Release and Deployment management process for IT services

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Abstract - **The main objective of this project is to come up with a Release and Deployment Management Process that can add value to customer products and enhance the operations. The scope of this paper is limited to the definition of different programs, Risk and Security, Team Establishment and Logistics, and Creation of the Build and Testing Documentation that are vital. Process integration in this Release and Deployment Management remains critical in understanding different activities that will enhance security. Release and Deployment Management is a factor of capacity management, problem management, availability management, service management, change management, and service desk. There are also life-cycle phases that are critical in the Release and Deployment Management including initiation, concept, analysis, design, build, test, deploy, closure, and benefits.**

Keywords - **Bug, Break fix, Change Request, Change Management, Cutover Verification Testing, Global Network Operations Centre, Major Release. Minor Release, Product Verification testing Release, Service Desk.**

I.INTRODUCTION

The process of management of release and deployment is within the transition stages of service of an ITIL life cycle service. The process involves the transition of services to a live environment that is operational. The schedules control the builds and plans of the organization release and test as they transit their services to operate.

According to Guo et al. (2016), the primary goal is to create value for the clients and ensure that the service can be handed over to operations of services. The packages designed at the end of design of functions are implemented, built, and tested in the transition of services within the stages and while releasing and deploying the process of management. Deployment of the releases to production and the establishment of active service use are among the goals of the process.

II. OBJECTIVE

Release and Deployment Management is to deploy releases into production and establish effective use of the service in order to deliver value to the customer and be able to handover to service operations.

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1) To ensure the satisfaction of the users, staff of service management, and customers.

2) Enabling by providing clear and comprehensive release and deployment plans that enable the customer and business change projects to align their activities with these plans.

3) Built a release package that can be installed, tested and deployed efficiently to a deployment group or target environment successfully and on schedule.

4) There is minimal unpredicted impact on the production services, operations and support organization and Improving consistency in implementation approach across the business change, service teams, suppliers and customers.

III.WHAT IS THE RELEASE?

A release is a package that seeks to deliver services to customers in the end, depending on what they require. According to Manglik et al. (2016), it is a collection of software, hardware, documentation, and other components that enhance the implementation of more than one change that has been approved to the services of information technology. The overall package of service involves various assets interconnected to each other that delivers value to customers may also indicate release. All the contents of a release are deployed, tested and managed as single entities. Thus, a release is made up of various services, assets, and components. All the elements of a package of service are meaningful if they are served to the customer together. A provider of service usually manages a release as one single entity.
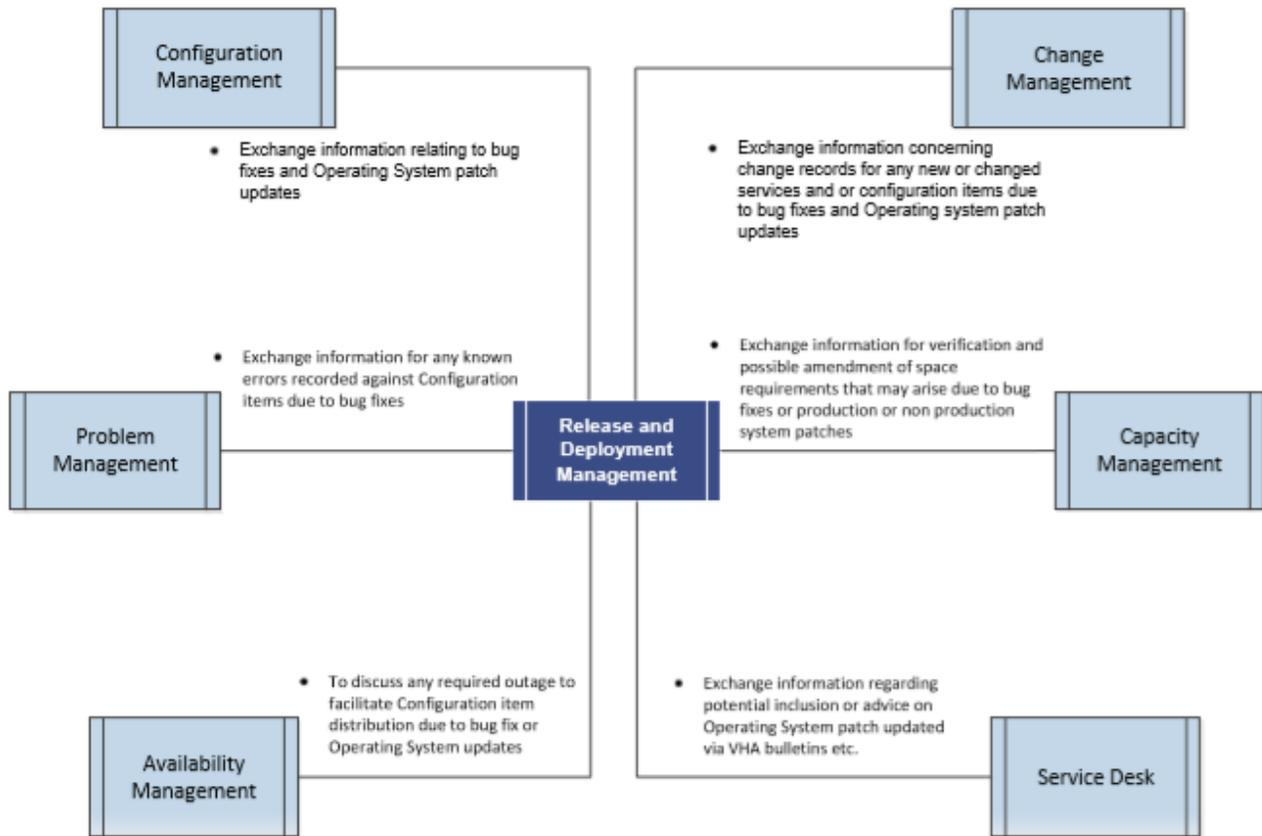
IV.PROCESS INTEGRATION

Fig 1: Integration of the Process

A. *Configuration Management*
   Exchange information related to patch updates of the operating system bug fixes.

B. *Problem Management*
   Information exchanges for errors recorded and known against the configuration items because of bug fixes.

C. *Availability Management*
   Discusses required outages to facilitate the shape and distribution of elements because of updates of the operating system or bug fix.

D. *Service desk*
   Exchanges information that regards all inclusions that are potential and advises on the patch of system operation.

E. *Capacity Management*
Exchanges information for verification and amendment of the requirements of space which originate from bug fixes or the patches in non-production and production

F. *Change Management*
Exchanges information that concerns records of change for new or changed services or configuration items because of bug fixes and updates of the operating system.

V. DESCRIPTION OF LIFE CYCLE PROCESS

   The framework seeks to define the lifecycle for developing systems that are often used for IT projects (Mantripragada et al., 2016). Some of the framework's vital features are the approval gates and a checklist at the end of the phase. The framework categorizes the aspects into nine broad categories to enhance the transition from one stage to the next. The phases are:
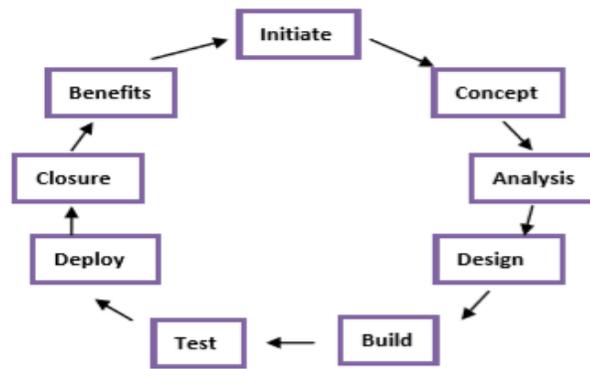
Fig 2: Phases of the life cycle of a software

A. Initiate

The stage involves the generation of business ideas, identification of the problems in a business, definition of the goals of the business, and formalization of requests for improvements and solutions.

B. Concept

It reviews all ideas and prepares proposals of projects that comprise the benefits of business, options of the solution, assessment of risks, costs, and higher levels of project plans.

C. Analysis

It confirms whether completion of a given project is viable within the time frame, budget, and the available resources while respecting technology and business.

D. Design

Creates a design for the elements of requirements using the identified needs, the architecture of the solution, and analysis that is approved.

E. Build

It involves the development of software's or processes of change, products, or services.

F. Test

It allows the running of tests to determine and verify the completeness and accuracy of solutions.

G. Deploy

It involves implementing software's or processes of change and products in live environments and how they are available to different users.

H. Closure

During this phase, results are verified in terms of their quality, duration of cost, and the timelines.

VI. PLANNING THE RELEASE

The process of release scheduling and planning involves determining the desired outcomes for more than one major release and maximization of the chances of achievement. Passmore, (2016) argues that, it involves establishing specific, measurable, and clear goals.

A release describes the portion of service or Application change or IT Infrastructure change performed on the IT Service Environment. It can also be a code change which can be deployed into Production.

The process of planning a release occurs in two levels. The first one is across several releases and in a single release. The former may be done appropriately with a roadmap for the product (Pillay et al., 2018). A road map that is goal-oriented indicates the benefits that are desired or the outcomes of each release. Some of the goals are acquiring new users, reducing costs, and removing debts that are technical and proof of the product in the future.

There are different types of Release classification based on the scope and prioritization of project impacts.

1) Pricing Releases –Are high-priority, high-impact pricing changes deployed each month.

2) Maintenance (Break fixes) – These include System break fixes (Siebel, ASAP, Mediation etc), PIE releases, Hot fixes and minor enhancements. Weekly windows will be made available for these releases.

3) Minor release items – These release items will cover most of the release units currently being classified as Capacity and Stand Alone units. These will be deployed on a daily basis.

4) Major release items – These are major changes and high-impact projects, bundled together or standalone and deployed in one go, causing significant increase in revenue, volumes, and scaling. They will be deployed on Bi-monthly basis.

5) Emergency CRs – All Emergency CRs that need to be deployed immediately to restore a service so that Operations are not impacted. These will be deployed at any point of time.

Any approved project or maintenance bundle that is scheduled to be deployed during the monthly release window are referred to a ON release. Any project or maintenance that is scheduled on any day of the month, outside the monthly release window are referred to as OFF release.

A. Release Item

A release item (or Project) is a collection of one or more deliverables into Production, each deliverable dependent on the others.

B. Release Registration

Each release item is registered with the Release planning manager, through the Release Request Form. This form includes details of the technical impact, business impact, systems impacted, outage duration, risk involved and stakeholders.

The details from RR form are recorded in the release request list, against a unique Registration number. This number is used to track the release item through the deployment schedule of the different deliverables.

C. Release Unit and Identification

A release unit describes the portion of service or Application change or IT Infrastructure change performed on the IT Service Environment. It can also be a code change which can be deployed into production. Common options for release and deployment that are considered in service design are discussed below. It is important to understand the patterns of business activity (PBA) and user profiles when planning and designing the release units.

This can also be done in a phased Approach. A portion of service is deployed initially, and then this operation is repeated for subsequently via a scheduled rollout plan. Below diagram provides the details on the phase approach. Each Phase has been identified as Release unit.

D. Release Calendar

The Release Calendar is a planned operational change deployed/rolled out in production, in controlled manner, ensuring minimal outages and impacts to systems. The plan for deployment is intended to group together release items of similar or dissimilar type (Category of the release item viz. capacity, stand alone, break fix, pricing etc), which can co-exist without impacting each other. It also takes into account the Business priorities, Technical limitations and Resourcing

E. Release Approval

The classification of a release item into Break fix, Minor or Major Category and its subsequent deployment, will be approved by the weekly release deployment dependencies workshop. The forum will comprise technical team, business representatives and select architects. Post-classification and approval, the release calendar will be published to a wider audience for review and consent.

1) Each Release Item must have a unique release number and predefined Naming Convention.

2) Each Release Unit must be deployed during the release calendar window. All the calendar's need to be consolidated and accounted in the overall calendar.

3) Each Release Unit must be approved before moving to production.

F. Deployment Planning

This phase involves planning the activities to rollout a release into operations and managed by a release manager. It involves.

1) Providing Deployment schedule for the impacted components

2) Identifying technical dependencies for the final implementation

3) Identifying technical dependencies for pre-production deployment Communication

4) Identifying/maintain the stakeholders (Business and Operations) impacted by the change.
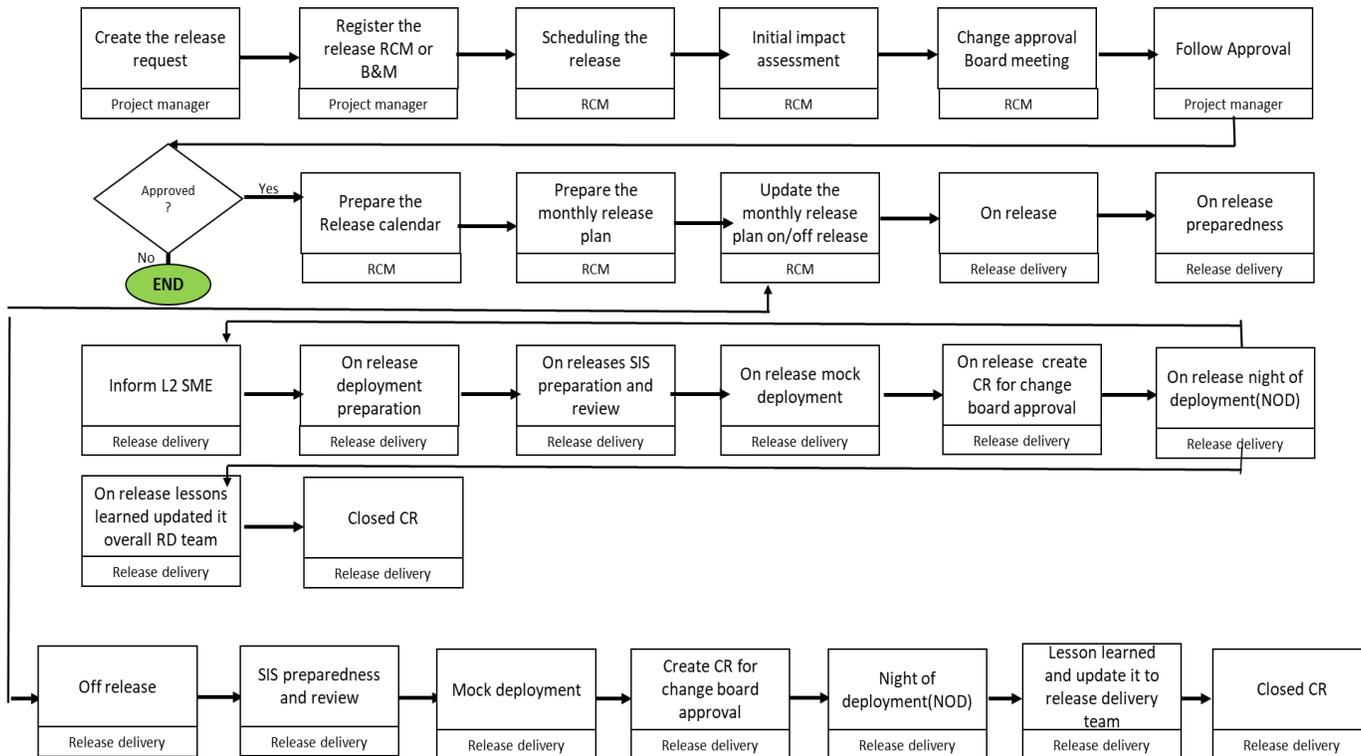
5) Training People impacted by the change.

Fig 3: Detail process release flow

VII. RELEASE CHANGE MANAGEMENT PROCESS

The project manager completes and submits requests of entry in the log of RCM. They also provide any information about RCM and resubmit claims. The release management then opens and reviews the applications that were entered, adds them to the RCM agenda and meetings, and sends out invitations. They also discuss the items in the RCM meeting, publish notes for RCM meetings and update the entire release management documentation. Once the above is completed, the teams of supply will review requests that are open in the pre-RCM meeting, ensure the RCM requests are approved, and ensure they are ready for RCM meetings.
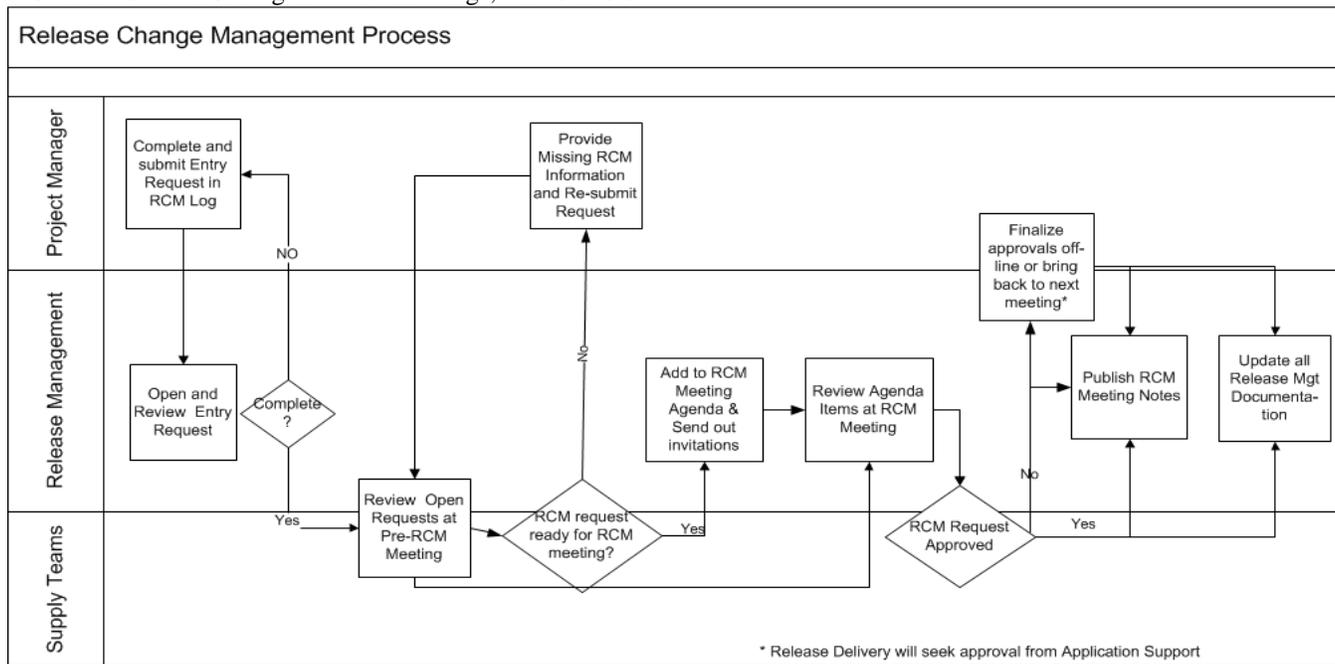

Fig 4: Release change management Process

VIII. MAINTENANCE AND BUG FIXES

Maintenance of software's involves modification of products of software to correct faults and enhance performance. Singh et al. (2017) proposes that, the efforts to support enhance non-corrective actions. Users perpetuate the perception through the submission of reports on problems.

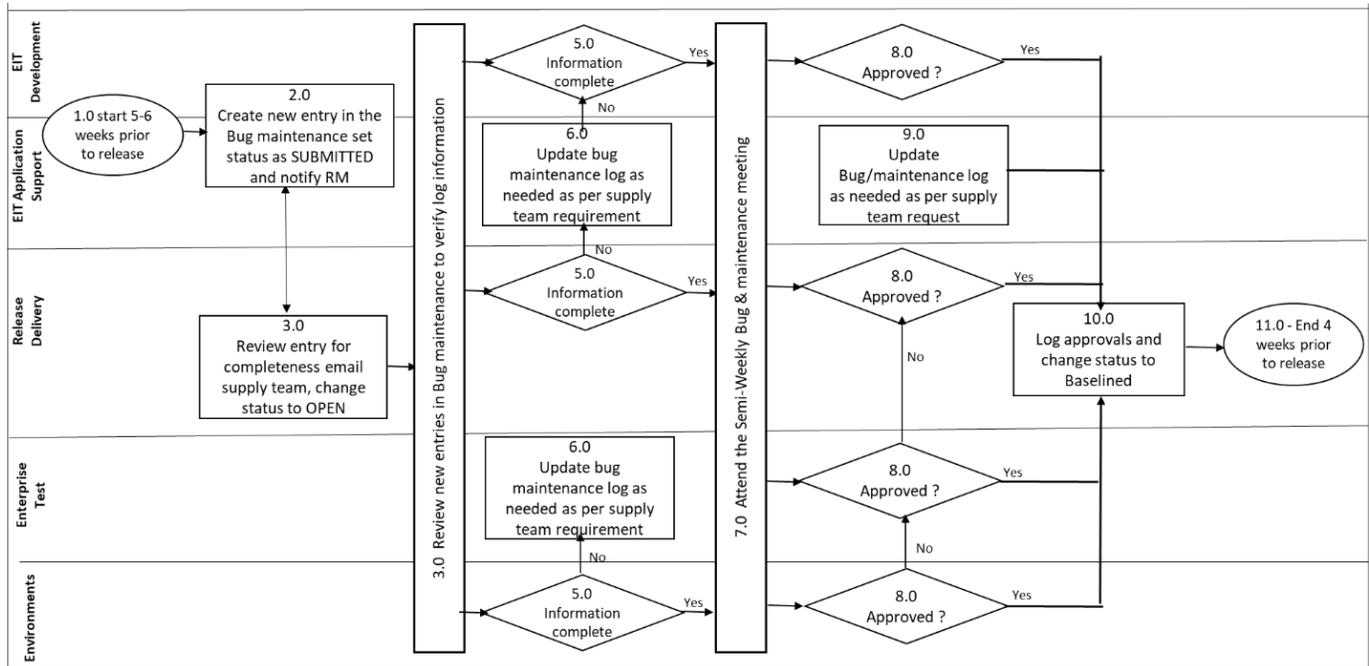The maintenance and bug fix processes are summarized in the diagram below.

Fig 5: Maintenance and bug fixing

1/2	Application Support and/or Development	a. START: Approximately 5-6 weeks before a major or minor release, Requestors must create a new Bug or maintenance entry.
		b. Requestor creates a new entry in the Bug & Maintenance Tracker in SharePoint.
		c. Complete all required information, which includes:
		  i. Release Date:
		  ii. Bundle Name:
		  iii. Remedy Ticket #/Description
		  iv. Code/Configuration Impacted applications
		  v. Test impacted applications
		  vi. Code Drop date
		  vii. Test Intake Request #
		  viii. Assigned Test Lead.
		  ix. Set Status to: Submitted
		  x. Requestor name
		d. Send email notification of item entry to Release Management. List the Bundle Name and Release Date in the email notification.

3	Release Management	a. Reviews new entry for completeness of required information.
		  i. If entry form is incomplete, Release Management will route it back to the Requestor
		  ii. If entry form is complete, Release Management advances to next steps.
		b. Release Management changes the status of the Bug/Maintenance item in the log to: Open as that indicates the item is ready to be placed on the meeting agenda for review.
		c. Release Management emails communications to the Bug & Maintenance Distribution list asking supply teams to review and ready their approvals.

4	Test Manager	a. Assigns a Test Lead or test resource. b. Test Resource will create a Test ID and Environment Request for new entry.

5 / 6	Supply Teams	Review new entry in the Bug/Maintenance log for completeness and further analysis. a. Developer review to ensure all information provided is accurate and up-to-date and confirm capacity to support. b. Application Support review to ensure all information provided is accurate and up-to-date and confirm capacity to support. c. Enterprise Test review information provided in Test ID to ensure all information provided is accurate and up-to-date and that the Test ID and Environment have been added to the log. Confirm team's capacity to support. d. Environments/Enterprise Test review information provided in Test ID and Environment Request and up-to-date and confirm capacity to support. e. Release Delivery reviews information provided and consults with Application Support to ensure all information provided is accurate and up-to-date and confirm Application Support's capacity to support.

7	Supply Teams
	
	 Release Delivery
	
	 Release Management
		Managers or proxies attend the semi-weekly Bug & Maintenance Meeting.
		 a. Meeting is held to verify final approvals. Invitations are sent by Release Management.
		 b. Required representatives from:
		    a. Requestor: Resource from App Support or Dev (or proxy) who initiated the new entry.
		    b. Environments team:
		    c. Test Manager or proxy from each impacted application group.
		    d. Test Release Coordinator: escalation point for test issues/approvals.
		    e. Release Delivery
		    f. Release Management: facilitates the meeting.
		 c. Item will be reviewed for final scope. If there are more items coming for a bundle, the baseline process will be deferred.
		 d. Item will be either approved or rejected with action items. Rejected items will remain on agenda in Open status for next meeting.

8	Supply Team Managers	If more information is needed from a Supply Team at the meeting: Email the Requestor of the new entry item.
9	Application Support and/or Development	Update Bug/Maintenance.
10	Release Management	Enter approval information into Bug/Maintenance Log and change status to: Baselined. Items that have not met the criteria to be baselined will be moved to the following month's agenda. Add the Baselined entry to the Release Plan.

XI. DEPLOYMENT PLANNING

The process of developing a plan of deployment requires the provision of a schedule of deployment, identification of the dependencies that are technical for implementation (Stadler et al., 2019), identification of the dependencies that are technical for the deployment of pre-production.

1) Communication involves the maintenance of the changes impacted—training people on the changes and communication within massive releases.
2) Agreement schedules multiple stake holders.
3) Identification of releases and mitigation of the possible risk factors.
4) Scheduling controlled environments of transition.
5) Agreements on the entry release and the criteria of exit.

A. Pre Deployment Process

Preparation for deployment includes assigning the resources to perform the deployment activities.

1) Implementation plan –Deployment steps agreed and signed off by Operations team
2) Deployment timelines has been agreed and interdependencies identified
3) Mobilizing Operations team for the deployment
4) Arranging release notes walkthroughs for only impacted components with L2 and L3 teams and identifying the gaps
5) Conducting production schedule walkthroughs with l2 and L3 resources
6) Communicate Service Desk and Support staff on the target deployment and outages
7) Communicate the Target Impacted groups on, how the change impacts them
8) Final Release package moved under control of Configuration Management with version control
9) Preparing the Environment- Taking Backup, Port configurations etc, prior to deployment

10) Delivering production schedule documents and communication plan to all the stakeholders involved in the release.
11) Provide escalation contacts in the Production schedule.

12) Release manager to follow the Go/No-go decisions taken by release team and business teams for the production change.
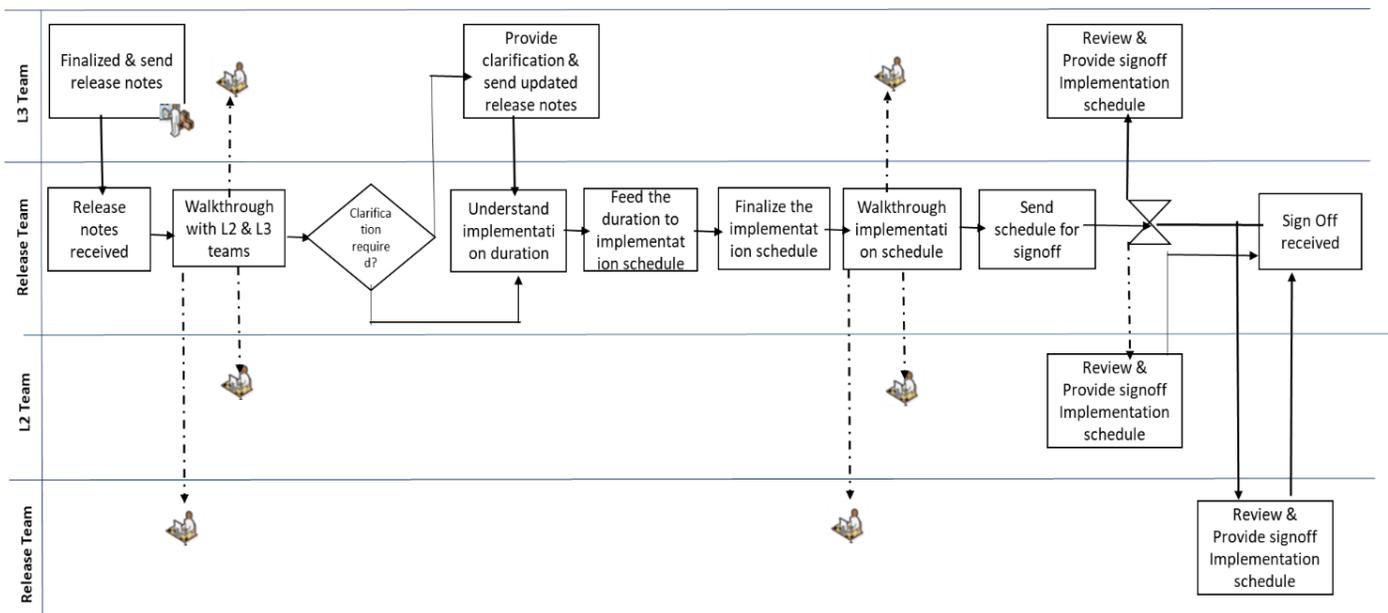13) Release manager to arrange the L2 resources for rollback decisions taken by release manager.

Fig 6: Pre production deployment

B. Deployment Process

Deployment involves carrying out the activities as defined in the Implementation plan. This includes

1) Manage all pre deployment and backup activities as identified in the implementation schedule

2) Communicate to helpdesk, Service desks and other stakeholders about the commencement of the deployment window and outages

3) Obtain the receipt from helpdesk

4) Check with service desk if there are any open request/tickets on production environment before commencing the main deployment

5) If any request/tickets found must be notified to release management team

6) Participate in the Go/No-Go decision meeting and inform about the decision to all identified stakeholders

7) Resolve deployment issues found during the deployment by effectively coordinating with required resources

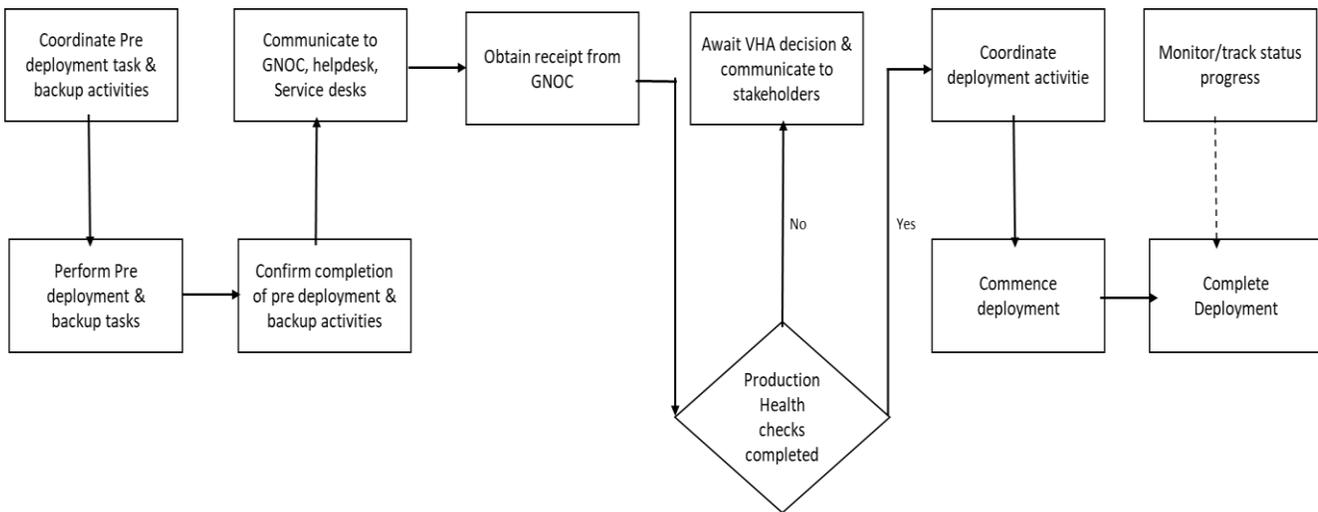8) Recording any incidents, unexpected events, issues or deviations from the plans

Fig 7: Production deployment

C. Post Deployment Process

Post deployment activities, it is important to verify that package has been installed properly on the target environment and at the desired location. The tests include.

1) Perform audit –compare against the Deployed baseline vs Planned Baseline
2) Perform system Health checks that all the services, interfaces are performing as desired
3) Operations team are prepared to operate in normal and emergency situations
4) Perform PVT as per guidelines given in release notes
5) Provide Log files to L3 for the verification and take the confirmation for the same
6) Support Cut Over verification test(CVT) phase. L2 resources available for hot fixes and support activities
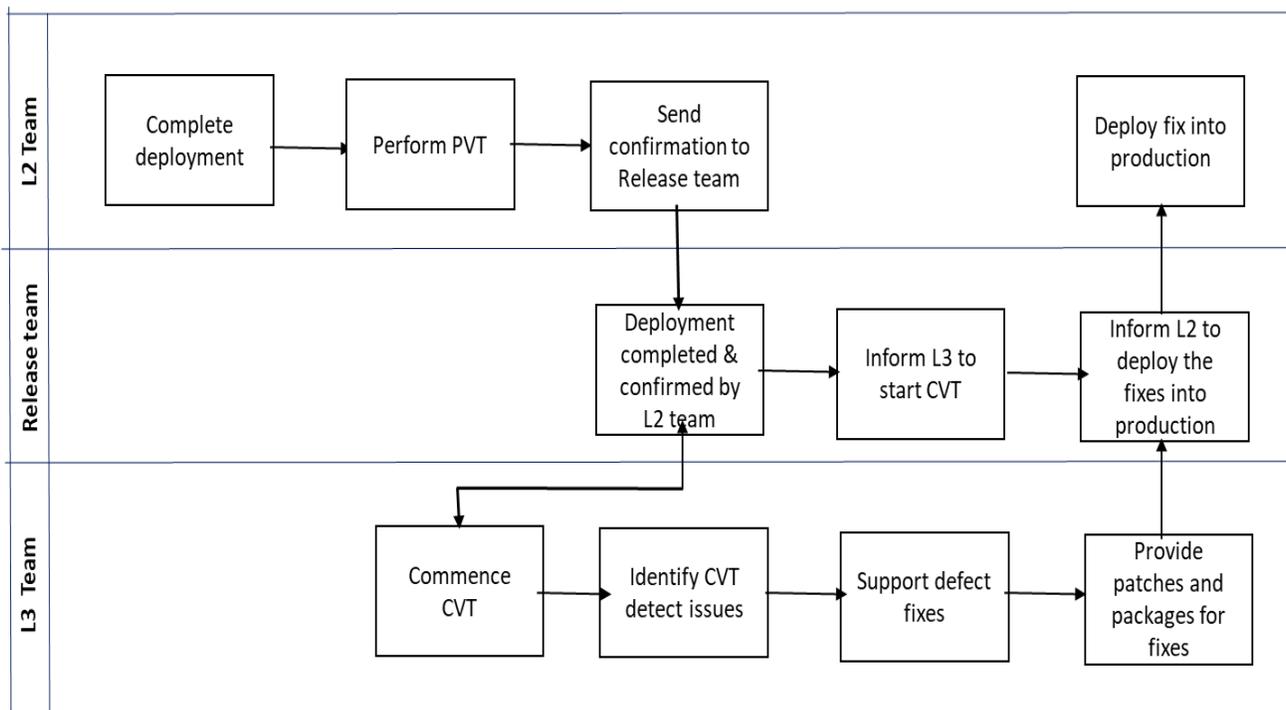7) Support and coordinate post deployment defect fixes

Fig 8: Post Production deployment

X. CONCLUSION

Due to continuous and dynamic changes in business the need of an organization to adopt to market's changing trends are resulting in implementing new software's, hardware, patches, enhancements, resulting to have their release and deployment process managed very effectively as this involves a transition to living environment that are in operation.

Release and Deployment is a process that ensures that the implementation and use of new software meet the requirements and standards that have been set in the organization. The software developers are always specific on the procedure and standards to be met. In the Release Management cycle, eight steps have been accepted as being vital in the promotion of the standard way of improving the quality and ensuring that the process meets its objectives. However, the identification of the gap needs to be very particular. In developing a system that can be relied upon by various players in the industry, it remains critically essential in handling the design and software issue. The association between the Release and Deployment procedures and the safety of the software and hardware remains critically essential in the handling of the main issues.

XI. GLOSSARY OF TERMS

Acronym	Full Name
RR	Release result
Capex	Capital expenditure
PM	Project Manager
PMO	Project Management Office
PMP	Project Management Plan
PT	Project Team
PVT	Product Verification testing
BAU	Business As Usual
CVT	Cutover Verification Testing
RASR	Release and Service Request
GNOC	Global Network Operations Centre
SLA	Service Level Agreements
SME	Subject Matter Expert

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