Service Oriented Infrastructure Framework

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Abstract

The Service Oriented Infrastructure (SOI) is to apply Service Oriented Architecture (SOA) to IT Infrastructure. The role of IT is changing. IT infrastructure is not only associated with hardware, software, and network components any more, it is becoming more integrated with business operation strategies, and being operated as a business service as well. A Service Oriented Infrastructure Framework is introduced here, which consists of four categories of components: Service Planning, Service Systems, Service Management, and Service Stakeholders; while other SOI frameworks presented today mostly address the Service System category only. This SOI framework is helpful for SOI practice in establishing structure, life cycle, and governance.

1. Introduction

The wide adoption of Internet in our life and work has imposed much higher expectation to today’s businesses regarding to agility and responsiveness to new requirements and changes. The agility of business depends heavily on the flexibility of IT for automation. The complexity is growing fast for current IT infrastructure. It is required to serve ever extending enterprise needs. With technologies and products of many generations, and with stovepipe implementation, it can not meet the needs for current shared service environment that promotes collaboration, interoperation, and reduce cost by eliminating duplicated resources across organizations. Also, the continue innovation in technologies provides various possibilities to meet agile business needs, and it pushes for rapid evolution in IT infrastructure.

Due to the rapid changes and increasing complexity that IT infrastructures are experiencing, the most important factor to consider in moving forward is its flexibility in adapting to changes, instead of re-implementation based on existing and currently foreseeable technologies. It’s hard to predict new technologies for even two or three years from now, so that building future IT infrastructure based on currently available or foreseeable technologies is short sighted and in lure to the old problems. Also, most IT projects are failed due to lack of culture and people acceptance or corresponding processes instead of technology availability and technical implementations. Therefore, for a flexible and adaptable IT infrastructure, we should build a solid organizational foundation first to accommodate the evolution. This means that IT should involve into business strategies and decisions, and have long-term blueprint and big picture as guidance. IT infrastructure is no longer about only hardware, software, and network components; itself is a line of business that provides IT infrastructure related services as commodities for business organizations.

This SOI Framework is based on above considerations. It provides a holistic view of what involved in operating IT Infrastructure as a line of business.

2. SOI Framework

This SOI framework consists of four categories of components, as illustrated in Figure 1.

![Figure 1. A SOI Framework](image)

<table>
<thead>
<tr>
<th>Service Planning</th>
<th>Service Systems</th>
<th>Service Management</th>
<th>Service Stakeholders</th>
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<td>• External and Internal drivers</td>
<td>• Business processes and services</td>
<td>• System operation management</td>
<td>• Business decision makers</td>
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<td>• Strategies and objectives</td>
<td>• Application services</td>
<td>• IT service management</td>
<td>• Service providers</td>
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<td>• Economics and business cases</td>
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<td>• Business plan and models</td>
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<td>• Elected officials and regulatory bodies</td>
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<td>• LoB Enterprise Architectures</td>
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<td>• Performance measurement model</td>
<td>• Data center facilities</td>
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</table>

Security

Governance

Service Planning

The IT infrastructure service planning should be driven by business domain requirements, e.g. the external and internal drivers, so that to establish business improvement goals and objectives. The IT infrastructure service plan should contain vision, strategy, business service model, cost model, standards, organizational realignment, etc. It should be in line with the organization’s IT strategic plan. The segment enterprise architecture should be created for this line of business. The architecture should include both as-is and to-be architectures, as well as transition roadmap. Also, a performance measurement model should be created, which provides measurement guidance for IT infrastructure design, implementation, and operations.
The plan should well consider adaptability to changes in both business requirements and technologies, and be maintained as a live document with continuous improvement along the IT Infrastructure Service Life Cycle.

**Service Systems**

The service systems will be designed and implemented based on above service plan, which is to facilitate the implementation and deployment of business processes and services, applications and data, as well as infrastructure services. The service system implementation decisions should factor in the flexibility for changes, though it will have strong influence from available technologies. Business requirements drive technology decisions, and at the mean time, the new technologies will inspire business envisions and provide various possibilities for business being operated in a more effective and efficient way.

**Business Orientation:** The technology decisions for service systems should support business improvement goals, objectives, strategies, and models. It should enable business cases to be executed efficiently; and it should facilitate business processes and operations effectively. At the mean time, technology possibilities should be feed back to enable new business ideas.

**Flexible System Architecture:** Technology innovation is a continuous effort. Also, the pervasiveness of Internet based services demands businesses being more agile. A flexible architecture is important in coping with the rapid evolution of new technologies and new business requirements. For the Service Systems in SOI framework, we define the systems associated with the services they provide, and these services are defined with layers in business level, application level, infrastructure level, and physical level. For example, for the systems to support business collaboration service, its layered services will be:

- Business service: enterprise collaboration service
- Application services: video conferencing, email, etc.
- Infrastructure services: server virtualization, cloud computing, file service, etc.
- Physical level services: network, servers, data center, etc.

The upper level services can be unchanged for relatively longer term than the technologies implementing them. This means we can provide similar business, application services but with evolving technologies along time that enable continuous improvements in service quality, features, and options.

**Performance Driven:** Business needs to be measured by results and value. The system performance matrix should be derived from business performance indicators in performance measurement model created during service planning stage. Both business and system performance will be measured during operation by implementing an effective performance measurement system. The performance measurement system provides the base for performance review and for performance improvement across service life cycle.

**Service Management**

The service management component includes both system operation management and IT service management in functional level.

**System Operation Management:** The system operation management includes the management of IT system portfolio, system hardware and software, as well as networks and data centers. It also includes the management of applications and data that are resided and running on these systems.

**IT Service Management:** There is a well accepted framework for best practice approaches in IT service management, which is ITIL (Information Technology Infrastructure Library). The ITIL lifecycle can be applied to our SOI Framework as an integral part. The SOI framework provides the content base and the context for this best practice to be applied.

**Service Stakeholders**

The service stakeholders should be identified for roles and responsibilities, and should be aligned with business operational structures. At the mean time, the architecture should be defined independent of individual stakeholder, so that people changes will not affect organization structure, processes, and systems.

**3. Conclusions**

In response to the trend of evolution in IT and IT infrastructure, this paper introduced a service oriented infrastructure framework that applies service oriented architecture concept to the IT infrastructure domain. This framework is created from the perspective of dealing with IT infrastructure as a line of business, and segment enterprise architecture should be created specifically for IT infrastructure. This SOI framework demonstrated a complete picture in operating IT infrastructure as a service. It categorized and identified the involved service components, as well as their relationships and how they should play together in the IT infrastructure service life cycle. This paper can be served as a high level reference for IT infrastructure service planning, implementation, and operation.

**4. References**