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**STREAMLINING OF A PROJECT MANAGEMENT
PROCESS WITHIN A COMPANY**

ZEFEKTIVNĚNÍ VYBRANÉHO PROCESU PROJEKTOVÉHO ŘÍZENÍ VE FIRMĚ

MASTER'S THESIS

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Abstract

This master's thesis focuses on streamlining the process of lessons learned, which is one of the project management processes that enables the project managers to improve and make the future projects more efficient. The thesis utilizes theoretical knowledge and performs thorough analysis focused on the project environment and current level of the lessons learned process to propose a solution that aims to rectify identified shortcoming and puts forward a possible solution for the purpose of streamlining the process.

Key words

project management, project, lessons learned, knowledge, process, issue, success, Project Management Institute, root cause analysis, tools, techniques

Abstrakt

Diplomová práce se zabývá procesem vyhodnocování či poučení se z projektů, patřící mezi procesy projektového managementu, které umožňují projektovým manažerům zefektivňovat budoucí projekty. V této práci je využito teoretických znalostí a důkladné analýzy projektového prostředí a aktuální úrovně daného procesu pro vytvoření návrhu řešení, který cílí na odstranění identifikovaných nedostatků za účelem zefektivnění celého procesu.

Klíčová slova

projektový management, projekt, poučení z projektu, znalost, proces, problém, úspěch, Project Management Institute, analýza hlavních příčin, nástroje, techniky

Rozšířený abstrakt

Diplomová práce je zaměřena na zefektivnění vybraného procesu projektového řízení ve firmě. Konkrétně jde o proces poučení z projektu, který se v anglické odborné literatuře nazývá lessons learned. Tento proces patří mezi podpůrné procesy projektového řízení a jeho zefektivnění bude specificky určené pro tým projektových manažerů ve společnosti Red Hat Inc. Tento tým projektových manažerů patří do organizace Workplace Technology (WT), která se zabývá interními IT projekty po celém světě, a kromě již zmíněného týmu projektových manažerů jsou její součástí další dva týmy. Tým projektových manažerů je rozmístěn mezi hlavní světové regiony (NASA, EMEA, APAC, India) a zodpovídá za řízení a kontrolu všech interních IT projektů, a to po celý životní cyklus těchto projektů.

Vedení organizace Workplace Technology po projektových manažerech vyžaduje využívání již výše zmíněnému procesu lessons learned, a to především z důvodu, že tento proces může přinést spoustu přínosů jak jednotlivým projektovým manažerům, tak i firmě, ovšem pouze v případě, že je využívám správně. Nicméně, jednotliví projektoví manažeři k danému procesu přistupovali doposud individuálně, a to zapříčinilo několik problémů ze kterých plynula zásadní neefektivnost a nevyužitelnost získaných dat. Proces lessons learned tedy nepřinášel celému týmu ani firmě žádné přínosy, a proto bylo potřeba daný proces optimalizovat.

Pro vytvoření návrhu pro zefektivnění daného procesu bylo v první řadě potřeba nastudovat relevantní zdroje, aby byla nashromážděna data o tom, jak správně fungující proces lessons learned vypadá a jaké prvky obsahuje. Tímto tématem se zabývá první část diplomové práce. Tato část tedy rozebírá představení celkového konceptu procesu lessons learned a dále se zaměřuje na jeden z možných přístupů k danému procesu, který je postaven na základech metodiky řízení projektů dle Project Management Institute (PMI). Tato metodika patří mezi jednu z nejvyužívanějších po celém světě a využívá se zejména v USA, a je také v této části diplomové práce stručně představena. Přístup této metodiky byl zvolen jako řešení z jednoho prostého důvodu, kterým je fakt, že až na jednoho člena projektového týmu, jsou všichni projektoví manažeři daného týmu certifikováni právě touto organizací, a tudíž jsou s danou metodikou velmi dobře seznámeni.

Dalším krokem k vytvoření návrhu, který by zefektivnil daný proces byla nutnost provést důkladnou analýzu projektového prostředí ve kterém se daný projektový tým pohybuje.

Cílem této analýzy bylo získat, jak všechny relevantní informace, které musí být zohledněny k vytvoření daného návrhu řešení, tak i identifikovat nedostatky současných přístupů jednotlivých projektových manažerů. Celá analýza byla provedena především ve formě rozhovorů s jednotlivými členy WT organizace a také za využití brainstormingu, dotazníků a dalších podobných metod na získání dat. Analýza byla navíc doplněna informacemi z firemního intranetu.

První část analýzy se věnovala představení jednotlivých týmů WT organizace, jejich struktuře a také jejich odpovědnostem vzhledem k životnímu cyklu interních IT projektů. Dále byl dopodrobna rozebrán tým projektových manažerů, a to především z kolika členů se skládá, jaké regiony mají jednotliví manažeři na starosti a jaké mají zkušenosti s projektovým řízením, či jaké obdrželi certifikace.

Analýza se dále věnovala celkovému projektovému prostředí, ve kterém jednotlivé projekty probíhají. Tato část analýzy se tedy věnovala například nástrojům a technikám, které jednotliví projektoví manažeři využívají při řízení projektů. V této části bylo identifikováno velké množství důležitých informací, které byly zásadní ve vytvoření následného návrhu řešení a jednalo se především o nástroje využívané pro vytváření, sdílení a ukládání dat, dále se jednalo o dokumenty využívané v průběhu životního cyklu jednotlivých projektů, či způsoby využití firemního intranetu a mnoho dalších.

Velmi důležitou částí analýzy bylo podrobné rozebrání dvou základních typů projektů, které WT organizace provádí. Tyto typy projektů se od sebe liší například v komplexnosti či v počtu využívaných procesů, nebo třeba také ve složení projektového týmu. V první řadě se jedná o projekty zaměřené na budování či modernizaci nových kanceláří společnosti. Tyto projekty jsou hlavním zaměřením WT organizace a zaměřují se na výstavbu IT řešení, která umožňují zaměstnancům společnosti využívat audio-vizuální a konferenční systémy pro každodenní práci. Součástí těchto projektů je i výstavba celkové IT infrastruktury pro zajištění funkčnosti dané kanceláře, jak z hlediska síťového připojení, tak i bezpečnostního. Tento typ projektu je nejvíce komplexní, jelikož vyžaduje spolupráci s několika organizacemi společnosti. Druhý typ projektu se zaměřuje pouze na IT infrastrukturu jednotlivých kanceláří a většinou se jedná o výměnu zařízení na konci životnosti.

Poslední část analýzy byla zaměřená na zhodnocení úrovně procesu lessons learned z pohledu jednotlivých projektových manažerů. Jednotlivé přístupy každého

z projektových manažerů byly zachyceny do samostatných podkapitol a zaměřily se především na to jakým způsobem je k danému procesu přistupováno, jaké nástroje či techniky jsou využívány, kdo je zahrnut do procesu vyhodnocení projektu a jak je nakládáno se shromážděnými daty. Projektoví manažeři byli také dotázáni na nedostatky či možná vylepšení, které by u tohoto procesu uvítali. Na konci analytické části byly poté shrnuty všechny důležité poznatky a nedostatky současného procesu, které vyplynuly z analytické části a je zapotřebí na ně brát ohled při vytváření daného návrhu řešení.

Následující část diplomové práce se zaměřila na vytvoření návrhu řešení, který má za cíl zefektivnit celkový proces lessons learned v daném týmu projektových manažerů, a to za pomoci využití teoretických znalostí shrnutých v první části práce a také identifikovaných poznatků z analytické části. Celkový návrh je postaven na základech přístupu popsaného v teoretické části, který je postaven na bázi pěti po sobě jdoucích aktivit, které tvoří celkový proces lessons learned, jedná se o následující aktivity – identifikace, zaznamenání, analýza, ukládání, a využití. U každé z jednotlivých aktivit jsou popsány prvky procesu, na které je potřeba se zaměřit a jakým způsobem je potřeba k nim přistupovat.

Hlavním cílem návrhu bylo vytvoření standardizovaného procesu, který by využívali všichni projektoví manažeři, čímž by se zajistil jednotný výstup, který by mohli využít všichni projektoví manažeři a mohla se vytvářet databáze shromážděných dat pro využití v budoucích projektech. Tato standardizace by byla zajištěna vytvořením lessons learned registru, který by byl využit při všech aktivitách procesu. Dále vytvořením přehledného úložiště a představení pravidelného virtuálního setkání mezi projektovými manažery, jejímž účelem by bylo předávání získaných zkušeností a řešení identifikovaných problémů. Součástí práce je také ekonomické zhodnocení daného návrhu.

Návrh řešení byl po odprezentování celému týmu přijat. Aktuálně se pracuje na jeho implementaci, která zahrnuje iterativní schůzky, která mají za cíl shodnout se na finální podobě jednotlivých prvků, které byly v řešení navrženy.

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Honourable statement

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no. 121/2000 Coll., about Copyright and right related to Copyright).

In Brno, 16th May 2020

Student's signature

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INTRODUCTION

Change is the only constant in the business world. Today's companies need to embrace the change to stay relevant within the highly competitive environment, especially in the area of technology, where new solutions are being developed every day. The driving force behind any change is the project management that aims to manage the change and achieve the end target of the particular change. As the current technological environment is changing at such a fast rate, making same mistakes, and not learning from past experiences is not an option. Fortunately, one of the project management processes that is focused on this area is lessons learned. Lessons learned is one of the project management processes that enables project managers to learn from past mistakes and make the future projects more efficient, whilst creating organizational process assets for the company. The lessons learned process is included in all well-established project management frameworks that exist today as it is an integral part of today's projects.

The main objective of this thesis is to create a solution proposal that would aim to streamline lessons learned process within a team of project managers. To achieve the aim of the thesis, it is important to firstly introduce the theoretical background of the lessons learned process, to understand how correctly functioning process of lessons learned should look like. Therefore, the first section of this thesis focuses on introducing one of the possible approaches to the lessons learned process, which is based on the project management framework outlined by the Project Management Institute.

In order to propose solution, it is important to perform a thorough analysis, which is based on interviews and conversations with Red Hat Inc. employees. The analysis focused on the overall project environment and the current level of the lessons learned process of each project manager belonging to the Workplace Technology organization, which focuses on IT projects. Based on the theoretical knowledge and findings from the analysis, a solution proposal for streamlining the lessons learned process has been introduced. Proposed solution aims to rectify the shortcomings identified in the analysis and puts forward possible solution for the purpose of streamlining the overall process.

GOALS OF THE THESIS AND METHODS

The main aim of the thesis is to streamline a project management process of the lessons learned within a company. In order to achieve the main aim of the thesis, as mentioned above, it is vital to fulfil several complement objectives. One of those objective is to introduce the overall concept of lessons learned and outline one of the possible approaches that builds upon a project management framework defined by the Project Management Institute. The framework defined by the Project Management Institute is widely used within project management community and it will be described in the theoretical section as well.

A second complement objective of the thesis is to perform a thorough analysis of the overall project environment in which the lessons learned process is being utilized. This includes introducing the Workplace Technology organization, its current state and individual teams that contribute to the overall delivery of the individual projects. It is important to understand the responsibilities of the individual teams, understand the different types of projects that are deployed as well as all the tools utilized during the project lifecycle. Further, it is important to objectively evaluate current state of individual approaches of the project managers to the lessons learned process. The evaluation should encompass individual documents and templates, which are being used by individual project managers for the process of lessons learned. Also, the analysis will focus on the procedures and methodologies used for evaluation of completed projects. This includes questions asked during the lessons learned session, meeting participants, tools used, length of the lessons learned session, and other relevant factors.

The final proposal of the solution for streamlining the process of lessons learned is then proposed based on the findings acquired during the analysis. The solution takes into account all the important details that need to be considered to satisfy all the requirements of lessons learned process.

The thesis utilizes project management framework outlined by the Project Management institute and further utilizes data gathering techniques and methods such as brainstorming, interviews, focus groups, questionnaires, and meetings, to correctly analyse the current situation and to satisfy the requirements of the individual project managers.

1 THEORETICAL REVIEW OF A PROBLEM

The first part of this thesis will introduce the methodology outlined by the Project Management Institute in the guide to the project management body of knowledge sixth edition. Hereafter, the basic theoretical background of lessons learned within project management will be discussed. The concept of lessons learned will be introduced, summarization of what the lessons learned process is, why is it one of the project management processes, and how should the lessons learned be handled. This chapter also introduces the concept of knowledge management and its two basic categories of knowledge.

1.1 PMI framework

As mentioned earlier, the PMI stands for the Project Management Institute which is a non-profit organization that provides project management certifications, resources for its members, and industry standards. One of the resources that PMI provides is the Project Management Body of knowledge (hereinafter referred as PMBOK), which is not a methodology per se, but a framework or a set of guidelines and standard terminology for project management.

The whole PMI methodology is centred around defined forty-nine project management processes or activities that are described as a common good practice that project managers should utilize. Even though not all the processes are utilized for every project, they set a good basis for any project manager when managing a project. These forty-nine processes are broken down into two groupings. To introduce the first group, it is necessary to look at how the PMBOK splits the project lifecycle into four generic phases that are relevant for every project – “*Starting the project, Organizing and Preparing, Carrying out the work, Ending the Project*” (A guide to the project management body of knowledge, 2017, p. 548). These are generally accepted phases that can be found even in IMPA approach as “*initiation, planning, implementation, and conclusion*”, Svozilová (2006) in her book about project management adds one more phase that is called “*Conceptual design*”, which deals with formulation of purposes and benefits of the project. The remaining four phases that follow the “*Conceptual designs*” phase correlate with those outlined by PMI or IMPA. However, PMBOK takes those phases and reorganizes them further into a set

of five process groups. These five process groups are the first grouping of the 49 processes. These five project management process groups are employed to meet project deliverables and they are outlined below (A guide to the project management body of knowledge, 2017, p. 554).

1. **Initiating Process Group** – This process group contains processes that “*define a new project or a new phase of an existing project by obtaining authorization to start the project or phase*” (A guide to the project management body of knowledge, 2017, p. 561). In the initiating process group stakeholder’s expectations, initial scope and objectives are aligned and initial financial resources are committed. This process group ensures that “*only projects that are aligned with the organization’s strategic objectives are authorized and that the business case, benefits, and stakeholders are considered from the start of the project*” (A guide to the project management body of knowledge, 2017, p. 561).
2. **Planning Process Group** – This process group is concerned with processes that define and refine the total scope, objectives, and produce the required course of action to attain projected objectives (A guide to the project management body of knowledge, 2017, p. 565). The important aspect of this process group is the development of project management plan and other project documents.
3. **Executing Process Group** – In the Executing Process Group the processes are focused on the completion of work that was outlined in the project management plan to accomplish project requirements. This involves coordination of resources, managing stakeholder’s engagement and other activities that are outlined in the project management plan and need to be performed to meet project requirements (A guide to the project management body of knowledge, 2017, p. 595).
4. **Monitoring and Controlling Process Group** – The fourth process group is concerned with processes that are responsible for tracking, reviewing, and regulating the progress and performance of the project. These processes identify if any changes to the plan are required and initiate correspondent action if needed (A guide to the project management body of knowledge, 2017, p. 613).
5. **Closing Process Group** - The last process group is concerned with a process that is performed to formally complete or close a project or phase. This process group verifies that all the processes within all the process groups are completed so that

project or phase can be appropriately closed (A guide to the project management body of knowledge, 2017, p. 633).

Furthermore, the second grouping is called Knowledge Areas. In the guide to the project management body of knowledge (2017), A Knowledge area is defined as “*a set of processes associated with a particular topic in project management*”. There is a total of ten Knowledge areas that PMBOK considers, which are utilized on most projects and they group the processes by subject or content area. The ten knowledge areas are listed below.

- **Project Integration Management** – Processes and activities that identify, define, combine, unify, and coordinate different project management activities (A guide to the project management body of knowledge, 2017, p. 23).
- **Project Scope Management** – Processes that ensure that the project includes all the work required, and only the work required to get to the successful completion of the project (A guide to the project management body of knowledge, 2017, p. 23).
- **Project Schedule Management** – Processes that are responsible for managing timely completion of the project (A guide to the project management body of knowledge, 2017, p. 24).
- **Project Cost Management** – Processes that are involved with planning, estimating, budgeting, financing, funding, managing, and controlling the costs so that the project is completed within the approved budget (A guide to the project management body of knowledge, 2017, p. 24) .
- **Project Quality Management** – Processes that are responsible for project and product quality. This can include incorporating organization’s quality policies, planning quality, controlling, and managing quality (A guide to the project management body of knowledge, 2017, p. 24).
- **Project Resource Management** – Processes that identify, acquire, and manage all the resources that are needed for successful completion of the project (A guide to the project management body of knowledge, 2017, p. 24).
- **Project Communications Management** – Processes that ensure appropriate planning, collection, creation, distribution, storage, retrieval, management,

control, monitoring, and finally disposition of project information (A guide to the project management body of knowledge, 2017, p. 24).

- **Project Risk Management** – Processes responsible for conducting risk management planning, identification, analysis, response planning, response implementation, and monitoring of risks (A guide to the project management body of knowledge, 2017, p. 24).
- **Project Procurement Management** – Necessary processes to purchase or acquire goods, products, services, or results that are not delivered by the project team (A guide to the project management body of knowledge, 2017, p. 24).
- **Project Stakeholder Management** – Processes that identify the people, groups, or other parties that could have an impact or could be impacted by the project, and processes that analyze stakeholder expectations and their impact to develop appropriate management strategies (A guide to the project management body of knowledge, 2017, p. 24).

The two groupings of the forty-nine processes create an interconnection in a way that they define processes that are specific for a particular knowledge area and a specific phase of the project. Therefore, as outlined in the figure 1., the interconnection of the two groupings defines a set of processes focused on specific knowledge area that should be performed within individual process groups. This distribution of processes greatly outlines all the necessary action that should be considered during a project by the project manager.

Knowledge Areas	Project Management Process Groups				
	Initiating Process Group	Planning Process Group	Executing Process Group	Monitoring and Controlling Process Group	Closing Process Group
4. Project Integration Management	4.1 Develop Project Charter	4.2 Develop Project Management Plan	4.3 Direct and Manage Project Work 4.4 Manage Project Knowledge	4.5 Monitor and Control Project Work 4.6 Perform Integrated Change Control	4.7 Close Project or Phase
5. Project Scope Management		5.1 Plan Scope Management 5.2 Collect Requirements 5.3 Define Scope 5.4 Create WBS		5.5 Validate Scope 5.6 Control Scope	
6. Project Schedule Management		6.1 Plan Schedule Management 6.2 Define Activities 6.3 Sequence Activities 6.4 Estimate Activity Durations 6.5 Develop Schedule		6.6 Control Schedule	
7. Project Cost Management		7.1 Plan Cost Management 7.2 Estimate Costs 7.3 Determine Budget		7.4 Control Costs	
8. Project Quality Management		8.1 Plan Quality Management	8.2 Manage Quality	8.3 Control Quality	
9. Project Resource Management		9.1 Plan Resource Management 9.2 Estimate Activity Resources	9.3 Acquire Resources 9.4 Develop Team 9.5 Manage Team	9.6 Control Resources	
10. Project Communications Management		10.1 Plan Communications Management	10.2 Manage Communications	10.3 Monitor Communications	
11. Project Risk Management		11.1 Plan Risk Management 11.2 Identify Risks 11.3 Perform Qualitative Risk Analysis 11.4 Perform Quantitative Risk Analysis 11.5 Plan Risk Responses	11.6 Implement Risk Responses	11.7 Monitor Risks	
12. Project Procurement Management		12.1 Plan Procurement Management	12.2 Conduct Procurements	12.3 Control Procurements	
13. Project Stakeholder Management	13.1 Identify Stakeholders	13.2 Plan Stakeholder Engagement	13.3 Manage Stakeholder Engagement	13.4 Monitor Stakeholder Engagement	

Figure 1. Project Management Process Group and Knowledge Area Mapping.

Reprinted from (A guide to the project management body of knowledge, 2017, p. 556).

Furthermore, each project management process or activity “*produces one or more outputs from one or more inputs by using appropriate project management tools and techniques*” (A guide to the project management body of knowledge, 2017, p. 22). Thus, each process has a defined set of Inputs, Tools & Techniques, and outputs (ITTOs) that relate to each other within a process, and with other processes. The output of a process can be a deliverable, a document, or an outcome, which is an end result of a process and the outputs can result in being either an input to another process or a deliverable of the project. (A guide to the project management body of knowledge, 2017). Inputs are usually things such as documents, enterprise environmental factors, company processes, policies, procedures, and any knowledge base captured by the organization (e.g. lessons learned register, deliverables, organizational process assets).

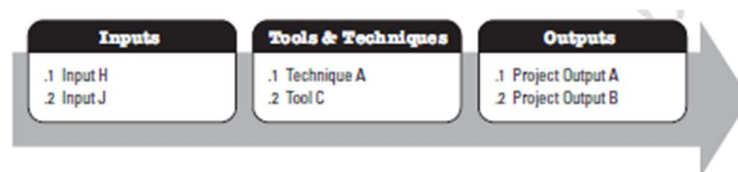


Figure 2. Example Process: Inputs, Tools & Techniques, and Outputs.

Reprinted from (A guide to the project management body of knowledge, 2017, p. 22).

Lastly, a tool is a tangible resource that is used to perform an activity or to produce a product. A technique, on the other hand, is a procedure performed by a human resource with a goal to produce or deliver a product or service with the need of employing some tool (PMP ITTO Complete Guide, 2015). There are about 132 individual tools and techniques in the PMBOK and about 72 of them are grouped into six groups, the rest does not fall under any of the six groups. A guide to the project management body of knowledge (2017) lists the groups as following,

- **Data Gathering Techniques** (e.g. earned value analysis, decision tree analysis)
- **Data Analysis Techniques** (e.g. regression analysis, SWOT analysis, simulations)
- **Data Representation Techniques** (e.g. flowcharts, histograms, mind mapping)
- **Decision-Making Techniques** (e.g. voting, multicriteria decision analysis)
- **Communication Skills** (e.g. presentations, feedback, nonverbal)
- **Interpersonal and Team Skills** (e.g. active listening, conflict management, leadership)

The ungrouped tools and techniques are for example – expert judgment, critical path method, meetings, schedule compression, training, three-point estimation, and many more.

With regards to lessons learned two particular processes are relevant – Manage Project Knowledge process, which falls under executing process group and Close Project or Phase process, which falls under closing process group. Both of these processes are under Project Integration Management knowledge area and will be further discussed.

1.2 Lessons Learned

Generally, The Project Management Institute defines the lessons learned as “*the knowledge gained during a project which shows how project events were addressed or should be addressed in the future for the purpose of improving future performance*” (A guide to the project management body of knowledge, 2017, p. 709). Doležal et al. in the Projektový management podle IPMA (2012) treats the lessons learned as a simple project evaluation. The aim of the evaluation is to figure out what went well and what went wrong in the project. Doležal et al. (2012, p. 42) underlines the fact that if the project manager does not think about the failures in projects or he/she does not even identify the failures, then the level of project management will stagnate for a period of time and then it begins to worsen. Therefore, it is absolutely vital to establish a lessons learned process for any project management professional or in any organization because lessons learned are an important asset to the whole organization, as those lessons learned became an asset for future use (Clayton, 2019). However, it is important to distinguish between “*Lessons Learned*” and “*Lessons Identified*”, a lot of companies keep identifying a lot of lessons, but they are never learning from them. This means that issue or success is identified but nothing is done to improve upon it. To avoid having only “*Lessons Identified*”, Williams (2007) suggests having a specific department for Lessons Learned that would be in charge of the whole process. Further, it is vital to mention that lessons learned are not only about the issues or what went wrong, it is also as important to capture the successes that happened during the project to keep doing the things that went well. The entire process of lessons learned is about identification, documentation, analysis, storage and retrieval of successes, issues or improvements that can help the project professional or organization to increase the level of project management and to make the future projects more effective.

In the following chapters, key subjects of lessons learned will be discussed.

1.2.1 Lessons learned register

The Project Management Institute in the PMBOK (2017) defines the lessons learned register as “*a project document used to record knowledge gained during a project so that it can be used in the current project and entered into the lessons learned repository*” (A

guide to the project management body of knowledge, 2017, p. 709). The creation of lessons learned register falls under the Manage project knowledge process. It is created as a key output of this process in the early stages of the project. Throughout the project life cycle, the lessons learned register is an input to many of the processes and can be updated as an output of these processes, *“this emphasizes the need to learn continually throughout the project rather than waiting until the end to reflect”* (A guide to the project management body of knowledge, 2017, p. 644).

In the Close project or phase process, the lessons learned register is finalized to include final information on a particular phase or project closure. The finalized lessons learned register may contain information about business case accuracy, risk and issue management, stakeholder engagement, or any other of the project management processes (A guide to the project management body of knowledge, 2017, p. 127). One of the main purposes of the lessons learned register is to effectively capture any knowledge, may it be a failure or a success, acquired during the project that could help to improve the efficiency and effectiveness of a particular process. Henry Ford once said that *“Failure is simply the opportunity to begin again, this time more intelligently”*, but only provided that lessons learned are documented, ideally in the lessons learned register.

1.2.2 Lessons learned session

Clayton (2019) defines a lessons learned session as *“a safe place to share thinking and insights about a shared experience”*. A lessons learned session is an activity that falls under the close project or phase process, which is the only process under the closing process group. The goal of the lessons learned session is to reflect back on the project to identify what was learned during the project and to identify pitfalls and successes of the project that can be improved upon. It is advised to perform this session either after the project completion or after a phase is completed, although this is not a rule as in some specific environments it might be beneficial to have them more regularly, for example retrospectives in agile, which is an effective tool for gathering continuous feedback throughout the project (Šochová, 2014, p. 70). In not agile environments it is advised to hold the session as soon as possible after the phase or entire project is completed to ensure that the memories from the project are still fresh. As far as participation goes, it is ideal to invite anyone who has had a considerable involvement in the project, but it usually

applies the less is better. You definitely do not want to have more than twelve participants in the session as that begins to be hard to manage. A lessons learned session should definitely include the core project team as the value of the lessons learned exercise is highest for the people that have shared the experience together and can harvest most value out of it. Furthermore, any stakeholder that was closely involved in the project, is relevant and can contribute to the session should be invited as well. As for any meeting it is important to have an agenda, which will help to have the session more structured and focused. To ensure that the participants are familiar with the agenda it should be shared in advance to the session.

As remarked by Clayton (2019), a lessons learned session should be a safe place where people are not afraid to share their thinking or insights, therefore it is crucial to have a set of ground rules that must be followed in the session. The following chapter discusses this issue in more detail.

1.2.2.1 Ground rules

A set of ground rules is an important aspect for having a successful lessons learned session. The company culture plays crucial role in how the lessons learned will be viewed and therefore, it is important to have a set of ground rules that will make sure that the team members are aware that there are in a safe, honest and most importantly transparent environment.

“Only in a safe, honest, and transparent environment can team members and leaders truly reflect on their successes to ensure their projects continue to advance, or apply lessons learned on failed projects so they do not fall back into the same patterns” (The Agile practice guide, 2017, p. 75).

It is vital that every participant is aware of and agrees with the outlined ground rules at the beginning of the session, where couple of minutes should be dedicated to review the ground rules and to explain how lessons learned can be used effectively (Rowe, 2014). All the participants should be encouraged to criticize the processes but criticizing people must not occur. Not criticizing people goes hand in hand with not using people's names as it is not desired to end in a finger pointing session (Rowe, 2007). Further, it is important to make everyone aware that everyone is allowed to speak, but they do not have to. People that want to provide any input should be aware that the input must be constructive and

supportive not negative and hostile. The sessions should be an ego free zone so that everyone can be honest without the fear of retaliations.

Every team and every organization will have a different set of ground rules that are a product of a specific environment and culture. Although, some ground rules should be universal.

1.2.3 Lessons learned repository

A guide to the project management body of knowledge (2017, p. 709) defines lessons learned repository as “*a store of historical information about lessons learned in projects*”. To rephrase that, a lessons learned repository is a central place within an organization where lessons learned, and all the knowledge gained throughout the project is transferred to for future use. The repository is a place where the lessons learned become historical information and it is important to keep in mind that the repository is an integral part of the continuous improvement process in organization. A repository should contain lessons learned register and any other output of the lessons learned process. The tool chosen for the repository is an important aspect of a successful repository, it must be available throughout the organization, easily accessible, located in a known area, and ideally supporting a search function. There needs to be a hierarchical folder structure to easily navigate through types of projects so that similar projects information is stored together. Rowe (2014) in her PMI conference paper mentions a survey, which focused on sharing of lessons learned and included eighty project managers. One of the suggestions gathered from the survey included the importance of categorizing lessons learned and putting them on a shared drive.

1.2.4 Lessons learned process activities

The Project Management Institute defines a process in A guide to the project management body of knowledge as a “*systematic series of activities directed towards causing an end result such that one or more inputs will be acted upon to create one or more outputs*” (A guide to the project management body of knowledge, 2017, p. 714). The objective of a lessons learned process is to outline a series of activities needed to successfully identify, capture, and use lessons learned for future projects. Rowe and Sikes (2006) in their conference paper presented at PMI Global Congress suggest a series of five stages or steps that should constitute the lessons learned process. See below figure of proposed activities.



Figure 3. Lessons Learned Process Phases.

Adapted from (Rowe, 2006).

The stages of the lessons learned process are: **Identifying, documenting, analysing, storing, retrieving**. Each of these stages serves its purpose to support the overall lessons learned process and they include different activities, tools and techniques. To enable the lessons learned process to function correctly, there needs to be a clear support from the company’s or organization’s leadership encouraging project stakeholders to use the process, tools and most importantly to use the results of the lessons learned process (Rowe, 2006). Dülgerler (2016) suggest a very similar approach to lessons learned process. His PMI conference paper suggests also a five-step process – Collection, Prioritization, Documentation, Communication, Assimilation. These five steps closely correlate with the previously suggested process by Rowe and Sikes (2006). According to a survey mentioned by Rowe (2014), discipline and establishing a lessons learned process that the project managers will follow, is one of the few key points in having successful lessons learned process. The following subchapters are discussing the individual activities, suggest by Rowe and Sikes (2006), of the process in more detail.

1.2.4.1 Identifying

The first part of the lessons learned process includes the identification of comments, issues, recommendations, successes, and suggestions for improvement that could be beneficial for future projects. All the project stakeholders should be able to put forward their inputs about the project at any given stage of the project. This first step goes hand in hand with the second step – documenting, it is vital to capture any issues immediately as they happen, the project team should have a clear understanding how and where the issues are to be captured, ideally in the lessons learned register. Once these inputs are captured, they need to be discussed either during the project or at the end of the project to come up with lessons learned. Identification in-flight is one of the possible ways how the identification happens. However, the identification most frequently happens either via survey sent out at the end of the project or via special meeting held for this specific purpose, which is usually referred to as lessons learned session.

In ideal scenario, the person facilitating the lessons learned session should prepare in advance. The preparation would include a project survey, which would be sent out to all the participants for completion. The survey helps the participants to be better prepared to respond during the session and it gives an opportunity to provide inputs if they are not able to attend (Rowe, 2006). Ideally, categories should be utilized for the project survey. The categories will ensure that key information is not missed, on top of that the used categories will help to focus the discussion. It is advised to have standard categories for each project and more categories can be defined based on the needs of the particular project (Rowe, 2006). The standard categories should be tailored according to the nature of the projects and according to the environment in which the projects are happening. Examples of categories might include – project management methodology, communications, change management, scope, resources, etc. Each category should be supported with set of basic questions that will support the surveyors. Recommended three key questions are taken from the retrospective sessions in agile – “*what went right*”, “*what went wrong*”, and “*what needs to be improved*”.

If a project survey has been sent out, it should be followed by a lessons learned session. The session will follow up on the data gathered in the project survey, identify further points, and clarify the items identified in the survey. In some cases where the survey is

not utilized, the lessons learned session is the single post-project identifying tool and it needs to be treated that way. This means accommodating enough time for the sessions to identify all the issues, recommendations, remarks, successes, which happened during the project. The facilitator of the session should use the three questions used in the survey to guide to discussion and stay within the survey categories. Ms. Rowe recommends in her PMI conference paper from 2008 to have the lessons learned session facilitated by someone else than the project manager because “*the project manager’s closeness to the project may cause a bias in obtaining a fair review*”, Ms. Rowe further points out that “*the project manager needs to participate and provide content in key areas*” (Rowe, 2008). The facilitator should be prepared for the session in advance, the most basic preparation would include identification of participants, reviewing key project documents and most importantly reviewing the survey results. This will allow the facilitator to create a list of questions specific to the project (Rowe, 2008). The beginning of the session should focus on reviewing the agenda, defining roles and responsibilities (e.g. transcriber, timekeeper), mentioning and gaining acceptance on ground rules so that it is clear that there is no criticism or finger-pointing towards anyone. Lastly, the beginning of the session should also focus on making sure that the participants understand the lessons learned process and its activities. Furthermore, it is advised to utilize facilitated brainstorming in the session (Rowe, 2008).

1.2.4.2 Documenting

The documenting stage is tightly connected with the identifying stage, these stages are dependent on each other to function properly. As mentioned before, it is vital to capture any issues, comments, suggestions immediately as they happen or are proposed during the project. The project manager must make sure that the entire project team understands where those identified remarks needs to be captured and the project manager needs to be responsible for capturing comments of project stakeholders as well. The ideal tool for this stage is the lessons learned register to which all the project team members need to have access and the project manager is responsible for it. Capturing of lessons learned during the session or in the questionnaire are also part of the documenting activity and therefore needs to be well captured. Ideally, the output of the documenting activity should be a report of the data captured in the lessons learned session and all other identifying

processes. Survey mentioned by Rowe (2014) also underlines the importance of having defined standardized templates in place, so that the output of the process is consistent.

Rowe (2008) lists five types of outputs that can be usually created during the documenting activity, together with their description.

- **Detailed Report** - *The detailed lessons learned report consists of the data captured during the lessons learned session and any additional input from participants who were not able to attend. The facilitator should distribute the detailed lessons learned report to all participants and participants should be given time to respond to the accuracy of the report. After the report is finalized, the project team should receive a copy.*
- **Summary** - *This is a one-page brief for leadership summarizing the findings and providing recommendations for correcting the findings.*
- **Executive Report** - *This report should present an overview of the lessons learned process and a summary of project strengths - what went well, project weaknesses - what went wrong and recommendations - what we need to improve. Specifics can also be included by category. The detailed report can be included as an attachment or made available in the event leadership needs more information.*
- **Findings** – *A summary of the issues found during the review process.*
- **Recommendations** – *Recommendations are actions to be taken to correct findings. The approved actions should be documented and tracked to completion. In some cases, the approved action may become a project due to high level of resources required to address the finding.*

Any reports created should be stored together with another project documentation (Rowe, 2006).

1.2.4.3 Analysing

The third stage of the lessons learned process is the analysis of the results identified and documented in the earlier activities. This stage is responsible for evaluation and analysis of the lessons learned to identify room for improvement and give the organization a better understanding of what can be improved (Rowe, 2008). The ideal tool for this stage, according to Rowe (2008), is a Root Cause Analysis technique. The Project Management

Institute defines a Root Cause Analysis in A guide to the project management body of knowledge (2017, p. 292) as an “*Analytical technique used to determine the basic underlying reason that causes a variance or a defect or a risk. It may also be used as a technique for identifying root cause of a problem and solving them.*”. This corresponds with the description that Rowe (2008) provides and further elaborates on the objectives of the Root cause analysis in the lessons learned process. The main objective in this specific application is to identify reoccurring problems in past projects and determine steps to be taken to eliminate the identified root causes. Rowe (2008) underlines the fact that “*the analysis should provide true cases, not symptoms*”.

When conducting the Root Cause Analysis, the participants should begin by utilizing the report or list of the items that were identified as going wrong in past projects. Each item on the list should be discussed and the participants should determine if it was a cause or effect. If an item is identified as a cause, the participants should further analyse the sequence of causes by asking multiple “*why*” questions, until the root cause is identified (Rowe, 2008). Once the root cause has been identified it is vital to document it for follow up. Ideally, all the root causes identified should be consolidated on a list and then prioritized. Individually prioritized root causes shall be assigned to one or more resources that will be responsible for developing a solution. It is important to assign the root cause to a resource that is able to come up with or implement the solution. Dülgerler (2016) in his conference paper point out that one of the main traps of lessons learned is the fact that the lessons or root causes are documented in a “*not-actionable*” format. This responsibility is often assigned to a Project Management Office within organizations if they do have it. Rowe (2008) points out that solutions to the root causes are usually in a form of a process improvement or training programs. Additionally, as original root causes are eliminated new root causes will begin to appear.

In addition to root causes, the analysis should also focus on identifying best practices that can and should be incorporated into existing methodologies, processes and procedures (Rowe, 2008).

1.2.4.4 Storing

The penultimate stage of the lessons learned process is storing the knowledge gained in a repository. This is an important stage because having the lessons learned accessible and

easily retrievable for future use is crucial. Rowe (2006) points out that *“one of the biggest challenges in having an effective Lessons Learned Program within any company is determining what tool to use to efficiently store and retrieve lessons learned data.”* In most companies the leadership require the project team to document lessons learned and to store them into either project folders or some made repositories, but this is usually just a way to create huge data dumps that are never used again. If there is no setup process for the lessons learned, it usually ends here with the data dump. To avoid this, there is a need to have two things standardized besides having the lessons learned process in place. First, it is important to have a standardized lesson learned document that will be consistent for every project and the project teams will be familiar with it. This will allow for consistency and easier retrieval. Further, the standardized template should include agreed upon fields such as: category of project, lesson learned, impact, action taken, root cause, key words, etc. (Rowe, 2008). Key words are essential part of the easy retrieval and therefore needs to be always identified. Secondly, a useful hierarchical folder structure for the lessons learned repository needs to be in place, ideally accessible online. Having defined folder structure will support the need to have the lessons learned easily searchable and retrievable and keeping the data consistent. This is underlined by Rowe (2008) as well:

“The tool selected to store the lessons should be accessible across the organization, and also should be easy to use. Documentation and training should be available for new users.”

Furthermore, the project managers are responsible for making sure that the lessons learned have been uploaded to the relevant repository.

1.2.4.5 Retrieving

The final stage within the lessons learned process is the retrieval of lessons learned from establish repository. Ideally, as the documents within the repository should have a keyword search capability the project managers can then easily retrieve useful details about a specific project when starting a new one. It is a best practise to review historical information of similar projects. In A guide to the project management body of knowledge (2017), the historical information or lessons learned are hidden under a specific input group - Organizational process assets (Hereinafter referred to as OPAs). OPAs are inputs to vast majority of processes within the Initiating and Planning phases, and therefore it is

vital to make sure lessons learned are reviewed prior to starting a new project, as they can provide great insights. As pointed out by Rowe (2006), in the repository the project managers should be looking for:

- *Previously successful projects, practices, and processes to duplicate and incorporate into the new project's approach.*
- *Early detection of known and potential pitfalls from previous project failures.*

1.3 Knowledge Management

In correlation with lessons learned, we are interested in one of the PMBOK processes within the execution process group, the “*Manage Project Knowledge*” process, which is another name for knowledge management withing a project lifecycle. According to A guide to the project management body of knowledge (2017, p. 710), the Manage Project Knowledge process is defined as “*the process of using existing knowledge and creating new knowledge to achieve the project's objectives and contribute to organizational learning.*” This process is tightly connected with lessons learned as they fall under the organizational process assets and the OPAs are one of the inputs to this process. This process is about leveraging prior organizational knowledge to ensure project success and about producing new knowledge that can support organizational operations and future projects (A guide to the project management body of knowledge, 2017, p. 98). The Manage Project Knowledge process is performed throughout the project and one of the outputs of this process is the lessons learned register, which is a “*project document used to record knowledge gained during a project so that it can be used in the current project and entered into lessons learned repository*” (A guide to the project management body of knowledge, 2017, p. 709). The literature commonly splits the knowledge into two categories, “*explicit*” and “*tacit*”. Both of these categories of knowledge are described in detail in the following subchapters. Knowledge management deals with managing both of these categories with the aim to reuse existing knowledge and create new knowledge (A guide to the project management body of knowledge, 2017, p. 100).

1.3.1 Tacit knowledge

According to Cambridge dictionary, the tacit knowledge is “*knowledge that you do not get from being taught, or from books, etc. but get from personal experience*”. The guide to the project management body of knowledge (2017, p. 724) interprets it from a different point of view, but very similarly as “*knowledge that is personal and difficult to express*”. If we would like to be more specific, the tacit knowledge could therefore be something related to “*know-how*”, experience, or beliefs. Example of tacit knowledge could be emotional intelligence, innovative thinking, or intuition. Thus, tacit knowledge is usually something that a person takes with him when he or she leaves a company. Hence, tacit knowledge can be taken as crucial competitive advantage for the success of an organization. Callahan (2005) points out that “*knowledge provides the only sustainable market differentiator*” and he suggests that tacit knowledge makes up a significant portion of this crucial knowledge, as much as 80%. Managing tacit knowledge represents a quite a challenge for any organization. One of the learning theories that is widely recognized and connected with transfer of tacit knowledge is called Community of Practice. A community of practices can be defined as “*a group that shares knowledge, learns together, and creates common practises*” (McDermott, 1999). The goal of these communities is to enrich the context around their area of interest or improving their practice by interaction, asking questions, developing new artefacts, listening to stories, fostering discussions, etc. (Callahan, 2005). Other practices that can support the transfer of tacit knowledge can be mentoring programs or networking for example. For companies, it is important to create an environment and culture that will support these practices.

1.3.2 Explicit knowledge

Explicit knowledge on the other hand is knowledge “*that can be codified using symbols such as words, numbers, and pictures*” (A guide to the project management body of knowledge, 2017, p. 706). Therefore, this knowledge is much easier to pass on to other people, this is supported by the definition given by Cambridge Dictionary – “*Explicit knowledge can be articulated and easily communicated between individuals and organizations.*” Great example of explicit knowledge can be the lessons learned. The content of Lessons Learned can be classified as explicit knowledge due to the fact that

the information is usually easily captured, articulated, communicated, and stored. Other examples of explicit knowledge within organization can be data sheets, white papers, reports, etc. It is important to ensure that explicit knowledge is accessible to all parties interested and it is not tied to an individual project.

1.4 Knowledge transfer

Knowledge transfer is a valuable activity that can ensure that experienced project managers share their knowledge and skills to people that are junior or new to the organization. By doing so, the project managers can also “*maintain, as well as improve, their own effectiveness by continuing to learn through knowledge transfer*” (Rowe, 2014). Within organizations, it is important to enable the project managers to collaborate with other project managers to ensure their growth and to improve their effectiveness because “*an effective means of learning from experience on projects*” was described as one of the key factors leading to consistently having successful projects (Cooke-Davies, 2002).

Within project management teams, it is important to build relationships with other project managers. It can be a challenge to leave a comfort zone of their own projects and to reach out to other project managers to establish collaborative relationships with the goal of mutual knowledge sharing and deliberate aim of learning (Rowe, 2014). However, if the team of project managers are all working on related types of projects, the knowledge sharing can be greatly beneficial as the project managers can share knowledge acquired from a project team’s experience (e.g. lessons learned) and share it with other project managers (Rowe, 2014).

It is important to establish an appropriate format of the knowledge transfer. The format will greatly depend on the environment in which the team exists and as well on the type of knowledge we want to transfer - explicit or tacit (Williams, 2007, p. 43). As the tacit knowledge is much harder to pass on, more complex techniques exist to support the sharing, for example the Community of Practice that was introduced in previous chapters. As for the explicit knowledge, there are numerous possibilities how to approach the sharing. One of the examples that Rowe (2014) mentions are Lunch-and-Learn sessions that can be a great tool for collocated teams. However, for geographically dispersed teams it might be a challenge to find an appropriate format as most interactions happen virtually.

One of the suggestions that came out of a project management survey mentioned by Rowe (2014), recommended to have the sharing of lessons learned mandatory and to set up a regular meetings where the lessons learned are shared.

2 ANALYSIS OF THE CONTEMPORARY SITUATION

The focus in the following section will be on the overall analysis of the environment in which the current process of lessons learned is utilized. The analysis includes introduction of the company and overall introduction of the Workplace Technology organization and its teams that deal with specific types of projects. The goal is to analyse not only the overall project environment but mainly to analyse the current state of the lessons learned process and to identify possibilities for improvement and crucial factors that needs to be considered when creating a solution proposal. The information included in this section comes mainly from interviews and conversations with Workplace Technology associates and from Red Hat's intranet.

2.1 Company Introduction

Red Hat Inc. is an American multinational software company that is the world's leading provider of enterprise open source software solutions and services, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers develop cloud-native applications, integrate existing and new IT technologies, and automate, secure, and manage complex environments. Since Red Hat is a software open source company, its revenue comes mainly from the area of application development and emerging technologies, usually in a form of subscriptions to the products like Red Hat Enterprise Linux (RHEL) and others. Other large portion of revenue comes from infrastructure-related technologies and from training and services. Currently, about 50 % of Red Hat's revenue comes from North American region, the remaining 50 % are about evenly split between EMEA and APAC regions. (Novet, 2018) (Harris, 2020)

Red Hat vision – *“To be the defining technology company of the 21st century; and through our actions strengthen the social fabric by continually democratizing content and technology.”* (Harris, 2020)

Red Hat mission – *“To be the catalyst in communities of customers, contributors, and partners creating better technology the open source way.”* (Harris, 2020)

Red Hat was founded in 1993 and has its corporate headquarters in Raleigh, North Carolina. There are more than one hundred Red Hat offices worldwide in more than 40

countries. About 25% of all the offices are managed service offices (MSOs), these are offices that have small presence in that area. Being managed service office (hereinafter referred to as MSO) means that Red Hat is not fully managing this office but it's in hands of local service provider, this is because before capital investments are made into an area, the business prefers to start with a MSO in order to test the potential of the local market. After Raleigh, the second largest office location is Brno, Czech Republic. Red Hat Czech s.r.o. was formed in 2006 and it is a research and development arm of Red Hat Inc. and it is its subsidiary. In Brno, Red Hat has more than 1200 employees, which is about 8 % of Red Hat's total employee count. Brno office has two building complexes, two new buildings has been built in the technological park in the recent years (buildings TPB-B & TPB-C), the old complex is situated at Purkyňova street 97 & 99 (buildings FBC1 & FBC2).

On October 28, 2018, IBM announced its intent to acquire Red Hat for \$34 billion, this has been the largest acquisition done by IBM and one of the largest in tech history. This deal closed on July 9, 2019 and Red Hat became a unit of IBM's hybrid cloud division. Although, Red Hat is now part of IBM it will keep its independence and will keep working as an independent unit. The CEO of Red Hat (James M. Whitehurst) is now directly reporting to the CEO of IBM. This approach has been established due to the fact that Red Hat has always been the neutral entity in the market, and it needs to stay that way to correctly function.

2.1.1 Company Structure

Even though IBM has acquired Red Hat back in 2019, Red Hat Inc. still holds its independence in decision making. The CEO of Red Hat reports directly to IBM CEO – Ginny Rometty. Therefore, we can say that Red Hat is still a large corporation with more than thirteen thousand employees, and it utilizes its own hierarchical structure. In this structure the highest-ranking individual is a Chief executive officer (CEO). The CEO is also a member of board of directors, which includes other nine representatives plus the CEO and therefore ten members in total. The individual branch vice presidents report to the CEO of the company. Few examples of Red Hat's executives can be found below:

- Executive vice president, Global Sales and Services
- Executive vice president and chief marketing officer (CMO)

- Executive vice president and chief people officer (CPO)
- Executive vice president and general counsel
- Executive vice president and president, Products and Technologies
- Chief information officer (CIO)
- Senior vice president of Customer Experience and engagement (CEE)
- Senior vice president and chief technology officer (CTO)
- Senior vice president of Engineering
- And more

The above-mentioned executives usually direct specific company organizations, for example CIO directs the IT organization, this organization can then be divided according to geographical location, type of focus, etc. (Leadership Team, 2020).

This thesis is interested in the IT organization, that has subsidiary organization IT Experience (hereinafter referred to as I.T.X) that is led by Mason Sanders, the I.T.X director. The I.T.X organization is further divided into four subsidiary organization, that work together towards the organization mission and vision. The subsidiary organizations are as follows:

- | | |
|--------------------|-----------------------------|
| - Endpoint Systems | - Document Management & |
| - IT Mail Services | Collaboration |
| | - Workplace Technology (WT) |

The individual subsidiary organizations have their own missions and visions that should contribute to the overall mission and vision of I.T.X organization.

2.1.2 Company Culture

Every company has a different work environment and culture. In Red Hat, the culture is probably the most important part and even a strategic topic. As Red Hat is an open source company it is no surprise that big part of the culture comes from Red Ha's openness and core values – freedom, courage, commitment, accountability. No single value is as important as all of them, these core values would not exist without a sense of balance. At most companies, the core values would be handed down by executive leaders, but not in Red Hat. When the identification of the core values began, all associates in Red Hat were invited to offer an input. (Fernandez, 2018)

Red hat's source of competitive advantage is tight up in Red Hats culture, and culture is really hard to duplicate. The culture comes from the people, with the Red Hat's current growth rate, every two years roughly about half the people at Red Hat are newcomers and so when Red Hat's core source of advantage is tight up in culture and your culture is tight up in your people, how do you make sure you persistently grow your culture over time? This is why it is crucial to create a lot of cultural context for the newcomers so that the whole company can keep its culture and continue to survive and thrive. This is done through a numerous initiatives, programs and events that are called "Culture Activators" that the associates come up with, and any Red Hatter can become a Culture Activator. (Whitehurst, 2019)

Red Hat is an environment where diversity and inclusion play a crucial role in doing business. Additionally, it is not unusual that in Red Hat people tend to challenge each other over their ideas, even though there might be a big hierarchical difference between their roles. As Red Hat is an open meritocracy, position does not matter when you are voicing your ideas or thoughts, the best ideas should always win at Red Hat. This goes hand in hand with the fact that the best ideas come from frank honest conversations; creative friction is needed to come to the best outcomes. This goes hand in hand with trusting environment and positive intent from every Red Hatter. (Whitehurst, 2019)

2.2 Workplace Technology

The Workplace technology (hereinafter referred to as WT) organization is part of a larger I.T.X organization and consists of three together working teams. The three teams work together to deliver a best-in-class workplace environment through innovative technologies that enable Red Hat associates to utilize audio-visual and video conferencing systems to work more efficiently with customers and other teams across the globe. The WT organization has its own mission and vision.

Workplace Technology mission – *“To create a reliable, innovative workplace using technology that enable a seamless experience for associates, the Red Hat Way.”* (Johnson, 2019)

Workplace Technology vision – *“To be a competitive differentiator for attracting and retaining global talent by providing a best-in-class workplace environment through innovative technologies.”* (Johnson, 2019)

All the WT teams are working together towards the mentioned mission and vision to enable the customers to have the best solution available at their office and the teams are as following.

The experience team’s goal is to go beyond expectations to provide a better associate experience through workplace technology with both form and function. Therefore, the main duties of this team include gathering business requirements, taking care of content, communication, and associate change management. This team is WT IT product owner that makes the prioritization and analysis of the environment. (Johnson, 2019)

The engineering team’s role is to standardize, deliver and maintain workplace technologies that make Red Hat associates more effective. That includes platform and problem management, operations, functional quality assurance, research and development and solution design. (Johnson, 2019)

The project management is a global reaching team managing and controlling workplace technology projects within the full project lifecycle. The team deals with transaction management, procurement, delivery change management, product quality assurance, and delivery project management. (Johnson, 2019)

Besides these three teams the Workplace technology organization also has a program manager that is responsible for the entire project portfolio. The program manager works with partners within Red Hat (IT, finance, Global Workplace Solutions) to provide more clarity around health of WT project portfolio and keeps the stakeholders better informed. There is another small team within the engineering team, which is called “*Live Events*”. This small team of two is responsible for managing large live events in Raleigh and across other larger sites around the globe to make sure that they run smoothly. You can see all the teams in hierarchical structure in the below figure.

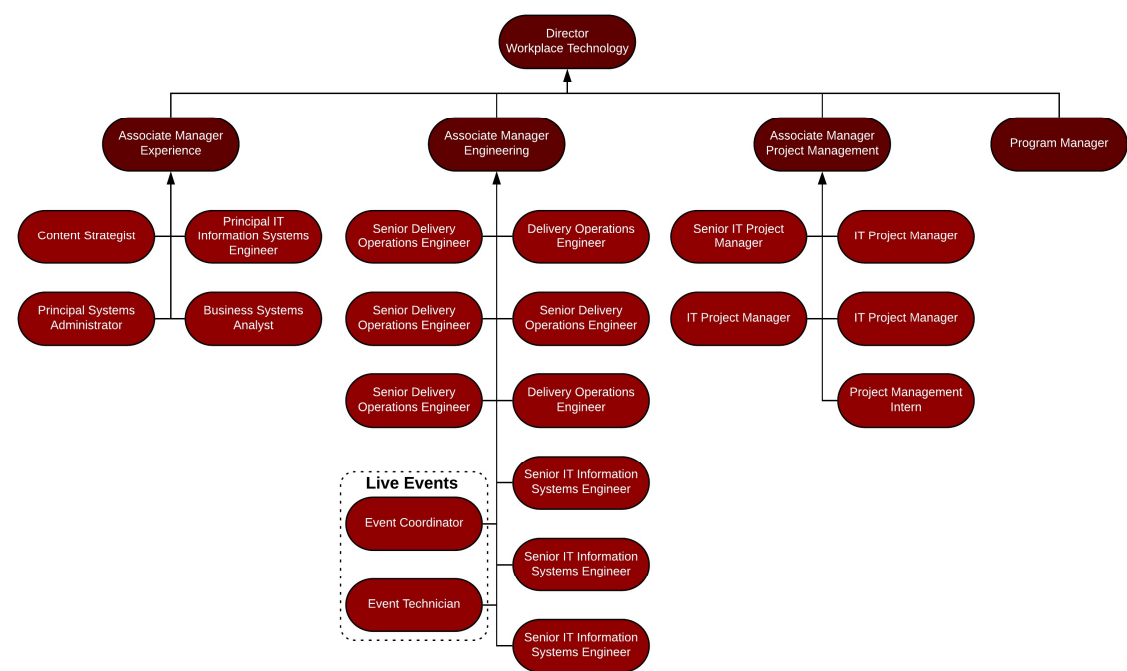


Figure 4. Workplace Technology hierarchical structure.
Adapted from (Grey, 2019).

2.2.1 The project management team

The current project management team consists of a total of six members. Four of the members are project managers, one is an associate manager and the last member of the team is an intern as can be seen in the figure 4. of the previous chapter. The overall project management team is managed by an associate manager. This position of an associate manager is a dual role as such, one part of it is people management, the other part is to ensure that standards and processes are created for managing projects and that each project manager is upholding to these processes and standards. Other responsibilities include assigning projects, helping project managers overcome issues that appears during project, reporting to higher management, communications with the business, and others.

As mentioned above, the team consists of four project managers that are distributed across the globe according to the respective regions in which Red Hat has a market presence. Red Hat has the largest presence in North America region, therefore one of the project managers is based in the Red Hat headquarters – Raleigh, North Carolina. However, the project manager is likewise responsible for the South America region, so the entire scope of the project manager is the North America and South America region (hereinafter referred to as NASA). This region includes about 34 offices of which 26 are located in North America and 8 in South America. The NASA project manager has been with Red Hat since 2017 and has more than 10 years of experience in project management, she holds a certification from the Project Management Institute (PMI) – Project Management Professional (PMP).

Second project manager is responsible for projects in Europe, the Middle East and Africa (hereinafter referred to as EMEA) region, although in Africa Red Hat has only one office in Johannesburg, South Africa. EMEA project manager is based in Brno, Czech Republic, which is the second largest office after the headquarters in Raleigh. The EMEA region includes 38 offices in total, out of which 17 are managed service offices. The EMEA project manager has been with Red Hat since 2009 and as a project manager since 2015, he is also the only senior project manager in the team and holds multiple certifications. One certification is the Project management professional (PMP) issued by Project Management Institute (PMI), and the second certification is Advanced Certified

ScrumMaster (A-CSM), which is a second-level certification focused on scrum issued by a non-profit organization Scrum Alliance.

Furthermore, the third project manager of the project management team is responsible for projects in Asia Pacific region (hereinafter referred to as APAC), without India, as this region has its own project manager. Nevertheless, before the India project manager was hired in 2017 India was part of the APAC region from the project manager responsibility point of view. APAC region has about 24 offices, from which 11 are managed service offices. The project manager is based in the Red Hat's headquarters for APAC, the city of Singapore, an island city-state in the southern Malaysia. The APAC project managers has been with Red Hat since 2005 and as a project manager since 2014, he also holds the certification issued by the PMI - Project Management Professional (PMP), since 2007.

As Red Hat has seen the most substantial growth in India, one of the project managers is responsible for projects taking place only in India to meet the needs of business for expansion in this region. The employee count has been growing significantly for the last 3 years in this region and that is why India has a total number of 6 offices, from which only one is managed service office. The project manager is based in the largest Indian office that is situated in the city of Pune and currently does not hold any project management certifications. Although he is planning to obtain the Risk Management Professional (RMP) certification that is also issued by the PMI. This project manager has been with Red Hat since 2017 and has about ten years of project management experience.

The last member of the project management team is an intern based in Brno, Czech Republic. The Intern's main responsibility is to support all the project managers across the globe and help them in any way possible. This usually includes procurement, documentation, reporting and supplier management. Other responsibilities include creation and maintenance of budgeting and project documents that exist within the project lifecycle and managing of smaller scale projects. The intern holds a certificate issued by the Project Management Institute as well – Certified Associate in Project Management (CAPM).

Currently, each team of the Workplace technology organization is required to create their development plan. This initiative came as a requirement from higher management during Workplace Technology all-hands meeting in Red Hat's headquarters last September. The project management team approached this requirement by utilizing the SWOT analysis.

The team identified its strengths, weaknesses, opportunities, and threats. For each of those, the team identified multiple topics that required the team's focus. Both strengths and weaknesses contained areas that touch the topic of lessons learned. One of the strengths that the team identified is the use of project management best practices via industry resources and certifications. The team agreed that they should maintain PMBOK, Scrum principles and guidelines. Furthermore, the team agreed that continuous improvement of Project management skills and refinement of processes is needed, which closely correlates with lessons learned. As for the weaknesses, one of the identified weaknesses was the “*limited knowledge sharing/transfer in the PM team*” which specifically touched the use of lessons learned documentation, the storage, retrieval, and transfer of lessons learned.

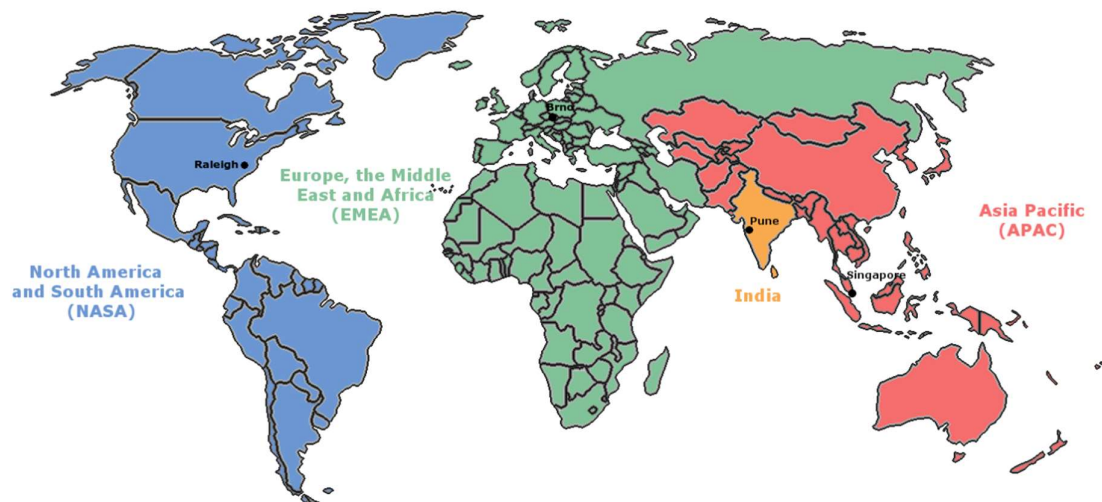


Figure 5. Geographical representation of individual regions and cities that the project managers are based in.

Adapted from Wikipedia (August, 2008).

2.2.2 Established tools and techniques for project management

As the project management team within WT consists of four project managers and an intern across the globe, its main goal is to manage the projects in the same way. The most influential framework that the project managers take resources from is the set of guidelines created by the Project Management Institute (PMI), as previously stated, except one, each of the team members is certified by the Project Management Institute. A great deal of inspiration is taken from the Project Management Body of Knowledge (PMBOK), when managing projects.

The individual project managers are free to utilize any techniques and methods they prefer for managing their projects. Nevertheless, there are few techniques and methods that all the project managers agreed on using globally. The reasoning behind this is that if any project manager would have to fill in for another one, the transition would be as smooth as possible.

During the realization of the project, all the project managers should be utilizing the Gant diagram, which is a tool for project scheduling that includes the critical path method (CPM), which defines the longest stretch of dependent activities. The Gant diagram is also utilized because it is used as a tool for sharing timelines with the stakeholders. Furthermore, as the WT organization partners with multiple organization within Red Hat on different projects, another important tool that is very crucial to utilize is the RACI matrix. The RACI matrix defines project roles and responsibilities so that everyone involved in the project knows who is doing or responsible for what tasks.

Red Hat as a company utilizes Google suite, which is an integrated suite of secure, cloud-native collaboration and productivity apps. It includes Gmail, Docs, Drive, Calendar, Meet and more. As most of the company utilizes this resource, the WT organization decided to leverage it as well due to the fact that it gives the ability to easily collaborate with internal teams and outside vendors. The project management team utilizes the following Google docs apps – Docs, Sheets, Slides and Forms, for number of project related documents that are used within all phases of projects. This includes different kinds of project templates, snag lists, project trackers, checklists, budget tracking, lessons learned, etc. Currently, the WT engineering and project management team are working together on creating project templates that are utilized during all office projects and can

help speed the execution phase considerably, Google sheets are the main tool in achieving that as there is a lot of possibility for customization and automation due to scripting and sharing possibilities.

The WT organization is currently in a planning phase of implementing AO Docs, which is a documentation management system that can be integrated into the Google drive and can add a lot of great functionalities that the Google drive is currently missing. Due to this implementation, there are no other expenses planned for new tools that the team could utilize.

2.2.2.1 Documentation storage

The WT organization utilizes Google Drive, which is a cloud-based file storage for online collaboration, as a storage of all relevant documentation. The WT organization has a shared team drive that is accessible to the whole WT organization with edit rights and with other teams that have read-only access but can be given edit-access to certain documents. Within this shared drive all the relevant WT documents are stored that include project documentation, templates, meeting minutes, project concepts, office photos, and other types of documentation. Each project has its own folder created with agreed hierarchical folder structure so that any needed document within any project can be found in the same folder as in any other project. This helps keeping things organized and consistent. The top level of the agreed upon office project folder structure contains schedule, project management, scope, and financial folders. Its further hierarchical distribution can be found in figure 6. For smaller scale projects the folder structure does not contain all the folders but keeps only the relevant.

Furthermore, the project management team has its own team folder that contains only relevant documents for the project managers. These documents are for example templates, financials, development plans, etc. Nevertheless, other teams from WT organization have shared access as well.

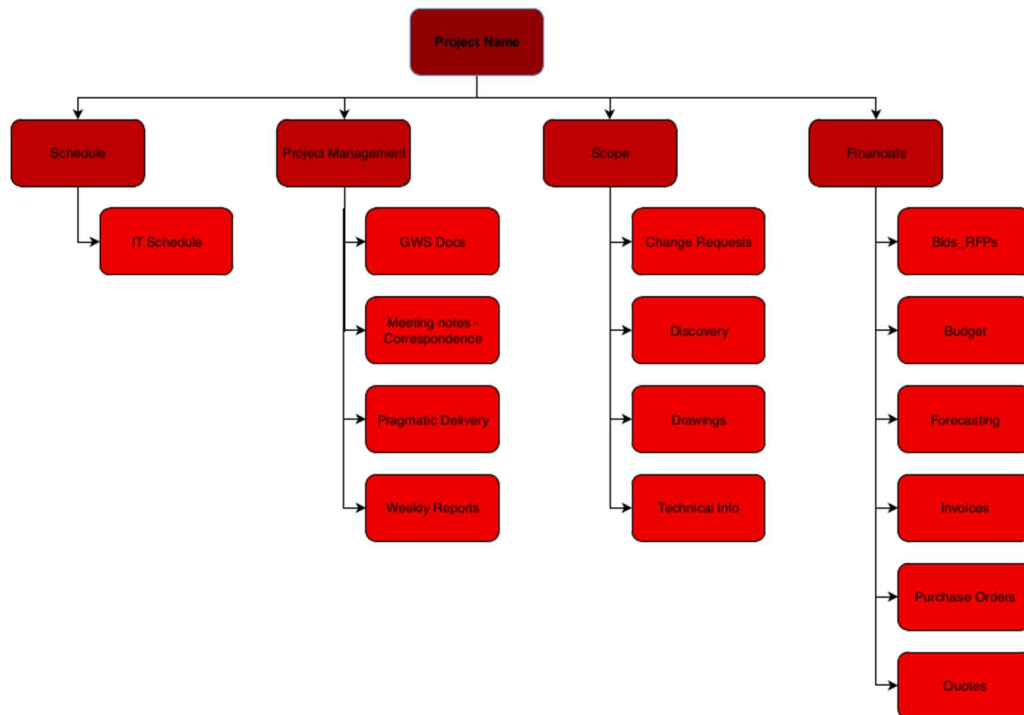


Figure 6. Representation of hierarchical project folder structure utilized within the WT project management team.

Source: Author.

2.2.2.2 Project tracker

One of the main project documents, that the project managers agreed on using is Project Tracker. There are two versions of project tracker, one is utilized mainly for office projects and the second for smaller scale project, even though the tracker for smaller scale projects is not an agreed standard. The project tracker, as vast majority of documents within the project management team, is created in Google Spreadsheets. It contains all the relevant information about the project, such as – Project status, project team contact information, scope, timelines, utilized vendors, change log, issue log, etc. It is a main location for the project manager to store all relevant project information so that everything sits in one place.

2.2.2.3 Red Hat's intranet

Red Hat has its own intranet in a form of a web domain that is accessible only to Red Hat associates. It is called Mojo and it is a collaborative, online environment, where Red Hatters can communicate, share ideas, provide feedback, store documents and

information, and stay connected. On Mojo it is possible to find communities of people who share common interests, both professionally and personally. Furthermore, you can find useful information about different teams, processes, and tools. Thanks to this tool, it is possible to easily share information and ideas with Red Hatters around the world. (Peters, 2015)

The WT organization as a whole utilizes Mojo as a representative platform, it manages an official page within Mojo that contains relevant information about the organization – mission, vision, collaborative partners, individual teams and contact to their leaders, latest project highlights, IT standards, and representative photo gallery. This space is accessible to all associates within Red Hat and as mentioned, it serves as a representative platform of the WT organization.

The individual teams utilize the intranet in their own liking. For example, the engineering team currently utilizes Mojo for storing office infrastructure documents, which are documents about each office that is managed by the engineering team from IT perspective and includes all the relevant information about the office and details about its current infrastructure – network HW, security HW, audio-visual and conferencing HW, etc. Although, this is a currently a standard way of storing this information, the engineering team is trying to find a better solution for it. This is due to the fact that Mojo was designed to be mainly a communication platform with limited storing capabilities, however Red Hat associates started to use it for storing large amounts of data. This resulted in numerous issues that make the use of this platform inefficient.

On the other hand, the project management team utilizes Mojo mainly for representative purposes and in regard to project reporting for pull communication. Main reason being that the project management team is trying to gain more recognition within Red Hat for the work that the whole WT organization is doing. This is why the project management team has its own representative Mojo page. Each major project has its own project page that holds the most important information about the project, being it a weekly report for stakeholders, schedule, scope, or links to all relevant project documents. All the active projects can be found on the team's main Mojo page that on top of all the active projects also contains completed projects, utilized tools, and important links for both the visitors of page and project managers. Furthermore, after each major project the project managers

are creating blog posts that summarize the accomplishments of the project and introduce the project to the wider audience within Red Hat.

2.2.3 Types of projects

The projects that the Workplace technology team deals with can be divided into two main types of projects and this section will focus on introduction both of those types of projects. It is important to distinguish between these two types, as the complexity of them differs substantially and a lot of processes are different. Additionally, the execution part of these projects include different teams and it is crucial to use different approaches when managing. This section will introduce both project types and will give a high-level overview of them.

2.2.3.1 Office projects

The office projects are the primary focus of the WT organization as these projects are focused on the field of expertise due to which this organization has been established. From the WT perspective, the office projects are concerned with workplace IT solutions that enable associates to utilize audio-visual and video conferencing systems to work more efficiently with customers and other teams across the globe. Each of the previously mentioned WT teams contributes to the successful delivery of these projects. The engineering team contributes to these projects by creating the solution designs and together with the project management team contributes through the actual delivery of the projects. The experience team contributes by acquiring the business requirements during the discovery phase and by creating the standard and non-standard solutions that needs to be deployed as part of the project due to the business needs in the particular office where the project is due to be happening. The requirements are gathered by a business analyst who works closely with IT business relationship manager. The project managers are usually not involved in the requirements gathering stage, but it might happen that the business analyst asks for a consultation from the project manager side. Therefore, when the project managers are brought into office projects the requirements are already gathered.

The office projects are the most complex from the WT perspective for the reason that the WT organization needs to partner with multiple Red Hat organization that needs to

contribute to the overall delivery of the project as well. Officially, the office projects are run by the Global Workplace Solutions (hereinafter referred to as GWS) organization. This organization is responsible for all the Red Hat offices across the globe except the managed service offices. The main responsibility of GWS is to make sure that the office spaces are ready and running, this includes coordinating building services, office budget management, space management, facilities engineering, event planning, and more. From the project perspective the GWS is responsible for acquiring the business requirements that need to be implemented in the particular office.

The office projects require a lot of construction and design work to be done, that is why the GWS utilizes outside services for this portion of work. GWS has been collaborating globally with a global commercial real estate services company (hereinafter referred to as company X), which is responsible for the design and construction part of the project. The global collaboration is in place to adhere to the office standards that GWS has implemented across the globe, to ensure that all the associates have the same conditions in any office they are working from. Company X have assigned project manager for their portion of work as well and they are the leading party running the project from the GWS side. However, as mentioned before they need to adhere to the global standards that Red Hat offices are build according to and which go hand in hand with the WT IT standards. Therefore, it is crucial to have both project managers cooperating due to the fact that the IT project deliverables are dependent on the work done by GWS, in this case managed by company X.

Other partnering organizations include Global IT Infrastructure services organization that includes networking team, which is responsible for the connectivity standpoint of the office space and ensures that all the meeting rooms and workstations have working connections. Besides the internet connections, it is also crucial to ensure that all VoIP telephones in the office are working correctly as well, this is where telephony team plays its role. This team is part of a large organization within the IT department - IT Productivity Services organization. Lastly, as part of a larger GWS organization, an important role also plays the Safety Security and Business Resiliency (SSBR) team that is responsible for the security of the office as well as for the access management.

The overall project team can be divided into two together working teams. The first team from the chronological order of the project is the GWS project team that also consists of

the members from company X. As mentioned before, this part of the project team is taking care of the construction and design part of the project. There are usually about three to five members from the company X side and two to five members from GWS side that are running the project. The second team is considered to be the Red Hat IT team that consists of all the members that are working on the project from infrastructure, audio-visual, videoconferencing, telephony, or connectivity perspective. This is usually about five to seven members.

For office projects the WT organization is commonly cooperating with two outside vendors. One vendor is focused on the structured cabling part of the project, and therefore takes care of the design and installation of a cabling system that supports the IT hardware utilized in the office. The second vendor aims to install the audio-visual equipment utilized in the project, this includes video-conferencing units, displays, supporting hardware, etc. These integrators are chosen for each project separately by a tendering process, which considers several attributes before choosing the winning bidder. Both utilized vendors need to be enlightened on the global WT IT standards and are managed by the WT project manager.

As per the responsibilities on the project, the responsibilities of the WT project manager can be matched with the project management knowledge areas and its processes that are interpreted in the PMBOK Guide Sixth Edition. Even though, the process for each project need to be tailored to satisfy the needs of the project, the knowledge areas accurately summarize the responsibilities that the project managers should be aware of and manage them accordingly. The knowledge areas and therefore the responsibilities of the project manager include – integration management, scope management, schedule management, cost management, quality management, resource management, communication management, risk management, procurement management, and stakeholder management (A guide to the project management body of knowledge, 2017). A great deal of focus needs to be applied to the collaboration between GWS project team and the IT project team, due to the fact that IT deliverables are dependent on the successful delivery of GWS deliverables. This point needs to be considered when tailoring the processes for the office projects.

The WT engineer is the technical lead of the project and helps the project manager to do technical decisions and makes sure that everything from the technical side of the project is correct and ready. The engineer is also responsible for the readiness of the main and intermediate distribution frames (server rooms), and overall technical documentation of the site. All the audio-visual and videoconferencing units in the office are configured by the engineer as well as all the printer units.

The other team members from the partnering organization are responsible for small portions of work that usually happens near the end of the project. However, they are brought to the project early for consultations, so that the WT project manager can procure the correct equipment or devices, for example. The telephony project team member is responsible for the configuration of all the IP telephones that are deployed for each workstation and in all the meeting rooms of all sizes. The network engineer is responsible for configuration of network device and for making sure that all the devices are correctly connected and running without any issues.

From the timeline perspective, the office projects usually span across several months, depending on its scope. The office projects can be further divided into four categories according to the type of the office project.

- **Office expansion** – This type of office project is expanding current Red Hat office. That commonly means acquiring another floor in the same building or expanding within the same floor of the building. Therefore, there is a need to build out the standard Red Hat office space in the new building spaces. From the WT perspective that means deploying new audio-visual and conferencing systems according to the business needs and upgrading current IT infrastructure to satisfy the new expected headcount in the office.
- **Office renovation** – This type of office project deals with re-doing an old office that is currently not adhering to the global standards. Therefore, the office space is usually upgraded from the WT standpoint and re-built to adhere to the standards from GWS standpoint.
- **Office move** – Occasionally it happens that office space lease runs out and the office needs to be moved due to several reasons. When this happens, the whole office is moved into another location where it is built out according to the standards and needs of the business.

- **New office** – This type of office project can be either build out of a completely new Red Hat office or it can be managed service office turned into official GWS managed office. In both cases the new office needs to be adhere to both GWS and WT standards.

2.2.3.2 Smaller scale projects

On the contrary to the office projects, the smaller scale projects do not include so many partnering organizations and do not span for such a long period of time. Therefore, these types of projects are less complex, and they generally deal with the office infrastructure in the existing office around the globe. The smaller scale projects are usually driven by organizations within the IT department and these organizations are also the sponsors of the project. As the projects usually focuses on the office infrastructure, the project team generally consists of WT project manager, WT engineer, and an engineer from the respective organization that is driving the project. Another person that needs to be involved in those projects is an office managers of the particular site where the project is taking place. The office manager is always the main point of contact and does a lot of work around logistics and access management.

However, the WT organization generally does not sends its own resource to the site for these projects due to resource and time constraint, the WT organization is cooperating with an integrator company in each region that provides an engineer that goes to site and performs the needed action and it is therefore part of the project team as well. The content of these projects is usually a replacement of end-of-life (EOL) infrastructure devices, such as network routers, network switches, intrusion detection system sensors, and other replacements or moves of infrastructure devices.

The responsibilities of the project manager can be matched with the project management knowledge areas and its processes in the same fashion they are for the office projects. Although, the knowledge areas will be the same, the processes that are utilized for the smaller scale projects will differ vastly due to the fact that these projects are much less complex. The project managers still need to be considering all the ten knowledge areas when managing the project.

For the smaller scale projects, the WT engineer is also the technical lead of the project and therefore helps the project manager to do technical decisions and makes sure that

everything from the technical side of the project is correct and ready. The WT engineer is also responsible for the integrator's assigned engineer that performs the work on site and therefore oversees his work. The engineer from the respective organization that is driving the project is responsible for providing required consultation and needed technical documentation for the work to happen and equipment to be purchased for the installation. The engineer is likewise responsible for the configuration of the new installed devices and the engineer works together with the integrator to ensure that everything on site is tested after the deployments of the new devices is done. Lastly, the office manager is responsible for receiving any packages that are shipped to the site, preparing access for the integrator and provides any needed consultations about the site.

There are also global initiatives or programs that consist of small projects around the globe. These small projects are bundled together into a program and are commonly working towards a single goal that is achieved after every project within the program is finished. One example of such a program is global wireless improvement program, the ultimate goal of this program is to improve Wi-Fi across all the offices. As this goal would not be achieved easily within one single project, the program consists of number of smaller projects that deal with Wi-Fi improvements in individual or multiple offices at once. The programs are generally run in the same fashion as are the other smaller scale projects and the WT organization is responsible for managing them from the delivery perspective.

2.3 Current level of lessons learned

This chapter will discuss the current state of lessons learned within WT organization and specifically in the project management team. The project management team currently does not have any standardized processes in place for lessons learned. Whether it is the capturing of lessons learned, documentation for storing the lessons learned, repository of lessons learned, or process of passing the knowledge gained to other members of the team. Presently, each project manager is utilizing different approach for all of the above-mentioned lessons learned processes, or there is no approach at all. This is particularly true for the last phase of lessons learned which is the knowledge transfer between project members. This results in repetition of issues that have been identified in different regions. This is due to the fact that other team members are not knowledgeable about the issues happening in different regions, after all there is no platform or way of sharing the encountered issues of projects happening in other regions.

In the following subchapters, individual approaches to lessons learned of all project managers within WT organization will be discussed, including suggestions for improvement that the individual project managers believe should be implemented to improve the current state of lessons learned processes.

2.3.1 APAC project manager

As all the project managers within WT are told to conduct lessons learned after each project, the APAC project managers is trying to hold to that. However, as there is not always the time to do it, the project manager tends to skip lessons learned if the project is deemed to be small or short in length. He considers carrying the lessons learned worthwhile if the project is above \$100,000.00, or if it takes more than three months to complete and if it involves a core project team of more than five members. It is important to highlight that the APAC project manager does not have any established way of capturing the lessons learned during the project, therefore the whole process of capturing is left on the lessons learned session.

The ideal time to conduct the lessons learned session from his perspective is about 2-4 weeks after project completion, because that is usually enough time to settle most of the outstanding issue after Go-Live date. Although, having the session after 2-4 weeks is not

always possible due to availability of the team members. The APAC project manager tends to prepare for the lessons learned session by going through the project email folder and he takes notes of the major issues that the team has faced.

Some of the projects he is managing can have several phases and span across over a year. In this case he expressed uncertainty in the way how the lessons learned should be handled for projects with several phases. In the case of discussed project, he held the session after the first phase, however, after that the project team was deeply engaged in the execution of the complicated project and there was no time to hold other sessions after each of the following phases. Further, no session was done after the project completion because he felt that no one would remember many issues in earlier phases as there were total of seven phases. Thus, the project ended without the final lessons learned, even though there could have been a lot to learn from.

Furthermore, the APAC project manager believes that all the project members should evaluate the project as well as the main stakeholders. Although stakeholders are not involved in the implementation, they are the ones who can evaluate what is delivered versus what was envisioned, how communications went, etc. However, having both the team members and the stakeholders in one meeting is easier said than done, also it is hard to manage and control such a large group of participants. Therefore, in the case of office projects, he usually invites the GWS director who is leading the project, GWS office manager, WT delivery team, network team, telephony, and the business relation management team. He does not include any vendors in the lessons learned session, as that would increase the number of participants and make the meeting even harder to manage. Although, he believes it could be beneficial to have a separate session with the vendors, the projects in APAC region usually happen across different countries and it is usually not possible to work with the same vendor on another project. Therefore, the lessons learned collected would not be relevant due different vendor utilized and to the geographical differences. He underlines that this is specific to APAC region, where even if working with the same vendor in a different country, the representative will be always different. In addition, the project manager points out that in Asia countries and most often in China or Japan the people prefer to have a quick and topic related meetings that discuss just the crucial things and do not stretch for a long period of time. Utterly different situation is in India, meetings have a tendency to go over scheduled time and it is quite

usual that people tend to discuss things that are not directly related to the meeting topic and it is hard to steer the conversation the right way.

As for the lessons learned session, there is no particular method that the project manager utilizes, he uses the three standard questions. “*What went well*”, “*What can be done better*”, “*What went wrong*”, and the lessons learned session also summarizes the key accomplishments and any other comments that does not fall in any of the above questions or categories. The session is usually recorded, and the recording is uploaded either to Google drive project folder or to a project mojo page, together with a written session minutes. The main issue is that the process ends here, the session is held, recording and document uploaded, so that the check box can be checked, no further action is taken. The uploaded data are forgotten and not further utilized as there are no follow ups on the identified items.

As far as the improvement suggestions goes, the APAC project manager believes that there should be a standardized feedback form that would be sent to each team member and stakeholder. The form would enable the team members and stakeholders to write down their remarks anonymously and the remarks could be reviewed in follow up session to come up with solutions to these issues outlined. However, the project managers also underlined the fact that there is nothing making the team members, from different organizations, and stakeholders to fill the form voluntarily or attend the lessons learned meetings and that this needs a support from management. Additionally, he mentions that the project management team would definitely benefit from some team guidelines or standardized process for lessons learned. The guideline or process should include the timeframe to conduct the lessons learned, list of participants, topics to discuss, platform to publish the data, and finally what to do with the data after each lesson learned session. He also mentioned that it might make sense to let GWS lead the lessons learned sessions.

2.3.2 EMEA project manager

The EMEA project manager approaches the requirement of conducting lessons learned very responsibly. In regard to the office projects he tends to conduct the lessons learned for every project and he does this by his own formal process that he has developed. In the case of smaller scale projects, the lessons learned are not such a high priority for him as these project does not have such a large impact on the business. Although, he still tends

to do them but not in such a formal way as these projects include a really small project team and therefore can be handled individually if needed. One of the reasons why he is so pro-active in this regard is definitely the fact that he has been in this position for 5 years and he did get accustomed with the processes, plus he is the type of person that is always trying to learn from past mistakes and ensure that they do not happen again.

Optimally, his lessons learned happen within thirty days after the project Go-live, however, as the project closure usually happens after ninety days it sometimes happens that the lessons learned session is postponed towards this day if necessary. This postponing can be problematic since people tend to forget what happened during the project after such a long period of time. Needless to say, the sooner is the lessons learned session is held, the better. From the participants perspective, he points out that it sometimes happens that for the office projects which happen to have two project managers, one from GWS side and the other from IT, GWS holds a separate lessons learned session without including the IT project team. For the time being, the EMEA project manager believes that it is not an issue, as the primary focus of IT should now be on its own processes. However, in the future the lessons learned of both organizations should ideally merge into one. Therefore, it can be concluded that the EMEA project manager currently holds the lessons learned session only with IT associates involved in the project. In the case of vendors, there is no special separate session, the project manager usually tends to ask for their feedback in the sense of the implemented solutions and what would they do different from the design perspective. Their feedback can be then brought back to the experience team that is responsible for the standards. In Europe, for every office project there is a tendering process when selecting a vendor, therefore it is not usual to have the same vendor for more project, although it has happened in some cases.

The lessons learned session that the EMEA project manager is conducting can be divided into three parts. The first part consists of a questionnaire that is sent out to all the IT members that were at some point part of the project. This includes associates from all three teams from WT organization – engineering, experience, project management, and additionally the telephony team members, network engineer, business relation manager, and IT support manager. The questionnaire was originally in a form of word document and the beginning of the document stated ground rules and it followed up by nine individual topics for discussion – *“Project Expectations vs. Deliverables, Project*

Planning, Resource Management, Communications, Quality Assurance, Management of Change, Vendor Management, Methodology, Other” (Švécar, 2016). Each of these topics had couple of questions which purpose was to help the respondents to remember what happened during the project. The answers could then be captured to two different tables – “Did Well” or “Struggles”, the team member also could suggest “Opportunities for improvement”, see figure below.

“Ground Rules”

Do:

- Be precise and specific.
- Be constructive and supportive.
- Focus on challenges and suggestions for improvement surrounding process rather than specific individuals.

Do NOT:

- Use people’s names.
- Be negative or hostile.
- Ask permission.

1. Project Expectations vs. Deliverables

- Did the project meet the requirements stated in the specification?
- Did the project deliver the expected value as defined at the start of the project?
- Were requirements dropped or scaled back to meet a cost or date target?
- What additional requirements were added to a change in scope?
- How was risk managed on the project?

Did Well	Struggles

Opportunities for Improvement

Figure 7. Example of Lessons Learned questionnaire document structure.

Adapted from (Švécar, 2016).

This questionnaire was later re-designed by the project management intern into a Google form document that allowed for easier data gathering and evaluation. This re-design helped to speed up the overall process of lessons learned and allowed it to be anonymous. The questionnaire is distributed about two weeks before the lessons learned session is held to give the associates enough time to fill the form out.

The second part of this process consists of evaluation and pulling of all the data into one single document which will be used during the lessons learned session as an agenda to go through. In the last part of the process, the lessons learned session, the participants go through individual remarks that the team members have written down and these remarks are then thoroughly discussed. There are usually other remarks raised during the session besides those that came from the questionnaire. The outcome for each topic of the

questionnaire is usually in the form of lessons learned conclusions that should be carried over to next projects or suggestions for improvements.

Even though the EMEA project manager has quite a thorough process for capturing the lessons learned, he still believes there is a room for improvement, especially in the way the lessons learned are captured during the project. Although he tends to capture anything as it appears, there is no clear and simple way of doing this that all the project managers could utilize. Despite the fact that he does utilize the lessons learned that he captures, he points out that the project management team is missing a standardized process that all the project managers would utilize and make the lessons learned more useable for all the team members. Most importantly, he believes that the most important part of the lessons learned is the knowledge transfer between the individual team members, which is currently not in place. This results in repeating mistakes or issues in different regions, even though, other project managers have encountered and captured the issues already but did not have the chance to pass the knowledge to other team members. One of the few drawbacks that the process of the EMEA project managers have, is the absence of a clear follow up on the identified issues, which should be assigned to some resource as a responsibility and tracked.

2.3.3 NASA project manager

As the NASA project manager joined the team in 2017, she did not create lessons learned for each project as the project managers are required, because she wanted to get better understanding of how the team functions and what are the process. Therefore, after onboarding she focused more on the important aspects of the projects before creating her first lessons learned. Currently, she has completed lessons learned for three office projects.

She believes that the lessons learned should be optimally conducted within a month after the project, although she admits that she has gone longer due to snag items, which can usually get as long as ninety days after Go-live to resolve. As far as participants go, the NASA project manager usually holds a lesson learned sessions separately with AV vendor and another session with the structured cabling vendor, in both session the technical lead of the project is also present (WT engineer). This is possible, unlike in APAC region, because in the United States Red Hat tends to work with the same

companies if possible and the companies are usually represented by the same management team with which the project manager communicates and works with towards the completion of the project. This fact makes it much easier to improve upon past mistakes and avoid them in the future projects. Moreover, she does not include the team members from network team or telephony team as she believes there is not much knowledge to gain from them, since their involvement in the project is rather simple and quick. She also believes that including the stakeholders is not necessary as well, due to the fact that the project managers do not get the project requirements from them directly, but that is a job of a business analyst.

As for the lessons learned session, the project manager mentioned that for the first project for which she made the lessons learned, she developed quite a few questions to be asked in the session. However, she has found out that the more questions you put on the lessons learned, the more you are likely to end up with these very lengthy calls in order just to complete the documentation. Therefore, currently she just prefers to use the three standard questions from retrospectives - *“What went well”*, *“What tripped us up”*, *“How can we improve”*. These questions proved to be the best to get the participants talking and have a good dialog. This is true even for some hard topics where there can be some miscommunication or frustration, the three questions do help a lot, since it is put in a way that it does not cause a lot of stress to the participants. Additionally, she underlines the fact that everybody knows in advance that this is a lessons learned session and that there will not be any pointing or putting blame on someone. As the session is happening online, usually via videoconferencing, the session is always recorded, and the project managers also keeps written notes as well. For the first project that the project manager did lessons learned the outcome was documented in the Project Tracker document. For following projects, the lessons learned sessions were captured to a separate document for each AV and structured cabling vendor individually. The documents outline the meeting participants and each of the three questions have bullet points with remarks raised under the respective question. These documents were further linked in the Project Tracker document to have all the data about the project in one place. The overall approach is very similar to the one of the APAC project manager and it also lacks the connection between the *“what went well”* and *“what tripped us up”* with the *“suggestions for improvement”*. Further, without these connections there is no easy way for any other project manager to

retrieve the knowledge in the future. The outcome of the lessons learned is also missing any follow up actions as it was for the other project managers.

The NASA project manager points out that even though her approach works quite well, she believes that her approach could be better structured. She underlines the fact that the lessons learned need to be usable for future, however putting too much effort to lessons learned from her perspective is not her priority, as she wants to work smarter not harder. She agrees with all the other project managers that the team needs to find an efficient way of sharing the important lessons learned between the project managers. And since the team is now focusing on development plan, the lessons learned are one of the areas that needs to be addressed.

2.3.4 India project manager

The India project manager has been with Red Hat almost three years, however as the projects in India were coming in fast with no large gaps between them, the project manager focused more on the planning and execution part of the projects and therefore the lessons learned were treated more or less as a checkbox activity. Nevertheless, he believes that the lessons learned should be done after every project, no matter its budget or scope. As expected, the project manager approaches the lessons learned mainly by a lessons learned session held after the project completion, usually after all the financials are closed. As far as participation goes, the project manager for India believes that besides Workplace Technology members, also other IT teams should be invited to the sessions as well. He commonly establishes the list of participants based on the resources or teams that contributed to the project. During his time at Red Hat he did not have a lessons learned session with any vendors. Nevertheless, he sees the possible advantages in having a separate session with the vendors. The main reason for that is the fact that projects in India utilize the same vendors and there is great room for improvement.

Throughout his project management career, he utilized a few different approaches to the lessons learned session. First approach was based on a questionnaire sent to the project team prior to the meeting. The gathered feedback from the questionnaire would be then utilized to steer the conversation in the actual meeting. The second approach utilized an open round table discussion in which all the inputs from each resource would be documented and then prioritized accordingly. Lastly, the project manager developed a

table with questions on different aspects of the project and the lessons learned session went through the questions to find answers. Example of the table can be found below.

Lessons Learned:

Category	Lesson Learned	Achieved?	Comments
Project Planning	Product concept was appropriate to Business Objectives		
	Project Plan and Schedule were well-documented, with appropriate structure and detail		
	Project Schedule encompassed all aspects of the project		
	Tasks were defined adequately		
	Stakeholders (e.g., Sponsor, Customer) had appropriate input into the project planning process		

Figure 8. Lessons learned questions utilized by the Indian project manager.

Adapted from (Bagull, 2018).

Even though, the first two techniques seem valid for the purpose of lessons learned session, the main issue that the project manager pin points is the fact that there never was any tangible outcome from the lessons learned process that could be easily actionized and followed on or utilized for future projects. As most of the projects in India have multiple phases and span over a long period of time, the project manager also expressed an issue with not having an established way of capturing the lessons learned during an ongoing project. Not having established place for him and the team usually resulted in forgetting about the lesson and not capturing it at all.

As for the suggestions how to improve current lessons learned process, he underlines the fact that a uniform approach and format is required to be followed by the entire project management team. He believes that a clear standardization on the critical aspects of the overall process is a necessary further step. Personally, he would appreciate having a clear database of consolidated lessons learned from all the regions or a possibility to share and discuss past project with other project managers. The main reason for that is that he will start managing projects from other regions as well and would like to have an option to utilize such resources.

2.4 Analysis summary

The lessons learned is a project management tool that is utilized to help the project managers to make their projects more efficient and to increase the project management level in any organization. Each project manager of the WT project management team does have in place its own process for lessons learned. However, there are a lot of drawbacks in those processes that do not enable the project managers to fully utilize this tool and to gain real value out of it.

It is important that the new process for lessons learned will take into the consideration the fact that there are two main project types that the team is dealing with – office projects and smaller scale projects. Each of these project types will have to have a slightly different approaches as the project team, documentation and overall management approach differs considerably. Additionally, as found by the analysis, it is crucial that the proposed solution will leverage only already existing tools that WT is currently utilizing. There is no possibility to deploy new tools or solutions due to the fact that the WT team is currently in implementation phase of another tool that was funded and there is no budget for any other tools.

The analysis revealed some major shortcomings in the current utilized lessons learned processes that the new process proposal should focus on. The most important issue is the fact that every output of the lessons learned process is currently different, there is no agreement on what the outcome should be. This creates an issue with the retrieval of knowledge, as every output is different, the individual project managers do not know what to look for, they are not familiar with the different outputs and cannot easily digest the lessons learned. This issue results in lack of interest to even retrieve any knowledge. Therefore, it is important that the proposed process would ideally include standardized document that would unite the outcome and enable the project managers to easily capture and retrieve the knowledge.

Additionally, the project management team currently does not have any agreed upon method of capturing any lessons, issues, recommendations, etc. during the project. In other words, the team is not utilizing any kind of lessons learned register that would allow them to easily capture any knowledge during the project that could be reviewed at the end

of the project. Not having the register can result in the issue of missing important points that could be forgotten due to the length of projects.

Furthermore, the project managers are currently required to do the lessons learned, but as nothing is done to follow up on the identified items, the whole process, in most cases, just creates a data dump. This is because the outcome of the lessons learned is usually in form of answers to the three questions – “*what went wrong*”, “*what went well*”, “*what can be improved*”, but the improvement part is not clearly linked to any of issues or successes. The identified item needs to be analysed and clear follow up action to mitigate the issue or improve processes needs to be assigned to a resource which will be responsible for it. Ideally, there also needs to be a platform to check on the progress.

Along with these drawback, the analysis implies that currently there is no clear repository structure in place that the project managers would use for the storage of the lessons learned outputs. The lack of dedicated place for the storage of lessons learned outputs brings back the issue of easy knowledge retrieval. The absence of the repository makes the retrieval process cumbersome due to the fact that the project managers do not know where to look for the knowledge and they spend valuable time finding it. Introduction of agreed upon lessons learned repository with clear rules and structure, deployed within tool that would enable search option and therefore easier retrieval of knowledge is a basic requirement of having effective lessons learned process.

Last but not least, it is important to focus on the fact that all the project managers are dealing with very similar projects that usually and mainly differ only by the region in which the project is taking place. As a result, there is an extensive potential in enabling the project managers to share their knowledge between each other. Unfortunately, in the current state, this is not the case, which results in repetition of mistakes or issues across different regions. Even though, the other project managers have encountered the same issue, there is no platform to share those experiences to avoid doing them in other regions. Therefore, it would be beneficial to set up some kind of regular knowledge transfer meetings between all the project managers, which would ensure that all the important knowledge gained from each project is shared among all the team members.

3 PROPOSAL OF SOLUTION

The aim of this section is to create a proposal that aims to streamline the current process of lessons learned in the project management team within Workplace Technology organization. The previous section focused on the analysis of the current process of lessons learned and the encompassing environment of the Workplace Technology organization that plays a crucial part in the creation of the proposal. All the findings will be considered during the creation of the proposal and the solution will aim to focus on the most pressing issues that needs to be mitigated in order to streamline the process. The overall proposal creation is approached according to the five lessons learned process steps that were outlined in the theoretical background. Each chapter of this section will elaborate on individual steps and propose solutions that will aim to streamline the overall lessons learned process. Further, the economical evaluation of the proposed solution will be introduced, followed by a summary of benefits that the proposed solution will aim to realize. Overall diagram of the proposed lessons learned process can be found in the appendix.

3.1 Identification

The identification is a stage within the lessons learned process that depends on the project manager and the team's ability to recognize what is an important lesson or knowledge that could be utilized in future projects. Therefore, it is vital to make sure that at least the project manager is aware of how to identify such items that can bring value to future projects. The project manager would then be responsible for conveying this knowledge to the project team, ideally during the project kick-off meeting, as to what is important to capture and where to capture it.

To make sure that all the project managers are able to recognize the items that are worth capturing, the implementation of this process would encompass a session where all the tools and steps of the process are explained. This session would also include a quick section on what kind of knowledge or lesson is worth capturing and would be recorded so that any new team member can easily retrieve that knowledge as well.

There are two main possibilities to identify any lessons. The first and most ideal opportunity to identify lessons is during the ongoing project, however this approach is

currently not correctly utilized in the WT project management team and therefore needs to improve. The second and mostly utilized opportunity is in the lessons learned session that is held after the project completion and which can be supported by a project survey beforehand. The overall process of identification is mostly dependent on the project manager and the project team's ability. However, the process can be supported by making sure that activities, which allow for easier identification, are correctly utilized.

3.1.1 Identifying lessons during project

Most of the lessons are identified during the ongoing project, however it is not enough to just identify those lessons but it is vital to capture the lessons, issues, or comments that arise during the project in a timely and accurate manner, so that the project team can be aware of them and can immediately evaluate them if needed or come back to them at the end of the project to evaluate them. An important source of feedback that can be turned into lessons learned during the project are the project stakeholders that can have valuable comments, recommendations, or issue as well, it applies here as well that it is vital to capture those as well. The identification can happen throughout any stage of the project and the issues can be related to any of the knowledge areas.

The current process lacks the option to easily capture this acquired knowledge or lesson and most of the project managers do not capture it as they appear, or they do it randomly with no sense of continuity. This results in an issues that some knowledge is forgotten before the end of the project and therefore not captured at all. To resolve this issues, it is important to introduce a standardized lessons learned register, which will be discussed more thoroughly in the next chapter, since it belongs into the documenting activity.

3.1.2 Lessons learned session

The lessons learned session currently serves as the main platform to identify the lessons learned in the project management team. The lessons learned session is an important activity in the whole process, as it is an activity where every participant can voice their remarks that should then be thoroughly discussed, captured, and ideally analysed to come up with recommended action to avoid the issues again. The lessons learned session cannot be easily put into one of the process steps, but it is touching three different steps of the process – identification, documenting, analysing. To make sure there is enough time to

go through all of these steps, agenda is a must and needs to be known in advance of the session. To ensure that all the participants are aware of what to expect from the session, the calendar invitation must include clear agenda with allotted time slots for each activity. As the length of the session will vary according to the project's size, it should apply that both the identification and analysis would be allocated with the same amount of time. Therefore, first part of the session should focus on identification of the issues or successes, identified points should then be analysed to give individual points a priority. The most pressing issues should be discussed first to allow for their thorough analysis.

In the ideal scenario, the lessons learned session would be facilitated by someone impartial who was not directly involved in the project to steer the discussion, as the project manager's closeness to the project may cause a bias. However, having impartial facilitator in the WT project management team is currently not feasible and therefore the project manager will have to be the facilitator.

The overall proposed process of the lessons learned is designed in a way that it does not require to re-write and use a different documents or formats to capture, document and store the lessons learned. Therefore, for the lessons learned session, the facilitator should be using the lessons learned register for capturing as well as analysing the identified issues or successes. This will allow to have only one single document in the entire lessons learned process and will ensure that there is no duplicative or extra work created by having to copy over the notes from meeting minutes into the register for storing. Nevertheless, the meeting minutes should still be in place, it is important to keep in mind that details like participation and date of the session still needs to be captured and that the meeting minutes ought to be distributed to all participants. To accommodate for this, the lessons learned register would include a dedicated place for that details in the header. This would allow the project managers to easily convert the spreadsheet into PDF and distribute it to all the participants in the same fashion as meeting minutes. Example of the entire lessons learned register can be found in the appendix.

As for the questions utilized by the facilitator to drive the discussion, the analysis of the process found that almost every project manager utilizes the three questions from the retrospectives – “*what went right*”, “*what went wrong*”, and “*what needs to be improved*”. The questions utilized should not be a mandatory, as the facilitator should be able to decide what works best for him/her and be able to choose his own approach to drive the

discussion. Nevertheless, those three questions are an effective tool that is advised to be utilized. It is important to keep in mind that the sessions should never focus entirely on the issues encountered but there should always be some successes pointed out. By focusing solely on the negatives, we could risk damaging the morale of the team. Ideally, the facilitator should start with addressing the positives, as it usually makes people more open.

3.1.2.1 Ground rules

It is important that every member of the lessons learned sessions understands the purpose of the session and is aware of the rules that needs to be respected so that the members know that they are in a safe, honest, and most importantly transparent environment. To ensure that every participant is aware of the ground rules and understands the purpose of the session, first item on the agenda of the meeting will be a section on the ground rules joined with a quick statement about the purpose and about what is the session trying to achieve. This section will be assigned with at least five-minute slot to review those points and to allow people to ask questions about it. Once the project manager gets consensus from all the participants, it is time to move to another item on agenda, not before. To support the session, the meeting invitation will include a section on ground rules with all the ground rules listed, so that the participants have the option to review them in advance. As for the actual ground rules utilized, it is important to take into account that Red Hat is a very transparent and open company and that fact needs to be underlined in the ground rules as people are used to being open and having constructive discussions where everyone's opinion matters and the best ideas wins. However, making someone to talk is not encouraged, if someone has a thing to say they have the option to voice their concerns or ideas, but they do not have to unless the topic of discussion requires their input. The ideal format of the ground rules is to implement the **to do's** and **not to do's**, that can be supported with one sentences explaining the purpose of the meeting, example below.

“The point of this session is to identify and document lessons so that the future projects do less of the unsuccessful things and do more of the successful things encountered by the project team.”

DO:

Be constructive and supportive.
Be concise, transparent, and specific.
Challenge ideas, evidence, or current
processes.
Turn your cell phone to silent.
Focus solely on this session.

DO NOT:

Mention people's names.
Be hostile and negative.
Ask for permission to speak.
Personalize.
Make people to contribute

3.1.2.2 Participants

As the projects within WT organization can be easily divided into two types of projects, it would be beneficial to have an agreed-on list of participants for each of these project types, as the project team usually consists of the same roles. Currently, the project managers make the list of participants to the lessons learned session on their own, and there is no standardization in place. The agreed-on list would enable to gather a feedback from relevant people and it would also allow the participants to get used to the sessions, as a lot of them would keep participating with each project and the overall lessons learned experience would get better with time. Currently, it does make sense to preferably focus on the IT lessons learned and once the process is optimized and well established, then it would be beneficial to include other organizations.

For the smaller scale projects, the list of participants would consist of the entire IT project team as that is usually 2-4 people. So, from the project team perspective the attendees would be – project manager, WT engineer, and any other engineer assigned to the particular project, being it a network, infosec, telephony, or other engineers, depending on the project. Besides the project team it would be also beneficial to invite office manager of the particular site that the project is happening, due to the fact that the office manager is usually main point of contact and handles a lot of things from logistic perspective. Therefore, the office manager can provide valuable viewpoint.

For the office projects the lessons learned session will always include the WT project manager and the WT engineer of the respective region, because these two roles create the

foundation of the entire project as they are involved throughout vast majority of the project stages from IT perspective. One of the roles that have been missing in the current lessons learned sessions is a business systems analyst. Having a business analyst in lessons learned sessions can be greatly valuable as the business analyst is a person that gathers requirements from the business and has a lot of context that can be brought to the project manager. Additionally, as the business analyst is the one who is validating the project after the completion it can be a great source of information from business perspective and how they are satisfied with the end product. Together with a business analyst, another important role that is involved in the project from the early stages is the IT business relationship manager and a solution architect from the Experience team. The solution architect is responsible for creation of solutions not established in the standards and therefore can get and provide valuable feedback. Further, as the project team consists also of other teams from IT organization that are responsible for specific parts of the project (network, Infosec, telephony), it is vital to include them in the session as well. These project members can provide valuable feedback from multiple areas, for example resource management, communications, quality management, and many others. Another important party that needs to be considered are the members of WT leadership (associate managers of individual WT teams). The WT leadership can provide valuable feedback from overseeing perspective as well from higher management, which otherwise would be hard to acquire. Inviting associates from outside of IT organization is not necessary at this stage, as the GWS organization is usually having their separate lessons learned session after each office project. Therefore, it does not make sense to include them in the IT lessons learned. The main reason being that the IT project manager is invited to the GWS session and is the main voice of the IT organization. The project manager's role is to bring any remarks or feedback about the project to the table from IT side. Therefore, it is important to have the IT lessons learned session before the GWS to identify and gather feedback from IT that would be then brought to the GWS lessons learned session.

Apart from the above-mentioned roles for both project types, the list of participants would include additional roles that might be invited to the session as well based on the particular project and its progress. The overall list aims to help the project manager in the phase of creating the invitation for the lessons learned session. As it states the mandatory participants that are automatically invited to each session and he or she does not need to

think about them, however by listing the other possibilities it helps the project manager realize and think about the progress of the project and what roles should be invited as well to gather valuable feedback.

3.1.2.3 Lessons learned questionnaire

To enable project team members or stakeholders to voice their remarks even if they are not able to join the lessons learned session, there would be a standardized questionnaire that would be sent to those that were not able to make it to the session. This will ensure that everyone had the chance to submit feedback. The survey would be sent out before results of the session would be shared with the project team, to get clearer picture from the respondent.

Ideally the questionnaire would be in a format of all the knowledge areas that are relevant for the project team members or project stakeholders. Those knowledge areas would be supported by a set of prompting question that would help the respondent to come up with remarks and answer to questions “*what went right*”, “*what went wrong*”, and “*what needs to be improved*”, with the possibility to answer to a text field, see figure 9. The exact set of prompting questions for each knowledge area would be result of a team discussion to agree on the standardized questionnaire. It is also important to include a section on ground rules, which would contain points discussed in chapter on ground rules. The ideal candidate for the creation of the questionnaire would be the Google Forms application, which enables to easily capture, export data and it belongs within already utilized tools with which the team is already familiar. The standardized questionnaire would be ideally stored together with all the other standardized lessons learned documentation. To utilize the questionnaire, the project managers would simply create a copy of it to the project folder and rename it accordingly.

Resource Management

How can we improve our methods of planning team member capacity?
Were enough team members assigned to the project, given the schedule constraints?
What could have been done to prevent team member capacity overload?

What went right?

Your answer

What went wrong?

Your answer

What needs to be improved?

Your answer

Figure 9. Lessons learned questionnaire - example of question structure.

Source: Author.

3.2 Documenting

The documentation stage is all about documenting the identified lessons and about sharing those with the project team. It is vital to capture every lesson, issue, success, comment, or recommendation that arises either during the project, through the project survey, or in the lessons learned session. It would be ideal to have a single document that would be utilized during the project and then taken over and used in the lessons learned session for capturing and then stored in the repository as well. This is because we want to make the lessons learned process as simple as possible so that it does not create more workload than it brings added value. It is important to keep in mind that the finalized output of the lessons learned needs to be shared with all the project team members.

3.2.1 Standardized document – lessons learned register

There are three issues that the analysis identified, which could be tackled thanks to the standardized documentation. To make the process efficient and simple, the ideal candidate for standardization is the lessons learned register. The project management team is currently not utilizing any lessons learned register and because of that the register is ideal candidate to capitalize on. The introduction and standardization of the lessons learned register will aim to rectify three issues that were identified in the analysis as the standardized lessons learned register will be utilized during all of the lessons learned process stages. The standardized register aims to rectify the following issues:

- 1. Not having any standardized output of the lessons learned process.**
- 2. No agreed upon method for capturing lessons during the project.**
- 3. No analysis or follow up is conducted upon the identified issues.**

As the project management team utilizes the Google Suite's applications for vast majority of documentation, the ideal tool for creation of the register would be the Google Sheets application. When creating the register, it is really important to determine where would be the ideal place to store the register within the project lifecycle so that it is easily accessible, and it does not create a need to maintain another document. As the project team agreed upon using Project Tracker, which is a standardized document created within Google Sheets that contains all the relevant information about the office project, such as – project status, project team contact information, scope, timelines, utilized vendors,

change log, issue log, etc. The project tracker would be an ideal place to keep the lessons learned register. The register would live in its separate sheet as it is for the other relevant topics within the tracker. By having the register in this centralized place, it would be avoiding the need to track and maintain another separate document. Having the lessons learned register created within the Google Sheets application also enables the team to easily share the content with needed parties. Even if the live project tracker should not be shared to some stakeholders, the finalized register can be easily exported as a PDF document distributed to all interested stakeholders.

The lessons learned register itself needs to be simple, understandable and must enable the project managers to capture important details. It is important to capture not only what was the issue or success, but it is also important to capture a concise description, specify impact, and ideally also mention recommendation that would help to avoid the issue in the future, as an example. Additionally, each issue or success needs to be referenced with some set of keywords that will create simple categorization and make searching for specific topics easier. Individual features of the lessons learned register are discussed in the following subchapters.

3.2.1.1 Utilizing keywords

Keywords are an important feature that allows for categorization of the issues or successes and enables to utilize search function that exist within the Google Drive application and can also bring more context of the item. Additionally, the keywords can be easily utilized for filtering functions within the spreadsheet to find only relevant categories if needed. Further, as all the project managers are familiar with the PMI terminology, the first ideal category for keywords utilization are the ten knowledge areas defined in the PMBOK - Integration Management, Scope Management, Schedule Management, Cost Management, Project Quality Management, Resource Management, Communications Management, Risk Management, Procurement Management, and Stakeholder Management. This first category of keywords would therefore specify the topic of the issue or success and it would be incorporated into the lessons learned register as a dropdown. The project manager would simply choose the respective category of the item from the list. As we want to be more precise and create more context, another categorization could be also utilized. The second category would be also taken from the

PMI approach as well and it would be the project phases defined in the PMBOK – Initiation, Planning, Execution, Monitoring and Controlling, and Closing. This categorization would enable the project manager to specify in which exact phase of the project did the issue or success occurred. Other possible categorization to be utilized could for example be the individual outputs of the knowledge areas, again defined in the PMBOK, which would categorize the individual item to its fullest potential. This categorization would be implemented in the register in the manner of conditional dropdown list. This means that dropdown list of this third category would be dependent on the knowledge area chosen in the first category. Once the project manager would choose one of the ten knowledge areas, relevant outputs of that knowledge area could be chosen in the dropdown for process outputs. The conditional dropdown functionality is done using ArrayFormula, IF, and transpose functions together with data validation functionality of the Google Sheet. The individual columns with keywords categories can be easily re-organized to a different order if needed.



Lesson Learned Topic [Keywords]			
#	Knowledge Area	Project Phase	Process Output
1	Communication_Management	Planning	Project Communications

Figure 10. Example of utilization of keywords categories in the lessons learned register.

Source: Author.

3.2.1.2 Issue or success

The initial concept of the lessons learned register included an individual sheet tab for both successes and issues, however after a few iterative sessions with the project management team it was agreed that the lessons learned register will be utilized within the Project Tracker document and it did not make sense to keep it that way. Therefore, new column

for differentiation between issue and success has been implemented. Apart from those two, the dropdown contains “*Other*” option, for occasions when the line item is not issue nor success. This column will allow for simple filtering option to differentiate between those three categories. The issue or success column is situated right after the keywords section divided by bolded borders between to allow clear formatting.

3.2.1.3 Description of the issue

A concise description of the issue or success is also an important detail that helps to create a context, so that if anyone will be retrieving the lessons learned of that particular project, the lessons learned can be easily digested, as each issue or success creates the needed context and helps the person retrieving the knowledge to understand the situation. Therefore, the creation of a description column where the context would be captured, greatly supports the knowledge retrieval process.

3.2.1.4 Impact

As mentioned before, another important information that should be captured in the register is the impact of the issues or the success. Capturing the impact can help greatly in creating more context for the retrieval process. Having written a clear impact of the success or issues can help in setting up a recommendations on how to avoid the issue or how to increase the likelihood of the success. It can also set a good expectation of the severance of the issue. The overall breaking down of the individual categories of description, keywords, impact, etc. can be a huge help in identifying the root cause of some problems. The impact description would be represented in the register as a single column next to the description of the issue or success.

3.2.1.5 Root cause

The first column utilized under the analysis step would be for the capturing of root causes. It is crucial to identify the root causes of the identified issues so that recommended actions can be proposed and actionized or assigned to a resource. As the analysis requires a consolidation of all the root causes followed by their prioritization, this column aims to satisfy those requirements.

Lessons Learned Register			
Success/Issue	Description of the Issues/Success	Impact	Root Cause
Issue	The office manager was not aware of the incoming HW to site. The HW was ordered couple of months before the project by the ISO team with no notification to the Office manager.	This created confusion with locating and identifying the delivered HW and resulted in having wrong power cables delivered at one of the locations. This led to the need to have the contractor to visit the site.	There is no agreement between the ISO and the WT organizations on a clear process for ordering HW.

Figure 11. Overview example of utilized columns in the lessons learned register.

Source: Author.

3.2.1.6 Recommended action

Another important column that needs to be implemented within the lessons learned register, as it brings great value, would be for recommended actions, suggestions for improvement or re-phrased lesson learned. The recommended action column should be ideally filled during the analysis part of the lessons learned session or lately by the project manager as an outcome of individual analysis. This column is not only for the project manager to realize what should be considered or done differently for future projects, but it can become a great organizational process asset that is stored in the lessons learned repository and can be used as source of possible issue mitigations for similar projects. For example, lets imagine a new project manager that joins a company. During a project, the new project manager would encounter some issue that he would not know how to solve, hence he/she could go to the lessons learned repository, search for similar projects and try to find similar issue with recommended action that could be utilized.

3.2.1.7 Responsibility

The next column in line would be utilized for assigning responsibilities. If some recommended action needs a follow up and therefore needs to be assigned to someone, this column would be used. It is useful to have this data documented not only for tracking purposes of the assigned action points, but it also helps in the retrieval knowledge process. If somebody will be retrieving lessons learned for a particular project and sees that there has been an issue and there is an possibility of that issue happening again, the person managing the new project can reach out to the responsible person and ask if anything has

been done in follow up to mitigate the issues or not. The responsibility is assigned as a result of an analysis stage of the lessons learned process.

3.2.1.8 Further discussion

The “*Needs to be discussed further*” column aims to capitalize on an overall process that includes having a regular transfer knowledge meetings within the project management team. These meetings will analyse and follow on those items that will be marked as “*needed to be discussed further*” to come up with an action points to mitigate those issues or improve processes. The format of those meetings will be discussed in more depth in later chapters. This column belongs under analysis stage as well.

3.2.1.9 Responsible party acknowledged

One of the added columns based on the feedback from the project management team, is also the “*Responsible part ACK*” column, ACK is an abbreviation for acknowledged. As it is not always possible to track the progress of some assigned action points, especially if the action item is on someone outside of the Workplace Technology organization, it makes sense to have some kind of checkbox for pointing out that the responsible party has been acknowledged about the action point and the responsibility is on them. Additionally, it is always a good idea to document those things that can later help clear up disputes. This column can also help in the knowledge retrieval process when someone on a similar project encounters the same issue, he or she can then follow up with the assigned party if any solution to the problem was implemented. This column is followed by a last one, which is designated for any notes that might make sense to capture.

Details				
Recommended Action/Improvement/Lesson Learned	Responsibility	Needs to be discussed further?	Responsible party ACK	Note
It would be beneficial to be in charge of the procurement process so that we can make sure the HW is on site and no extra work is created by the need to identify and locate delivered HW. Agree on a specific process with the ISO team.	Management	Yes	<input type="checkbox"/>	

Figure 12. Second overview example of utilized columns in the lessons learned register.

Source: Author.

3.3 Analysing

The third step of the lessons learned process is the analysis. Its goal is to analyse and evaluate the identified and documented items from earlier steps for applications of results. Analysis is an important step that focuses on the underlying reasons or conditions that resulted in an issue. A desired outcome of the analysis step is the identification of best practices that should be incorporated into existing methodologies, procedures, and processes, which aim to solve the underlying issues. The outcome of the analysis should be in a format of recommended actions and assigned responsibilities to apply those recommended actions.

The analysis stage is closely related to the two preceding steps that go together hand in hand. Ideally, the analysis should happen during the lessons learned session due to the fact that most of the project team members are present and they should be part of the analysis of relevant items. Nevertheless, some items might require analysis performed only by the project manager as they are valid only for the project manager. Once the issues have been identified and documented on a clear list, it is important to perform a root cause analysis which should help to identify the underlying root causes of the issues. To identify the root causes, the team can utilize a technique of using multiple “*why*” questions until the underlying root cause is identified. As it can happen that some issues will have the same root cause, it is also important to put all the root cause on a consolidated list. The individual root causes then need to be prioritized so that the most pressing issues can be addressed first, to arrive at some recommended action or solution and to assign it to a resource. The introduced lessons learned register in the previous chapter is designed in a way that it enables the project manager to capture all the necessary details to perform the analysis.

Furthermore, some identified root cause will require further analysis to come up with a recommended action. Such items might be touching project management process and therefore they would need a more in-depth discussion with the project management team to arrive at some solution. Those items should be marked in the lesson learned register and then further discussed in the transfer knowledge meeting, which will be introduced in later chapters. Those identified items should be handled the in the same manner as the other issues discussed in the lessons learned session.

3.4 Storing

The storing of lessons learned is an important part of the lessons learned process that ensures that the lessons learned are easily searchable, centralized in one location, and accessible to all the interested parties. As there is currently no lesson learned repository in place in which all the lessons learned documents would be stored, it is important to set it up. Due to the fact that there is no possibility to utilize new tools besides those that are currently available in the WT organization, the best tool for lessons learned repository is the Google Drive. As Google Drive is a cloud-based file storage for online collaboration, it provides the simple availability across the company and it also has quite a good search function built in that allows for easy search according to the key word utilized in the lessons learned register. On top of that the Workplace Technology organization is now working on implementing AO Doc, that sits on top of Google Drive and brings more searching possibilities and folder management for easier documentation management.

The analysed environment creates an option for two possible approaches for storing the lessons learned. The overall approach of both options is quite similar, however they differ in one crucial element. The following chapters will discuss one of the options in detail, followed by a brief discussion of the second approach. The end of this chapter will focus on the advantages and disadvantages of both approaches and will propose possible adjustments that would exploit advantages of both approaches.

3.4.1 Lessons learned repository

It is important to place the lessons learned repository in a location that will provide easy access to all interested parties, mainly the entire WT organization and also individual project team members that are from different organizations (network team, telephony team, SSBR, Infosec, etc.). The ideal candidate for such place is the ITX - Workplace Technology shared drive to which the entire WT organization has edit rights and other organizations read-only, but anyone from Red Hat can be granted with edit rights to individual documents. As the lessons learned repository will be centralized in one location and it is an important asset to the organization it is advised to have the data backed up in a different location. Each project manager should download the entire

lessons learned repository to his own laptop each quarter, this will ensure that the data are fully backed up.

As the Workplace technology organization has been trying to get more recognition from top management and across the company, a link to the lessons learned repository would be put on the representative Mojo page that the project management team has created. This would enable the team to not only share their resources, or enable easy access to all resources, but also to show that the team is making sure that the lessons learned are treated as an important organizational process asset.

3.4.1.1 Folder structure

To ensure that the lessons learned repository is simple and it is easy to navigate in it, there needs to be a clear folder structure. As the projects that the WT organization deals with can be easily divided into two types, it is convenient to have an individual folder for each of the project type. Therefore, all the lessons learned documents of office projects will be stored into its respective folder “*Office Projects*” and all the smaller scale related projects will be stored into another respective folder “*Smaller Scale Projects*”. This will allow to have all the relevant documents that are closely tied in respective folder. No other folders will be created under each project type folder, due to the fact that we want to avoid having to click through multiple folders to get to a single needed document. The lessons learned repository will also include the standardized templates of the lessons learned questionnaire and the lessons learned document that includes the standardized lessons learned register and an overview page of the project. This document is utilized for each project and when finalized, it is saved into the respective project folder.

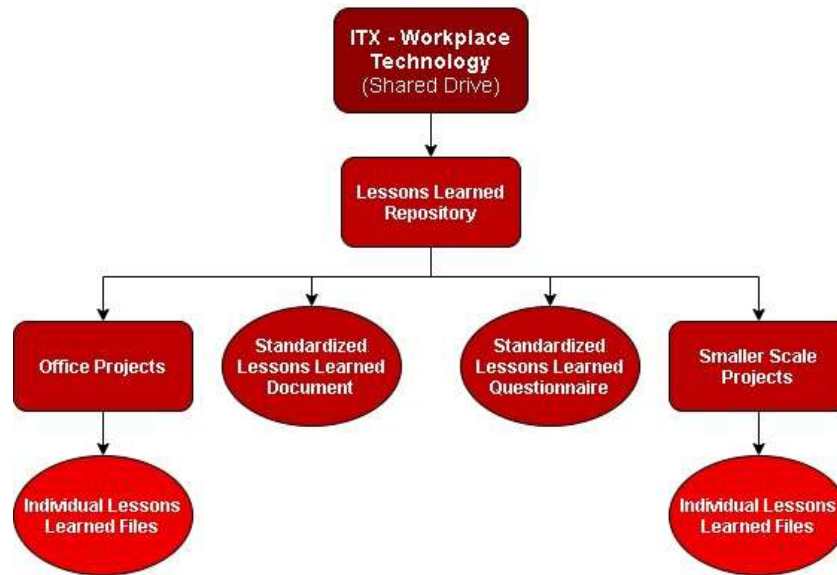


Figure 13. Lessons learned repository structure.

Source: Author.

3.4.1.2 Naming Scheme

As every project will consist of only one lessons learned document (the lessons learned register with the overview page) that will be stored into the respective lessons learned repository folder, it is important to create appropriate name scheme for those individual documents in the project folders. The naming scheme will bring simplicity and allow for easy search/navigation within the project folder. To enable the simplicity and easy navigation, the naming scheme needs to contain important data about the respective project. The format of the naming scheme would be as follows:

[Lessons Learned - Project Type - IATA - Project Subcategory - Calendar year of Go-live - Region]

Every document would start its name with “*Lessons Learned*”, followed by the project type, being it either office project or smaller scale project. Subsequently, the code of the particular office would follow, this code comes from airport codes that the IT organization utilizes for names of individual offices, each office gets a code according to the closest airport. Next attribute would be the subcategory of the project (renovation, move, expansion, or new office), followed by the calendar year in which the project was

completed. The last attribute would consist of the region in which the project took place. The figure 14. shows couple of naming examples.





	Lessons Learned - Office Project - BRQ - Renovation - CY20 - EMEA
	Lessons Learned - Office Project - PNQ - Office Move - CY20 - INDIA
	Lessons Learned - Office Project - RDU - Expansion - CY19 - NASA
	Lessons Learned - Office Project - SYD - New Office - CY21 - APAC

Figure 14. Lessons learned document naming scheme examples.

Source: Author.

3.4.2 Lessons learned repository document

Each individual lessons learned document that would be stored within the repository would be in a form of Google Sheet document that would contain two separate sheets. The first sheet within the document would be so called “*Overview*” page and would contain high level details about the particular project, this sheet will be more thoroughly discussed in the next chapter. The other sheet would contain the actual lessons learned data and would actually consist of finalized lessons learned register. For office projects, the finalized lessons learned register would be easily copied over from the project tracker so that no extra work is created as there is a handy functionality in Google Sheets to easily copy individual sheets to another documents in few easy steps. For the smaller scale, the approach of copying it over would be the same, with only small difference that the lessons learned register is a separate document for smaller scale projects.

3.4.2.1 Overview sheet

The overview sheet would be a standardized document that would be stored in the lessons learned repository as shown in figure 13. in previous chapters. To correctly store lessons learned from projects to the repository, a copy of this document would be created with the appropriate naming according to the project as mentioned in previous chapters. The overview sheet would be supplemented with the finalized lessons learned register that can be easily copied over from respective documents.

The overview sheet would contain high level data about the individual project to create more context and to enable more clear recognition of relevant projects for knowledge retrieval. For example, a project's budget vs. budget spent is an essential information that could help to recognize more relevant projects in the retrieval process. Mainly in the sense that if the project is over or under the budget, we could expect a valuable information in the lessons learned that could interpret why those deviations occurred. The length of the project is also very useful information that can help with identifying how complex the project was. Another data that the overview sheet would contain is the name of the person that managed the project. This information can easily enable the person retrieving the knowledge to reach out to that person for further clarification if needed. As it is not always the project manager who manages the project, this line would be accompanied with a dropdown menu to choose the correct role that was responsible for managing it – „*Project Manager*“, „*Project Coordinator*“, or „*Technical Lead*“. Furthermore, the basic information about the project type, its category, and region in which the project is taking place would be on the overview sheet as well and could be chosen by a dropdown menu. Number of solutions would be one additional detail relevant only for office projects. This attribute would indicate whether a non-standard solution was deployed in that project and therefore increased overall complexity.

The other section of this overview page would focus on listing useful links that would lead to relevant project documentation and would enable the person retrieving the knowledge to gain more detailed information on the overall project. This feature should help with localization of important documentation and folders that would otherwise take a lot of time and effort to locate. As can be seen in figure 15., the list would include links to project tracker, budget tracker, timelines of the project, stakeholder register, overall project folder, scope of the project, photos, or to a blog post that gives a good summarization of the project with pictures of finalized space. Last but not least, the top of the sheet would also list the name of the project for reference.

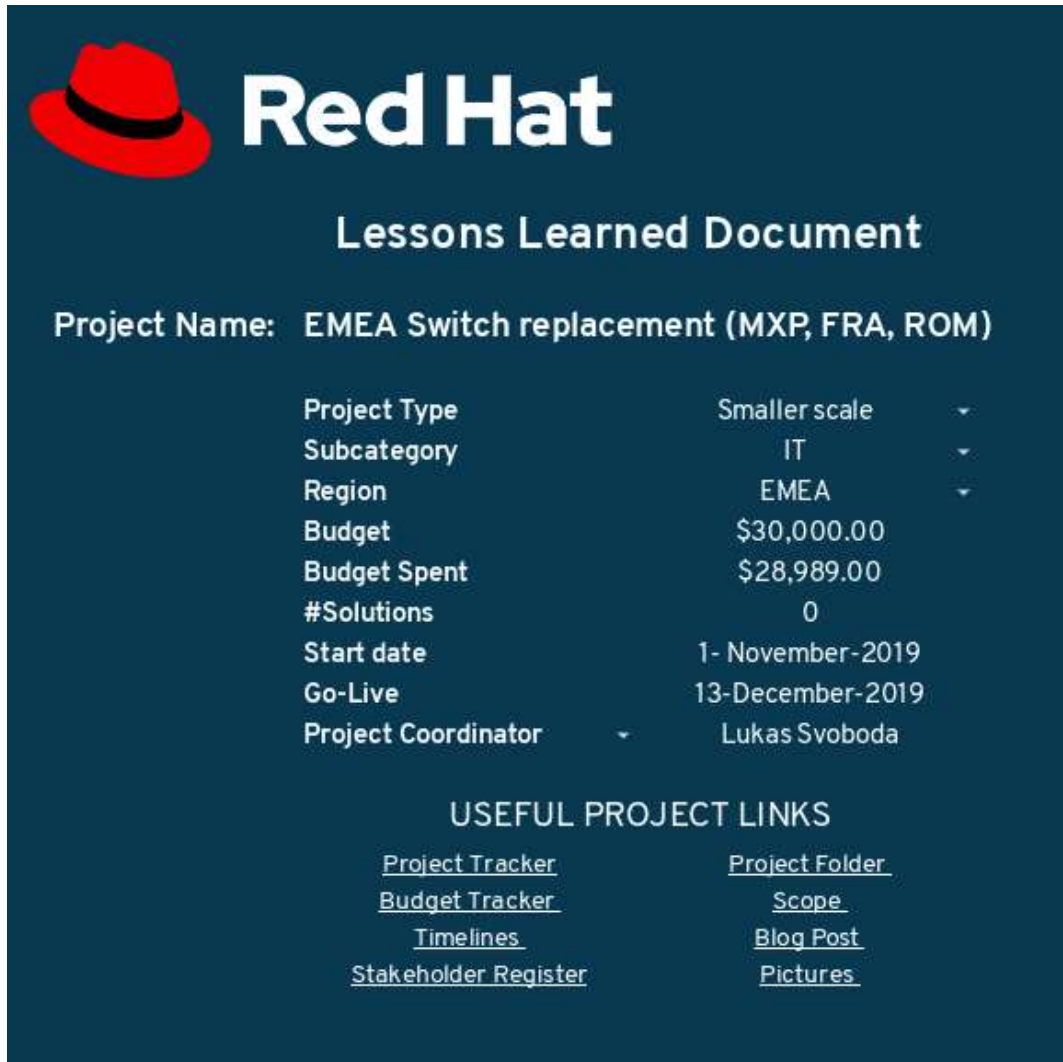


Figure 15. Example of lessons learned overview sheet.

Source: Author.

3.4.3 Single consolidated document

The second option for storing lessons learned differentiates from the first approach in one main element. The first approach aimed to have an individual lessons learned document for each completed project joined by an overview sheet with high level details of the project to create more context. However, the second approach would instead aim to consolidate all the lessons learned to one single document for each of the two project types. Therefore, there would be a single document with all the lessons learned for office projects and one document for smaller scale projects. The consolidated document would

contain all the lessons learned from the finalized lessons learned registers of particular projects, but there would be no overview sheet. The main advantage of this approach lies in the fact that as all the lessons learned are consolidated in one single document, it is quite easy to search through that one single database, utilize keywords or filters and search for relevant lessons. However, this approach will lack a lot of context about particular projects.

This approach would utilize the same tools and would also keep the same folder structure as the initial approach. However, the consolidated document would not keep the same naming scheme and would be renamed to – “*Consolidated Lessons Learned – Office Projects*” and “*Consolidated Lessons Learned – Smaller Scale Projects*”. Additionally, to make up for the missing context of each lesson stored in the consolidated document, the document would have to contain one or more additional columns into which a link or any other relevant detail would be inserted.

3.4.4 Comparison of the two approaches

Both of the above approaches have some advantages and disadvantages, the main difference between the two is in the way how the lessons learned are stored. The first approach focuses on providing a lot of context about each of the completed projects through having a single lessons learned document for each project. This enables to have an overview sheet that includes links to relevant project documentation as well as high-level project details. Besides the high-level project details, by introducing naming scheme and clear folder structure this approach enables for easy search for relevant projects based on go-live date, region, budget, timelines, or project subcategory. On the other hand, the main disadvantage lies in the decentralization of data, anyone retrieving the knowledge will have to go through a lot of documents to find valuable data that might not be in the first document opened.

The second approach focuses more on creating a large database of all lessons learned by each project type. Therefore, the main advantage of this approach lies in its centralization, easy data filtering, and searching. This approach also eliminates the need to go through multiple documents to find valuable data. The main disadvantage, however, lies in the missing context, that the consolidated document would not contain, unless multiple columns would be added to create at least some context about each project.

As can be seen, each approach pretty much eliminates the disadvantage of the other one. If it would be possible to choose only one approach, it would be important to test both approaches, adjust them in the process and see what brings more value in the long run. However, it seems that the most value could be generated by combining both approaches together. One possibility to utilize the value of both approaches could be accomplished by adding one additional column to the consolidated document with the project name containing a link to the individual lessons learned document. The project managers would be using the consolidated document to retrieve the knowledge and when needed they could simply use the link to easily get to more context about the project. Even though, this would be eliminating disadvantages of both approaches, new disadvantages would be created by this combined approach. This approach would create an extra work for the project managers, as they would have to additionally copy the lessons learned data to the consolidated document and create the link under the new column as well. Further, someone would have to be responsible for maintaining the consolidated documents. Even though, these might seem as not so significant disadvantages it is important to consider them. To decide which of the above mentioned approaches to adopt, it would be important to test, discuss and come to an uniform decision as a team.

3.5 Retrieving

The end goal of the overall lessons learned process is the actual retrieving or use of knowledge that has been identified, captured, analysed, and stored in the previous process steps of lessons learned. All the previously mentioned proposed solutions aim to enable for easy and fast retrieval of explicit knowledge once it is stored in the lessons learned repository. One of the possible ways to retrieve and utilize the knowledge is to consult the lessons learned repository to find any applicable knowledge that could be utilized for any current projects. This practise of consulting the lessons learned database should be done by the project manager, ideally prior to the project's kick off meeting, as it can be the first opportunity for identifying potential project risks, opportunities, or mitigation strategies. The retrieval of knowledge from lessons learned repository should be incorporated into the overall process as a best practice that all the project managers should utilize.

Besides the retrieval of knowledge from lessons learned repository, it is important to enable the project managers to share their experiences through a platform that would enable more social interaction that could lead to transfer of tacit knowledge. The following chapter introduces the concept of such a platform.

3.5.1 Transfer knowledge sessions

To support the overall lessons learned process that has been proposed it is important to make sure that there is a platform where the individual project managers can share the knowledge they have acquired in their past projects with project managers from other regions. As the entire team is dispersed around the globe, the only possible platform to utilize would be a meeting in a form of a video conference that the team utilizes on daily basis. This meeting would aim to tackle the issue, identified in the analysis, of project managers encountering same issues across regions, not knowing that the same issues has been already encountered in a different region and mitigated. Further, the meeting would address any issues needed to be addressed by the entire team to find resolution and to share any other important knowledge the individual project managers have gained in their recently completed projects to increase the overall level of project management.

This meeting would be scheduled on regular basis, ideally quarterly as that is usually a good timeframe to have a completed project and therefore to have something to discuss. The format of the meeting would consist of two main parts. The first part of the meeting would focus on discussion of items identified and marked as “*Needs to be discussed further*” in the lessons learned registers, see chapter 3.2.1.8. Those discussions would consist of an analysis described in chapter 3.3, to come up with possible resolutions, action points to mitigate the identified issues, or to improve current processes. Thus, it is important to create and maintain meeting minutes for this meeting as the action points and progress on them would be captured and reviewed in the beginning of every instance to identify blockers, reassign actions and to move forward with individual resolutions. The second part of this meeting would focus on the sole transfer of knowledge between the project managers. As the project managers would complete lessons learned for their completed projects, they would identify the most critical lessons that could be beneficial for the other project managers and share them in this meeting. Each project manager would get time allocated to share their lessons and allow for further discussion of the lesson. This will enable the project managers not only to share their knowledge but also to gain a different perspective from their colleagues working in different environments and cultures, which in the end can broaden their horizons and lead to transfer or tacit knowledge.

3.6 Economical evaluation of the proposal

The overall cost of the proposed solution will require minimal investment due to the fact that the solution does not include implementation of any new tools, and thus, the solution is taking advantage of already existing tools. This was one of the main requirements discovered in the analysis, as the available budget for implementing new tools was already utilized for implementation of AO Docs. Therefore, there is no associated cost with any licenses or purchases of tools. All the cost of the proposed solution will be mainly associated with the time spent on the creation of the proposal and on the implementation of individual features proposed in the proposal. Hence, the main factor driving the costs are going to be the salaries of the individual associates of the project management team that participated in the proposal and that will also participate in the implementation.

The below table specifies particular activities that were or will be executed in order to create and implement the solution. All the hourly rates are based on averaging individual salaries of all associates involved in the activity. The average salaries are taken from a website [glassdoor.com](https://www.glassdoor.com).

Table 1. Economical evaluation of the proposal.

Adapted from (Glassdoor, 2020).

Activity	Time spent (Man Hours)	Average hourly rate	Sum
Consultations	20	\$ 43,00	\$ 860,00
Proposal creation	30	\$ 4,50	\$ 135,00
Presentations of the proposal	12	\$ 43,00	\$ 516,00
Questionnaire creation	18	\$ 43,00	\$ 774,00
Lessons Learned register creation	4	\$ 4,50	\$ 18,00
Repository creation	1	\$ 4,50	\$ 4,50
Iterative sessions	30	\$ 43,00	\$ 1 290,00
Training	6	\$ 43,00	\$ 258,00
Process documentation creation	3	\$ 4,50	\$ 13,50
Total			\$ 3 009,00

It is important to bear in mind that those cost are associated with the associate's salaries that are in the end doing their job - increasing the level of the project management by streamlining the current process. The vast majority of time spent on the process improvement was done during the COVID-19 pandemic. This situation halted all the

ongoing projects as it was not possible to go on site and execute the project work. Therefore, the project management team used this available time for multiple process improvements that were in a backlog for some time and ensured that the time is well spent.

3.7 The benefits of the proposal

As the goal of the proposed solution is to streamline a project management process that aims to increase efficiency of future and current projects, it is not possible to calculate any future profits that would result from this change. However, the overall proposed solution of the lessons learned process aims to rectify issues identified in the analysis that made the current process ineffective and wasteful, as there was no real tangible output from it.

The proposed solution aims to standardise the process of lessons learned that has been handled individually by each project manager. The main benefit of the standardization is that the output of the process will be unified. This will greatly help the project managers to retrieve any knowledge gather by other project managers, as they will be familiar with the outputs and where to look for it. Other benefit of the standardization is that the associates that are part of the project teams will have the chance to get accustomed to the process overtime and therefore there would be much more value to be gained.

One of the main benefits that will be realized over a long-term period is the intention behind the creation of lessons learned repository, which will enable the collection of valuable organizational process assets acquired over time. These organizational process assets can be further utilized in the planning as well as in execution phase of any future project. The longer would the process be in place the more value would it bring as more data would be stored in the repository, which would serve as a database that anyone from the company could utilize for reference, if required. On top of that, the solution also introduced a knowledge transfer meetings between the project managers. Those meetings would be utilized as a platform to share past experiences and engage in discussions that would enable the project managers to get more perspective on the projects from another regions.

Additionally, the solution proposes and outlines a standardized lessons learned register that can be utilized during all the process steps of the lessons learned process outlined in the theoretical part of the thesis and utilized in the solution. By having a single standardized document for the overall process, the project managers can save a lot of time by not having to maintain multiple document throughout the process and having to copy the data from one document to another.

Besides all the benefits arising from the lessons learned process improvements, the proposal and the subsequent implementation also shows the Red Hat's higher management that the project management team has been utilizing its time wisely during the COVID-19 pandemic. As all the projects have been halted during this unprecedented situation, the project management team worked hard on the team development plan and its execution to increase the level of project management within the team. Additionally, the proposal creation and implementation of the change identified and triggered some needed changes to other processes within the project management team, which lead to increased efficiency as well.

CONCLUSION

The lessons learned process is an integral part of today's projects as it enables the project managers and companies to improve and get more efficient with future projects to stay relevant within the highly competitive environment. However, the lessons learned process is still only a supporting process that is not required to deliver a project and therefore, it is on the project manager's willingness to utilize it. It is getting more and more common that companies establish specific departments focused solely on the lessons learned and the gathering of organizational process assets to make sure that important data are captured and utilized in the future. Unfortunately, not all companies have the possibility to establish a department for this particular process, therefore, the companies expect the project managers to utilize it themselves. Even though, most of the project managers tend to do it, it often happens that the process does not bring the value it should and the project managers treat it as a checkbox activity that needs to be satisfied. A team of project managers within Red Hat Inc. was in a similar situation.

Thus, the main objective of the thesis was to propose a solution that would streamline the process of lessons learned. To correctly approach the situation and propose suitable solution for the current state of the process, the thesis firstly focused on introducing the concept of lessons learned and a specific approach that would be appropriate for the specific environment. Consequently, a thorough analysis of the overall project environment has been conducted in order to identify shortcoming of the currently established process and any other important details that need to be considered when creating the proposal of solution.

The proposed solution focused on the most pressing issues of the current lessons learned process. The shortcomings of the current process resulted in ineffective process that did not have any tangible output and therefore was not bringing any value to the company, nor to the project managers. The proposed solution builds upon recognized approach and aims to remove those shortcomings identified in the analysis. The solution includes several features that will enable the project managers to identify, capture, analyse, store, and retrieve the lessons learned more effectively.

The proposed solution has been already accepted after being presented to the project management team of the Workplace Technology organization. The project management team is currently working on implementing the proposed solution by holding iterative sessions that aim to agree on the final look of proposed elements of the lessons learned process.

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LIST OF ABBREVIATIONS

NASA (North America and South America)

EMEA (Europe, the Middle East and Africa]

APAC (Asia Pacific)

WT (Workplace Technology)

I.T.X (IT Experience)

GWS (Global Workplace Solutions)

IT (Information Technology)

EOL (End of Life)

MSO (Managed Service Office)

PMBOK (Project Management Body of Knowledge)

PMI (Project Management Institute)

OPA (Organizational Process Assets)

PMP (Project Management Professional)

CEO (Chief Executive Officer)

HW (Hardware)

APPENDICES

 **Red Hat**

Lessons Learned Register

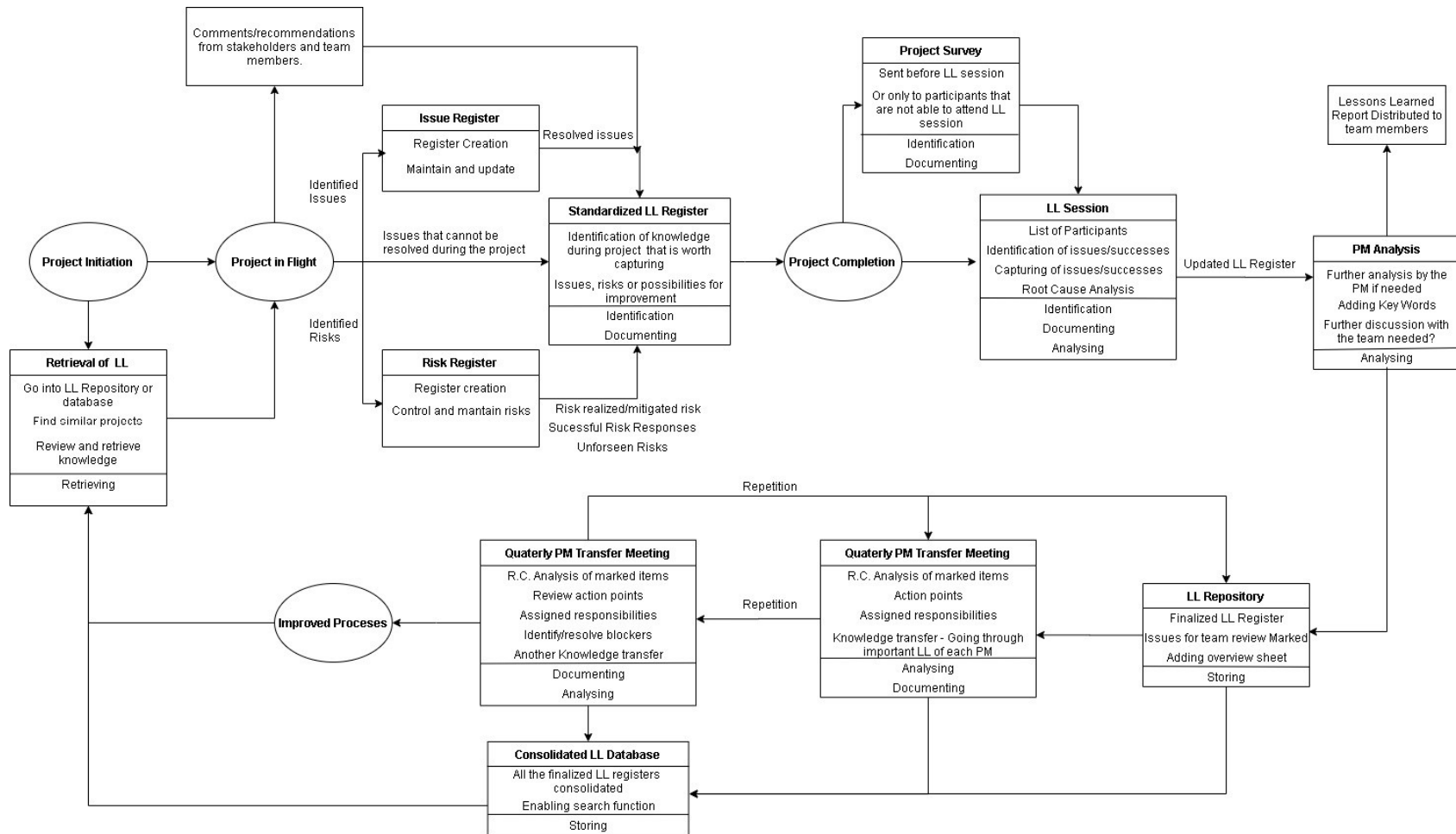
Date of the session:
15th of May 2020

List of lessons learned attendees:
lsvoboda, msmith, esmith, psvoboda..

Lesson Learned Topic [Keywords]				Details							
#	Knowledge Area	Project Phase	Process Output	Success/Issue	Description of the Issues/Success	Impact	Recommended Action/Improvement/Lesson Learned	Responsibility	Needs to be discussed further?	Responsible party ACK	Note
1										<input type="checkbox"/>	
2										<input type="checkbox"/>	
3										<input type="checkbox"/>	
4										<input type="checkbox"/>	

Appendix 1. Overview of the entire lessons learned register.

Source: Author.



Appendix 2. Diagram of the overall process of lessons learned.

Source: Author.