

## Problem Management Process for IT Services

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**ABSTRACT:** The paper discusses the problem management for IT service management. The objectives of the problem management are considered the scope and the definition. There is also the discussion on the triggering events, the inputs, and the resulting outputs involved in the management process. Some of the inputs include the data received from the capacity, the details of the incidences, and the feedback. The outputs include documented knowledge information, an updated problem record. There is detailing the process that is involved as well as the activities. The activities include problem identification, problem categorization, and problem investigation, identification of workarounds, problem resolution, problem closure, and proactive problem management. The document also discusses the process relationship and the metrics involved in the management of the problems. The end of the paper also provides definitions of technical terms that have been used.

**KEYWORDS:** Problem, Workaround, Know Error Known, Error data base(KEDB), Error, Incident, Impact, Urgency

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### I. INTRODUCTION

According to the information technology infrastructure library, a problem is a cause or even a potential cause of incidents or many incidences. This is to say, a known error is a problem that is analyzed but not resolved. Problem management reduces the occurrence and impact of an incident through the identification of the actual and potential causes of those incidents and, more so, managing the known errors (Walker, 2001). There is a correlation between problems and incidents, although it is essential to have different approaches. For regular business activities to take place, incidences must be resolved since they interrupt the activities. On the other hand, incidents are caused by problems, and this requires analysis and profound investigation to determine the cause create workarounds and suggest a long term resolution. When this is done, there is a reduction in future incidences and their impacts (Walker, 2001).

Problem management has three phases, and they include problem identification, problem, and error control. Problem identification involves performing an analysis of trends on the occurrence of incidents, detecting repetitive issues, identifying the probability of an event that can reoccur, analyzing information from customers, and the internal test and project teams. On the other hand, problem control involves analyzing the problems and documentation of the known errors and workarounds. They are priorities based on the severity of their risk. There is much focus on these risks that have huge impacts on service management. Known errors are managed by Error control activities enhances solution identification.

### II. OBJECTIVE

The aspects of problem management rely on knowledge and experience of the staff members as opposed to the documented procedures. Some skills and capabilities are essential in the management of the problem. They require a thorough understanding of the sophisticated systems and discern how failures might have happened. However, developing a combination of analytical and creative skills requires adequate time and proper training techniques. The problem, management is designed to improve the activities and processes in the values chain.

First, you engage the customers in problem management and inform them of the plans that are being developed to solve the problem. Secondly, there is a provision of information that leadsto improvement in testingand transfer of knowledge. Thirdly, there is the identification of product defects and their management

(Walker, 2001). Fourthly, the management process prevents further occurrence of incidences as implementing strategies that can detect the incidents as early as possible. Lastly, if the management process is effective, it will explain why it is crucial to improve and reduce occurrences. The main objectives in problem management is to prevent occurrence of the problem and the resulting incidences, eliminate the chances of the incidents from happening, and minimize the impacts of those incidents (Walker, 2001).

The scope of problem management has activities that are needed to investigate the root causes of problems and incidences and determine effective solutions. The problem management is meant to ensure the implemented solution adheres to the appropriate laid out procedures. An effective problem managing has the potential to maintain the records of the problems and their proper resolutions to reduce the occurrence of incidences over time. This is to say; Problem management has an association between knowledge involved in the management and the tools required, such as the known error database.

This management process has reactive and proactive approaches in which the reactive approach is involved in solving one or more incidences. On the other hand, the proactive approach requires identifying problems and solving them prior to incidents(Walker, 2001).

### III. PROBLEM MANAGEMENT PROCESS

The problem management process is a set of procedures and activities that manage the life cycle of the problems that have a probability of occurrence in the information technology service. The activities diagnose the root cause of the incidences and produce effective resolution procedures that should be followed. The management process begins with the detection problem, the problem's categorization, and the investigation of the problem. At the investigation stage, you examine and come with a solution (Walker, 2001).

#### 3.1 Triggering events

- The problem management triggering events vary depending on the approach of problem management.
- Reactive problem management, the records are triggered from incident reactions and through service desks.
- In testing, there might be triggering off the known error records and other problem records mostly in the end stages of testing where the user acceptance testing had offered a go-ahead solution, but there are recognized faults.
- The suppliers may also trigger problem records through complaints in the products and services they get.
- In Proactive approach of problem management, by reviewing historical incident records the patterns and trends of the incidences can be identified.

#### 3.2 Inputs and outputs

The inputs in the problem management activities include;

- Records of the incidences, which are the triggering vents of the management activities. The information regarding the center for internal securities and the current status.
- The report concerns the incidents and historical records, which will support the proactive method approach.
- Feedback about the incidents and the symptoms they display.
- Preexisting process or newly implemented procedures.
- Communication of the triggered events from the event management.
- The objectives at the operational and service level.
- The chosen criteria for prioritizing and solving the problems.
- The output from the activities and management involved in risk as well as the customer's feedback.

The resulting outputs are;

- Resolutions of the problems.
- Updated records of problem management.
- A request for change that corrects the infrastructural problems
- The workarounds for incidences.
- Records of the known errors.
- the report concerning problem management
- Recommendations on the ways of improvement

#### IV. PROCESS ACTIVITIES AND DETAILED PROCESS FLOW

Below are the detailed process activities and processed flow involved in the problem management process.

##### **Step1: Evaluating request**

At this stage, there is the identification of the person or group responsible for making the change and in which unit. This helps in getting a clear picture of the change needed. There is a need to acknowledge what the change is bringing, which could be a reduction of impact from a potential incident or an incident that has happened. The changes could be addressing long term needs while other short term needs. If what is to be accomplished is known, the outcomes can be anticipated. The team should determine the values of the risk that is being avoided. The risks that are linked to the change should be listed so that the impact could be measured. It is also possible to identify the resources needed for successful implementation. The roles need to be defined to reduce misunderstandings. At this stage, too, there is an assessment of the change relationships with other planned changes. The change should involve a significant amount of risk.

##### **Step2: Creation of problem record**

This is the record that is filled the information concerning the problem. It records the cause of the problem to the end of the problem. A description is given for the problem, and the assigned group is stated.

##### **Step3: Assigned to L2 team**

At this stage, the experienced technicians are assigned the task representing L2 team. They are the individuals who know the problem experienced and are responsible for analyzing it. They help the L1 team in solving the basic procedures. The research on the failed program and give the L3 these details.

##### **Step4: Problem investigation**

This process helps in the identification of the root cause of the problem. At this stage, it is also possible to develop workarounds that can help service restoration if it had been interrupted. Various specialists are involved in this process, and if necessary, there are references to the external resources (Mahy, 2016).

At this stage, the problem is reviewed to validate by the problem analyst through the coordination by the problem coordinator. The problem analyst assign conducts an investigation and assigns tasks to the resources responsible for the identified root causes. The problem record is updated with the identified roots cause as well as the workarounds if developed. If the root causes are determined, the related incidents are reviewed, and the assigned analysts are notified. If the root cause is not identified, it then requires determination of the relationship between the root cause and the known error, and if there is the relation, it is moved to the resolution phase.

##### **Step5: Create Root Cause Analysis(RCA) report**

The root cause analysis identifies the reasons for the occurrence of the incidents. At this point, there is an assumption all systems are related, which means any action will affect another area. The cause could be physical, human, or organizational. Patterns of the adverse effects are discovered, thus finding the actions needed. The analysis involves several steps, and they include, defining the problem, collecting data, identifying the causes, identifying the root causes, and lastly, recommending and implementing the actions.

##### **Step6: Actions recommended by the resolver team**

The recommendations address how to prevent the problem from occurring again, the approaches to implement the problem, the individuals responsible, and the risks associated with implementing the actions. At this stage, the changes that need to be made are identified and the impacts of the actions.

##### **Step7: Review of the RCA /problem record**

A review is conducted on the RCA to examine the effectiveness of its recommendations and provide possible ways of improving the quality.

##### **Step8: Change Problem Record status after confirmation**

It is important to update the status of the changes that have been made. After confirmation are done, changes are made on the problem record. In case there is no change action required the problem record is closed by problem manager.

**Step9: Updating KEDB**

At this stage, the KEDB is updated with the known issue. They are recorded as they are, and the time in which they happened and a proper record is maintained. The system must be well developed to ensure easy retrieving of the documents.

**Step10: Action Items/ Workaround Completed by Resolver team**

These are the temporary approaches to restore the interrupted services. They reduce the effects of the problem in case a solution has not been found.

**Step11: Update KEDB as known error**

The known error database is updated as a known error since the problem has been identified, the root cause, and a workaround has been provided.

**Step12: Testing or verification of the solution**

The solution is tested to verify its application and the ability to resolve the problem. This is meant to find the defects so that corrections can be made.

**Step13: Problem closure**

Once the implementation of the solution has finished, the known error record is closed, and the actions are taken to apply it. In this stage, the problem is reviewed so that it can be validated the problem has been resolved. Problem review includes identifying trends such as the reoccurring of the incidents, identifying rooms for improvements, and staff commitment to addressing the incidences (Mahy, 2016).

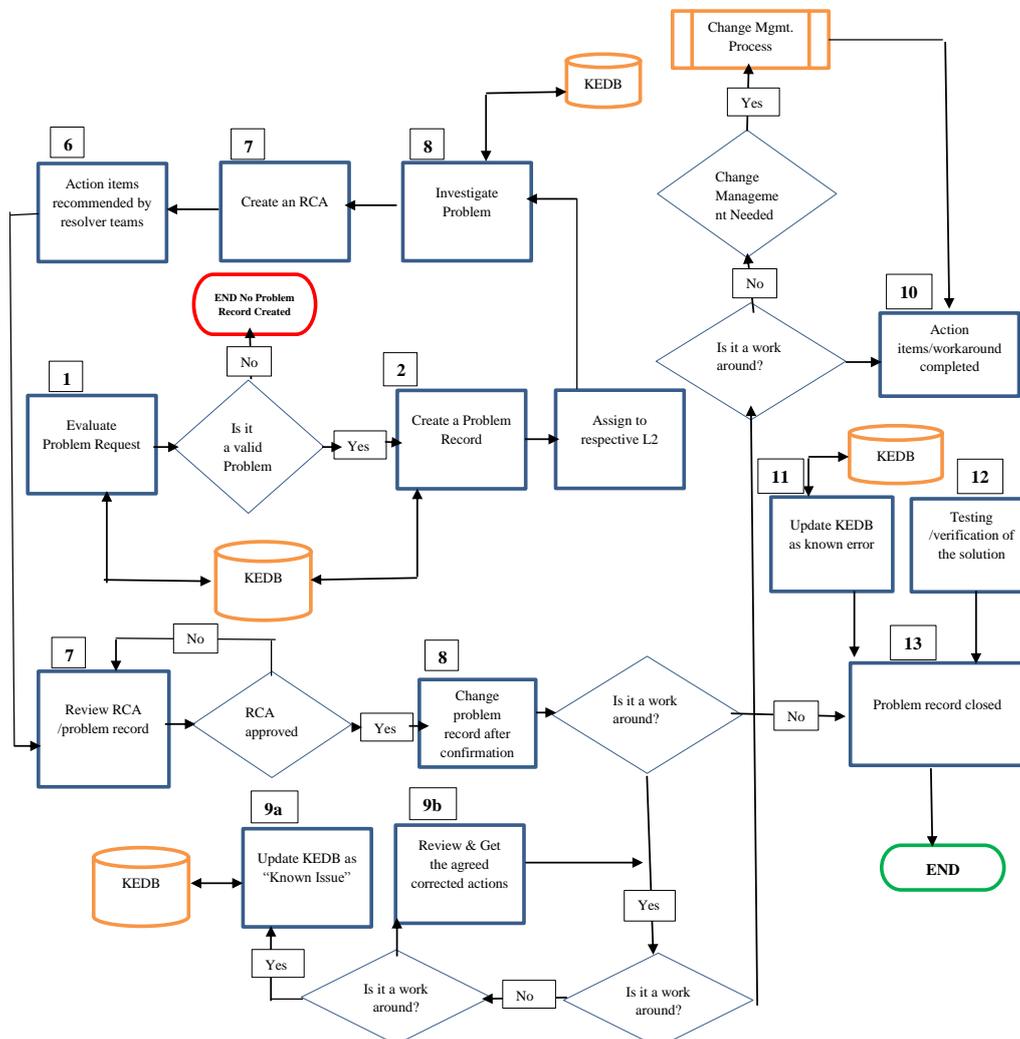


Figure1: Process activities and detailed process flow

## V. INTEGRATION PROCESS FLOW

Problem management has a close relationship with the following processes:

### 5.1 Incident management

This is an area of information technology management where the teams resolve the problem to return the services to normal in the shortest time possible after an interruption. The aim is to ensure the impact is minimal to the running of the activities. It is related to problem management since it utilizes feedback from the permanent solution of associated incidents. In case of an incident, knowledge management is used.

### 5.2 Configuration management

Configuration management provides details on known errors and related cis, their criticality, relationships, and dependencies. It also provides historical data that is used for trend analysis and monitoring processes. It is implemented with change and release management to ensure the effective management of the information technology assets. With configuration management, it is possible to identify, maintain and verify CIS versions in the infrastructure (Walker, 2001).

### 5.3 Change management

Change management minimizes the risk associated with changes. These changes are related to the removal of agents that can have an impact on the services. The change management provides input to the management process by issuing a request for changes to be made (Walker, 2001).

### 5.4 Availability management

It defines analyses, plans, and measures and improves the aspects of the availability of services. Ensuring Roles, processes, IT infrastructure and tools are appropriate for settled availability. More so, it provides information during problem investigation and diagnosis. The primary role of availability management is to ensure the level of services meets the agreed needs of the services (Walker, 2001).

### 5.5 Capacity management

In ITIL, capacity management ensures adequate capacity is available to meet the services' agreed needs at the lowest cost. It works in conjunction with the service level management in ensuring the requirements are met. The capacity management offers support to the service desk and the management of the problem (Walker, 2001).

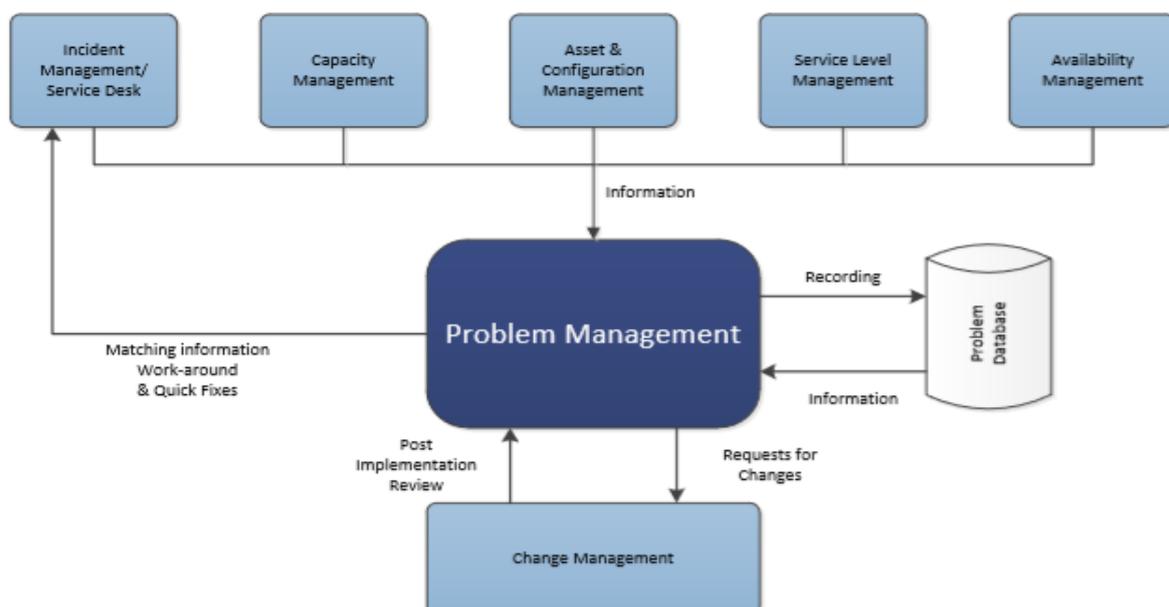


Figure2: Integration ProcessFlow

## VI. MEASUREMENT METRICS

Measuring the performance of the problem management process involves using the following indicators for internal use.

### 6.1 Incident response time

This the duration between when an incident is reported, and it is successfully resolved. Efficient and effective responses with low reopen rates are the key indicators of good services.

### 6.2 First-touch resolution rate

Percentage of incidents resolved in the first instances, with no repeat calls. This results in higher customer satisfaction and is a positive sign of effective incident management.

### 6.3 SLA compliance ratio

This is the number of resolutions that fulfill service level on agreed guidelines in relation to the response time, workflow prioritization, cost, and other relevant metrics. High ration ensures adequate compliance.

### 6.4 Cost per ticket

This the total amount of money spent to resolve each reported incident. This ensures more efficient problem-solving methods are identified.

### 6.5 Number of active tickets

These are the reported incidents that are yet to be resolved. When the number is few ensures one is not overwhelmed by customer dissatisfaction.

### 6.6 Recategorized incidents

Re categorized incidents are the number of incidents that have not been diagnosed properly at such that they are placed into other categories. To improve this metric, one needs to clean up the categories and subcategories to ensure accurate data collection upfront.

### 6.7 Reopen rate

This is the percentage of tickets that need to be revisited after being marked as resolved initially. High reopen rates would require training technicians or checking the hardware or applications to ensure there are no problems.

### 6.8 Incidents per department

This is the total number of incidents reported by each department within an organization. This metric is important since the organization can determine the departments that have a high demand for services, and also identifies service gaps.

Incidents with associated problems. This helps you prioritizing major repairs, updates, or decisions based on the total impact of each problem.

### 6.9 Ticket volume

This is the total amount of tickets at a given periodof time. It identifies trends that predict what may be causing higher or lower ticket volumes.

## VII. ROLES AND RESPONSIBILITIES

Role	Responsibilities
Problem Requester	This is the one who requests a Problem Record to confirm the resolution.
Problem Record Creator	This is the individual assigned to create the Problem Record.
Problem Owner	Assigns tickets to Groups and monitor their progress and lead them to closure.
Technical Support Analyst	He resolves the problem and this by using the processes, procedures, instructions, policies, required documentation, and tools.
Vendor Problem Manager	He is the leader in the whole process and ensures accountability for the day-to-day execution and monitoring of a process.
CUSTOMER Service Desk Analyst	He proactively monitors progress towards resolution. He refers to KEDB to get a workaround that can resolve Incidents.

L1 team	L1 team are the resources who interact with customer and provide first level support to resolve the issue.
L2 team	L2 team are responsible for undertaking various activities in the Problem Investigation, creation of Known Error records. They are responsible for raising the Change Requests and delivery of corrective action tasks.
L3 team	Escalation SMEs which L2 teams may engage for restoration of an incident, provision of RCA and recommendation of corrective actions.

## VII. CONCLUSION

In conclusion, the objective of problem management is to minimize the impact of problems on the organization by reducing the occurrence of incidents, minimizing duration of the incident, improving IT service quality thereby reducing the impact, and this is done through identifying and managing known errors. Management of the problem is associated with the activities that determine the root causes and identify effective solutions. The management process has both reactive and proactive approaches that are involved in solving of the incidents, before a permanent solution is identified, a workaround solution is used to minimize the impacts and maintaining service level agreement.

## VIII. GLOSSARY

Problem	This is an unknown cause of one or more incidents.
Workaround	This is a temporary solution that is utilized before a permanent solution can be found.
Known error	This is a root cause because it is documented, and a workaround is well known. Through his problem management, know errors are identified and managed throughout the lifecycle. Even though the problems are unique, some of them reoccur.
Known error database (KEDB)	This is where knowledge management takes place. The storage of incidents and problems and their resolutions is in the KEDB. It holds the exact details of problems and their resolutions.
Error	This is a malfunction that causes failure in information technology services. It could be caused by many mistakes or a single mistake that affects a vital process.
Impact	This is the magnitude of the incident, change, problem in the services. It is considered in prioritizing.
Incidents	This is an interruption that is unintended in the services or even a reduction in the quality of services. For example, failure to configure the items is an incident.
Priority	This is a tool used to determine the importance of an incident or a problem over the other.
Service desk analyst	This person is responsible for reporting, carrying out the initial diagnosis, and assigning incidences to relevant teams by using incidents management system.
Urgency	This is a measure of the time that is due before the incident, or a problem can impact the business.

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Maqbool Jameel Ahmed is presently working as a Director in Supply Chain Management & Digital Transformation in Information Technology sector. He has overall 15 years of experience in the area of Business Enterprise System Implementation and Operational support. He is highly experienced in Enterprise Resource Planning and led multiple large sized client to transform their IT platform by implementing ERP's–SAP, Oracle, Digital platforms. He has guided graduate and post graduate students on Enterprise resource planning applications He has extensive experience in IT infrastructure management, Project management, Project analysis, Cost control, Resource management, Financial management, critical analysis, problem resolution and Quality assurance

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