Quality Attributes Scenarios

for

E-Farm

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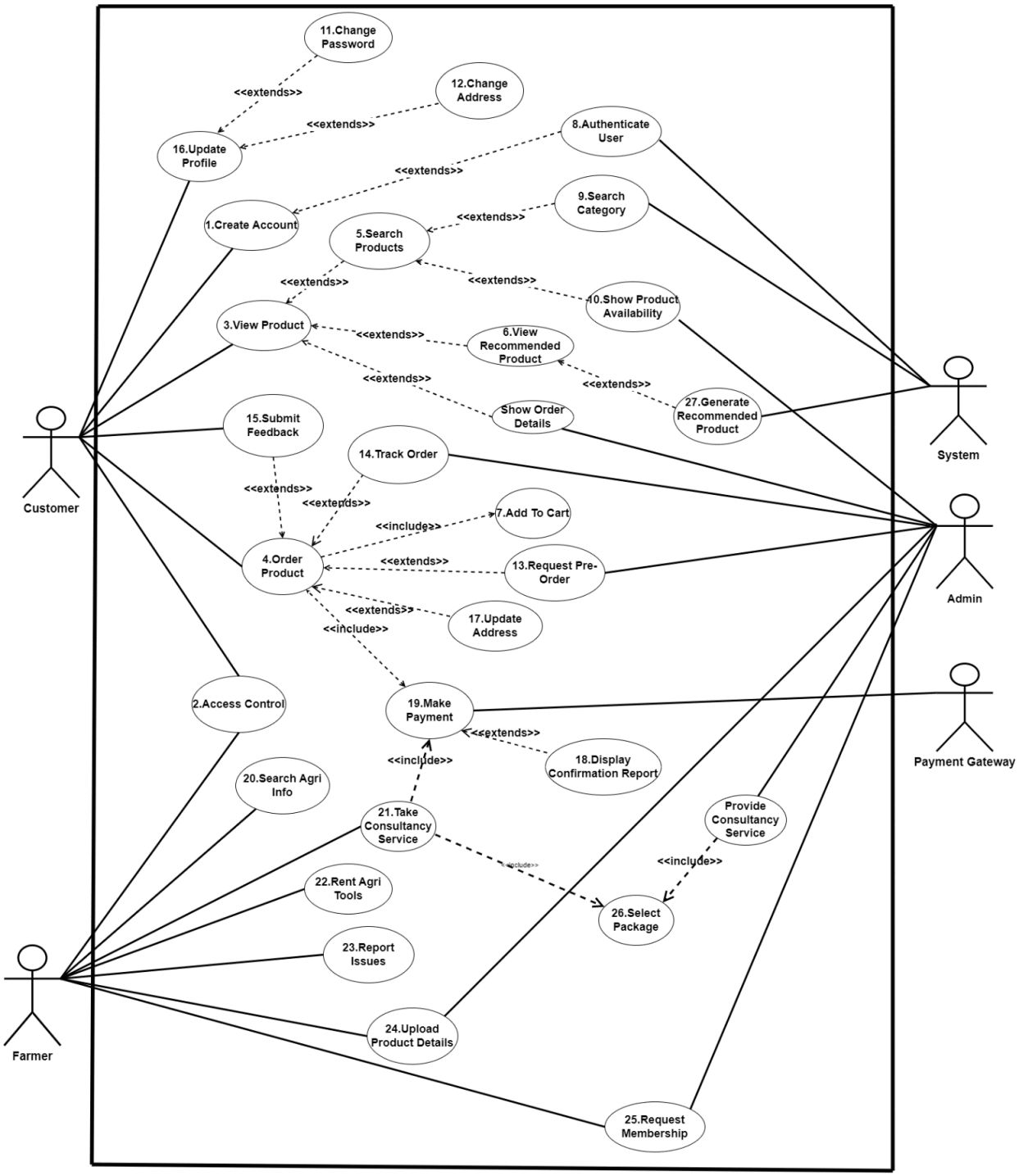
What do we do?

E-Farm serves as a direct link between *farmers* and *consumers*, offering various services:

- Agri Marketplace
- Agricultural Equipment Rental and Maintenance
- Agro Solution and Consultancy

Use Case Diagram (for better understanding of our system):



Short Description of System Quality Attributes in E-Farm:

- **Availability:** Ensuring the platform is consistently accessible and operational for both farmers and consumers, especially during critical times such as peak farming seasons or high consumer demand.
- **Reliability:** Providing consistent and dependable services to farmers and consumers, ensuring that transactions, equipment rentals, and consultancy services work reliably without failures.
- **Usability:** Designing an intuitive and user-friendly interface for both farmers and consumers to easily navigate the platform, making transactions, rentals, and consultations straightforward.
- **Performance:** Optimizing the speed and efficiency of the platform to handle transactions, equipment bookings, and consultations swiftly and effectively, especially during high-traffic periods.
- **Security:** Ensuring robust security measures to protect the sensitive data of both farmers and consumers, especially in financial transactions and personal information.
- **Scalability:** The platform's ability to accommodate an increasing number of users, farmers, and consumers without compromising performance or service quality.
- **Maintainability:** Ease of maintaining and updating the platform, including system updates, bug fixes, and introducing new features without disrupting ongoing services.
- **Interoperability:** The ability of the platform to seamlessly interact with different agricultural tools, equipment, and systems used by farmers, ensuring compatibility and integration.

Scenarios for System Quality Attributes in E-Farm:

① Availability Table for E-Farm:

Source	Stimulus	Artifact	Environment	Response	Measure
Internal	Hardware fault: omission	Server processors	Normal	Automatic failover to backup server	Uptime & downtime stats
External	Network crash	Communication channels	Normal	Automatic rerouting of traffic	Response time to recover
External	Service timing issues	Database storage	Degraded	Redundant data storage and retrieval	Recovery time

1. Availability Scenario: High Traffic Period

Scenario	A surge in user activity during the planting season
Source of Stimulus	Surge in user activity
Stimulus	Increased user activity during the planting season
Artifact	Server processors, communication channels
Environment	Normal operation
Response	Auto-scaling of server resources, load balancing
Measure	Uptime maintained at 99.9%, with minimal impact on transaction speed

② **Reliability Table for E-Farm:**

Source	Stimulus	Artifact	Environment	Response	Measure
Internal	Component failure, transaction errors	Transaction processing	Normal	Redundancy, error handling	Error rates, Failure recovery time
External	Network outages, service disruptions	Service availability	Normal	Redundant network routing	Downtime, Service recovery time

2. Reliability Scenario: Equipment Rental

Scenario	Farmer requests equipment rental
Source of Stimulus	Farmer requests equipment rental
Stimulus	Equipment rental request
Artifact	Rental booking system, equipment availability database
Environment	Normal operation
Response	Immediate confirmation of booking, accurate equipment availability information
Measure	Zero booking errors, timely and accurate equipment delivery

③ **Usability Table for E-Farm:**

Source	Stimulus	Artifact	Environment	Response	Measure
Internal	User interaction pattern	User interface	Normal	Intuitive design improvements	User satisfaction, Task success rate
External	Device diversity, usage patterns	Platform navigation	Normal	Responsive design adaptation	Usability metrics, Error rates

3. Usability Scenario: User Interface Navigation

Scenario	New consumers exploring the platform for produce purchase
Source of Stimulus	New consumers exploring the platform for produce purchase
Stimulus	Consumer exploring platform
Artifact	User interface, navigation menus
Environment	Normal operation
Response	Clear and intuitive interface, easily navigable categories for produce selection
Measure	Low learning curve, successful purchase within 5 minutes

④ Performance Table for E-Farm:

Source	Stimulus	Artifact	Environment	Response	Measure
External	Event arrival pattern	System services	Normal	Optimization, load balancing	Latency, throughput, jitter
Internal	Increased user interactions	Platform resources	Overload	Scaling resources, caching	Response time, Data loss

4. Performance Scenario: Consultation Service

Scenario	High concurrent consultation requests
Source of Stimulus	High concurrent consultation requests
Stimulus	Concurrent consultation requests
Artifact	Consultation scheduling system, server response time
Environment	Normal operation
Response	Swift scheduling and connection with consultants, minimal wait time
Measure	Average response time below 10 seconds, no service disruptions

⑤ Security Table for E-Farm:

Source	Stimulus	Artifact	Environment	Response	Measure
Internal	Unauthorized access attempts	Data encryption	Normal	Authentication and access control	Security breach attempts, Encryption strength
External	Network attacks, phishing attempts	System firewalls	Normal	Intrusion detection & response	Threat detection, Incident response time

5. Security Scenario: Financial Transaction

Scenario	Consumer purchasing produce using a payment gateway
Source of Stimulus	Consumer purchasing produce using a payment gateway
Stimulus	Purchase transaction via payment gateway
Artifact	Consultation scheduling system, server response time
Environment	Normal operation
Response	Secure payment processing, encryption of sensitive data
Measure	No reported security breaches, encrypted data transmission maintained

⑥ Scalability Table for E-Farm:

Source	Stimulus	Artifact	Environment	Response	Measure
Internal	Increased user base growth	Server infrastructure	Normal	Auto-scaling, load balancing	Performance metrics, Resource utilization
External	Demand surge during peak seasons	Database services	Overload	Distributed caching, data partitioning	Scalability metrics, Response time

6. Scalability Scenario: Rapid User Growth

Scenario	Increased user registrations
Source of Stimulus	Increased user registrations
Stimulus	Increase in user registrations
Artifact	Server infrastructure, user database
Environment	Normal operation
Response	Auto-scaling of server resources, seamless onboarding of new users
Measure	Platform performance maintains stability, and no degradation despite an increased user base

⑦ Maintainability Table for E-Farm:

Source	Stimulus	Artifact	Environment	Response	Measure
Internal	Codebase complexity, feature additions	Software architecture	Normal	Modular updates, version control	Update frequency, Code complexity
External	System failures, bug reports	Error logs, feedback	Normal	Bug fixing, Patch deployment	Issue resolution time, Patch success rate

7. Maintainability Scenario: System Update

Scenario	Introduction of a new feature set for equipment monitoring
Source of Stimulus	Introduction of a new feature set for equipment monitoring
Stimulus	New feature introduction
Artifact	Software architecture, update deployment process
Environment	Normal operation
Response	Seamless deployment of updates, minimal service disruption
Measure	No downtime during the update, and successful feature integration

⑧ **Interoperability Table for E-Farm:**

Source	Stimulus	Artifact	Environment	Response	Measure
External	New integration requirements	API, data formats	Normal	API updates, compatibility checks	Integration success rate
Internal	Software updates, feature additions	Integration components	Normal	Version control, backward compatibility	Compatibility errors

8. Interoperability Scenario: Integration with Farming Equipment

Scenario	Farmer attempts to link personal monitoring equipment to the platform
Source of Stimulus	Farmer attempts to link personal monitoring equipment to the platform
Stimulus	Integration of personal farming equipment
Artifact	API, equipment compatibility
Environment	Normal operation
Response	Successful integration, and data synchronization between equipment and platform
Measure	No data discrepancies, real-time and e equipment data displayed accurately