

Problem Management for CERN

Process Documentation

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1 Document Information

1.1 Version Management

Change	Date	Version	Author
Initial Creation	16.11.2011	0.1	Phil Marland
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1.2 Distribution List

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2 Management Summary

This document provides both an overview and a detailed description of the Problem Management process for CERN and covers the requirements of the various stakeholder groups.

The Problem Management process will be designed to fulfil the overall goal of unified, standardized and repeatable handling of all Problems experienced by CERN.

The Problem Management process design is characterized as follows:

- **Reactive Problem Management** – Including Major Incident Handling
- **Proactive Problem Management** – Ensuring that potential Problems affecting service delivery are identified and that preventative actions are taken in advance.
- **Problem Control** – Ensuring Problem records are identified, accurately categorised and investigated for the Root Cause.
- **Error Control** – Ensuring Workarounds are identified for Problems and Known Errors and resolved through the generation of Requests for Change for a structural fix.
- **Major Incident Control** – Ensuring Major Incidents are effectively managed to resolution by the Problem Management team.

This document is intended as an addendum to the existing CERN Service Management process documentation which covers Incident Management, Request Fulfilment and Change Management.

To prepare for the workshop this document contains descriptions of roles required for implementation and operation. This is particularly relevant for Functional Managers and Service Owners.

3 Purpose of Problem Management

Problem Management activities will result in a decrease in the number of incidents by creating structural solutions for errors in the infrastructure or provide Incident Management with information to circumvent these errors to minimise loss of service. The process has both reactive and proactive aspects. The reactive aspect is concerned with solving problems in response to one or more incidents. Proactive Problem Management focuses on the prevention of incidents by identifying and solving problems before incidents occur.

The goal of Problem Management and Incident Management can be in direct conflict; both processes aim to restore an unavailable or affected service to the customer. The Incident Management function's primary goal is to restore this service as quickly as possible whereas the speed with which a resolution for the Problem is found, is only of secondary importance to the Problem Management process. Investigation of the underlying cause of the Problem is the main aim of the Problem Management process.

4 Problem Management Mission Statement

To maximise IT service quality by performing root cause analysis to rectify what has gone wrong and prevent re-occurrences. This requires both reactive and proactive procedures to effect resolution and prevention, in a timely and economic fashion.

5 Definitions

Problem Management for CERN will be based on ITIL best practices to ensure the controlled handling, monitoring and effective closure of Problems within the estate. This will be achieved within CERN by using a combination of activities that are designed in-line with ITIL Best Practices

Although the process is supported by a Problem Manager, other resources and departments are involved in the Problem Management Process.

6 Benefits

6.1 To the Various Departments (Delivering Services)

- Better first-time fix at the Service Desk
- Departments can show added value to the organisation
- Reduced workload for staff and Service Desk (incident volume reduction)
- Better alignment between departments
- Improved work environment for CERN staff
- More empowered staff
- Improved prioritization of effort
- Better use of resources
- More control over services provided

6.2 To the Customer Organisation (Receiving Services)

- Improved quality of services
- Higher service availability
- Improved user productivity

7 Scope of Problem Management

The scope of the Problem Management process is to perform the reactive and proactive aspects of a Best Practice process in relation to Problems and Known Errors. These are Problem control, Error control, Major Incident Control and Proactive Problem Management.

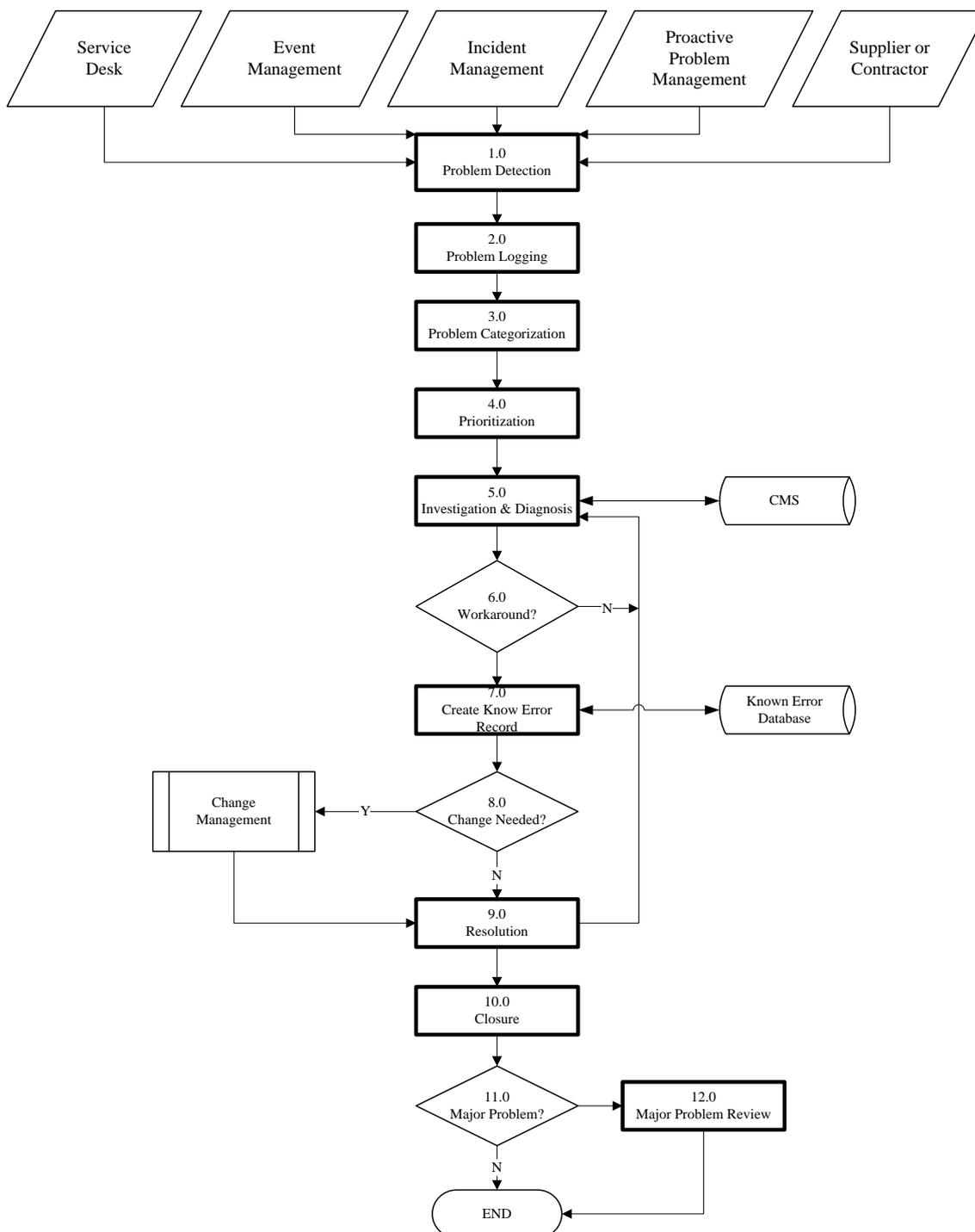
In terms of definitions, a Problem in the infrastructure is an unknown underlying cause of one or more incidents which can be identified in the following ways:

- It is identified as soon as an incident occurs that cannot be matched to existing or recorded problems for which a root cause is to be sought
- It is identified as a result of multiple Incidents that exhibit common symptoms
- It is identified from a single significant Incident, indicative of a single error, for which the cause is unknown, but for which the impact is significant (a Major Incident)

A Known Error is a problem that is successfully diagnosed and for which a workaround or (temporary) solution has been identified. This term is also described as a fault in the infrastructure that can be attributed to one or more faulty CI's (Configuration Items) in the Infrastructure and causes, or may cause, one or more incidents for which a work-around and/or resolution is identified.

8 Process Overview

High Level Reactive Problem Management



9 Process Activities

The following table provides a description of each activity¹ in the Problem Management High Level Process Flow diagram:

Activity	Description
<p>1.0</p> <p>Problem Detection</p>	<p>Identify Problems from the following activities:</p> <ul style="list-style-type: none"> • Incident Matching • Trend Analysis <p>Review Problem alerts raised by Incident Management and other processes.</p>
<p>2.0</p> <p>Problem Logging</p>	<p>All relevant information relating to the nature of the Problem must be logged so that a full historical record is maintained. As a minimum, the following details are input during Problem Logging:</p> <ul style="list-style-type: none"> • Unique reference number • Date/Time recorded • Cross reference to related Incidents • User details • Service details • Configuration Item details • Priority and Categorization details • Description of incident symptoms that resulted in Problem identification • Details of diagnostic or attempted recovery actions taken
<p>3.0</p> <p>Problem Categorization</p>	<p>Properly Categorize the Problem so that it enhances Management Reporting. Use the same categorization structure for Problems that are used for Incidents; as defined in the Service Catalogue.</p>
<p>4.0</p> <p>Prioritization</p>	<p>Problems should be Prioritized using the same priority matrices for impact and urgency that are used for Incidents. Prioritization provides the order for working on Problems.</p>
<p>5.0</p> <p>Investigation & Diagnosis</p>	<p>Properly investigate, diagnose, test and verify the root cause of the Problem and determine the associated Configuration Item (CI). Problem analysis, diagnosis and solving techniques should be used to facilitate finding the root cause.</p>

¹ Adapted from ITIL Service Operation, 4.4.5 Crown Copyright 2007

Activity	Description
6.0 Workaround Decision?	The Known Error Database (KEDB) can be searched to match the Problem against any known errors and possible workarounds. Existing workarounds should be identified and assessed as possible resolutions for Incidents related to the Problem. This activity will also define new workaround(s), if feasible, to take the place of existing workaround(s), or to define a workaround if one does not exist.
7.0 Create Known Error Record	Once the root cause has been determined, Configuration Item (CI) has been discovered and a workaround or permanent fix is identified, a Known Error record must be raised and recorded in the Known Error database. Depending on the tools used, raising a Known Error record may be equivalent to changing a status of a Problem Record to 'Known Error.'
8.0 Change Needed Decision?	Properly complete a Request For Change (RFC) and submit the request following the predefined Change Management procedures. Participate in the Post Implementation Review (PIR) to ensure that the Request For Change (RFC) was successful and the error was removed from the Infrastructure.
9.0 Resolution	As soon as a resolution is found, it should be applied to resolve the Problem. This resolution may lead to initiation of an RFC and approval through that process before the resolution can be applied. In some cases the cost and/or impact of resolving the Problem cannot be justified. In that case a decision may be made to leave the Problem open and continue to resolve subsequent Incidents using a validated workaround.
10.0 Closure	The Known Error and associated Problems will be closed after successful implementation and Post Implementation Review (PIR).
11.0 Major Problem Decision?	A definition and criteria for major Problems are part of the organizations prioritization matrices.
12.0 Major Problem Review	A review to identify lessons learned should be conducted with all appropriate parties soon after the Major Problem is resolved.
Proactive Problem Management	Trending analysis against Incident Records and other IT Service Management Processes is used to proactively identify problems that might otherwise be missed.

10 Specific tasks

There will be Specific Tasks that need to be identified for Service Now and associated Subject Matter Experts from various areas. These will be identified during the course of the workshops and during design and implementation.

11 Roles and Responsibilities –

RACI Matrix

Process Roles	Problem Process Owner	Problem Manager	Functional Manager/Support Groups	Service Owner/Customer/User
Activities Within Process				
1.0 Problem Detection	A	R	R	C
2.0 Problem Logging	A	R	R	C
3.0 Problem Categorization	A	C	R	I
4.0 Prioritization	A	C	R	I
5.0 Investigation & Diagnosis	A	C	R	I
6.0 Workaround Decision?	A	R	R	I
7.0 Create Known Error Record	A	R	R	C
8.0 Change Needed?	A	R	R	I
9.0 Resolution	A	R	R	I
10.0 Closure	A	R	R	I
11.0 Major Problem?	A	R	C	I
12.0 Major Problem Review	A	R	C	I

A – Accountable R – Responsible

C – Consulted

I – Informed

12 Problem Management Process Owner

12.1 Profile of the Role

The person fulfilling this role has end-to-end responsibility for the way in which the Problem Management process functions and develops. The main role of the Problem Management Process Owner is to ensure that the processes are efficient, effective, and fit-for-purpose.

The identified Process Owners will work closely together to ensure integration of the ITIL disciplines and their process-flows.

The ideal Problem Management Process Owner:

- Has been trained to ITIL v3 Expert and or Service Management Manager level
- Is positioned at Senior Manager level within the organisation
- Has a strong knowledge of the Infrastructure processes
- Can coach and mentor the Problem Manager
- Understands the environment and has a strong network of contacts
- Understands the business side of the organisation

12.1.1 Objective of the Role

- Take ownership of the process to establish accountability
- Be a director level escalation point regarding any Problem Management Process issues
- Ensure there is balance between the key components of a good Service Management environment: People, Process, Tools and Partners

12.1.2 Responsibilities

- Define the Business Case for the Problem Management Process
- Ensure end responsibility for the Problem Management Process
- Ensure the Problem Management process is fit-for-purpose
- Ensure there is optimal fit between people, process and technology
- Ensure proper Key Performance Indicators are set
- Ensure reports are produced, distributed, and used
- Integrate the Process into the line organization
- Drive forward the integration of the Problem Management process with other Service Management processes

12.1.3 Activities

- Promote the Service Management vision to top-level / senior management
- Attend top-level management meetings to assess the impact of organizational decisions on the Problem Management environment
- Attend meetings with the Problem Management Process Manager
- Communicate changes to the Problem Management infrastructure
- Discuss report outcomes, improvements and recommendations with the Problem Manager
- Distribute reports

- Review proposed changes to the Problem Management process
- Review integration issues between the various processes
- Initiate and review Key Performance Indicators and reports design
- Initiate improvements in the tool, process, steering mechanisms, and people issues
- Initiate training
- Recruit Problem Management staff where needed (including the Problem Manager)
- Coach the Problem Manager in the correct steering of the process
- Function as a point of escalation for the Problem Manager

12.1.4 Authority

- Initiate and approve the implementation of any changes to the Problem Management Process
- Escalate any breaches in the use of the process to top-level management
- Initiate research with respect to any tools to support the execution of the process's tasks.
- Block any tool change that negatively impacts the process
- Recruit a Problem Manager
- Communicate with the relevant Process Owners when there are conflicts between inter-related processes
- Organize training for employees and nominate staff. They cannot oblige any staff to attend training, but can escalate to line management should training be required in their opinion

12.2 Problem Manager

12.2.1 Profile of the Role

The Problem Manager reports to the Problem Management Process Owner and performs the day-to-day operational and managerial tasks demanded by the process flows.

The Problem Manager is responsible for identifying opportunities for improvement and audits the use of the process on an operational level. This ensures compliance to the process by the Support staff.

The Problem Manager is responsible for liaising with and providing reports to other Service Management functions. They will also be responsible for managing the output of the process according to the Service Level Agreements. They act as a guardian of the quality of the discipline and are responsible for ensuring that processes are used correctly.

The Problem Manager:

- Is a discussion partner at Functional Manager and Service Owner level within the organization
- Understands the services that are delivered to the customers
- Must be flexible as well as convincing, as often they do not have authority to enforce the use of the Process
- Can balance the support requirements of the business with resourcing and prioritization issues in order to ensure optimal effective business support within the available means

12.2.2 Objective of the Role

- Establish accountability for the day-to-day operation of the process
- Create a responsible monitoring function

12.2.3 Responsibilities

- Ensure the Problem Management process is conducted correctly
- Ensure the Problem Management Key Performance Indicators (KPIs) are met
- Ensure the Problem Management process operates effectively and efficiently
- Ensure process, procedure and work instruction documentation is up-to-date
- Be the operational process executer
- Be the owner of registered problems
- Enter all relevant details into the Problem record, and ensure that this data is accurate
- Provide management and other processes with steering information
- Maximise the fit between people, process and technology
- Promote the (correct) use of the process
- Execute and co-ordinate Proactive Problem Management
- Execute and co-ordinate Reactive Problem Management
- Ensure correct closure and evaluation of Problems
- Ensure the Problem Management process, procedures; work instructions, and tools are optimal from a department/section point of view
- Carry out Problem Management activities according to the process, procedures, and work instructions
- Obtain the technical and organizational knowledge required to perform the activities

12.2.4 Activities

- Update the process and procedures documentation
- Initiate and update the process work instructions
- Identify problems and analyse Incidents
- Register problems
- Execute classification of problems
- Co-ordinate and plan Problem Resolution, as required
- Co-ordinate and monitor problem resolution for vendor maintained products
- Monitor Problem Resolution progress in accordance with classification
- Monitor the Error Resolution progress (Error Control)
- Monitor the hand-over of Problems to other support groups
- Monitor the process performance against Key Performance Indicators in all departments
- Monitor the Problem Management process, using Key Performance Indicators and reports
- Perform trend analysis
- Attend meetings with the Problem Management Process Owner, Functional Managers, Service Owners and Support Group staff.
- Attend Change Advisory Board (CAB) meetings concerning Problem Requests for Change (RFC)
- Assess the possibility of the approval of any RFCs generated by the Problem Management process
- Escalate to the Problem Management Process Owner where the process is not fit-for-purpose. The Problem Manager escalates to line management and the Problem Management Process Owner in case of a conflict between Process and Line Management. Escalation reports are sent to the Process Owners and line management
- Coach Support Group staff in the correct use of the process
- Identify training requirements
- Identify opportunities for improving the tools used
- Identify improvement opportunities to make the Problem Management process more effective and efficient
- Identify and improve operational alignment between various processes
- Review and evaluate closed Problems
- Identify improvement opportunities within all departments
- Produce steering information in the shape of management reports
- Produce steering information for other processes
- Promote the correct use of the Problem Management process within all departments and sections
- Communicate changes to the Problem Management process within departments and promote the use of the changed process
- Audit and review the Problem Management process periodically

12.2.5 Authority

- Monitor the Problem Management process for all departments
- Report on all Problems, specified per service, process, department, and any other Key Performance Indicator that will be established
- Escalate any issue impacting the ability of the Problem Management process to complete its objectives to Line Management, Functional Management and/or the Problem Management Process Owner

- Discuss problems relating to the process or execution of the process with the Problem Management Process Owner, Functional Management and/or Line Management
- Recommend (process) improvements to the Problem Management Process Owner

12.3 Support Group Staff

12.3.1 Profile of the Role

The Support Groups are the technical staff who work on the Problem records to investigate and diagnose them, devise workarounds and work on permanent solutions to eliminate the Known Error. Due to their technical expertise, it is generally accepted that in the main, it will be these support groups that will identify Problems, both reactively and pro-actively, will populate the Knowledge systems, raise Problem records and Requests for Change (RFCs) as required.

12.3.2 Objective of the Role

- Investigate and resolve problems under the co-ordination of the Problem Manager and Functional Manager
- Ensure problems are managed within their teams, providing workarounds that will resume service and devise permanent solutions to eliminate Known Errors and reduce numbers of incidents

12.3.3 Responsibilities

- Ensure they are fully conversant with and follow the Problem Management process, procedures and work instructions
- Ensure Problems and Known Errors are processed in a timely manner
- Diagnose the underlying root cause of one or many incidents
- Ensure that work on the Problem is accurately recorded in the Problem record
- Ensure that optimal solutions are devised to rectify Known Errors

12.3.4 Activities

- Follow the Problem Management process, procedures and work instructions
- Review Problems passed to them in a timely manner
- Update the Problem record with any progress made
- Use Problem Management techniques to investigate, diagnose and resolve problems in line with agreed priorities and timings
- Employ specialist tools and systems to detect and diagnose problems
- Have at least one team member monitoring for new problem records. The records will be assigned to groups, not individuals
- Update the Problem Manager on any progress made to diagnose and resolve problems
- Raise changes as required. This requires familiarity with Change Management process, procedures and work instructions
- Work with other support groups to gather additional information, where needed, and update record with additional information
- Populate Knowledge documents
- Identify opportunities for improvement
- Obtain the technical and organisational knowledge required to perform responsibilities
- Regularly monitor the status of a problem throughout its lifecycle, updating when appropriate
- Assess how well solutions applied have restored the service or eliminated the Problem
- Every Support Group is responsible for on-going monitoring of their queue

12.3.5 Authority

- Escalate Service Level Agreement breaches for Problems, or difficulties in providing diagnoses or solutions
- Raise and update Problem Records
- Escalate or indicate any need for more training, or for technical and organisational information
- Specify diagnostics to be applied for the capture of information required to analyse the underlying root cause of a Problem
- Raise RFCs to apply workarounds or permanent solutions to Problems and Known Errors

13 Line Management Responsibilities

13.1 Functional Manager

The Functional Managers have a key role to play in the Problem Management process. As the managers responsible for the technical resources, they need to work closely with the Problem Manager to ensure that staff are available to work on the Problems encountered within the CERN infrastructure and allocate their time accordingly. Once the solutions to Problems have been identified, they will authorise any Changes through the Change Management process. They will also be required to attend any Major Problem Review to identify lessons learned and ensure that the Knowledge Base is populated with the required Knowledge Article.

13.2 Service Owner

As “owner” of the service (s) provided, the Service Owners will need to monitor closely the activities of the Problem Management process on behalf of their customers to ensure that they get the most benefit from the activities performed. In addition they will report back on how solutions to Problems are progressing and give an indication of likely resolution times. They also have an important role in the identification of Proactive Problem Management, as any Problems and therefore any “pain” will be felt by the user community in the first instance. They may also be invited to attend Major Problem Reviews.

14 Integration with other Processes

The following integration between Problem Management and other processes must as a minimum be shaped, and guarded by the Problem Management Process Owner and Manager.

Incident Management/ Service Desk

- Provide details of Workarounds and resolution progress to Incident Management
- Arbitrate where the ownership of Incidents or Problems is unclear
- Take ownership of Major Incidents
- Make improvement recommendations on aspects of the Incident Management process as necessary

Configuration Management

- Make improvement recommendations on aspects of the Configuration Management process as necessary

Change Management

- Ensure that Requests for Change (RFCs) raised by Problem Management are correctly assessed for impact and are authorised/rejected as appropriate
- Make improvement recommendations on aspects of the Change Management process as necessary

- Attend Change Review meetings where appropriate

Release Management

- Make improvement recommendations on aspects of the Release Management process as necessary
- Attend Release planning meetings where appropriate

Security Management

- Consult with Security Management where appropriate to ensure all Problem resolutions and Workarounds adhere to the Security policy
- Consult with Security Management to ensure the correct classification of Security problems

Business Continuity & ITSCM

- Ensure Problem and Major Incident information is escalated to the ITSCM team for invocation of Continuity Plans as defined within the Business Continuity policy

Service Level Management

- Notify Service Level Management of any potential service improvements achievable through the amendment of SLAs, Operational Level Agreements (OLAs) or Underpinning Contracts (UPCs)

Availability Management

- Notify Availability Management of any potential problems threatening the availability of Services

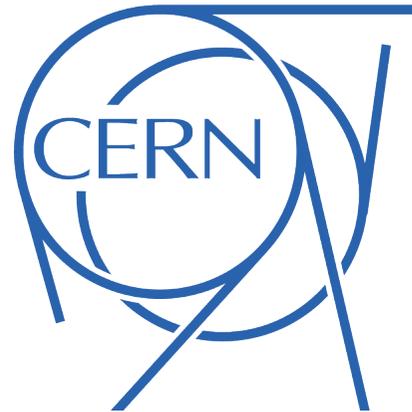
Capacity Management

- Consult with Capacity Management to devise Workarounds that can be implemented using Capacity Management sub-processes. (For example: Demand Management could be used to spread the throughput on a heavily loaded server, therefore improving the performance of that machine)



15 Tool Requirements

The tooling specification will be handled outside this document.



16 Key Performance Indicators (KPIs)

Critical Success Factors		
<ul style="list-style-type: none"> ▪ improved service quality 	<ul style="list-style-type: none"> ▪ minimize impact of Problems 	<ul style="list-style-type: none"> ▪ reduce the cost to Users of Problems
Key Performance Indicators		
<ul style="list-style-type: none"> ▪ percentage reduction in repeat Incidents/Problems ▪ percentage reduction in the Incidents and Problems affecting service to Customers ▪ percentage reduction in the known Incidents and Problems encountered ▪ no delays in production of management reports ▪ improved CSS responses on business disruption caused by Incidents and Problems. 	<ul style="list-style-type: none"> • percentage reduction in average time to resolve Problems • percentage reduction of the time to implement fixes to Known Errors • percentage reduction of the time to diagnose Problems • percentage reduction of the average number of undiagnosed Problems • percentage reduction of the average backlog of 'open' Problems and errors 	<ul style="list-style-type: none"> ▪ percentage reduction of the impact of Problems on User ▪ reduction in the business disruption caused by Incidents and Problems ▪ percentage reduction in the number of Problems escalated (missed target) ▪ percentage reduction in the IT Problem Management budget ▪ increased percentage of proactive Changes raised by Problem Management, particularly from Major Incident and Problem reviews.