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X Product: Smart Form - A Unified Platform For Intelligent Data Collection

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Abstract

This paper presents *SmartForm*, a unified data collection platform named X Product that integrates AI-powered forms and interactive email submissions. In contrast to traditional data collection tools like Google Forms and Typeform, SmartForm focuses on enhancing user experience, improving response rates, and providing intelligent automation for personalized interactions. The platform is architected on a serverless infrastructure using AWS services, offering scalability, security, and extensibility. With a responsive design, AMP-like embedded email capabilities, and smart analytics, X Product sets a new standard for frictionless digital data engagement across industries, including SaaS, education, and healthcare.

1. Introduction

In an era where data drives decisions, organizations face ongoing challenges in acquiring accurate, timely, and high-volume user responses. Traditional form platforms often require redirects, leading to user drop-off. Moreover, fragmented tools for forms, meetings, and feedback loops increase complexity.

This research introduces X Product (SmartForm), which addresses these inefficiencies through AI-generated form questions and interactive form submissions directly within email environments. The need for such platforms is underscored by increased mobile-first behavior and declining conversion rates on static form systems. X Product aims to simplify data collection while maximizing user participation and engagement.

2. Related Work and Tools

2.1 Google Forms

A free and accessible tool widely used but lacks automation, branding, or email integration capabilities.

2.2 Typeform

Innovative for its conversational UI, Typeform allows conditional logic and mobile optimization. However, it still requires redirects and lacks email-native support.

2.3 Tally.so

A minimal, modern form builder with conditional logic and Notion integration, yet it falls short in enterprise scalability and lacks real-time email form submissions.

2.4 Jotform

Supports enterprise use cases and integrations but can feel bloated for small teams.

Table 1. Feature Comparison

Feature	Google Forms	Typeform	Tally.so	SmartForm
AI Question Builder	No	No	No	Yes
In-Email Submission	No	No	No	Yes
Custom Branding	Limited	Yes	Yes	Yes
Workflow Automation	No	Partial	No	Yes
Pricing	Free	Paid	Freemium	Freemium

3. X Product Overview

SmartForm (X Product) combines two core innovations:

- **Smart Forms:** AI-driven forms that adapt to user input, generate dynamic questions, and support drag-and-drop customization.
- **Interactive Emails:** Forms embedded directly into emails (leveraging AMP HTML or similar structures), increasing submission rates.

Targeted at digital marketers, SaaS startups, and educators, the product minimizes user drop-offs and centralizes data for immediate action.

4. Architecture & Technology Stack

X Product is built on a serverless AWS architecture to maximize scalability and reduce operational overhead.

4.1 AWS Services Used

- **Lambda:** Backend processing
- **Cognito:** User authentication
- **S3:** File and form template storage
- **DynamoDB:** Form data storage
- **SES:** Email dispatch with embedded forms
- **Amplify:** Hosting and CI/CD pipeline

4.2 System Architecture Diagram

5. Smart Form Building

The smart form builder uses the GPT API to generate relevant questions based on the title or initial inputs provided by the form creator. Customization options include:

- Drag-and-drop question blocks

- Logic jumps and branching
 - Pre-built templates (feedback, lead gen, event RSVP)
 - Real-time previews
-

6. Interactive Email Forms

Traditional forms redirect users to a browser. SmartForm enables users to respond within their inbox using embedded HTML components and AMP-compatible structures.

Benefits include:

- Higher engagement
 - Reduced friction
 - Fewer abandoned forms
-

7. AI Capabilities

AI is integrated to:

- Auto-suggest questions
- Score leads based on responses
- Recommend follow-ups
- Perform sentiment analysis

Machine learning pipelines (using Python + Flask microservices) process historical data to improve question relevancy.

8. User Experience & Design

Designed with UX-first principles:

- Minimal-click workflows
 - Mobile-first responsive layout
 - Admin dashboard for analytics
 - Real-time response view
-

Privacy and Security Features

1. GDPR & CCPA Aligned Privacy Features

- The system is designed in accordance with major global data privacy regulations, including the **General Data Protection Regulation (GDPR)** and the **California Consumer Privacy Act (CCPA)**.
- **User Consent Management:** Explicit consent is obtained for data collection and processing.

- **Data Subject Rights:** Mechanisms are in place to support data subject rights such as the right to access, rectify, delete, or port personal data.
- **Data Minimization & Retention:** Only essential personal data is collected and stored for a limited period, aligned with compliance requirements.
- **Privacy by Design and Default:** Privacy considerations are integrated at the core of system architecture and throughout the data lifecycle.

2. Role-Based Access Control (RBAC)

- Implements fine-grained access controls based on user roles (e.g., Admin, Staff, Patient).
- Each role is granted the minimum necessary permissions, adhering to the principle of **least privilege**.
- Ensures **segregation of duties**, preventing unauthorized access or misuse of data by enforcing role boundaries.
- Supports **custom roles and permission sets** to cater to organization-specific workflows.

3. Encrypted Submissions

- All form submissions and sensitive data transmissions are encrypted using **TLS 1.2+** protocols.
- **Data at rest** is secured using **AES-256 encryption** to ensure stored information remains confidential.
- End-to-end encryption practices are followed, particularly for Personally Identifiable Information (PII) and Protected Health Information (PHI), where applicable.
- Encryption keys are securely managed and rotated periodically in line with best practices.

4. AWS WAF (Web Application Firewall) Integration

- Integrated with **AWS WAF** to protect against common web exploits and bot traffic.
- Custom **firewall rules** are defined to detect and block:
 - SQL injection attempts
 - Cross-site scripting (XSS) attacks
 - Malicious IPs and abnormal request patterns
- **Rate limiting and geo-blocking** policies are enforced to mitigate DDoS attacks and restrict access from high-risk regions.
- **Real-time traffic monitoring** and automated rule updates help adapt to evolving threat landscapes

10. Use Cases

10.1 SaaS (Lead Capture)

Example: A B2B SaaS company embeds an intelligent lead generation form within their email newsletter campaigns. These forms leverage AI-generated questions based on recipient metadata (e.g., job title, industry). Once submitted, responses are instantly scored and categorized based on predefined rules. High-intent leads are automatically sent follow-up emails or notifications to sales representatives. This results in improved lead quality and faster conversion cycles compared to traditional landing page forms.

10.2 Education (Feedback Collection)

Example: A higher education institute deploys SmartForm for gathering post-course feedback from students. Forms are directly embedded into institutional emails using interactive email components, allowing students to respond without navigating away. The AI clusters responses based on sentiment and common themes, giving instructors actionable insights via dashboards. Over time, SmartForm learns to ask more relevant questions based on past feedback trends, driving academic improvement and transparency.

10.3 Healthcare (Patient Intake)

Example: A chain of urban clinics uses SmartForm to streamline patient intake processes. Before appointments, patients receive an interactive email that includes a form asking about medical history, symptoms, and insurance details. This data is processed securely and attached to the patient's profile. The AI engine flags potential health risks (e.g., symptoms matching critical patterns) and notifies staff. This reduces wait times, improves preparedness, and enhances patient satisfaction.

11. Performance & Impact

Preliminary usage during beta testing suggests:

- 3x higher completion rate compared to redirect-based forms
- 40% reduction in response lag
- 2x lead conversion improvement in marketing campaigns

12. Screenshots from SaaS Blogs and Users

Screenshots from Typeform, Tally.so, and Jotform blogs as well as user tweets reveal:

- Complaints about low email engagement
- Praise for interactive experiences
- Reasons business owners pay for premium features despite free alternative.

13. Limitations & Challenges

- AMP email support limited to Gmail and Mail.ru
- Requires user awareness of email permissions
- Serverless cost spikes on large-scale submissions

14. Future Scope

Planned features include:

- Slack & CRM integrations
- AI-generated form summaries
- Multi-language support
- Mobile app for live form tracking

15. Conclusion

SmartForm bridges the gap between static forms and intelligent workflows. Its serverless architecture, AI integration, and embedded email functionality redefine user engagement in data collection. Designed for scale, compliance, and performance, X Product has the potential to become a category-defining tool.

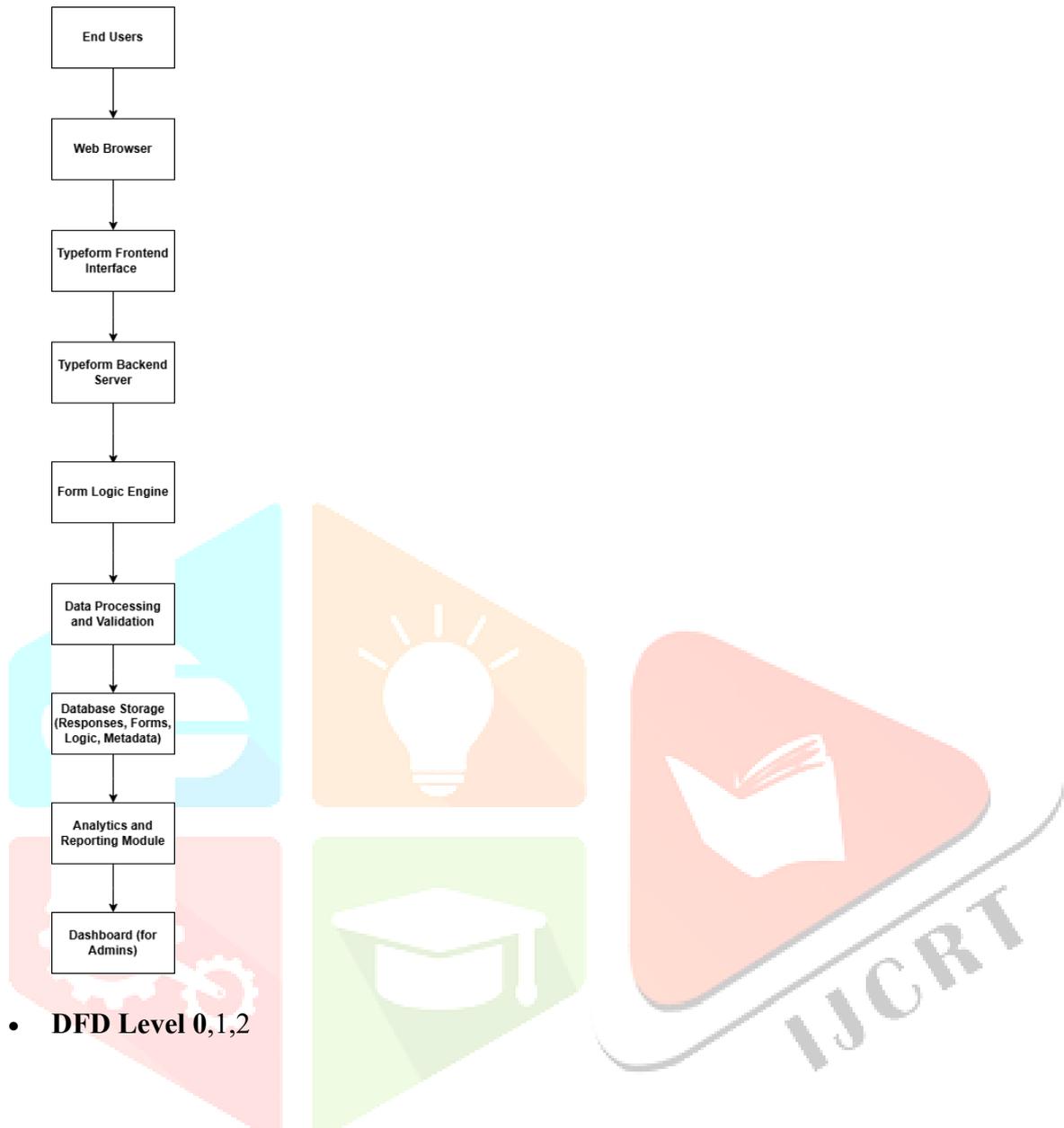
- ✓ Submitted response #92
 - ✓ Submitted response #93
 - ✗ Error on response #94: Message: element not interactable
(Session info: chrome=134.0.6998.88)
- Stacktrace:
- #0 0x56cdf96a8a1a <unknown>
 - #1 0x56cdf91601e3 <unknown>
 - #2 0x56cdf91a8282 <unknown>
 - #3 0x56cdf91d7bd2 <unknown>
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- ✓ Submitted response #95
 - ✓ Submitted response #96
 - ✓ Submitted response #97
 - ✓ All 97 responses submitted successfully!

References

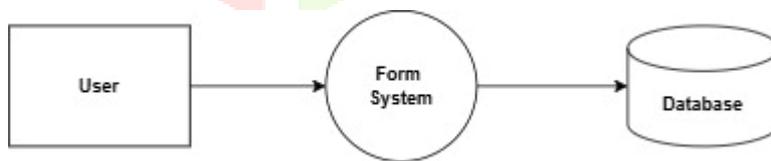
- [1] Graßl, S., Zangl, S., Kimmerle, J., & Cress, U. "Conversational User Interfaces in Online Surveys: Impact on User Experience and Data Quality," *Computers in Human Behavior Reports*, vol. 4, 2021, pp. 100127.
- [2] Dillman, D. A., Smyth, J. D., & Christian, L. M., *Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method*, 4th ed., Wiley, 2014.
- [3] Couper, M. P., *Designing Effective Web Surveys*, Cambridge University Press, 2008.
- [4] Pew Research Center, "Mobile Fact Sheet," 2021. [Online]. Available: <https://www.pewresearch.org/internet/fact-sheet/mobile/>
- [5] Rahman, S., & Islam, M. A., "A Comparative Analysis of Online Form Builders: Typeform, Google Forms, and Jotform," *International Journal of Web Applications*, vol. 14, no. 2, 2022, pp. 56–62.
- [6] Jain, A., & Agarwal, R., "Enhancing User Engagement in Web Forms through Conversational Interfaces," *ACM SIGCHI Conference on Human Factors in Computing Systems*, 2020.
- [7] Zhang, H., & Li, M., "Serverless Computing for Scalable Web Applications," *IEEE Cloud Computing*, vol. 7, no. 3, pp. 42–49, 2020.
- [8] Sharma, V., & Gupta, P., "AI-Powered Question Generation for Survey Systems," *International Journal of Artificial Intelligence Research*, vol. 11, no. 1, 2021.
- [9] Typeform Blog, <https://www.typeform.com/blog/>
- [10] Tally.so Blog, <https://tally.so/blog>
- [11] Jotform Blog, <https://www.jotform.com/blog/>

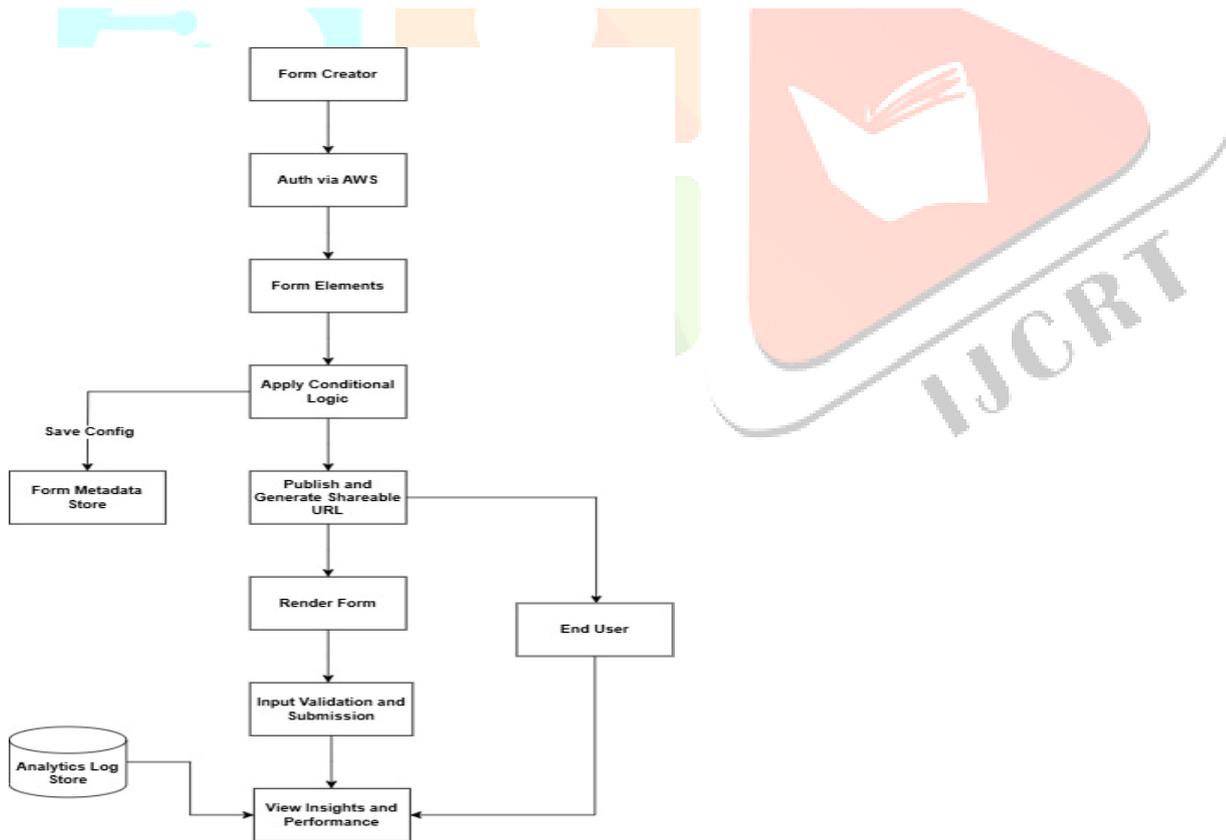
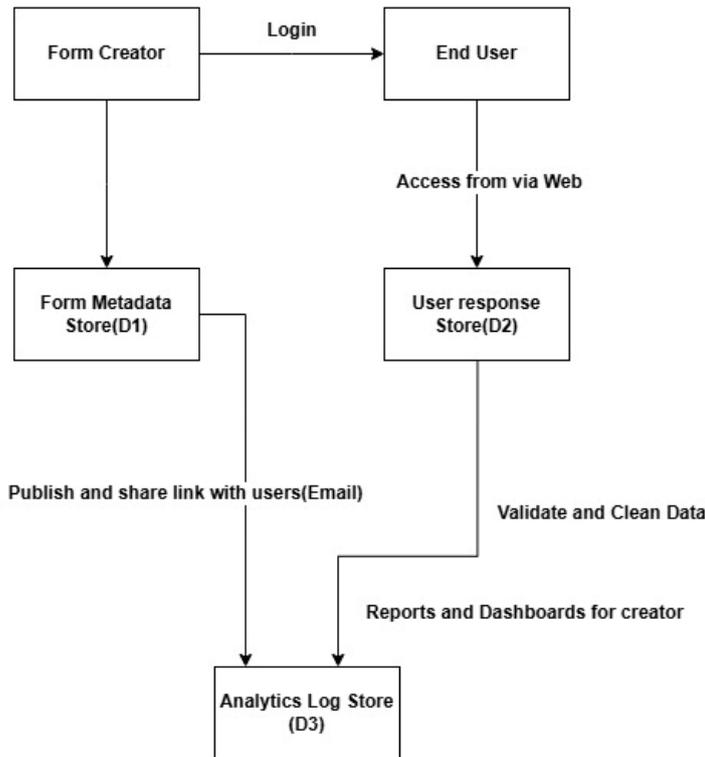
Appendix

- System Architecture Diagram

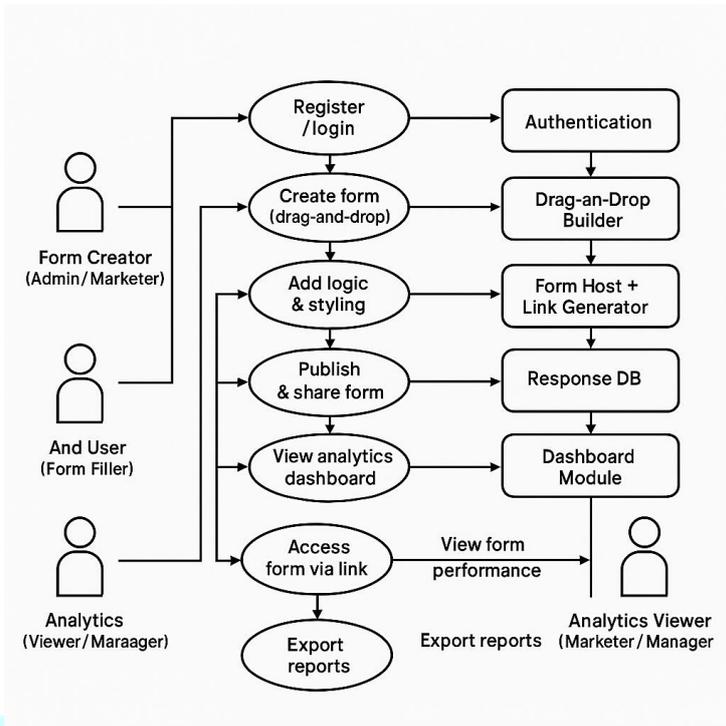


- DFD Level 0,1,2





Use Case Diagram



Results

Type	Questions	Responses
website	0	0

Create New Form

Form Type:

Form Title:

Select Workspace:

Workspaces + My Workspace ... Q + Create Form

Name	Type	Questions	Responses	Created At	Actions
New Form 1	website	4	1	27/02/2025	...
erty	website	1	1	15/04/2025	...
asdfghj	website	1	0	15/04/2025	...
test 01	website	1	151	12/03/2025	...
New Form 1	website	1	0	27/02/2025	...
f	website	0	0	21/03/2025	...

