

UDC Software Development Life Cycle

Document Number:	
Effective Date:	3/3/2011
Revision Date:	
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Table of Contents

1	Overview	3
2	Scope of this Document	3
3	Definitions	4
4	Tools	5
4.1	SharePoint	5
5	Projects Managed Through the SDLC Process	5
6	Prototyping	6
7	Job Titles, Roles, and Conflicts of Interest	7
8	The Full SDLC	7
9	Phase 1: Horizon	9
9.1	Process Step: Concept Proposal	9
10	Phase 2: Plan	10
10.1	Process Step: Vision & Scope / Functional Specification	10
10.2	Process Step: Project Plan	11
10.3	Process Step: Review Functional Specs	11
10.4	Process Step: Design	12
10.5	Process Step: Technical Specification	13
10.6	Process Step: Training Plan	13
10.7	Process Step: Functional & Structural Test Plans	14
10.8	Process Step: Impact, Capacity & Monitoring Plans	14
10.9	Process Step: Release Plan	15
10.10	Process Step: Review Plans	15
11	Phase 3: Develop	17
11.1	Process Step: Write Code	17
11.2	Process Step: Unit Test	17
11.3	Process Step: Collect Unit Testing Results	18
11.4	Process Step: Incremental Review	18
12	Phase 4: QA	18
12.1	Process Step: Code Review	19
12.2	Process Step: Build	19
12.3	Process Step: Release to Development	20

12.4	Process Step: Release to QA	20
12.5	Process Step: Execute Test Plans	20
12.6	Process Step: Training Doc	21
12.7	Process Step: User Acceptance and Training	21
13	Phase: Deploy	23
13.1	Process Step: Release Approval	23
13.2	Process Step: Release to Production	23
13.3	Process Step: Confirm	23
13.4	Process Step: Project Metrics	24
14	Rapid SDLC Patterns	25
14.1	SDLC for Content Modifications and Tasks	25
14.2	SDLC for Production Data Change	28
14.3	SDLC for Release Management Wrapper	28
14.4	SDLC for Research	29
15	Other Process Patterns	31
15.1	Process Pattern for Account Changes	31
	Appendix A: SharePoint Alignment with the SDLC	32
1	SDLC Notes in SharePoint	32
1.1	Automated Notes	32
1.2	Manually Entered Notes	32
2	Project Status in SharePoint	35
	Appendix B: Roles and Responsibilities Throughout the SDLC	37
	Appendix C: Documents Used Throughout the SDLC	41

Overview

A formal Software Development Life Cycle (SDLC) will provide the following benefits:

- Traceable progress toward completion of projects for audit compliance
- Shared methodology across the Information Systems team for identifying, designing, assuring quality, and deploying technology projects
- Explicit and shared knowledge of a project's progress toward completion using common and well-defined language
- Reduction of the risk of project failure because risk factors are identified prior to code being written:
 - technical and management issues
 - realistic expectations of what the project will and will not accomplish are set
 - resource needs and availability
 - integration with multiple systems
- Documentation through all phases of the life cycle

While the SDLC will initially require extra work, once committed to practice, the technology team will enjoy a more efficient process and a higher rate of success.

Scope of this Document

This document describes elements of UDC's SDLC. It defines core terms, describes how the SDLC process integrates with SharePoint as its tracking tool, and walks through a detailed narrative that all projects follow. The document also covers topics related to Projects Managed through the SDLC Process; Prototyping; and, Job Titles, Roles, and Conflicts of Interest.

The full process flow is designed to contain a finite number of "atomic" or self-contained process steps that flow in a coherent manner. This design should allow for the removal of process steps in a manner that could itself result in a coherent flow. In fact, after the full process is described, some rapid development patterns are identified that allow for speedier completion of tasks like web site content modifications and other small tasks.

This document does not dictate the structures of the various components of the Information Systems teams (Architecture, Infrastructure, Services, etc.). Rather it attempts to describe process steps in terms of staff acting in specific Roles for completing each process step.

This document refers to several additional documents that are integral to successful completion of the SDLC process flow. However, this SDLC document does not describe those documents in full detail. In some cases, templates for these documents still need to be developed.

This document presupposes that End Users in the business initiate the SDLC process by making a request to Information Systems; however, this document does not limit the manner in which such requests are initially recorded and reacted to. In addition, it's encouraged that members of the Information Systems team ought to themselves propose projects, though a true project Sponsor in the organization must be identified prior to project initiation.

This document does not address prioritization of projects. Rather, ongoing prioritization is something addressed in meetings between Business Analysts and members of the Business itself. Should competition remain unresolved, the chain of escalation is through the Director of the Program Management Office, up to the Chief Information Officer, then ultimately to the Chief Executive Officer.

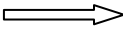
Additional items that are outside the scope of this document include:

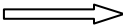
- Hardware testing performed by the IT Operations team.
- Configuration management by the IT Operations team.
- A dependency map of which applications rely on other applications and servers.
- Architecture and software development coding standards.
- Project Management process.
- Bug tracking and resolution process.

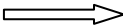
Definitions

Roles	A Role identifies who is responsible for tracking, completing, or documenting a process step in the SDLC. Other responsibilities for individuals placed in these roles are documented in the various Technology teams' operational manuals.
Process	A repetitive and organized sequence of steps performed by more than one human participant.
Process Step	A Process Step is a specific set of actions to produce a quantifiable result.
Activities	Activities are work actions to be performed during a process step.
Milestones	Milestones are indicators that a significant point in the life cycle has been achieved. Additionally, milestones may reflect completion of a process step. Some milestones indicate the failure of a process step. In these cases, the project will return to some previous step in the SDLC, or else a Technology Manager may elect to stop the project altogether.
Approvals	Approvals Indicate that a Process Step is completed successfully, approved by an individual acting in an appropriate Role, and the project can then proceed through subsequent steps in the SDLC.
Deliverables	Deliverables are various artifacts, like documents and code, which are collected throughout the SDLC. All project documentation is attached to SharePoint under the Documents tab for each project.
AUDIT	The abbreviations "AUDIT" used throughout this document is short for Audit. Documentation detailing Audit requirements can be found in the Technology Services Operations Manual.
Project	A project is a non-repetitive activity that has a well-defined beginning and end, a clear set of deliverables, involves the utilization of a significant amount of resources (people and/or capital), and typically lasts more than 1 week.

For the purposes of UDC, the following database/environments correspond with environments mentioned here:

BILD  Development

BPRD  OA

PROD  Production

Tools

SharePoint

The SDLC will be tracked through SharePoint for all applications projects, hosted at <http://sharepoint.udc.edu/Banner/default.aspx>. This document only describes how the SDLC is tracked in SharePoint. More detail on formalized use of SharePoint will be supplied in a separate document.

Recording SDLC Notes in SharePoint

For each Approval or Milestone action within the SDLC that is entered into SharePoint, it is very important to note a specific comment related to that action. Auditors review the SDLC, Notes, Documents, History, Contacts, and Display areas of random projects to determine the level to which Technology is AUDIT compliant. Therefore, all entries in SharePoint require explicit and precise language because the ultimate audience is the Auditor, and the Auditor is guided only by what is entered for each project. The Auditor cannot rely upon verbal narratives or interviews with Technology staff to make a determination of compliance on a project-by-project basis.

Examples of Explicit Comments:

Action	Comment
AUDIT Workflow Not Needed	Uses Banner as supported interface for changing a student's status to fix the problem.
Approval: Functional Specification	I approve the specification as articulated in the project Description
Approval: Functional Specification	I approve the specification as articulated in Notes
Approval: Functional Specification	I approve the specification as articulated in the Document titled <i>DocumentName.doc</i> .
Milestone: Change Request	Project suspended to allow re-write of Functional Specification.
Milestone: Failed Quality Assurance	See defect report under Documents.

SharePoint Reviews

Technology Management will also conduct periodic reviews of the Approvals and Milestones in order to:

- Proactively determine AUDIT compliance
- Compile project delivery metrics
- Assess training needs in the event of project problems or failures during the Quality Assurance and User Acceptance process steps.

Projects Managed Through the SDLC Process

The SDLC process is in part adopted as a means for controlling changes to systems and data.

In some cases the SDLC process is not followed. Whenever this occurs, the Technology Manager must add the AUDIT Workflow Not Needed action in the SDLC Notes and include a specific comment justifying this designation.

The SDLC process **is not followed** whenever:

- Any interaction with systems and/or data occurs through a supported application interface. Supported application interfaces are those interfaces that End Users can interact with directly, and that do not require the intervention of Information Systems team members. Supported application interfaces are most often graphical in nature, and deployed on an End User's desktop machine. Banner INB/SSB, Luminis, Workflow as well as Blackboard are all examples of these interfaces. Supported application interfaces are those applications that have already been adopted by the organization and have been historically demonstrated to reliably allow End User interaction with systems and/or data.

or

- The application being modified is not a member of the list below.

The SDLC process **must be followed** whenever one or more of the following occurs:

- change will be introduced into systems, data, and/or supported application interfaces because a Developer is delivering a coded solution for any of the following applications (see Application Description Worksheets for more specific information, including locations of Development, QA, and Production environments):
 - Banner
 - eCollege
 - Blackboard
 - Workflow
 - Luminis
 - Evisions
 - BDMS
- change will be introduced into systems and/or data due to the scheduling of new automated jobs or changes in the schedule of existing automated jobs
- a new application is being produced
- a new Banner Product, Module is being implemented (e.g. Banner Accounts Receivable, or Grants Modules for Banner Finance)
- A new system Interface is needed.
- Upgrades to any systems listed above.

Prototyping

The SDLC process is in part adopted as a means for controlling changes to project scope after the Sponsor has understood and authorized the utilization of Information Systems team resources. It is also in part adopted to control costs associated with the full development of the business solution. As such, the SDLC process may employ the use of prototyping:

- in the Vision and Scope phase as a means for determining the overall feasibility of initiating a project.
- in the Conceptual Solutions, Functional Specification or Design phases as a means for better isolating one particular programming approach over another. Such comparison can be made to help identify project risks and costs based upon difficulty of implementation. Such risks can then be mitigated early in the SDLC process.

Prototyping is, at its core, a means for gathering information by simulating the production environment. It is most often used when it is costly to follow a person's activities in the normal work environment. Prototyping is often used in conjunction with other tools (a camera to monitor end user activity or a program to monitor keystrokes and mouse clicks) to collect empirical data rather than interview-based responses from users.

Prototyping can be costly, so a viable alternative is to use a low-fidelity representation for a project, such as wireframes of a proposed user interface.

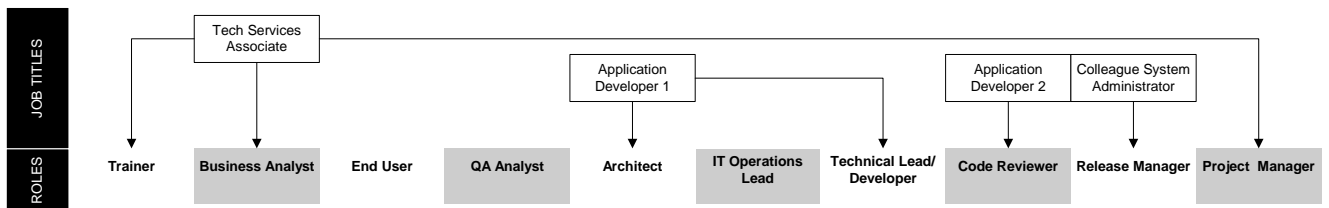
In the context of this SDLC, prototyping is a means for early Developer involvement in a project that helps identify potential solutions at reasonable cost. Keep in mind, however, that prior to the End User authorizing the Functional Specification, project scope can change. Therefore, prototyping at too early a stage and over too long a duration introduces uncontrolled cost into the project definition process, so prototyping ought to be used judiciously.

Finally, Prototyping in this SDLC context should not be confused with a completely different type of SDLC. Some Information Systems shops follow a rapid application development pattern centered on Prototyping. This pattern engages Developer, End User, and Business Analyst in an iterative solution refinement process that ultimately spirals to project completion while rapidly reacting to changes in project scope based upon direct user feedback. The UDC SDLC does not support this alternate pattern.

Job Titles, Roles, and Conflicts of Interest

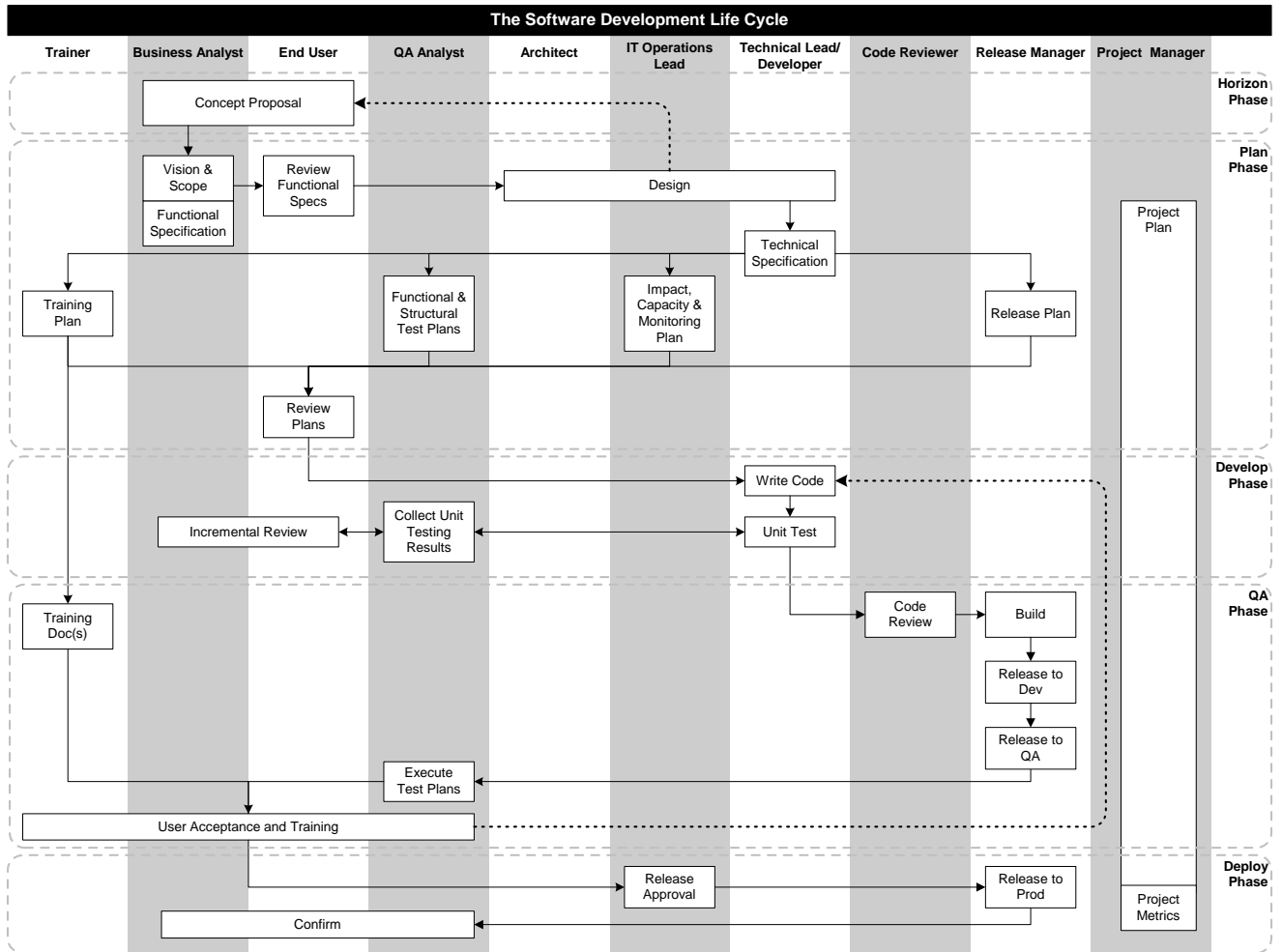
The reader should understand this document makes a clear distinction between Job Titles and Roles. As the example below demonstrates, a staff person holding the Tech Services Associate job title can act in the roles of Trainer, Business Analyst, and Project Manager on the same project. An Application Developer can engage in the roles of Technical Lead and Developer at the same time. However, a conflict of interest is present if the same Application Developer also performs his or her own code review. Therefore, some other individual on the Information Systems team must do the Code Review process step.

As a general rule of thumb, a Conflict of Interests is present whenever one individual acts as both the author and the approver of any one Deliverable for a given project, be it Documentation or Code.



The Full SDLC

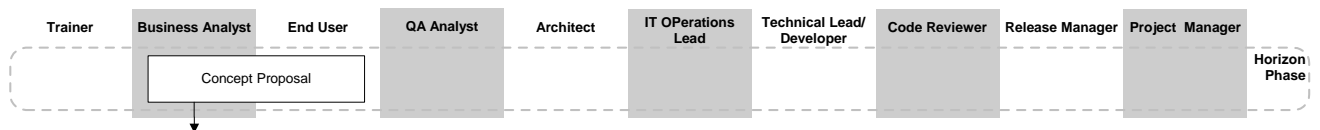
The following image displays the full SDLC process, with roles and phases.



Phase 1: Horizon

The Horizon phase identifies a need or opportunity within a business unit or OIT. The Horizon phase is initiated by a senior business stakeholder or from Technology leadership. Activities include:

- Preliminary feasibility analysis
- High-level requirements capture
- Business alignment
- Identification and assignment of planning resources
- Identification of Business Sponsor and Technology Manager



Process Step: Concept Proposal

During this step the Business Analyst captures the Sponsor's high-level requirements, vision of the solution, scope and limitations of the project, and the business context in which the finished project will operate.

Activities

- The Technology Manager enters the project into SharePoint. The following fields are filled out:
 - Project status is entered in SharePoint as Horizon
- Technology leadership identifies the Project Manager, and the Business Analyst enters the Project Manager under the Contacts tab for the project.
- The Business Analyst writes the Concept Proposal document:
 - Works with the Stakeholder(s) and Project Manager as required
 - May consult with the Developers as needed.

Deliverables

- Concept Proposal (Business Analyst)
- Prototype (optional) (Developer)

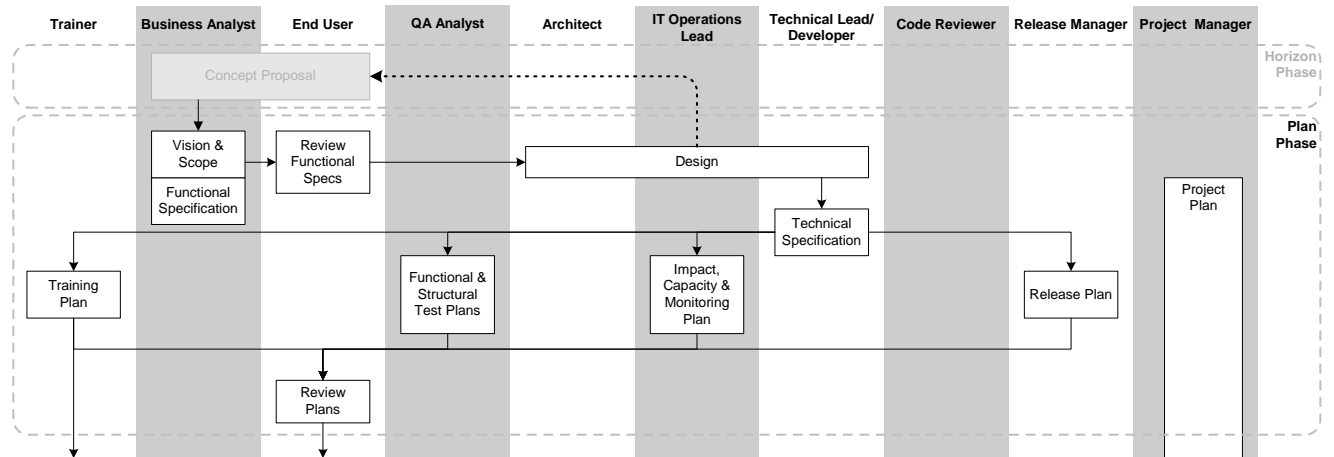
Approvals

- Business Analyst adds the Approval : Project Initiation action in the SDLC Notes for SharePoint item.
- Sponsor adds the Approval : Concept Proposal action in the SDLC Notes.

Phase 2: Plan

The Plan phase comprehensively identifies the details of the project. Activities include:

- Estimate Resources, Budget and ROI. Obtain Executive approval if necessary
- Define deliverables, project dependencies, and development milestones.
- Sign-off: Requirements definition, deliverables list, milestones and end-user resource commitment



Process Step: Vision & Scope / Functional Specification

Using the Concept Proposal document as a guide, the Business Analyst creates a Vision and Scope document and Functional Specification document. (Note: on projects of smaller size or duration, the Technology Manager will not require a Vision and Scope document.) Whenever required, creation of the Vision and Scope document is a highly collaborative effort between Business Analyst and project Sponsor. Although there is no explicit approval required, the Business Analyst must obtain sufficient buy-in during the creation of the Vision and Scope before proceeding to the Functional Specification. (Approval for Vision and Scope is implied in 10.3 Process Step: Review Functional Specs where the Sponsor approves the Functional Specification.)

The Functional Specification document focuses on the business needs and targets Trainer, End User, QA, and Developer as the audience. Sponsor approval of the Functional Specification forms a contract for project scope, and allows the team to begin work on other planning documents.

Activities

- Business Analyst changes project status in SharePoint to Planning.
 - Business Analyst enters Project Manager into SharePoint.
- The Business Analyst writes the Vision and Scope (including resource identification of people and dollars) and/or Functional Specification.
 - Works with the stakeholder(s), Technical Lead (if required) and Project Manager (if required)
- The Project Manager begins tracking the project
 - An initial Project Plan document may be uploaded into SharePoint.
- The Project Manager identifies personnel who will be needed to complete the project. At a minimum, the End User, Sponsor, QA Analyst and Trainer must be identified.
- The exercise of creating the Vision and Scope and/or Functional Specification allows the Business Analyst to clearly identify the SDLC Design Pattern for the project, and could also allow an articulation of whether or

not AUDIT Workflow is required for the project. The Business Analyst therefore makes the following changes in SharePoint:

- (Optional) AUDIT compliance review status is identified if it is known at this time.
 - If AUDIT is not required: the Technology Manager adds the AUDIT Workflow Not Needed action to the release notes, and provides a detailed comment justifying this designation.
- (Required) SDLC Design pattern is identified (either full project lifecycle, or one of the rapid SDLCs)

Deliverables

- Vision and Scope (optional) (Business Analyst)
- Functional Specification (Business Analyst)
- Prototype (optional) (Developer)

Process Step: Project Plan

Creating a Project Plan begins by identifying the project's work breakdown structure (WBS), which divides the project work into manageable tasks and logically orders them to ensure a smooth evolution between tasks. Specific milestones are then identified in the WBS, the number of which depends on the size of the project. Milestones serve to signify key events and to draw management attention to them. Once the WBS is defined, resources are assigned to each element of work. Then, an estimate of the time required for each item to be completed is supplied. This plan then becomes the schedule, which is adjusted through the life of the project as required, and which is used to track progress. Project Plan tracking and maintenance is an activity which continues through the remaining phases of the project. A core responsibility for the Project Manager, therefore, includes continual collaboration with the Release Management team in order to accurately represent project delivery dates within the Release Calendar.

Activities

- The Project Manager collaborates with the Business Analyst, Technical Lead, and Developers to produce the WBS.
- The Project Manager collaborates with the Business Analyst to identify development milestones.
- The Project Manager collaborates with the Business Analyst to assign resources to work elements.
- The Developers supply estimates of the time required for each work element.
- As work is completed, Developers report their completed work to the Project Manager, and supply estimates on how much more time will be needed to complete an unfinished task in order that the Project Manager may adjust the plan accordingly.
- The Project Manager communicates with all team members on the project in order to adjust the project plan through the project lifecycle as required.

Deliverable

- Project Plan (Project Manager)

Process Step: Review Functional Specs

The Sponsor and Business Analyst review and agree to the content of the Functional Specification prior to any additional planning effort. **Hereafter, changes identified in scope require review and potential rewrite of these foundational documents, or amendment to scope in a separate Change Request document.**

Approval

- The Sponsor notes the approval in SharePoint SDLC Notes as Approval : Functional Specification.

Process Step: Design

The Design Step identifies how the project deliverable will exist within the business. This is a highly collaborative step that brings together team members acting in Architect, IT Operations Lead, and Technical Lead/Developer roles. Moreover, different Technology teams will contribute a variable amount of resources depending on the size of the project.

It's important to note that Design activities can conclude by gathering evidence that it may be too costly (either in dollars, man-hours, or impact to systems) to honor the Sponsor's request. In these situations, individuals engaged in the Design process can recommend that the Sponsor be informed, and that the project itself return to the Concept Proposal phase.

During this step, the **Design Worksheet** is completed to identify development and production environments and their configuration, system interdependencies, infrastructure requirements, architecture best practices, and other specifics. All new systems require that an initial and complete Design Worksheet be created. Existing systems, however, will already have Design Worksheets available. Most enhancements or small projects on existing systems need only refer to the existing Design Worksheet. Where changes are made to existing systems, an abbreviated Design Worksheet will be attached to the original worksheet as an addendum, listing only items that are different and relevant to the new project.

Activities

For larger initiatives:

- The Technical Lead and Architect review the Functional Specification and are informed by additional context contained in the Vision and Scope and/or Concept Proposal documents. The Technical Lead/Architect identifies existing systems or proposes new systems, code, best practices, factories, or other assets that will fulfill the business requirements stated in the Functional Specification. The supporting Infrastructure dependencies and requirements are specified and additional risks and proposals for mitigation are identified. This information is summarized in the Design Worksheet.
- The Technical Lead submits the Design Worksheet for Architecture team review to determine conformance to Architecture Group principles.
- The Architect includes a recommendation to either *Build or Buy* based on Design Worksheet, Vision & Scope, and Function Specification document data.
- The Architect may provide multiple potential solutions to consider, with high level costs vs. risk analysis
- The Project Manager continues refining the Project Plan and associated timelines as the Technical Lead locks down effort associated with programming tasks.
- The Project Manager supplies all planning documents, including those related to design, to the Infrastructure Group so they will be informed of system requirements and can confirm the envisioned design requirements.
- The Infrastructure Lead devises a Capacity and Monitoring Plan for the system and identifies metrics.
- The Infrastructure Lead identifies Server, Network, and Security impacts.

Smaller-sized initiatives presumably require less attention from Architecture and Infrastructure teams, leaving the Services team in a nearly or completely self-sufficient mode until QA and deployment is required. For medium to smaller initiatives:

- The Developer reviews the Functional Specification and is informed by additional context contained in the Vision and Scope document, and the Conceptual Design document. The Architect/Developer proposes a solution(s) that is summarized in the Design Worksheet.
- The Developer submits the Design Worksheet to the Development Manager for the project. An Architect from the Architecture team may optionally be consulted.
- The Project Manager continues refining the Project Plan and associated timelines as the Developer locks down effort associated with programming tasks.
- The Project Manager may optionally request assistance from the Infrastructure team in order to help determine application location and deployment assistance.

Deliverables

- Conceptual Design Document (Technical Lead/Architect)
- Design Worksheet (Technical Lead/Architect or Developer)
- Solution recommendation (Technical Lead/Architect)
- Prototype (optional) (Developer)

Approval

- Depending upon project size, the Technical Lead, Architect or Development Manager enters Approval : Design Worksheet into the SDLC Notes in SharePoint upon review and acceptance of the Design Worksheet.

Process Step: Technical Specification

The Technical Specification is a document required for large or complex projects; it supplies the technical details to support the broad requirements identified in the Design Worksheet document.

Activities

- The Technical Lead documents results of the Design process in a Technical Specification document that includes detail defining the programming tasks, resources and time, risks and mitigation, system design, supporting infrastructure requirements, database and other system dependencies, etc. This is a living document that will last through delivery. This is to include future development artifacts unknown at this stage.
- The Project Manager documents all programming tasks and time estimates for completion of each task in the Project Plan.

Deliverables

- Technical Specification (Technical Lead)

Approvals:

- Depending upon project size, the Technical Lead, Architect or Development Manager enters Approval : Technical Specification action in the Release Notes.

Process Step: Training Plan

The Trainer uses the Functional Specification as the guide for creating a Training Plan document.

Activities

- Trainer writes the training plan and uploads the document into SharePoint.

Deliverables

- Training Plan (Trainer).

Approvals

- Business Analyst approves the training plan.

Process Step: Functional & Structural Test Plans

The QA Analyst uses the Functional Specification as a guide for creating the Functional Test Plan. In addition, informed by the Technical Specification and the inner workings of the technical solution, the QA Analyst designs a test plan for measuring performance characteristics of the solution.

Activities

- QA Analyst writes the Functional Test Plan and uploads the document into SharePoint.
- The QA Analyst writes the Structural Test Plan and uploads the document into SharePoint.
- The Project Manager updates the project plan with QA tasks and associated time estimates for executing the Functional and Structural test plans

Deliverables

- Functional Test Plan (QA Analyst).
- Structural Test Plan (QA Analyst)

Approvals

- QA Manager approves Functional and Structural Test Plans.

Process Step: Impact, Capacity & Monitoring Plans

Infrastructure is responsible for determining impact to servers, networks, and security. In addition, Infrastructure is engaged to insure that appropriate capacity planning and monitoring will be in place upon delivery of the solution.

Deliverables

- Backup Plan (if needed) (IT Operations Lead)
- Server, Network, Storage, and Security report (IT Lead)
- Capacity Plan (IT Operations Lead)
- Monitoring Plan (IT Operations Lead)

Approvals

- IT Manager approves all planning documents

- IT Manager notifies Architecture.

Process Step: Release Plan

The Release Manager uses the Functional Specification as a guide for creating an initial draft of the Release Plan.

Activities

- Release Manager writes a draft of the Release Plan and uploads the document into SharePoint.

Deliverables

- Release Plan (Release Manager).

Process Step: Review Plans

The Technology Manager reviews and insures that the various foundational documents and planning documents are in order and ought to result in the desired project outcomes. The Technology Manager then authorizes the Business Analyst to engage the Sponsor and reviews the Functional Specification, Training Plans, and Functional Test Plan documents.

Activities

- At the beginning of this step, the Business Analyst changes the project status in SharePoint to Spec / Approval .
- The project Sponsor reviews the Functional Specification, Training Plan, and Functional Test plan
 - If the planning documents are not approved:
 - If the Sponsor still wants the project to progress: then the Business Analyst corrects any deficiencies in the Functional Specification, and allows the Trainer and QA Analyst to make changes to their foundation documents as well, until the Sponsor approves. No notation is made in SharePoint as the planning documents are being modified.
 - If the Sponsor chooses not to re-engage Information Systems in the project, then the Business Analyst marks the project status on SharePoint as Suspended or Cancel l ed (as directed).
- The Technology Manager and Development Manager review all deliverables and determine if the project is ready to move to the Develop Phase.

Approvals

- The project Sponsor approves the Functional Specification, Training Plan, and Functional Test plan
- The Sponsor notes the approval in SharePoint SDLC Notes as Approval : User Acceptance (Pl anni ng).
- The Technology Manager enters Approval : Proceed to Devel op Phase in SharePoint. **Changes made after this approval can be tremendously expensive, and the articulation of any change must be formally included in a Change Request document.**

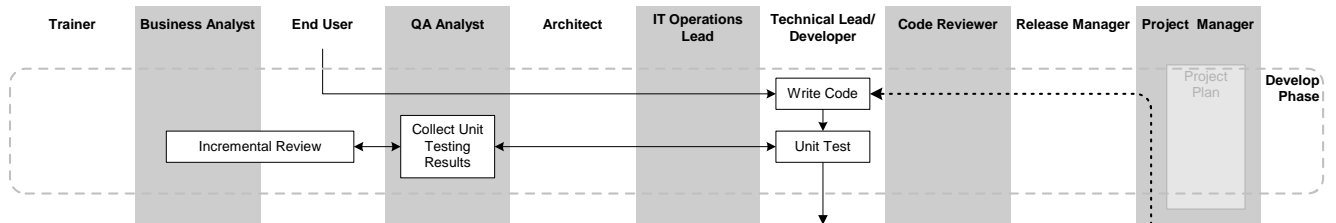
Milestones

- By the end of this step, the Business Analyst changes the project status to:
 - Execut i on, if the Sponsor and Technology Manager indicate that the project will proceed.

- Suspended, if the Sponsor or Technology Manager indicate the project needs re-definition or change.
- Cancelled, if the Sponsor indicates the project is no longer needed.

Phase 3: Develop

Development is characterized by the engagement of Developers for coding the solution based upon details provided in the Functional and Technical Specifications. The QA Analyst collects the results of Developers unit testing in order to adjust functional and structural test plans as the solution is being coded. The Project Manager manages changes to timelines and tasks in the Project Plan based upon the daily progress made by the Developers. For large projects, The Business Analyst and End User will conduct incremental reviews as development occurs to ensure that the requirements are being correctly implemented, and to confirm the vision of the End User.



Process Step: Write Code

Developers engage in writing code in order to solve the identified business needs. The Technical Lead then hands off unit tests for QA

Activities

- If, prior to this process step, the AUDIT Compliance requirement was not known, then it must be articulated before this step can proceed. The Business Analyst therefore makes the following changes in SharePoint:
 - (Required) AUDIT compliance review status is identified.
 - If AUDIT is not required: the Technology Manager adds the AUDIT Workflow Not Needed action to the release notes, and provides a detailed comment justifying this designation
- The Business Analyst updates the project status as Execution.
- Developers write code
- Project Manager updates the schedule as communicated by the Technical Lead

Deliverables

- Code (Developers)

Process Step: Unit Test

Developers perform unit tests of their code as solutions and/or components of solutions are completed.

Activities

- Developers perform units tests on code and document results
- QA Analysts review unit test results and update functional and structural test plans as appropriate.

Deliverables

- Packaged Code Release (Developer)
- Code Review Instructions (Developer)
- Code Promotion Instructions, if required (Developer)
- Supplemental Testing Instructions (Developer)
- Supplemental Training Instructions, if required (Developer)

Process Step: Collect Unit Testing Results

QA Analysts collect unit-testing results and update functional and structural test plans as appropriate. The type of information passed from the Developer to the QA Analyst should not include specific data that might bias the orientation of the QA Analyst and affect the validity of quality assurance.

Activities

- QA Analysts review unit test results and update functional and structural test plans as appropriate.

Deliverables

- Updated Functional Test Plan (QA Analyst)
- Updated Structural Test Plan (QA Analyst)

Process Step: Incremental Review

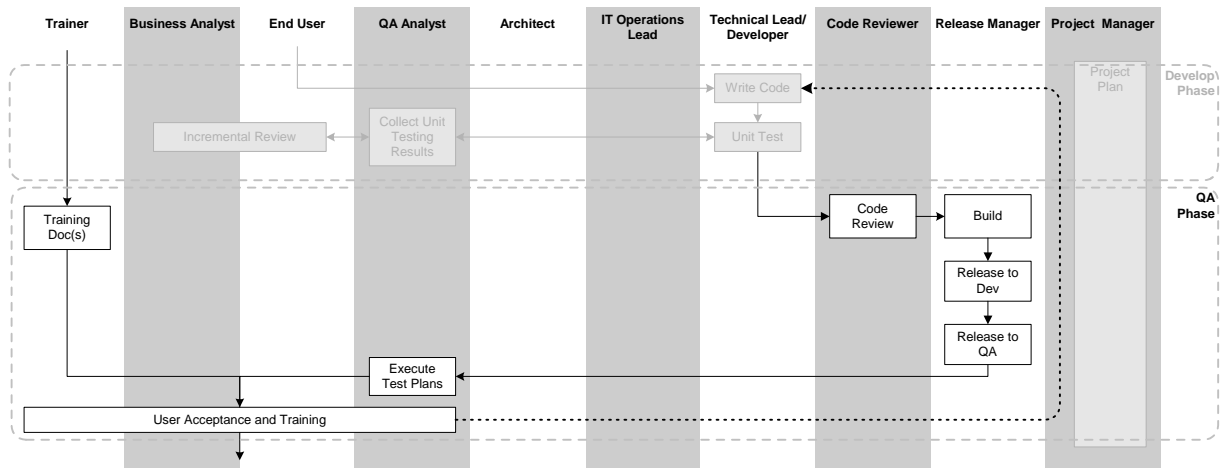
For very large projects it may be appropriate to give the End User the opportunity to approve development incrementally to be sure work is aligned with specifications. Additionally, end users may require standalone functional elements of the system, complete with the front-end user interface (UI) and dummy data, in order to confirm the UI flows as envisioned.

Activities

- Business Analyst communicates with End User and controls expectations throughout the incremental review.
- End User reviews and approves development.
- Trainer may attend for better understanding.

Phase 4: QA

Code Reviewer, Release Manager, QA Analyst, Trainer, and End User participate in assuring that the solution provided meets expectations from a functional perspective as well as from an overarching systems stability perspective.



Process Step: Code Review

The Code review process maintains consistency, best practices, and assists in early detection of code that may have an adverse effect on existing and ancillary applications. Project code review is a proactive way to fix bugs, and defects early in a software product development cycle.

The person performing the code review role cannot be the same person who developed the code.

Activities

- At the beginning of this phase, the Business Analyst marks the project Status in SharePoint as Waiting for Code Review.
- The Code Reviewer examines for defects, both in implementation and design, and tracks actions in the code review worksheet (for large projects) or in the Notes section (for small projects).

Deliverables

- Code Review Worksheet (Code Reviewer)

Approvals:

- Upon completion of the code review, the Code Reviewer creates a note in SharePoint stating Approval : Code Review, and states exactly where the code review notes are (Documents or Notes).

Process Step: Build

For some technologies where a code compile is not required, this process step will be omitted.

Activities

- The Release Manager compiles the code and checks for errors.

Deliverables

- Compiled code (Release Manager)

Process Step: Release to Development

For some technologies where a code compile is not required or no isolated Development environment exists, this process step will be omitted.

Activities

- Release Manager communicates with IT operations to determine readiness, especially on new or large projects.
- The Release Manager deploys the application in the shared Development environment, when appropriate for the given technology.

Deliverables

- Application code deployment in Development environment. (Release Manager)

Process Step: Release to QA

For some technologies where a code compile is not required or no isolated QA environment exists, this process step will be omitted.

Activities

- At the beginning of this phase, the Business Analyst marks the project Status in SharePoint as **Waiting for QA Release**.
- The Release Manager deploys the application in the QA environment, and reviews any dependencies. He or she changes the project Status to **Released to QA**.

Deliverables

- Application code deployment in QA. (Release Manager)

Process Step: Execute Test Plans

During this step, the QA Analyst executes the tests identified during the planning phase. Either the QA Analyst will certify that the deliverables have been met according to expected results articulated in the test plan, or the QA Analyst will reject the project and request further project definition and/or programming resolution.

Activities

- At the beginning of this phase, the Business Analyst marks the project Status as **Quality Assurance**.
- If the project does not meet the requirements of the test plan, the QA Analyst will enter a **Missed Quality Assurance** action in the Release Notes. The QA Analyst will return the project to the Technical Lead or Developer for defect resolution. If any planning documents change as a result, then Architecture and IT Operations are notified, and re-engaged in the Planning process.

Deliverables

- Test plan results (QA Analyst)
- The Final Release Date is set (Project Manager)
- QA Analyst notifies IT Operations of any performance data, and requests network tests when necessary.

Approvals:

- If the project passes the QA process step, the QA Analyst enters an Approval : Quality Assurance action into the SDLC Notes and the project continues through subsequent steps in the SDLC.

Process Step: Training Doc

In this step the Trainer creates the user training documentation. This process step will be omitted in many cases.

Activities

- The Trainer delivers a final Training Document or End User Manual to end users who will be interacting with the application. Subsequent training could occur in a formal course or informally through the delivery of the documents at the beginning of the Deploy phase.

Deliverables

- Training Document (Trainer)

Process Step: User Acceptance and Training

The Business Analyst, Trainer, and/or QA Analyst engage the project Sponsor. Where training is required, training is given to the business users. In any event, the Sponsor will be asked to approve the results of the project.

It's important to note that User Acceptance and Training activities can conclude with some aspects of the project remaining unfulfilled or off target as promised in the Functional Specification. In these situations, individuals engaged in the acceptance process can recommend that the project itself return to the Write Code phase so that any issues can be fixed. As an additional subtlety, if the project does deliver the requirements asserted by the Functional Specification, then the individuals engaged in the acceptance process can elect to fill out a Change Request form, and incur the cost associated with potential change in Design.

Activities

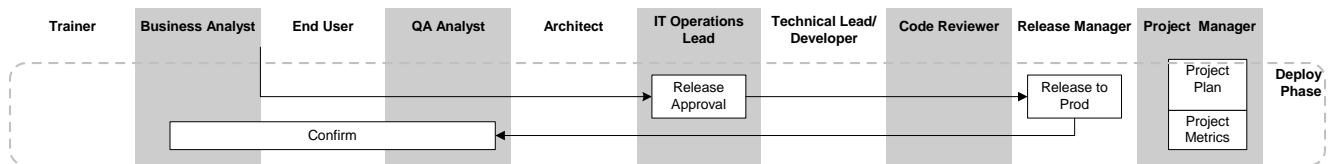
- The QA Analyst shares the results of testing with the End User
 - If bugs are present, the End user may decide to either:
 - Reject the deliverable and move the project back to the Develop phase, or
 - Accept the deliverable and release with a "known bug."
- The Sponsor and stakeholders are given access to the system in order to approve the new functionality.
 - If the user does not approve the project, it is possible that a Change Request will result.

Approvals:

- If the Sponsor approves, the Sponsor adds an Approval : User Acceptance (QA) to the Release Notes of SharePoint item, with specific reference to the stakeholder and verifiable reference, such as the text of an email message.
- A Technology Team manager adds an Approval : System Change action to the Release Notes.

Phase: Deploy

During the deploy phase the team deploys the core technology and site components, stabilizes the deployment, transitions the project to operations and support, and obtains final customer approval of the project. Stabilizing activities may continue during this period as the project components are transferred from a test environment to a production environment.



Process Step: Release Approval

The IT Operations team reviews project deliverables to insure system changes will not compromise uptime.

Activities

- The IT Operations Lead performs a final review of documentation for the project, including QA results and performance test results. He or she also insures that hardware and firewall requirements are implemented, and that IT Operations staff is ready for production release.

Approvals

- The IT Operations Lead adds an Approval : I T R e l e a s e A p p r o v a l a c t i o n i n t o t h e S D L C N o t e s .

Process Step: Release to Production

In this Step, the solution is released to the live production environment.

Activities

- At the beginning of this phase, the Business Analyst marks the project Status as W a i t i n g f o r P r o d u c t i o n R e l e a s e .

Milestones:

- Upon step completion, the Release Manager changes the project Status to R e l e a s e d t o P r o d u c t i o n .

Process Step: Confirm

The confirm step is final confirmation that the product is working as expected in the production environment.

Approvals:

- The QA Analyst confirms that the project is functioning in the Production environment, and adds an Approval : Confirmed in Production action to the Release Notes.
- The project Sponsor confirms that the project is functioning in the Production environment, and adds an Approval : User Acceptance (Production) action to the Release Notes.
- The Business Analyst marks the project Status in SharePoint as Completed.

Process Step: Project Metrics

Project metrics are delivery measures that identify the final output of a project as compared to the planning estimates. Project metrics provide statistics by which the Technology Services Group may identify and track the Service Level Agreement with the business. Projects will be measured by the following metrics:

Metric	Description
Requirements Traceability	Requirements Traceability measures whether the agreed upon scope of the project was delivered as expected.
Schedule Adherence	Schedule Adherence measures the percentage of milestones completed in agreement with the schedule.
Budget Adherence	Budget Adherence measures the project's adherence to the established budget.

Details on project metrics and scoring techniques will be detailed in the Technology Services Operations Manual.

Activities

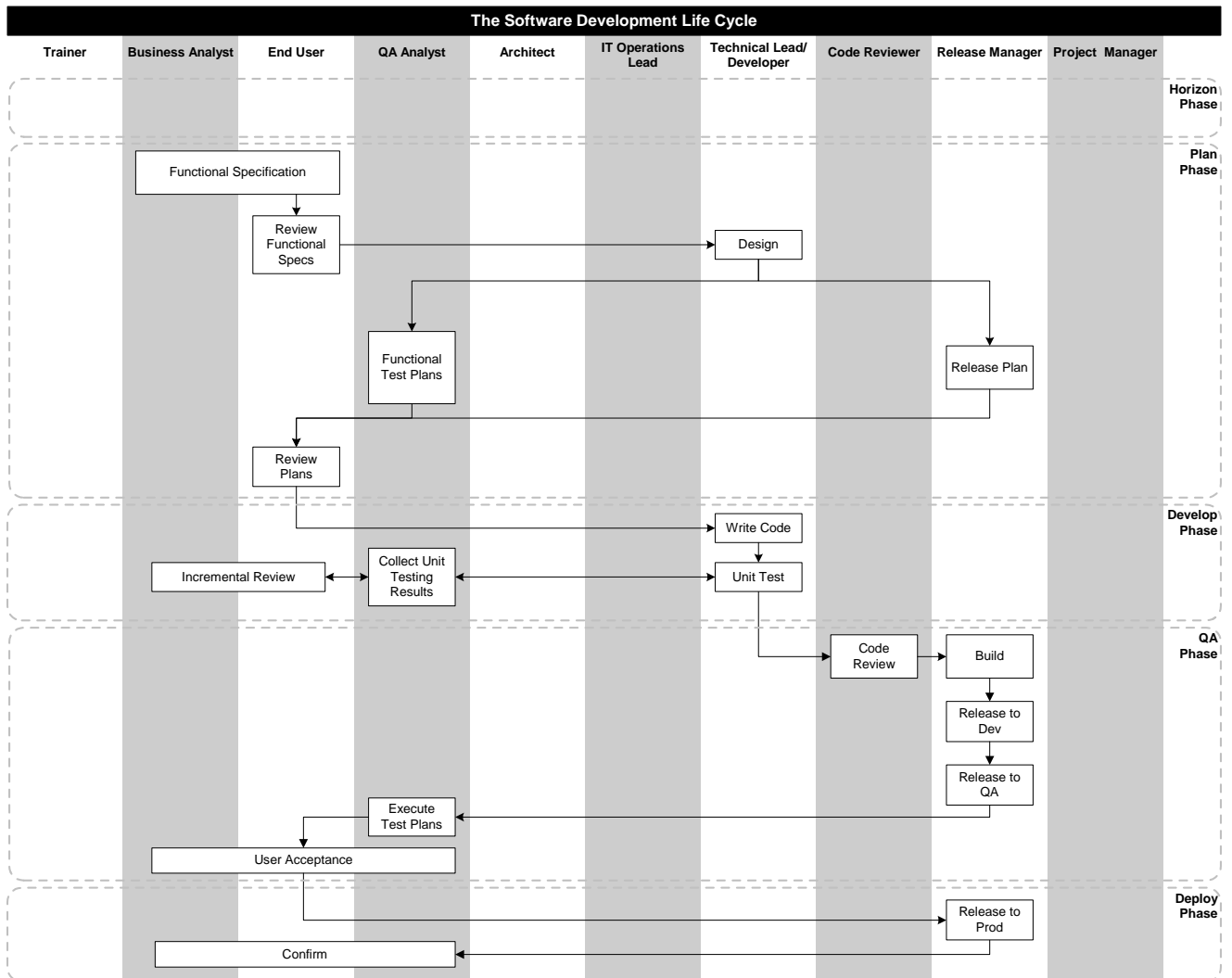
- The Project Manager records project performance and supplies a standard score for each metric on the project.

Rapid SDLC Patterns

The SDLC Pattern for each project is identified by a Technology Manager within SharePoint. As new patterns emerge that differ from the "Full" pattern, they will be added to this section of this document.

SDLC for Content Modifications and Tasks

The SDLC for Content Modifications and Tasks is for small changes that are commonly made to a variety of UDC's web sites, and for "mini-projects" that are completed in a relatively short period of time.



Process Steps

- AUDIT compliance review status is identified.
 - If AUDIT is not required: the Technology Manager adds the AUDIT Workfl ow Not Needed action to the release notes, and provides a detailed comment justifying this designation.
- The SDLC Design Pattern for SharePoint item is identified as Content Modifications and Tasks.

- Project Status is marked as Planning. Depending upon the complexity of the change, the Functional Specification may be located in SharePoint Description for easily summarized work effort, Notes for moderate work effort, or Documents as a rich text document.
- The End User reviews the Functional Specification and adds the Approval: Functional Specification action to the SDLC Notes.
- Design will occur only for complicated web site modifications; i.e., where wholesale page layout changes occur, a Design process step may be required. In such a case the Design Worksheet needs to be completed by the Developer and an Approval: Design Worksheet action needs to be added to SharePoint by the Technical Lead. If either a Content Modification or Task requires consultation with an IT Lead or an Architect, then the project is likely a better candidate for the Full SDLC.
- The QA Analyst creates a brief Functional Test Plan.
- The Release Manager tracks the modification at least enough to know if the modification or task can participate in a partial code promotion or if it requires a full application build to be released. If the Release Manager determines that a full application build is required, then the task should likely go through the Full SDLC process.
- Project Status is changed to Spec/Approval. The End User approves work summary and design by adding the Approval: User Acceptance (Planning) action to the SDLC Notes.
- Project Status is changed to Execution. The Develop Phase follows the pattern for all status changes, approvals, milestones, and documents articulated in the Full SDLC process, except that any Trainer or Project Manager involvement is omitted.
- Project Status is changed to Waiting for Code Review. The QA Phase follows the pattern for all status changes, approvals, milestones, and documents articulated in the Full SDLC process, except that any Trainer or Project Manager involvement is omitted.
- Project Status is changed to Waiting for Production Release. The Deploy Phase follows the pattern for all status changes, approvals, milestones, and documents articulated in the Full SDLC process, except that any Project Manager involvement is omitted.

Approvals

- Approval: Functional Specification (End User)
- Approval: Design Worksheet [optional] (Technical Lead/Architect or Development Manager)
- Approval: User Acceptance (Planning)
- Approval: Code Review (Code Reviewer)
- Status Change: Released to QA (Release Manager)
- Approval: Quality Assurance (QA Analyst)
- Approval: User Acceptance (QA) (End User)
- Approval: System Change (Technology Manager)
- Status Change: Released to Production (Release Manager)
- Approval: Confirmed in Production (QA Analyst)
- Approval: User Acceptance (Production) (End User)

Documents

- A rich text Functional Specification document will likely include screen captures and additional details about how the layout, wording, or pictures on a web page or pages are to be affected. (Business Analyst)
- Conceptual Solution Design (Architect)
- Design Worksheet (Developer)
- Functional Test Plan (QA Analyst)
- Release Plan (Release Manager)
- Code Review Instructions (Developer)
- Code Promotion Instructions (Developer)

- Supplemental Testing Instructions (Developer)
- Code Review Worksheet (Code Reviewer)

SDLC for Production Data Change

Production Data Changes are those data changes that occur directly in a production database environment in order to correct a deficiency that might be directly impacting a student's experience due to missing or incorrect data.

Process Steps

- The SDLC Design Pattern for SharePoint item is identified as Production Data Change.
- Project Status is marked Planning, and the Business Analyst places a brief description in the Description field of a SharePoint item that details what data change will fix the issue to be resolved.
- The Business Analyst directs the Sponsor to read and approve SharePoint item description by placing his/her Approval : Functional Specification action in the SDLC Notes tab.
- Project Status is changed to Execution. A database update/insert/delete statement code is written, unit tested, and executed against the QA environment wherever possible to insure the desired results will be met.
- A Code Reviewer is asked to assure that the database statement will have the desired effect, and places his/her Approval : Code Review in the SDLC Notes of SharePoint item.
- The Technology Manager enters his/her Approval : System Change action in the SDLC Notes of SharePoint item.
- The DBA, acting in the Release Manager role, executes the database statement against the production database and changes SharePoint item status to Released to Production.
- The Sponsor is directed to check the production environment and determine if the change has had the desired affect. If so, the Sponsor adds his/her Approval : User Acceptance (Production) action to the SDLC Notes of SharePoint item.
- The Business Analyst changes the project Status to Completed.

Approvals

- Approval: Functional Specification (Sponsor)
- Approval: Code Review (Code Reviewer)
- Approval: System Change (Technology Manager)
- Approval: User Acceptance (Production) (Sponsor)

Documents

- none

SDLC for Release Management Wrapper

The purpose of the Release Management Wrapper pattern is to allow an individual acting in the Release Manager role to monitor and ultimately deploy SharePoint items identified as components of a release into the QA and Production environments. Release Management Wrapper projects utilize the Dependencies tab in SharePoint to identify components of a release to one system environment or another. Components of a release have their own specific SDLC Patterns to follow, so the Release Management Wrapper pattern contains very few approvals and AUDIT-related requirements.

Process Steps

- The SDLC Design Pattern for SharePoint item is identified as Release Management Wrapper.

- Project Status is marked Planning, and the Release Manager (acting in the Business Analyst role) places a brief description in the Description field of a SharePoint item that details the types of changes the target system will undergo when identified components are released. SharePoint item will remain in this status as components are identified and entered in the Dependencies tab for SharePoint item.
- The Release Manager indicates that components are released into the QA environment by changing the project status to Released to QA.
- Quality Assurance personnel change the item status to Quality Assurance during the QA phase.
- When the dependent components all successfully make it through the Quality Assurance phase, a Technology Manager adds an Approval : System Change action to the SDLC Notes.
- The Release Manager changes the item status to Waiting for Production Release.
- Once all the project components are released into the production environment, the Release Manager changes the project status to Released to Production.
- Quality Assurance Analysts confirm that all components are successfully operating in the production environment and a Lead Analyst adds the Approval : Confirmed in Production action to the SDLC Notes.
- The Release Manager changes the project Status to Completed.

Approvals

- Approval: System Change (Technology Manager)
- Approval: Confirmed in Production (Lead QA Analyst)

Documents

- Release Plans (Release Manager)
- Release History Reports from SSCM (Release Manager)
- Release Worksheet (completed for both QA and Production environments) (Release Manager)

SDLC for Research

The purpose of the Research pattern is to allow the Architecture team to track progress related to the identification and analysis of new software implementations. The Research pattern may also be used when determining implementation path for removing an existing system from Technology's portfolio of supported systems, or when creating a roadmap for combining more than one system into other existing systems for the purpose of simplifying the supported systems portfolio. Research efforts may require the creation of prototypes or other proofs-of-concept; however, the ultimate implementation of Research projects will become projects unto themselves. Research projects typically result in the Technical Specification or technology recommendations of other projects.

Process Steps

- The SDLC Design Pattern for SharePoint item is identified as Research.
- A Technology Manager approves the research to be conducted by adding the Approval : Project Initiation action to the SDLC Notes.
- The Technology Manager conducts a project definition meeting to determine the scope of research to be conducted and documents the scope in a Vision and Scope document. The Technology Manager adds the Approval : Concept Proposal action to the SDLC Notes.
- The Lead Architect for the project changes the project status to Execution.
- As findings are shaped into recommendations and a Technical Specification is produced from the research efforts, the Technical Specification is added as a document within the project. The Technology Manager reviews the specification and ultimately adds the Approval : Technical Specification to the SDLC Notes.

- Additional findings related to hardware requirements, cost, licensing, staff requirements and schedule for implementation, etc. are added to the set of documents collected during the research process. Once the findings of the project are completely vetted through all levels of Technology Management, and potential Stakeholders in the organization are informed as to findings, the Technology Manager adds an Approval : User Acceptance (Planning) to the SDLC Notes.
- The Lead Architect changes the project Status to Completed. Technology team leadership subsequently determines the best set of follow-up projects to add to SharePoint in order to implement the findings from this Research project.

Approvals

- Approval: Project Initiation (Technology Manager)
- Approval: Concept Proposal (Technology Manager)
- Approval: Technical Specification (Technology Manager)
- Approval: User Acceptance (Planning) (Technology Manager)

Documents

- Various

Other Process Patterns

Some Technology team efforts are not part of the Software Development Life Cycle per se. However, they are still managed using language common to this document or are managed using SharePoint.

Process Pattern for Account Changes

Account Changes represent changes to application-level user accounts for applications like D3, Banner, PowerFAIDs, and Luminis. They follow a limited number of SDLC process steps, approvals, and milestones.

Process Steps

- All account changes require AUDIT Compliance review.
- The SDLC Design Pattern for SharePoint item is identified as Account Change or Account Change Removal.
- For new accounts or changes to existing accounts:
 - Project Status is marked as Planning. The Functional Specification is detailed in either the Project Description in SharePoint or under Notes. In addition, the HR-initiated Employee Onboarding or Exiting document is attached to the Documents area of SharePoint.
 - The End User reviews the Functional Specification and adds the Approval : Functional Specification action in the SDLC Notes.
- User Acceptance in this case only consists of the Entitlement Team Manager adding the Approval : System Change action in the SDLC Notes. Project Status is marked as Execution.
- An Entitlement Team staff person acts in the role of Release Manager and makes the account modification. The staff person adds the Status Change: Release to Production action to the SDLC notes. Project Status is marked as Quality Assurance.
- Actions are confirmed by an Entitlement team member and the End User. The End User adds the Approval : User Acceptance (Production) action to the SDLC Notes. Project Status is marked as Completed.

Approvals

- Approval: Functional Specification (skipped for account removals) (End User)
- Approval: System Change (Director)
- Milestone: Release to Production

Documents

- HR-initiated Employee Onboarding or Exiting (Human Resources)

Appendix A: SharePoint Alignment with the SDLC

1 SDLC Notes in SharePoint

Actions and comments related to the Software Development Life Cycle are added to every project under the SDLC Notes tab in SharePoint.

Automated Notes

Because Project Status changes and the posting of Project Documents are an integral part of the SDLC, an SDLC note is automatically added when the following events occur:

- Whenever a document is uploaded to the project, a Document Upload action is appended as an SDLC note. The document name is noted in the comment for this note.
- Whenever the project Status or Status Detail is changed (fields visible on the project Display tab), a Status Change: *status* action is added to the SDLC notes. The specific action added indicates the status change that was made (for example: Status Change: Horizon), and the Status Detail is recorded as a comment.

Manually Entered Notes

Please note that all manually entered SDLC notes require a sufficiently detailed comment targeted to Technology team members and Auditors attempting to determine the overall status of the project in the SDLC.

Note Summary	Responsible	Meaning
AUDIT Workflow Not Needed	Technology Manager	Banner, D3, and projects of a large size all require AUDIT rigor. When a Technology Manager indicates the AUDIT Workflow Not Needed designation, this is an explicit indication to Auditors that the project is out of scope for AUDIT. This designation does not mean, however, that the SDLC practices in this document are not followed.
Approval: Project Initiation	Business Analyst	The Technology Manager indicates that the initial business needs assessment and Vision and Scope for the project are approved, and that the project can proceed through subsequent steps in the SDLC.
Approval: Concept Proposal	Sponsor	
Approval: Functional Specification	Sponsor	The Project Sponsor indicates that the project and its associated foundational documents are understood, that the scope of the project is fixed, and that the project can proceed. If the project documents include a Vision and Scope, then this approval suffices for both Functional Specification and Vision and Scope.
Approval: Design Worksheet	Technical Lead, Architect or Development Manager	The responsible person indicates that costs and details associated with project implementation are understood, and that Developers and/or money can be assigned to the project.
Approval: Technical Specification	Development Manager	
Approval: User Acceptance (Planning)	Sponsor	
Approval: Proceed to Develop Phase	Technology Manager	

Approval: Code Review	Code Reviewer	A staff person acting in the Code Reviewer role under the Contacts tab of the project has reviewed the code and found that it follows standards, that it adheres to the approach articulated in the Design Specification, and that it generally accomplishes the goals set forth in the Functional Specification.
Milestone: Failed Quality Assurance	QA Analyst	The QA Analyst assigned to the project under the Contacts tab in SharePoint indicates that the project does not meet the expectations articulated in either the Functional or Structural Test Plans. The project is returned to some previous step in the SDLC, depending upon the severity of the problems identified.
Approval: Quality Assurance	QA Analyst	The QA Analyst assigned to the project under the Contacts tab in SharePoint indicates that the project meets the expectations articulated in the test plans. The project progresses through subsequent steps in the SDLC.
Approval: User Acceptance (QA)	Sponsor	The project Sponsor assigned to the project under the Contacts tab in SharePoint indicates that he or she has tested, in partnership with a QA or Business Analyst, the project implementation in the QA environment; and that he or she accepts the results of the implementation. The project progresses through subsequent steps in the SDLC.
Approval: System Change	Technology Manager	The Technology Manager reviews the approvals, milestones, and documents associated with the project to date, and indicates that the project can be promoted to the production environment.
Approval: IT Release Approval	IT Operations Lead	
Approval: Confirmed in Production	QA Analyst	The QA Analyst verifies that the project is operating as expected in the production environment.
Approval: User Acceptance (Production)	Sponsor	The project Sponsor verifies that the project is operating as expected in the production environment.
Deny (generic)	Anyone	Any person can indicate that the project cannot move forward until some issue is fixed. A specific comment should indicate the reason the project is being temporarily stopped. This particular action is best handled by changing the Project Status on the Display tab to Suspended, and including an appropriate Status Detail.
Deny: Fixed by Other Project	Business Analyst	Technology team members can indicate that a particular project is being cancelled because the business need was already addressed by a different project. When this action is invoked, the comment must include the Project Id of the project that accomplished the business goal.
Milestone: Change Request	Business Analyst	<p>During the course of a project, scope may change for several reasons. When scope changes, the Business Analyst must document the change in a Change Request document. The Business Analyst notes that the Change Request has been received, and includes a comment in the SDLC note to indicate how the Change Request is to be honored. Possible scenarios for honoring a Change Request include:</p> <ul style="list-style-type: none"> • Canceling the project by changing the project Status to Cancelled and including an appropriate Status Detail.

		<ul style="list-style-type: none">• Changing the project Status to Suspended, and including a Status Detail that indicates whether changes need to occur in Design, foundational documents, etc.
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Project Status in SharePoint

Status	Description/Usage
Horizon	Formerly Undefined. <ul style="list-style-type: none"> • Identification of need/opportunity within Business or IT. • Preliminary feasibility analysis. Business Alignment. • Identify and assign Planning Resources.
Planning	<ul style="list-style-type: none"> • Clearly define Business Sponsor and IT Leader. • Estimate Resources, Budget and ROI. Obtain SIP Approvals if Necessary. • Define Milestones (2 - 7), Deliverables, Other Project Dependencies. • Sign-off: Requirements definition, deliverables list, milestones and user resources commitment.
Spec/Approval	<ul style="list-style-type: none"> • Sponsor review of foundational documents. • Sponsor sign-off.
Waiting for Resources	Formerly Future. <ul style="list-style-type: none"> • Planning Stage completed. Budget Available and approved for spending • Project Ready to start/resume as resources become free • Commission Project when resources ready and dependencies fulfilled • Size of "Waiting" stage determines project backlog in labor/week
Waiting on Origin	<ul style="list-style-type: none"> • Project is suspended because project Sponsor is not available to participate, or they are gathering additional information.
Execution	Formerly In Production. <ul style="list-style-type: none"> • Currently in Progress. Size of Execution SharePoint equals available resources. • Prioritization process may affect speed and resources allocated for execution. • Projects may move back to waiting if depleted from resources but still viable.
Waiting for Code Review	<ul style="list-style-type: none"> • Code Reviewers use this status daily to search for projects that are assigned to them.
Waiting for QA Release	<ul style="list-style-type: none"> • Release Managers use this status daily to search for projects that are assigned to them.
Released to QA	<ul style="list-style-type: none"> • A Release Manager has indicates that the code has been promoted to the QA environment.
Quality Assurance	<ul style="list-style-type: none"> • QA team is executing test plans. QA Analysts use this status daily to search for projects that are assigned to them.
Waiting for Production Release	<ul style="list-style-type: none"> • Release Managers use this status daily to search for projects that are assigned to them.
Released to	<ul style="list-style-type: none"> • The Release Manager indicates that the project has been released to the production

Production	environment.
Completed	Formerly Live. <ul style="list-style-type: none"> • Project completion accepted by Business Sponsor and deliverables produced • User signs off project acceptance • Resources are freed up for other uses
Maintenance	<ul style="list-style-type: none"> • Project is repetitive, sys admin style task like weekly Banner maintenance, daily review of logs, etc.
Suspended	Formerly Started but Pending. <ul style="list-style-type: none"> • The project is on hold until issues identified during Planning, Waiting, or Execution states are resolved.
Canceled	Formerly Dead. <ul style="list-style-type: none"> • The project has ceased and will not be re-instated. If similar business needs require a Technology solution, an entirely new project is created in SharePoint.
Closed (Do Not Use)	This project status is deprecated. Do not use it.

Appendix B: Roles and Responsibilities Throughout the SDLC

Role	Description
Technology Manager	<p>A Technology Manager role is filled by a Technology Services Director, Director of Infastructure, Director of Release Management, Executive Director of Services, or above.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • SDLC Note Action: AUDIT Workflow Not Needed • Chooses the SDLC Design pattern for a given project. • Approval; Proceed to Develop Phase • Approval: System Change
Development Manager	<p>A Development Manager role is filled by a Technology Services individual responsible for managing a group of Developers.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Approval: Design Worksheet • Approval: Technical Specification
Business Analyst	<p>The Business Analyst Role is typically filled by a Technology Services Director or Technology Services Associate. The Business Analyst is responsible for initial problem identification and business need analysis, full life cycle ownership of project data in Display tab on SharePoint, full life cycle communication to end user/project Sponsor about project status and progress, and participates in User Acceptance and Training.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • All Status changes in SharePoint. • Document: Concept Proposal • Approval: Project Initiation • Document: Vision and Scope (optional) • Document: Functional Specification
Project Manager	<p>The Project Manager manages timelines, coordinates resources, and manages documents associated with the project. The project manager must continually collaborate with the Release Management team throughout the project planning process in order to accurately represent project delivery dates within the Release Calendar.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Project Plan
Technical Lead	<p>A Technical Lead may be assigned from the Developer team, should the size of the project warrant one. The Technical Lead becomes a liaison between Architect, Project Manager, and</p>

	<p>Business Analyst for communicating the Developer team progress, roadblocks, successes, etc.</p> <p>The Technical Lead is responsible for acting as an escalation point for project resource issues, determining response to scope changes, and potentially managing effects of Change Requests. He or she is also responsible for crafting Design pursuant to standards and frameworks identified for the enterprise architecture. The Technical Lead responds to the Business Analyst's Functional Specification with a Technical Specification when the size of the project merits one.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Document: Design Worksheet (depends on project size) • Approval: Design Worksheet (watch for conflict of interests: the author and approver of the Design Worksheet cannot be the same person) • Approval: Technical Specification (watch for conflict of interests: the author and approver of the Technical Specification cannot be the same person)
Architect	<p>In larger projects, an Architect will be assigned from the Architecture team. This individual still essentially acts as the Technical Lead for the project.</p> <p>The Architect is responsible for acting as an escalation point for project resource issues, determining response to scope changes, and potentially managing effects of Change Requests. He or she is also responsible for crafting Design pursuant to standards and frameworks identified for the enterprise architecture. The Architect responds to the Business Analyst's Functional Specification with a Technical Specification when the size of the project merits one.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Document: Build versus Buy Recommendation (depends on project size)
Developer	<p>The Developer is responsible for writing code and performing unit tests on code.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Standardized in-line comments in code. • Comments in source code control database. • Unit Test results communication to QA Analyst • Document: Design Worksheet • Document: Code Review Instructions • Document: Code Promotion Instructions • Document: Supplemental Testing Instructions • Document: Supplemental Training Instructions
IT Operations Lead	<p>The IT Lead is a member of the Infrastructure team.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> • Document: Backup Plan • Document: Server, Network, Storage, and Security Report • Document: Capacity Plan • Document: Monitoring Plan

	<ul style="list-style-type: none"> Approval: IT Release Approval
Trainer	<p>The Trainer is responsible for creating training documentation and for end-user training.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> Document: Training Plan Document: Training Document / User Manual
Code Reviewer	<p>Depending upon the size of a project, the Code Reviewer may be an Architect on the Architecture team or a Development Manager or a peer Developer from the Services team.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> Reviewing code written by Developers Document: Code Review Worksheet Approval: Code Review
Release Manager	<p>The Release Manager is a staff person on the QA and Release Management team. To control for conflict of interests, the Release Manager ought never to develop code on the systems that he or she is responsible for releasing code to, except under extreme and well-monitored circumstances.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> Code builds and compiles Application configuration management Strategic bundling of release components (multiple projects in one release) Code promotion to QA and Production environments Document: Release Plan Status Change: Released to QA Status Change: Released to Production
QA Analyst	<p>The QA Analyst is a staff person on the QA and Release Management team. To control for conflict of interests, the QA Analyst cannot be a Developer responsible for writing code.</p> <p>Responsibilities:</p> <ul style="list-style-type: none"> Documenting testing procedures Executing test plans Reporting the results of testing Collecting the results of Developer unit tests in order to appropriately inform the overall testing process. Document: Functional Test Plan Document: Structural Test Plan Approval: Quality Assurance Milestone: Failed Quality Assurance Approval: Confirmed in Production

End User Stakeholder Sponsor	<p>The End User is the project originator or Sponsor. The business need that he or she articulates ultimately determines the scope of a project. A project Sponsor may appoint a Stakeholder to serve as the primary “end user,” to review and approve the project documentation and deliverables. The End User also ultimately determines whether or not a project will be accepted. The End User can change the scope of a project by formally making a Change Request through the Business Analyst.</p> <p>Responsibilities:</p> <ul style="list-style-type: none">• Initiating the project• Requesting changes to scope• Collaborating with all members assigned to project to guarantee successful completion• Approval: Concept Proposal• Approval: Functional Specification• Approval: User Acceptance (Planning)• Approval: User Acceptance (QA)• Approval: User Acceptance (Production)
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Appendix C: Documents Used Throughout the SDLC

Following is a high level summary of each document in the SDLC. More specific instructions on the content and creation of each template will be supplied in a separate document.

Document Name:	Document Owner	What the document describes:
Concept Proposal	Business Analyst	Very brief identification of the basics of the project.
Vision & Scope	Business Analyst	What is the product and why do we need it?
Functional Specification	Business Analyst	<p>What will the product do/how will it work?</p> <p>Functional Specification can include:</p> <ul style="list-style-type: none"> • Workflow diagrams (if user workflow) • Process Flow diagram (if multi-tier or if new process) • Integration diagrams (if multi-system) • Security specification (if new system)
Project Plan	Project Manager	<p>How the work will be done, who will do it, and how long will it take?</p> <p>The work breakdown structure of the project with time estimates and resource assignments.</p>
Design Worksheet	Technical Lead/Architect or Developer	<p>How does the product fit into existing systems, and conform to department and company standards?</p> <p>Used to identify development and production environments and their configuration, system interdependencies, infrastructure requirements, architecture best practices, and other specifics. All new systems require that an initial and complete Design Worksheet be created. Existing systems, however, will already have Design Worksheets available. Most enhancements or small projects on existing systems need only refer to the existing Design Worksheet. Where changes are made to existing systems, an abbreviated Design Worksheet will be attached to the original worksheet as an addendum, listing only items that are different and relevant to the new project.</p> <p>Can include:</p> <ul style="list-style-type: none"> • Dependency diagrams
Build versus Buy Recommendation	Architect	Will we build the application in-house or purchase a solution from an external vendor?
Technical Specification	Technical Lead/Architect	What are the details of system design, configuration, and integration?

Training Plan	Trainer	How will end users be instructed on the new product?
Functional Test Plan	QA Analyst	How will it be verified that the product performs as required?
Structural Test Plan	QA Analyst	How will it be verified that the product is built to accommodate load and growth?
Backup Plan	IT Lead	
Server, Network, Storage, and Security Report	IT Lead	Security content will include firewall needs, ports per server.
Capacity Plan	IT Lead	
Monitoring Plan	IT Lead	Includes physical plan for server groups updated, and shows flow.
Release Plan	Release Manager	How will the product be deployed to the production environment?
Unit Tests Results	Developer	Results of the tests that a developer conducts on incremental elements of code functionality to be sure it works.
Code Review Instructions	Developer	Identifies the pieces of code that must be reviewed, where the pieces reside. Relays other pertinent information to the Code Reviewer.
Code Promotion Instructions	Developer	Provides instructions to the Release Manager for moving the code into the QA and Production environments. Includes any additional steps that may need to be performed to compile or execute the code. If security modifications are necessary for End Users to access the new process, a note is made in this document. (A new SharePoint is created specifically to address the security requirement and change.)
Supplemental Testing Instructions	Developer	Identifies and Provides suggestions to QA Analysts for effective testing of the code. Caution is taken not to bias the QA Analyst.
Supplemental Training Instructions	Developer	Identifies pertinent information needed by the Trainer.
Code Review Worksheet	Code Reviewer	Is the code bug-free, structured properly, and written in accordance with design standards?
Training Document	Trainer	Documentation to be distributed to the end user describing how to use the product (i.e.: help files, training manual, user manual)
Change Request Form	Business Analyst	Identifies the change requirements requested to the product after the planning documents have been agreed to.
Change Modification	Technical Lead	Identifies how the change request affects changes to the Design and Technical Specifications, and to the already produced code.
Test Results	QA Analyst	Which elements of the product have passed tests and which

Summary		have failed.
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