1. **Essay**
2. **Apa jebakan dalam mengadopsi SOA? Jelaskan bagaimana menghindari perangkap tersebut!** **(10%)**.

**Answer:**

1. **Pitfall 1: SOA is the Solution**

(Thomas Erl, 2005) **SOA is an architecture rather than a solution** that **is a collection of instructions for putting a system in place** and **reveals some of the knowledge required to use the design efficiently**.

**To avoid this kind of pitfall:**

List all defined problem at the beginning and choosing SOA to solve a business challenge is a decision to look for a solution based on a set of requirements.

1. **Pitfall 2: Publish Whole System in one Graphic User Interface (GUI)**

(Thomas Erl, 2005) In compared to other software designs, a **SOA offers some significant benefits such as more agile** because everything is **separated into services (components)** and **each service can be reused in a simple way**.

**To avoid this kind of pitfall:**

Make SOA service design a separate and distinct phase in the software development life cycle and should be designed as externally facing business functions rather than technical software modules (even when they are implemented as technical software modules).

1. **Pitfall 3: Leaving SOA to the IT governance**

(Thomas Erl, 2005) When the SOA process is mostly handled by IT, **services may be built to enhance software speed and convenience of use rather than to represent the application's business functions**.

**To avoid this kind of pitfall:**

Recognize that SOA design is a joint effort between the business and IT departments including bring all parties to the "meeting table".

**REFERENCES :**

Erl, T. (2005). Service-Oriented Architecture: Concepts, Technology, and Design.

1. **Apa perbedaan antara orkestrasi dan koreografi? Bagaimana Anda memutuskan kapan menggunakan orkestrasi dan koreografi?** **(15%)**.

**Answer:**

**Take example analogy as Orchestral Music and Jazz.**

**Orchestrations:**

A conductor is required in an orchestra and every note of music for every role in the orchestra is on the conductor's stand. The music must be performed exactly as the conductor directs.

**Choreography:**

There is no conductor in a traditional Jazz band, and performers will improvise other players for various sections. In choreography, this is exactly how each constrained context interacts.

**When to Used Orchestration or Choreography:**

(Thomas Erl, 2005) If a web service includes several tools, such as payment, order, login, and so on, it might be registered, but only one component would be operational, each constrained context would register in choreography, and each component would only be aware of the events that concern them. But, In Orchestrations, orchestrator know all the process given in the web services.

**REFERENCES :**

Erl, T. (2005). Service-Oriented Architecture: Concepts, Technology, and Design.

1. **Jelaskan detail dan beri contoh apa yang dimaksud dengan enterprise logic!** **(15%)**.

**Answer:**

(Thomas Erl, 2005) Business logic is a catch-all phrase for logic that is part of an application's non-technical purpose, i.e. logic that exists for a functional reason rather than a technological one such as when restrict a person access to website because they are not fillable in term of age and there is no technical reason why those are prohibited.

Enterprise logic is similar to Business logic, with the exception that it is meant to be reusable across the company's numerous apps. For example, if you utilize a bank as a payment method, you might wish to reuse the credit card number verification logic across multiple different applications. The credit card verification logic in this situation is corporate logic.

**REFERENCES :**

Erl, T. (2005). Service-Oriented Architecture: Concepts, Technology, and Design.

1. **Jelaskan 8 prinsip umum SOA dan berikan contoh!** **(10%)**.

**Answer:**

1. **Loose Coupling**

A system can be loosely linked in various dimensions, and depending on the requirements and circumstances, it may be loosely coupled in some and firmly coupled in others, such as:

1. **Time**

User or Client don't have to be up and running at the same moment to communicate when they're loosely tied in time. This necessitates some form of buffering/queuing in between them, albeit the method used is unimportant. (Thomas Erl, 2005) **Example of this is** when one participant delivers a message to the other, the processing does not rely on an instantaneous response message (neither logically, nor physically).

1. **Location**

(Thomas Erl, 2005) **Example of this** if participants inquire for the address of participants with whom they wish to speak, the location can change without requiring the communication partners to be re-programmed, reconfigured, or even restarted. This suggests a lookup operation including a directory or address containing service endpoint addresses.

1. **Type**

(Thomas Erl, 2005) User or Client can either rely on all or only sections of a document structure to accomplish its task. **Example of this** analogous to the concepts of static vs. dynamic and weak vs. strong typing in programming languages.

1. **Version**

(Thomas Erl, 2005) Service providers should be set up to take as many distinct versions as feasible, allowing them to be more liberal in what they accept (and maybe even tolerating errors), while service users should do their best to adhere to strict grammar and document types. **Example of this** is improve features of overall system and minimize error.

1. **Cardinality**

(Thomas Erl, 2005) **Example of this** is when a request/response interaction occurs or an explicit message queue is employed, there may be a 1:1 connection between service users and service providers. In other circumstances, a service customer (also known as a "message sender" or "event source") may be unaware of or unconcerned with the number of receivers of a message.

1. **Lookup**

(Thomas Erl, 2005) This refers to a registry and/or repository that can match a customer's requirements to a provider's capabilities. **Example of this** is built system as user needs in business capability.

1. **Interface**

**Example of this** when User or Client may demand that a service-specific interface be followed, or they may accept a generic interface. (Thomas Erl, 2005) If a generic interface is implemented, all participants who consume it can communicate with all participants who provide it. While this may appear strange at first glance, the WWW's design is built around the concept of a single generic (uniform) interface.

1. **Service Contract**

**Example of this** is services that must connect with one another must employ a contract that includes the address, name, function, and service-specific input and output data. (Thomas Erl, 2005)This contract is the only method to identify the service recipients to codify, thus it must be done carefully.

1. **Autonomy**

(Thomas Erl, 2005) A service provider cannot rely on its customers' capacity to swiftly adapt to a new version of the service such as some customers may not be able or willing to adapt to a new version of the service interface at all. **Example of this** when services can be updated, deployed, versioned, and maintained separately from one another.

1. **Abstraction**

(Thomas Erl, 2005) The service should not reveal how it performs its functions; instead, it should inform the client application of what it does rather than how it does it. **Example of this** similar to Java Programming concept like private method.

1. **Reusability**

(Thomas Erl, 2005) Reusability is a huge subject in every development organization since organization didn’t wants to spend time and effort writing the same code over and over again for various applications that demand it. **Example of this** is when a web service's code is built, it should be able to interact with a variety of application types.

1. **Composibility**

(Thomas Erl, 2005) Services interact with one another, resulting in a variety of granularities that allow them to cover the operation and performance of a subsystem. **Example of this** is make services must be able to be integrated with one another.

1. **Statelessness**

(Thomas Erl, 2005) Information should not be withheld from one state to the next and have to be done from either the client application or the server application. **Example of this** is add product to a shopping cart and navigates to the payment page, web service should not be responsible for the price of the item being transmitted to the payment page.

1. **Discoverability**

Advantage of this technology is that it allows the user to select service providers based on a variety of criteria, including quality, affordability, and support. **Example of this** is Users must be able to deduce, find, and extract information from the interface defined for the service.

**REFERENCES :**

Erl, T. (2005). Service-Oriented Architecture: Concepts, Technology, and Design.

1. **KASUS 1**

P.T. HealthOp adalah sebuah perusahaan yang bergerak di bidang marketing, sales dan perndistribusian alat-alat Kesehatan. Peralatan Kesehatan didapat dari berbagai vendor, terdiri dari vedor local maupun internasional. Bisnis utama P.T. HeaklthOp adalah untuk mendistribusikan alat-alat kesehatan kepada rumah sakit maupun kepada dokter-dokter praktek sesuai dengan pemesanan serta mengurus pembelian alat-alat kesehatan melalui vendor-vendor terkait.

P.T. HealthOp sendiri adalah perusahaan besar dengan banyak cabang dan total karyawan kurang lebih 1000 orang. Sistim pemesanan dan keuangan yang digunakan pada P.T. HealthOp sudah berjalan selama 10 tahun, namun dengan bertambahnya vendor baru, product baru dan customer (rumah sakit/dokter) baru, sangat sulit untuk memindahkan data dari vendor ke sistim mereka karena setiap vendor memiliki sistim sendiri-sendiri yang berbeda dengan sistim yang dimilik P.T. HealthOp saat ini. Yang perlu dilakukan oleh P.T. HealthOp adalah mengontrol pemesanan dan pengiriman barang. Semua pemesanan barang harus melalui P.T.HealthOp. 30% dari harga total harus dibayarkan saat konfirmasi pembelian oleh pihak Rumah Sakit/dokter. Sisa nya dapat dibayarkan saat barang tiba.

Divisi IT saat ini sedang merencanakan untuk mengimplementasikan SOA dan meminta anda sebagai konsultan SOA untuk memberikan saran.

**Jawablah pertanyaan di bawah ini seputar kasus di atas:**

1. **Buatkan Business Context diagram untuk bisnis P.T. HealthOp** **(5%)**.

**Answer (For Better View, I have Attach The Original Picture in Zip File):**

Diagram, schematic

Description automatically generated

1. **Buatkan Business Process Model untuk proses pemesanan barang** **(10%)**.

**Answer (For Better View, I have Attach The Original Picture in Zip File):**

A screenshot of a computer

Description automatically generated with low confidence

1. **Rancanglah servis integrasi yang sesuai untuk kasus ini berikut dengan security yang diperlukan** **(10%)**.

**Answer (For Better View, I have Attach The Original Picture in Zip File):**

**Overall Integration:**

Diagram

Description automatically generated

**Process Order:**

Diagram

Description automatically generated

**Shipping Service:**

Diagram

Description automatically generated

1. **KASUS 2**

Anda adalah seorang analis kebijakan teknologi informasi yang bekerja pada pada salah satu institusi kementerian di Pemerintahan Indonesia. Anda memimpin sebuah proyek IT pada salah satu institusi kementerian di Pemerintahan Indonesia. Kondisi saat ini, semua dokumen di tanda tangani secara fisik. Namun karena pandemi, tanda tangan fisik di atas kertas menjadi sulit dilakukan. Untuk itu, diputuskan, semua dokumen yang ada di tanda tangani secara digital menggunakan sistem QR Code. Sehingga institusi ini harus membuat sistem tanda tangan digital berbasis QR Code. Terdapat banyak hal yang perlu dilalukan dalam proyek ini antara lain sebagai berikut : Semoga pegawai di institusi ini harus dapat mengakses dan dapat melakukan tanda tangan digital. Sistem kepegawaian harus terintegrasi dengan sistem tanda tangan digital ini. Sistem persetujuan dari berbagai sistem informasi yang ada di institusi ini termasuk berbagai sistem administrasi internal maupun berbagai sistem informasi pelayanan publik. Sistem yang dibangun harus menyesuaikan dengan proses bisnis dan tata kelola yang berjalan di insititusi ini. Terdapat alur kerja dan tingkatan persetujuan yang harus dilalui sebuah berkas. Sebuah berkas tidak dapat di tanda tangani oleh pejabat level di atas nya jika pejabat level dibawahnya belum memberikan tanda tangan. Alur kerja tanda tangan sebuah dokumen dapat terjadi pengulangan jika salah satu pejabat meminta revisi.Sistem ini mengitegrasikan semua aspek mekanisme persetujuan di seluruh proses bisnis yang ada di dalam institusi ini. Sistem yang dibangun juga wajib mengakomodasi mekanisme pengecekan keabsahaan dan keaslian tanda tangan digital. Nama yang tertera di dokumen sebagai penanda tangan harus orang yang sesuai yang tercatat di dalam sistem. Selain itu, sistem yang dibangun mematuhi dan tersertifikasi terhadap standar sistem tanda tangan digital yang di atur oleh Badan Siber dan Sandi Negara (BSSN).

**Berdasarkan kasus di atas, Anda diminta untuk:**

1. **Analisis proses bisnisnya dan modelkan dengan BPMN (Business Process Modeling Notation) pada kasus di atas** **(10%)**.

**Answer (For Better View, I have Attach The Original Picture in Zip File):**

Graphical user interface, application

Description automatically generated

1. **Melakukan analisa dan mendesain arsitektur SOA pada sistem ini yang terdiri atas** **(10%):**

**Answer (For Better View, I have Attach The Original Picture in Zip File):**

Diagram

Description automatically generated

1. **Melakukan analisa apakah diperlukan Enterprise Service Bus (ESB) pada kasus ini? jelaskan alasannya dan berikan contoh penerapannya terkait kasus di atas** **(5%)**.

**Answer:**

ESB stands for Enterprise Service Bus, and it is a software architecture application model for designing and implementing interaction and communication amongst interacting applications in SOA. Its primary function is to integrate disparate and sophisticated enterprise applications. The analog bus in the hardware architecture of computer devices was used to establish this notion.

Shape, polygon

Description automatically generated

Each client routes all requests through the ESB rather than directly to the server to keep track of service traffic and log it in message exchange and service delivery standardization. Apps will interact across a bus in an enterprise architecture that uses ESB, which functions as a single message channel between applications and decreases the amount of point-to-point connections required for communication between apps. As a result, assessing the impact of software changes becomes easier and simpler to monitor, modify, and add number of interactions to and from a specific application is reduced.

The Indonesian government will implement an ESB system in ministerial institutions. When there is war, monetary policy, or other emergency events that endanger national security, the Indonesian Ministry of Security may need to be steady, swift, and efficient. **So, when a problem happens in the system, the usage of ESB is critical** so that you can quickly determine whether there is a fault in any function and not all are affected, allowing you to rapidly resolve the issue.