Skill#1. Software Development Life Cycle (SDLC)

The SDLC is to understand the core methodology of the software development process. This process is one of the essential concept for Dev/QA individual and the teams to collaborate effectively in the creation of the software products or IT services.

1. **What is Software?**

- The Software or Computer Software is a set of programs and data that process information and controls underlying hardware. It includes programs, libraries, and non-executable data.
- Some of the examples include the following.
- Operating Systems such as Windows, MacOS, Linux, Solaris, etc.
- Browser software such as Firefox, Chrome, Internet Explorer, Safari, etc.
- Office software such as Microsoft Office, Star Office, etc.
- IDE software such as Eclipse, NetBeans, IntelliJ, etc.
- Any other programs that operate on devices and data.
- The main purpose of software is to have the flexibility to control a general purpose solution, business solution or devices such as mobile, desktop or large computers.
- The software is everywhere in the Today's evolving technologies. Understanding and gaining of software skills would help in professional advanced technology careers.

1. **What is SDLC? Why do you need such models? What are different models?**

- SDLC stands for Software Development Life Cycle. It is the process of developing any software. There are many processes around from a traditional "Waterfall model" to the latest "Agile" processes. There are many types in Agile itself such as XP (eXtreme Programming), Scrum, TDD (Test Driven Development), etc.

1. **How is SDLC related to Testing?**

- Testing is the part of the SDLC and understanding it will help effective testing of a software product. The testing is the process that comes as verification phase in Waterfall model and in testing part of agile Scrum.

1. **What is Waterfall model? What are different phases involved?**

- The Waterfall model (as the name indicates) is like water flowing from upper ground to next lower ground where development (along with information) passes through different phases as one after the other. It involves five different phases in an order and goes to next phase only after completing the prior phase.
- The phases are

i) Inception
ii) Design
iii) Implementation
iv) Verification
v) Maintenance.

- It is hard to inject the customer requirements (either with new requirements or changes to old requirements) while development is in progress. It usually takes about six months to 1-5 years to complete such projects and most of the time used in old stable/matured projects and also in larger projects.

1. **What is Agile Scrum process? Can you describe at a high level?**

- Agile Scrum is an iterative process of developing software with the goal of getting incremental intermediate product delivery. In the agile scrum process, there will be a product backlog, Sprint backlog and short cycles of the development process(typically seven days length of a sprint with the goal of delivering product in 4-5 weeks) and release. Sprints are repeated until entire product backlog is completed. Every release is towards an improvement or finish towards the end product. Customer requirements can be injected into product backlog and will be picked up by next sprint (through sprint backlog). There will be daily stand-up meetings of approx. 15 mins in length on the scrum sync' up.

1. **When does the testing activity gets started in each development model?**

- In the waterfall model, testing is started only in the verification phase after completing the implementation phase.
- In the agile model, testing is done in every sprint or scrum cycle. Testing is started since beginning with the features in that sprint and work closely with the dev on the completed features within that sprint.

1. **What is meant by standup meetings in the scrum process? What are the three questions (typically) you need to answer in Agile Scrum process?**

- The following three questions are to be answered and should be getting ready for the meeting.
- What have you done since Yesterday?
- What are you going to do Today?
- What are the blocking issues or stumbling blocks (from you)?

1. **Who is Scrum Master? What is his/her role and responsibilities?**

- The scrum master is like project manager in the agile scrum software development process. Scrum master handles the sprint schedule, product backlog, sprint backlog and conducts the daily standup meetings with all stakeholders.

1. **Are you aware of any Agile tools?**

- Rally software is one of the tools (http://www.rallydev.com) to used for tracking the Agile process.
- Atlassian's JIRA also being used to track the tasks in a sprint and have the epics with JIRA dashboards.
- Finally, simple wikis/spreadsheets can also be used as a tracking tool.

1. **What is a sprint? What is a typical duration for a sprint?**

- The sprint is the short cycles of software development lifecycle, and typically it is a weekly or 2 or 3 or 4 weeks period to code, verify, document a set of user stories or fix and verify the bugs.

1. **What is meant by product backlog?**

- The product backlog is the list of tasks and requirements for a product under development. The backlog gives the full list of prioritized requirements or tasks for the product at any given time. If any new or changes in the old requirements, those will be updated in this product backlog and prioritized.

1. **What is a sprint backlog?**

- The sprint backlog is the list of prioritized tasks and requirements to be completed in a particular sprint cycle. It is a subset of top requirements or tasks picked from the product backlog.

1. **Where do you add the changed requirements? Whether in a sprint backlog or product backlog?**

- The changes in the requirements would be added to the product backlog and will not be added to the current sprint backlog. These changes would be picked up in Next sprint cycle (through sprint backlog) from the product backlog.

1. **Can you change a sprint backlog during a sprint?**

- No. Not in the current sprint but the next sprint cycle would catch up the sprint backlog derived from product backlog with those changes.

1. **What is a use case?**

- Use case is the sequence/flow of actions and events performed by an actor to achieve a business goal. The actor could be an end-user using the system or the system or device itself interacting with some other system. There will be many use cases for a given product under development.

1. **What is a user story?**

- The user story, the term used in the agile SDLC process and is a simple description of a software requirement in the end user's perspective and his/her business job function. It should be scoped for an iteration and should provide a business value or add the value to the overall product once implemented.

1. **What is Test Driven Development(TDD) process?**

- The Test-driven development is an agile software development process under extreme programming paradigm. In the TDD, the developer first writes an initial, which is a failed automated unit test as per user story and repeatedly modified the code until the test passed. I don't think TDD is that popular or widely used now.

1. **What are the advantages and disadvantages of waterfall model?**

- Waterfall model advantages:
- It can give better project schedule estimation and planning.
- It provides the re-use of Resources because of sequential phases.
- Good for large projects with clear planning, design, architecture before actual implementation. The team is not under time pressure (in comparison with Agile) as there can be sufficient time buffer for planned tasks. Typical project release duration is higher and is between 6 months to 1-5 years compared to Agile monthly project releases.
- Waterfall model disadvantages:
- Customer requirements can't be accommodated in the middle of the project.
- This takes more time and incurs more cost.
- There is no incremental product delivery. The final project is available only after the final phase, which is a longer in duration.
- It is difficult to predict if the project is doomed to failure until the project completion or out of resources.

1. **What are advantages and disadvantages of Agile Scrum process?**

- Scrum process advantages:
- Adapt to the changes where customer requirements can be honored in the middle of the project development (that is in the next sprint cycle).
- It helps in doing incremental product delivery.
- It takes less time comparing with waterfall model.
- It gives an early indication of the project status and can be stopped quickly or can be transformed to a different project.
- Scrum process disadvantages:
- It can consume more resources because sprint cycles need to cover all dev/test/doc activities at same time.
- Typically, it is good for shorter projects with less complex projects (where fewer alternatives/architectures to be considered).
- It demands high productivity and constant effort be done by the team and thereby stress or time pressure felt by the team.
- Also it will have more quick sync' up meetings.

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1. **What is the typical team size in different SDLC models?**

- A typical number could be viewed as below, and it can very much be based on the matured SDLC process in the organization.
- Waterfall model >10 team size
- Agile model < 10 team size
- Nowadays, more team size projects (like more than 50) also doing well with Agile Scrum process. It is becoming a de-facto process for most of the startups and new development teams in larger organizations.
- Also, it could be some kind of mixed as waterfall and agile together in the development process.

1. **Which SDLC model suits for rapidly changing requirements?**

- Agile SDLC process (say scrum) is most suitable because the changes can be uptaken in the next sprint cycle. Thereby customer requirements can be considered during the product development time itself rather than waiting till the product release.

1. **Which model suits for incremental product delivery?**

- Agile SDLC process (say scrum) because it is an iterative process contributing to the overall product in each sprint cycle. Thereby product progress can be seen as sprints in progress and can be demo-ed or given to the sales and trial customers before the final release of the product.

1. **What is meant by refactoring? Where do you typically do?**

- Refactoring is the general software engineering process in coding and is to make code changes in such a way that it can improve readability, structure and optimization while keeping the use case/behavior intact.
- This refactoring process is very typical in the software programming and also especially in the agile process as it is iterative because getting the perfect code is not possible with all optimizations at a time.

1. **What is meant by alpha and beta products? Who are the consumers? What is the main objective?**

- The Alpha product is the very initial product available after code completion but exists with many bugs (all features might not work as expected).
- The Beta product is the next milestone product after Alpha release with more bugs fixed but some bugs can still exist in the end-user functionality and also still the quality improvement should be done.
- Few Alpha customers would be selected for Alpha testing, which is done at the customer site to get the very initial feedback on the features understanding.
- Few Beta customers would be selected for Beta testing, which is done at the customer site to get the feedback so that those can be fixed before the release of the RTM (Release to Manufacture) product.
- The main objective of these intermediate releases is to make sure that the customer acceptance is in-line with the product development and make corrections with their feedback.

1. **What is a PRD (Product Requirements Document) or BRD (Business Requirements Document)? What it contains and who owns this?**

- PRD is the product requirements document with the list of customer features gathered and the documented by the product management (PM) team. The PMs interact with customers on the product requirements and acceptance criteria later.
- BRD is the Business requirements document, which is similar to PRD but used in the context of IT projects or consumer projects (like retail or financial) than Product research projects.

1. **What is a functional specification? What it contains and who owns this?**

- The Functional specification document is a detailed requirements analysis document created by the senior development team for each feature listed in the PRD/BRD.
- This document contains a detailed specification of features and owned by the Dev team.

1. **What is meant by soft code freeze (SCF)? When does it happen in the SDLC process?**

- Soft code freeze or Feature complete is a considerable milestone that occurs after completing the implementation of all the features during the development process.
- After SCF, no more features would be added, and instead, only critical, high and medium bugs would be fixed.
- A separate branch or tagging of source code repository would be created for this SCF milestone and keep using this branch until release is completed.
- QA team would continue to test and file bugs as Dev team continue to fix the bugs (but no new feature).

1. **What is meant by hard code freeze (HCF)? When does it happen in the development process?**

- Hard code freeze is a milestone and happens after SCF milestone when most of the critical/high/medium bugs fixed and ready for final QA test cycle to find any showstopper bugs (that can stop the release).
- After HCF, only show stopper (customer impact is very high) bugs would be fixed.
- Please note that these show stopper bug fixes are allowed only with product management approvals.

1. **What is product release candidate (RC)? What is a release?**

- Release Candidate (RC) is the final milestone in the product release cycle timeline.
- RC is created after HCF is completed and QA would do the final test cycle before RTM release.
- RC would be released as RTM product when no show stopper bugs found on this final build.
- The product release is nothing but bits are ready to handover for manufacturing (i.e., to cut the CD/DVD) or download from the internet by the customers.
- For the release bits testing, QA and dev teams would do the final sanity testing like checking binary sizes, documentation links, basic installation, downloads check, etc., so that customers don't see any basic issues.

1. **What is release notes? Who drives this?**

- Release notes is a document that is made available to the customer along with product release where customer is aware of such as basic version, features summary, critical known issues with workarounds, documentation references etc.
- Release notes document is integrated into the product bundle and also downloadable from the internet. Any updates in future would be updated in the online documentation.
- Release Engineering (RE) team drives the release notes but contributed and reviewed by all the project stakeholders.

1. **What is a release criteria? Who sets this up and who has to follow?**

- The Release criteria are the minimum checklist or goals to be achieved to release the product. This effort is driven by RE team, and all the project stakeholders would contribute to making this release to happen.
- Below is a sample release criteria/checklist and can be taken as a template if none is available.
- Bugs criteria
- Quality criteria
- Stress/Load/Concurrency criteria
- Performance criteria
- Code coverage
- Internationalization (I18N) & Localization (L10N)
- Documentation (books/online)
- License and license text
- Support/Maintenance plan

1. **What is meant by a release showstopper? When does it happen?**

- The showstopper is a bug that has a visible & high impact to the customer and must be fixed before the product release. If the fixes are not possible within the release time, then corresponding bugs and workarounds should be added to release notes.
- This kind of bug fixes should go through focused reviews and approvals to minimize the regressions (if any) in this final release of the product.
- The showstopper happens after the HCF and RC milestones or during the final sprint of the development process.
- The regressions tests should be selected based on the bug fixes instead of running all the tests because of the need for quick turnaround time.

1. **Who are all project stakeholders? What are those teams?**

- In general, below are the Project stakeholders in a product development organization.
- Product Manager
- Project Manager/Dev Manager/Dev Director
- Program Manager
- Architects
- Designers
- Developers
- QA/QE
- Doc writers
- Release Engineers (RE)/Devops
- Support Engineers/Front-end support (customer facing)
- Support Engineers/Backend support

1. **What is a test cycle at product level?**

- A test cycle is the duration of time, where all the test activities can be completed on a given product binary/build.
- A typical cycle could be varied from 1 week to 4+ weeks.

1. **How does the QA team track the weekly status or progress?**

- Typically, QA team representative (Director or Manager or Lead) would prepare the answers to the following questions while tracking the status summary.
- How many open bugs and list of these bugs?
- How many blocking bugs (P1)
- How many tests are failing (count and %)? Example: 30% failing
- How much test development is pending? Example: 40% tests
- When will be the test automation is going to be completed?
- What are the bugs inflow (new bugs came since last reported time) and outflow (fixed bugs since last reported time)? (Example: Weekly)
- What are the total number of bugs fixed and bugs opened? Bugs trend.
- How many bugs yet to be verified?
- Get all the answers in a wiki or document and update in the email for the weekly status report and send to stakeholders.

1. **What is Go/No-Go for product release?**

- "Go/No-Go" is the decision voting conveyed/sent after their respective release criteria met by each project stakeholder participated in the release meeting.
- Once all votes of GO received, then RE would take it as the GO for release. Any No-Go voting should be discussed and mitigated or fixed before release.
- Once it is a GO, then it is a celebration time for the entire project team;)

← End: Skill#1. Software Development Life Cycle (SDLC) ←

Good!
Keep going and never give up!!
Please re-read again for more clarity and feel free to contact for help!!!

→ Start: Skill#2. Software Quality Concepts →