**Citizen AI Chatbot - Technology Stack**

| **Date** | **26 June 2025** |
| --- | --- |
| **Team ID** | LTVIP2025TMID32134 |
| **Project Name** | Citizen AI Chatbot |
| **Maximum Marks** | 4 Marks |

**Technical Architecture Components**

| **S.No** | **Component** | **Description** | **Technology** |
| --- | --- | --- | --- |
| 1. | User Interface | Multilingual chat interface (Web/WhatsApp) | Gradio, React.js |
| 2. | Application Logic-1 | Query processing & routing | Python (Flask) |
| 3. | Application Logic-2 | Speech-to-text for voice queries | IBM Watson Speech-to-Text |
| 4. | Application Logic-3 | Intent detection & response generation | IBM Granite-3B model |
| 5. | Database | Government service knowledge base | IBM Cloudant (NoSQL) |
| 6. | Cloud Database | Citizen query logs | IBM Db2 |
| 7. | File Storage | PDF templates (forms, checklists) | IBM Cloud Object Storage |
| 8. | External API-1 | Aadhaar verification | UIDAI API |
| 9. | External API-2 | Sentiment analysis | IBM Watson NLP |
| 10. | Machine Learning Model | Hindi-English translation | IBM Watson Language Translator |
| 11. | Infrastructure | Scalable deployment | IBM Cloud Kubernetes |

**Application Characteristics**

| **S.No** | **Characteristics** | **Description** | **Technology** |
| --- | --- | --- | --- |
| 1. | Open-Source Frameworks | UI development & API integration | React.js, Flask |
| 2. | Security Implementations | Data encryption & access control | AES-256, IBM Cloud IAM |
| 3. | Scalable Architecture | Microservices with auto-scaling | Kubernetes, Docker |
| 4. | Availability | Multi-zone deployment with load balancing | IBM Cloud Load Balancer |
| 5. | Performance | 1000+ queries/sec with Redis caching | Redis, CDN (Akamai) |

*[End of template - No additions or deletions]*

**Reference Architecture**:  
[IBM AI-Powered Chatbot Patterns](https://developer.ibm.com/patterns/)

**Key**:

* **Frontend**: Gradio for prototyping, React for production
* **Backend**: IBM Cloud-native services
* **AI**: IBM Watson/Granite for NLP tasks