Practical No: 2

Title: Enterprise architecture with emerging technologies such as cloud/IoT/AI/ Blockchain.

Problem Statement: Sketch enterprise architecture with emerging technologies such as cloud /IoT/AI/Blockchain

Software Tools Required: Edraw Max

Theory:

Enterprise architecture (EA) is a strategic framework that helps organizations plan, design, and implement their business processes, information systems, and technology infrastructure to achieve their objectives. When incorporating emerging technologies like cloud computing, IoT (Internet of Things), AI (Artificial Intelligence), and blockchain into enterprise architecture, it requires careful consideration and planning. Here's how these technologies can be integrated into enterprise architecture.

1.Cloud Computing:

Cloud Strategy: Define a cloud strategy that aligns with the organization's goals. Decide whether to use public, private, or hybrid cloud solutions.

Cloud Service Models: Determine which cloud service models (IaaS, PaaS, SaaS) are most appropriate for different business functions.

Cloud Governance: Establish policies, controls, and best practices to ensure data security, compliance, and cost management in the cloud.

Internet of Things (IoT):

Device Management: Develop a strategy for managing a wide range of IoT devices securely, including sensors, actuators, and other connected devices.

Data Management: Plan for data collection, storage, and analytics to derive meaningful insights from IoT data.

Integration: Ensure seamless integration of IoT data with existing systems, such as ERP, CRM, and analytics tools.

2.Artificial Intelligence (AI):

AI Strategy: Define how AI will be used to enhance business processes, automate tasks, and improve decision-making.

Data Strategy: Develop a robust data strategy to feed AI algorithms with high-quality data, including data governance and quality assurance.

AI Governance: Establish ethical guidelines, accountability, and transparency for AI usage.

Blockchain:

Use Cases: Identify potential use cases for blockchain technology, such as supply chain tracking, smart contracts, and identity verification.

Integration: Plan how blockchain will integrate with existing systems and databases to maintain data consistency and integrity.

Security and Privacy: Address security concerns related to blockchain, including cryptographic protection and access control.

To effectively integrate these technologies into your enterprise architecture, consider the following best practices:

Business Alignment: Ensure that the adoption of these technologies aligns with your organization's strategic objectives and can deliver tangible business value.

Data Management: Data is a critical asset for these technologies. Establish data governance, quality, and security measures to support their implementation.

Scalability: Design your architecture to be scalable, as these technologies often involve a growing amount of data and infrastructure demands.

Security: Place a strong emphasis on security and compliance, especially in technologies like blockchain, which rely heavily on cryptographic security.

Change Management: Prepare your workforce for the cultural and operational changes that may accompany the adoption of emerging technologies.

Monitoring and Optimization: Continuously monitor the performance of these technologies and optimize their use to ensure they meet the evolving needs of your organization.

Vendor Selection: Choose reliable vendors and partners for cloud services, IoT devices, AI tools, and blockchain platforms. By incorporating these emerging technologies into your enterprise architecture thoughtfully and strategically, your organization can gain a competitive edge, improve efficiency, and better serve your customers and stakeholders.

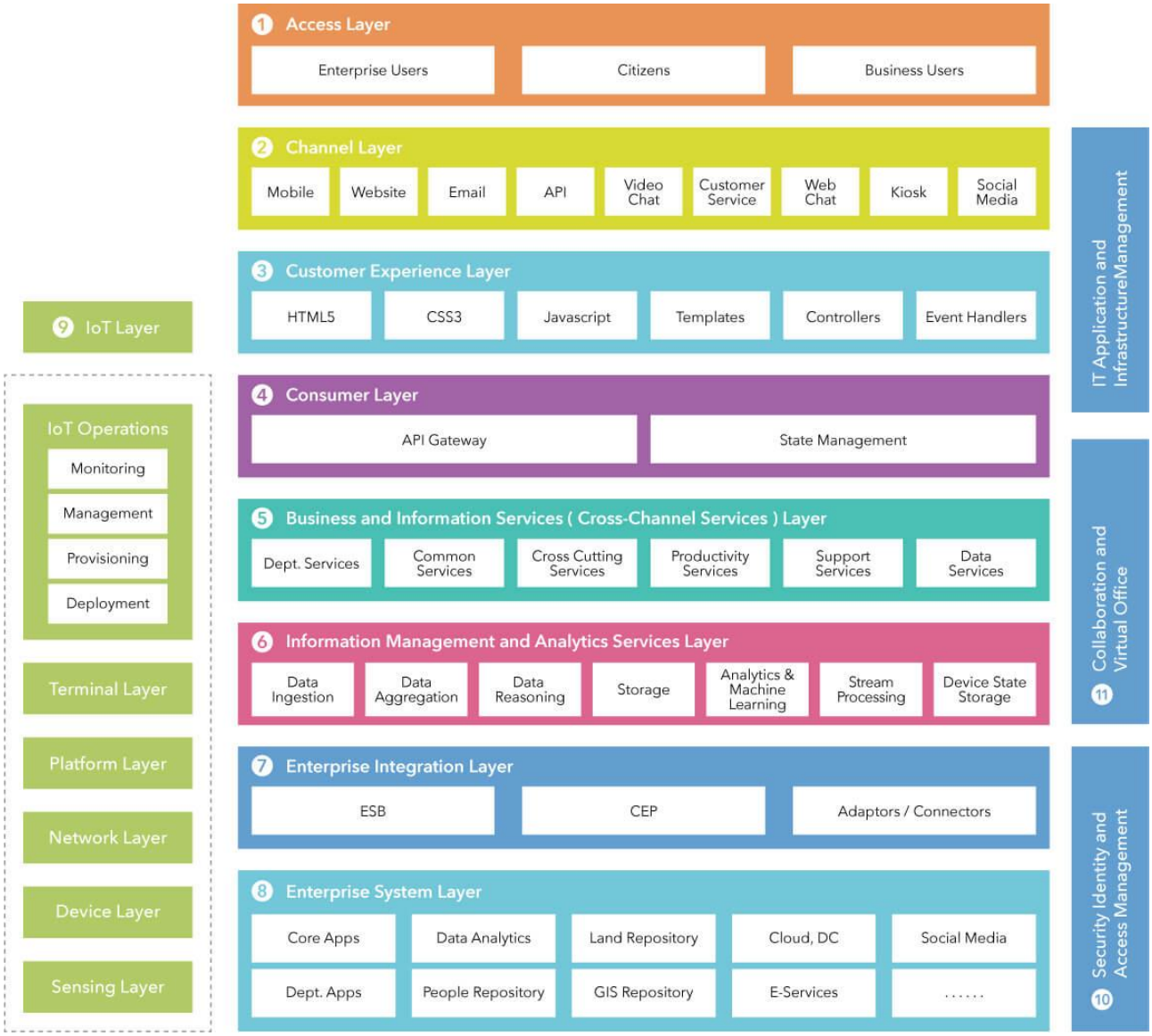

Fig: IoT in Connected Enterprise

Access Layer

End users both internal and external to the enterprise interact with channel(s) and play a role in the overall customer journey.

Channel Layer

End users use media to interact with the enterprise over multiple channels, both physical and digital.

Customer Experience Layer

A collection of presentation components and services – the critical systems the enterprise uses to engage with end users.

Consumer Layer:

Acts as a gateway for channels, and aggregates functionalities through composition and orchestration, mediation, and routing. Its key capabilities are:

- API Gateway: a single point of entry giving consumers access to backend services, as provided by API Management platforms. The composition and orchestration of these services are based on customer journey and context.
  State Management: manages state and transition. Control logic is decoupled from the user interface and managed at the customer experience layer.

Business and Information Services Layer

Provides cross-channel capabilities. Its design is based on micro-services architecture principles. A business service system is responsible for realising traditional or new Internet-specific business functions, including: Enterprise Resource Management (ERP), Customer Relationship Management (CRM), asset management, service lifecycle management, payment processing, human resource activities, work planning and scheduling systems.

Information Management and Analytics Services Layer

Focuses on data ingestion, processing, complex event processing and real-time analytics and insights. A basic service system provides fundamental data services, including (but not limited to): data access, data processing, data fusion, data storage, identity resolution, geographic information services, user management and inventory management.

Enterprise Integration Layer

This layer is a key enabler: it provides mediation, transformation, protocol and routing capabilities, and acts as a gateway to integrate with core enterprise systems. It also provides aggregation and broker communications.

The Enterprise Integration layer is responsible for integrating the IoT environment into the enterprise's business processes. The IoT solution ties into existing line-of-business applications and standard software solutions through adapters or Enterprise Application Integration (EAI) and business-to-business (B2B) gateway capabilities.

Enterprise Systems Layer

This layer is a collection of enterprise back-office core systems and applications that house business logic and data.

IoT Layer

This layer consists of the following:

- **IoT Operations:** A collection of capabilities and systems for provisioning, management and monitoring
- **Platform Layer:** A collection of information management / analytics and enterprise integration capabilities which can capture and process events and generate insights
- **Network Layer:** Connects sensors, actuators, controllers, and gateways with Platform Layer capabilities
- **Control and Sensing Layer:** A collection of capabilities to read sensor data, apply necessary rules/logic and deliver data and control signals to actuators
- **Physical Devices Layer:** A collection of physical systems such as smart sensors, devices and machines.

Security

This layer handles single sign-in, authentication, encryption and authorisation capabilities

Collaboration & Management

This layer leverages infrastructure-as-a-service and platform-as-service technologies, as it requires large computing capabilities.

Opportunities

There are many opportunities for enterprises to use IoT to make business services more efficient and customer-centric. IoT can help enterprises achieve their most important goals:

- Create significant impact on customer experience and deliver unified product and service experience Huge cost savings/revenue
- Improving employee productivity
- Improving customer requests and service delivery
- Improving innovation

Conclusion: In this way we have successfully designed Enterprise Architecture by incorporating t emerging technologies thoughtfully and strategically, your organization can gain a competitive edge, improve efficiency, and better serve your customers and stakeholders