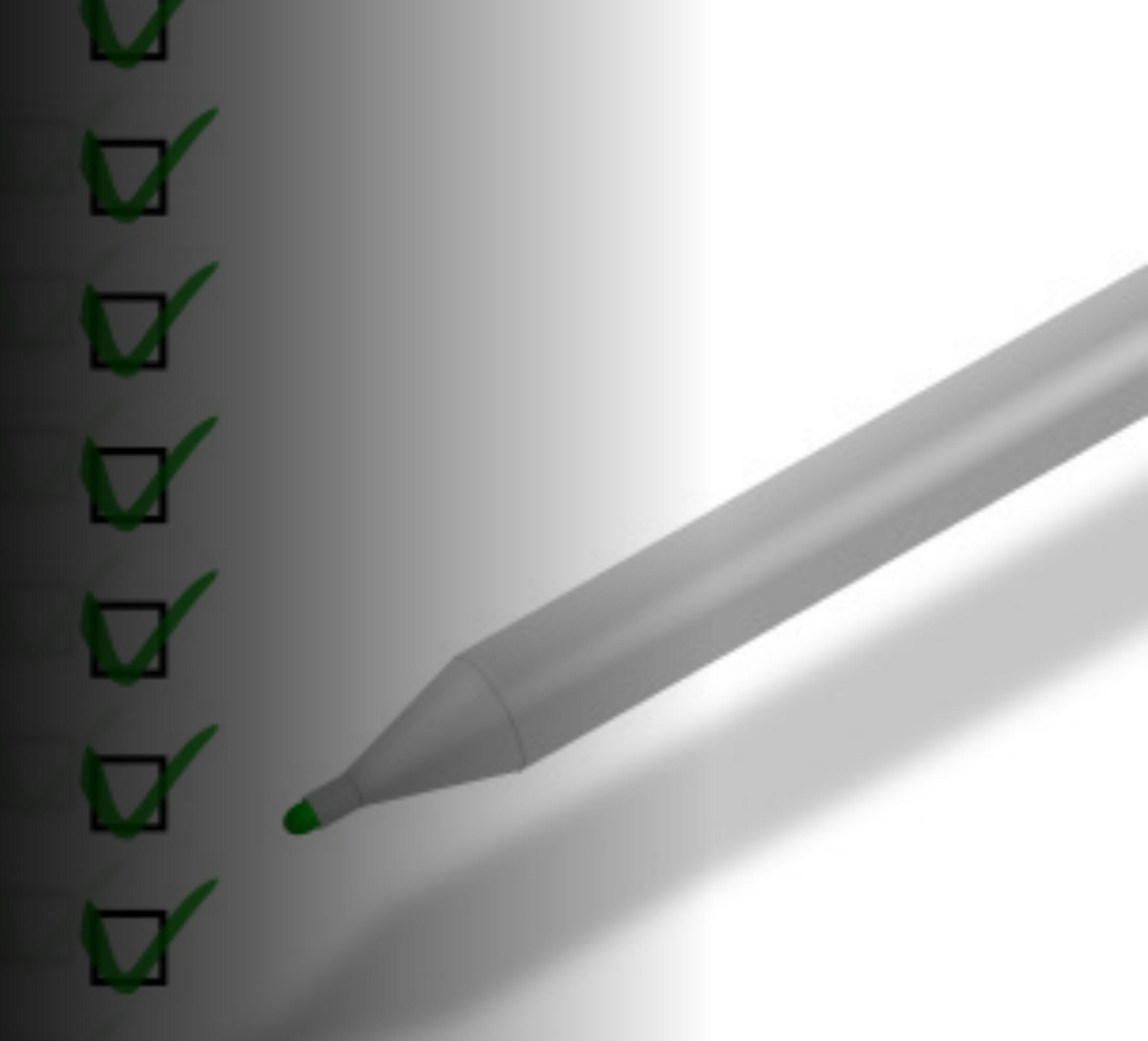
Scalability

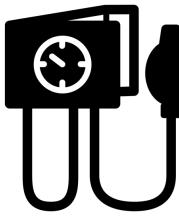


Final architecture presentation (semi-finalist)



The Business Problem





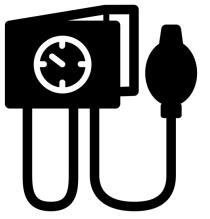
MonitorMe

StayHealthy, Inc. is a large and highly successful medical software company located in San Francisco, California, US. They currently have 2 popular cloud-based SAAS products: *MonitorThem* and *MyMedicalData*.



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MonitorThem a comprehensive data analytics platform that is used for hospital trend and performance analytics—alert response times, patient health problem analytics, patient recovery analysis, and so on.

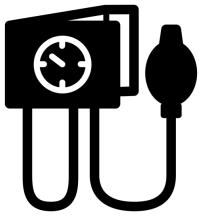


MonitorMe

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MonitorThem a comprehensive data analytics platform that is used for hospital trend and performance analytics—alert response times, patient health problem analytics, patient recovery analysis, and so on.

MyMedicalData is a comprehensive cloud-based patient medical records system used by doctors, nurses, and other heath professionals to record and track a patients heath records with guaranteed partitioning between patient records.



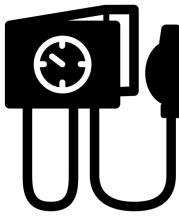
MonitorMe

StayHealthy, Inc. is a large and highly successful medical software company located in San Francisco, California, US. They currently have 2 popular cloud-based SAAS products: *MonitorThem* and *MyMedicalData*.

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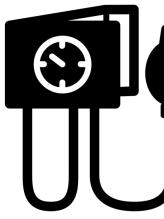
StayHealthy, Inc. is now expanding into the medical monitoring market, and is in need of a new medical patient monitoring system for hospitals that monitors a patients vital signs using proprietary medical monitoring devices built by StayHealthy, Inc.



MonitorMe

Requirements

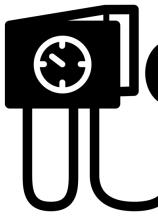
- *MonitorMe* reads data from eight different patient-monitoring equipment vital sign input sources: heart rate, blood pressure, oxygen level, blood sugar, respiration rate, electrocardiogram (ECG), body temperature, and sleep status (sleep or awake). It then sends the data to a consolidated monitoring screen (per nurses station) with an average response time of 1 second or less. The consolidated monitoring screen displays each patients vital signs, rotating between patients every 5 seconds. There is a maximum of 20 patients per nurses station.



MonitorMe

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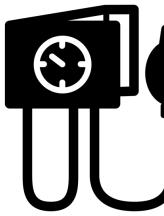
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MonitorMe

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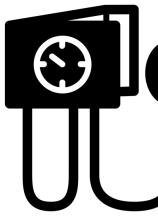
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- In addition to recording raw monitoring data, the *MonitorMe* software must also analyze each patient's vital signs and alert a medical professional if it detects an issue (e.g., decrease in oxygen level) or reaches a preset threshold (e.g., temperature has reached 104 degrees F).



MonitorMe

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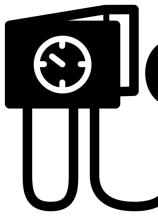
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- In addition to recording raw monitoring data, the *MonitorMe* software must also analyze each patient's vital signs and alert a medical professional if it detects an issue (e.g., decrease in oxygen level) or reaches a preset threshold (e.g., temperature has reached 104 degrees F).
- Some trend and threshold analysis is dependent on whether the patient is awake or asleep. For example, if the blood pressure drops, the system should notice that the patient is asleep and adjust its alerts accordingly. The same is true with the respiration rate and heart rate. For example, all of these vital signs are reduced when the patient is asleep, but if awake something might be wrong.



MonitorMe

Requirements (cont.)

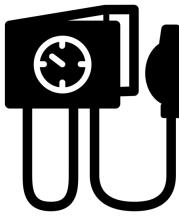
- Medical professionals receive alert push notifications of a potential problem based on raw data analysis to a StayHeathy mobile app on their smart phone as well as the consolidated monitoring screen in each nurses station.



MonitorMe

Requirements (cont.)

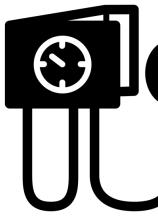
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MonitorMe

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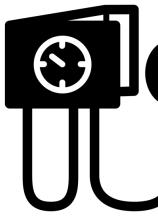
- Medical professionals receive alert push notifications of a potential problem based on raw data analysis to a StayHeathy mobile app on their smart phone as well as the consolidated monitoring screen in each nurses station.
- If any of vital sign device (or software) fails, *MonitorMe* must still function for other vital sign monitoring (monitor, record, analyze, and alert).
- Medical staff can generate holistic snapshots from a patients consolidated vital signs at any time. Medical staff can then upload the patient snapshot to *MyMedicalData*. The upload functionality is within the scope of the *MonitorMe* functionality and is done through a secure HTTP API call within *MyMedicalData*.



MonitorMe

Requirements (cont.)

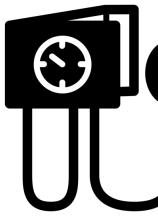
- Each patient monitoring device transmits vital sign readings at a different rate:
 - Heart rate: every 500ms
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MonitorMe

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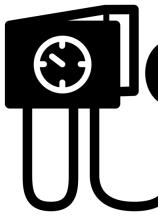
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- *MonitorMe* will be deployed as an on-premises system. Each physical hospital location will have its own installation of the complete *MonitorMe* system (including the recorded raw monitoring data).



MonitorMe

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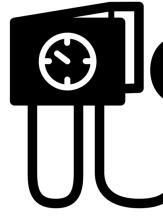
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MonitorMe

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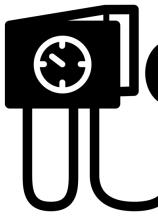
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- Maximum number of patients per physical *MonitorMe* instance: 500
- StayHealthy. Inc. will be providing a **comprehensive** hardware and software for this system. The platform, data stores, databases, and other technical tools and products are unspecified at this time and will be based on your on-prem architectural solution.



MonitorMe

Other Considerations

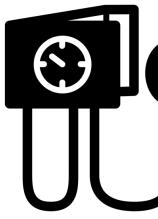
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MonitorMe

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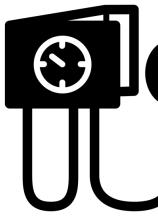
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MonitorMe

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- Vital sign data analyzed and recorded through *MonitorMe* must be as accurate as possible. After all, human lives are at stake.
- As this is a new line of business for StayHealthy, they expect a lot of change as they learn more about this new market.

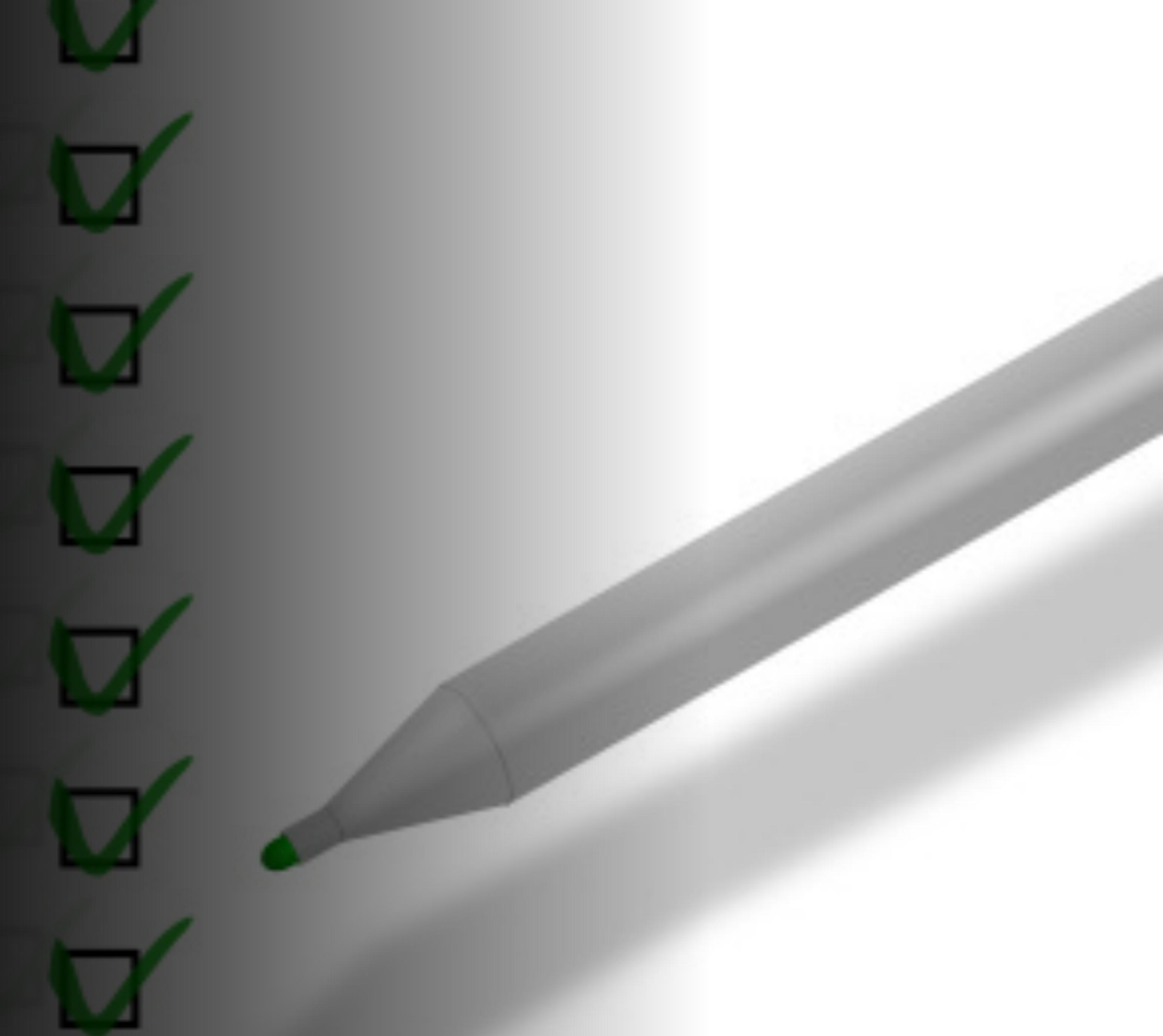


MonitorMe

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- Vital sign data analyzed and recorded through *MonitorMe* must be as accurate as possible. After all, human lives are at stake.
- As this is a new line of business for StayHealthy, they expect a lot of change as they learn more about this new market.
- StayHealthy, Inc. has always taken patient confidentiality seriously. *MonitorMe* should be no exception to this rule. While patient monitoring data must be secure, *MonitorMe* does not have to meet any government regulatory requirements (e.g., HIPPA).

Contest Details



Dates

- All teams must submit this Google Form (<https://forms.gle/6ESA49iD8VW6AskQ9>) by Thursday, February 22 at 11:59pm Eastern to participate
- Solutions are due in your GitHub repo by Thursday, February 22, 11:59PM Eastern
- Semifinalists will be announced at the second event on Monday, March 4
- Questions? Email us at katas@oreilly.com

Architecture Katas

Private Event February 2024

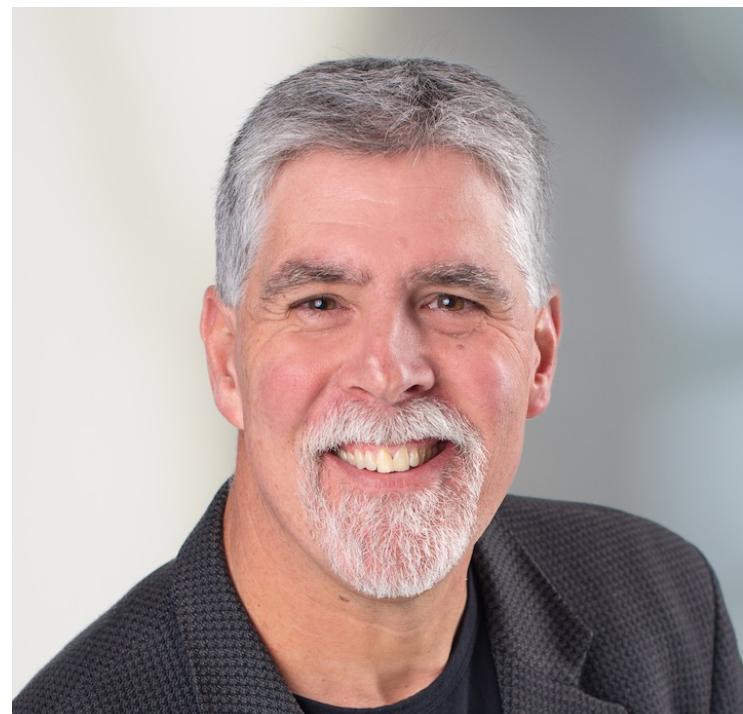


Neal Ford

Thoughtworks

Director / Software Architect / Meme Wrangler

<https://www.nealford.com>



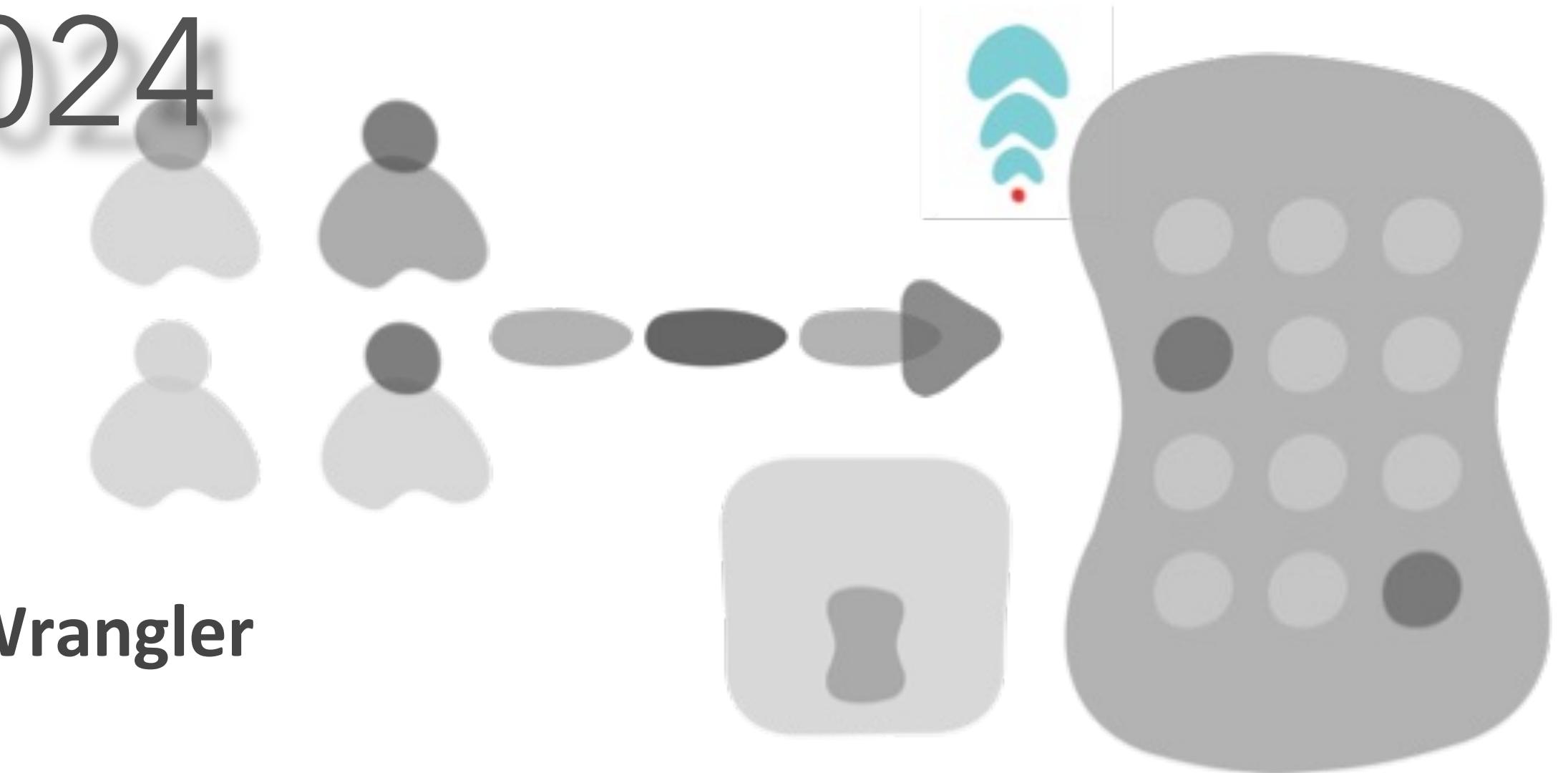
Mark Richards

Independent Consultant

Hands-on Software Architect, Published Author

Founder, DeveloperToArchitect.com

@markrichardssa



Contest Kickoff