

# Implementing ITIL using a Workflow Tool

Summary of dissertation for the degree of Master in Information Systems and Computer Engineering

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## ABSTRACT

Nowadays organizations need to increase their efficiency while reducing their costs to be able to compete in today's global market. This lead to the creation of several methodologies that envision reducing costs while increasing quality and reliability. One of the most accepted methodologies is ITIL which focus on the entire lifecycle of a service, identifying the needs and drivers of the IT requirements to monitor and improve the services. Despite its success with large organizations, smaller organizations are reluctant to adopt it due to its complexity. A big part of that complexity arises from the tools available today. To tackle this problem we implemented the processes that offered the most benefits in the short term so that smaller organizations can obtain a tool to back their ITIL adoption and obtain ITIL's benefits with a smaller investment.

## Keywords

ITIL, JIRA, Design Science Research, Service Design, Service Transition, Service Operation.

## 1. INTRODUCTION

Nowadays organizations are increasingly dependent on Information Systems (IS) to manage their business and how they work. [1] This increased reliance in IS changed the way they interact with their customers, and through it, are able to offer a new breed of products that are more dynamic and flexible.

The help managers face the challenges brought by this new landscape, several methodologies were created, under the branding of IT Service Management (ITSM), with the intent to change the focus from the technology to the quality of the service provided. [2] One of the most common, and considered by some as the standard, is ITIL. ITIL consists on a set of best practices intended to help organizations improve their processes by providing checklists for tasks, procedures and responsibilities that should be carefully analyzed, implemented and acted upon.

JIRA is a project and issue tracking platform where users can register and track issues which represent tasks or occurrences. These issues follow a workflow where the set of states and permitted transitions are defined. This makes it a perfect candidate to implement several processes and functions from ITIL such as Incident Management, Change Management and Service Desk and, due to the open REST API and thousands of available add-ons, can be extended to support even more processes.

The present document followed the Design Science Research Methodology (DSRM) which searches for innovative solutions to either unsolved problems or solved problems but with a more efficient solution exists. The end result is an artifact that can be analyzed as to its use, efficiency and performance. [3][4] The resulting artifact of this work is and instantiation of a tool that implements the customer facing processes from ITIL that offer the most benefits in the shortest amount of time.

### 1.1. Problem

Due to the applicability of ITIL to organizations of all sizes and sectors, its publications had to be written with a certain lack of formalism, describing the processes in general terms, so it was more about what every organization should do instead of the how it should be done. This lack of formalism present in ITIL increases the complexity, effort, time and resources needed to carefully plan and execute the adoption as to actually provide the intended benefits.

One phase of planning that is often overlooked is the tool selection. Despite its documented importance, there is still little information available to help choose the appropriate tool for the organization. Vendors have responded to this lack of guidance by typically bundling the biggest number of processes possible as to attract more

potential customers. This practice not only increases the overall cost but also the complexity of the implementation while bringing little to no benefit to smaller organizations.

Tool selection is critical in order to help the organization take full advantage of the newly adopted framework. [5] The selected tool should help address the organization's problems while also help to coordinate the involved parties and enable communication between them. While most tools offer these capabilities, they often bundle too much functionality which interferes with the user's ability to perform their job.

**Problem:** there are no tools supporting exclusively the most interesting processes for smaller organizations

## 2. RELATED WORK

ITIL consists in five publications[6], each pertaining to one phase of the lifecycle of a service. In each of these publications, generalized guidance is provided under the form of checklists for tasks, procedures and responsibilities that should be carefully analyzed, implemented and acted upon. Despite this guidance being generalized, organizations can customize it to their individual needs. The five publications of ITIL are:

- **Service Strategy:** In this phase service management is designed, developed and implemented as a strategic resource
- **Service Design:** In this phase strategic objectives are converted into several portfolios of services and services assets ensuring current and future business requirements are met.
- **Service Transition:** In this phase the new or changed service is transitioned into production while controlling the risk of failure and disruption.
- **Service Operation:** In this phase the services are managed in order to achieve efficiency and effectiveness to ensure they provide value to the customer.
- **Continual Service Improvement:** In this phase improvements to the service are designed, transitioned and operated in order to improve the value to the customer.

The proper adoption of ITIL might require a restructuring of the organization. This restructuring leaves the organization with a clearer structure which will be more efficient and focused on the organization's goals. This is also one of reasons why the implementation of ITIL should be carefully planned, having severe consequences otherwise.

Due to the popularity of ITIL, several vendors offer tools to help organizations achieve the full potential of their ITIL adoption. As such we collected information about three of those tools, EasyVista, ServiceNow and Track-IT. In Table 1 we compare the implemented processes of those three tools.

Process	EasyVista	ServiceNow	Track-IT
<b>Service Level Management</b>	✓	✓	
<b>Capacity Management</b>	✓	✓	
<b>Availability Management</b>	✓	✓	
<b>Supplier Management</b>		✓	
<b>IT Service Continuity Management</b>	✓		
<b>Service Catalog Management</b>	✓	✓	
<b>Capacity Management</b>	✓	✓	
<b>Service Asset and Configuration Management</b>	✓	✓	✓
<b>Release and Deployment Management</b>	✓	✓	
<b>Knowledge Management</b>	✓	✓	✓

<b>Event Management</b>	✓	✓	
<b>Incident Management</b>	✓	✓	
<b>Request Fulfilment</b>	✓	✓	
<b>Problem Management</b>	✓		
<b>Service Desk</b>		✓	✓

Table 1 - Comparison of implemented processes

### **EasyVista**

EasyVista is a solution that focuses on IT Service and Asset Management (ITSM and ITAM) that is simple enough to be used by non-technical personal. It supports the entire process from designing an IT service to its delivery and support. EasyVista's most remarkable feature is the automatic environment discovery which automates the lookup of both software and hardware using the SNMP protocol. This solution is available in two formats, either on premise or on the cloud.

### **ServiceNow**

ServiceNow exists only as a PaaS that works as an interface to all organizational data and knowledge. It is highly configurable and easily extendable allowing even non-technical personal to develop new applications or update existing applications. Reports on KPI can be created from any application implemented in ServiceNow.

### **Track-IT**

Track-It is a solution designed support small to mid-sized organizations' Help desk, Asset and Change Management. It can be integrated easily with the client's current infrastructure, including with Active Directory. Through the use of its automatic tools for asset discovery and auditing it is able to create comprehensive catalogues of every asset in the network.

### **3. PROPOSAL**

Considering the stated problem, our proposal is to offer to organizations of all sizes **a JIRA based solution that supports the implementation of the most common processes**, Incident Management, Problem Management, Change Management, Request Fulfilment, Event Management and Service Desk function. This will be accomplished through a combination of workflows and scripts that combined with custom issue types and add-ons.

The main objective of our proposal is to offer a tool supporting the adoption of those processes by an organization. It should also offer an easy to use interface that requires little to no training specifically while also being compliant with ITIL's best practices. This tool should be more affordable than the ones from the competition while being able to help all organizations obtain the benefits of their ITIL adoption.

Despite all processes having their advantages, smaller organizations typically focus on the quick-wins, that is the processes which will bring the most benefits in the shortest amount of time and with less resource consumption. As such small organizations, and some times larger ones too, begin with the customer facing processes as those are the ones where current practices differ the most from ITIL's. The processes included in this list are Incident Management, Change Management, Request Fulfilment, Problem Management and Service Desk. We will implement all of the processes in this list and three more, Service Level Management, Knowledge Management and Event Management. The first two were added to the list due to performing important tasks for the other processes and Event Management to both showcase how other processes that require functionality that isn't present in JIRA can be implemented and due to the close relation between events and incidents and problems.

JIRA was selected due to being one of the most popular tools and that is best suited for the types of processes we want to implement. Besides having a large user base that is more likely to accept the result of the present work, it also offers a clean and easy to use interface and the needed flexibility to implement the selected processes.

#### **4. DEMONSTRATION**

Our demonstration consists in implementing the selected processes from the previous section. To accomplish this we began by creating a project for each of them, excluding Service Desk, Knowledge Management and Service Level Management which are implemented inside the other processes' projects.

Each project was created using the “Simple Issue Tracking” template which also creates a new Issue Type Scheme and a Workflow Scheme. The projects were named after the process they implement with a key three characters long. It also has a custom issue type which encapsulates the needed fields for the process.

The workflow defines the steps in the lifecycle of the issue, so it is of the up most importance to have a flexible workflow that is capable to accurately represent each step where the issue will be and how it will progress while restricting the transitions that can be done in each step. To accomplish this we used a mix of conditions, validators and post functions so that the user is only presented with valid options. Despite JIRA offering some validators out of the box, we felt the need to resort to 3<sup>rd</sup> party add-ons to implement some of the most complex validators. We used JIRA Suite Utilities to validate custom fields, especially Cascading select lists which typically represented the category of the issue.

Through the use of Script Runner we can sent an issue to another project, where the new issue will be created with a link to the originating issue and has the original summary and description prefixed by the code of the project of the originating issue. Once the new issue is solved, the originating issue will be marked as done through the use of a post function provided by JIRA Misc Workflow Extensions which sets the resolution field from issues with a given link. Script Runner is also responsible for the automated creation of the RFC and known error entries in Confluence through the use of a custom script that calls the Confluence API to create the said pages.

In Change Management and in Request Fulfilment it is very important to ensure that every issue is approved. To accomplish this we used Herzum Approval which allows us to block a transition until a given group of approvers approves the said transition.

Due to JIRA's lack of monitoring capabilities, we resorted to Nagios to achieve this task. Once Nagios detects a failed component sends an alert via mail to JIRA which in turn creates an event issue.

Service Desk and Service Level Management are implemented using the JIRA Service Desk add-on which allows us to create portals where the customers can perform their service requests. These customizable portals are designed to provide customers with an easy method to create issues, filling the required fields and being able to check the issue's progress without having to login in JIRA. This add-on is also responsible for enforcing the defined SLAs. Each process is able to define multiple SLAs for its issues. The SLAs are applied based on a JQL query. In order to notify the relevant personnel about impending SLA breaches, or actual breaches, we created a couple of filters that will alert the correct team via mail.

All documentation is stored in Confluence. This includes all contracts that might be celebrated or RFCs. It is also here that we store information about known errors and their workarounds and solutions.

If after the incident, problem or request is closed and the requester feels that it shouldn't be so, he can reopen the issue by just commenting on it. This is accomplished thought the use of a custom listener provided by JIRA Toolkit Plugin.

#### **5. EVALUATION**

Despite the remarkable lack of available guidance in this area, evaluation is considered one of the most important steps of DSRM. To overcome this lack of guidance, several authors have proposed their own evaluation frameworks. One of the most common was presented by Pries-Heje et al. where is stated that all DSRM evaluation should answer to three questions: when, what and how. [7] *When* refers to the time of the evaluation, if it is before or after the artifact is built. *What* refers to the object of the evaluation, it can be the artifact itself or the design process and *how* refers to the environment of the evaluation. It can be in the real world or in a simulated environment. In our case the *when* can be easily be answered since our artifact is the instantiation, as such the evaluation was done after the artifact was built. For the *what* and *how* we based our evaluation on the paper by Prat et al. where the IS artifact is treated as a system thus adopting its dimensions. [8] So being an artifact has a goal, an environment, a structure, an activity and an evolution. For each dimension several criteria are offered. We chose to evaluate our artifact on its completeness, from the activity dimension, and ease of use, from the environment dimension.

To evaluate the completeness of our artifact we looked at the requirements for each process and compared them to what is in our artifact. We chose not to evaluate Service Level Management as it wasn't considered for implementation, the only requirements that were implemented are in the context of the other processes.

## **Incident Management**

Incident Management being one of the most straightforward to implement in a workflow management system like JIRA is mostly implemented where it is supported. The only criteria not implemented are the ones related to Capacity Management, Availability Management and CI information resulting in **26/30** implemented requirements.

## **Change Management**

In this process we managed to implement the base functionality but we lack any type of risk analysis about the proposed/performance change. As such that information should be entered manually in each RFC stored in Confluence. Furthermore each proposed RFC must be manually checked as to ensure that the necessary precautions are taken to prevent an OLA breach. Our current implementation doesn't support deployment of any kind, as such it should be handled externally and later acknowledged in our artifact. In this process we achieved **35/43** implemented requirements.

## **Request Fulfilment**

In this process we didn't implement 2 of the presented requirements. The first one being the ability to handle some requests automatically and the latter is the lack of billing support built in JIRA that prevents us from calculating the cost of a request. This processes is rated at **18/20**.

## **Problem Management**

Problem Management is afflicted by the same lack of integration with Capacity Management, Availability Management and CI information that Incident Management is. As such we implemented **28/32** requirements.

## **Event Management**

This is the process with less implemented requirements with only **9/15**. This value is the result of JIRA not being able to monitor other systems, as such it isn't possible to define monitoring targets or thresholds.

## **Service Desk**

The Service Desk function was completely implemented using JIRA Service Desk. The only requirements not covered by this add-on, performing user satisfaction survey and offering a FAQ, were readily done using Survey for Service Desk and Confluence respectively. It is implemented **9/9** requirements.

## **Knowledge Management**

Knowledge Management was implemented using Confluence. On the rare occasions where Confluence wasn't enough to comply with the requirement we used either the Rate Macro add-on or Comala Workflows approvals. The only requirement that isn't supported is the ability to present users with only approved pages. For this process we implemented **12/13** requirements.

<b>Heuristic</b>	<b>EasyVista</b>	<b>ServiceNow</b>	<b>Track-It</b>	<b>JIRA</b>	<b>JIRA Service Desk</b>
<b>1</b>	✓	✓	✓	✓	✓
<b>2</b>	✓	✓	✓	✓	✓
<b>3</b>	✓	✓	✓	x	✓
<b>4</b>	x	✓	✓	✓	✓
<b>5</b>	x	✓	✓	✓	✓
<b>6</b>	x	x	✓	✓	✓
<b>7</b>	✓	✓	✓	✓	x
<b>8</b>	✓	x	✓	✓	✓
<b>9</b>	✓	✓	✓	✓	✓
<b>10</b>	x	x	✓	✓	x

Table 2 - Ease of use evaluation

To evaluate the ease of use, depicted in Table 2, we focused on the 10 usability heuristics for user interface design enunciated by Jakob Nielsen<sup>1</sup> which are:

1. **Visibility of the system status:** Let the user know what is happening.
2. **Match between system and real world:** The systems should speak the language of the user.
3. **User control and freedom:** The system should offer a way for the user to exit unexpected situations.
4. **Consistency and standards:** The system should respect the existing norms as to ensure the user understands exactly what a word, situation or action means.
5. **Error prevention:** The system should try to prevent the occurrence of errors through good design.
6. **Recognition rather than recall:** The system should not require the user to remember information previously used to move forward.
7. **Flexibility and efficiency of use:** The system offers accelerators for experienced users that are hidden for novices, allowing it to cater to both types of users
8. **Aesthetic and minimalist design:** The system shouldn't present irrelevant information
9. **Help users recognize, diagnose and recover from error:** Error messages should be presented in the user's language and help to correct or workaround the error.
10. **Help and documentation:** The system should offer clear and concise documentation that allows users to complete tasks.

## 6. CONCLUSION

Although ITIL has been highly praised, organizations still struggle to adopt it, in part due to its focus on what should be done and by the variability from which the organizations can approach it. Tool selection continues to present a considerable challenge, not just due to the inherently difficulty of selecting a tool that actually helps taking advantage of the benefits of adopting ITIL but also by being an almost afterthought in the ITIL project. The artifact resulting from the present work, consists in creating a JIRA based tool which implements Incident Management, Service Desk, Change Management, Request Fulfilment and Problem Management. These are the so "Customer Facing" processes that offer the most value in the shortest amount of time while also giving ITIL visibility within the organization. Aside from those projects, we followed the close relation between events, incidents and problems to implement Event Management, which generates several of the aforementioned. During this endeavor we felt the need to also implement Service Level Management and Knowledge Management as the former allows to measure the SLAs for the implemented processes while the latter retains and stores all known error information and RFCs.

Looking at the results of the evaluation we can conclude that the JIRA proved to be an appropriate platform to implement those processes, with an implementation ratio of over 80% of the requirements on all processes with the exception of Event Management which was afflicted heavily by the lack of monitoring capabilities present in JIRA, as were the other processes to a lesser extent.

Despite the high implementation rate, we feel that our artifact has some noteworthy limitations. The first limitation is the lack of capability to monitor a service or IT infrastructure which prevents our artifact from providing information about what is affected by each occurrence. Secondly is the impossibility to offer our artifact as a single add-on since it would make its installation much smoother. Lastly we feel that the lack of tools to ensure the Confluence page is updated when it should might degrade the value of the information stored there since there is no guarantee that it is current.

In the future we would like to try our artifact in the context of several organizations, each in different sectors. An interesting limitation to solve is the lack of monitoring capabilities present in JIRA. This could be achieved through the use of a 3<sup>rd</sup> party system that monitored the Infrastructure and updated a space in Confluence with the information regarding the existing CIs.

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