EXTRAPOLIX

PROCESS OF TRANSFORMATION

The process of transformation starts with key stakeholders approaching Extrapolix with a letter of intent for a Proposal of solution.

Phases:
1. Proposal Phase
2. Study & Analysis Phase
3. Design Phase
4. Development Phase
5. Testing Phase
6. Deployment & Training Phase
7. Maintenance Phase
8. Evolution Phase

Proposal Phase

In most cases, a business stakeholder comes with a business case along with the proposal or collaborates with us to prepare a business case. Once we receive a proposal we form a high-level team involving business analysts, subject matter experts, and functional project managers. We also invite key stakeholders into the same team to work together on the proposal.

Activities

In this phase the team is authorized to conduct the following activities:
- Proposal Study
- Stakeholder Engagement
- Feasibility Study
- Estimation

Proposal Study: In this activity, we establish a partnership with the business organisation for their transformation from the current state to a future state. As part of this activity the designated team conducts a detailed study of the following:
- Business Case
- Products and Services
- Business Process
- Workflow
- Problem Areas
- Values to be Delivered

Stakeholders' Engagement: In this activity, we engage in understanding the organisation's structure, culture & environment, key stakeholders, their area of influence, interest, expertise, contribution, and expectation. This enables the project team to identify the appropriate focus for the engagement of each individual stakeholder.

Feasibility Study: In this activity, we study the rationality of project implementation, a pragmatic view of the cost to incur against the benefit to accrue analysis for the proposed solution, resources required, and prospects for success.

Estimation: This is a highly technical and complex activity. Senior professionals with years of hands-on experience with a detailed understanding of the functional requirement, technical complexities, and implementation adversity are able to conduct estimation. The estimation of the amount of work required (20 Input Screens, 30 DB Tables, 50 Reports), the number of different types of resources (User Interface Developer, Database Developer, Testers) required for the work are important factors for consideration.

Deliverables

In this phase the team produces the following deliverables:
- Project Scope
- Estimate (Budget & Schedule)

Project Scope: A formal scope (high-level scope) document is delivered with the following contents:
- Project purpose
- Measurable project objectives and related success criteria
- High-level requirements
- High-level project description, boundaries, and key deliverables
- Overall project risks and assumptions
- Summary milestone schedule
- Key stakeholder list
- Project approval requirements (who signs off on the project, what constitutes project success, who decides the project is successful)
- Project exit criteria (Conditions to be met in order to close or cancel the project or phase)

Estimate: A proposal indicating budget and time duration to implement the project or phase based on the factors mentioned in the Project Scope document.

Exit Criteria

Once the proposal is submitted by us the business stakeholders decide on the project (Go or No-Go). This decision either authorises the project or parks the project at the proposal phase. At times based on the available resources, budget, and other constraints the business stakeholders may go for scope curtailment or phased implementation approach.

In case of a decision to Go-Ahead of the project, the business organisation gives **Work Order** to Extrapolix followed by our **Acceptance** to formally commission the project at a mutually agreed budget and duration. In case of No-Go or failure to agree upon the budget or duration, the project is parked there with no cost charged for the work.

This is the most important phase in the entire project life cycle. At this phase, the project is commissioned and Extrapolix is authorised to carry out the project execution. Every project commissioned undergoes rest all the phases of our predefined process, with each phase having certain well-defined activities, deliverables, and exit criteria. At each phase people with different skill-sets and experience join the project from both Extrapolix and business to conduct certain activities.

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Study and Analysis Phase

Here we formally assign a project manager and allocate relevant project resources to the project. The project manager forms a project team consisting of subject matter experts, a technical development manager, and a testing manager to carry out a detailed study and analysis of the project. At the onset of this phase, the project manager prepares a framework for managing the scope of the work and modalities around the collection of requirements.

Activities
In this phase the team conducts the following activities:
- Requirement Gathering
- Functional Analysis
- Project Planning

Requirement Gathering: In this activity, the project team engages with various stakeholders from business across different functional units and gathers detailed requirements with respect to the agreed scope. As part of this process, the project team SMEs conduct business analysis, requirement elicitation, requirement analysis and use similar past project experience for gathering data. Further Data gathering is conducted using various techniques such as interviews, brainstorming, document analysis, questionnaires, surveys, and also benchmarking to identify industry best practices and generate ideas for improvement. At times observing the existing process or job shadowing uncovers a lot of hidden requirements. In case of conflicting requirements, the PM follows the predefined guidelines to resolve the deadlock.

System Analysis: This activity of system engineering process decides the final outcome of the entire process of application development to a greater extent. Both success and failure of the project hang on the intensity of this activity. We conduct the following activities in this process:
- Requirement Analysis: The goal of requirements analysis is to determine the needs that make up a system to meet the business objective.
- Functional Analysis: This is a top-down approach, here higher-level requirements are traced back in the decomposed lower-level specification.
- Design Synthesis: The conceptual designs, entity relationships and logical data flows are drawn to reflect the proposed business solution architecture.

The project team further conducts operation research, process optimisation to arrive at system specification that meets the business goal.

Project Planning: Project planning is the key to the project manager's success in executing the project. Primarily the three (3) critical factors such as Scope, Cost, and Schedule constraints are paramount keeping both Extrapolix and business interests in mind. However, during project delivery, the PM also takes into consideration many other factors such as project life cycle, development approach, stakeholder communication plan, configuration plan, change management plan, risk management plan, and performance measurement plan.

Deliverables
In this phase the team produces the following deliverables:
- System Requirement Specification (SRS)
- Project Plan

System Requirement Specification: This document is also called Business Requirement Document, and/or Functional Requirement Document. This is one of a kind document, which brings together both stakeholders from the business and project team to the same platform. This document captures business requirements, use case diagrams, process flows, prototypes of the user interface, input data, validations, business logic, process outcomes, report formats etc.

Project Plan: A project plan with Resource and Schedule outlay is delivered with the following contents:
- Development Plan
- Testing Plan
- Deployment Plan
- Training Plan

Exit Criteria

System Requirement Specification is sent to the business stakeholder for review and sign-off. In a more collaborative model, we usually schedule various sessions with business stakeholders to review the document together and clarify all different aspects. In case of disagreement on any particular point, we always incorporate those feedbacks and send that again for business approval. At times business stakeholders' feedback result in some work that goes beyond the initial high-level scope already defined and mutually agreed upon. In such cases, business is advised to review such changes and to raise a change request to implement the change. Once we get the business stakeholders sign-off this phase comes to an end. Then the SRS document is assigned to the project team with the authorisation to develop the business application.

Design Phase

At this phase, the high-level design document the system requirement specification (SRS) is transformed into a low-level detailed technical design document. In general, the high-level technology stack to be used is already decided at the proposal phase however minor technical details are left to the decision of the development manager.

Activities

In this phase the team conducts the following activities:
- Technical Analysis

Technical Analysis: The Technical Project Manager conducts a detailed study of the System Requirement Specification (SRS) and develops a suitable physical design of the proposed system. Technical analysis suggests the right architecture for the business application, the IT infrastructure, the technology stack, the programming languages, etc. The technical implementation approach for each of the components in SRS is elaborated and documented. The in-depth analysis at this stage helps the development team using their time more efficiently while executing the project.

Deliverables

In this phase the team produces the following deliverables:
- Technical Design Document (TDD)
- Test Cases

Technical Design Document: This is also called a Detailed Design Document. Each of the components in System Requirement Specification (SRS) is further elicited and translated into technical specifications. For example, the user management module in SRS appears in Technical Design as a User Table, User Access Table, User Management Interface (GUI) HTML, CSS Pages, and Business Rules written as Stored Procedures, Client-Side Scripts, Server-Side Programs, and other technical information.

Test Cases: The project testing team prepares Test cases to be used during the development and testing phases. Test cases are prepared to simulate all different real-time business scenarios. Test cases are prepared for individual components as well as the entire business application.

Exit Criteria
The project team Functional Project Manager, Technical Project Manager, and Testing Manager reviews the Technical Design Document and checks its conformity with System Requirement Specification and jointly sign-off. In case of any breaches with SRS, the Technical Design is re-worked before getting signed-off. The development commences only after the Technical Design is duly signed-off by the Project Managers.

Development Phase

The development phase is the heart of our entire process; Extrapolix with 3 decades of its software development history is an established entity in the business of application development. Both in terms of domain verticals and technology stack, Extrapolix has an accomplished track record. With a long history of development, we take pride in the high standard of code and the usage of modern frameworks. Extrapolix constantly invests in Research and Development (R&D) and updates development tools, technologies, standards, frameworks, and industry best practices. In this phase, the project team conducts the following development activities: Code Development, Code Review, and Unit Testing.

Activities
In this phase the team conducts the following activities:
- Code Development
- Code Review
- Unit Testing

Code Development: Year of collective experience invested into the development process has resulted in a matured development environment. The project team can be entrusted with the signed-off Technical Design Document and expected to deliver the desired business application. The technical design document is religiously followed for developing Graphical Unser Interface, Database Objects like Tables, Views, Queries, and Stored Procedures, Web Components, etc. Developers are allocated based on their past project experience and technical expertise.

Code Review: Peer Review of source code is conducted by project team members in order to ascertain and ensure the right standards and frameworks are maintained in the application development. Code Review offers a range of advantages that are experienced in the maintenance and evolution phase e.g. ease of locating error, doing code change, maintaining a coding standard that is independent of any particular developer.

Unit Testing: Once development is over the project team conducts Unit testing of individual components. This is the first-ever testing venture in the entire project life cycle. Every User

Interface, Database Object, Server Side Programs, Client Objects, Middle tier objects are independently tested for their desired functionality. Only successfully unit-tested components are rolled into the testing phase. Those components which are rejected or failed during unit testing are sent back for re-work and re-tested.

Deliverables
In this phase the team produces the following deliverables:
- Unit Tested Code Build

Unit Tested Code Build: A development codebase is maintained separately with all the successful components. That codebase is ready for the next formal and advanced testing phases like integration, system, and UAT.

Exit Criteria
In general, the project development team signs off the code after successfully passing all the application components. This is an important criterion for the project manager to programme further testing cycles and involve business users.

Testing Phase

Testing whether what has already been promised is delivered or not. The business application as a whole is evaluated to check whether that meets predefined requirements, responds correctly, performs efficiently, and achieves the stakeholders' business objectives. The business-approved System Requirement Specification (SRS) plays a vital role as a reference document during the entire course of testing. The project team conducts the following three (3) different types of testing during this phase: Integration Testing, System Testing, and User Acceptance Testing (UAT).

Activities
In this phase the team conducts the following activities:
- Integration Testing
- System Testing
- User Acceptance Testing

Integration Testing: The unit-tested code components are deployed in a test environment and tests are conducted to uncover interfacing errors. Integration testing pre-empts technological integration issues in the advanced phase of implementation especially in case the project uses a variety of technology and architecture. We usually practice two separate approaches for integration testing:
- Big Bang Approach
- Incremental Approach

In the case of smaller projects with a limited number of code components, we follow **Big Bang Approach**. Here we combine all code components in advance and test the entire application as a whole.

In the case of moderately bigger projects with a higher number of code components, a variety of technologies and architectures used **Incremental Approach** is followed. Here the entire project is gradually incremented and tested e.g. module wise (procurement, accounts, etc.). This helps in reducing integration chaos and faster error detection and resolution.

System Testing: Prior to User Acceptance Testing the project team conduct System testing. The qualitative experience of business users can be improved by effectively conducting System Testing. The project team conducts the following two (2) types of tests as part of system testing:

- Functional Testing
- Non-Functional Testing

Functional Testing: The project team conducts tests on the business application as a whole for the agreed functionality well documented in System Requirement Specification (SRS) and approved by stakeholders. The requirement traceability matrix is used to validate all predefined requirements are reflected in the application without fail. Specially designed test cases are run to test the accepted behaviour of the application. The results of each testing cycle are documented and failed test cases are re-tested after the project team addresses the issue.

Non-Functional Testing: The project team conducts tests on the non-functional aspects of the business application such as:

- Usability Testing
- Performance Testing
- Security Testing

User Acceptance Testing: UAT is the most important phase-gate before the code goes live. This is also important as business users are involved in spending their limited but valuable time conducting the tests. The project team schedules the UAT keeping in mind both criticality of the testing phase and the availability of business users. UAT is nothing but a re-playing of System Testing and simulation of the production environment with Business users. In general, separate business users test and certify their own modules followed by a senior stakeholder approving the entire Application. As the name suggests it's the users' acceptance of the business application developed as per the business requirement.

During UAT some new test cases are also devised to capture any new business scenario or use cases. Many defects are also uncovered that remained undetected in the earlier phases of testing. In that case, those defects are sent back to development for patching and the UAT is conducted fresh from scratch.

Deliverables

In this phase the team produces the following deliverables:

- UAT Signed-off Code Build

UAT Signed-off Code Build: The development code build that comes as input to the testing phase undergoes several rounds of changes, upgrades, and patching before the final code build gets ready. The final code build is time-tested with proven results. The business users accept the same code build and sign off for production deployment

Exit Criteria

Acceptance of Business users is not only a significant users' approval but also has a vital commercial aspect enabling Extrapolix to raise bills as per agreement. Once stakeholders provide user acceptance the project team is authorised to deploy the code in the production environment as per the agreed schedule.

Deployment and Training Phase

The business stakeholders communicate a formal date and time for the business application Go-Live. The project configuration management team prepares accordingly and conducts code building in the production environment with all necessary configuration changes in the application. During the project planning phase, a small plan component called Configuration Management Plan is prepared. This contains how the information about the source code and application hardware and software configuration is recorded and updated so that the product, service, or result of the project remains consistent and/or operative. This contains Version Management, Release Management, and post-deployment Production Environment setup. A formal User Manual is delivered to business users along with Business Application Training in order to use the application accurately.

Activities
In this phase the team conducts the following activities:
- Configuration Management
- User Training

Configuration Management: This broadly covers the following 3 components:
- Version Management
- Release Management
- Production Environment Setup

Version Management: This is also called Version Control or Revision Control to effectively track and control changes to the collection of source code. A central repository of source code is maintained with necessary separation for Development, UAT, and Production code base. All changes are appropriately recorded against a new version number that ensures no overwriting of any previous version. An effective version management process helps during incident management or disaster recovery in restoring back the application services.

Release Management: Release management refers to the process of planning, designing, scheduling, testing, deploying, and controlling software releases. It ensures that release teams efficiently deliver the applications and upgrades required by the business while maintaining the integrity of the existing production environment. Once the configuration management team takes over the code build from Development Team they prepare both test and production using a similar framework. This helps effectively in catching leftover development bugs, maintaining the integrity of Test Environments, and controlling unexpected issues in the production environment.

Production Environment Setup: Post-deployment the business application is subject to initial configuration changes before business use. This is a one-time application setup with respect to user administration, accounts, inventory, statutory, document setup information.
We maintain record of all of the above in the Secured Configuration Document (SCD). The SCD also features the minimum hardware (Operating System, Memory, CPU requirements), software requirements and web browser with version number to smoothly use the application.

User Training: User Training is very essential for both faster implementation and better user feedback. The project team prepares a training plan in consultation with Business Stakeholders who in turn nominate business users for formal training. The project team hands over a detailed User Manual during the said training. A good user training module helps reducing production incidents and service outages.

Deliverables

In this phase the team produces the following deliverables:

- Production Code Built
- Secured Configuration Document (SCD)
- User Manual

Production Code Built: The Configuration Management Team builds the production environment with the UAT certified code base. All the processes laid down for version control, release management, and production environment set-up are followed during the code building process. In the case of a running application when upgrades are applied the application outage is formally communicated to business users.

Secured Configuration Document: A configuration document that contains the following components:

- Hardware Requirement
- Software Requirement
- Web Browser & Version
- Application Version
- Any Other Technical Detail

User Manual: A user manual is a version-controlled document that is prepared to guide business users to be able to efficiently use the business application. User Manual contains scope and purpose of the application, process flow, features with all details required. This gives an overall idea about the business application and a business user may use the same document as a reference document with respect to the application.

Exit Criteria

Once the production code build is over and the application is up and running, the operations/ production support team conducts checks on the application using a checklist. The operations/production support team then formally signs off and approves business use. In the above sign-off process User training is also factored, however, it's imperative for the initial production code build.

Maintenance Phase

Once the code is deployed in the production environment the project moves into the maintenance phase. Right from the day of deployment Extrapolix provides free support service for one year period. During this time Extrapolix helps the business familiarise themselves with the application. All necessary defect fixes are done in the application without any extra cost to the business. In most cases, users are imparted with proper training of a particular application feature. Generally, a spike is experienced in the number of incidents raised in the first few weeks of deployment. Once the issues are resolved by user awareness or defect repair, the business application starts stabilising. Based on the size and complexity of the application this period varies from three (3) to (6) months.

Activities
In this phase the team conducts the following activities:
- Incident Management

Incident Management: Every single unplanned or unexpected event occurs that causes business application service interruption is said to be an Incident. Now Incident management is an operational process that identifies incidents and responds to them with the objective of restoring the services back to their previous functional state. Extrapolix keeps the record of all such incidents raised to it and responds to them based on the Service level Agreement (SLA). The business tags each such incident based on its criticality and priority. Our project team conducts reviews to identify reasons for incidents, evaluate the same and also develop corrective and preventive actions to manage and /or avoid recurrence of the incidents. An incident results in either user training, or defect repair.

Deliverables
In this phase the team produces the following deliverables:
- User Training
- Defect Repair

User Training: The code deployment in the production environment always goes hand in hand with formal user training and handover of the user manual. Production incidents raised during the initial few weeks post deployments are mostly because of a lack of user awareness. Our collective experience and incident root cause analysis always suggest proper user training to avoid unnecessary incidents. Whenever an incident is raised because of improper usage of the application, the project support team takes care of formal user training and resolves such incidents.

Defect Repair: A defect repair code fix may be warranted primarily because of two reasons:
- An undetected syntax error.
- A missing functionally against the agreed scope of the work.

Extrapolix quickly fixes any such bug brought to its notice within the time period mentioned in SLA. In some rare cases, based on the complexity of the incident we may quote a different time period. Once the ticket for such a bug is assigned to the project team they conduct a thorough review, implement the code change and test them as per the predefined process. The project team also checks for any other similar error which may not be detected or reported yet. Before delivering the code change a thorough system test is conducted in the pre-production test environment and user acceptance is carried out. All such code changes are done without any extra cost.

Exit Criteria

Unlike the rest of the project phases, the maintenance phase is a phase of iterative cycles. Every time a new incident arrives the process kicks off. Once the incident is resolved by user awareness or a defect repair the Incident is closed. The Business user who raised the incident updates the incident with close status.

Evolution Phase

The business application is developed as per the project scope approved by business at the very beginning. However change is inevitable, the business is always free to suggest enhancements or changes from time to time. A change request is a formal proposal to modify any deliverable. When issues are found while project work is being performed, change requests can be submitted, which may modify project or product scope, project cost or budget, project schedule, or quality of the project or product results. Other change requests cover the needed preventive or corrective actions to forestall negative impact later in the project. Any project stakeholder may request a change. Every CR is treated like a small project which goes through all the phases of our development process with a separate cost and schedule attach to it. We have a very robust change management process within our organisation that ensures the changes proposed by the business are well integrated into the business application without degenerating the core functionality and sanctity of the application.
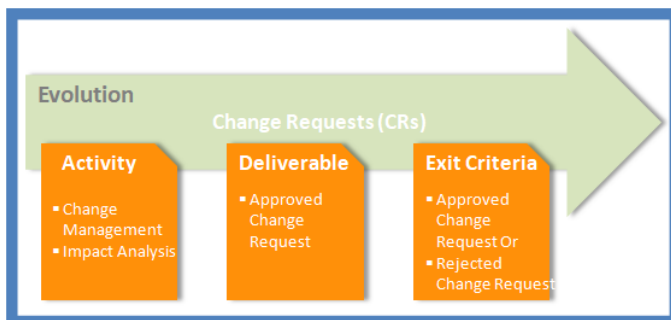
Change requests may include:
- **Corrective action**. An intentional activity that realigns the performance of the Business Application.
- **Preventive action.** An intentional activity that ensures the future performance of the Business Application is aligned.
- **Defect repair.** An intentional activity to modify a nonconforming Business Application or Business Application component.
- **Updates.** Changes to formally agreed Business Application Scope to reflect modified or additional ideas or content.

Activities
In this phase the team conducts the following activities:
- Change Management
- Impact Analysis

Change Management: During the project planning phase, a small plan component called a change management plan is prepared to formally authorise and incorporate the change requests throughout the project life cycle. The change management plan is mutually approved by both

business stakeholders and representatives of Extrapolix. Extrapolix facilitates change requests following the change management plan and formally nominates key stakeholders from the business and development team to a specially designated committee. The committee is responsible for reviewing, evaluating, approving, delaying, or rejecting changes to the project.

Impact Analysis: When we have an application running well for quite some time it won't be wise to disturb the functionality without sufficient reason. If random changes are implemented without much thought it may lead to disastrous results. So the change management committee may reassign the change requests for thorough impact analysis. Impact analysis is identifying the potential consequences of a change or estimating what needs to be modified to accomplish a change. The project team does a detailed study of business activities, dependencies, and infrastructure and submits its report to the change management committee. The committee may approve, delay or reject the change requests based on the impact analysis.

Deliverables
In this phase the team produces the following deliverables:
- Approved Change Request

Approved Change Request: Approved change requests are an output of the Change Management Process, and include those requests reviewed and approved for implementation by the change management committee. The approved change request may be a corrective action, a preventive action, or a defect repair. Approved change requests are scheduled and implemented by the project team and may impact the project life cycle.

Exit Criteria
Similar to the maintenance phase, the evolution phase is also a phase of iterative cycles. Every time a new Change Request arrives the process kicks off. Any particular Change Request may be presented in the Change Management Committee several times until all requirements are met. Once a duly completed Change Request is submitted it may either be "Approved" resulting in an Approved Change Request or Rejected. Those change requests which are "Rejected" are updated in the Change-Log with the current status without any further action.