

Enhanced Service Level Management Process as a Result of Best Practices Integration

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Abstract

This paper proposes to produce a hybrid of best practices in the field of Information and Communications Technologies (ICT). The aim is to empower the user to use a combination of multiple ICT best practices concurrently, leveraging off the strengths of some best practices to support the weakness of others. This goal would help organisations to solve the challenges faced when they need to get multiple standards of ICT best practices simultaneously, resulting in an enhanced integrated process. This paper focuses on the Service Level Agreement (SLA) process, following a “Best of Breed” approach on the four integrated best practices.

The main contribution of our research is the enhanced process, which has taken into consideration a combination of multiple ICT best practices. By following the steps and using the proposed systematic way for building the new integrated process, the organizations will be able to follow the multiple best practices and pass the standard audit. As a baseline, four best practices have been selected to apply this study, namely Information Technology Infrastructure Library (ITIL) V4 , Capability Maturity Model Integration (CMMI) V2, Enhanced Telecom Operations Map (eTOM) V18.5, and Control Objectives for Information and Related Technologies (COBIT) 2019 .

Keywords

SLAM, CMMI2, ITIL4, eTom18.5, COBIT 2019, Best of Breed.

1. Introduction

Nowadays, most organizations are convinced of the value in implementing process improvement standards and best practices. This is due to the high expectation on service quality to gain customer satisfaction and improve the business orientation. Business environments are increasingly driven to increase higher quality value to the stakeholders, improve customer loyalty and retention, corporate governance, market share and profit and to reduce overall costs. All these demands put increased pressure on organizations to become more and more effective. An efficient way of achieving this is better exploitation of ICT systems. This is a worldwide trend prompted by increasing interest and demands for greater levels of governance, audit, and control.

Best practices are a way of working that has been proven to be successful by multiple organizations, while a standard is a document, established by consensus and approved by a recognized body, that provides for common and repeated use, mandatory requirements, guidelines, or characteristics for that subject (AXELOS 2019). All best practices and standards are specialized in different focusing areas and some of them may offer ready-made templates to standardize business process documentation. In the Information technology (IT) world, best practices help businesses improve their services and security while maximizing the value of their investments. According to Gartner, an IT best practice is “a group of tasks that optimizes the efficiency (cost and risk) or effectiveness (service level) of the business discipline or process to which it contributes. It must be implementable, replicable, transferable, and adaptable across industries” (Gartner 2020).

Applying appropriate best practices and standards will enable the organization to work against objectives and achieve service quality. The available best practice guidance options can be easily confusing as to which one should be used for the organization. However, for many organizations, only using one body of best practice could mean that they are missing out some objectives requested by businesses. In fact, most of the best practices have been designed by different bodies with similar initiatives, with organizations encouraged to integrate them in a proper way.

Each best practice has some weaknesses and main strengths, and many best practices recommendations may not be applicable to all organizations but may be useful for specific service providers in particular situations. The final output in this paper are the enhanced processes, and the final goal is to provide the organization with more mature ICT processes, which can fit most ICT sectors, that improve the desired value that the business needs.

The identified problem is that many international companies are facing some difficulties when they want to get certified from different standards at the same time. Usually, in order to comply with the standards, it is recommended to be compliant with a certain best practice to be eligible to apply for the standard audit. As a consequence, one of the main challenges that companies are facing is that many of the processes are covered in multiple best practices, and thus they cannot follow the same process using different best practices at the same time. The benefits that will be earned from the integration are:

- Exploit the strengths of each model for further effectiveness.
- Design applications to run effectively in their intended environment.
- Define a common terminology and lexicon.
- As compliance and regulation become more prevalent and pervasive, the need for broader process capability and (especially) governance is essential.

The primary objective of this paper is to produce a hybrid of best practices, empowering the user to use a combination of multiple IT best practices concurrently, leveraging off the strengths of some best practices to support the weaknesses of others. The secondary objectives of this paper include:

- Integrating the processes between the selected IT best practices,
- Applying the Best of Breed approach for the selected subject to develop the enhanced processes. This approach is usually applied on products and systems to select the best parts that can meet the business requirements, then integrate them as an integrated solution, rather than the selection of one solution from a single vendor.

The rest of the paper is organized as follows. Section 2 provides a definition with a high level background about the best practices in scope, and it is shown how the integrated best practices overlap. Section 3 describes the steps needed for integrating any best practices and implementing the best practice integration between ITIL V4, CMMI V2, eTOM V18.5, and COBIT 2019. Finally, in Section 4 The "Best of Breed" approach is used in order to select the best parts of processes from the best practices and develop the new integrated process.

2. Background and scope

In the last years, most best practices' bodies are missing the integration and the mapping part with other best practices, and sometimes some best practices are linking some mature processes from others; however, they are not following the recent updates. For example, the ITIL Incident and Problem management processes are used by eTOM and are linked to ITILV3 processes, but not to ITIL V4 practices. The integration approach has started to be more popular recently. For example, ITIL V4 mentioned that ITIL Specialist books to be published in Q3 2019 would provide more information about the Integrations with other frameworks such as “Lean, Agile and DevOps”.

The best practices that are selected in this paper are:

- **Control Objective for Information and Related Technology (COBIT)**, with focus on Enterprise governance & management. It was developed by ISACA and it was initially released in 1996. The object of this best practice was to set the control objectives to help the financial audit community better manoeuvre in IT-related environments. The processes are split into governance and management “areas”. These 2 areas contain a total of 5 domains and 37 processes (ISACA 2018).

- **IT Infrastructure Library (ITILv4)**, with focus on Service management, was launched in February 2019. It was initially developed by United Kingdom's Central Computer and Telecommunications Agency (CCTA) in 1989, which recognized the value of delivering IT as a service and applying consistent reliable practices across the IT service lifecycle and developed Government Information Technology Infrastructure Management. ITILV4 contains 4 dimensions, 7 principles and it includes 34 practices in 3 areas (General management, Service Management & Technology management) (AXELOS 2019).

- **Capability-Maturity Model Integration (CMMI2) Framework**, with focus on Maturity improvement. It was developed by a group from industry, government, and the Software Engineering Institute (SEI) at Carnegie Mellon University. It is used to improve the processes across a project, division, or organization. CMMI is divided into 4 categories, 12 capabilities and 25 process areas (Eileen 2009).

- **The Enhanced Telecommunication Operating Manual (eTOM18.5)** A framework that focuses on Network Business processes. It was developed by the TM Forum, an association for service providers and their suppliers in the telecommunications and entertainment industries. eTOM is a comprehensive, industry-agreed, multi-layered view of the key business processes required to run an efficient, effective, and agile digital enterprise (TM Forum 2019). Level 1 is conceptually composed by three (3) focus areas:
 - Strategy, Infrastructure and Product (SIP)
 - Operations (OP)
 - Enterprise Management (EM)

3. Literature Review: The Analysis and Mapping

During the preparation of this paper several studies were checked and analysed focusing on aligning and mapping different best practices from previous versions. Other authors focus on mapping two best practices and sometimes more. A few references have tackled the mapping between ITIL with COBIT (ITSMF 2005) (Debora Suryawan 2017)(Ghazouani 2013)(Gehrmann 2012), ITIL CMMI COBIT and eTOM (Soomro 2012) (Latif 2010)(Ali 2013) , COBIT with CMMI (Aileen 2013), CMMI with ITIL (Desai. 2007) (Ota 2017), ITIL with COBIT and CMMI (Aguilar 2018)(Aileen 2013)(Alfaraj 2011), and some generic papers tackle this goal in a general way (Selig 2018) (Vincze 2018)(Pardo 2013)(Ghazouani 2013). All of these references are not proposing a systematic way for integrating the best practices, and most of them analysed three best practices or less, but they use the splitting way for the low-level processes , and then they align them together.

After studying the best practices individually, the result of our research leads us to Figure 1, which illustrates that COBIT 2019 covers the governance part of most of the IT processes, while ITIL focuses on the service management of the IT processes, and eTOM is focused on the telecommunication sector and it includes some of ITIL processes such as Incident Management, Service Catalogue Management. Finally, CMMI can work with almost all processes to improve the maturity level of the processes.

In section 4, one process will be presented as an example for the best practice overlapping that is mentioned in Figure 1.

After studying the latest version of the targeted best practices, one best practice should be selected as a baseline. Then, the low-level processes of all best practices must be analyzed, and the selected baseline should be split down and find the matched processes from the same topics in a single line. In the matching some topics can be covered by one

process or more from other best practices, and some of them are not matched with any process. In our proposal COBIT 2019 was selected as such a baseline. Any other best practice can be considered as a baseline, but in this case the mapping would be different.

Table 1 shows a sample of the mapping between the processes of the integrated best practices. One process has been selected to discuss it and to develop an integrated process. The Service Level Agreement (SLA) process has been selected as a proof of concept, the first step that needs to be done is to start aligning the processes, so to be able to do that, the process that covers the Service Level Agreement in best practices should be found, so in COBIT 2019 “P009 Manage Service Agreements” is covering that topic, and in ITIL the processes as a part of Service management practices (SMP) Service catalogue management, Service design, and Service level management. While in eToM ITIL service catalogue management and ITIL service level management, and finally in CMMI the processes are strategic service management and service delivery.

4. The Enhanced Processes

ITIL v3 was selected from a wide range of best practices because it provides a good explanation about the process module that should exist in each process, and therefore is a good candidate to build the systematic steps that are needed for extracting the components of the integrated process.

As per ITIL v3, Figure 2 shows the main minimum components that should exist in each process, and this paper proposes to use them to have the basic components of the integrated processes as below. This will help the researcher who is looking for integrating best practices to follow our method and to guarantee a more systematic integration.

- Process Definition, which describes the business use-cases and the input and output, which consist of the process components of this part: process objective and process policy.
- Process Lifecycle, that covers the process components and consists of the process activities, process procedures, process work instructions, and process improvements.
- Process Requirements, which consists of the process documentation, process resources and process capabilities.
- Process Metrics, which consist of the process components of this part are process metrics and process feedback.
- Process Roles and Responsibilities, which consist of the process components of this part: Process owner, process roles, and process resources.

In this paper, ITIL v3 is used to find a systematic way to generate the enhanced Service Level Agreement process. The ITIL structure has been selected because it provides comprehensive, practical, and proven guidance for the processes from the Service Management point of view.

5. Example of enhanced process: Service Level Agreement

We now describe how the enhanced process can be developed using the proposal that is described in the previous section. In order to do so, the following processes are used: Align, Plan and Organize (APO) Manage Service Agreements from COBIT 2019 (ISACA 2018), SMP Service catalogue management, SMP Service Design, SMP Service level management from ITIL V4 (AXELOS 2019), ITIL Service Catalogue Management and ITIL Service Level Management from eTom (TM Forum 2019) and finally, from CMMI, the Strategic Service Management and Service Delivery (Eileen 2009). These processes have been chosen because all these processes are related to the Service Level agreement from different points of view.

5.1 Process Definition

The Objective of a SLA is to document the agreement between a service provider and the customer(s)/user(s) that defines the agreed performance targets for a service and how they will be measured.

Services are specified and realistic service levels are negotiated with the users in order to deliver services that satisfy the user’s need for IT services. The delivered services, the specified service levels and the user’s service needs are reviewed with the users on a regular basis. When necessary, the service level agreement is adjusted. Service delivery is being tracked. The actual service levels are compared with the specified service levels and are reported to the users and management on a regular basis. Corrective actions are taken when actual service delivery is different from the specified service levels.

Some of the key Policies and requirements for successful SLAs include (AXELOS 2019):

- They must be related to a defined 'service' in the service catalogue. Individual metrics without a specified service context are unhelpful.
- They should relate to defined outcomes and not simply operational metrics. This can be achieved with balanced bundles of metrics, such as customer satisfaction and key business outcomes.
- They should reflect an 'agreement': an engagement and discussion between the service provider and the service consumer. It is important to involve all stakeholders, including partners, sponsors, users, and customers.
- They must be simply written and easy to understand and use for all parties.

Before developing the SLA, it is a key aspect to understand the following information about the provided services, the value, about the company and existing tools (AXELOS 2019):

- Value is always seen from a customer perspective.
- What does the company work involve?
- How does technology help in measuring SLA?
- What are the key business times, areas, people, and activities?
- Which of these activities are most important for the company?
- What are the company goals, objectives, and measurements for this year?
- What is the best measure of the company's success?
- What is the customer base opinion and evaluation of an IT/Technology service?
- How can this service help the company more?

5.2 Process Lifecycle

In this subsection, a set of coordinated activities are described, in order to get a generation of the SLA and a revision and improvement of the current agreements, by combining and implementing resources and capabilities (Eileen 2009). These activities are proposed in the form of the following steps, as described in Figure 3. The figure is created as a lifecycle because the business requirements and the needs are changing by time, so the revision is needed on a regular basis to amend the changes in the Service level agreement.

1. Revision of the data of the available customer and end-user needs. The understanding of the customer and end-user service perceptions before establishing the service agreement is a key aspect. These include customer objectives not expressed as service requirements in a direct way. Examples of gathering needs from customer and end-user are:

- Face-to-face or remote meetings surveys.
- Plans supplied by the customer with goals outlining their expectations about the services.
- Statements of work and related solicitation materials.
- Shadowing.

2. Revision of the service delivery concerns and support staff. Before establishing the service agreement, it is a key issue to understand the service delivery and support staff perspectives, who are important stakeholders that work with customers and end users. They are responsible for requirements and expectations achieved by the service delivery. Additionally, they also have unique insight from the operational point of view into the new agreement's potential impacts. All this information can be gathered through remote or face-to-face meetings, or feedback means (e.g., surveys, emails).

3. Revision of the agreements, not only about the existing service but also the supplier ones. These steps take into consideration the following aspects:

- Consideration of the customer's supplier agreements impact on the fulfilment of the requested service.
- Revision of the requirements of the requested service compared to the standard service definitions, if applicable.
- Revision of the agreements of the existing service level and supplier (e.g., underpinning contracts, operational level agreements,) against their capacity to meet the requirements of the identified service.

4. Revision of the available data of the current service and the system designs. This revision affects the data of existing service (e.g., service levels, performance data, data from capacity and availability management, baselines, incident

histories), as well as capabilities (e.g., monitoring). Possible methods include data about industry benchmarks or alternative information, due to service requirements that are not addressed by the provider previously.

5. Analysis of the capacity of supplying the requested services. A holistic approach of how to accomplish the delivery of requested service. As well make-buy-reuse examples of the approach are:

- Use of existing service system resources.
- Modification or creation of a service system in order to fit new requirements.
- External outsource of some services or service system components.

5.3 Process Requirements

The following requirements and information should be documented in the SLA document (TM Forum 2019):

- Signature page (identification of the participants, signature block for key personnel).
- Synopsis of the services (job scheduling, access control, contingency planning, problem tracking, change management ...).
- Service measurement criteria, turnaround time, exclusions to SLA.
- Service charges.
- Change procedures.
- Penalties for non-achievement (such as free service or reduced cost).
- Levels of service:
 - Availability.
 - Reliability.
 - Performance.
 - Capacity for growth.
 - Levels of support provided to users.
 - Continuity planning.
 - Security.
 - Minimum acceptable level of satisfactory delivered system functionality.

5.4 Process Metrics

A set of standard measurements that can be used to evaluate and benchmark the performance of SLA are listed in Table 2 All Key Performance Indicators (KPIs) from all best practices in scope have been selected. All KPIs should be useful because each one of them is measuring the Service level of agreement from a different point of view (AXELOS 2019), (Gartner 2020), (ISACA 2018), (Eileen 2009).

5.5 Process Roles and Responsibilities

In Table number 3 we will list down the members that are expected in this process as a function of their roles with tasks or duties that they are responsible for, and these roles are collected from all best practices (AXELOS 2019), (Gartner 2020), (ISACA 2018), (Eileen 2009).

6. Conclusion

This paper proposes a way to develop an enhanced process as a result of process integration that came from different best practices, and the Service Level Agreement process was selected as a proof of concept. The result has been obtained by selecting the strengths from the selected best practices and by using “Best of Breed” strategy, and the integrated enhanced processes will be compliant with all integrated best practices and it will become ready to be used in the company and for auditing use. The procedure proposed in this work can be followed to develop an enhanced process for other processes. This systemized way enables having fully documented processes experienced from different backgrounds. The proposed way of the best practice integration can be used as a foundation for future research. In fact, this paper can give widespread and realistic support to any ICT best practice integration.

ACKNOWLEDGEMENT

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Figures

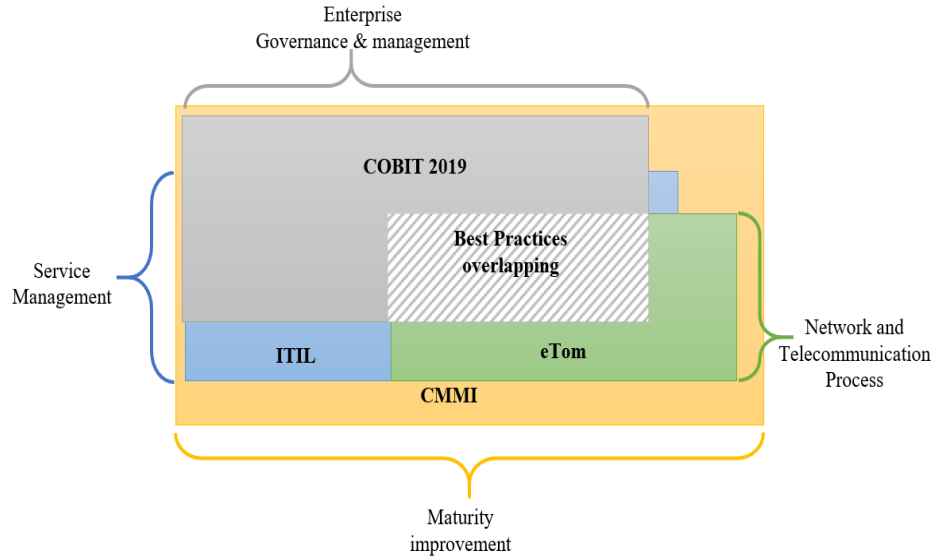


Figure 1. Best Practices overlapping

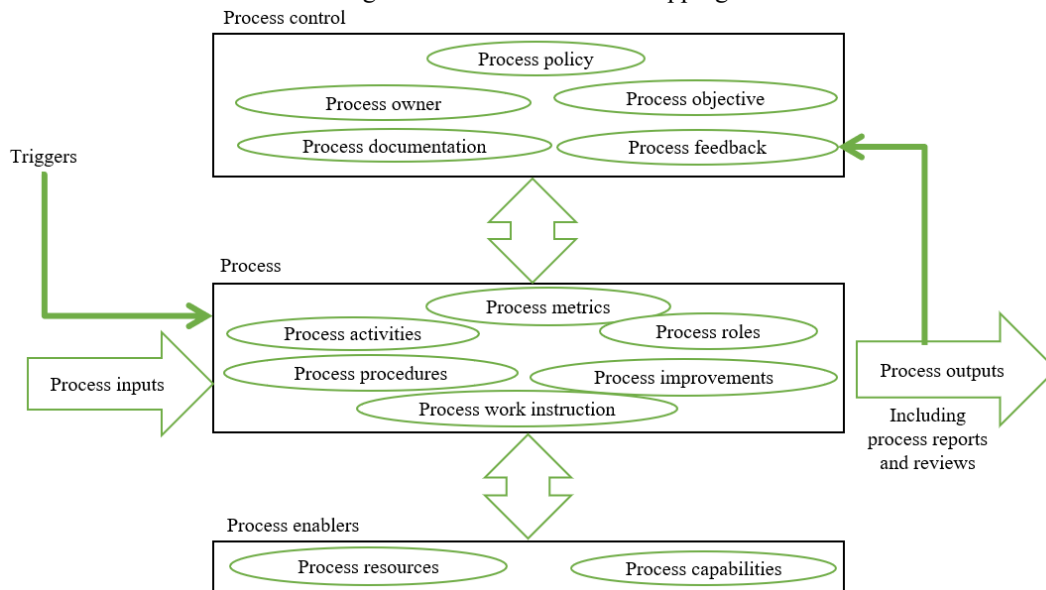


Figure 2. ITILv3 Process Model (OGC 2012)

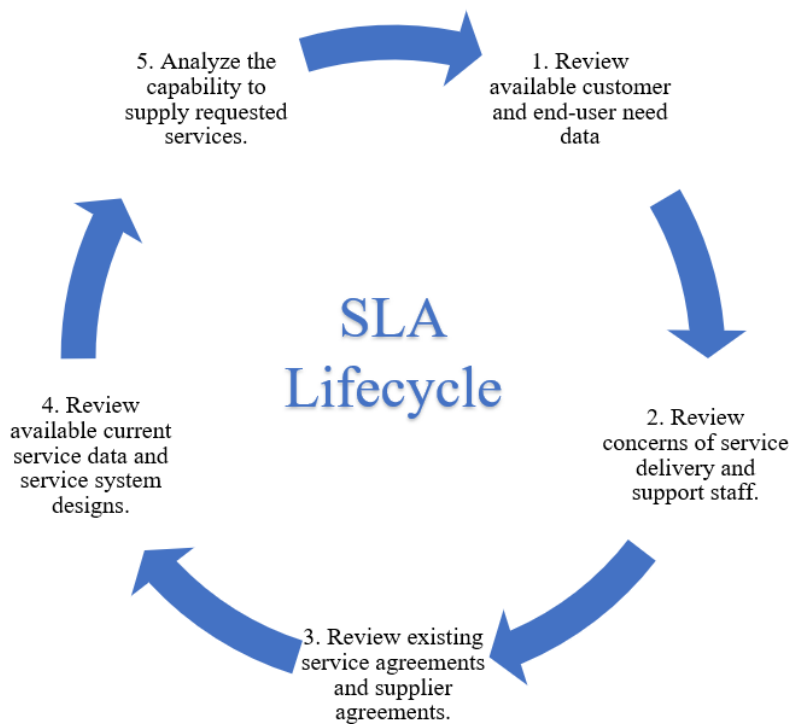


Figure .3 SLA Lifecycle

Tables

Table 1. The Mapping Table of Best Practice integration

| Process Name | Service Level Agreement |
|-------------------|--|
| COBIT 2019 | <ul style="list-style-type: none"> ● PO09 Manage Service Agreements |
| ITILV4 | <ul style="list-style-type: none"> ● SMP Service catalogue management ● SMP Service Design ● SMP Service level management |
| eTOM V18.5 | <ul style="list-style-type: none"> ● ED_ EEM L3 ITIL Service Catalog Management ● ED_ EEM L3 ITIL Service Level Management |
| CMMI | <ul style="list-style-type: none"> ● O L5 Strategic Service Management ● M L2 Service Delivery |

Table 2. Enhanced KPI as a result of best practices integration

| Key Performance Indicator (KPI) | Definition |
|---|---|
| Services covered by SLAs | Number of services covered by SLAs |
| Services covered by OLAs (Operational level Agreement) /UCs (Underpinning Contract) | Number of Services where SLAs are backed up by the corresponding OLAs/ UCs |
| Monitored SLAs | Number of monitored Services/ SLAs, where weak-spots and countermeasures are reported |
| SLAs under Review | Number of Services/ SLAs which are regularly reviewed |
| Fulfilment of Service Levels | Number of Services/ SLAs where the agreed service levels are fulfilled |

| | |
|--|--|
| Number of Service Issues | Number of issues in the service provision, which are identified and addressed in an improvement plan |
| The percentage of reviewed SLAs | Number of Service Level Agreements (SLAs) that are being reviewed relative to all active SLAs. |
| The percentage of service levels (in SLAs) | Percentage of service levels (in Service Level Agreements) that are actually measured. |
| Number of SLA Complaints | Number of customer complaints due to not fulfilled service levels in absolute figures |
| Amount for SLA correction | Consequential costs for corrective action due to not fulfilled service levels |
| Number of penalties for SLA breaches | Consequential costs of contractual penalties due to not fulfilled service levels |
| Number of SLA implemented improvements | Number of implemented improvement potentials from the review of service level arrangements in absolute figures |
| The cost of SLA activities | Total costs of activities for service level management |

Table 3. Enhanced Roles and Responsibilities as a result of best practices integration

| Roles | Responsibilities |
|-----------------------|---|
| Process owner | A role responsible for ensuring that a process is fit for purpose. The responsibilities of this role include the sponsorship, design, and continual improvement of the process and metrics. In larger organizations there might be separate Process Owner and Process Manager roles, where the Process Manager has responsibility for the operational management of a process. |
| Service Level Manager | The main responsibility of this role is to negotiate Service Level Agreements and ensure that these are met. He/she makes sure that all IT “SLA” Service Management processes, “OLA” Operational Level Agreements and “UC” Underpinning Contracts are appropriate for the agreed service level targets which are contracted with the customer... The Service Level Manager also monitors and reports on service levels. |
| Service Owner | The main responsibility of this role is to deliver a particular service within the agreed service levels. Typically, he acts as the counterpart of the Service Level Manager when negotiating “OLAs” Operational Level Agreements. Usually, the Service Owner leads a team of technical specialists or an internal support unit. |
| Customer | The Customer is someone who buys IT services. And this role could be a person or group who defines and agrees with the service level targets. |
| User | A person who uses one or several IT services on a day-to-day basis. Service Users are distinct from Customers, as some Customers do not use IT services directly. |
| Process Consultant | Usually, one or two individuals who are outside consultants brought in to help set up, plan, lead, and monitor progress in organizational process improvement. These individuals bring experience doing process improvement from several other organizations and industries. |
| Sponsor | This person generally has the power to allocate funds and personnel. This person is usually at the directorate level or above. |

Biography / Biographies

Muhammad Anas AlGhamian is a Telecommunication Engineer, earned his B.S. in Telecommunication and Electronic Engineering from October 6th University, Cairo, Egypt (2007). And he earned his master’s degree in (2017) in Applied Telecommunication and Engineering Management from the Universitat Politècnica de Catalunya - BarcelonaTech (UPC), Spain. And currently he is progressing with PhD research with the same university. He is ITIL v3 Expert, ITIL v4 MP certified. He played different roles with many international companies such as MTN, Nokia, Mobinets, Schneider Electric, and NTT Global. He is a member of TM forum.

Jesus Alcober is a Telecommunications Engineer for the Telecom BCN School (1993) and PhD in Telecommunications from the Universitat Politècnica de Catalunya - BarcelonaTech (UPC) (1997). He is Associate Professor, at the Department of Telematics Engineering of the UPC, and since 1996, he teaches in the Castelldefels School of Telecommunications and Aerospace Engineering (EETAC). His area of interest is based on the learning management systems, service management systems and m-health. He has been involved in numerous national and international R D i projects. He has authored more than 20 national and international publications. He is also currently the AENOR CTN71 Chairman of the ISO SC6 Subcommittee “Telecommunications and information exchange between systems”.

David Rincón received a M.Sc. in telecommunication engineering and a Ph.D. (2007) degree in Computer Networks from the Universitat Politècnica de Catalunya – Barcelona Tech (UPC). In 1998 he joined the Department of Telematics Engineering at UPC, where he is currently a Lecturer and member of the Broadband Networks and Services (BAMPLA) research group. He was a visiting researcher at the Teletraffic Research Centre (University of Adelaide, Australia, 2007) and at the Institute of Pure and Applied Mathematics (IPAM) at UCLA (2008). His interests include network traffic modelling, multi-resolution analysis techniques, cloud computing, and energy consumption in communication systems.