IT INFRASTRUCTURE REPORT
[DEXIAO YE 827499]
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Report Prepared for Assignment A03

ISYS90048 Managing ICT Infrastructure

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Question1.

Sascar is committed to providing real-time vehicle monitoring service to about 116,000 registered customers across 15,000 companies. To improve the efficiency and quality of the service, Sascar should adopt service-oriented architecture SOA as the basis of its ICT infrastructure.

The analysis is divided into two parts:

- Analysis of what are the factors that encourage Sascar to adopt SOA.
- Discussion on how does Sascar solve some issues by the adoption of SOA.

The analysis is based on the assumption that Sascar keeps the original global positioning system in the new platform.

Analysis of drivers

With the increasing size of business, Sascar is facing some structural IT problems:

- **Availability:** The system could not keep up with the speed of message generation, which caused process delays. Therefore, the respond time of the system requires acceleration. It means that the service requires higher availability.
- **Scalability:** The data volume held by Sascar is increasing at 6-gigabyte per day, therefore Sascar always requires new storage systems to handle the increasing amount data. It means that the system lacks scalability.
- **Integration:** Sascar needs a more robust IT infrastructure with greater stability. However, Sascar does not integrate proprietary software, global positioning system, load and fleet management and data storage. In addition, it is hard for Sascar to manage 70 servers, which also requires integration.

- **Reusability:** It is expensive to abandon legacy system.

The current situation requires Sascar to adopt a software design architecture to enhance the system. SOA is one of the best options for Sascar. With adopting SOA, Sascar could achieve following improvements.

- Improve the availability of the service so that customers can have instant access to the information they are looking for.
- Scalability can be achieved so that Sascar is able to provides service to more and more customers.
- With creating an infrastructure for the system, different sub-systems can be integrated.
- Sascar is able to reuse the legacy system to reduce costs.

Discussion on the adoption of SOA

The discussion is based on four aspects of SOA: availability, scalability, integration and reusability.

Availability:

Evidence	1. "Oracle Exadata and Oracle Exalogic provide the foundation for Oracle WebLogic Suite 11g and Oracle SOA Suite, accelerating responses to customer inquiries about vehicle location." (p5)
Discussion	One of the benefits of adopting SOA is that it accelerates the response time to customer inquires. It solves the problem of low availability.

Scalability:

Evidence	1. "Suite and Oracle SOA Suite that has significant capacity for growth Achieved significant data compression with Oracle Hybrid Columnar Compression, reducing the need to add storage systems to support growth in data…" (p7)

Discussion	With the significant capacity in the new system, Sascar is able to deal with rapid growth of data and does not need to add new storage systems. It makes the system have the property of high scalability. Loose-coupling is a huge advantage of SOA. (Pulier&Taylor, 2006) It means the dependency of different components is minimized, because the infrastructure can be divided into various services. It makes the architecture of the system can be easily scaled up.

Integration:

Evidence	1. “Integrated and reconciled vehicle monitoring, load and fleet management, and telemetry data” (p7) 2. “Replaced approximately 70 servers with Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud”(p6)
Discussion	Integration makes the different components in the system can easily communicate with each other. It transforms the IT system into a high performance environment. Via Enterprise Service Bus(ESB), SOA provides an approach to interconnect all the services. (BAO, 2008) It can save costs and time loss for integrating major applications. When Sascar adopts SOA, it can easily integrate applications and sub-systems in a cost-effective way.

Reusability:

Evidence	1. “Replaced older applications with a modern, Java-based system built on Oracle WebLogic Suite and Oracle SOA Suite” (p7) 2. “Reduce a large number of servers, saving physical space and reducing maintenance costs” (p7)
Discussion	With migrating the system to Oracle database and cloud, Sascar does not reuse the original application to a great extent. The good thing is that Sascar keeps the original global positioning system(assumption). In addition, evidence 2 indicates that migrating to Oracle platform can save great costs. It fulfills the main purpose of re-use -- cost saving. However, it takes time and cost to adapt to the new application.

Question3.

Interoperability is a critical success factor in system interaction, as it enables seamless

exchange of messages among systems. (Kubicek&Cimander, 2009) The interoperability(IOP) can be separated into three layers, which are namely technical IOP, semantic IOP and organizational IOP. The feature of three layers can be summarized in the following table (Kubicek&Cimander, 2009)

Layer of IOP	Aim	Objects	Potential solutions
Technical IOP	Provides the standards of data communication	Signals	Protocol of data transfer/ format of data
Semantic IOP	Ensure that the precise meaning of exchanged information is unambiguously interpretable	Information	Ontologies, common directories
Organizational IOP	Making information available, easily identifiable, accessible throughout different information systems possibly across different geographic regions.	Processes	Architectural models, standardized process elements (e.g. SOA with WSDL, BPML)

The following content analyses the evidence in case study that indicates how Sascar handles technical, semantic and organizational interoperability.

Technical interoperability

Evidence	1. “Oracle partner Service IT Solutions supported Sascar in migrating to Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud.” 2. “Its approximately 60 million vehicles’ positions are transmitted daily through the global system for mobile communications (GSM/ GPRS) network to the company’s data center.” 3. “The old infrastructure could not keep up, sending approximately 20% of the messages to a backup queue, which was prone to cause processing delays”
Analysis	Evidence 1 indicates the procedure of migrating the system to a new platform with the help of the partner. The procedure of data transfer is

	decided by the partner. Evidence 2 shows the data transfer the data from GSM/GPRS to the data center. Besides3 shows how Sascar handles handles huge amount of messages. All these three evidence shows Sascar is seeking to achieve technical interoperability. However, the case study does not include details of data transfer, like protocol, network interface, data format and data security.

Semantic interoperability

Evidence	1. “Each company must have a large volume of real-time information—such as about vehicle location, departure and arrival, and load/unload data—at hand to support the rapid decision-making needed to recover vehicles or loads” 2. “Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud deliver real-time data for our management reports” 3. “The company uses its proprietary software and GSM/GPRS and satellite technologies to track and monitor vehicles, providing information that helps clients in fleet, risk management, and transportation industries to improve security and productivity.”
Analysis	The evidence 1 and 3 indicates Sascar is committed to ensure the precise meaning of the transferred data is understandable by the customers. The evidence 2 indicates that the information from Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud should be unambiguous to Sascar. These evidences show Sascar is on the right tack for achieving semantic interoperability. However, the case study does not show the specific operation that Sascar will perform to ensure the data is not misunderstood.

Organizational interoperability

Evidence	1. “Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud deliver real-time data for our management reports while serving as the platform for our proprietary fleet management and telemetry applications. With Oracle, we can offer more efficient vehicle monitoring and better fleet security to our clients” 2. “After considering alternatives on the market, Sascar selected Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud due to their excellent cost-benefit ratio.” 3. “Improved IT security with Oracle Exadata Database Machine’s ability to auto-diagnose system breakdowns”
Analysis	These evidences indicate that Sascar has defined clear business goals associated with the supplier. Besides the aim of above operations is to improve services to the user community and reduce cost, which meets the requirement of organizational interoperability.

Question4.

Information Technology Infrastructure Library(ITIL)is chosen as the ICT governance framework for Sascar. The first part of this section is identifying some evidences in the case study that is relevant with guidelines of ITIL. The second part justifies the choice of ITIL based on information in the case study and features of service oriented architecture.

Analysis of relevance

ITIL is a set of detailed practices for IT service management that focuses on aligning IT services with business goals. Compared with other ICT frameworks, ITIL describes in more detail of IT service management. It coincides with the the content of case study because the case study is mainly about how to efficiently deliver service and improve service quality.

The following table illustrates the relevance between the case study and the guidelines of ITIL. (Cartlidge et al., 2007)

Guidelines	Evidence	Analysis
Demand management: "understand and influence customer demand for services and the provision of capacity to meet these demands." (Service Strategy)	• "Sascar specializes in real-time vehicle monitoring solutions, with innovative and scalable technology, that allow significant savings due to better fleet use, with reduced operating costs and increased productivity and profitability for transport." • "Sascar increased data processing speeds and	Sascar clearly understands customer demands for services. In addition, Sascar is aware of the provision of capacity to meet these demands.

	simplified IT maintenance— essential for a company focused on real-time vehicle monitoring" • "provide high-quality, consistent load and route information to customers"…	
Financial Management: "covers the function and processes responsible for managing an IT service provider's budgeting, accounting and charging requirements"(Service Strategy)	• "Sascar selected Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud due to their excellent cost-benefit ratio."	With adopting a new platform, Sascar should clearly the manage financial issues to make sure the service is cost-effective
Capacity Management: "provide a point of focus and management for all capacity and performance-related issues"(Service Design)	• "Vehicle information collected by Sascar currently generates up to 5,000 messages per second… The new system is built to scale to 50,000 messages per second, 10x the previous amount handled." • "achieving a 10x data volume compression ratio— supporting Sascar's daily 6-gigabyte data growth"	Sascar has to deal with huge amount of data, so it is important for Sascar to manage the capacity of the system.
Information Security Management: "align IT security with business security and ensure that information security is effectively managed in all service" (Service Design)	• "Sascar's daily 6-gigabyte data growth" • "Sascar's trackers collect vehicle data through the global positioning system (GPS), and its approximately 60 million vehicles' positions are transmitted daily through the global	According to the evidences, Sascar deals with huge amount of data from its customer, therefore, any leakage of data is a disaster. So Sascar should have robust information security management to ensure the security of information.

	system for mobile communications (GSM/ GPRS) network to the company's data center"	
Supplier management: "obtain value for money from suppliers and to ensure that suppliers perform to the targets contained within their contracts and agreements"(Service Design)	• "Oracle partner Service IT Solutions supported Sascar in migrating to Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud." • "Oracle Exadata and Oracle Exalogic provide the foundation for Oracle WebLogic Suite 11g and Oracle SOA Suite, accelerating responses to customer inquiries about vehicle location."	According to the relevant evidence, Sascar greatly relies on its supplier. Sascar should develop plans for managing, maintaining and monitoring contracts and service delivery of suppliers.
Service Validation and Testing: "provide objective evidence that the new/changed service supports the business requirements" (Service Transition)	• "Replaced older applications with a modern, Java-based system built on Oracle WebLogic Suite and Oracle SOA Suite" • "replacement of approximately 70 servers with Oracle Exadata Database Machine and Oracle Exalogic Elastic Cloud."	Since the system of Sascar is migrated to a new platform and replace old applications with a new system, the new environment should tested carefully to make sure the new service is able to deliver business goals.
Incident management: "restore normal service as quickly as possible, and to minimize the adverse impact on business operations" (Service operation)	• "Sascar specializes in real time vehicle monitoring solutions" • "provide high-quality, consistent load and route information to customers" • "Improved IT security with Oracle Exadata Database Machine's ability to auto-diagnose system breakdowns"	The main aim of Sascar is to deliver real-time and high-quality service so that Sascar needs incident management to handle unplanned reduction in the quality of an IT service. Although Oracle Exadata Database Machine can restore from system breakdowns, Sascar should develop formal strategies to deal with incidents.

Justification

The above analysis of evidences demonstrates that ITIL is relevant to the case study thus this framework is suitable. Furthermore, Sascar is developing service oriented architecture, which aligns well with ITIL.

Firstly, both ITIL and SOA focus on the delivery of service. ITIL puts emphasis on technical aspect, while ITIL focuses on customer's demand. Combining them together can ensure efficient and high-quality delivery of service. In addition, one of the advantages of adopting ITIL is reducing costs. (Neničková, 2011) It aligns well with the SOA development of Sascar. Via SOA, Sascar can "reduce a large number of servers, saving physical space and reducing maintenance costs" which is also the aim of adopting ITIL. Finally, via adopting ITIL, Sascar would define an agreed level of service. It provides guidelines for service quality to the development of SOA. In SOA, the infrastructure can be divided into various services to achieve loose couple and ITIL can provide guidelines to each of the services.

In a nutshell, ILIL is the most appropriate ICT governance framework for Sascar.

References

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