

# System Integration **Sample Questions** 2019/2020

**Introduction to System Integration** – enterprise applications infrastructure, challenges of developing enterprise applications, overview of integration technologies and programming solutions, criteria for comparing, standardization in system integration

## **Sample Questions**

- Which software applications are called enterprise applications? Give some examples.
- Which business considerations could be a challenge for enterprise application integration?
- Which software related issues could be a challenge for enterprise application integration?
- Which developer related issues could be a challenge for enterprise application integration?
- What is System Integration, what does it mean for enterprise applications?
- What is meant by tightly coupled and loosely coupled systems? How do they differ? Give examples.
- What is the difference between synchronous and asynchronous communication between applications?
- How would you order the different integration technologies we have worked with in class in respect to coupling?
- What is known as OSIMM and what is the role of it?

**Distributed Computing** - interconnectivity and interoperability of computer systems and applications, P2P communication, evolution of distributed computing, technologies for developing distributed applications.

## **Sample Questions**

- Name some networking technologies that are used in system integration and explain how.
- Explain the difference between distributed and parallel computing.
- What is RPC and how can it be used for integration?
- What is RMI? How does it differ from RPC? Give example of implementation.
- Advantages and disadvantages of P2P, RPC, and RMI technologies?

**Web Services**– overview, features and comparison, advantages and disadvantages

## **Sample Questions**

- What are the web services? Which are the important features of a web service?
- How does a web service differ from web application?
- Explain the difference between stateful and stateless web services?
- What is the role of XML in web services programming and implementation? Name some XML-based communication protocols, used in system integration.
- Compare JSON and XML. Give some advantages and disadvantages in using each of them with web services.
- What is SOAP? What is the content of it? What is called SOAP envelope?
- Which protocols are used for implementing a SOAP service?
- How to describe the endpoints, operations, and access methods of a SOAP service?
- How is the HTTP protocol used in integration of web services?
- What does REST stand for and what is the meaning of it?
- Compare the HTTP methods, used in REST-based web services, in regard to operability, idempotency, side effect and use of parameters.
- Which are the RESTful constraints, who has defined them, and what was the motivation for introducing them?
- Are REST and SOAP comparable? Why or why not?
- Explain Hypermedia As The Engine Of Application State (HATEOAS)
- Explain Richardson Maturity Levels

**Business Process Modeling and Automation** - business considerations, standards and best practices in BPM, BPMN and BPEL

#### Sample Questions

- What is business process modeling? How is it associated with system integration?
- BPMN 2.0 and DMN 1.1 are names of standards, related to business process management and automation. What is the scope of each?
- Explain the meaning and components of BPMN 2.0.
- Name some BPM software development tools.

**SOA and Application Integration Middleware** - SOA design principles, SOA Manifesto, Enterprise Service Bus, Message Oriented Middleware

#### Sample Questions

- What is SOA? Describe SOA concepts and characteristics. How does SOA differ from SOAP? Compare SOA to MVC.
- Explain the eight SOA design principles.
- Some important features of SOA are stated in the SOA Manifesto. Which are they?
- What is ESB to SOA? What are the functions of ESB?
- What type of projects ESB is beneficial for? Which are the alternative solutions?
- What is MOM? Compare MOM to ESB.
- Are the applications communicating over MOM decoupled? Why or why not?
- Explain the messaging concept in system integration. Which are the basic elements of a generic messaging system?
- Name some types of consumers, operating in an application integration middleware.
- Define orchestration and choreography in system integration.
- What is Ballerina? Name at least one software integration platform, which provides implementation of Ballerina.

**Enterprise Integration Patterns** – features, categories, implementation

#### Sample Questions

- What are the EIP? What are the benefits for developers in applying them?
- What types of data transformation can be necessary for integration of applications? How can you implement such transformations? Give examples.
- Explain the difference between splitter, router and aggregator patterns. What is scatter-gather?
- What kind of software is Apache Camel? What can it be used for? Which are the benefits for developers in using it? In which type of projects it is not the best option to use?
- Which part of Camel programming model is called 'context'? Give an example of using it in an integration project?

**Microservices Architecture** - features, implementation recommendations, development and integration of microservices

#### Sample Questions

- Why microservices?
- How can microservices be used for modernization of a legacy system?
- What is microservices architecture?
- Which are the main advantages and disadvantages of microservices architecture?
- Compare microservices architecture with monolithic architecture, web services, and SOA.
- When it is not appropriate to use microservices architecture? Describe at least five cases.
- What is known as Twelve-Factor App? Which are the twelve factors?
- Describe some features of a microservices deployment environment.
- What is an API? How do APIs compare to microservices?
- How do APIs compare to web services and SOA?

**DevOps and Continuous Integration** - technologies and tools for containerization, composition, integration and deployment of microservices architecture

#### Sample Questions

- What is known as DevOps? What is the objective of it?
- What is container in microservices architecture? What is a virtual machine?
- What is Docker for a microservices architecture? What is image in Docker?
- Explain the Docker architectural components. Explain volumes in Docker.
- Explain how applications in containers communicate in Internet.
- Explain cows and layers in Docker containers.
- What are the benefits for developers and operators of using containers?
- What are the roles of Dockerfile and Docker Compose?
- What is Kubernetes and how is it related to microservices architecture? How to use it?
- Which are the main Kubernetes objects? How does Kubernetes process the Internet traffic?
- Explain the processes of continuous integration, continuous delivery and continuous deployment of microservices application.
- Give examples of CI/CD implementations.
- What types of services do clouds provide? Explain IaaS, PaaS, SaaS, and iPaaS.
- How can cloud platforms facilitate system integration? Give some examples.