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LIVE ONLINE TRAINING

Architecture Katas Semi-Finalists

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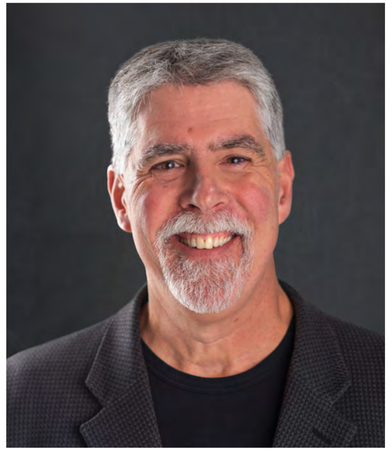

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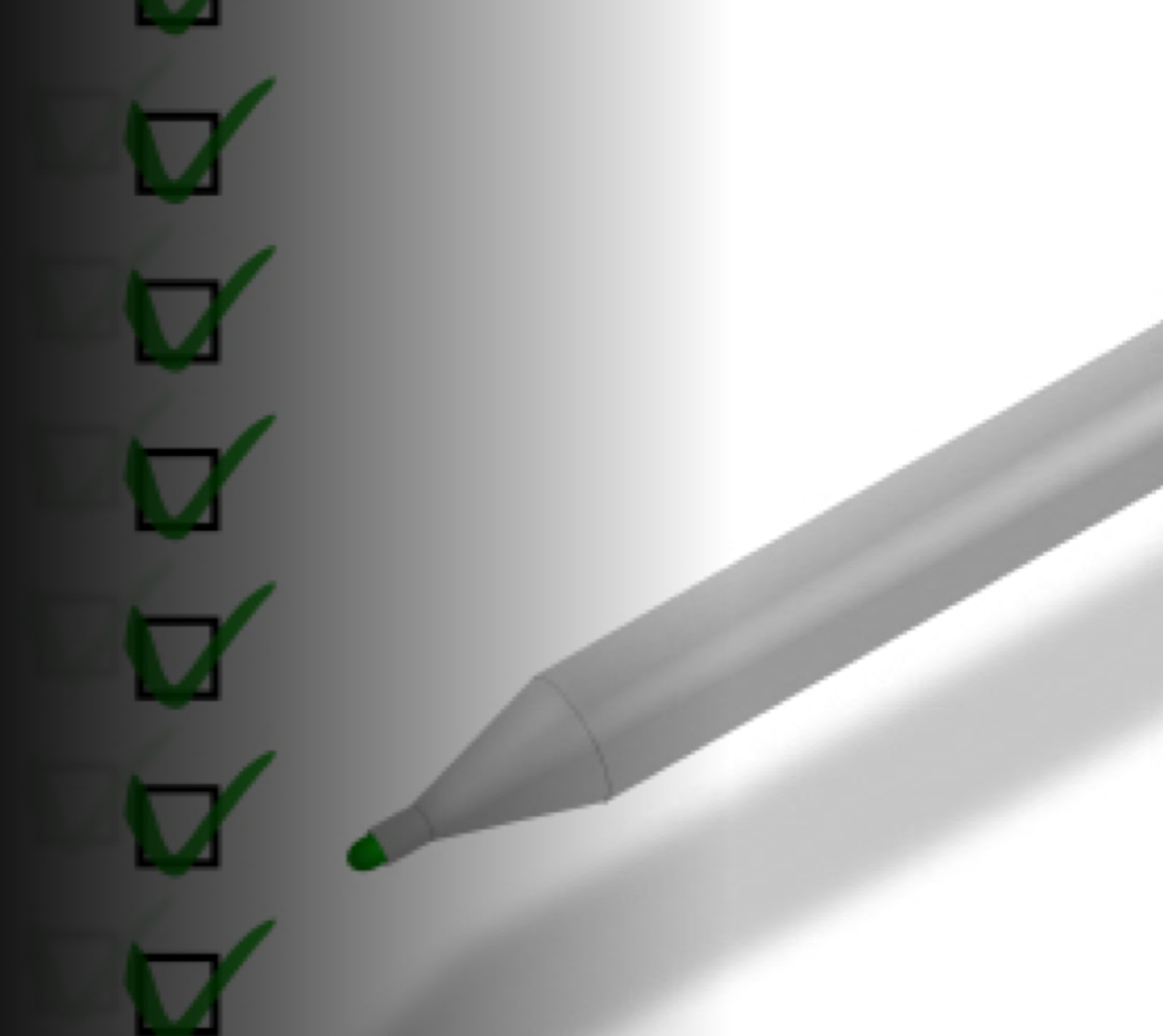
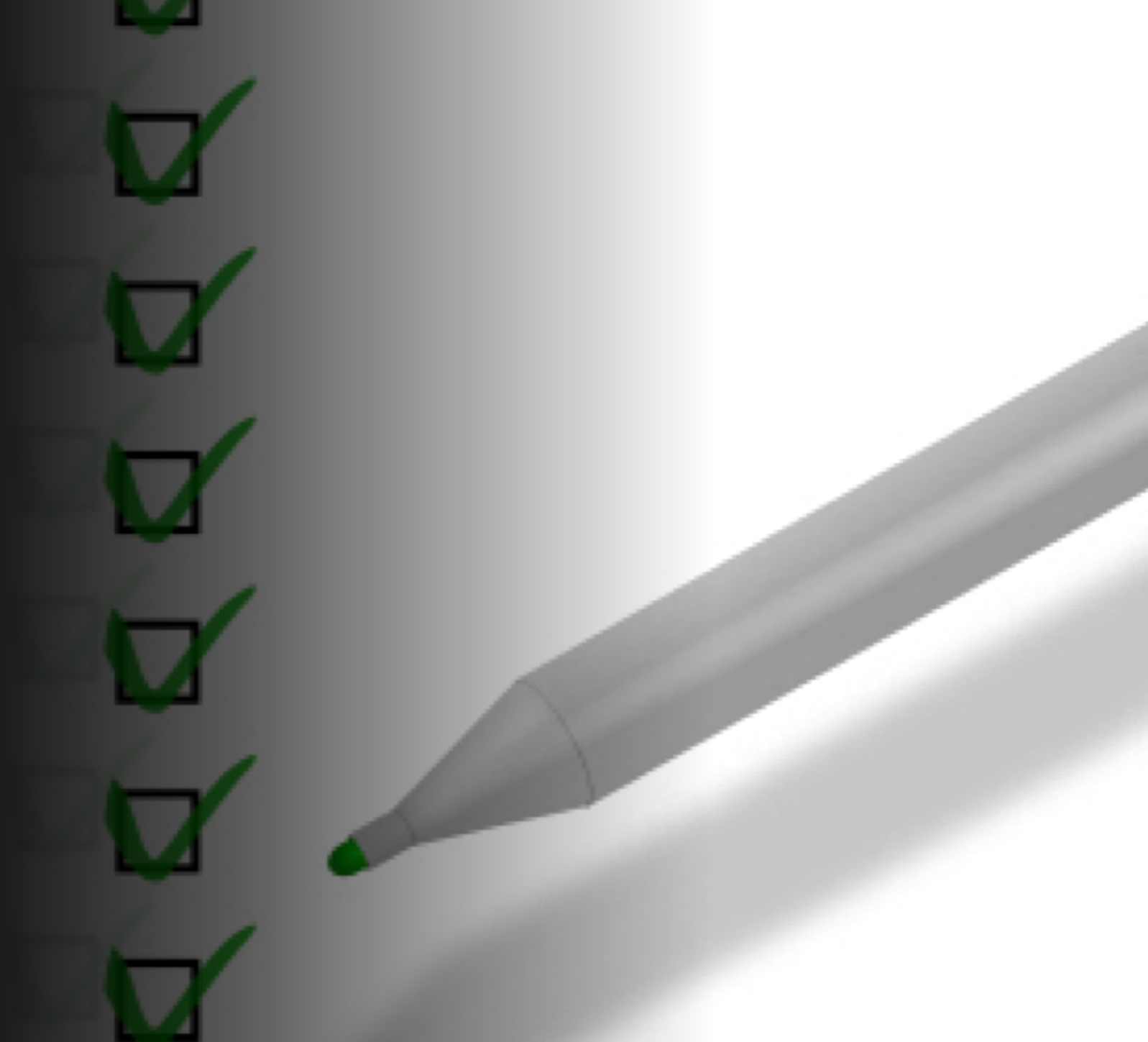
Judges Criteria



Clarity of narrative, organization, and supporting documentation



Organization

clarity - narrative, organization, supporting documentation

- Problem Background
  - System overview
  - Goals and Context
  - Constraints
  - Significant Driving Requirements
- Solution Background
  - Solution Overview
  - Assumptions
  - ADRs
- Views and Perspectives

- Overview
- Baseline Architecture
  - Context
  - Containers
- Initial requirements
  - Primary goals
  - User requirements
  - Stakeholders
  - Constraints
  - User stories
- Target Architecture
  - Context
  - Containers
  - Assumptions
  - Significant Quality Attributes
  - Deployment
  - Risks
  - Security
- Architecture design records
- Additional resources

Repository Structure

```
.
│
│   1_BusinessAnalysis.md       * Business Canvas and Market Analysis
│   2_Requirements.md           * Listing Actors and use cases
│   3_Solution.md               * Initial increment of the Architectural Solution
│   4_Team.md                   * list of team members and their contriubtion
│   README.md                   * This file
│
├──0_other_controbutions        * Early contribution from a team member
│       business_canvas.png
│       Farmacy Family Requirements.pdf
│       readme.md
│
├──diagrams                     * Architectural diagrams
│       analytics.png
│       component_diagram.png
│       customer_segmentation.png
│       data_model.png
│       onboarding_flow.png
│
└──images                       * supporting images
        Berlin.jpg
        ELC_DA.png
        Jane.png
        LeanCanvas_FarmacyFood.png
        pdca.png
        TAM-SAM-Market.jpg
```

Problem Background

clarity - narrative, organization, supporting documentation

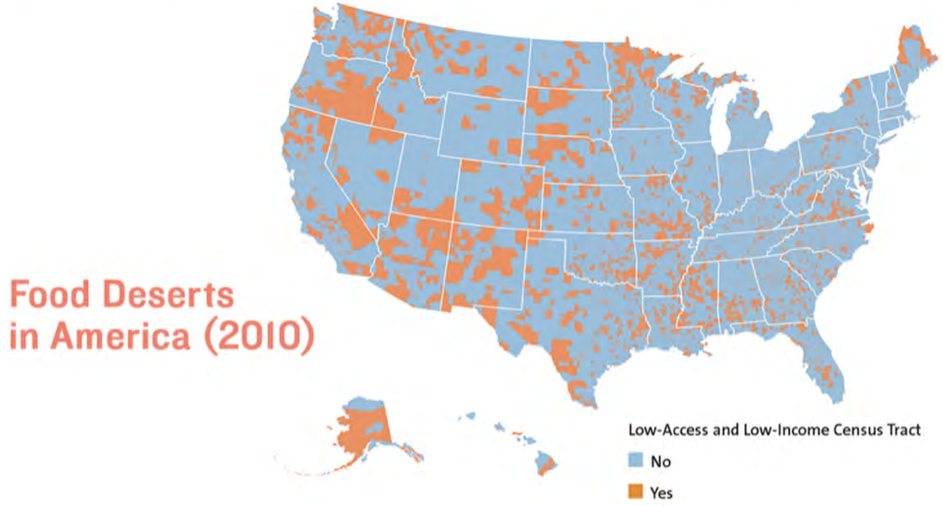
2.Background

2.1.Overall strategy

Turn food deserts into fresh and healthy food oases for everyone. Everyone feels like they are part of a community that helps them make the right choices for their circumstance.

2.2.The problem

Food deserts are an issue that effects 39.5 million people (or 12.8% of the population) in the United States.



Business Case and Goals

The overall goal of FFamily is to connect, gather, analyze, and communicate.

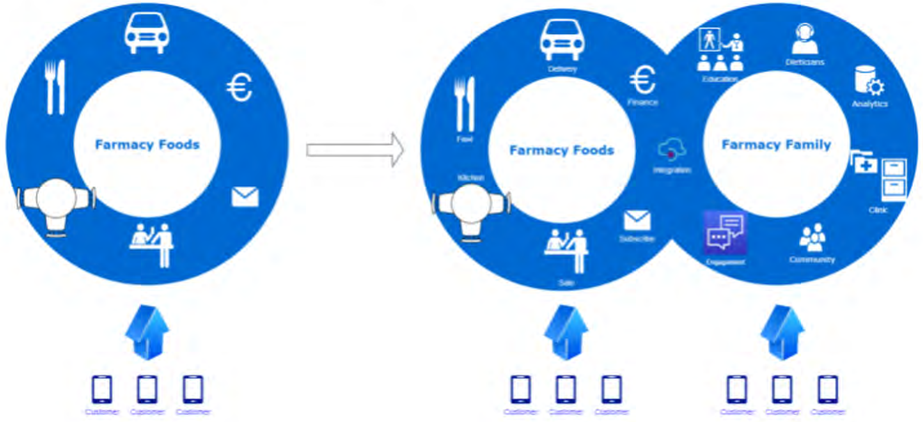
Primary goals are:

- develop relationships between engaged customers and nurture those relationships;
- convert transactional customers to engaged customers;
- generate analytical data from medical information to demonstrate the benefits of FFoods;

Users: Hundreds, separated by distinct geographic zones. Additionally, different clusters of customers frequently consolidate around similar dietary requirements. Shouldfocus on ensuring that entire offering is accommodating to low income, poverty, and homeless.

FFamily should provide the Customer Relationship Management system (CRM) and Customer Data Profile system (CDP). Also it should provide the ability to get Data-Driven decisions and analytics.

The desired solution from the functional perspective:



Solution overview

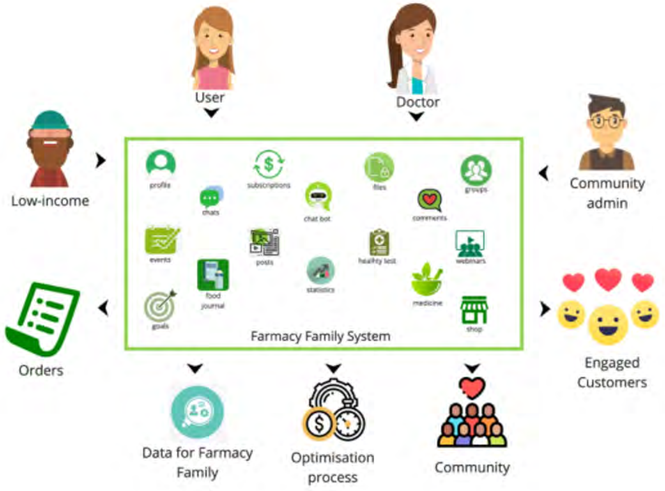
clarity - narrative, organization, supporting documentation

Target Architecture

Here you find the documentation of the software architecture that we envision to address Farmacy Family's user requirements.

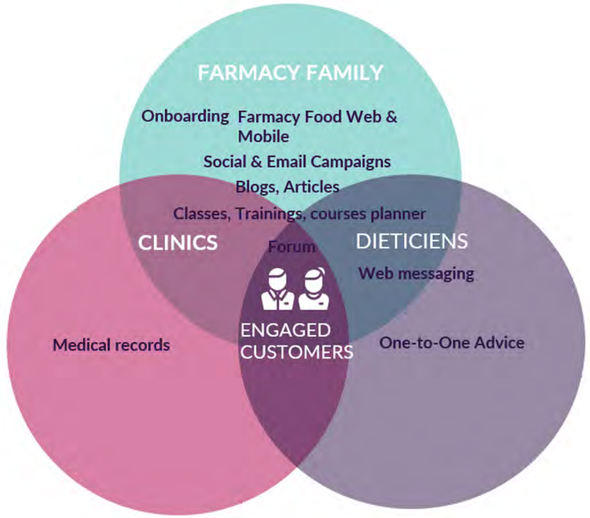
We distilled several key functional areas of Farmacy Family System:

- Rich user profile
- Social Network with blogs, forums, posts, events, chats, media, groups, subscriptions, etc
- Webinars for education and online meetings
- Notifications through SMS, email and Push
- Integration with clinics and Farmacy Food System
- Data analysis for food and health recommendations and optimizations of logistic process
- Statistics and reports



Conceptualization

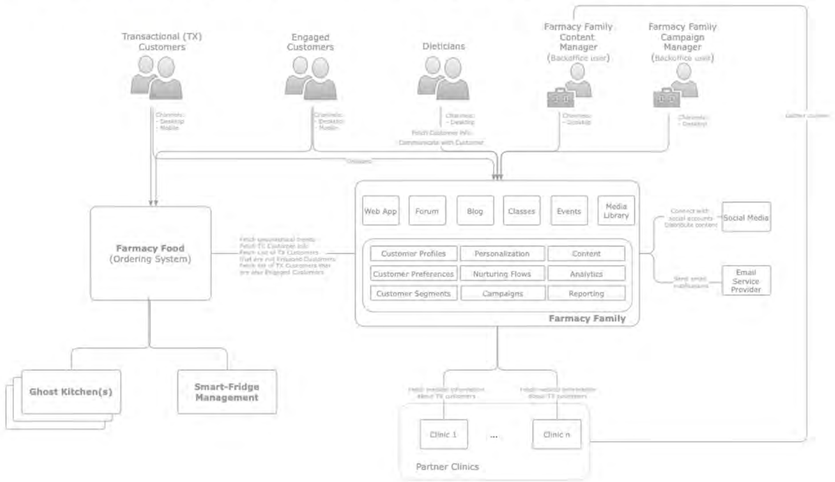
Farmacy Family is aimed to create a digital ecosystem for addressing the end customers (Engaged Customers) through various cl and/or touch points by Farmacy Food Brand, Clinics and Dieticians, allowing them to get onboard a **healthy lifestyle journey** and **brand ambassador in their communities**.



Context View

The following diagrams present the solution context, namely:

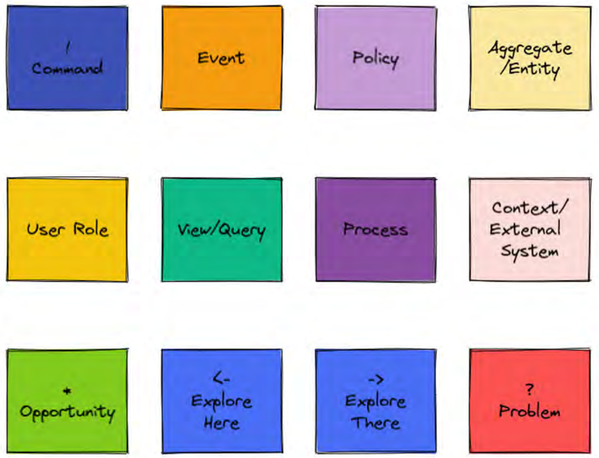
- the list of users along with the channels they are interacting on
- how would the **Farmacy Family** fit into the Client's architectural landscape and the systems it has to integrate with



Supporting documentation

clarity - narrative, organization, supporting documentation

The Key



Definitions

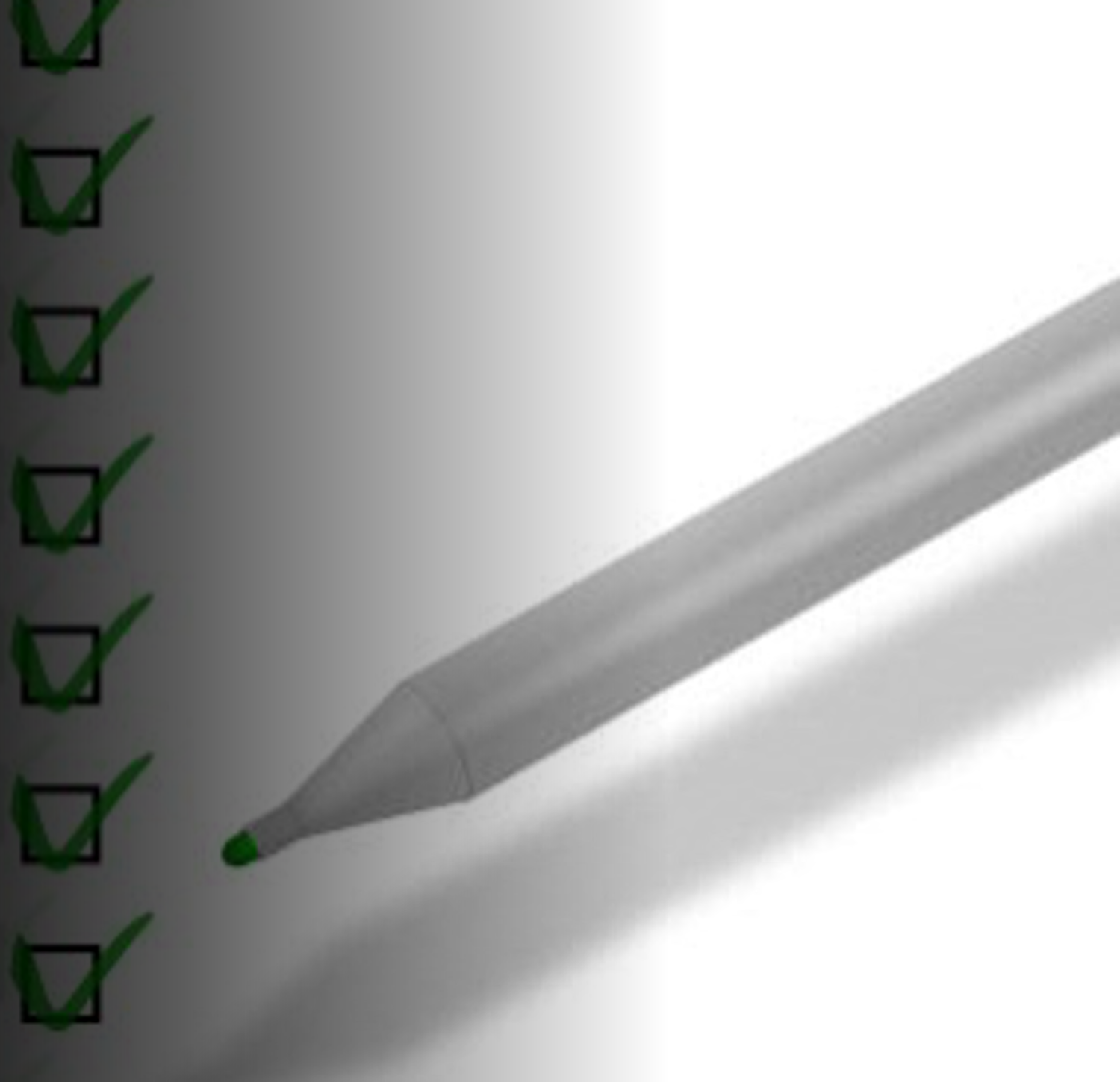
1. Transactional Customer: Customer of FFoods
2. Engaged Customer - Customer of both FFamily and FFoods
3. Support Community - Engaged members within a [community]
4. Client: low income, poverty level, homeless, college students, educators, senior citizens
5. Community - small group of engaged customers within a neighborhood area

ADR

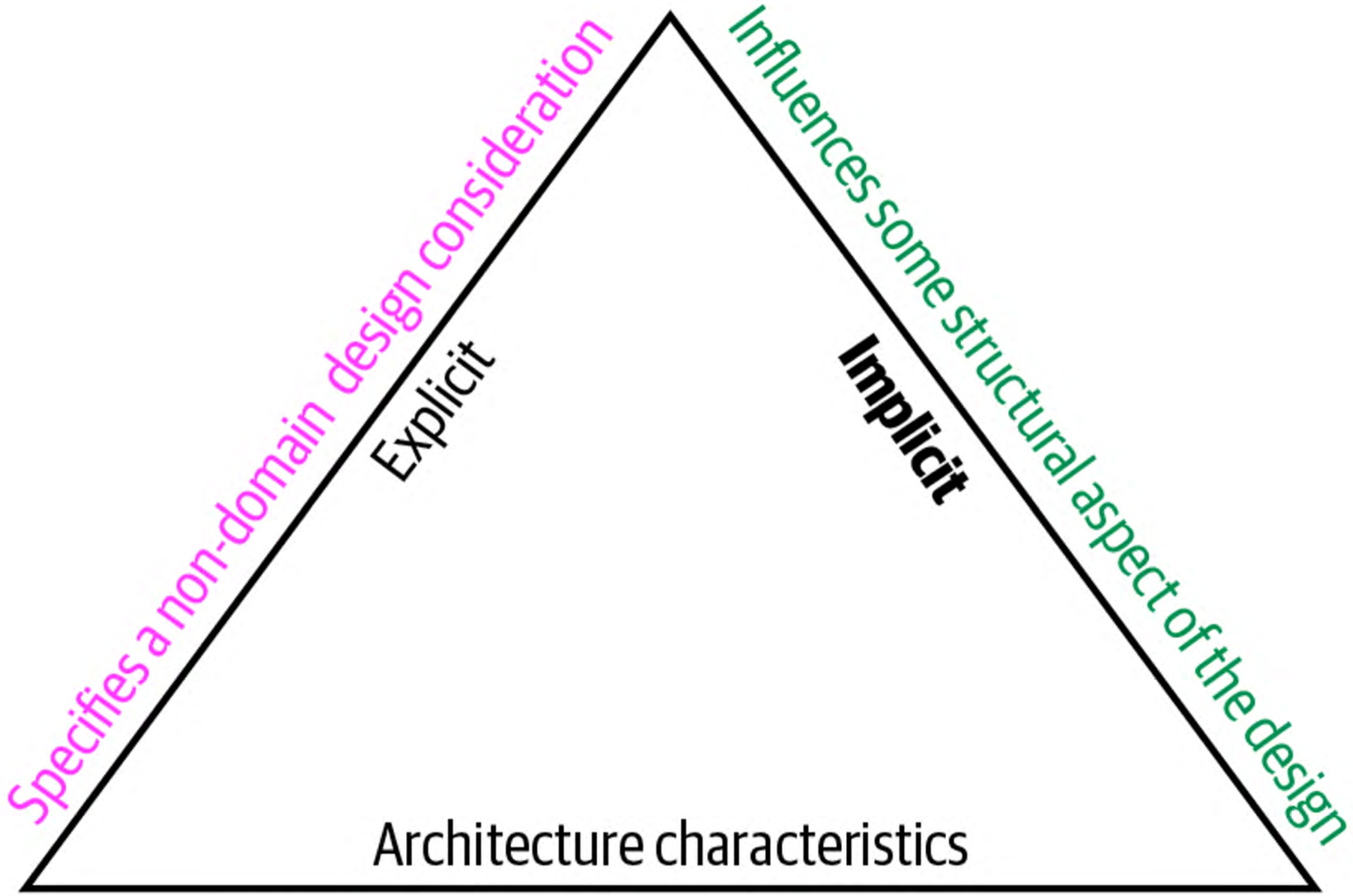
Architecture Decision Log

1. ADR01 Architecture Style
2. ADR02 Interaction with external systems
3. ADR03 System decomposition
4. ADR04 Handle scalability requirement

Identification of supporting architecture characteristics



Architecture Characteristics



Critical or important to application success

Judges Criteria

Supporting architecture characteristics

Top Architecture Characteristics

S.No.	Characteristic
1	Cost
2	Adaptablity
3	Agility
4	Security
5	Feasibility & Simplicity
6	Extensibility
7	Scalability

Selected Architecture Characteristics

Top 3	Characteristic	Source
Y	Interoperability/Integration	Integration with Farmacy Foods (converting Foods transactional customers to Family engaged customers, and analytics feedback), and with dieticians and clinics.
	Data Integrity	Generate analytical data from medical information, geographical data, etc, to demonstrate the benefits of FF, improve fridge supplies for Foods, and exchange analytical data with clinics. Must be correct as is medical data.
	Scalability/Elasticity	Analysis domain, and some other domains like reference material / media, likely to require more resources (especially computational) at different times.
Y	Configurability	Customers have fine-grained control what other customers can see on their profile, and give permissions for e.g. clinics to access their medical data.
Y	Authorisation	Although normally an implicit architecture characteristic (see below) this is promoted here due to clinician and dietician needing authorisation from a customer user to access medical information.
	Workflow	Transactional Foods customers must be onboarded as engaged Family customers, with a completed profile.
	Fault-Tolerance	Community is the most important part of Family. It consists of many aspects, e.g. forums, events, classes, and so each community subdomain must be fault-tolerant of the others else one small problem could take the whole community domain down.

Judges Criteria

Supporting architecture characteristics

Significant Quality Attributes

The target architecture must support goals, user scenarios and constraints described above while satisfying the quality attributes listed in this section. There are some global quality attributes and also there are several individual QAs for certain parts of the system.

Global

- **QA-1:** Interoperability
  - We need to incorporate new functionality into the existing Farmacy Food reactive UI - web and mobile applications
  - The system must be able to integrate with different services including social networks, clinics, web-conferencing, etc
- **QA-2:** Elasticity
  - Because we actually can not predict the real count of user registrations in Farmacy Family application during future marketing campaigns, we need ability to
- **QA-3:** Reliability
  - The system must be available during 24/7 and the user interface has to be continuously available with the exception of small maintenance windows during low traffic times.

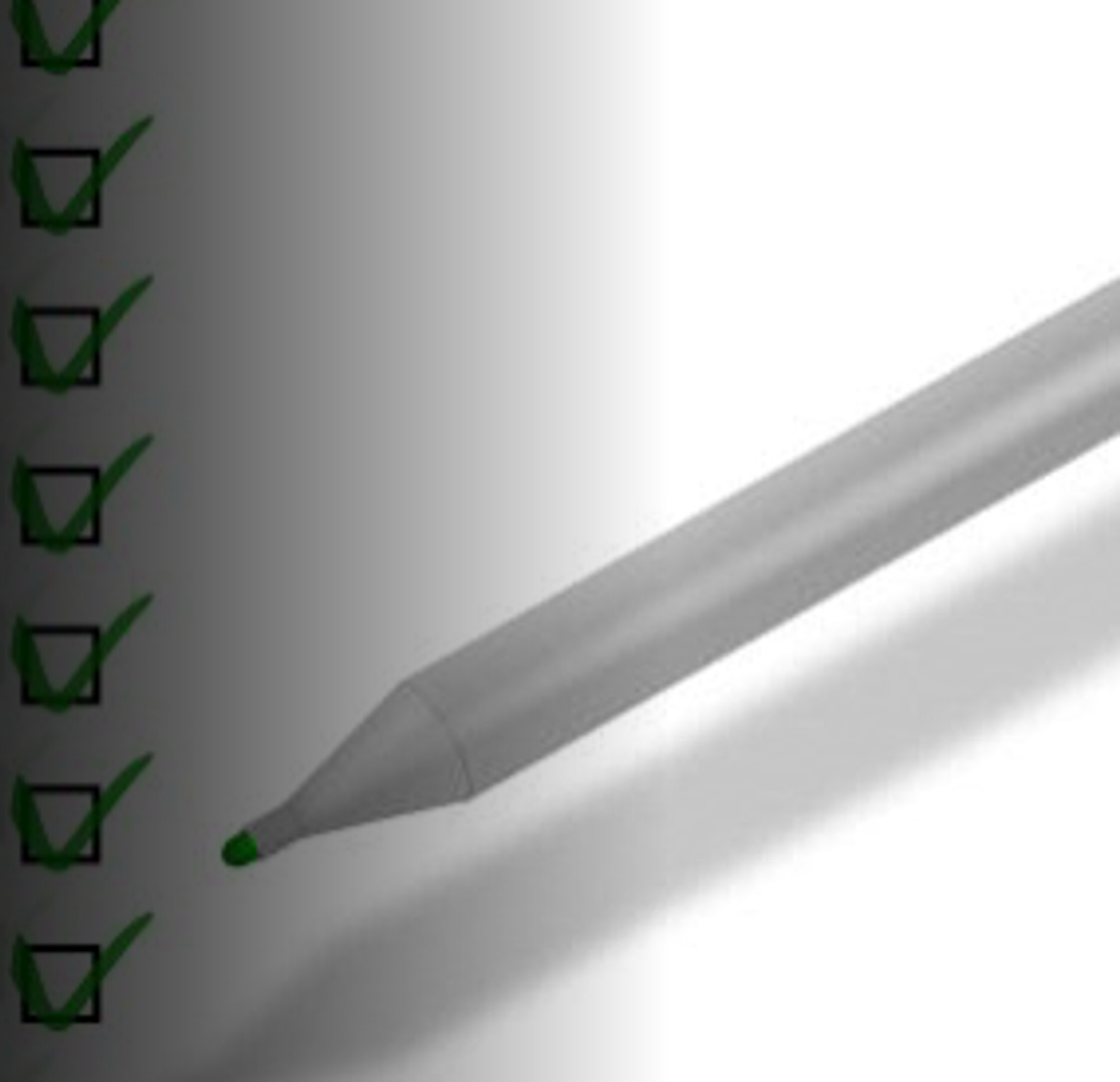
Profile

- **QA-4:** Security
  - User personal data must be protected via encryption mechanisms in all communication channels.
  - User personal data (including medical data) must be protected via encryption or access control wherever it is stored or manipulated.
  - Health data is sensitive data and should also be carefully considered. Consulting should be used to ensure compliance with regulatory requirements e.g. PCI for credit cards or HIPAA for health data.

Web and mobile applications

- **QA-5:** Usability
  - Farmacy Food is startup and we need a large number of users satisfied with the quality of our service in general and especially in Mobile and Web user interface experience
- **QA-6:** Modifiability
  - User requirements dictate us that Farmacy Family users should get a lot of social media functionality. So we need an approach to modify it fast according to clients wishes and our goals.

Diagrams – types, level of detail, completeness



Judges Criteria

diagrams - types, level of detail, completeness

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

- Neal Ford

Judges Criteria

diagrams - types, level of detail, completeness

Concept

Judges Criteria

diagrams - types, level of detail, completeness

Concept 1

Concept 2

Judges Criteria

diagrams - types, level of detail, completeness

Judges Criteria

diagrams - types, level of detail, completeness

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LANGUAGE™

Judges Criteria

diagrams - types, level of detail, completeness

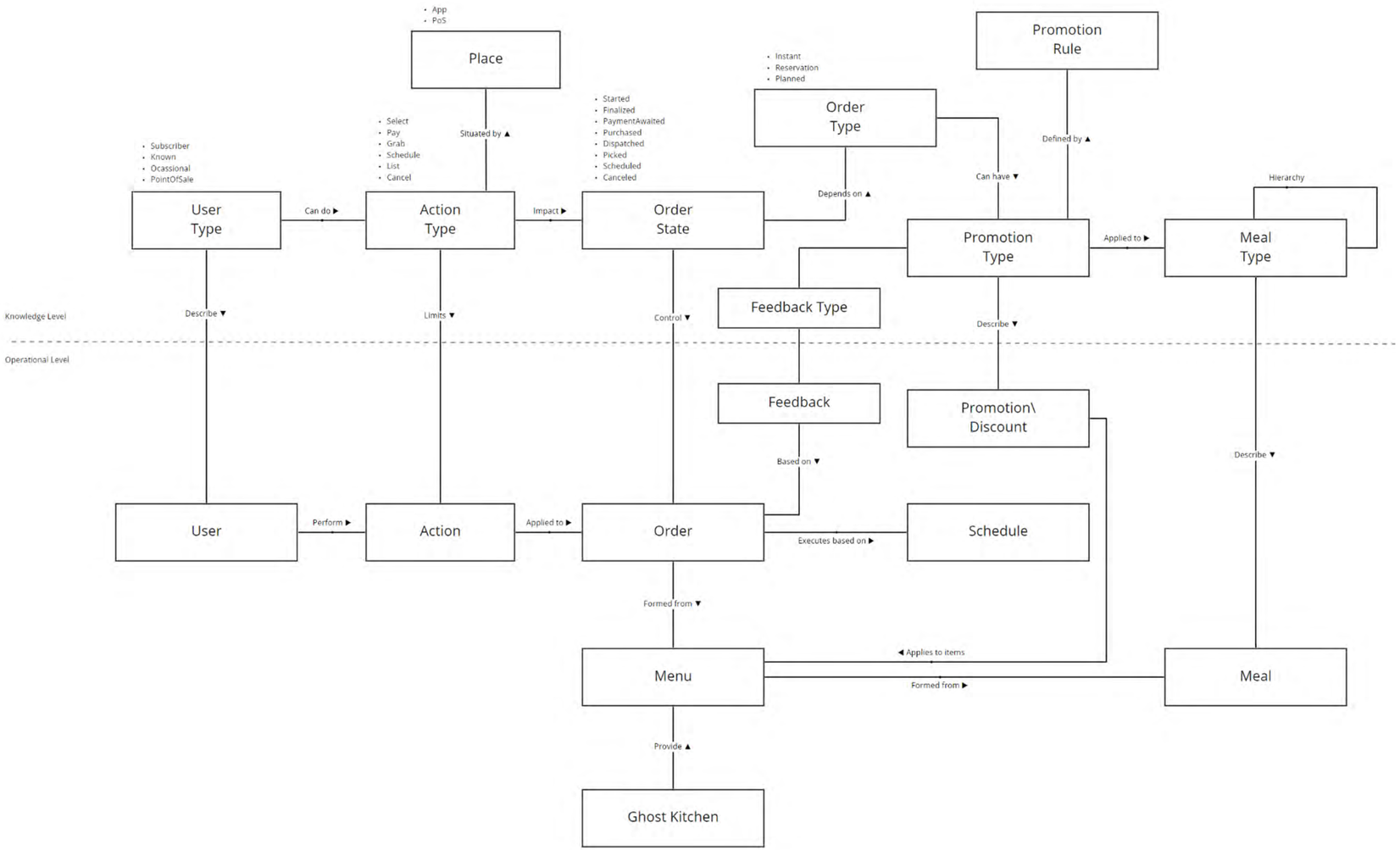
ArchiMate®

UNIFIED MODELING LANGUAGE™ UML®

C4

Judges Criteria

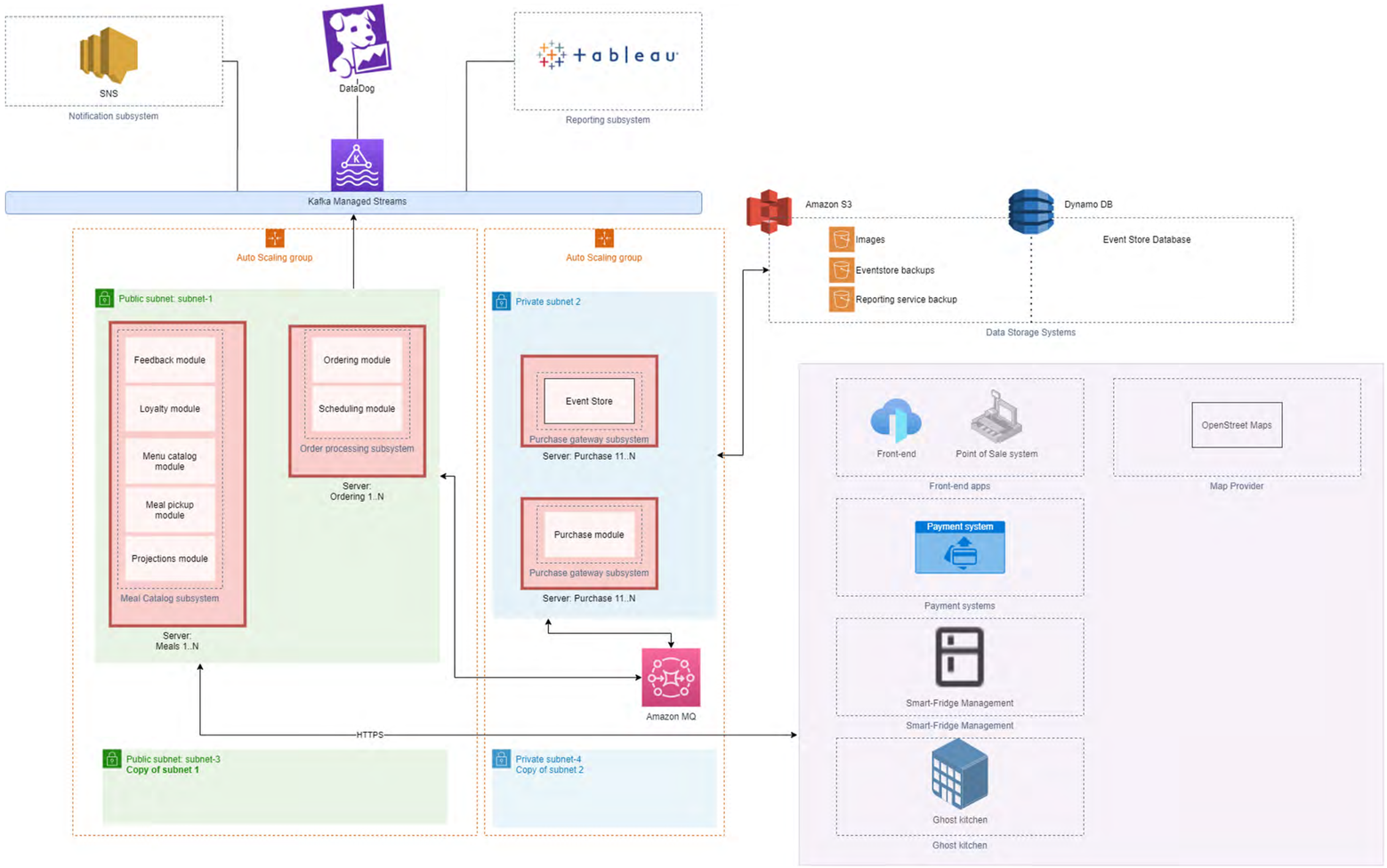
diagrams - types, level of detail, completeness



Farmacy Food Metamodel, ArchCollider (Spring 2021)

Judges Criteria

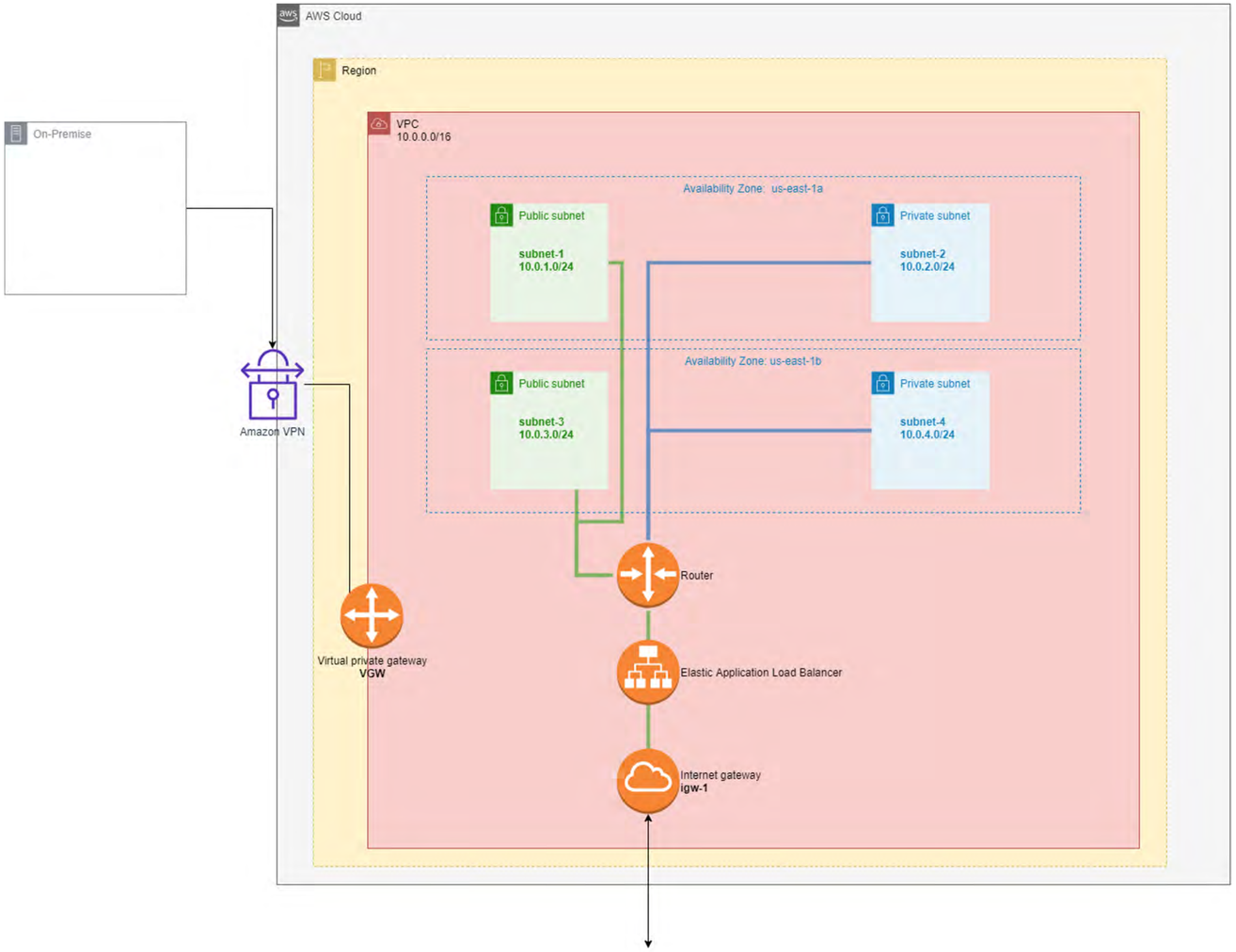
diagrams - types, level of detail, completeness



Farmacy Food Services Diagram, ArchCollider (Spring 2021)

Judges Criteria

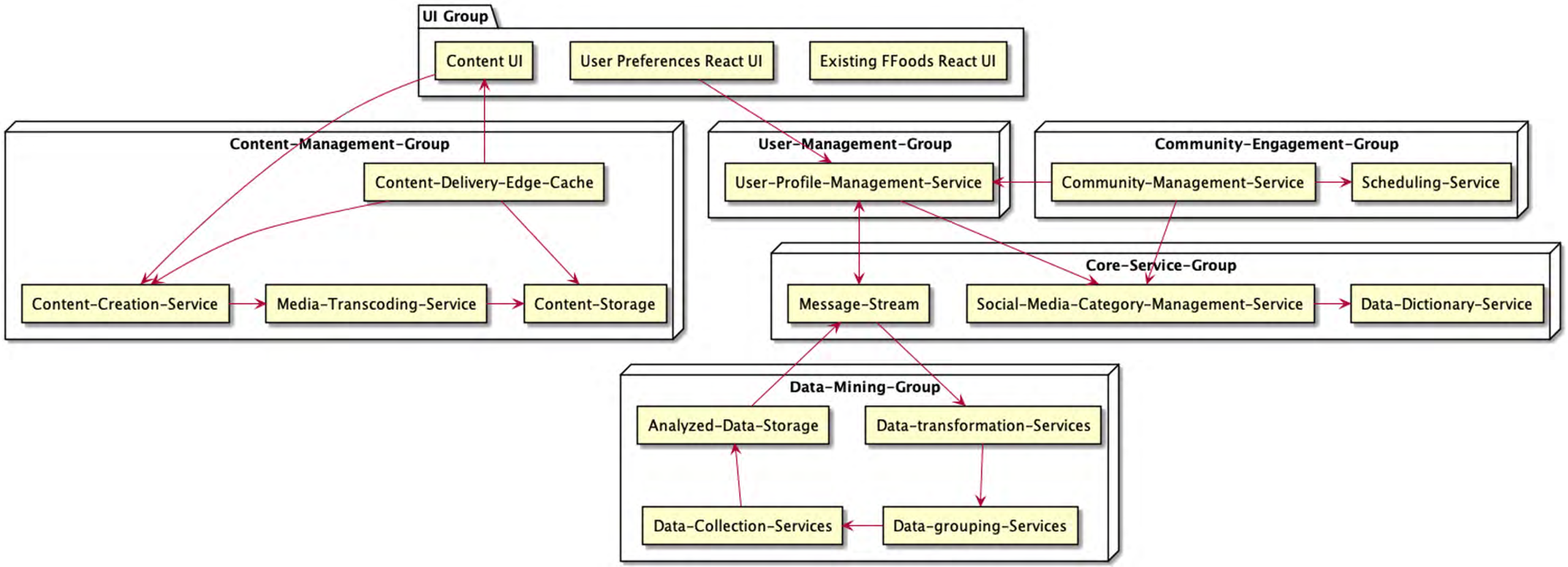
diagrams - types, level of detail, completeness



Farmacy Food Infrastructure VPC Diagram, ArchCollider (Spring 2021)

Judges Criteria

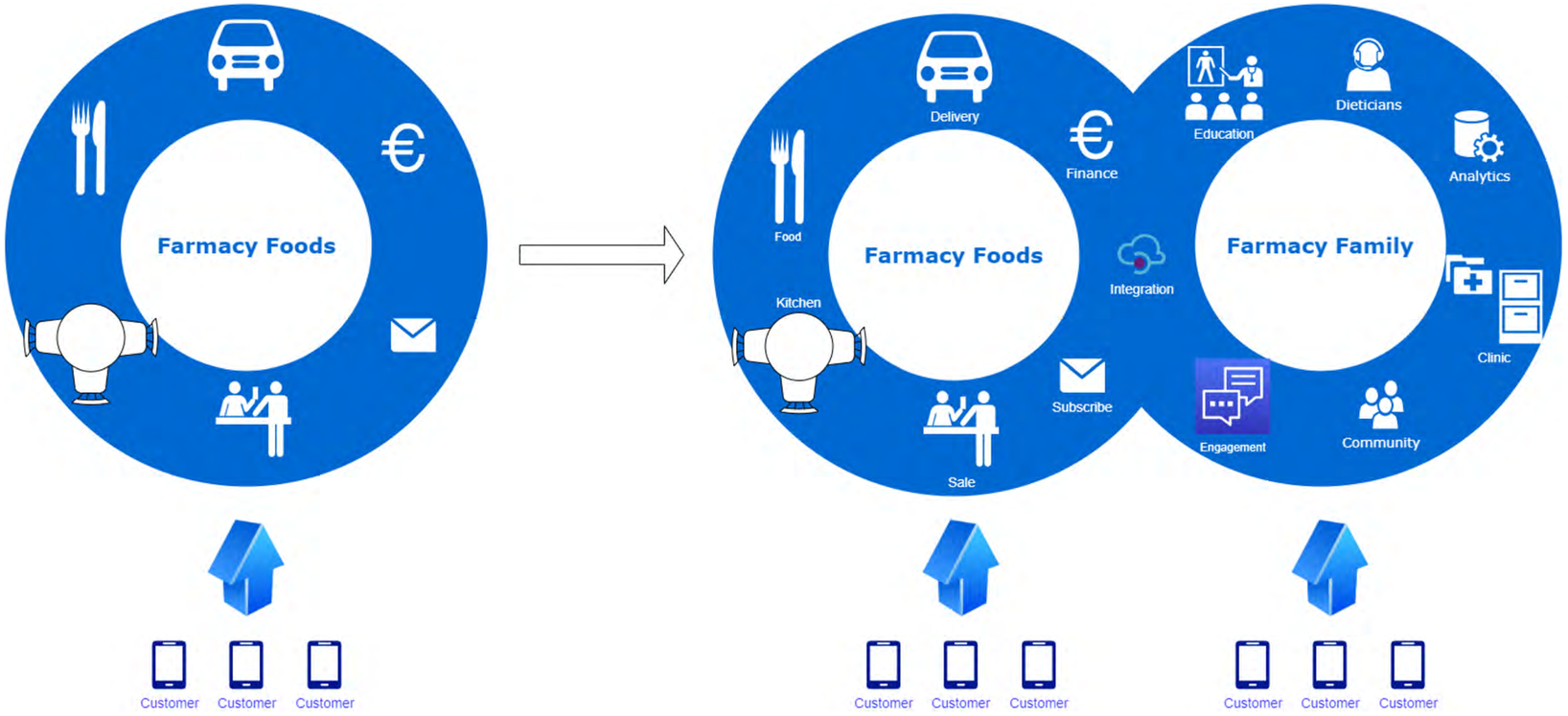
diagrams - types, level of detail, completeness



Farmacy Food Component Diagram, (Proposed, Fall 2021)

Judges Criteria

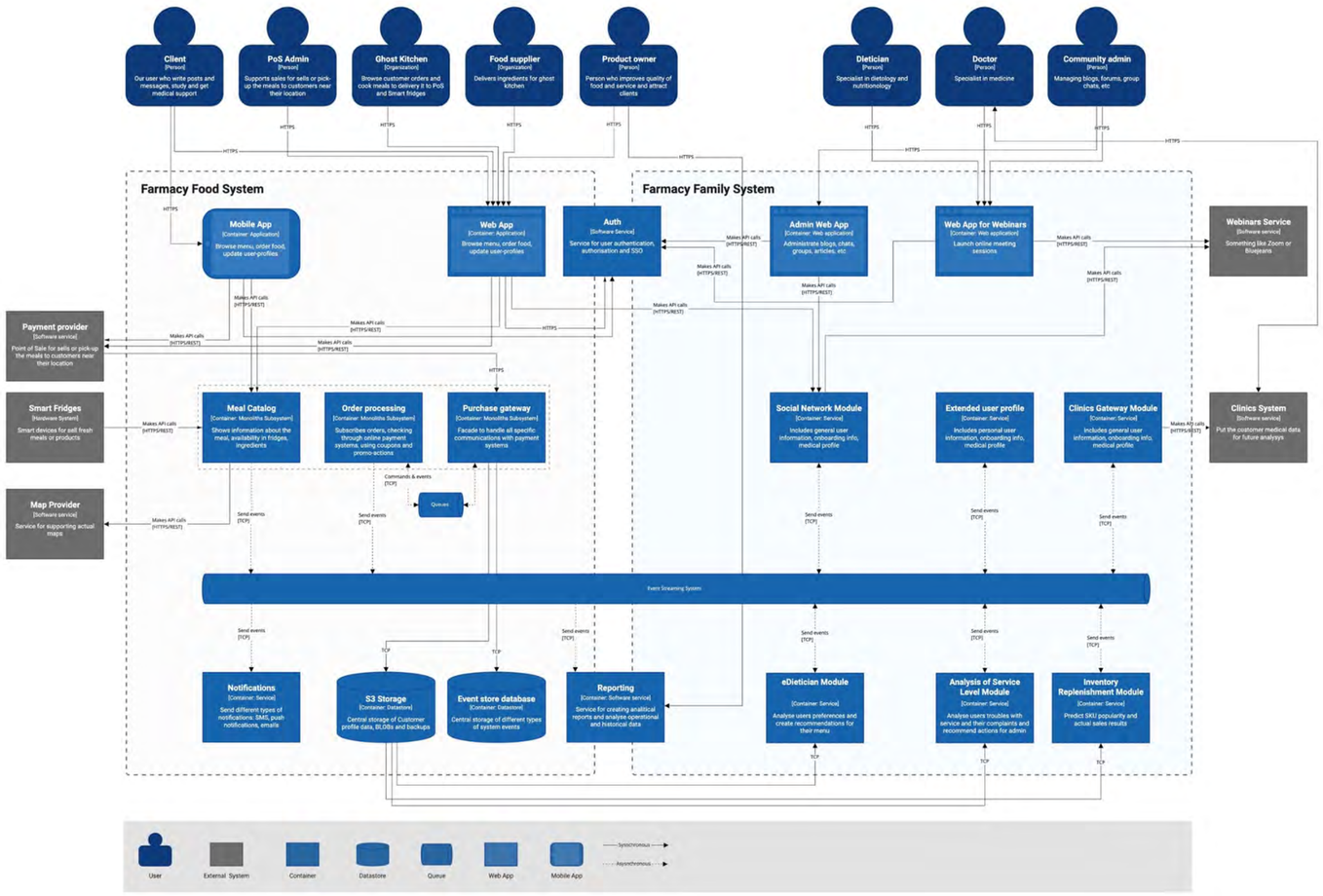
diagrams - types, level of detail, completeness



Farmacy Food “Marketecture” Diagram, (Proposed, Fall 2021)

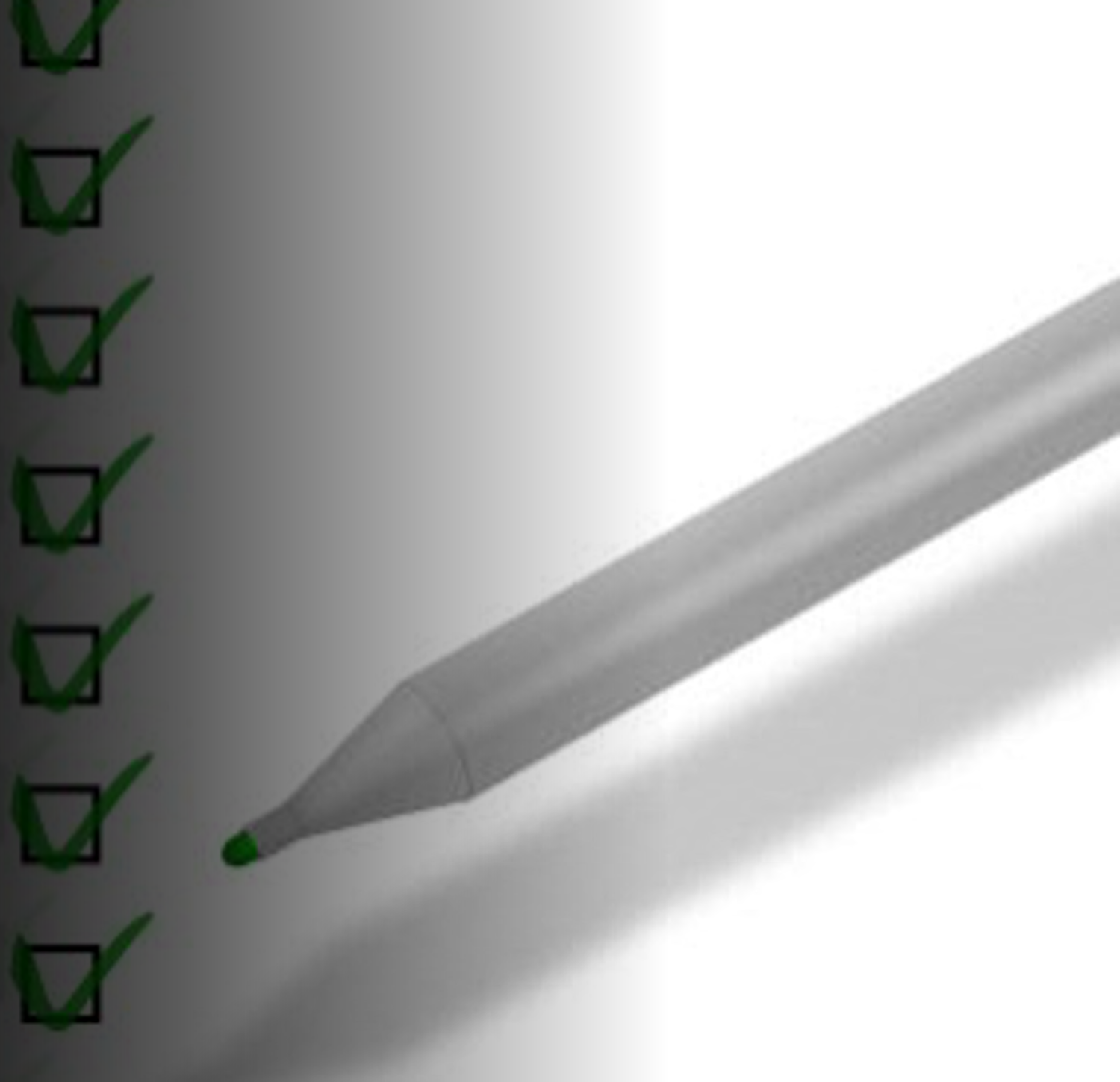
Judges Criteria

diagrams - types, level of detail, completeness

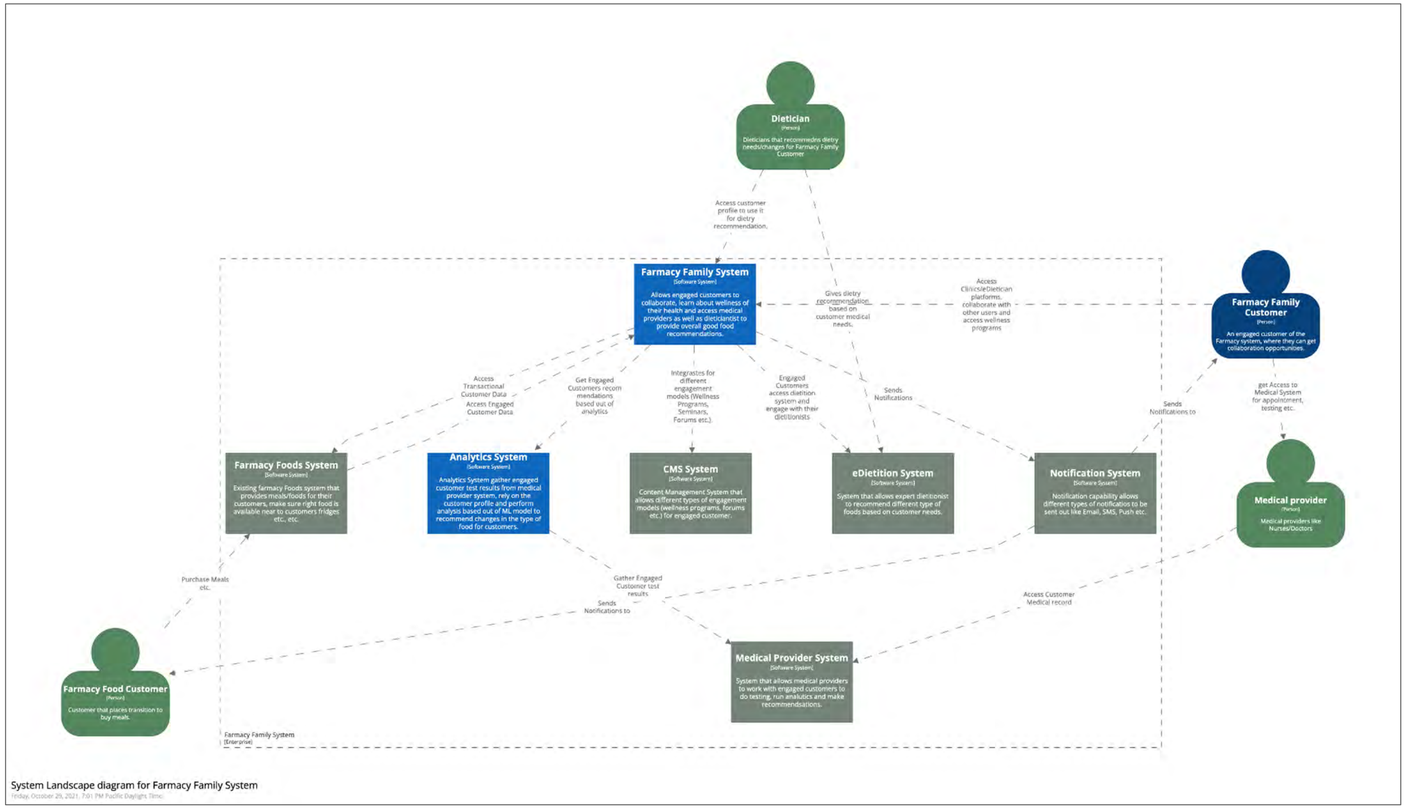


Farmacy Food Target Architecture / Container Diagram, (Proposed, Fall 2021)

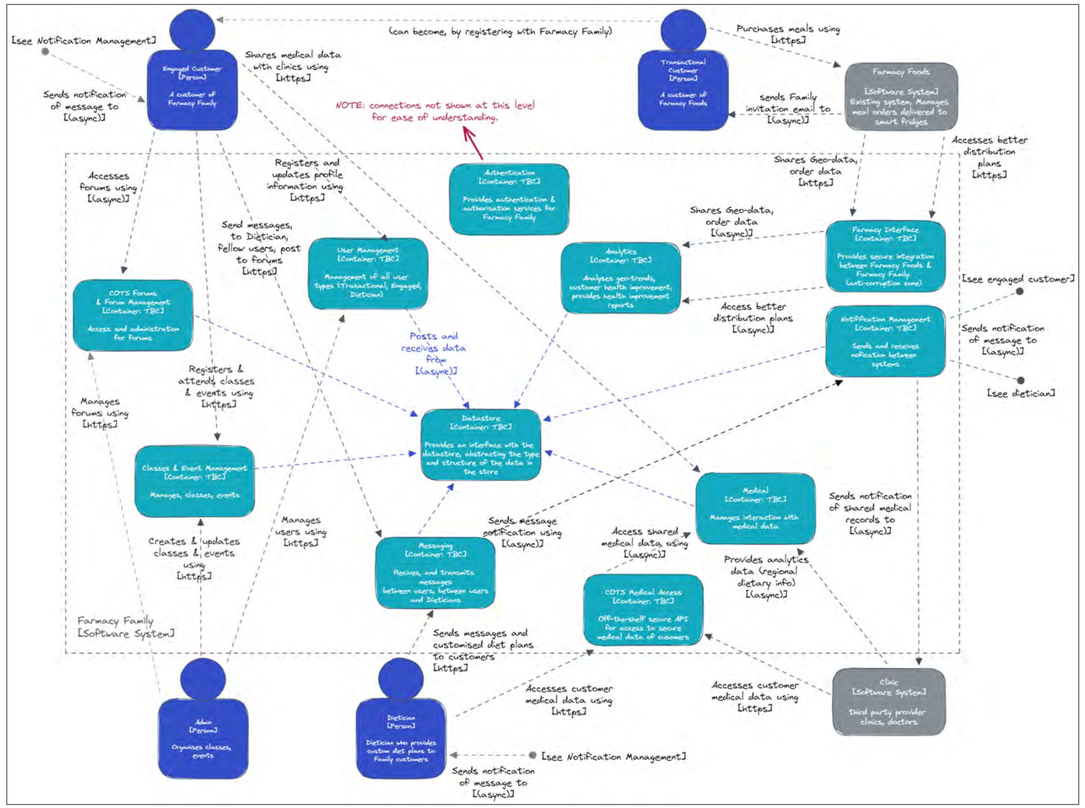
Overall systems architecture



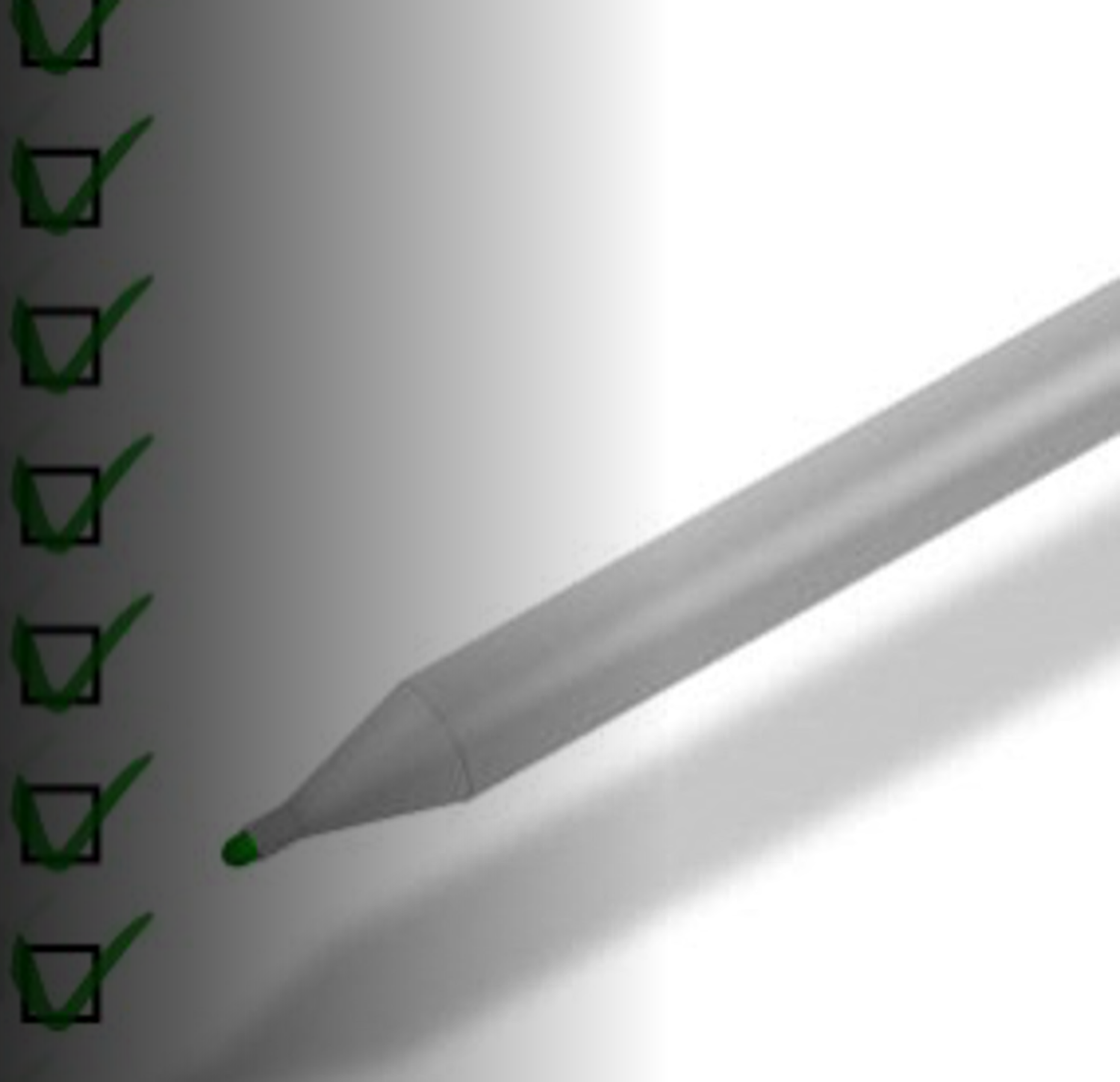
Overall Systems Architecture



System Landscape diagram for Farmacy Family System
Today, October 29, 2021, 7:01 PM Pacific Daylight Time.

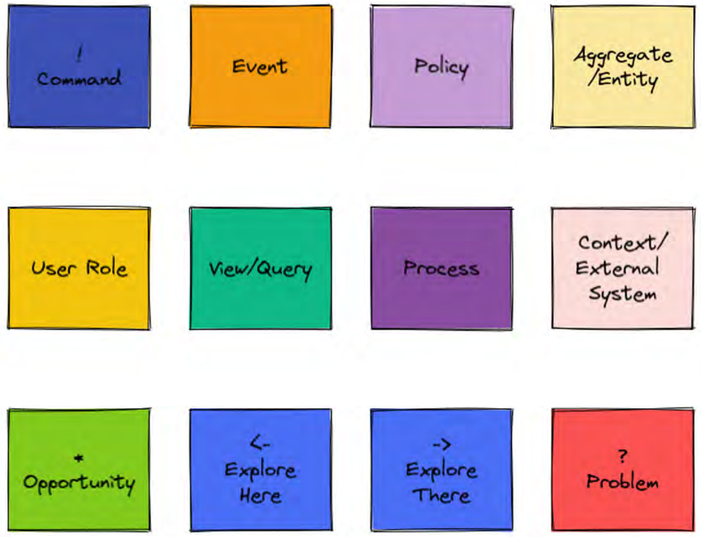


Architecture decision records – documentation and justification



Supporting documentation

The Key



ADR

Architecture Decision Log

1. ADR01 Architecture Style
2. ADR02 Interaction with external systems
3. ADR03 System decomposition
4. ADR04 Handle scalability requirement

Definitions

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Judges Criteria

architecture decision records - documentation and justification

Architecture design records

- ADR-1 Architecture design record style
- ADR-2 Service-based architecture style appro
- ADR-3 Social network capabilities
- ADR-4 Webinars capability
- ADR-5 Incorporate new functionality into Farm
- ADR-7 Observability
- ADR-8 Notifications
- ADR-9 Inventory Replenishment Module
- ADR-10 Cloud provider

Architecture Decision Records

#	Description
ADR-1	Microservices as the base architectural style
ADR-2	Components must be cloud-native
ADR-3	Micro-frontends pattern for UI
ADR-4	Sensitive medical data should be stored and processed on the certified 3rd party platforms
ADR-5	Zero-Trust Architecture
ADR-6	SaaS Omnichannel Provider as Messaging Gateway

Application ADR-1 & ADR-2 can be reflected on more detailed diagrams.

Despite the fact that ADR-5 depicted on Dietitian CJM Diagram this decision applied to all subsystems.

Judges Criteria

architecture decision records - documentation and justification

ADR 003: Use Service-Based Architecture Style

Farmacy Family system is an extention of an existing application to provide more engagement & analytics exprience to Farmacy engaged customers. Its still running in a start up mode so its very crucial to not invest lot of time facilitating an archtecture style that requires good tooling for collaboration, development, release and deployment. Also team size is not big hence the overarching architecture style for the Farmacy Family system should be simple, easy to create, maintain and evolve. Evolvability is the key factor we consider here. In other words, Farmacy Family should adopt an established architecture style that suppors evolution.

Status

Proposed

Rationale

Both Microservices architecture and Service Oriented architecture (SOA) are considered service-based architectures, meaning that they are architecture patterns that place a heavy emphasis on services as the primary architecture component used to implement and perform business and nonbusiness functionality.

A service-based architecture modularity is at the center of it encouraging encapsulating portions of your application into self-contained services that can be individually designed, developed, tested, and deployed with little or no dependency on other components or services in the application. They all can share the same datastore or we can split them into few datastores as well.

A service-based architecture provides more delivery speed than a monolith or service-oriented architecture (SOA) by breaking the code apart in the domain-centric way advocated by microservice and DDD proponents.

Its evolvable to microservices later in times hen team gets more maturity and familiarity with different systemn components and learn from their initial round of cycles and user feedback.

Decision

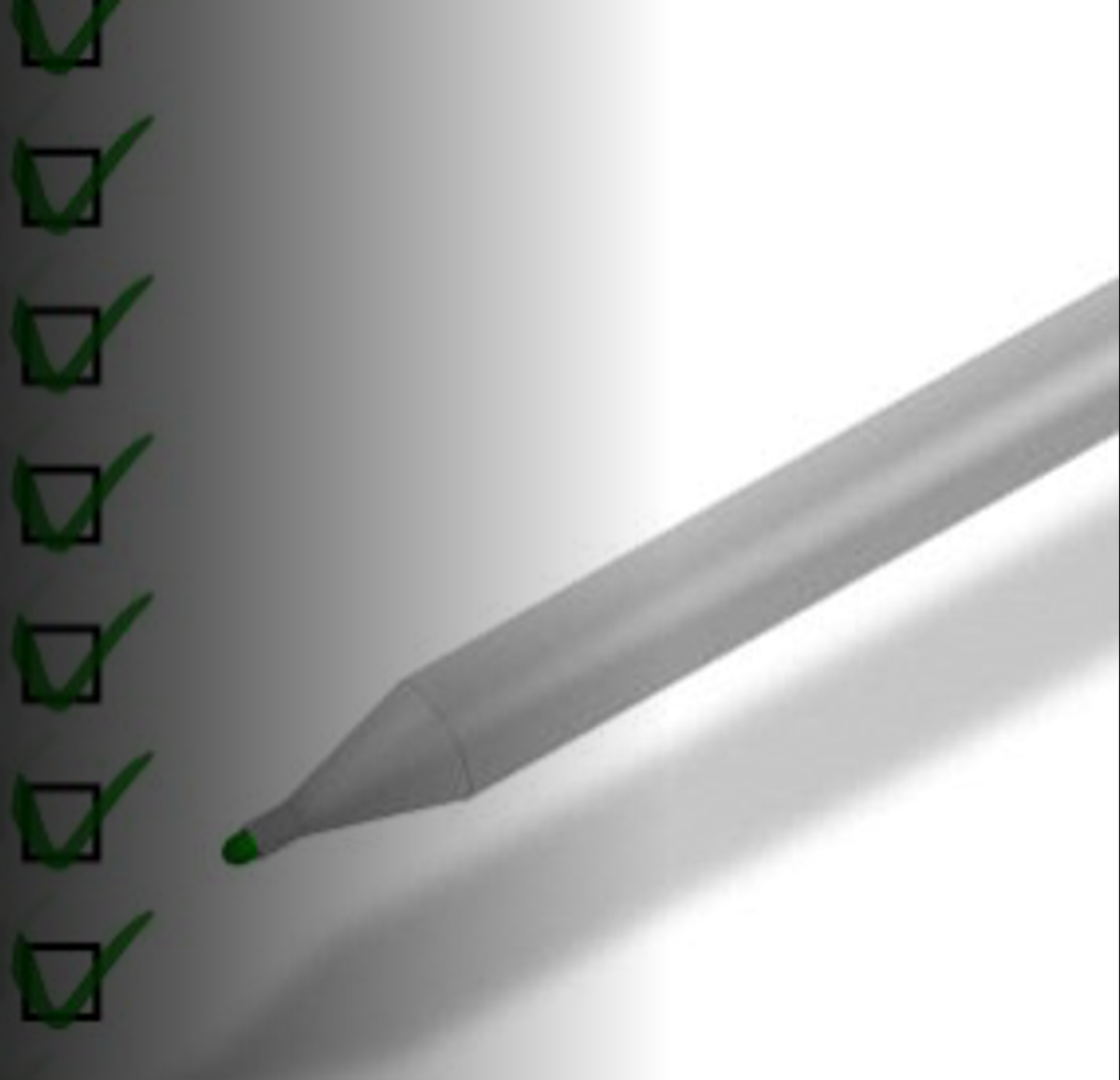
Use Service-based Architecture with one datastore that brings high cohesiveness, low coupling and better transaction manageability. We ill use following principles to deal ith distributed nature of the system.

- Define & share service contrats
  - As we will have fewer services so will use `service-based contracts` which brings speed & agility
- Use Orchestration rather than Choreography for communication
- Use Circuit brakers to make sure we handle service related operational issues (service not avaiulable for example)

Consequences

There are well known trade-offs for any distributed architectures and service-baed is of no exception. We called out how we will deal with these in general under the decision section.

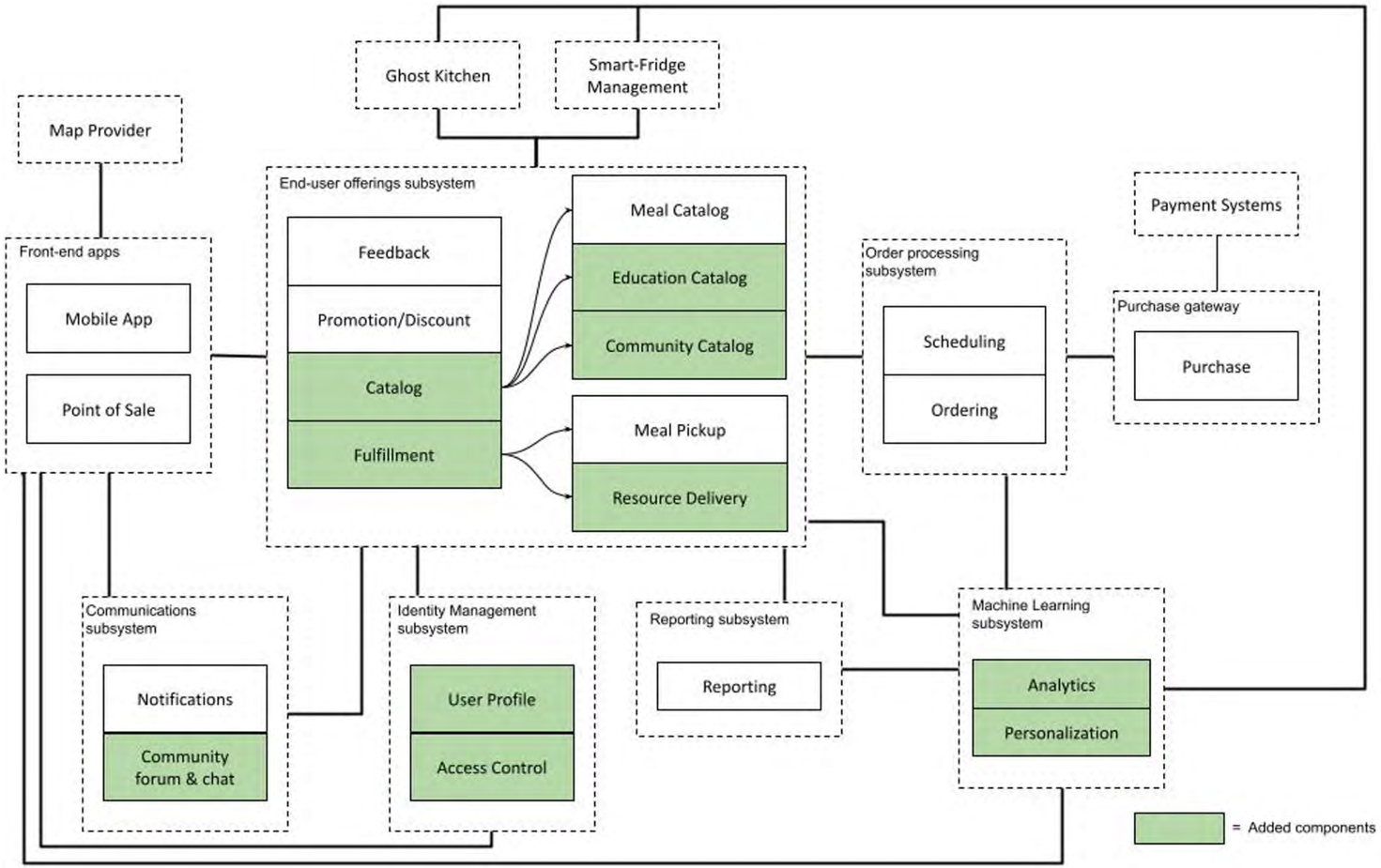
Understanding of the requirements and completeness of solution



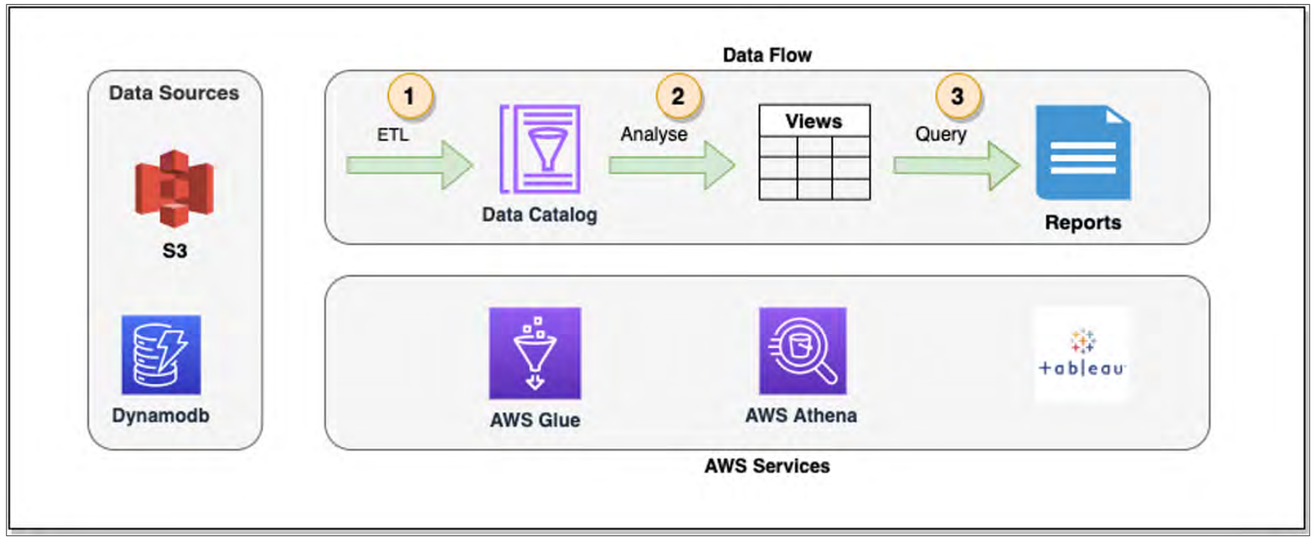
Completeness of Solution

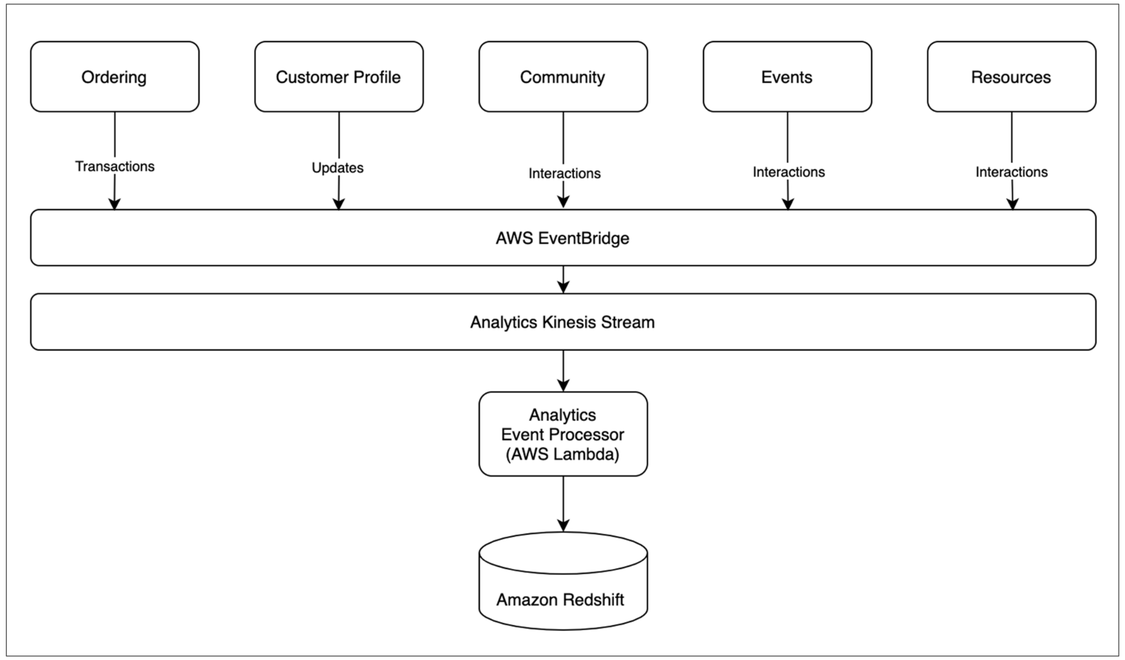
What does it mean for an architectural solution to be "complete"?

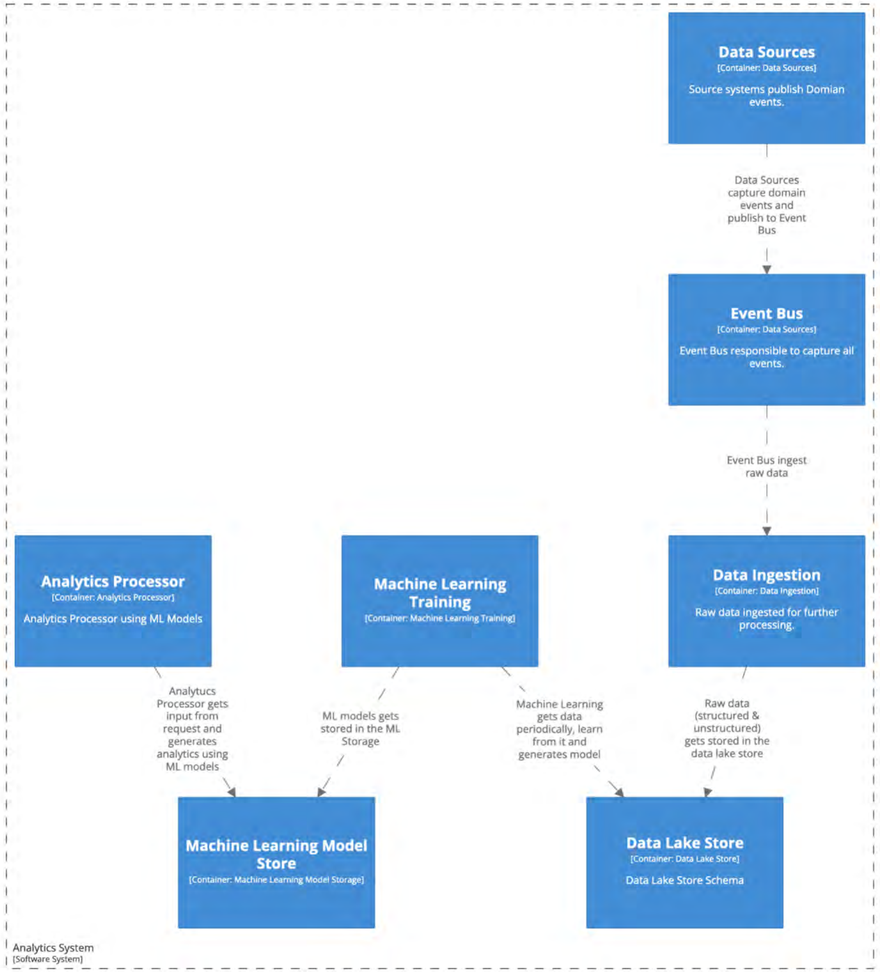
Integration



Analytics/Data







Deployment

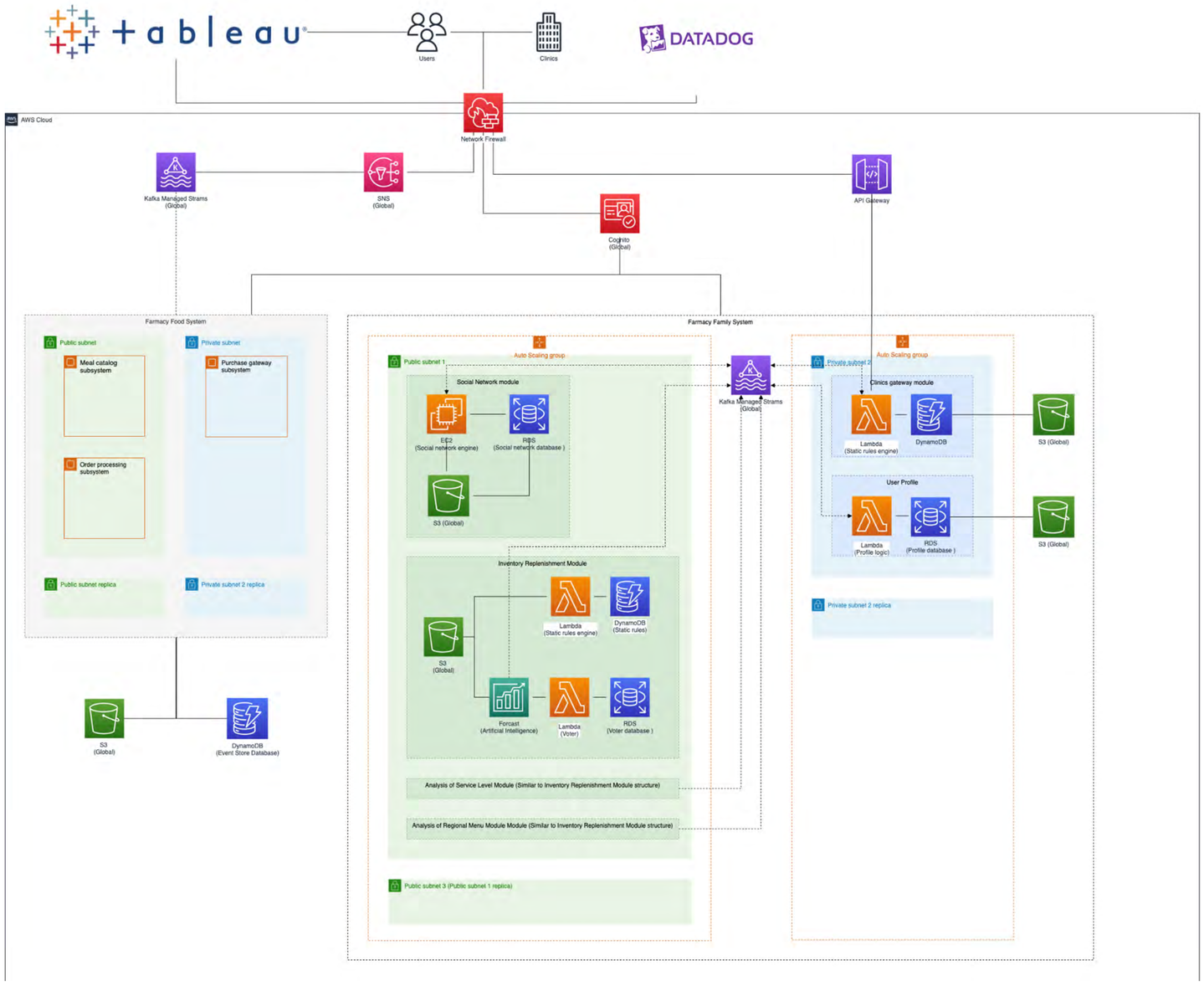
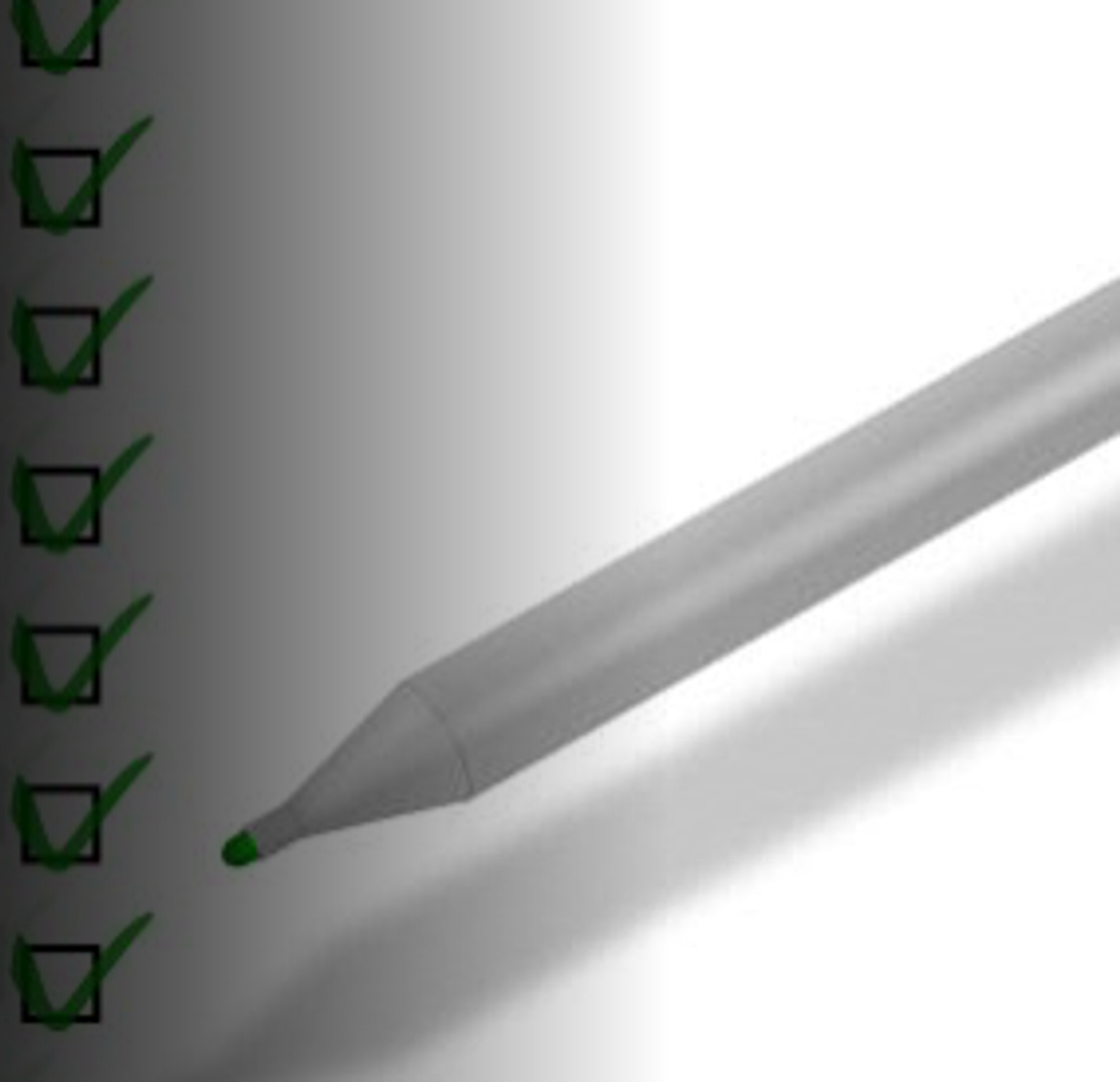


tableau
Users
Clinics
DATADOG
AWS Cloud
Network Firewall
Kafka Managed Strams (Global)
SNS (Global)
API Gateway
Cognito (Global)
Farmacy Food System
Public subnet
Private subnet
Meal catalog subsystem
Purchase gateway subsystem
Order processing subsystem
Public subnet replica
Private subnet 2 replica
S3 (Global)
DynamoDB (Event Store Database)
Farmacy Family System
Auto Scaling group
Public subnet 1
Social Network module
EC2 (Social network engine)
RDS (Social network database)
S3 (Global)
Inventory Replenishment Module
Lambda (Static rules engine)
DynamoDB (Static rules)
S3 (Global)
Forcast (Artificial Intelligence)
Lambda (Voter)
RDS (Voter database)
Analysis of Service Level Module (Similar to Inventory Replenishment Module structure)
Analysis of Regional Menu Module Module (Similar to Inventory Replenishment Module structure)
Public subnet 3 (Public subnet 1 replica)
Kafka Managed Strams (Global)
Private subnet 2
Clinics gateway module
Lambda (Static rules engine)
DynamoDB
S3 (Global)
User Profile
Lambda (Profile logic)
RDS (Profile database)
S3 (Global)
Private subnet 2 replica

Honorable Mentions…

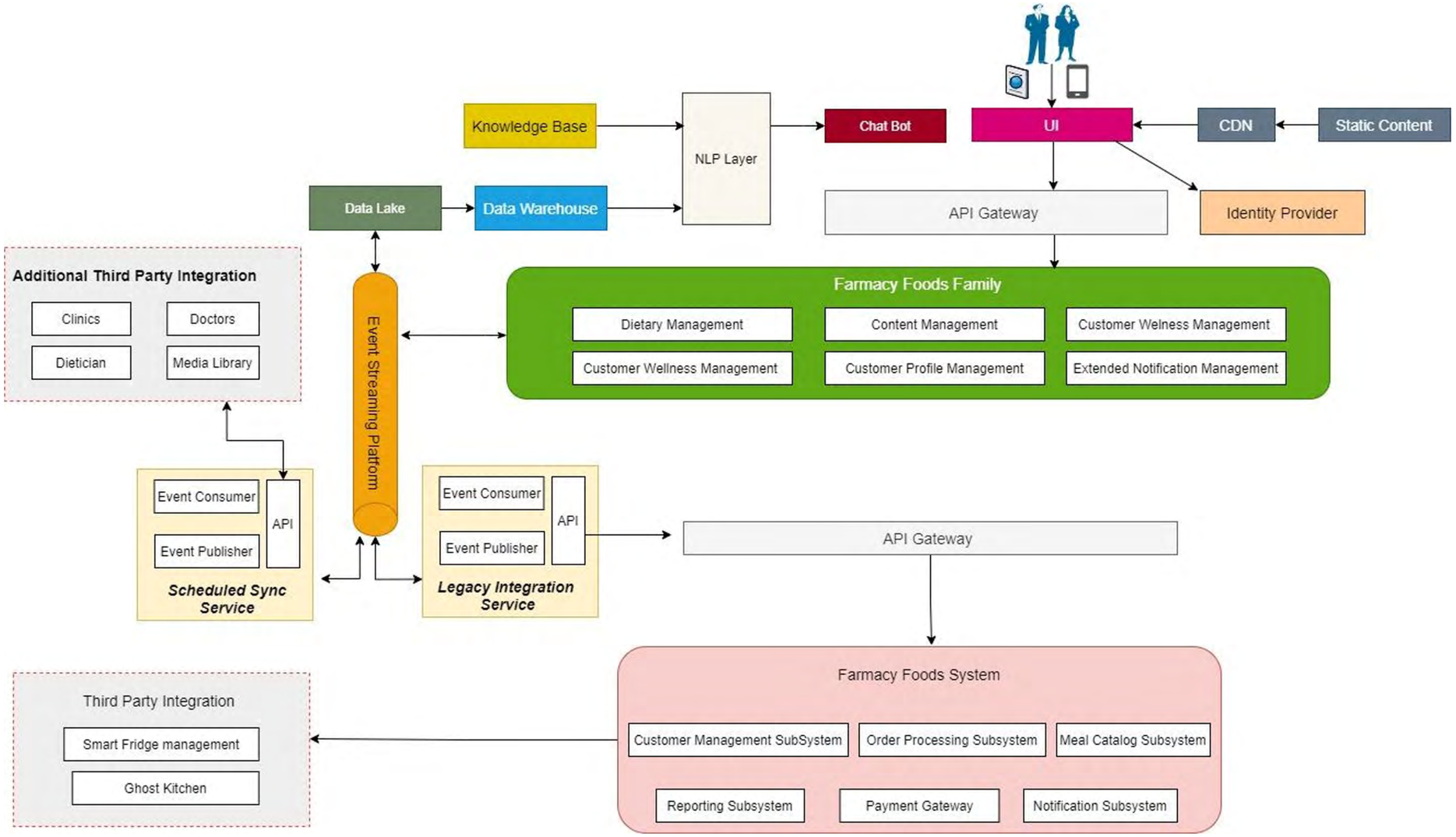


Honorable Mention

dfg_arc_team

✓ One thing that stood out from this team

dfg_arc_team


Knowledge Base
NLP Layer
Chat Bot
UI
CDN
Static Content
Data Lake
Data Warehouse
API Gateway
Identity Provider
Additional Third Party Integration
Clinics
Doctors
Dietician
Media Library
Event Streaming Platform
Farmacy Foods Family
Dietary Management
Content Management
Customer Welness Management
Customer Wellness Management
Customer Profile Management
Extended Notification Management
Event Consumer
Event Publisher
API
Scheduled Sync Service
Event Consumer
Event Publisher
API
Legacy Integration Service
API Gateway
Third Party Integration
Smart Fridge management
Ghost Kitchen
Farmacy Foods System
Customer Management SubSystem
Order Processing Subsystem
Meal Catalog Subsystem
Reporting Subsystem
Payment Gateway
Notification Subsystem

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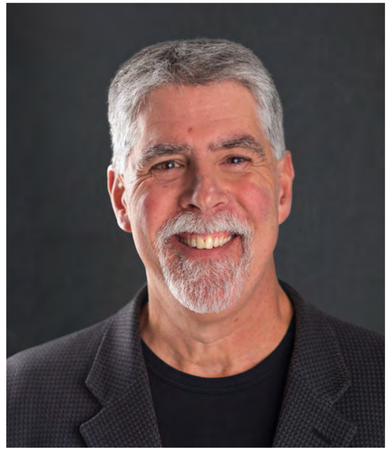

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