

# QUESTIONS & ANSWERS

Kill your exam at first Attempt



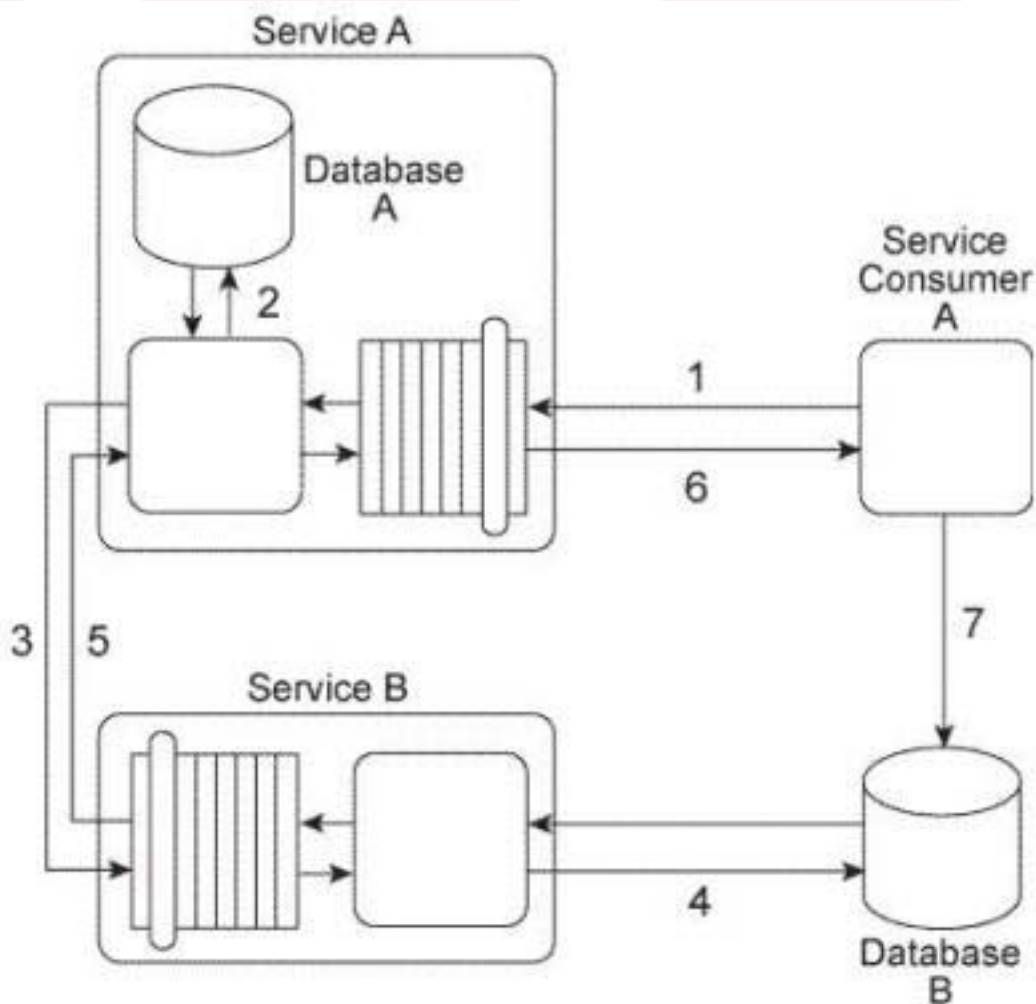
**SOA**

**S90.09A**

*SOA Design & Architecture Lab*

**QUESTION: 36**

Service Consumer A sends a message with a business document to Service A (1), which writes the business document to Database A (2). Service A then forwards the business document to Service B (3), which writes the business document to Database B (4). Service B then responds to Service A with a message containing a failure or success code (5) after which Service A responds to Service Consumer A with a message containing a failure or success code (6). Upon receiving the message, Service Consumer A updates a log table in Database B (7). The log entry is comprised of the entire business document. Database A is dedicated to the Service A service architecture and Database B is a shared database.



There are two problems with this service composition architecture that you are asked to address: First, both Service Consumer A and Service B need to transform the business

document data from an XML format to a proprietary Comma Separated Value (CSV) in order to write the data to Database B. This has led to redundant data format transformation logic that has been difficult to keep in synch when Database B changes. Secondly, Service A is an entity service that is being reused by several other service compositions. It has lately developed reliability problems that have caused the service to become unavailable for extended periods. What steps can be taken to solve these problems?

A. The Legacy Wrapper pattern can be applied so that data access to Database B is separated into a new wrapper utility service. This way, the Data Format Transformation pattern only needs to be applied within the logic of this new service which will expose a standardized contract that both Service Consumer A and Service B can access. The Asynchronous Queuing pattern can be applied so that messaging queues are established between Service Consumer A and Service A and between Service A and Service B . The Service Autonomy principle can be further applied to Service A in order to establish a more isolated and reliable surrounding infrastructure.

B. The Legacy Wrapper pattern can be applied so that data access to Database B is separated into a new wrapper utility service. This way, the Data Format Transformation pattern only needs to be applied within the logic of this new service which will expose a standardized contract that both Service Consumer A and Service B can access. The Reliable Messaging pattern can be applied so that acknowledgements are passed between Service Consumer A and Service A and between Service A and Service B . The Service Composability principle can be further applied to Service A in order to optimize its service architecture for improved participation in multiple service compositions.

C. The service composition can be redesigned with the application of the Contract Centralization pattern so that instead of writing the business document to Database B, Service Consumer A sends the business document to Service B instead. This way, Service B would provide the only location where data format transformation logic for Database B needs to be carried out, which further supports the application of the Service Reusability principle. The Reliable Messaging pattern can be applied so that acknowledgements are passed between Service Consumer A and Service A and between Service A and Service B . The Service Composability principle can be further applied to Service A in order to optimize its service architecture for improved participation in multiple service compositions.

D. None of the above.

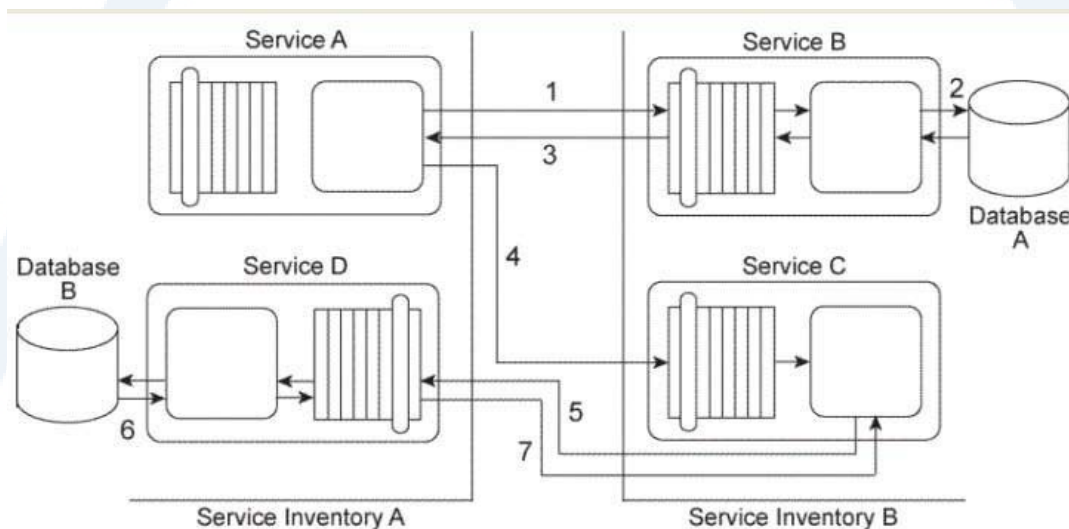
**Answer:** A

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**QUESTION:** 37

Service Consumer A invokes Service A (1). The logic within Service A is required to retrieve three independent data values from Services B, C, and D and to then return these data values back to Service Consumer A. To accomplish this, Service A begins by sending a request message to Service B (2). After receiving a response message with the first data value from Service B, Service A sends a request message to Service C (3). After it receives a response message with the second data value from Service C, Service A then sends a request message to Service D (4). Upon receiving a response message with the third data value from Service D, Service A finally sends its own response message (containing all

three collected data values) back to Service Consumer A. Service Consumer A and Service A reside in Service Inventory A. Service B and Service C reside in Service Inventory B. Service D is a public service that can be openly accessed via the World Wide Web. The service is also available for purchase so that it can be deployed independently within IT enterprises. Due to the rigorous application of the Service Abstraction principle within Service Inventory B, the only information that is made available about Service B and Service C are the published service contracts. For Service D, the service contract plus a Service Level Agreement (SLA) are made available. The SLA indicates that Service D has a planned outage every night from 11 PM to midnight.



You are an architect with a project team building services for Service Inventory A . You are told that the owners of Service Inventory A and Service Inventory B are not generally cooperative or communicative. Cross-inventory service composition is tolerated, but not directly supported. As a result, no SLAs for Service B and Service C are available and you have no knowledge about how available these services are. Based on the service contracts you can determine that the services in Service Inventory B use different data models and a different transport protocol than the services in Service Inventory A. Furthermore, recent testing results have shown that the performance of Service D is highly unpredictable due to the heavy amount of concurrent access it receives from service consumers from other organizations. You are also told that there is a concern about how long Service Consumer A will need to remain stateful while waiting for a response from Service A . What steps can be taken to solve these problems?

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A. The Event-Driven Messaging pattern is applied so that a subscriber-publisher relationship is established between Service Consumer A and Service A . This gives Service A the flexibility to provide its response to Service Consumer A whenever it is able to collect the three data values without having to require that Service Consumer A remain stateful. The Asynchronous Queuing pattern is applied so that a central messaging queue is positioned between Service A and Service B and between Service A and Service C . The Data Model Transformation and Protocol Bridging patterns are applied to enable communication between Service A and Service B and between Service A and Service C . The Redundant Implementation pattern is applied so that a copy of Service D is brought in-house and made part of Service Inventory A.

B. The Asynchronous Queuing pattern is applied so that a central messaging queue is positioned between Service A and Service B and between Service A and Service C and so that a separate messaging queue is positioned between Service A and Service Consumer A. The Data Model Transformation and Protocol Bridging patterns are applied to enable communication between Service A and Service B and between Service A and Service C . The Redundant Implementation pattern is applied so that a copy of Service D is brought in-house for fail-over purposes. The Legacy Wrapper pattern is further applied to wrap Service D with a standardized service contract that is in compliance with the design standards used in Service Inventory A. This wrapper utility service first attempts to access the external service, but if that service is unavailable it will access the redundant internal service instead.

C. The Reliable Messaging pattern is applied so that a system of acknowledgements is established between Service Consumer A and Service A . This gives Service A the flexibility to provide Service Consumer A with acknowledgements that indicate that the processing steps that are occurring between Service A and Service B, Service C, and Service D are progressing. The Asynchronous Queuing pattern is applied so that a central messaging queue is positioned between Service A and Service B and between Service A and Service C and between Service A and Service D The Data Model Transformation and Protocol Bridging patterns are applied to enable communication between Service A and Service B and between Service A and Service C

D. None of the above.

**Answer: B**

**QUESTION: 38**

You are an architect with a project team building services for Service Inventory A . You are told that no SLAs for Service B and Service C are available. You cannot determine how available these services will be, but it has been confirmed that both of these services support atomic transactions and the issuance of positive and negative acknowledgements. However, you also find out that the services in Service Inventory B use different data models than the services in Service Inventory A. Furthermore, recent testing results have shown that the performance of Service D is steady and reliable. However, Service D uses a different transport protocol than the services in Service Inventory A. The response time of Service A is not a primary concern, but Service Consumer A does need to be able to issue request messages to Service A 24 hours a day without disruption. What steps can be taken to fulfill these requirements?

A. The Event-Driven Messaging pattern is applied so that a subscriber-publisher relationship is established between Service Consumer A and Service A . This gives Service A the flexibility to provide its response to Service Consumer A whenever it is able to collect the three data values without having to require that Service Consumer A remain stateful. The Asynchronous Queuing pattern is applied so that a central messaging queue is positioned between Service A and Service B and between Service A and Service C . The Data Model Transformation and Protocol Bridging patterns are applied to enable communication between Service A and Service B and between Service A and Service C .

The Service Autonomy principle is further applied to Service A in order to improve its overall runtime behavioral predictability.

B. The Reliable Messaging pattern is applied so that a system of acknowledgements is established between Service Consumer A and Service A . This gives Service A the flexibility to provide Service Consumer A with acknowledgements that indicate that the processing steps that are occurring between Service A and Service B, Service C, and Service D are progressing. The Asynchronous Queuing pattern is applied so that a central messaging queue is positioned between Service A and Service B and between Service A and Service C and between Service A and Service D . The Redundant Implementation pattern is applied so that a copy of Service D is brought in-Upon reviewing these requirements it becomes D with a standardized service contract that is in compliance with the design standards used in Service Inventory A.

C. The Asynchronous Queuing pattern is applied so that a central messaging queue is positioned between Service A and Service B and between Service A and Service C and between Service A and Service D and so that a separate messaging queue is positioned between Service A and Service Consumer A. The Data Model Transformation pattern is applied to enable communication between Service A and Service B and between Service A and Service C . The Protocol Bridging pattern is applied to enable communication between Service A and Service D

D. None of the above.

**Answer: C**

**QUESTION: 39**

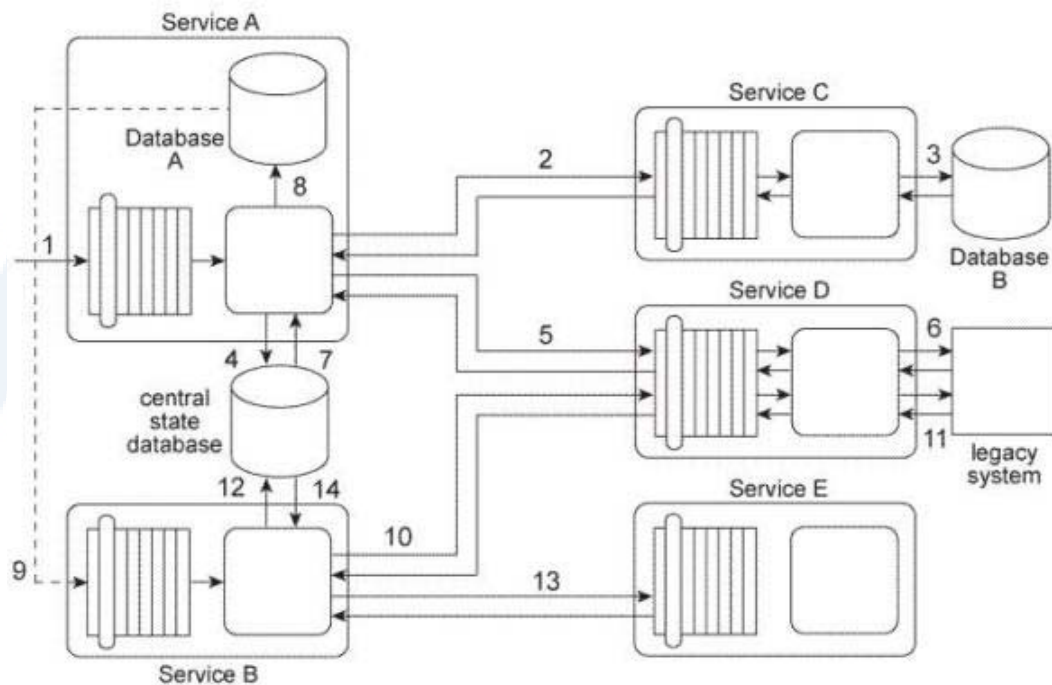
Service A is an orchestrated task service that is invoked by a separate composition initiator (1) and then sends a request message to Service C (2). Service C queries Database B to retrieve a large data record (3) and provides this data in a response message that is sent back to Service A. Service A temporarily stores this data in a central state database (4) and then sends a request message to Service D (5), which accesses a legacy system API to retrieve a data value (6). Service D then sends this data value in a response message back to Service A. The data in the state database is subsequently retrieved by Service A (7) and merged with the newly received data value. This combined data is written to Database A (8), which triggers an event that results in the invocation of Service B (9). Service B is an orchestrated task service that sends a request message to Service D (10). which accesses a legacy system API to retrieve a data value (11) and then sends this data value in a response message back to Service B. Service B temporarily stores this data in a central state database (12) and then sends a request message to Service E (13), which performs a runtime calculation and then responds with the calculated data value back to Service B. The data in the state database is then retrieved by Service B (14) and merged with the calculated data value. Service B then uses the merged data to complete its business task. The following specific problems and requirements exist:

- Database B uses a proprietary data format that is not compliant with the XML format used by all of the services in this service composition architecture This incompatibility needs to be solved in order to enable the described service message exchanges.
- The service contract provided by Service D does not comply with the data model standards that were applied to the other services and therefore uses a different data model

to represent the same type of data that is exchanged. This incompatibility needs to be solved in order to enable communication with Service D.

- Database B is a shared database that can be accessed by other services and applications within the IT enterprise, which causes unpredictable runtime performance. This performance problem needs to be solved in order to make the runtime behavior of Service C more predictable.

- For performance and maintenance reasons, Service A and Service B need to be deployed in the same physical environment where they can share a common state database.



Upon reviewing these requirements it becomes evident to you that the Enterprise Service Bus compound pattern will need to be applied. However, there are additional requirements that need to be fulfilled. To build this service composition architecture, which patterns that is not associated with the Enterprise Service Bus compound pattern need to also be applied? (Be sure to choose only those patterns that relate directly to the requirements described above. Patterns associated with the Enterprise Service Bus compound pattern include both the required or core patterns that are part of the basic compound pattern and the optional patterns that can extend the basic compound pattern.)

- A. Atomic Service Transaction
- B. Compensating Service Transaction
- C. Data Format Transformation
- D. Data Model Transformation
- E. Event-Driven Messaging
- F. Intermediate Routing
- G. Policy Centralization
- H. Process Centralization
- I. Protocol Bridging
- J. Redundant Implementation

K. Reliable Messaging  
L. Service Data Replication  
M. State Repository

**Answer:** H, L, M

**QUESTION:** 40

Upon reviewing these requirements it becomes evident to you that the Orchestration compound pattern will need to be applied. However, there are additional requirements that need to be fulfilled. To build this service composition architecture, which patterns that is not associated with the Orchestration compound pattern need to also be applied? (Be sure to choose only those patterns that relate directly to the requirements described above. Patterns associated with the Orchestration compound pattern include both the required or core patterns that are part of the basic compound pattern and the optional patterns that can extend the basic compound pattern.)

- A. Atomic Service Transaction
- B. Compensating Service Transaction
- C. Data Format Transformation
- D. Data Model Transformation
- E. Event-Driven Messaging
- F. Intermediate Routing
- G. Policy Centralization
- H. Process Centralization
- I. Protocol Bridging
- J. Redundant Implementation
- K. Reliable Messaging
- L. Service Data Replication
- M. State Repository

**Answer:** C, L

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