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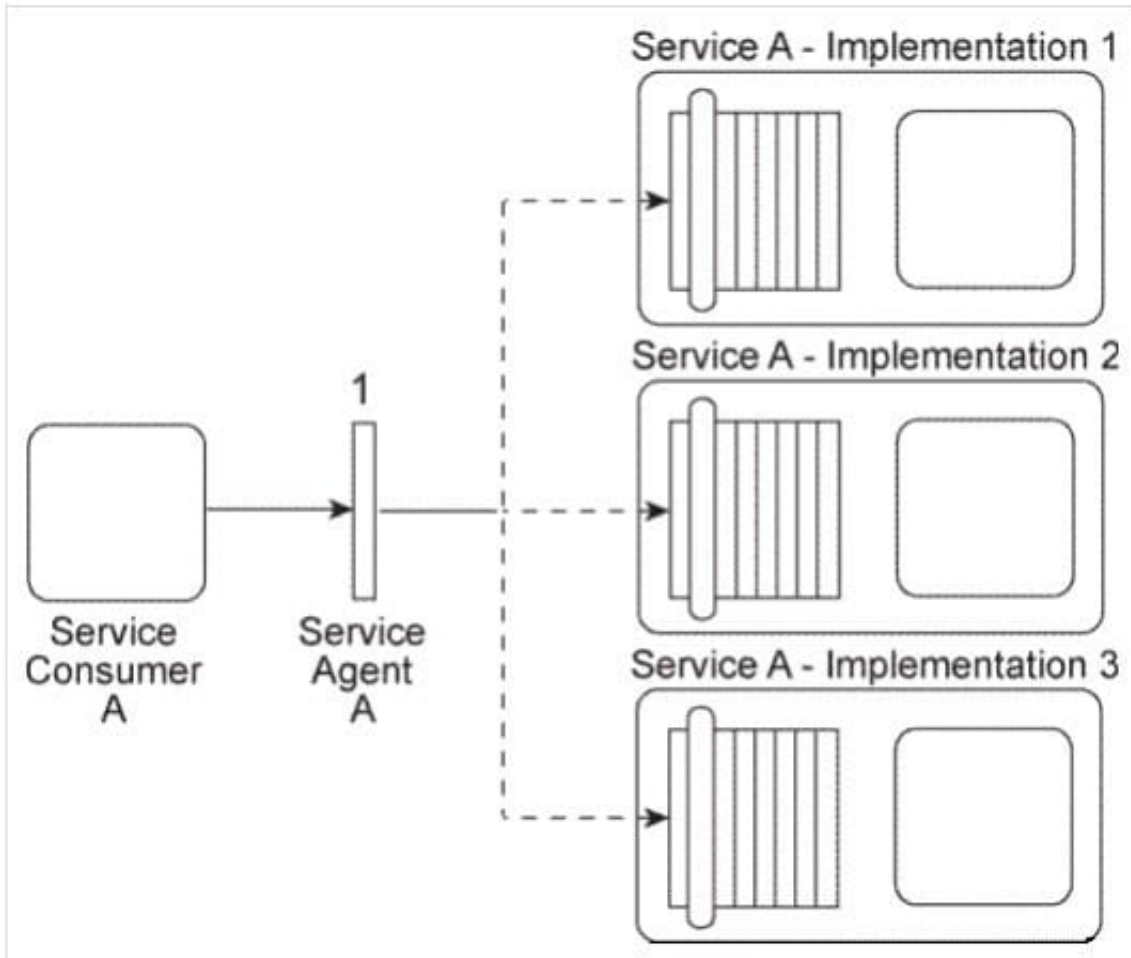
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QUESTION 1

It has been confirmed that Policy A and Policy B are, in fact, the same policy and that the security credential check performed by Service Agent B also needs to be carried out on messages sent to Service

B .



How can this service composition architecture be changed to reduce the redundancy of policy content and fulfill the new security requirement?

- A. The Policy Centralization pattern can be applied so that Policy A and Policy B are combined into the same policy. The policy enforcement logic is removed from Service Agent C and Service Agent A is then used to enforce the policy for messages sent to Service A and Service B . Service Agent B can be used to perform the security credential check for Service A and Service B .
- B. The Policy Centralization pattern can be applied so that Policy A and Policy B are combined into the same policy. The Service Agent pattern is then applied to introduce a new service agent (called Service Agent D) which carries out the validation and enforcement of Policy A and Policy B. Service Agent B can be moved so that it performs the security credential check for Service B, but not for Service A .
- C. The Policy Centralization pattern can be applied so that Service Agent A is changed to enforce the policy for messages sent to Service A and Service B and to perform the security credential check for Service A and Service B .
- D. None of the above.

Correct Answer: A

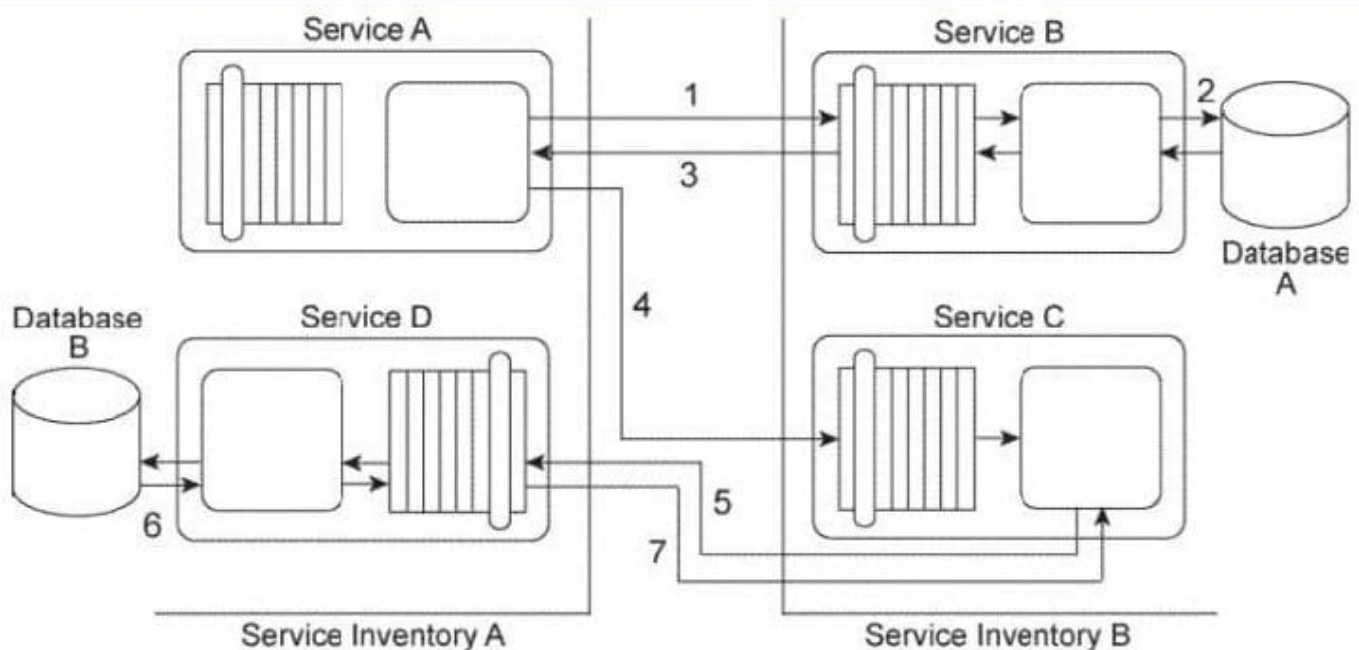
QUESTION 2

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?

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

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 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.

D. 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 .

E. None of the above.

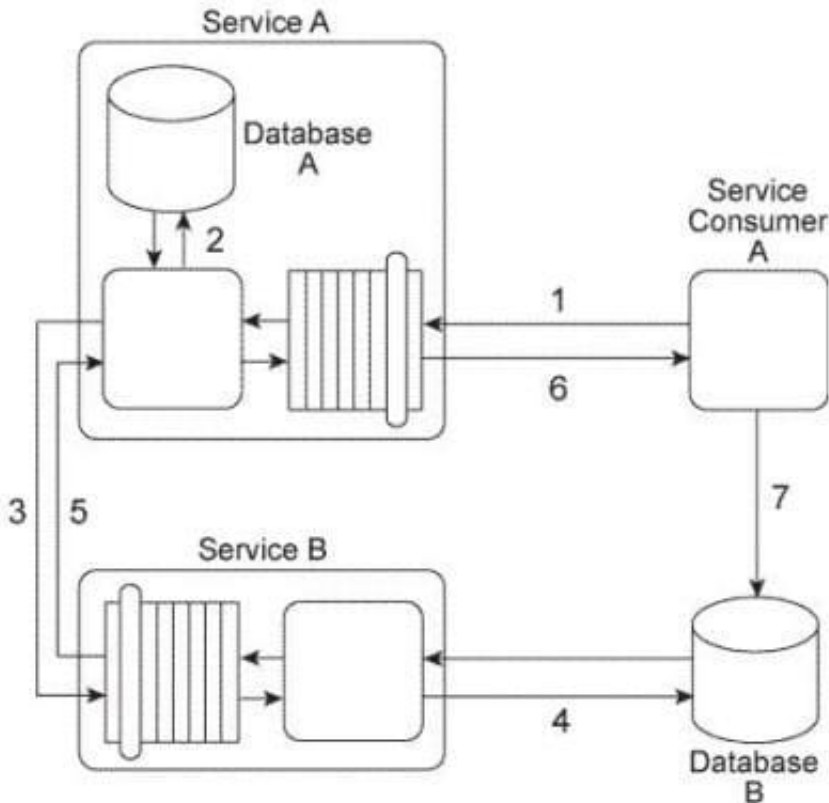
Correct Answer: B

QUESTION 3

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.

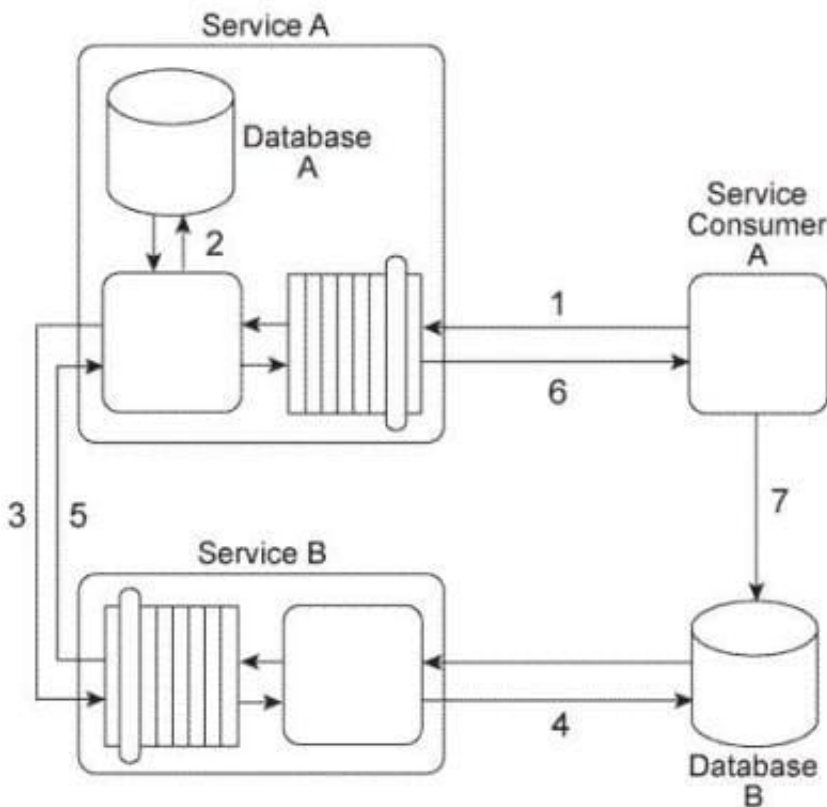
D. None of the above.

Correct Answer: A

QUESTION 4

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.



You are told that the database updates performed by Service A and Service B must be either both successful or they cannot happen at all. The database update performed by Service Consumer A must happen after it is given the outcome of the database updates performed by Service A and Service B . Given that Service Consumer A must also update Database B as part of this service composition architecture, how is it possible to fulfill these requirements?

A. The State Repository pattern can be applied so that Service A writes the business document data to a separate state database until it receives a response message from Service B . If the response message contains a success code, Service A writes the business document to Database A. If the response contains a failure code, Service A discards the data that was written to the state database.

B. The Service Data Replication pattern can be applied to Service Consumer A and Service B so that separate dedicated databases can be established allowing Service Consumer A to make updates independently of Service B .

Service A is simply redesigned to not write the business document to Database A until after it receives a message containing a success code from Service B.

C. The Atomic Service Transaction pattern can be applied to encompass Service A, Service B and Service Consumer A. This will guarantee that all of the actions performed by the service composition participants will either be successful or will be rolled back if anyone is not successful.

D. None of the above.

Correct Answer: D

QUESTION 5

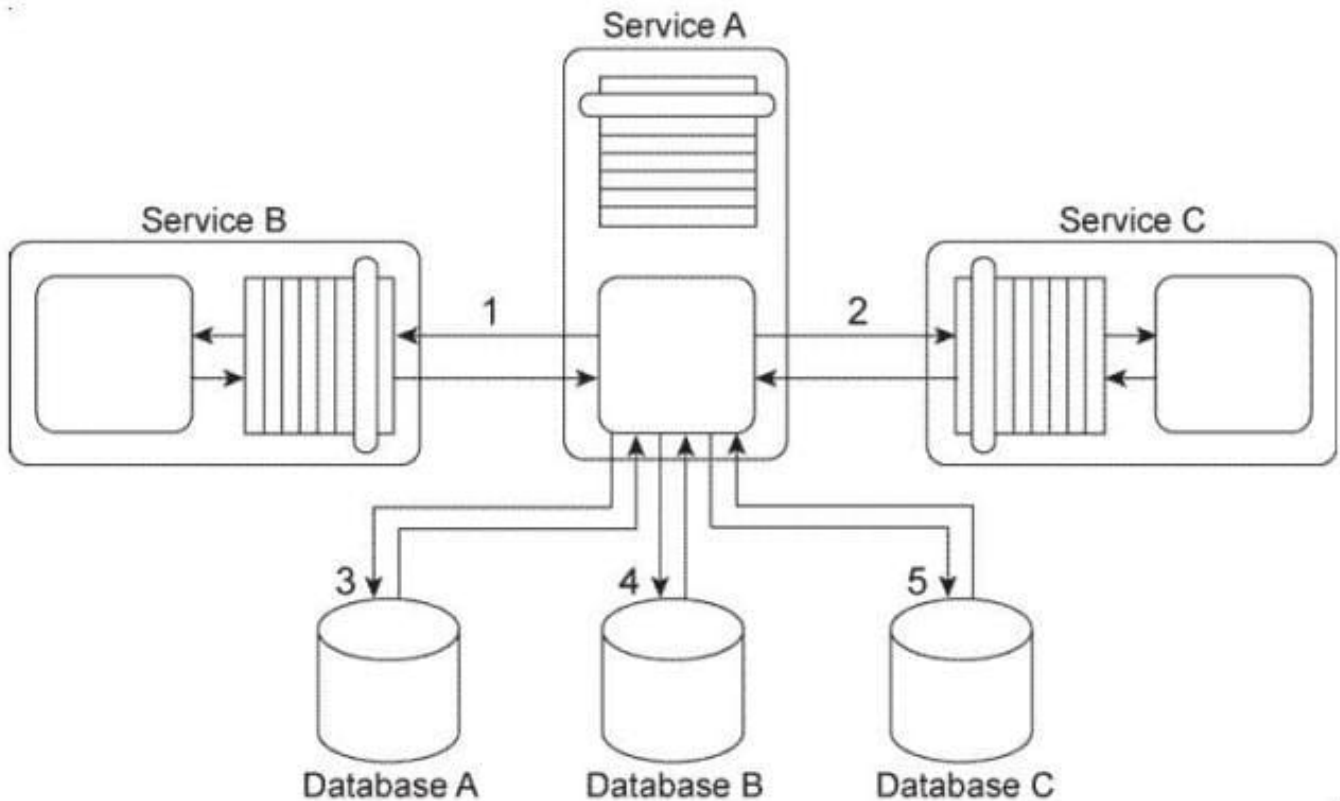
Service A is an entity service that provides a set of generic and reusable service capabilities. In order to carry out the functionality of any one of its service capabilities, Service A is required to compose Service B

(1) and Service C (2) and Service A is required to access Database A (3), Database B (4), and Database C (5). These three databases are shared by other applications within the IT enterprise.

All of service capabilities provided by Service A are synchronous, which means that for each request a service consumer makes. Service A is required to issue a response message after all of the processing has completed.

Depending on the nature of the service consumer request, Service A may be required to hold data it receives in memory until its underlying processing completes. This includes data it may receive from either Service A or Service B or from any of the three shared databases.

Service A is one of many entity services that reside in a highly normalized service inventory. Because Service A provides agnostic logic, it is heavily reused and is currently part of many service compositions.



You are told that Service A has recently become unstable and unreliable. The problem has been traced to two issues with the current service architecture. First, Service B, which is also an entity service, is being increasingly reused and has itself become unstable and unreliable. When Service B fails, the failure is carried over to Service A . Secondly, shared Database B has a complex data model. Some of the queries issued by Service A to shared Database B can take a very long time to complete. What steps can be taken to solve these problems without compromising the normalization of the service inventory?

A. The Redundant Implementation pattern can be applied to Service A, thereby making duplicate deployments of the service available. This way, when one implementation of Service A is too busy, another implementation can be accessed by service consumers instead. The Service Data Replication pattern can be applied to establish a dedicated database that contains an exact copy of the data from shared Database B that is required by Service A .

B. The Redundant Implementation pattern can be applied to Service B, thereby making duplicate deployments of the service available. This way, when one implementation of Service B is too busy, another implementation can be accessed by Service A instead. The Service Data Replication pattern can be applied to establish a dedicated database that contains an exact copy of the data from shared Database B that is required by Service A .

C. The Redundant Implementation pattern can be applied to Service B, thereby making duplicate deployments of the service available. This way, when one implementation of Service B is too busy, another implementation can be accessed by Service A instead. The Service Data Replication pattern can be applied to establish a dedicated database that contains a copy of the data from shared Database B that is required by Service A . The replicated database is designed with an optimized data model in order to improve query execution performance.

D. None of the above.

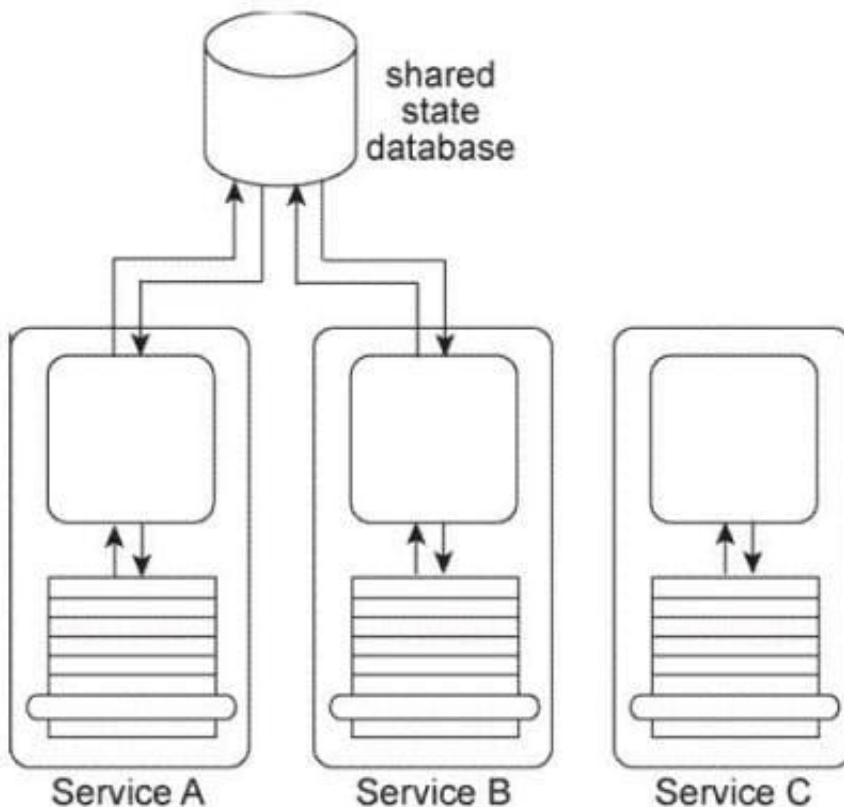
Correct Answer: C

QUESTION 6

Services A, B, and C are non-agnostic task services. Service A and Service B use the same shared state database to defer their state data at runtime.

An assessment of these three services reveals that each contains some agnostic logic, but because it is bundled together with the non-agnostic logic, the agnostic logic cannot be made available for reuse.

The assessment also determines that because Service A and Service B and the shared state database are each located in physically separate environments, the remote communication required for Service A and Service B to interact with the shared state database is causing an unreasonable decrease in runtime performance.



You are asked to redesign this architecture in order to increase the opportunity for agnostic service logic to be reused and in order to decrease the runtime processing demands so that performance can be improved. What steps can be taken to achieve these goals?

A. The Enterprise Service Bus pattern can be applied to establish an environment whereby the Process Abstraction and Process Centralization patterns are naturally applied, resulting in a clean separation of non-agnostic task services from newly designed agnostic services that are further shaped into reusable services by the application of the Service Reusability principle.

B. The Process Centralization pattern can be applied, resulting in a redesign effort where agnostic logic is removed from the three task services so that they only encapsulate non-agnostic logic. The agnostic logic is then moved to one or more new agnostic services that are shaped into reusable services by the application of the Service Reusability principle. The Process Abstraction pattern is then applied to the redesigned task services Service A and Service B, so that their logic is physically centralized, turning them into orchestrated task services.

C. The Process Abstraction pattern can be applied, resulting in a redesign effort where agnostic logic is removed from the three task services so that they only encapsulate non-agnostic logic. The agnostic logic is then moved to one or more new agnostic services that are shaped into reusable services by the application of the Service Reusability principle. The Orchestration pattern can be further applied to establish an environment whereby the Process Centralization pattern is naturally applied to Services A and B and the State Repository pattern is naturally applied to further help avoid remote communication by providing a local and centralized state database that can be shared by both services.

D. None of the above.

Correct Answer: C

QUESTION 7

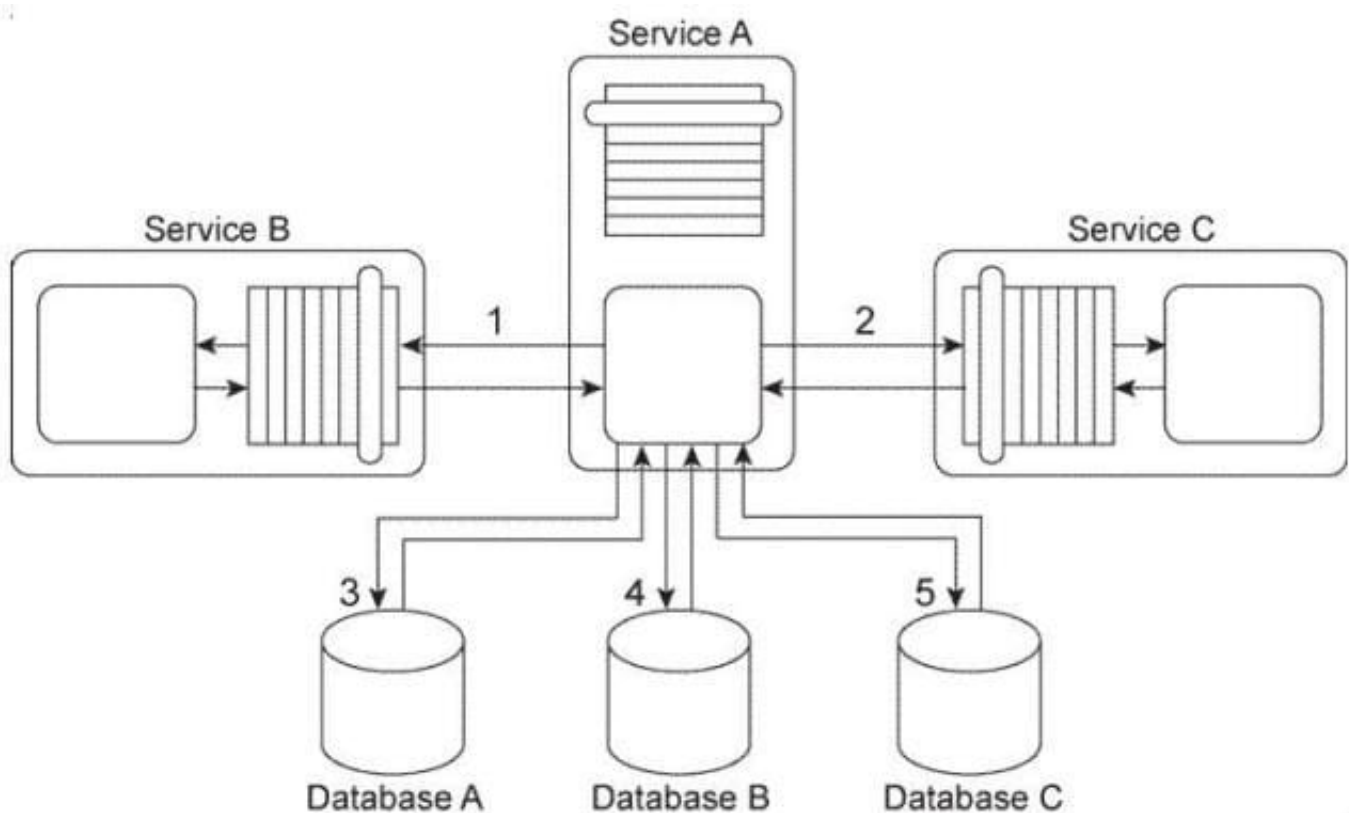
Service A is an entity service that provides a set of generic and reusable service capabilities. In order to carry out the functionality of any one of its service capabilities, Service A is required to compose Service B

(1) and Service C (2) and Service A is required to access Database A (3), Database B (4), and Database C (5). These three databases are shared by other applications within the IT enterprise.

All of service capabilities provided by Service A are synchronous, which means that for each request a service consumer makes. Service A is required to issue a response message after all of the processing has completed.

Depending on the nature of the service consumer request, Service A may be required to hold data it receives in memory until its underlying processing completes. This includes data it may receive from either Service A or Service B or from any of the three shared databases.

Service A is one of many entity services that reside in a highly normalized service inventory. Because Service A provides agnostic logic, it is heavily reused and is currently part of many service compositions.



You are told that Service A has recently become unstable and unreliable and several of the service consumers that access it have had to raise runtime exceptions due to these problems. What steps can be taken to solve these problems without compromising the normalization of the service inventory?

A. The Service Autonomy principle can be applied to increase the physical isolation of Service A and to reduce dependencies Service A has on external resources. In support of this, the Service Data Replication pattern can be applied in order to establish a dedicated database that contains replicated data from shared Databases A, B, and C . Furthermore, the Redundant Implementation pattern can be applied so that the logic Service A requires from Services B and C can be redundantly placed inside of Service A . This way, Service A avoids having to separately compose Services B and C

B. The Service Statelessness principle can be applied with the help of the State Repository pattern in order to establish a state database that Service A can use to defer state data it may be required to hold for extended periods. The Service Autonomy principle can also be applied in order to increase the physical isolation of Service A and to reduce

dependencies Service A has on external resources. In support of this, the Service Data Replication pattern can be applied in order to establish a dedicated database that contains replicated data from shared Databases A, B, and C.

C. The Service Loose Coupling and Standardized Service Contract principles can be applied by introducing a separate utility service that provides centralized data access to the Databases A, B, and C, and exposes a standardized service contract that can be used by Service A. This will prevent Service A from direct dependencies on the shared databases in case any of them are replaced in the future. By following this approach, the Legacy Wrapper pattern is effectively applied via the introduction of the new utility service.

D. None of the above.

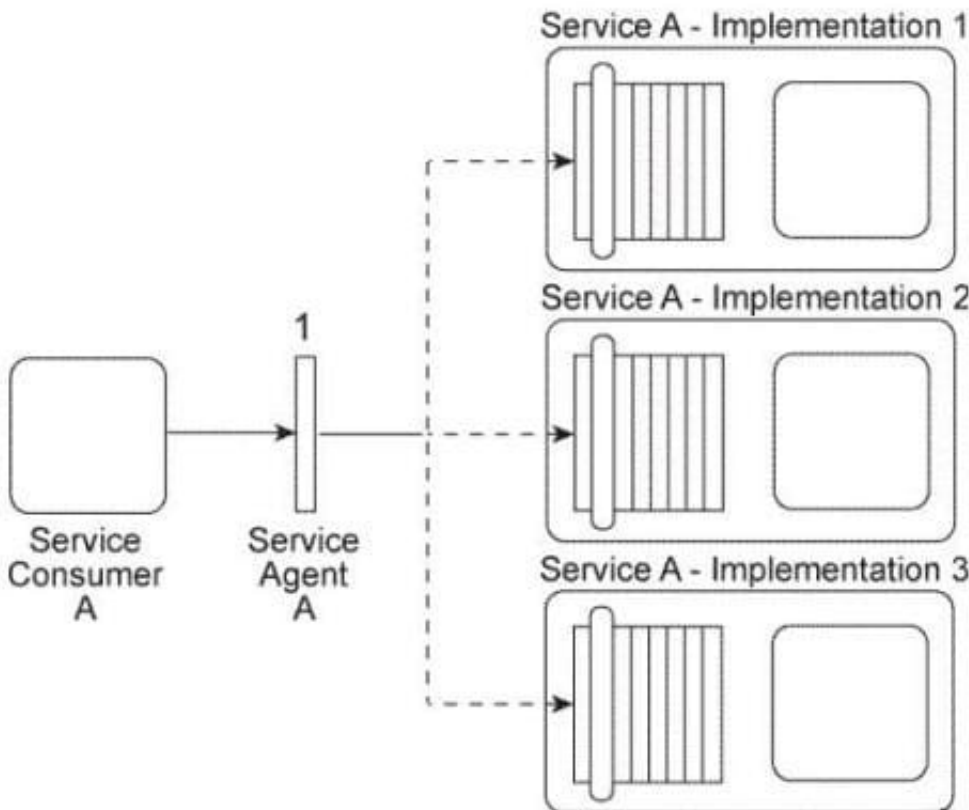
Correct Answer: B

QUESTION 8

Service Consumer A sends a message to Service A. There are currently three duplicate implementations of Service A (Implementation 1, Implementation 2, Implementation 3).

The message sent by Service Consumer A is intercepted by Service Agent A (1), which determines at runtime which implementation of Service A to forward the message to.

All three implementations of Service A reside on the same physical server.



You are told that after Service A was deployed, each of its three implementations was claimed by a different IT department, which means each implementation of Service A has a different owner. You are informed that a new service capability will soon need to be added to Service A. This service capability will introduce new business logic specific to Service A as well as logic required to access a shared database. What steps can be taken to ensure that the service

owners will each add the service capability in a consistent manner to their respective implementations of Service A?

A. The Contract Centralization pattern can be applied so that when the new service capability is added, the Service A service contract will become the primary contact point for Service A . This will avoid Service Consumer A or any other potential service consumer from being designed to access the shared database directly. The Service Abstraction principle can be applied to further hide the implementation details so that Service Consumer A and other service consumers are unaware of the fact that the shared database is being accessed.

B. The Legacy Wrapper pattern can be applied to establish a new wrapper utility service that will provide standardized data access service capabilities for the shared database. This will avoid Service A from having to access the shared database directly and will further support the application of the Service Loose Coupling principle between Service A and the new utility service. By abstracting the data access logic into the wrapper service, there is no need to add the new service capability to each implementation of Service A .

C. The Standardized Service Contract principle is applied to ensure that the new service capability is consistently added to the service contract of each implementation and that it extends the existing Service A service contract in a manner that is compliant with current design standards. The Service Loose Coupling principle is applied to ensure that the new service capability remains decoupled from the underlying logic and implementation so that Service Consumer A does not become indirectly coupled to any new logic or to the shared database.

D. None of the above.

Correct Answer: C

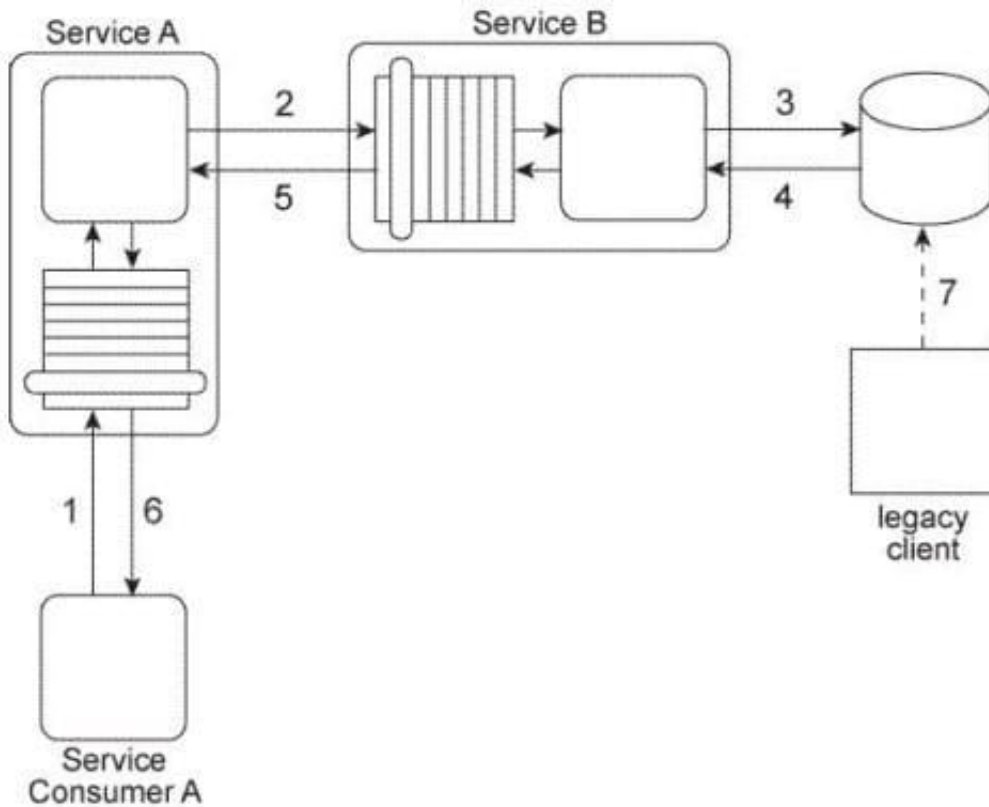
QUESTION 9

Service A is an entity service that provides a Get capability that returns a data value that is frequently changed.

Service Consumer A invokes Service A in order to request this data value (1). For Service A to carry out this request, it must invoke Service B (2), a utility service that interacts (3.4) with the database in which the data value is stored, Regardless of whether the data value changed. Service B returns the latest value to Service A (5), and Service A returns the latest value to Service Consumer A (6).

The data value is changed when the legacy client program updates the database (7). When this change happens is not predictable. Note also that Service A and Service B are not always available at the same time.

Any time the data value changes. Service Consumer A needs to receive it as soon as possible. Therefore, Service Consumer A initiates the message exchange shown in the Figure several times a day. When it receives the same data value as before, the response from Service A is ignored. When Service A provides an updated data value, Service Consumer A can process it to carry out its task.



Because Service A and Service B are not always available at the same times, messages are getting lost and several invocation attempts by Service Consumer A fail. What steps can be taken to solve this problem?

- A. The Asynchronous Queuing pattern can be applied so that messaging queues are established between Service A and Service B and between Service Consumer A and Service A . This way, messages are never lost due to the unavailability of Service A or Service B .
- B. The Asynchronous Queuing pattern can be applied so that a messaging queue is established between Service A and Service B . This way, messages are never lost due to the unavailability of Service A or Service B . The Service Agent pattern can be further applied to establish a service agent that makes a log entry and issues a notification when re-transmission attempts by the messaging queue exceeds a pre-determined quantity.
- C. The Asynchronous Queuing pattern can be applied so that a messaging queue is established between Service Consumer A and Service A. This way, messages are never lost due to the unavailability of Service A or Service B. The Service Agent pattern can be further applied to establish a service agent that makes a log entry each time a runtime exception occurs.
- D. None of the above.

Correct Answer: A

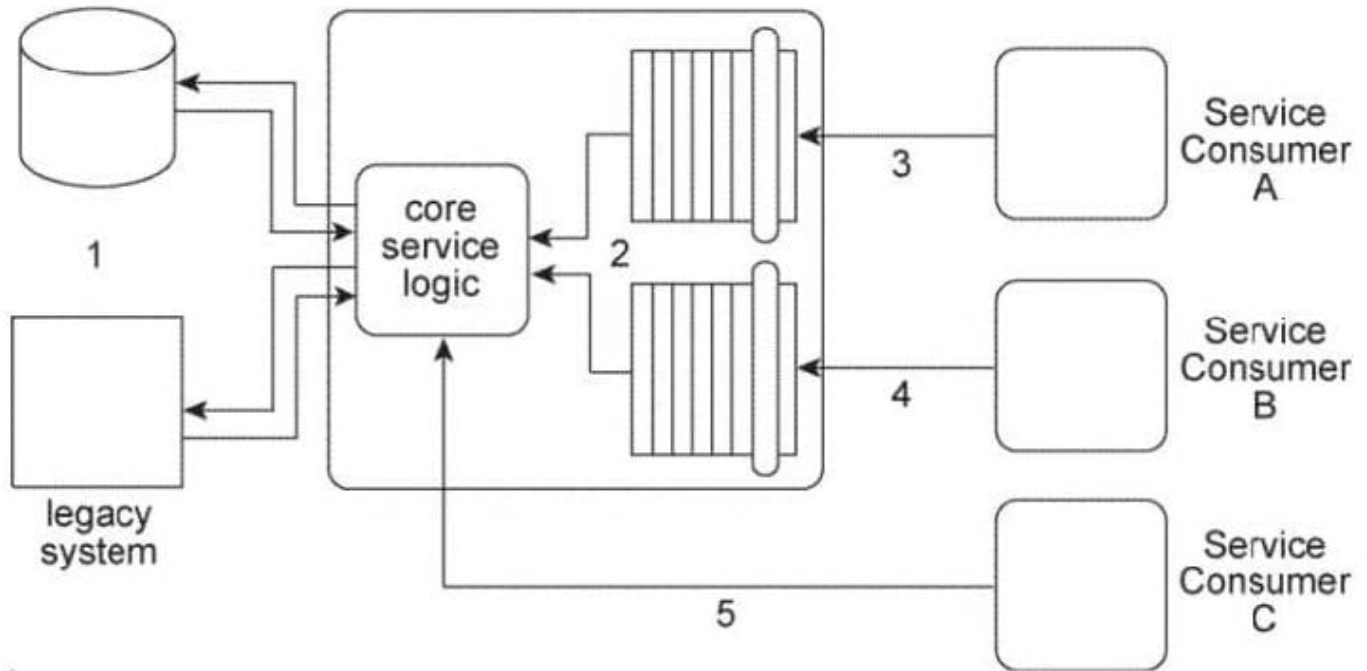
QUESTION 10

The architecture for Service A displayed in the Figure shows how the core logic of Service A has expanded over time to connect to a database and a proprietary legacy system (1) and to support two separate service contracts (2) that are accessed by different service consumers.

The service contracts are fully decoupled from the service logic. The service logic is therefore coupled to the service

contracts and to the underlying implementation resources (the database and the legacy system).

Service A currently has three service consumers. Service Consumer A and Service Consumer B access Service A's two service contracts (3, 4). Service Consumer C bypasses the service contracts and accesses the service logic directly (5).



You are told that the database and legacy system that are currently being used by Service A are being replaced with different products. The two service contracts are completely decoupled from the core service logic, but there is still a concern that the introduction of the new products will cause the core service logic to behave differently than before. What steps can be taken to change the Service A architecture in preparation for the introduction of the new products so that the impact on Service Consumers A, B, and C is minimized?

A. The Service Abstraction principle can be applied to hide the implementation details from the core service logic of Service A, thereby shielding this logic from changes to the implementation. In support of this, the Service Facade pattern can be applied to position Facade components between the core service logic and Service Consumers A and B. These Facade components will be designed to regulate the behavior of Service A. The Contract Centralization pattern can be applied to force Service Consumer C to access Service A via one of its existing service contracts.

B. A third service contract can be added together with the application of the Contract Centralization pattern. This will force Service Consumer C to access Service A via the new service contract. The Service Facade pattern can be applied to position a Facade component between the new service contract and Service Consumer C in order to regulate the behavior of Service A. The Service Abstraction principle can be applied to hide the implementation details of Service A so that no future

service consumers are designed to access any of Service A's underlying resources directly.

C. The Service Facade pattern can be applied to position Facade components between the core service logic and the two service contracts. These Facade components will be designed to regulate the behavior of Service A. The Contract Centralization pattern can also be applied to force Service Consumer C to access Service A via one of its existing service contracts.

D. None of the above.

Correct Answer: C

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