

# Implementation of the Information System of the Telecom Operators Using the ITIL V3 Methodology for the Service Design Phase

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**Abstract** - In order for any business organization to perform on a successful level, it is necessary that it has a defined set of activities that manage IT processes and services. Defined set of activities constitutes the Service Management of that organization. There are many types of Service Management, and this paper is based on the type of which is called Information Technology Infrastructure Library V3 (ITIL V3). ITIL V3 has a total of five phases: Strategy Service, Service Design, Service Transition, Service Operation and Continual Service Improvement. This paper is focused on the description of its second phase, which is called Service Design. The aim of this paper is to describe information systems development of the Telecom Operator for Service Design phase of the ITIL v3 methodology in all seven of the processes that are contained in these phases. These are: Service Catalogue Management, Service Level Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security Management and Supplier Management. This paper attempts to show to the telecom operators that during the realization of their IT processes they do not necessarily have to use the eTOM standard, but may use other standards and concretely they can use ITIL V3 standard. This paper in its conclusion, with previously detailed analysis of the implementation of the Service Design processes according to ITIL V3 methodology in the information system of the telecom operator, needs to define which teams are required to implement the Service Design processes and which are the activities that each team has during the implementation of the information system of the telecom operators.

**Keywords**-ITSM, ITIL V3, Service Design, Service Catalogue Management, Service Level Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security Management, Supplier Management

## I. INTRODUCTION

Any organization that wants to increase the level of their business depends on the way of the IT Service Management. In order to make IT processes and services successfully conducted, it is necessary that the organization defines a set of specialized organizational capabilities that are provided

to customers in the form of the service. This set of specialized skills consists the Service Management organization. There are many standards for Service Management practices such as ITIL, COBIT, CMMI, eTOM, PRINCE2 and ISO 20000 [6].

ITIL is an acronym for "Information Technology Infrastructure Library," and falls under ITSM, which is an acronym for "Information Technology Service Management". ITSM is defined as a discipline for managing IT systems, which is centered on the customer perspective of IT's contribution to the business. ITIL is the best practice environment for companies that provide IT services as its core business functions. ITIL takes a "life" approach for the development of IT services and produces the best practices and guidelines throughout each "life" stage to help IT companies to deliver the best possible services to their customers. ITIL V3 defines five main phases of life cycle [1], [2], [3], [4], [5]:

1. Service Strategy
2. Service Design
3. Service Transition
4. Service Operation
5. Continual Service Improvement

1. Service Strategy provides guidance on how to design, develop and implement Service Management, not only as an organizational capability but also as a strategic asset. These guidelines are based on the principles that underpin the practice of Service Management, which are useful for the development of Service Management policies, directives and processes through ITIL lifecycle development services [1]. Service Strategy includes the following five processes: Strategy Generation, Risk Management, Demand Management, Financial Management and Service Portfolio Management.

2. Service Design is the second phase of the development lifecycle of IT services for ITIL v3 methodology and an important element within the business processes aimed at

change. The role of Service Design can be defined as developing appropriate and innovative IT services, including their architecture, processes, policies and documentation to meet current and future agreed business requirements [2]. Service Design has the following seven processes: Service Catalogue Management, Service Level Management, Capacity Management, Availability Management, IT Service Continuity Management, Information Security Management and Supplier Management.

3. Service Transition phase has a role to let the operational use of the services that have been designed in the Service Design phase. Service Transition performs the same thing in a manner that it receives the Service Design Package and transferred to the Service Operation phase of each element required for operations that are executed [3]. If the business assumptions, forecasts or request change from the Service Design phase, then they may need modification during the Service Transition stage in order to deliver necessary IT service. Service Transition has a total of six basic processes: Change Management, Service Asset and Configuration Management, Knowledge Management, Transition Planning and Support, Release and Deployment Management and Service Validation and Testion.

4. Service Operation phase has a role to ensure that the user is provided with the agreed level of quality service that is necessary for this phase to be able to manage applications, technologies and infrastructure that supports the implementation of services. The goal of Service Operation is the coordination and execution of activities and processes that are necessary for enablement and management of the services at agreed levels [4]. Service Operation has a total of five processes: Event Management, Incident Management, Problem Management, Request Fulfilment and Access Management.

5. Continual Service Improvement is the last fifth stage of the development lifecycle of the IT services for the ITIL V3 methodology, which is responsible for continuously changing business needs by improving business needs by improving the effectiveness and efficiency of the process [5]. Duration of the Continual Service Improvement depends upon the size of the organization and takes several weeks to several months. The result of Continual Service Improvement is reflected through improved IT services throughout all of the first four phases of the ITIL V3 lifecycle.

Section II begins with a description of the importance of building a unified Telecom Operator information system with the aim to improve its business, and continues with a concrete description of the implementation of all processes of the Service Design phase of the information system of the Telecom Operator. Conclusion of the work, which

originated as a result of the analysis carried out in Section II, proposes teams for implementation of all Service Design phase processes, the time period for action of each team and the guidance in which direction should further research in this field be aimed.

## II. IMPLEMENTATION OF SERVICE DESIGN PROCESSES IN INFORMATION SYSTEM TELECOM OPERATOR

In condition of competitive environment and objective geopolitical circumstances, one of the basic tools for the successful positioning of telecom operators in area of some region is to construction of the system that will enable rapid implementation of the services and flexible tariff plan [10], [12]. The realization of such a system is aimed at providing conditions for the service users to be able to request in an identical manner and only in one step through multiple channels of access (Telecom center or web) each individual service, or any combination of available services in any part of the area in which operates Telecom operator and to receive personalized account for these services. Information System of the Telecom Operator, whose development for the Service Design phase of the ITIL V3 methodology is described in this document, should consolidate all of the databases for the Telecom operator's technologies: fixed telephony, mobile telephony and Internet services and their billing systems into a single database and a unique billing system. Development of the information system is based on development of the two key applications: application of the user data and sales applications that use Oracle database. Construction of the entire system involves the definition of business requirements with the creation of infrastructure design, logical and physical database design with the specification of the target business processes and functionality of the new applications, development and functional testing of the system with the development of applications and scripts for data migration and implementation of systems with migration of data into a new system and performing tests for checking the functionality of the new system.

General functionalities that need to be supported by the information system are:

- Administration of users, data entry and data management of all user-oriented activities.
- Support for complex hierarchical structure of the customer.
- Interaction with systems in the environment.
- Recording of the complaints and grievances.
- Generation of reports on service users.
- Sales Management with the complete supervision of the transactions execution.
- Dynamic generation of reports, documentation, and monitoring the sales process.
- Provision of the efficient distribution channels.

- Enablement of the review of the customer informations regarding subscription packages, included products, equipment and services.
- The execution of the integration with other applications.

A. Service Catalogue Management

The definition of a unique catalogue of IT services is affected by: products, product catalogue, product offer and price of the products whose value is affected by the first three mentioned parameters (Figure 1).

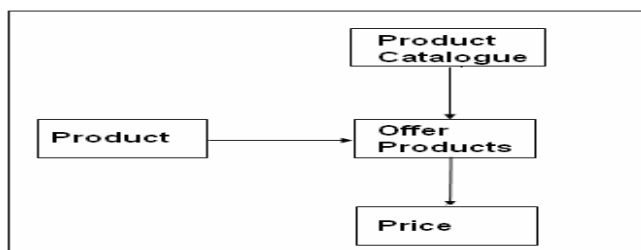


Figure 1. The parameters that influence the definition of IT service catalogue

During the construction of information system what should be taken into consideration is to build several different types of product catalogues, depending on the different categories of end users [8], [26]. It is necessary to define a total of seven product catalogues depending on the different categories of the users:

1. Product Catalogue for the business users
2. Product Catalogue for the residential customers
3. Product Catalogue for the disabled
4. Product Catalogue for the war veterans
5. Product Catalogue for the students
6. Product Catalogue for people with special needs
7. Joint product catalogue

Each of the displayed product catalogues should provide:

- Membership of the certain offer to a particular specification. Specification represents a group of a services with similar characteristics, which are sold and implemented in a similar manner.
- The associated products that define the way of payment and price.
- Link to a specific sales channel.
- Link to certain types of network elements.
- Connection to distribution channels.
- Connection to marketing promotions.
- Description of the data that must be entered for each of the products sold in conjunction with validating the rules.

External factors are affecting definition of the final structure of the product that is inserted into the product catalogue, and these factors are: a view of the end user, the

marketing impact, the impact of the accounts by the end user, the financial impact and payment structure of the product catalogue [6], [26] (Figure 2).

Price list of the information system should primarily include: the price of connecting practice, a subscription, the cost of monthly fees and the basic price of the device. It may or may not contain the costs of the service which is charged by usage and prices that are charged by duration or quantity. Catalogue of the IT services should enable discounts upon several different categories:

- Discounts on the basis of action offer
- Discounts for the duration of the contract
- Discounts for the length of the subscription service
- Discounts for each user
- Discounts for the number of connections
- Discounts on special conditions

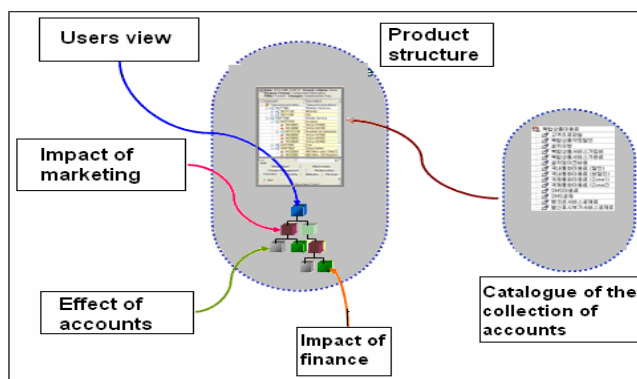


Figure 2. The parameters that influence on definition of the final structure of the product

B. Service Level Management

In the analysis of Service Level Management three types of agreements are taken into account: Service Level Agreements (agreements with end users), Operation Level Agreements (agreements within organizational units of the firm) and Contracts (agreements with the partner company that participates in the implementation of a project) [19]. All three agreements must ensure that service levels are aligned with business expectations.

Construction of agreements with customers (Service Level Agreements) involves the construction of a single document that represents a description of the mutual rights and obligations that need to be followed by the Telecom operators and their end-users when two sides agree to sign a contract on the use of a Telecom service operators by the end user. The document itself should contain seven items:

1. Defining the price of services that is defined by the Telecom operator through the catalogues of IT services and the payment method that requires the end user.

2. Defining the implementation of the services in which the Telecom operator needs to commit to a service realization time starting from the date on which end-user submitted a request to fulfill services.
3. Defining the terms on which Telecom operator can't implement the request for a service made by the end user because there is no technical possibility for the realization of the service.
4. Defining the termination of the contract between Telecom operators and end-user if the user does not pay the debt in cash within a defined time, is not available at the registered address or if there is reasonable suspicion that the user intends to misuse or abuse the service that is leased.
5. Defining the deadline for returning the terminal equipment by the end user if he withdraws from service or his service is turned off for legitimate reasons.
6. Defining the timeframe for abandonment of the implementation of services by the end user.
7. Defining the responsibilities of Telecom operator for any damage inflicted upon a user or third party due to misuse of user data from a person that performs before mentioned responsibility.

Required elements in the user data application for full implementation of the agreements with customers are:

- Provide monitoring of the data about all users of technology for Telecom operator to look at the details of user data from all billings and all of the technologies, as well as for creating a billing group according to user needs.
- Develop a clear hierarchy of users with the possibility to record the different roles that physical or business person may have, as well as defining the connections and relations between different users.
- Provide a flexible system of allocation of the discounts and affordable packages throughout segmentation of the users.
- Give the possibility to create different user profiles and assign user profiles defined for the purposes of reporting based upon user profiles.
- Support monitoring and recording of objections, claims and complaints of users, as well as creating and monitoring their implementation status.
- Define mechanisms for the integration of various technologies users into a single application user data.

Agreements between different organizational units (Operation Level Agreements) imply an agreement described in the document on cooperation in building a unified information system. The document must be a deal agreed between all organizational units of the Telecom operators

should commit to mutually exchange data and information when building information systems. Telecom operator's organizational units that should be included in the building of a new information system are: Division of fixed telephony, mobile telephony department, department of private Internet users, department of business Internet users, call center operator Telecom, Telecom Center and Department VPN.

Agreements with foreign company - consultant (Contracts) are achieved only after a public process of choosing IT consultant who will help the telecom operator in the implementation of information systems [23]. The choice of IT consultants is done in two phases: phase prequalification stage and calls for submission of bids. Required steps for the candidates to pass the prequalification status are:

- a) If there is no legal impediment to their participation in the competition for the selection of the best IT consultant.
- b) To be entitled to pursue professional activities and is registered in appropriate professional registers.
- c) To have economic and financial condition to realize a successful implementation of the contract.
- d) That their technical and professional capacity guarantees the successful implementation of the contract.

As for the technical and professional skills, candidates should meet the following minimum requirements:

- a) Employees at least 20 certified IT consultants.
- b) At least one reference to the information system implementation project in the telecom industry.
- c) Employed at least 10 certified IT consultants who will be constantly involved in the project and who have participated in at least 3 projects of implementation of information systems in the industry.
- d) Owning your own HW/SW infrastructure necessary to start the project (testing and development) and other necessary technical preconditions.

The second phase is the phase of invitations to tender where it is necessary to establish criteria for evaluating bids. There are three basic parameters by which the IT consultant is selected from all of the candidates: the lowest price (with percentage share of 60%), the quality of the offered solutions (with percentage share of 25%) and a time deadline for delivery of the offered solutions (with percentage share of 15%). The contract will be assigned to the IT consultant who submitted the top rated acceptable bid.

Telecom operators may, after completion of the first phase, and before the second phase, stop the process of selecting IT consultant for one of the following reasons:

- a) No bids have been submitted within a certain deadline.
- b) None of the bids received is not technically acceptable.
- c) Prices of all eligible bids were significantly higher than the budget for the contract signing with the IT consultant.
- d) Number of acceptable offers is less than 3 and does not ensure genuine competition.
- e) Number of qualified candidates is less than 3 and does not ensure genuine competition for the actual contract.

### C. Capacity Management

In order to verify system performance and architecture on which the system is based upon, during the design of information systems it is required to perform tests of system performance and stress tests [15], [20]. The aim of these tests is:

- Prove that the system is able to handle the expected load.
- Prove that the system is able to withstand the excessive load.
- Find errors in the architecture of the system that cause oversized stress.
- Propose a strategy to optimize the system.

For the purpose of measuring performance it is necessary to use the following three tools:

- Enterprise Service Bus (ESB) Console – used to measure the performance of business applications and communication between them.
- Business Process Execution Language (BPEL) Console - used for definition of web service compositions.
- Windows Task Manager – should be used on servers in order to verify the efficiency of the CPU.

For each technology, telecom operators should perform the following five tests:

1. Functional test - Only one request is sent to the subsystem of the technologies in order to prove the functionality and initialization of internal structures.
2. Scenario with an expected average load - simulating the expected load on the system in order to prove that the system is stable at this load.
3. Scenario with the expected excess load - Excessive load on the system is simulated in order to prove that the system is stable at this load.
4. Extreme scenario (shock) loads - Excessive workload increases by 10 times to prove that the system can withstand this pressure.
5. Scenario long test - This scenario has the same structure as the scenario with an expected average

load, only taking into account that the time of the load is increased.

There are two general conclusions that should result from the above tests that are done before the system itself is released into production:

1. Information system is ready to withstand the expected load level with respect to capacities that are currently available.
2. Information system is ready to withstand the excessive load level if it faces in the future the expanded capacity which currently has system itself.

Systems analysts should be taking into account the results of the testing and with knowledge of the system architecture propose four recommendations that will enable the system stability when it comes down to it's current and future capacity:

1. Use direct calls between Java Enterprise Service Bus (ESB) and Business Process Execution Language (BPEL).
2. Reduce the level of logging in a production environment.
3. Reduce Business Process Execution Language (BPEL) control level in a production environment.
4. Perform regular cleaning of the log files from the ESB and BPEL after measurements of system performance.

Giving the above recommendations requires the creation of the links of the Capacity Management with Demand Management for the formation of the necessary requirements for the implementation of the above proposals. So the link to the Demand Management influences on the formation of the budget.

### D. Availability Management

The new information system of the Telecom operator should be available and functional 24 hours a day during 365 days year. The reason for this is the Billing system and web portal that always must be functional. This means that the only possible value of the availability of the system is the maximum one (100%). For this purpose a stable system architecture needs to be built, design accessibility plan and form a group of IT professionals that will release the information system in production, constantly update the program status because of the eventual changes in the architecture of the system.

The plan includes access to all components of the architecture of information system that must always be functional [16], [24], [25]. Components of the architecture of the system are summarized in Figure 3. Note that the server side architecture are web services, Java services, Enterprise

Resource Planning (ERP), Oracle databases, and SAP; the user updates the database. The client-side architecture are web, application user data and application sales. The connection between server and client side architecture is realized through the Business Process Execution Language (BPEL), which is primarily used for definition of web service compositions.

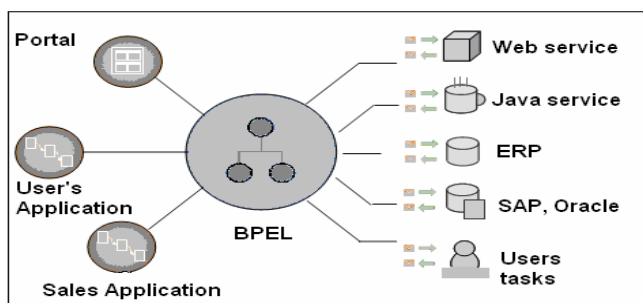


Figure 3. Components of the architecture of the Information system which are involved in the Availability plan

Availability plan consists of the following items:

- Defining the interoperability of systems - Define the integration of heterogeneous systems purchased from different suppliers based on different technologies into a single system.
- Defining the flexibility of the system - Define the integration of new applications into existing system structures. The whole logic of the integration of the information systems should be contained in one place and should not be placed in applications because it has to be defined in XML documents (BPEL processes). Business processes and information system should be flexible and tolerant to the changes in the integrated applications and systems. Integration platform should be such to provide a central point that the applications are associated to.
- Defining the independence of the data structure - Data within the system should be such that they are exchanged in form of XML documents that can be transformed so that the independence of the data structure is achieved.
- The definition of the integration based on events - BPEL processes should provide almost instant exchange of data and events between the integrated applications.
- Defining the performance and reliability - The platform should support a web server for fast execution of the program so that the BPEL Process Engine running on Oracle application server provides high availability and scalability of the application servers.
- Defining user tasks - Oracle BPEL Process Manager needs to support the creation of workflows

and integrate business processes with the BPEL processes. Standard graphical user interface for defining user tasks that can be partially or completely changed should be provided that way.

- Definition of system maintenance - Plan should include the availability of an algorithm for solving the problem. Every problem that impairs the availability of services, within a certain period of time.

If a problem results in termination of the entire system, the problem must be solved 24 hours from the hour of the occurrence problem. If the problem represents a decline in the primary service, then this problem must be solved 48 hours from the hour of creation. If the problem represents decline in the secondary service, then this problem must be solved six days from the date of creation. If it is a minor problem that caused the fall of a service, then this problem should be settled within 7 days from the date of the problem occurrence.

Each time delay regarding solution of these problems violates the above maximum systems availability. Every problem that has been successfully resolved in the timeframe described above maintains maximum availability of IT system. The Telecom partner and firm partner are responsible to solve the above-mentioned types of problems. Each one of the defined items of the accessibility plan must be updated regularly by a group of IT professionals.

#### E. IT Service Continuity Management

The basic step in the implementation of IT Service Continuity Management in Information System of the Telecom operator is to build the Business Continuity Plan [6]. Business Continuity Plan in information system contains the steps that need to be implemented when one of the services stops working in order to achieve faster construction of a new service that will continue to operate on the same level it operated before the old service failure [2]. It consists of four phases: initialization, definition of requirements and strategies, implementation and preparing for the production.

For the software engineering team to start the implementation of the Business Continuity Plan at all, it is necessary that reports regarding termination of an old service's functioning are delivered to them. To come to the team for a software engineering that is responsible for implementation of the Business Continuity Plan, it is necessary to pass through the four lower levels of support. The first level of support is reporting a problem, another level of support is to locate the problem, the third level of support does support the site, which is responsible for normal technical requirements, and the last fourth level of support is a technical support. Of course, the implementation of the Business Continuity Plan will come if any of the first four levels of support fails to recover the old

service. Table I. shows the Business Continuity Plan for the information system of Telecom operator.

TABLE I. BUSINESS CONTINUITY PLAN FOR INFORMATION SYSTEM OF TELECOM OPERATOR

Name of Business Continuity Plan phase	Name of the under phases of Business Continuity Plan
I. Initialisation	1. Document drafting job descriptions
	2. Detailed specifications for the functionality application development solutions
	3. Specification of target business processes and functionality of new application modules
	4. Detection and specification of services and orchestration integration flows
II. Definition requirements and strategy	1. Design data models and messages
	2. Design integration architecture
	3. Development of test strategy
	4. Preparation of development platform
	5. Implementation of database
	6. The development, implementation and Functional test of web service
	7. The formation of the final documentation
III. Implementation	1. Documentation of system
	2. Preparation of test platform
	3. Functional tests
	4. Integration tests
	5. End-2-End tests
	6. Creation production platform
	7. The formation of final documentation
IV. Preparation for production	1. Acceptance tests
	2. Training end users
	3. Moving into production

F. Information Security Management

Security in applications of information systems [25] of the Telecom operators are implemented on the basis of 6 levels where the most important role is played by a database administrator, application server administrators and end users:

- The level of database
- The level of web services
- The level of application server
- The level of application
- The level of URL
- The level of page

Each level of security must ensure the possibility of executing the action and review of the data only to a certain specified entities under a certain conditions. Figure 4 shows the relationship between the six levels of security to be realized when implementing this process.

1. The level of database

There should be a database user who will have access rights to all actions of the database and who will have access to all data in an information system. This user has all rights of access to all data that are needed for work. Its features, such as user name and password, knows only the chief

administrator of the database. For the purposes of access to data from the database, it is necessary to access the application server which contains username and encrypted password.

2. The level of web services

Web services that are used in applications of the information systems can provide more tools to help out of which the Oracle Web Service Manager is often used, which is primarily used against Oracle databases (OWSM). Exposed Web services can not be accessed except through defined channels and defined access rights. All monitoring or unauthorized attempts to access web services is done through OWSM application on application server.

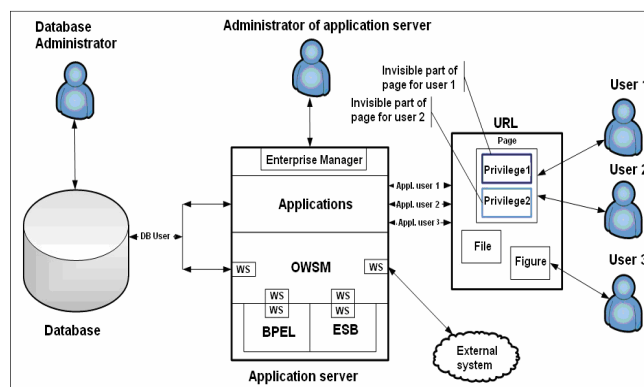


Figure 4. Information Security Management in Information system Telecom operator

3. The level of application server

Oracle Application server has an application for server management - Enterprise Manager Application Server Control. This application is executed on the server and it can be accessed by knowing the administrator username and password. The main application server administrator is responsible for creating, assigning roles and access rights to the application server. Roles and users of applications can be maintained in the application server.

4. The level of the application

Security-sensitive applications and information system components are divided into: URL (images, files, etc.), page (JSP, HTML, CSS, etc.) and part of the site. Any safety sensitive component represents a system of privilege. List of privileges that a user can have is constructed on that foundation. All privileges are grouped into application roles. Whenever security-sensitive components are accessed, it is checked whether the user belongs to a role that has the right of access privileges. If it does, the process goes smoothly. If user has no right of access, he gets notified that he is trying to access a protected resource. If it is the page that the user is accessing, then the forbidden part of the page is invisible or the access is denied. Most of the application options are in the menu of applications. Each user will have defined rights

to access certain options of the menu. The real URL that is shown during the selection of menu options is presented as a privilege and it is indirectly assigned to a user through a specific role.

5. Application roles of access to applications

The goal of application roles is to group access rights in order to facilitate the granting, revocation or modification of the rights. All users belong to a single application of application roles. User roles activated in applications are shown in Table II.

6. The level of URL

URL level of security is tied to the resources that are accessed through the Application Server. URL can represent images, files, pages, etc. If it is a security sensitive component, then it will be assigned to the role whose members have access to these components. They will be located in specific-protected directories, which will be accessed only with prior checking of the access rights. If it is a safety sear components, then they can be located in public folders that can be accessed simply by specifying the URL of the web address in your browser.

TABLE II. DEFINED ROLES RIGHTS OF ACCESS TO INFORMATION SYSTEM TELECOM OPERATOR

The role of user applications	Description of the role of application users
Application user	User that monitors other users.
Application Administrator	User who performs user registration process and has access to codes
IT Administrator	Super user who manages the applications, maintains codes and review the logs.
Back Office Administrator	User who has a right of access to all options of applications in information system.
Front Office Administrator	Users that has greater subset of the access rights as opposed to the Administrator of the Back-Office that is required to work at the Telecom operators counter service.
Call Centre Administrator	Users that has greater subset of access rights as opposed to the Administrator of the Back-Office that is required to work at the Telecom operators call center.
VPN Administrator	User who has a right of access to VPN and other parts of applications required for managers of large accounts of Telecom operator

7. The level of page

If a review or modification of data in a table on the form: a user will be able to review only the information from the table, while others will be able to change data in the table. This is the hardest part of the implementation, so it is recommended that, whatever possible, it is implemented through one of the above ways, and then if there is no acceptable solution this method is to be approached.

G. Supplier Management

Telecom operators need to save money and human resources engage partner firm that will assist in

implementation of a new information system. Modules that are implemented by the firm partner during the project, are obligatory to be maintained by firm partner after the system is available for production [8], [23]. Accordingly, it should define levels of support that the contract partner of the firm should implement in order to define hierarchies for problem solving (Table III).

With levels of maintenance contract should define levels of problems, definitions of failures, response time and problem removal that due to the contract should be addressed by the firm partner (Table IV).

After defining the level and types of problems, we can define a workflow to solve problems for which the firm partner should be in charge of according to the contract (Figure 5).

A signed agreement between telecom operator and companies partner needs to define the total time of the entire information system’s construction and a time deadline to complete the activities for which the partner firm in charge of. The selected firm partner should be an IT company that has already implemented a number of systems, and it should take over much of the analysis of the new system and the entire design and implementation of a whole new system. Figure 5 shows the workflow of the support in the five defined levels of the support in order to resolve the problem by the firm partners.

Telecom operators should take the following actions:

1. Planning, system analysis and definition of requirements specifications in accordance with all the necessary activities (final project and a term plan, defining frameworks and boundaries of the system, analysis existing processes and applications, defining business processes and specification of requirements that the new system should satisfy, as well as setting technical architecture, systems hardware platform-way necessary for project development).
2. Conduct testing of new systems implemented in the category of functional, integration, and tests end2end final checks.
3. To build a production database, and create a production platform on the basis of a detailed written plan for transition to production.
4. Integrate new system with the billing system, execute the migration of data from old system to the new system according to a pre-defined plans for transition to the new system.
5. Conduct user training that will work on a newly implemented information system.

The company partner should execute the following activities:



1. Execute the whole system design that includes architectural solution's design, modeling and database design (logical and physical data model) and the creation of the development of the database.
2. Set up and test system development platform.
3. Implement the security level and define the role of administrative control over the new system.
4. Design, build and develop applications including the preparation of interfaces to other applications, with special emphasis on the interpretation of the business logic and processes.
5. Define the integration of the old information system's customer base.
6. Define, encode, and make all the necessary mechanisms for the integration of information systems with other relevant information systems.
7. Document system as defined by the methodology of development of the information system within the telecom operator and the recommended methods of the partner companies in all stages of solution's development. Final papers should be such to have a form of the derived state with a detailed plan of the transition to producing.

TABLE III. LEVELS OF THE MAINTENANCE OF THE INFORMATION SYSTEM, WHICH DUE TO THE CONTRACT NEED TO BE MAINTAINED BY A SUPPLIER

The level of maintenance system	The job of maintaining the level of the system level support in the maintenance of a new information system
Level 1	Logging and tracking requests of Telecom Operator
Level 2	First line of support, location of problems and issues forward in the right department
Level 3	Support the site for normal technical requirements
Level 4	Technical support in case of escalation of problems that precedes the software engineering
Level 5	Software engineering, which includes work on the code and changes the design of the system

TABLE IV. CATEGORIES OF THE PROBLEMS WITH THE TIME FOR RESOLUTION THAT SUPPLIER MUST SOLVE DUE TO THE CONTRACT

Level of the problem	Definition	Time for call off	Removal time
Level I	A complete system crash	1 hour of receiving a verbal notification of the problem	24 hours after receiving oral notice of the problem
Level II	Fall of crucial part of the system	24 hours after receiving oral notice of the problem	48 hours after receiving oral notice of the problem
Level III	Fall of operating part of the system that is crucial for the whole system	2 business days of receiving notice of the problem	6 working days of receiving notice of the problem
	A minor	3 working	7 working days

Level of the problem	Definition	Time for call off	Removal time
Level IV	problem that does not affect the operation of the system	days of receiving notice of the problem	of receiving notice of the problem
Level V	A request of Telecom operator for additional functionality in the system	By agreement with a management of foreign firm	In case of agreement, the time of delivery and installation as well as the prices will be defined in cooperation with the telecom operator

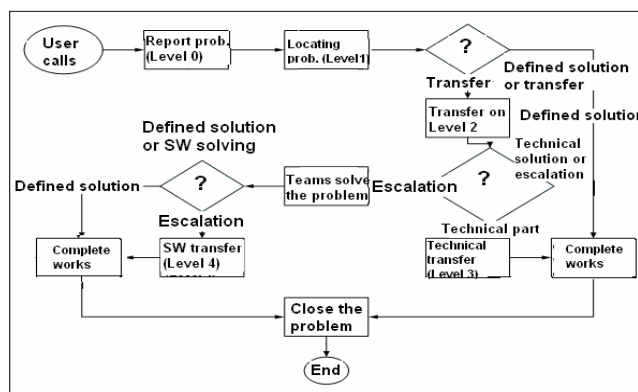


Figure 5. Workflow of the support for problem resolution for which the supplier is in charge of

### III. CONCLUSION

For the realization of the Service Design processes in an information system of the telecom operator, it is necessary to establish more teams of IT professionals for each of the Service Design processes before starting the actual implementation of selected recommendations of ITIL V3 [2], [6]. Service Catalogue Management Code required a team that will define the seven product catalogues, which should be given to the end user. Service Level Management requires the formation of three teams of IT specialists to define three different types of agreements: Service Level Agreements, Operating Level Agreements and Contracts. With Capacity Management only one team that should define five functional tests that measure the current and future IT available capacities that are available to the system itself is required. Availability Management demands formation of the two teams of IT professionals: the first team to define system components that should go into the future plan of the availability and other team that should be responsible for implementation of all of the defined items of the accessibility plan. When IT Service Continuity Management is concerned four teams are required for the implementation of each of the four phases of the Business Continuity Plan. Information Security Management requires the formation of two teams of IT experts: the first team that is responsible for implementation of the six defined levels of

security, and a second team to assign administrative roles for management of the system itself. For Supplier Management three teams of IT professionals are required: the first team that is responsible for monitoring activities to be implemented by the Telecom operator while implementing information system, the second team to monitor activities to be implemented by the firm partner when implementing IT Systems specialization, and the third team to monitor the speed of solving problems at levels of priority for which the company partner is responsible.

Each of the 16 teams in all seven Service Design processes, except for three teams of Supplier Management, is independent from one another and can be carried out continuously. Time limit for completion of team activities for the first six Service Design process is a maximum of 2 months. Regarding the activities of Supplier Management teams, they start with just three months after signing the agreement with the partner company and are valid depending on the category of agreements which can be six months, one year or two years.

Further research in this area is related to the development of similar studies for the remaining four phases of ITIL V3 standards, primarily for the Service Strategy phase because of its close links with the Service Design phase.

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