Coding Dojo

Architecture Kata

Agenda

- Introduction (this presentation)
- Architecture Kata process:
    - Architecture characteristics (~ 15 min)
    - Logical components (~ 60 min)
    - Architectural style (~ 20 min)
    - Diagramming (~ 60 min)
    - Presentation + Feedback (~ 10 min / group)

Definition

An **architecture kata** is a structured exercise designed to help software developers practice and improve their skills in designing software architectures.

Definition

- In reference to computers, software or networks, the overall design of a computing system and the logical and physical interrelationships between its components. The architecture specifies the hardware, software, access methods and protocols used throughout the system.

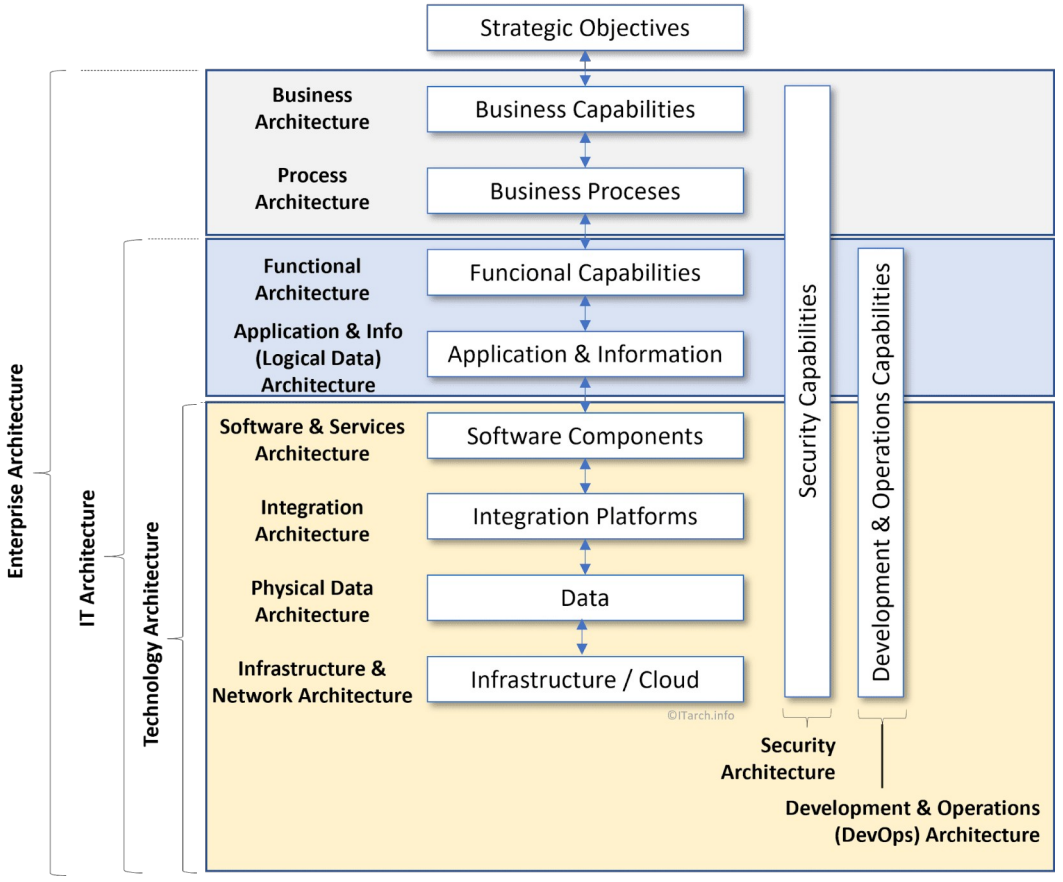
- A framework and set of guidelines to build new systems. IT architecture is a series of principles, guidelines or rules used by an enterprise to direct the process of acquiring, building, modifying and interfacing IT resources throughout the enterprise. These resources can include equipment, software, communications, development methodologies, modeling tools and organizational structures.

Gartner

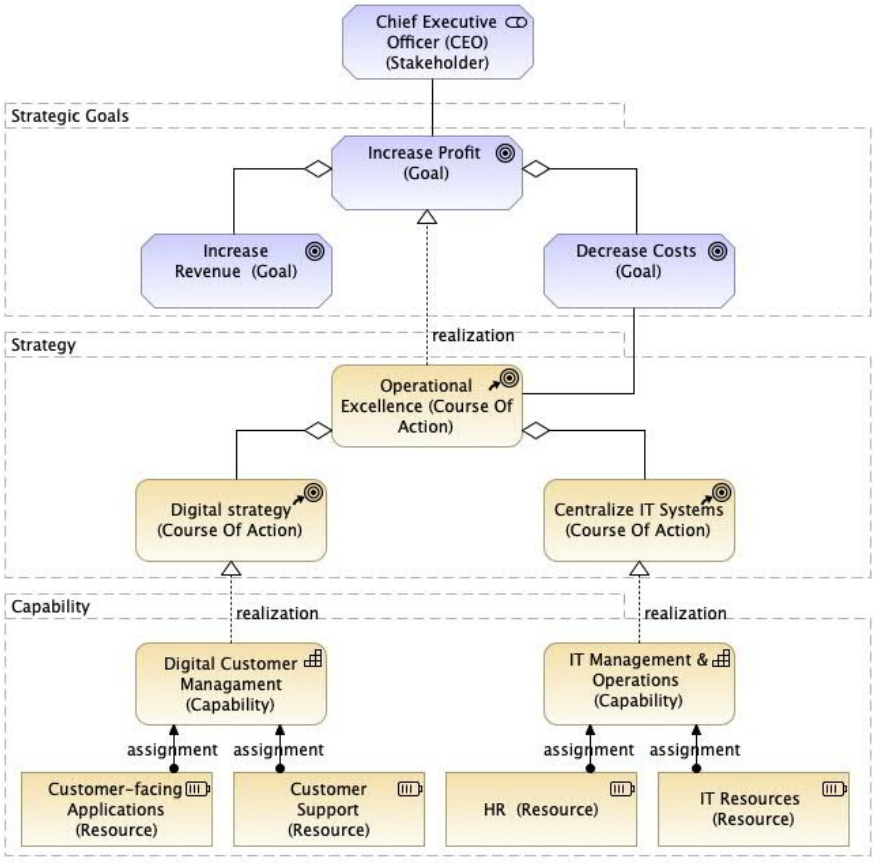
Architecture Overview

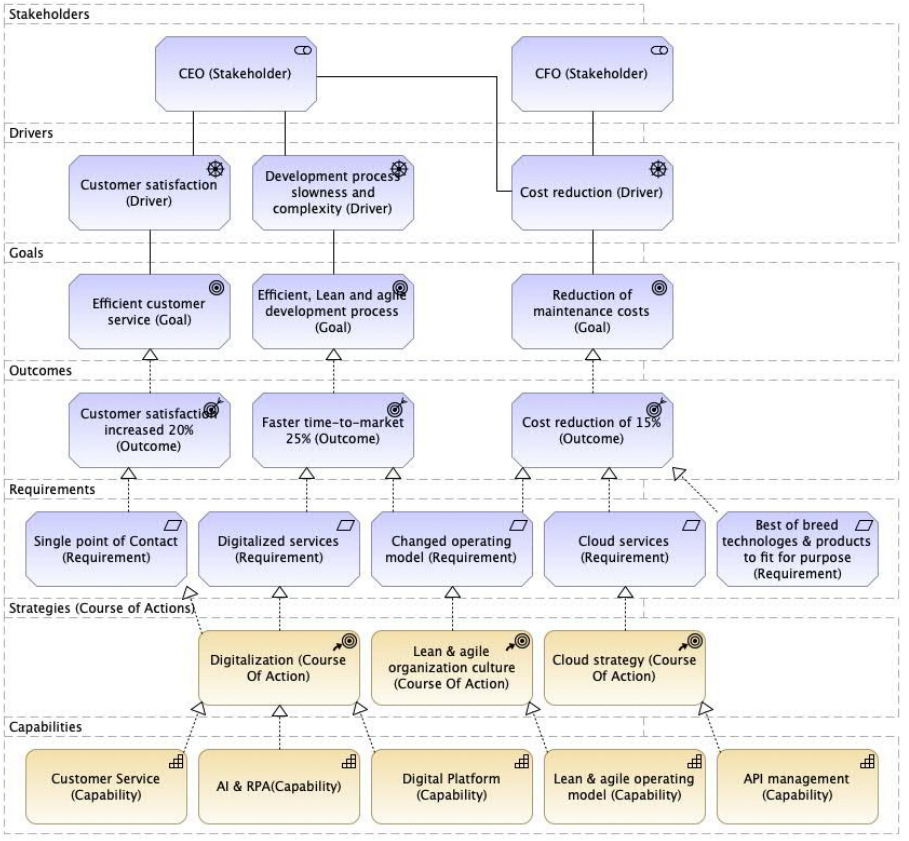
- Enterprise architecture (EA)
- Solution architecture (SA)
- Technical architecture (TA)
  - Software / application architecture
  - Data architecture
  - Cloud architecture
  - Network architecture

Architecture Overview

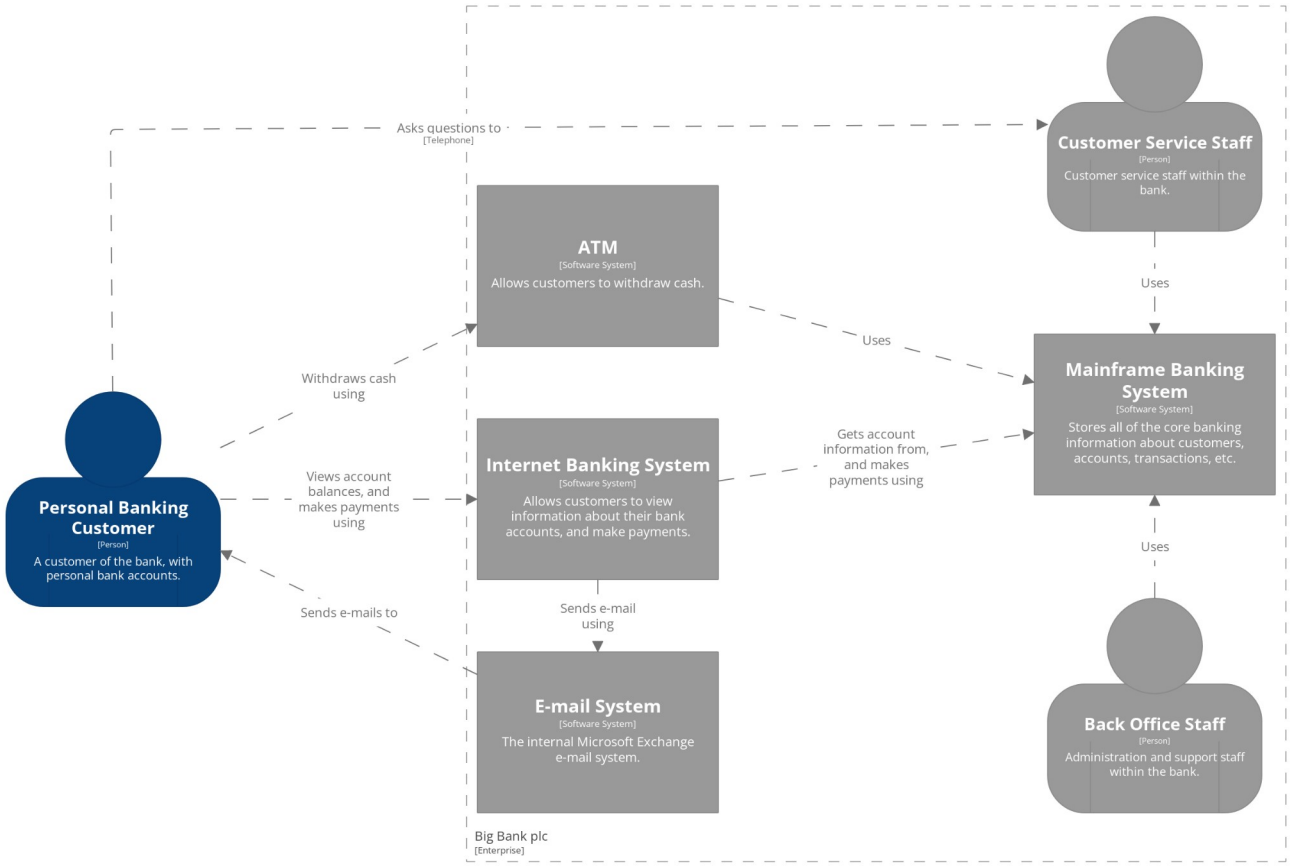


Architecture Overview





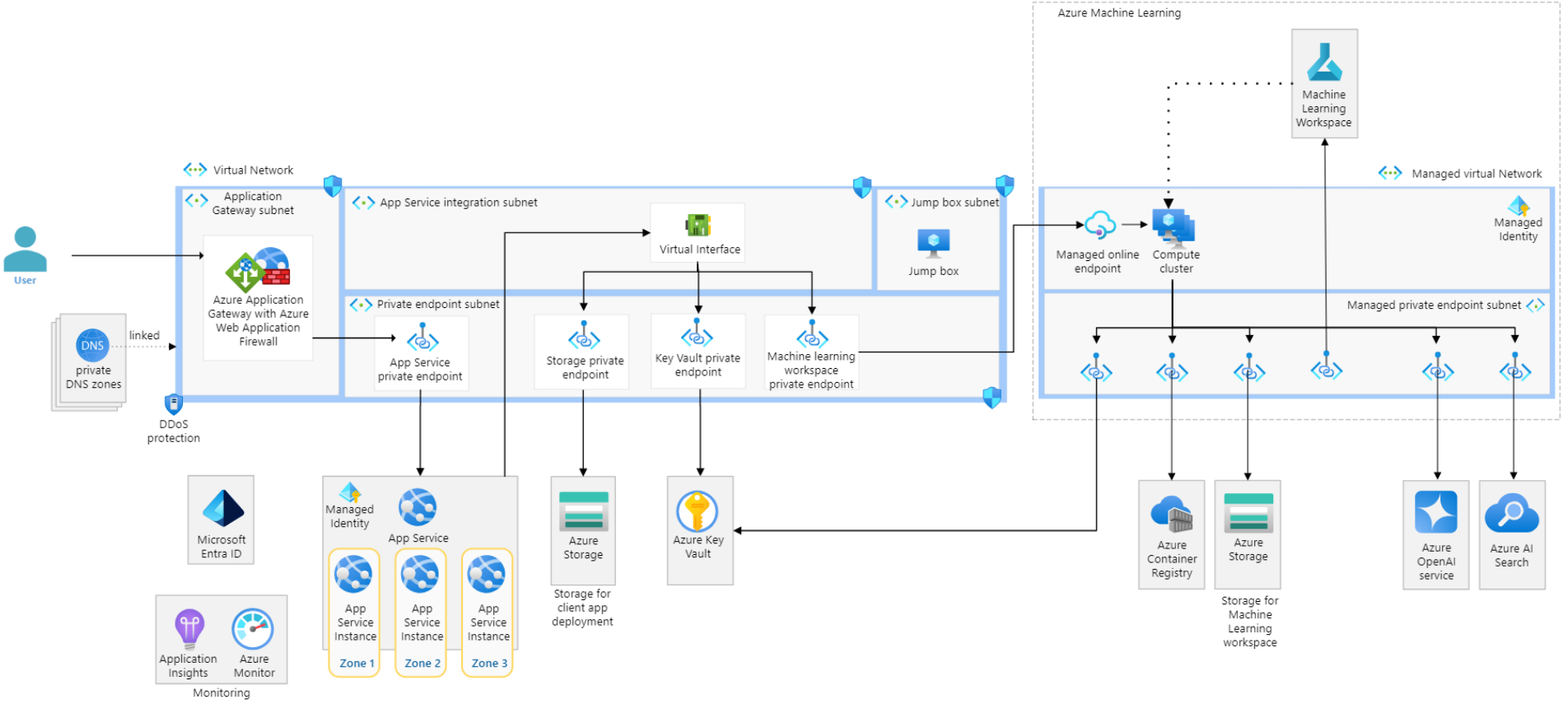
Architecture Overview



[System Landscape] Big Bank plc

Sunday, March 5, 2023 at 9:48 AM Coordinated Universal Time

Architecture Overview



Problem Description

- Background
- Users (kind, amount/scale)
- Requirements
- Additional context

Phases

Discussion Phase

Figuring out what you're building and building it

Peer Review Phase

Presenting your architecture to the rest of the group

Voting Phase

Final feedback on the proposal

Discussion Phase Breakdown

I. Define the architecture characteristis (-ilities)

II. Design logical components (building blocks)

III. Select an architectural style

IV. Create implementation diagram (physical architecture)

Architecture characteristics

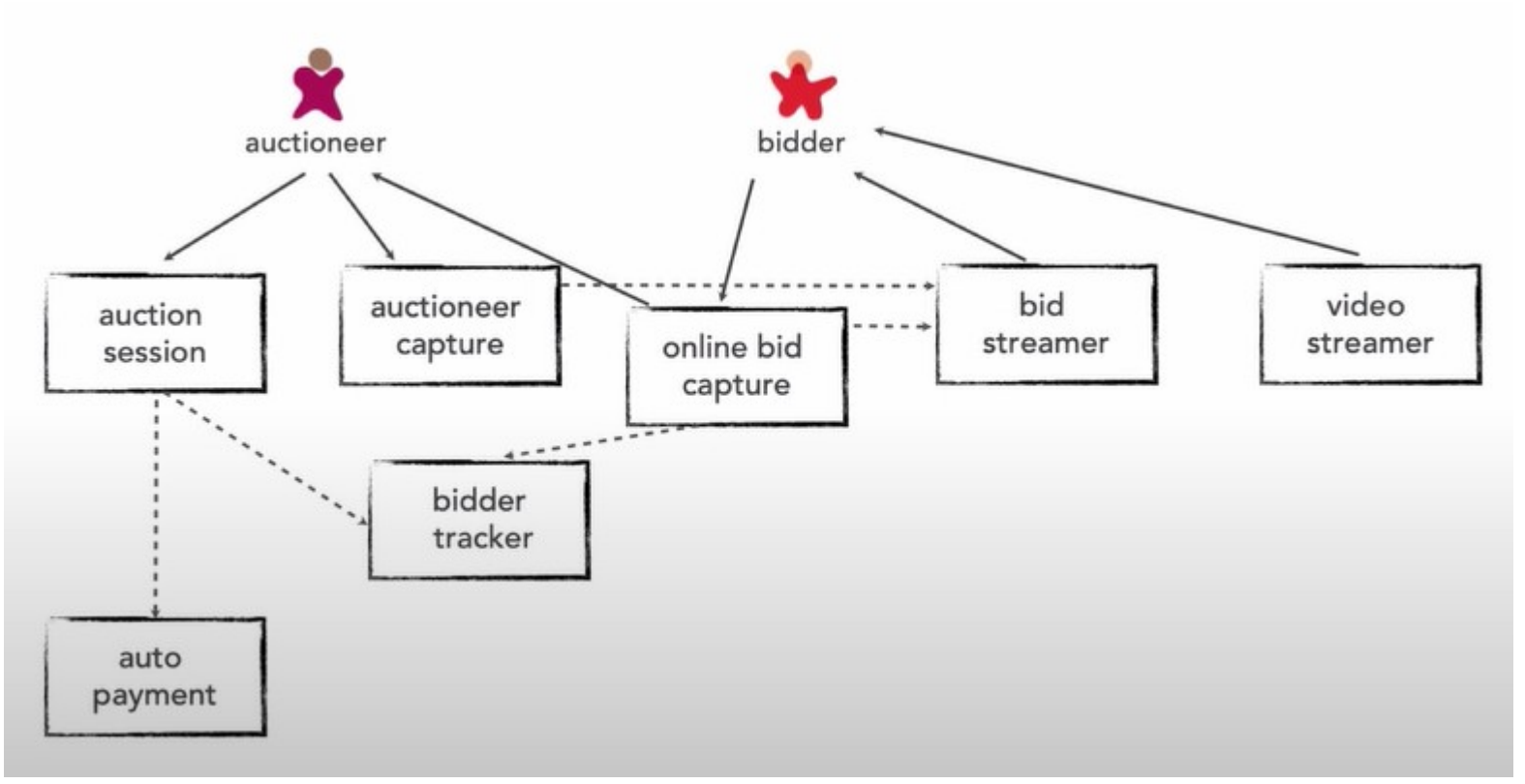
An auction company wants to take their auctions online to a nationwide scale--customers choose the auction to participate in, wait until the auction begins, then bid during the live auction as if they were there in the room, with the auctioneer.

- **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
  - auctions must be as real-time as possible
  - both online and live bids must be received in the order in which they are placed
  - bidders register with credit card; system automatically charges card if bidder wins
  - participants must be tracked via a reputation index
- **Additional Context:**
  - auction company is expanding aggressively by merging with smaller competitors
  - if nationwide auction is a success, replicate the model overseas
  - budget is not constrained--this is a strategic direction
  - company just exited a lawsuit where they settled a suit alleging fraud

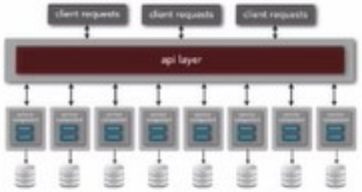
concurrency

availability reliability performance scalability elasticity (security)

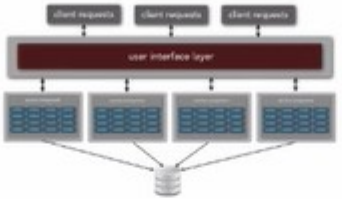
Logical Components



Architectural Style

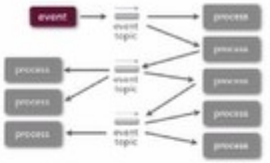


microservices architecture



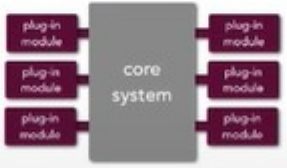
service-based architecture

layered architecture



event-driven architecture

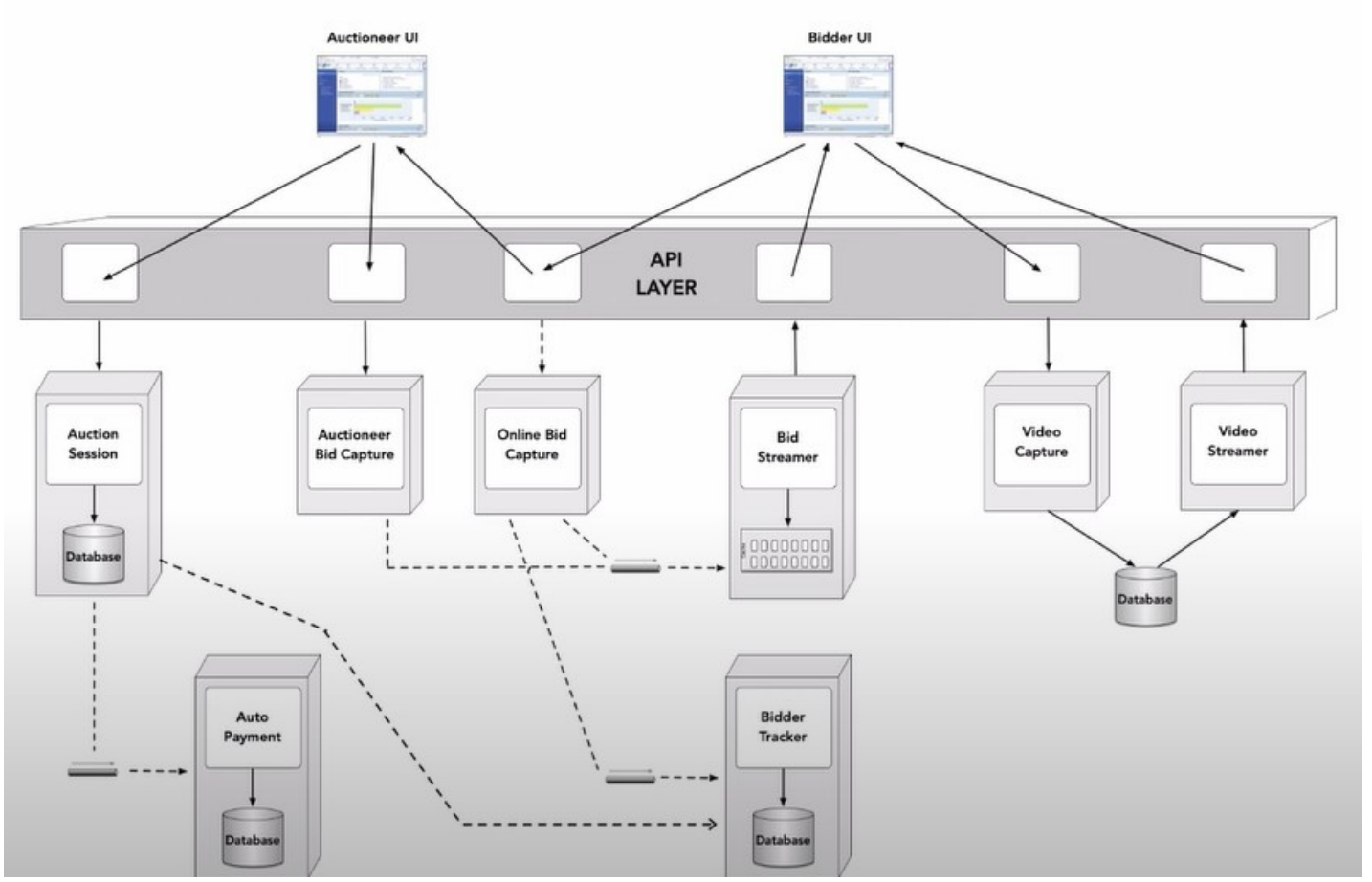
pipeline architecture



microkernel architecture

space-based architecture

Implementation Diagram



Guidelines

- Ask questions about requirements
- Discuss technology that could work (trade-offs)
- Sketch out rough vision
- Discuss / improve
- Prepare answering critical questions

Rules

- Co-workers not in same group
- (Physical) distance from other teams
- Laptop not required

  (whiteboarding, notes, organizing thoughts, flip-charts, post-its)
- Rotate whiteboarding role

The Kata

FreshShop, a growing retail chain with 400 stores across the world, is struggling with their current monolithic order management system. As they expand their e-commerce presence and add more fulfillment options, they need a new distributed system to handle orders across both online and physical stores.

The Kata – Baseline

- Single monolithic system handling all orders
- 400 retail stores worldwide
- 8 distribution centers
- 1 e-commerce website
- Orders per day: 300,000
- Peak holiday orders: 600,000/day
- Current system frequently crashes during peak times

The Kata – Challenge

Design a distributed order management system that:

1. Handles both online and in-store orders
2. Maintains accurate inventory across all locations
3. Scales for holiday shopping peaks
4. Provides consistent customer experience
5. Provides the business insights into operations

Reference / Worksheets

- FreshShop Kata
- Architecte Characteristics
- Architectural styles /trade off matrix

https://github.com/thomgre/architecture-kata