

TECHNOLOGY BRIEF: PROBLEM MANAGEMENT

# Problem Management: A CA Service Management Process Map

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# Executive Summary

## Challenge

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The Information Technology Infrastructure Library Version 3 (ITIL® V3) process framework approaches IT Service Management (ITSM) from the lifecycle of a service. The Service Lifecycle is an organization model providing insight into the way ITSM is structured, and embodies critical guidance for IT organizations seeking to improve service quality and align more closely with business goals to create value for the business and its customers.

ITIL V3 provides process implementation guidance across the phases of the service lifecycle to reduce the complexity and make them easier to implement. They are not designed to provide definitive rules about implementing ITSM processes. Many IT organizations consequently undertake an ITIL journey without a firm idea of their goals and the path to achieve those goals.

One of the key challenges IT organizations face is that they can be overwhelmed by the number of reoccurring or high impact incidents. Reoccurring incidents are a major problem as it wastes the time of valuable resources to resolve and reduces end user productivity. When high impact incidents hit the business, IT does whatever it takes to restore services even though they may not have fully identified the root cause of the incident. This can lead to inefficient usage of resources and increased costs.

## Opportunity

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By implementing Problem Management you have the opportunity to eliminate recurring incidents and to minimize the adverse impact of incidents that cannot be prevented. Problem Management focuses on removing the root cause of the Problem which differs from Incident Management, which focuses on restoring service as quickly as possible.

Although the goals of Incident and Problem Management differ, the processes have a strong relationship. Problem Management supports the Incident Management process by providing workarounds and permanent solutions. Incident Management supports Problem Management by providing comprehensive incident records to facilitate systemic problem identification.

Further, by addressing their root causes, Problem Management can reduce the number of incidents reported over time. In many cases Incident and Problem Management may use similar categorization, impact and priority codes.

CA has developed a unique approach to representing the ITIL framework and its interdependent IT Service Management (ITSM) processes at a high level in the form of an easy-to-use subway map. This map is an ideal starting point for understanding and communicating about ITIL in support of successful program planning and implementation.

## Benefits

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The CA Problem Management process map enables IT organizations to support services and better align IT to the needs of the business. Following the Problem Management map provides:

- Improve quality of service to users
- Improve user satisfaction
- Reduce or eliminate the impact of an incident
- Decrease in the number of incidents
- Improve the ability to manage changes/enhancements to the IT infrastructure
- More efficient Service Desk operations

## Simplifying ITIL

The ITIL V3 process framework focuses on the service lifecycle and the way that service management components are structured and linked. It embodies critical guidance for IT organizations that are seeking to improve service quality and align more closely with business goals

But, the ITIL V3 best-practice guidelines across the five phases of the service lifecycle are complex and challenging to interpret. Moreover, they are not designed to provide definitive advice about implementing IT Service Management (ITSM) processes. Many IT organizations consequently undertake an ITIL journey without a firm idea of their goals and the path to achieve those goals.

CA has developed a unique approach to charting the ITIL journey through a visual representation of the ITIL framework and its interdependent ITSM processes modeled after an urban subway system. This three-part map (Figure A) presents an easy-to-navigate, high-level view of the ITIL terrain. IT executives, strategists and implementers can use these Service Management process maps along with the family of CA Service Management process map technology briefs that expand on them. The maps and technology briefs provide a common reference point for understanding and communicating about ITIL and help you with program planning and implementation.

*CA ITSM Process Maps illustrate at a high level how best to navigate a journey of continual service improvement guided by strategic controls throughout the service lifecycle. Each map describes the relevant ITIL processes and activities you'll need to work with to reach your goals.*

### How to Use the CA Service Management Process Maps

CA's Service Management process maps (Figure A) illustrate every process (or track), each activity (or station) and the key relationships that are relevant to navigating continuous IT service improvement. The ITIL quality cycle takes the form of a "circle" with each Plan-Do-Check-Act (P-D-C-A) step as a process integration point (junction) on the line. Junctions serve both as reference points when assessing process maturity, and as a means to consider the implications of implementing a process in isolation.

Strategic controls (Service Portfolio Management, Demand Management and Financial Management) are needed to reduce risk and optimize integration across the service lifecycle, as illustrated on the three points of the triangle centered in the P-D-C-A quality circle (seen more easily in Figure B). These strategic controls help in evaluating, prioritizing and assuring the appropriate levels of financial and human resources for existing and new services.

This paper is part of a series of Service Management Process Map technology briefs. Each brief explains how to navigate a particular ITIL process journey, reviewing each process activity that must be addressed in order to achieve process objectives. Along each journey careful attention is paid to how technology plays a critical role in both integrating ITIL processes and automating ITIL process activities.

FIGURE A

CA has developed three maps: Service Design, Service Transition and Service Operation since most ITSM discussions focus on these critical ITIL disciplines.

MAPS

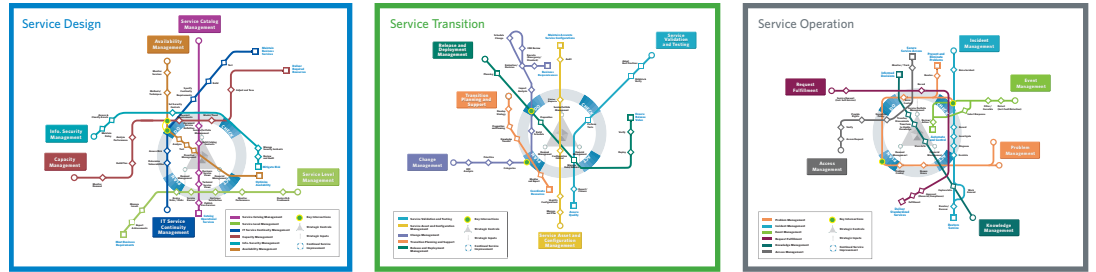
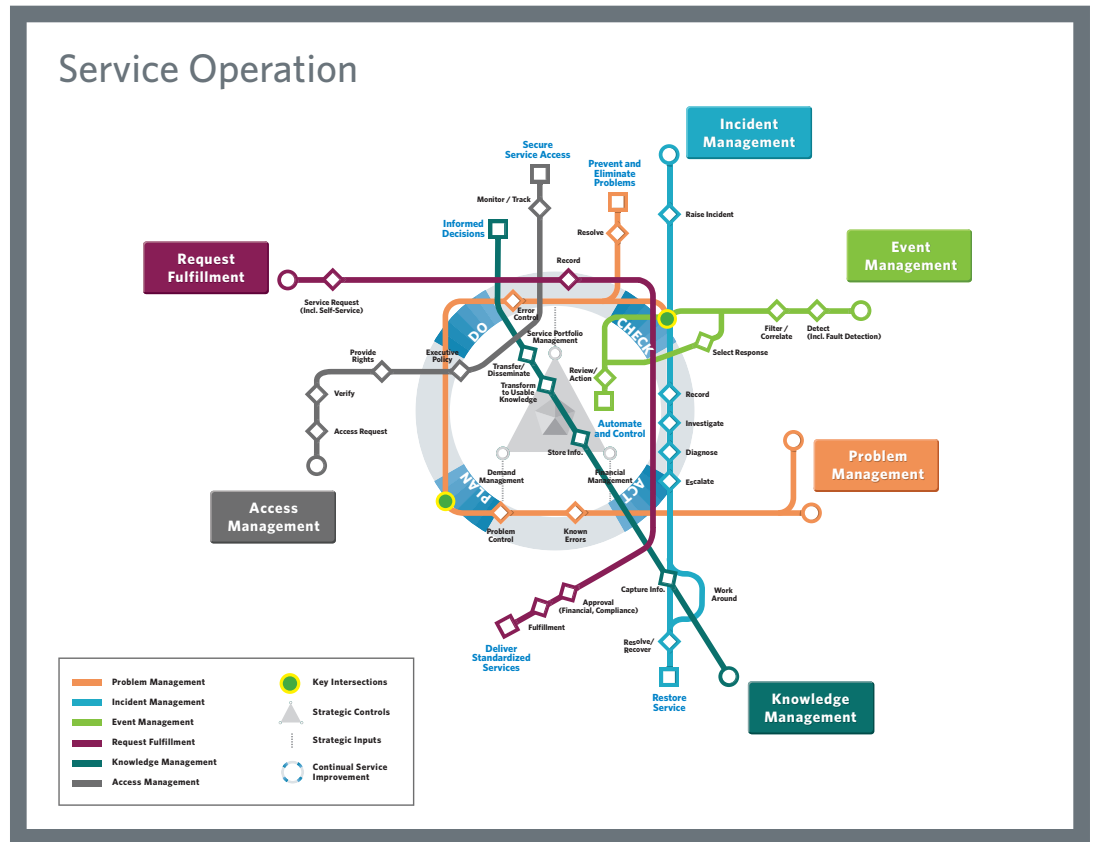


FIGURE B

The Service Operations map represents a journey of improving day-to-day IT service support operations processes that lay the operational foundation needed upon which to build business value.

SERVICE OPERATIONS MAP



## Problem Management

Problem Management requires several roles to ensure effective functioning. The Problem Process owner is responsible for creating and managing the process, associated activities and the roles and responsibilities of those that play a part in the process. The Problem Manager works with the Incident Manager to determine the criteria for, and how high impact incidents integrate with Problem Management. Also, and based on agreed-upon criteria, certain authorized staff within the Incident Management team can determine if a Problem actually exists; and, if so, can involve the Problem team to perform root-cause analysis while the Incident team concentrates on restoring the service.

Problem Management includes both reactive and proactive activities. Reactive Problem Management aims to identify the root causes of high impact incidents and present proposals for restoration of service and resolution by submitting Request for Changes (RFCs). Proactive Problem Management is responsible for the systemic analysis of all incidents to determine trends that may need to be addressed and have permanent solutions applied to remediate the trend.

The ten major activities within Problem Management include:

- Detection
- Logging
- Categorization
- Prioritization
- Investigation and Diagnosis
- Workaround
- Creation of a Known Error Record
- Resolution
- Closure
- Major Problem Review

### Problem Management Integration Points

Before examining the Problem Management process in detail, it is important to review critical process integration points. During problem diagnosis, the process integrates with Incident Management and Event Management tracks at the CHECK junction (Figure C) to provide information about Known Errors, workarounds, and quick fixes so that IT can restore services faster and with minimal disruption. When Known Errors have been identified, Problem Management may integrate with Change Management (at the Plan and Do junctions) to ensure that RFCs are raised and implemented to resolve these Problems.

*Many IT organizations spend too much time on reactive problem resolution. Problem Management can enhance IT's value to the business by enabling you to become more proactive. By leveraging preventative measures and controls in line with ITIL best practices you can achieve more robust and reliable service.*

FIGURE C

Once the Change has been implemented, Problem Management again integrates with Incident Management (at the Check junction) to gather and analyze Incident data to proactively identify Problems.

THE CHECK JUNCTION



DETECTION

Problem Management starts with problem detection, which is responsible for identifying problems, and the Configuration Items (CIs) that are at fault. Problem detection focuses on several areas of detection including suspicion of one or more incidents by the Service Desk resulting in the creation of a Problem Record. This gives Problem Management the ability to start the Problem Management process. Other areas that may raise a problem record could be via the technical support group determines that an underlying problem is likely to exist or actually exists. Suppliers, contractors, or even event management tools may raise an incident for which a problem record may need to be created. Also, analysis of existing incidents with proactive Problem Management may raise a problem record.

LOGGING

After a problem has been detected and a problem record has been created it is necessary to properly log the necessary information into the problem record, so that proper historical reference of the problem can occur, including the correct date and time so that proper escalation and control can occur. A link to the resulting incident(s) must also exist so that information on the resulting workaround or permanent fix can be transmitted to the associated incident. There are several relevant data points that must be captured in order to effectively manage a problem record. Data such as: user(s) affected, service(s) affected, CI information, priority and categorization information, description of the Problem (normally from the associated incident), all details of any diagnostics or activities being performed in the analysis of the problem.

### CATEGORIZATION

After incident data has been collected for analysis, and a problem record has been recorded, it must be properly classified according to the category. Following a similar coding system for the categorization of incidents, Problem Management classifies the types of problems to assist with proper reporting and assignment of ownership of the problem record. Problem category identifies the problem area (for example, hardware or software), as well as any additional levels classification necessary for the organization.

### PRIORITIZATION

After the problem record has been properly classified it must be properly prioritized. The prioritization of the problem record follows the same types of priorities as does Incident Management, however, Problem Management will also take into account the frequency and associated impact of the incident(s) associated to the problem record. To properly prioritize the problem record the impact and urgency must be taken into account. Classification is accompanied by impact analysis on IT services (via the Configuration Management Database (CMDB)) to determine the seriousness of the problem, and the extent to which deferral of a solution is acceptable (urgency). Impact, urgency and business risk help determine the priority of the problem, as it does with Incident Management. Another factor for proper prioritization is the severity of the problem which is how serious the problem is as it relates to the infrastructure such as: how long will it take to remediate the problem? How many CIs are affected?

### INVESTIGATION AND DIAGNOSIS

After the problem has been classified and prioritized, the Problem Management journey begins an iterative process of problem investigation and diagnosis. As illustrated in Figure B the Problem Management process track may be traveled several times before the root cause can be determined. During this phase, rapid response teams may meet to jointly investigate and diagnose the root cause of severe problems. Technology plays a critical role in this activity, helping pinpoint root cause across the technology domains that support IT services, such as Web services, applications, databases, servers and networks.

During the Investigation and Diagnosis phase, it is critical to have access to data on the status and the attributes of associated CIs (for example, access to information such as operating system level, past changes, and security patches). Combined with the number and type of incidents and problems associated with the CI, this information can enable the Problem Management team to more effectively determine root cause and quickly initiate remediation activities.

If no immediate workaround or known error is available, then the Problem Management team continues to gather additional information for further diagnosis. Effective diagnosis of the underlying cause of the problem requires access to CI attributes (as discussed above) as well as any documentation or troubleshooting information from the Incident Management team. The Incident and the Problem Management system should be integrated to make this process seamless. Also a fully integrated Configuration Management System (CMS) with access to information contained in the CMDB is crucial to the success of the Problem Management Process.

Throughout the Problem Management process, other groups outside of the Problem Management team, such as application support, may be brought in to assist with problem diagnosis. In such cases, however, care must be taken to ensure that such teams work collaboratively to resolve problems, avoiding the more traditional and inefficient practices of attempting to resolve problems “silo by silo.” Here again, advanced analytic and diagnostic tools can help pinpoint the problem to a specific area and avoid unnecessary and time-consuming problem investigation.

There are many diagnosis techniques that can be used such as brainstorming, pain value analysis, as well as documented analysis techniques such as Kepner and Tregoe. These techniques assist with rapid diagnosis as well as a more effective Root Cause Analysis (RCA) determination.

#### WORKAROUND

In some cases it will be possible to determine a workaround to the problem which will assist with temporarily resolving incidents associated to the problem. In these cases the problem record still must remain open to continue to find a permanent solution. The workaround needs to be documented in the problem record and be referenced and communicated to the associated incidents and their owners. During the analysis and root cause determination, an organization may find an actual resolution to the problem, but management may deem it is too costly to implement the permanent fix. In these cases the workaround will be enough to resolve the problem record. The problem record must be set to denote that a permanent fix has been determined, but the workaround is considered to be the solution for this problem due to cost justification. You can continue to review these permanent fixes over time, in case the organization determines that the workaround is not effective, such as more outages are occurring, then the permanent fix may be actually be put in place.

#### CREATION OF A KNOWN ERROR RECORD

Once diagnosis is completed and either a permanent fix or a workaround has been determined, a known error record needs to be created and placed in the known error database. This known error record contains the necessary information on the diagnosis results, the steps in which to resolve the problem, or in some cases the workaround steps. It is possible that the known error record gets created much earlier in the process to indicate that the error is known. Whatever the procedure, it must be documented so that the organization knows exactly when a known error record will be created.

The known error record contains the exact fault information, any and all symptoms that are known and the workaround or permanent resolution actions taken to restore the service and/or resolve the problem. Also, it is necessary to get all incidents associated to this known error logged against this known error record. This will assist with the frequency in which this problem exists which could influence a more permanent resolution in the case of a workaround for this problem.

Known error records should also be created when new services or updates are being transitioned where there are known errors either with or without workarounds. This enables Incident Management to more rapidly manage the incident.

## RESOLUTION

When a solution has been found for the problem record it should be applied to safeguard the possibility of additional problems in the environment. In many cases the resolution will involve raising a Request for Change (RFC) and proper change approvals will be necessary to put the resolution in place. If the problem is serious and an urgent RFC is necessary, then an Emergency RFC should be opened and the Emergency Change Advisory Board should be contacted with the necessary information regarding the affects of delaying the implementation of the RFC in the environment. The resolution should only be applied once proper Change Management processes have been adhered to. Remember that when determining the resolution to the known error, an organization may choose not to repair the problem either due to costs or effort associated with the resolution. In this case the problem record should be placed into the proper status so that it doesn't affect the performance of the team performing the process. The resolution should be documented properly to ensure that the workaround or permanent fix actually solved the problem prior to considering to going to the next station of closure.

## CLOSURE

Only when the resolution has been applied and/or the RFC has been successfully implemented and reviewed can the problem record be formally closed. In order to perform this activity you must ensure that all of the historical information and events are logged properly in the problem record as well as the known error record in the known error database. Also ensure that the proper status for the known error record has been recorded to show that the resolution has been applied. It is also important to ensure that all associated incidents to the problem record have been properly updated with the resolution to the problem. At this time the problem owner should ensure that all historical information has been captured in the Problem Record and any Known Error and Workaround documents. A major mistake organisations make is being too quick to close a problem. Mature organizations allow a number of cycles to occur where they would expect to see the problem reoccur after remediation before closing. This then means that your service levels on Problems should be set on a status of resolved, not closed.

## MAJOR PROBLEM REVIEW

As determined by the organizations priority system, every major problem must have a major problem review as soon as possible, so that any lessons learned, can be determined while the tasks are fresh in the minds of those performing them. The team must look at:

- What tasks were done correctly
- What tasks were done incorrectly
- What could be done better in the future
- How do we prevent the incorrect tasks for reoccurring
- Are there any 3rd party responsibility problems or actions that are needed

Any and all of these lessons learned should be documented including any work instructions or procedures that can be leveraged in the future. These reviews will increase the capabilities and effectiveness of the Problem Management process. You also may want to present the review results to the business or customer along with the plans and actions to be taken to minimize the impact of major problems in the future. This will improve customer satisfaction and help the organization understand that IT is handling the major problems effectively, and working to improve the speed and accuracy of resolving the problems in the environment.

### **Integrating Problem Management and other Service Operation Processes**

Problem Management becomes truly optimized when integrated with other processes, such as Incident Management, Change Management, Service Asset and Configuration Management and incorporating Knowledge Management. The close relationships between these processes are represented visually in the CA Service Management Process Map for Service Operation (Figure B). Some of the support processes cross each other at different intersections. This indicates a relationship between those processes where the outputs from one become the inputs to another. There are also integration points with other processes such as IT Service Continuity Management, Release and Deployment Management, Service Level Management, Availability Management, Capacity Management, and Financial Management.

As an example, Problem Management must gather data from the Service Asset and Configuration Management process, including essential information about the infrastructure, such as CI status and change history. The CI information serves as an input to the Incident, Problem and Change Management processes, while the output to Service Asset and Configuration Management includes data on how many incident records were logged against a CI; or, from Problem Management, what known errors are linked to it.

Armed with this information, Problem Management can raise a RFC to remove the problem from the environment, thus resulting in fewer recurring incidents against the relevant CIs. Working together, the integration of Problem Management with other processes allows for faster and more efficient customer service and better control of the IT infrastructure.

### **Selecting the Appropriate Problem Management Solution**

Tools that help enhance the Problem Management process should provide:

- Support for development of trend information for a more proactive Problem Management process
- The ability to view information contained in the CMS/CMDB regarding the CI attributes and relationships, assist in the problem resolution process via impact and possible root cause analysis
- Integration between Incident, Problem, Change and Service Asset and Configuration Management processes to speed up accuracy and resolution of problems in the environment
- Mechanisms (e.g., reports and service dashboards) to report key performance indicators, based upon metrics on the Problem Management process, including:
  - Total number of problems in a certain period
  - Percentage of problems resolved within the agreed upon service level agreement
  - Average problem resolution time (and by priority)
  - Average cost of resolving a problem
  - Number of incidents resolved by problems
- Data that can help measure IT performance and efficiency, such as:
  - Percentage of problems resulting in a RFC
  - Percentage of RFCs based on problems that had to be backed out
  - Known Error effectiveness (number of Incidents tied to Known Errors)
  - Number of problems as a direct result of failed or unapproved changes
  - Number of workarounds created and known errors created
  - Number of problems resolved by analyst group, individual analyst, etc.

### Keys to Success in Problem Management

The following are some of the most important areas to focus on within the Problem Management process:

**EFFECTIVE COMMUNICATION** Everyone involved in the Problem Management process must understand the importance of their role in the overall effort. Ensuring that each team member understands the proper handling of information regarding associated Incidents, Problems, Changes and CI information is critical to understanding the impact of a Problem. Also, effective communication allows each role to know the status and progress of a Problem. It is also important that team members communicate information regarding Problems back to the affected users and management.

**PROBLEM MANAGEMENT TEAM MEMBERS ARE NOT THE SAME AS INCIDENT MANAGEMENT** The Problem Management team must have the ability to position themselves outside the actual resolution of an outage enough to be able to get a holistic view of the possible root cause within the environment and have the ability to leverage diagnostic tools in which to analyze and determine resolution to these issues.

**EFFECTIVE KNOWN ERROR CREATION** The Problem Management team must understand what data is necessary for effective known error creation, categorization and workflow. Having a standard for required data types within the known error database is critical to effective management of information based on known errors.

**ACCESS TO TREND DATA** Ensure that the information needed for trending analysis is tracked and available. A fully integrated toolset allows organizations to readily see information contained within the Incident Management solution, information on the CIs, and access to the Known Error and knowledge databases. Also important is a management dashboard illustrating what is happening in the organization in near real-time.

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## SECTION 3: BENEFITS

### Benefits of Problem Management Best Practices

The benefits of implementing an effective Problem Management process in line with ITIL best practices include:

- Improve quality of service to users
- Improve user satisfaction
- Reduce or eliminate the impact of an incident
- Decrease in the number of incidents
- Improve the ability to manage changes/enhancements to the IT infrastructure
- More efficient Service Desk operations
- Enhanced ability to analyze and proactively address IT trends and issues

## Conclusions

The main objective of Problem Management is to mitigate the adverse impact on the business of incidents and problems that result from errors in the IT infrastructure; and to prevent incidents related to these errors from reoccurring. To achieve this objective, Problem Management attempts to discover the root cause of incidents and problems, and then to initiate actions to improve or correct the situation.

The Problem Management process includes both reactive and proactive activities. The reactive actions address problems that arise in response to one or more incidents. Proactive actions allow the systemic analysis of trends to remove reoccurring incidents which saves on resources and cost.

Technology can play a critical role in optimizing the Problem Management process, by automating the activities themselves (such as classifying problems), and by integrating the flow of data between Problem Management and other related processes such as Incident Management, Change Management, Service Level Management and Service Asset and Configuration Management. This integration is critical to having the ability to attain value from ITIL best practices to drive greater business alignment and cost reductions across the IT environment.

## About the Author

Randal Locke has more than 20 years of experience in IT Service Management. He has been instrumental in the development and delivery of ITIL solutions for large clients in the Defense, Services, Manufacturing, Financial industries and within the Federal Government. He has performed these Service Management consulting services in North America and Europe.

Randal is an ITIL Service Manager. He has co-authored an ITIL Strategy book for international publication by Van Haren Publishing called “Service Management Process Maps.” Randal has also published several white papers and many articles. His Service Management process strengths lie within Service Asset and Configuration Management and Service Operations.

Randal is also a member of the Help Desk Institute (HDI) and the IT Service Management Forum (itSMF) and is a Certified Help Desk Director by HDI/STI Knowledge.

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