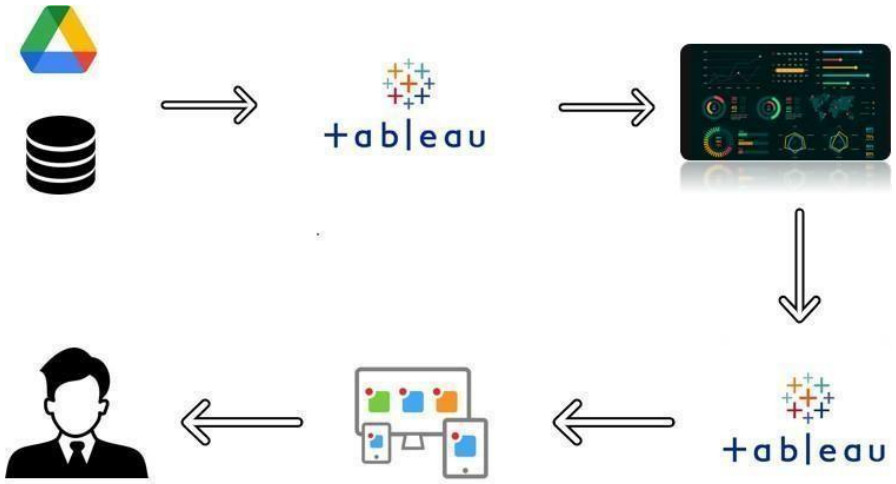
Project Design Phase-II
Technology Stack (Architecture & Stack)

Date	26 October 2023
Team ID	SI-GuidedProject-587483-1697199874
Project Name	Project - Subscribers Galore : Exploring World's Top Youtube Channels
Maximum Marks	4 Marks

Technical Architecture:

Reference:

https://www.google.com/search?q=Technical+architecture+for+the+project+Subscribers+Galore+:+Exploring+World%E2%80%99s+Top+Youtube+Channels&source=lmns&bih=815&biw=1440&hl=en&sa=X&ved=2ahUKEwiiv-Lq44yCAxVR5TgGHTQBAsEQ_AUoAHoECAEQAA#vhid=QZ69OOPyWOVGsM&vssid=l&ip=1



Guidelines:

Technology Stack: Choose suitable technologies for web development, including programming languages, frameworks, and databases, considering the project's requirements and scalability.

Data Collection and Storage: Create a system to collect and store data about top YouTube channels, using a combination of web scraping and API integration, then design an efficient database schema.

User-Friendly Interface: Develop an intuitive, responsive, and user-friendly front-end for displaying channel information, along with data analysis and visualization tools.

Security and Compliance: Implement robust security measures, user authentication, and comply with legal and ethical considerations related to data usage and user privacy.

Monitoring and Optimization: Continuously monitor system performance, apply performance optimizations, and maintain clear documentation to facilitate collaboration and troubleshooting.

Table-1 : Components & Technologies:

S.No	Component	Description	Technology
1.	Web Scraping Engine	Responsible for collecting data on top YouTube channels, such as subscriber counts, video counts, and more, from the web.	Python (Scrapy, BeautifulSoup), Web scraping libraries
2.	YouTube Data API	Interface with the YouTube Data API to access channel information and retrieve data such as video details, comments, and channel statistics.	YouTube Data API, OAuth 2.0
3.	Database	Justify the scalability of architecture (3 – tier, Micro-services)	PostgreSQL (or other relational databases), MongoDB (or other NoSQL databases)
4.	User Authentication	Provide secure user registration and login processes, including password hashing and account management.	OAuth 2.0, JWT (JSON Web Tokens)
5.	Front-End Application	Create a user-friendly web interface for users to search and explore top YouTube channels, including features like search, filters, and data visualization.	HTML, CSS, JavaScript, React (or other front-end libraries), Responsive Web Design
6.	Data Visualization	Implement data visualization tools such as charts and graphs to display channel statistics and insights in an understandable format.	D3.js, Chart.js, or similar data visualization libraries

7.	Notification System	Enable users to subscribe to channels and receive notifications for changes in subscriber counts, video uploads, or other relevant updates.	WebSocket, Push Notifications
8.	WebSocket, Push Notifications	Monitor system performance and user behavior, gather insights for optimization, and track application usage.	Google Analytics, Elasticsearch, Kibana
9.	Security Measures	Ensure security by implementing measures against common web vulnerabilities (e.g., SQL injection, XSS), user data protection, and compliance with legal and ethical standards.	SSL/TLS, Security Headers, OWASP Top Ten Best Practices
10.	Continuous Integration/ Continuous Deployment (CI/CD) Pipeline	Automate the deployment process for updates and enhancements, ensuring smooth development, testing, and release cycles.	Jenkins, Travis CI, CircleCI

Table-2: Application Characteristics:

S.No	**Characteristics**	**Description**	**Technology**
1.	Scalability	The ability of the application to handle a growing user base and data load. Scalability ensures the system can expand as needed without compromising performance.	Load balancers, horizontal scaling, cloud platforms (e.g., AWS, Azure, Google Cloud)
2.	Real-Time Updates	The application should provide real-time or near-real-time updates on subscriber counts, new video uploads, and other channel statistics, enhancing user engagement..	WebSocket, Server-Sent Events (SSE)

3.	Mobile Responsiveness	The application should be optimized for mobile devices, providing a seamless user experience on smartphones and tablets.	Responsive web design, mobile app development (e.g., React Native)
4.	Data Security	Ensuring the privacy and security of user data and compliance with relevant data protection regulations (e.g., GDPR). Protecting against common web vulnerabilities is crucial.	Encryption, security headers, access controls, penetration testing
5	Multilingual Support	To cater to a global audience, the application should support multiple languages and provide content in different languages.	Internationalization (i18n), localization (l10n), language libraries and frameworks

References:

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https://www.linkedin.com/pulse/exploring-worlds-top-10-most-subscribed-youtube-channels-winston

https://www.quora.com/Why-do-some-channels-blow-up-on-YouTube-while-others-dont