Module: Capstone Project using Java
Qualification: Advanced Certificate in Web Development

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IU6-Problem Management Part 2

By the end of this tutorial you will be able to understand the Problem Management

Contents

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S. No.	Topic Description	Required / Optional
01	Root Cause Analysis (RCA) to identify, track and resolve recurring incidents permanently	Required
02	Problem prioritization, Sizing Techniques, Methodologies and Parameters	Required
03	Documentation and tracking of problems encountered and resolved	Required

Root Cause Analysis (RCA) to identify, track and resolve recurring incidents permanently

Brainstorming

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- Bring all key stakeholders involved in a problem in one place and discuss possible causes.
- ***This method is ideal for highly creative teams and eliminates any silo situation.***

Brainstorming Involves:

- Involves round robin discussion among participants
- A high volume of ideas in a shorter time
- Faster and enables diverse idea generation
- Encourages full participation as every person contributes to problem analysis

Brainstorming Steps

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- ❑ Discuss and decide the brainstorming question
- ❑ Let every person share his/her idea
- ❑ Review the list of ideas to clarify and remove any duplicates
- ❑ Prepare an action plan to communicate to stakeholders

Ishikawa / Fishbone / Cause and Effect Analysis

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- The cause-effect analysis describes relationships between a problem and its possible causes.
- This method analyses various causes and defines relationships.
- This method is also known as Ishikawa or fishbone diagram that analyses primary and secondary causes of a problem.
- Causes, in turn, have different categories such as people, product, process, and partners.
- ***This method is used for reactive problem management. Therefore, it is essential to define the problem statement precisely.***

Ishikawa / Fishbone / Cause and Effect Analysis

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Ishikawa / Fishbone / Cause and Effect Analysis Involves:

- Get a thorough picture of all possible causes for an effect/situation
- Ideal for complex problems
- Has many possible causes and contributing factors
- Post the analysis, discuss action items to improve the process

Problem definition considering network downtime example:

This might have possible reasons such as router malfunction, network error, disaster, etc.

- *Problem* – Network outage
- *Stakeholder* – Employees
- *Impact* – Productivity loss for an hour
- *Evidence* – No internet connection

Ishikawa / Fishbone / Cause and Effect Steps

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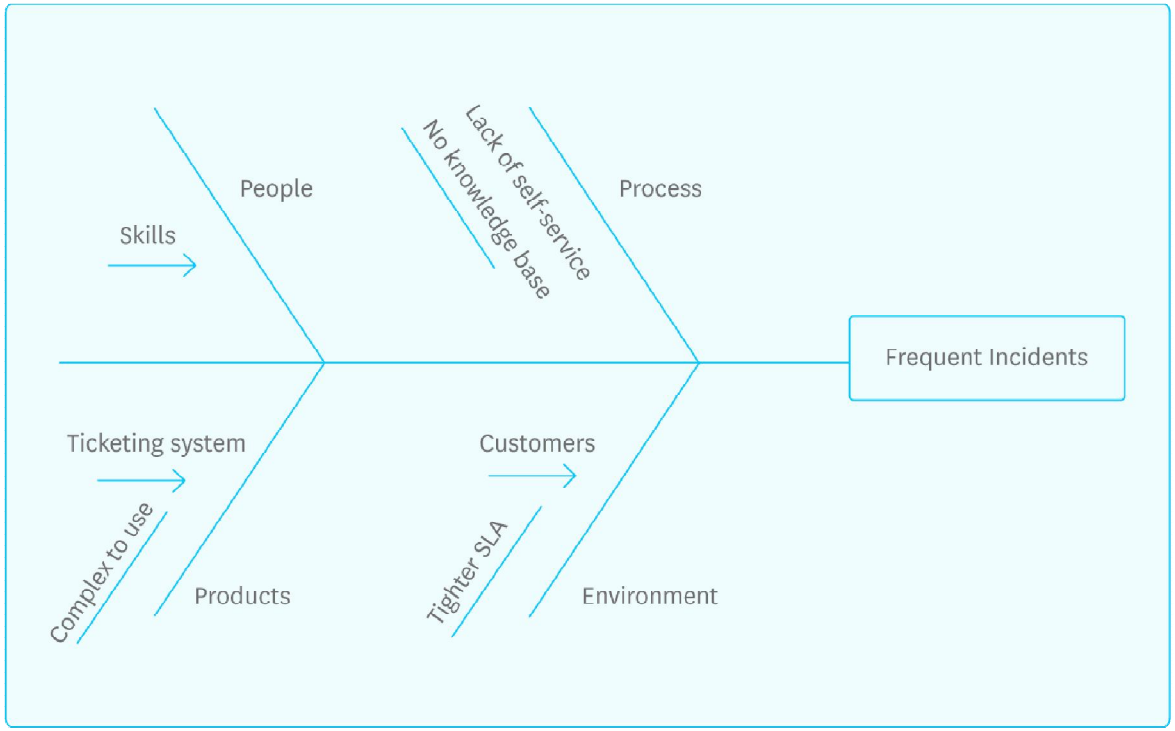
Steps through Ishikawa / Fishbone / Cause and Effect Analysis Steps:

- ❑ Define problem statement
- ❑ Add cause categories as fish bones
- ❑ Use traditional brainstorming techniques to fill in possible reasons for the “ribs.”
- ❑ Classify and prioritize primary and secondary causes as trunks



Kepner Tregoe Problem Analysis

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- A logical approach to problem-solving, starting with defining and then describing the problem.
- Possible causes are established, and then tested, and finally, the exact cause is verified.
- Systematic four phase Root Cause Analysis (RCA) for complex problem analysis.
- Kepner Tregoe (KT) is applicable for both proactive and reactive problem management.
- It involves problem analysis as well as potential problem analysis.

Kepner Tregoe Problem Analysis Involves

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Kepner Tregoe Problem Analysis Involves:

- ❑ What's going on – Situation Appraisal
- ❑ Why did this occur – Problem analysis
- ❑ Actual cause for the problem and alternatives – Decision analysis
- ❑ What is the plan of action and risk associated – Potential problem analysis

Kepner Tregoe focuses on finding the root cause before getting into solutions.

It is a group problem-solving technique to identify actual root cause with the help of evidence.

Kepner Tregoe Problem Analysis

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KT enables group problem solving, speed and precision.

KT framework includes “is” and “is not” kind of analysis.

Example: If Problem is Application Poor Performance

Possible Causes	Evidence	Result
Memory issue	Memory leakage	Cause
Server speed issue	Log files	Cause
Data retrieval Issue	Configuration issue	Not a cause

5 Whys

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- Five why strategy is a simple and effective mechanism to understand the root cause of a problem by asking subsequent “why” questions.
- ***It is one of the six sigma techniques to identify the actual root cause of a problem***
- It takes appropriate counter measures to prevent from occurring in future.
- It defines the relationships between different root causes.
- However, it is significant to frame the questions properly to find out the actual root cause.
- Asking why question five times is just a rule of thumb, and it varies depending on the problem complexity.

5 Whys Steps

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- Gather a group of people who are familiar with the problem
- Ask “why” questions – ‘n’ times depending on the complexity and type of answers
- Define action items to address the issue and prevent it in future

5 Whys

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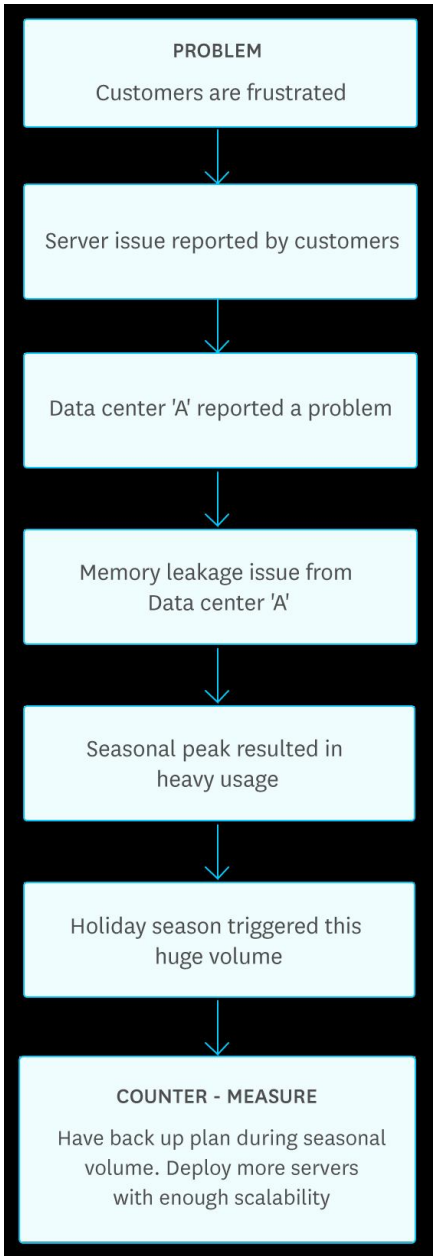
Although asking “Why” repeatedly sounds like the behavior of a child.

It is highly effective if you can answer the why’s correctly.



Problem prioritization, Sizing Techniques, Methodologies and Parameters

Single Point of Contact

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- Problem management involves several functions, the most important is the **service desk for single point of contact.**
- Single point of contact for service customers to report incidents and submit service requests

Without a single point of contact:

- Users may contact staff and expect immediate service without **prioritization limitations**.
- Urgent incidents could be ignored while incidents that don't impact the business get handled first.
- The important but low-priority incidents are not handled for weeks and the smaller issues would not be handled.

Service Desk

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- To address everyone's issues promptly and sequentially.
- Encourages knowledge transfer between departments.
- Collects data on IT trends.
- Feeds problem management.

This service function can be divided into separate support levels called tiers.

- Tier One
- Tier Two
- Tier Three

First Tier

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- First tier is for basic issues.
- This includes low-priority issues such as basic computer troubleshooting.
- Tier one incidents are the most likely to be turned into incident models, since these are easy to solve and recur often.
- Tier-one incidents do not impact the business or other users.
- They can always be worked around until the service desk resolves them.

- **Example**, a Microsoft® Outlook® error can be worked around by using the web-based email application instead.

Tier Two

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- The second-tier support level handles issues that have some impact on the user but not on the business as a whole.
- Usually these incidents require more skill or access to resolve.
- Tier-two incidents are medium priority,
- They require a more immediate response and higher level of access or training than tier-one incidents

Tier-Three

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- These incidents affect the entire organization and many users.
- Sometimes, a VIP may fall into a tier-two or tier-three categorization to provide a faster response time for these users.
- Often, these incidents fall into the **Major Incident Response (MIR)** process.
- These incidents are defined as, cause significant disruption to the business.
- These are always high priority.
- Incidents that require MIR are good candidates as potential problems.
- MIR's affect the business and likely have a different root cause than regular incidents.

The Service Desk

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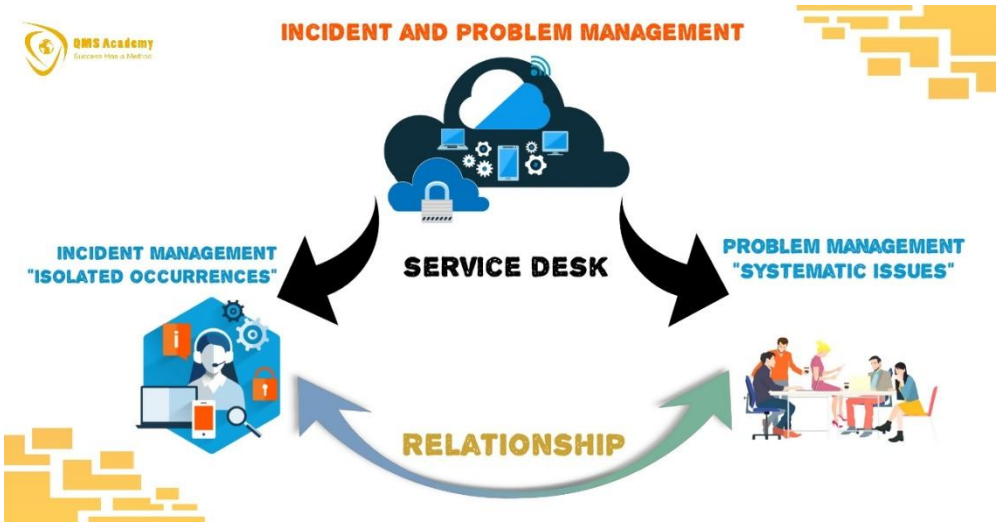
- The first interaction is when a potential problem is raised.
- When an incident is deemed unresolvable at the service desk and must be escalated.
- When an incident occurs repeatedly despite normal troubleshooting and resolution steps.
- After problem management identifies problems proactively, they may contact the service desk for information or incident statistics.



Top Problem Management Methodologies

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- Agile
- Waterfall
- Hybrid

Agile:

- Agile is the incremental approach.
- If we use software as an example, the process used to begin with customer input then the development could begin.
- Then testing would be done before the platform was delivered.
- This approach not only involves the customer more in the entire process
- It ensures that any flaws in the software are caught early and fixed.
- This method works for all kinds of endeavors, too, not just software development.

Top Problem Management Methodologies

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Waterfall:

- The waterfall project management methodology begins with a much more formal planning step
- The goal is to sufficiently capture all of the project's requirements upfront so as to reduce frame work of many companies.
- It's framework supports managerial control and departmentalization. The chances of losing any key requirements.
- This approach is much more like an assembly line.

The project moves through different stages of development.

- Requirements
- Design
- Implementation
- Testing
- Maintenance

Top Problem Management Methodologies

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- Unlike Agile, there are no iterative steps involved.
- One potential drawback, though, is that it doesn't provide the same opportunities for revision.

Example: Once the project reaches the testing stage, it is *extremely* difficult to turn back and make changes.

Hybrid:

- Popular alternative to choosing between the two.
- Lot of companies are hesitant to jump straight into Agile.
- With the hybrid methodology, the Waterfall's initial stage is kept.
- This tends to reassure those who are otherwise skeptical about the Agile methodology.
- However, once planning is complete, Agile steps take over, delivering the benefits of iteration, flexibility, and collaboration.

Problem Management Metrics

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The following metrics should be used to judge the effectiveness and efficiency of the problem management process and its operation:

1. The total number of ***problems*** recorded in the period (as a control measure)
2. The percentage of the problems resolved with in SLA Targets (and the percentage that are not!)
3. The number and percentage of problems that exceeded their target ***resolution*** times.
4. The backlog of outstanding problems and the trend (Static, reducing or increasing?
5. The average ***cost*** of handing the problem

Problem Management Metrics

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6. The number of major problems (opened and ***closed*** and backlog)
7. The percentage of major problem ***reviews*** successfully performed
8. The number of ***known errors*** added to KEDB
9. The percentage accuracy of the KEDB (from ***audits*** of the database)
10. The percentage of major problem reviews completed successfully and on time

All metrics should be broken down by ***category***, ***impact***, ***severity***, ***urgency*** and ***priority*** level and compared with previous periods.

Example

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Example: Based on certain incident statistics, it can be seen that the number of incidents related to the Email service during a certain time period is higher than in the time periods before.

An analysis is provided. Results of the analysis may be:

- The number of users increased by same ratio in same time period.
- The increase of incidents correlates with the increase number of users. No additional steps necessary

OR

- One of the mail servers did not operate at the availability level agreed.
- The increase of incidents correlates with these mail server issues.
- Reasons for mail server issues could be, for example old hardware etc.
- Together with Availability Management, the next steps will be determined in order to fix the issue.

Problem Controls

- The identification of the Root Cause of Incidents (problems), such as the configuration items that are at fault,
- To prove service desk with information and advice on workarounds when available
- Problem control activities include problem identification, recording, classification, investigation and diagnosis

Error Controls:

- The correction of configuration items to remove errors/faults, and the overall management of known errors .
- Known errors that remain unresolved until eliminated by the successful implementation of a change management process as a control.

Critical Success Factors

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Critical Success Factors :

- Incident Management and Problem Management cooperate and have precise fields of responsibility
- Access to well trained and experienced staff from the IT units
- Access to internal and external databases to avoid Incidents
- Reasonable and continuous Trend Analysis

Critical Success Factors Targets:

- Service quality excellence and improvement
- Lowered impact of incidents and problems
- Reduction of user cost associated with incidents and problems

Critical Success Factors: Improvements in service Quality:

- ❑ Reduce and eliminate repeat occurrence of incidents and problems
- ❑ Reduce number of incidents and problems affecting service to customers
- ❑ Measurably reduce the occurrence of management reports
- ❑ Improved response to business and normal service disruption caused by incidents and problems

Critical Success Factors: Minimize the impact of problems:

- ❑ Reduce average time to resolve problems
- ❑ Reduce time to implement fixes to known errors
- ❑ Reduce time to diagnose problems
- ❑ Reduce the average backlog of open problems and errors

Critical Success Factors: Cost reduction of problems to users

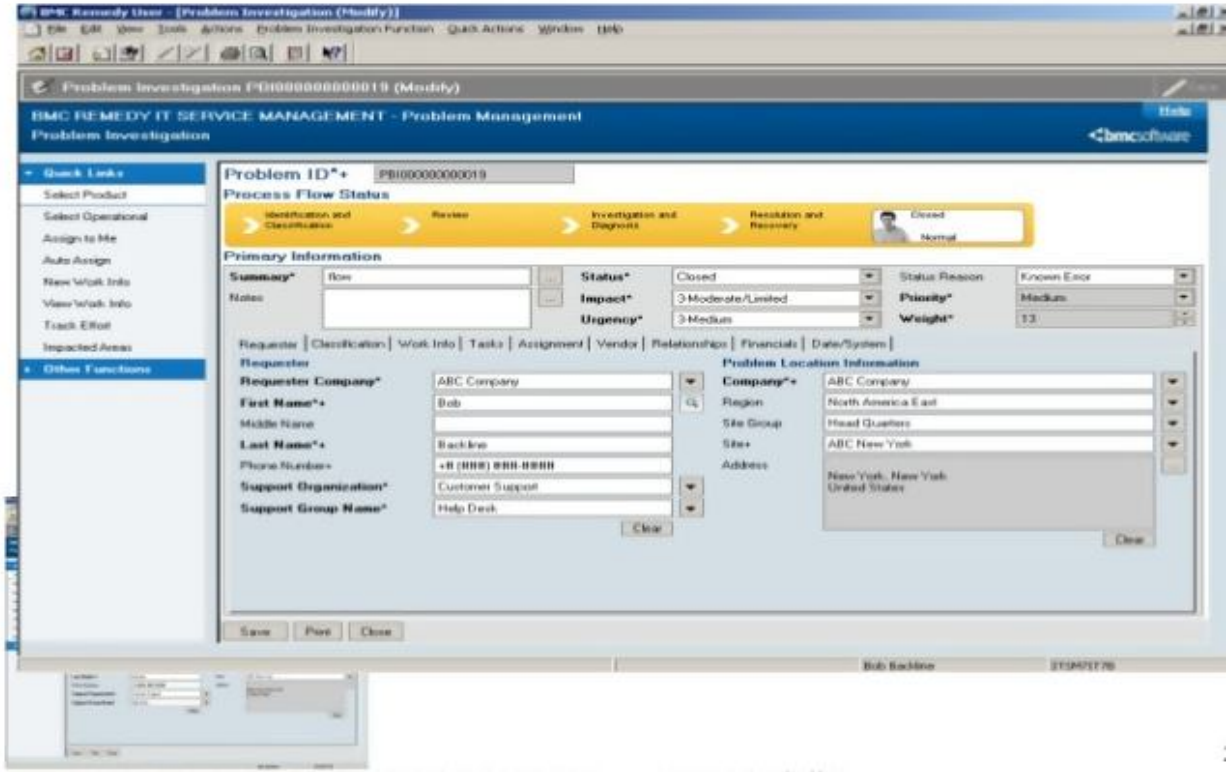
- Reduce impact of problems on users
- Reduce in the business and associated delivery of business services disruption caused by incidents and problems
- Reduce the number of problems escalated (due to missed resolution targets(SLA's))
- Reduce the IT problem management budget
- Increase the number and quality of proactive changes requested by problem management, particularly from major incident and problem reviews.

Performance Indicators (KPI)

- ❑ Transparency of used methods and tools
- ❑ Accuracy of trend analysis

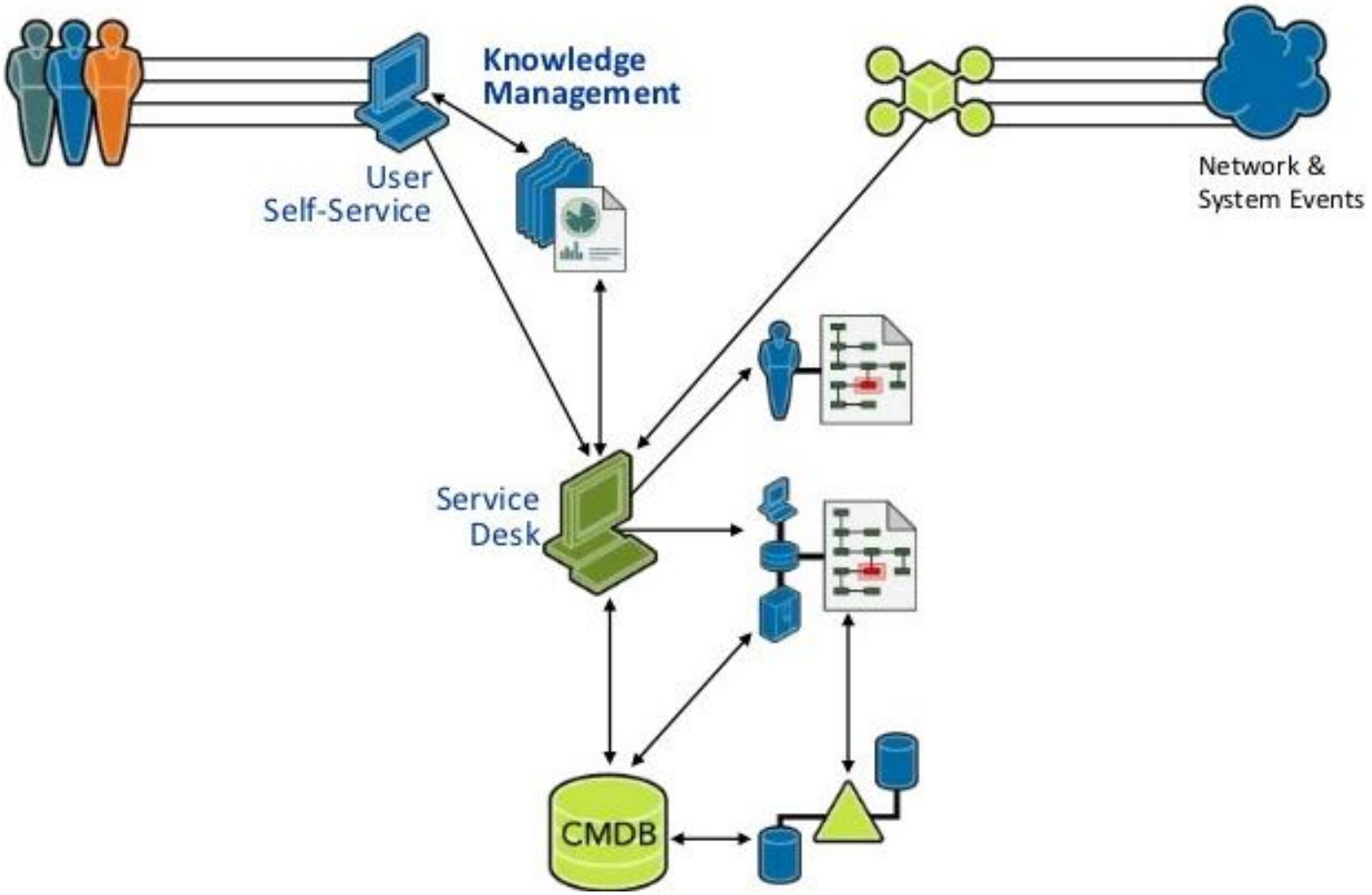
Problem Management Process

Tools Samples (BMC)



Problem Management Process

Tools Samples (BMC Knowledge management)



Problem Management Process

Tools Samples (HP)

Problem Management Relationship

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Incident Management

Assist in problem identification

Configuration Management

Configuration items and descriptions

Change Management

Progress on corrective changes

Service Level Management

SLAs that assist in defining problems

Integrated

Relationships

Incident details from Incident Management

Configuration details from CMS

Workarounds from Incident Management

Inputs

Problem Management

Outputs

Known errors

Requests For Change (RFC)

Updated problem records

Closed problem records

Incident matching to problems and known errors

Management reports

Integrated

Relationships

Release/Deployment Management

Fixes into the environment

Availability Management

Reduce downtime and increase uptime

Capacity Management

Proactive measures and performance issues

IT Service Continuity

Problems with potential impact on business

Documentation and tracking of problems encountered and resolved

Problem Management Database

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- **A known error database (KEDB)** is a database that describes all of the known issues within the overall systems.
- It describes the situations in which these issues appear, and when possible.
- It offers a workaround that will get the user around the problem and back to productive work.
- This database also becomes part of the overall **Problem Management Database**.
- The known error database should include screenshots of the issues, as well as the text of error messages, and describes the issue from the point of view of the user.

A Known Error Database Contains

- **Status** – e.g. “Archived” or “Recorded Problem” when Known Error is created, but root cause and workaround are not known yet
- **Error description** – content of this field is used for searching through Known Errors

e.g. “Printer does not print after sending a document to the printer.

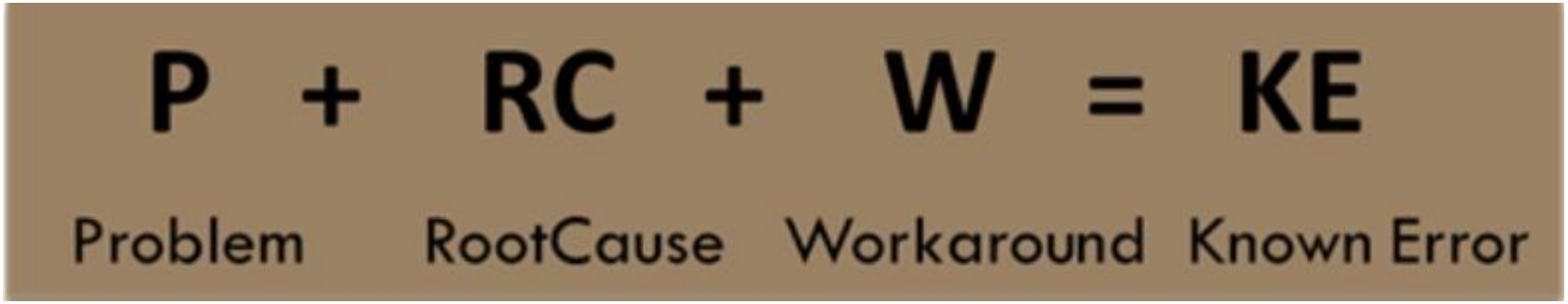
However, when printing a status page locally on the printer, everything works fine.”

- **Root cause** – entered by Incident/Problem Management staff

e.g. “Since printer does not accept documents to be printed from user computers, but prints out status report, a faulty network card is the cause of the problem.”

- **Workaround –**

e.g. “Closest printer to the user should be set as default printer or user should be instructed which device to use until new printer is provided.”



THANK YOU