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Software Development Life Cycle

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Document Overview:

The purpose of a Software Development Life Cycle methodology is to provide a documented description of how software is built by UIF. It describes the various phases of the development process and the activities performed by individuals during each phase. It is not meant to be a cookbook approach to software development, but a guide to the best practices and procedures used by UIF for various activities. As software development projects are executed, the SDLC serves as reference to determine which activities are needed for that particular project and provide detailed information on how to accomplish those activities; not every activity listed defined within the SDLC is required by every project. Furthermore, the SDLC provides access to the necessary templates and documented procedures associated with those activities.

The SDLC is comprised of eight major phases: Initiation, Planning, Functional Design, Technical Design, Construction, Integration and Testing, Functional Evaluation, Deployment, and Post Implementation. For each phase, this document provides a single page summary indicating objective, owner, entry criteria, participants and artifacts. Since the software development process is fluid, the order of events may not always be the same and certain components of a project may be in one phase while others are in a different phase.

It is important that the SDLC documentation focus on the relationship between activities and owners of the activities based upon role and functions instead of organizational structure. If the SDLC is tied closely to organizational structures within UIF, then it is susceptible to revisions whenever there are organizational changes. It is also common for participants in a project to perform a particular role for one project and a different role in another project. For example, a business analyst may perform the duties of an analyst and a project manager for one project and may serve as the customer in another. Therefore, it is important to make these roles general in nature and not a byproduct of the current UIF organizational structure. However, as organizational changes occur, the SDLC should be reviewed to ensure that the depiction of roles and descriptions of activities are still accurate. As the project charter and project plan are developed, a detailed assignment of resources will be done for the required activities using the SDLC documentation as an aid in determining the proper resources to assign to a task.

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Phase 1 – Initiation

Objective:

The purpose of the Initiation Phase is to develop proposals for potential projects, route the proposals through the proper review channels, and after review, if approved, schedule the projects based on priority and resource availability. Both ITG and internal UIF projects will pass through this phase, but will trigger different activities and key deliverables.

Owner:

Sponsor\Requestor

Entry Criteria:

A request can be initiated by Information Technology Governance (ITG) or a service request ticket.

Roles and Responsibilities:

- Sponsor – Clearly explain the value and purpose of the effort to include necessary and expected business benefits anticipated with the completion of the project using the Project Request form.

Artifacts:

- Project Request Form – See: *ITShared\SDLC\Business Case Template.pdf*

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Phase 2 – Planning

Objective:

The purpose of the Initiation Phase is to develop the Communication Plan, Project Plan and Project Charter to formalize project goals and deliverables, identify project participants and establish roles and responsibilities. The project team will review the Plans and Charter at the Kick-Off meeting to provide all participants with a shared understanding of project expectations.

Owner:

Enterprise Application Team

Entry Criteria:

The planning activity is initiated upon approval of the Project Request Form.

Roles and Responsibilities:

- Sponsor – The principle authority on matters regarding the expression of business needs, the interpretation of functional requirements language, and the mediation of issues regarding the priority, scope and domain of business requirement. Assist with attaining approval for the project charter.
- Enterprise Application Team - The person with the overall responsibility and authority for the day-to-day activities associated with a project and managing resources. Responsible for creating the charter, managing resources and supporting the sponsor.

Artifacts:

- Project Charter –See ITPM Charter Template. See: *ITShared\SDLC\UIF Enhancement ITG-055 Project Charter v1.0.docx.*
- Communication Management Plan. – See: *ITShared\SDLC\Project_Communication_Plan.doc.*
- Project Plan

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Phase 3 – Functional Design

Objective:

The objective of the Functional Design phase is to define in more detail the system inputs, processes, outputs and interfaces. At the end of this phase the systems processes will be defined at the functional level, meaning the functions to be performed will be known, but not necessarily how they will be performed.

Owner:

Business Analyst

Entry Criteria:

In order for Functional Design to begin, there must be an approved Project Charter. The roles and responsibilities for the various activities in the Development Life Cycle will be known.

Roles and Responsibilities:

- Enterprise Application Team - The primary responsibility of the Enterprise Application Team during Requirements Analysis is to ensure the Business Analyst(s) has access to the proper: Subject Matter Experts, Business Process documentation, existing technology and potential technological solutions as well as current and desired artifacts.
- Business Analyst - The BA must first develop a plan for how the functional design activity will be accomplished. The BA must then document the business process descriptions and collect the requirements of the system from the Subject Matter Experts (SME's) in a manner which allows traceability to documents generated in previous activities and creates a framework for future activities.
- Sponsor - The Sponsor\SME understands the current business processes and any new requirements that are to be satisfied by the project. They must work closely with the BA to transfer both stated and tacit knowledge for inclusion in the Functional Requirements Documents. Sign off on Specification document.

Artifacts:

- Functional Specification Document. See sample: *ITShared\SDLC\Specification Template.docx*.

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Phase 4 – Technical Design

Objective:

The objective of the Technical Design phase is to transform business requirements identified during previous phases, into a detailed system architecture which brings value to the organization. During this phase the code developed will go through an extensive review not only from unit testing but also from a peer review. The peer review will focus on Open Web Application Security Project (OWASP).

Owner:

Application Development

Entry Criteria:

The Technical Design phase begins once the Specification document used for Requirements Analysis have been approved.

Roles and Responsibilities:

- Sponsor - Sponsor project and signs off team effort; review strategy and artifacts. Final users of the system.
- Business Analyst - Provide requirements to the technical design team; review solution design and artifacts. Assist with identifying and finalizing testing strategy; review of the architecture and software components. Update the Requirements documentation as needed based on changes.
- Enterprise Application Team - Finalize data conversion strategy and test strategy; review solution design and artifacts.
- Developer - Assist in finalizing data conversion strategy; review of the architecture and software components. Design system architecture, software components, etc.; Design walk-through; Code Review
- IT Operations - Assist with architecture design and data conversion strategy.

Artifacts:

- Technical Design Document. For example see: *ITShared\SDLC\Technical Design Document sample.*
- Update Project plan.

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Phase 5 – Construction

Objective:

The objective of the Construction phase is to transform approved architecture and design into a working system that is consistent with functional and technical requirements identified during earlier phases of the solutions life cycle.

Owner:

Application Development

Entry Criteria:

You may proceed with the solutions construction work if the Technical Design document from the Design phase has been approved along with updated work schedule.

Roles and Responsibilities:

- Enterprise Application Team - Resolve resource, scheduling, budget issues; review and report progress.
- Developer – Develop the requested solution from the approved design; produce artifacts and put them under configuration control and perform change control; employ tools, systems and conform to prescribed standards (platforms, coding practices, and programming languages) that are in line with the organization's objectives.
- IT Operations - Assist with implementing the solution design and data conversion strategy.
- Business Analyst – BA will create test cases and update the Requirements documentation as needed based on changes.

Artifacts:

- Test Cases – See: *ITShared\SDLC\Test Case*

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Phase 6 – Integration and Testing

Objective:

The objective of the Integration and Testing phase is to perform system integration testing of the developed system. The systems integration test function is to ensure that the developed systems meet all the technical requirements with the components and subsystems integrated.

Owner:

Business Analyst

Entry Criteria:

Before entering the Integration and Test Phase, the entire system must be ready for assembly and subsequent integration testing. This means all software and hardware configuration item components have been constructed and successfully tested. In addition all test cases must be created and unit testing by Application Development has been completed.

Roles and Responsibilities:

- Enterprise Application Team - Resolve resource, scheduling, budget issues; review and report progress. Assist with analysis of test results.
- Developer - Assist with building tests and analysis of test results. Troubleshooting and fixing.
- IT Operations - Assist with integration of the solution design and data conversion tests.
- Business Analyst – Complete testing based on approved test cases and update the Requirements documentation as needed based on changes.

Artifacts:

- Defect List
- Updated Functional Specification document.
- Change Request

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Phase 7 – Functional Evaluation

Objective:

The objective of the Functional Evaluation phase is to assess the solutions conformance to functional requirements identified in the Functional Specification Document from the Requirements Analysis phase.

Owner:

Enterprise Application Team

Entry Criteria:

The Functional Evaluation phase may begin once all defects have been identified.

Roles and Responsibilities:

- Tester - Stakeholders, solution delivery team members, neutral third parties, or automated tools may fill this role. User Acceptance Testers will develop their own scenarios and utilize the BA's testing scripts and document their results.
- Enterprise Application Team - Resolve resource, scheduling, budget issues.
- Sponsor - Sponsor and signs off team effort; review progress with the developers and the PM. Responsible for final approval for solution.
- Training – Develop training related materials.

Artifacts:

- User Acceptance Test Cases
- User Acceptance Test Results
- Testing sign-off – For example see: *ITShared\SDLC\test_analysis-approval*.
- Training documentation.

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Phase 8 – Implementation

Objective:

The objective of the Implementation phase is: first to install the system in the production environment and to bring it into operation; and second, to ensure that the system, as developed, satisfies all functional requirements and business needs.

Owner:

Enterprise Application Team

Entry Criteria:

Successfully completed system, integration and user acceptance and have been signed off from the business, technical and management stakeholders. The training documentation from Functional Evaluation phase has been delivered.

Roles and Responsibilities:

- Enterprise Application Team - Enterprise Application Team – Ensures the project as developed satisfies the Customers initial request.
- Business Analyst – Perform production readiness testing and security configuration to support implementation into production. Update the Requirements documentation as needed based on changes.
- IT Operations – Deploy functionality to production.
- Release Manager – Schedule and facilitate deployment to production.

Artifacts:

- Deployment Plan: See ITShared\SDLC\TED Release Deployment Plan Sample.docx
- User Notification or Release Notes: See ITShared\SDLC\Release-Note-Template.

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Phase 9 – Post Implementation

Objective:

The objective of the Post Implementation phase is to successfully transfer maintenance responsibility of the solution. This information will facilitate configuration, administration, and troubleshooting of common issues.

Owner:

Enterprise Application Team

Entry Criteria:

Successful deployment of project deliverables to production.

Roles and Responsibilities.

- Business Analyst – Updates Specification document. Update the Requirements documentation as needed based on changes.
- Enterprise Application Team - Facilitates the survey and release resources. Ensures that all documents are gathered and archived to the proper locations.

Artifacts:

- User Survey

Artifact List

- **Project Request Form** (*Initiation Phase*) – Information required to start, modify or decommission services.
- **Project Charter** (*Planning Phase*) – The basis of a contract for the start of an effort. It formally authorizes work to begin on the project and links the project to ongoing work in the organization.
- **Communication Management Plan** (*Planning Phase*) **–** Defines the processes required to ensure timely and appropriate generation, collection, distribution, storage, retrieval, and dispositions of project information to the Project team, Stakeholders, Project Sponsor and Executive Sponsor.
- **Project Plan** (*Planning Phase*) – Details how the project will be executed, monitored, controlled and closed. It expands on the work done in the Project Charter.
- **Functional Specification Document** (*Requirements Phase*) – A formal statement of an application's functional requirements. The FRD is used for designing and developing the application system, evaluating the product in all subsequent phases of the life cycle and determining the success of the project.
- **Technical Design Document** (*Design Phase*) – Describes the system requirements, operating environment, system and subsystem architecture, files and database design, input formats, output layouts, human-machine interfaces, detailed design, processing logic and external interfaces.
- **Test Cases** (*Construction Phase*) – Set of conditions or variables under which a tester will determine whether a system under test satisfies requirements or works correctly.
- **Defect List** (Integration and Testing Phase) – Displays defects which does not meet software or system requirements or end user expectations.
- **User Acceptance Test Cases** (*Functional Evaluation Phase*) – Testing performed by the client to certify the system with respect to the requirements that was agreed upon.
- **User Acceptance Test Results** (*Functional Evaluation Phase*) - The output from conducting tests to create the pre-defined acceptance reports and queries.
- **Testing Sign-Off** – (*Functional Evaluation Phase*) - Serves as the user's recommendation for fielding the software release or migration to production.

- **Training Documentation** (*Functional Evaluation Phase*) – Contains all essential information for the user to make full use of the system. Includes a description of the system functions and capabilities and step-by-step procedures for system access and use.

Artifact List

- **Deployment Plan** (*Implementation Phase*) - Describes how the system will be deployed, installed and transitioned into an operational system. The plan contains an overview of the system, a brief description of the major tasks involved in the implementation, the overall resources needed to support the deployment effort and any site-specific deployment requirements.
- **User Notification\Release Notes** (*Implementation Phase*) – Should provide an overview of the entire document. It should include the disclaimer of warranty, purpose, scope, definitions, acronyms, abbreviations, references and overview of the Release Notes.
- **User Survey** – (*Post Implementation Phase*) - The purpose of the User Survey is to capture feedback about the conduct of the results achieved by the project, in order to evaluate the effectiveness of processes, procedures, management and governance techniques and delivery.

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