**Module 4: Essay Paper**

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**Chapter 5**

Middleware is software that connects different applications, systems, or services, facilitating communication and data management across a network. Middleware enables interoperability and simplifies the integration of various applications by managing interactions between them. According to Vivek Kale, the most common forms of middleware are:

1. *Database Access Technologies*
2. *Asynchronous Middleware*
3. *Synchronous Middleware*
4. *Message-Oriented Middleware*
5. *Request/Reply Messaging Middleware*
6. *Transaction Processing Monitors*
7. *Object Request Brokers*
8. *Application Servers*
9. *Web Services*
10. *Enterprise Service Buses*
11. *Enterprise Systems*

Messaging-Oriented Middleware (MOM) is a type of middleware that supports message passing between distributed systems, allowing applications to communicate asynchronously. This means that the sender and receiver do not need to interact with the message simultaneously, enhancing system resilience and scalability. MOM is particularly useful in environments that require reliable message delivery and high performance, making it ideal for complex, distributed applications. (Guide to Cloud Computing for Business and Technology Managers, 2015, pp. 107-117)

**Chapter 7**

Service-Oriented Architecture (SOA) is a style of organizing business services that guides all aspects of creating, deploying, and managing these services throughout their lifecycle. SOA provides an agile technical architecture that can be quickly reconfigured as business needs change. This flexibility helps to break down barriers within IT, enabling more seamless integration of business processes across various platforms and technologies. (Guide to Cloud Computing for Business and Technology Managers, 2015, pp. 154-164)

The nine characteristics (or principles) of SOA highlighted in the textbook are:

1. *Dynamic, Discoverable, Metadata Driven*
2. *Designed for Multiple Invocation Styles*
3. *Loosely Coupled*
4. *Well-Defined Service Contracts*
5. *Standard Based*
6. *Granularity of Service and Service Contracts*
7. *Stateless*
8. *Predictable Service-Level Agreements*
9. *Design Services with Performance in Mind*

AWS defines SOA as a design pattern in which services are provided to the other components by application components through a communication protocol over a network, allowing seamless service integration and adaptability to different business needs. (What’s the Difference Between SOA and Microservices?, 2024)

**Chapter 8**

Web services such as REST, SOAP, and XML-RPC are utilized for specific communication protocols, while APIs offer broader integration capabilities. AWS services that can be used for REST, SOAP, and XML-RPC include Amazon API Gateway, AWS Lambda, and AWS Elastic Beanstalk. These tools support seamless API integration, enhancing connectivity between various applications and systems. (What’s the Difference Between RPC and REST?, 2024)

**Chapter 21**

The textbook defines big data as, "Big data can be defined as volumes of data available in varying degrees of complexity, generated at different velocities and varying degrees of ambiguity, which cannot be processed using traditional technologies, processing methods, algorithms, or any commercial off-the-shelf solutions." (Guide to Cloud Computing for Business and Technology Managers, 2015, p. 442)

Big Data is characterized by these three dimensions; volume, velocity, and variety. Data Volume refers to the vast amounts of data generated daily from sources such as social media, emails, and enterprise systems. The exponential growth of this data requires innovative data processing techniques, as traditional methods are often insufficient for handling such massive scales. Data Velocity addresses the speed at which data is produced and processed. For instance, clickstream data from websites and social media interactions are generated at incredible speeds, requiring real-time processing to extract meaningful insights. This rapid data flow demands elastic and scalable systems that can adjust processing power dynamically. Data Variety encompasses the wide range of data types, including structured data from databases, unstructured data from emails and social media, and multimedia data like images and videos. The complexity of handling diverse data formats necessitates advanced processing capabilities to ensure that data is accurately identified, analyzed, and integrated into business processes. (Guide to Cloud Computing for Business and Technology Managers, 2015, pp. 442-444)

# References

Guide to Cloud Computing for Business and Technology Managers. (2015). In V. Kale, *Guide to Cloud Computing for Business and Technology Managers.* Boca Raton, FL: CRC Press.

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