Project Design Phase-II
Technology Stack (Architecture & Stack)

Technical Architecture:

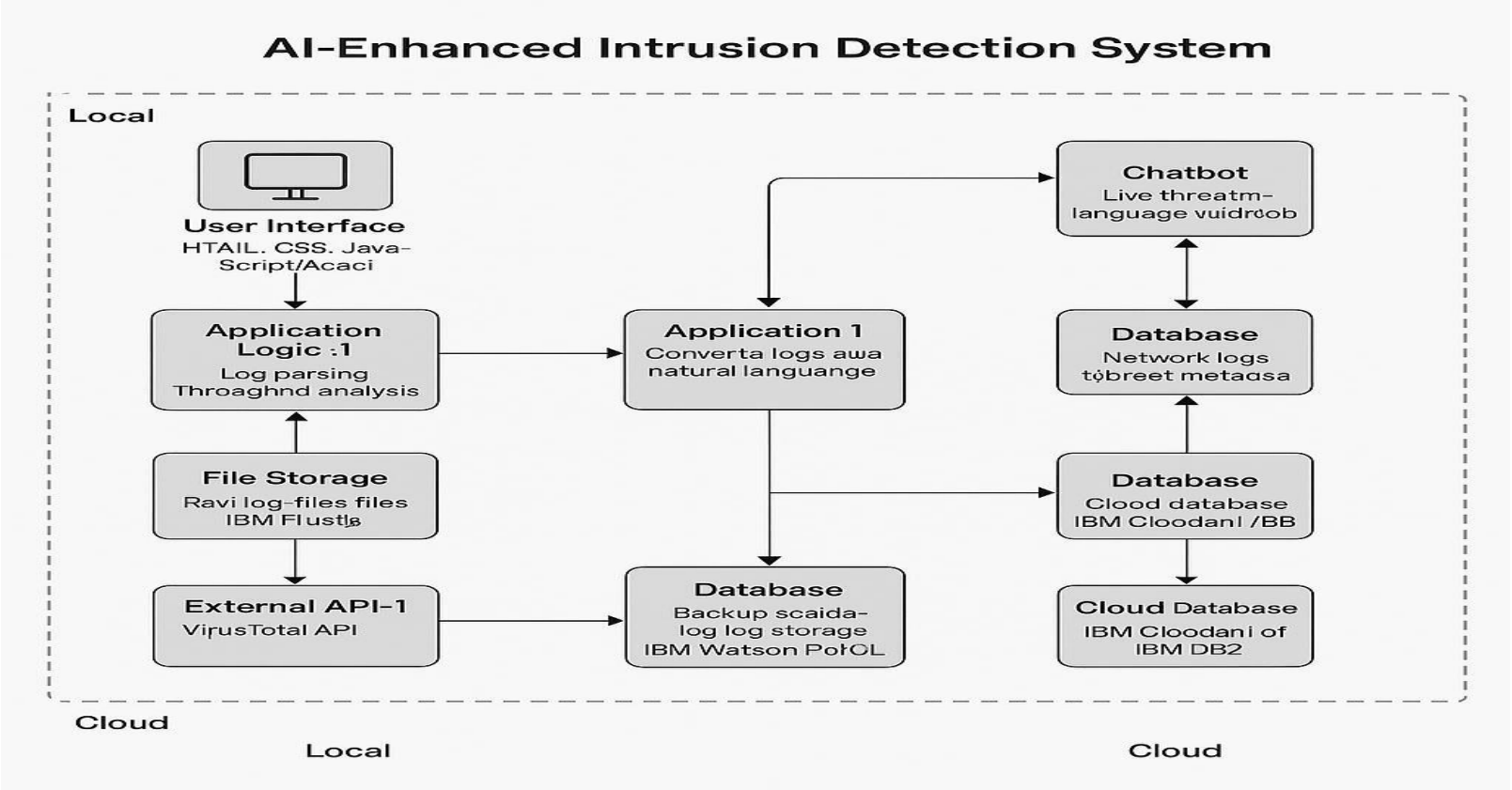

Table-1: Components & Technologies

S.No	Component Description	Technology
1	User Interface	HTML, CSS, JavaScript, ReactJS
2	Application Logic-1 (Call Handling & Routing)	Python (Flask), Telecom Integration APIs
3	Application Logic-2 (Speech to Text)	IBM Watson Speech to Text API
4	Application Logic-3 (Language Processing)	IBM Watson Language Translator, Knowledge Studio, NLU
5	Database	MySQL / SQLite for local staging
6	Cloud Database	IBM DB2 on Cloud
7	File Storage	IBM Cloud Object Storage
8	External API-1	IBM Watson STT
9	External API-2	IBM Language Translator API
10	Machine Learning Model	Watson Knowledge Studio / Watson NLU
11	Infrastructure (Server / Cloud)	Cloud Foundry / IBM Kubernetes

Table-2: Application Characteristics

S.No	Characteristics	Description	Technology
1	Open-Source Frameworks	Frontend & backend built with open-source technologies	ReactJS, Flask (Python), Node.js
2	Security Implementations	User authentication, encrypted data transmission, IAM controls, firewall	HTTPS, OAuth 2.0, SHA-256, IBM IAM, OWASP
3	Scalable Architecture	Microservices and 3-tier separation allow horizontal scaling	Docker, Kubernetes, REST APIs
4	Availability	Load balancing, multi-zone cloud deployment, fault-tolerant cloud services	IBM Cloud Load Balancer, Distributed DB2
5	Performance	Speech processing pipelines, use of cache (Redis), asynchronous processing	Redis, CDN for assets, concurrent workers