Point-of-View (PoV)

Software Development 3.0 for Digital HealthCare

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Objective

To foster integrated business and information technology (IT) transformation across the enterprise to improve the administration of the Clinical and Care Program. The framework must support improved systems development and health care management. The required improvements perhaps are only possible by seamless connecting of dots and workflows on three Architecture pillars i.e.

⇒ **Business Architecture:** Defines business activity and maturity determinations

⇒ **Information Architecture:** Defines data relationships and industry standards to support business activity

⇒ **Technical Architecture:** Defines sets of business and technical services, their connectivity, and standards to support Part I and II

Such efforts will deliver number of goals, including development of seamless and integrated systems that communicate effectively through interoperability and common standards and processes. It should be capable to promote flexibility, adaptability, and rapid response to changes in programs and technology.

Software Dev 3.0 (Agile + CI-CD + DevOps + Frontend Technology) = Digital HealthCare

The new Software / System must deliver 4 Standards:

Nimble & Modularity Standards (NMS) - Modular, flexible approach to systems development, including the use of open interfaces and exposed Application Programming Interfaces (APIs); the separation of standardized business rule definitions from core programming; and the availability of standardized business rule definitions in both human and machine readable formats.

Business Rules & Standards (BRS) - Systems should support accurate and timely processing of claims (including claims of eligibility), adjudications, and effective communications with providers, beneficiaries, and the public

Industry & Domain Standards (IDS) - Ensures alignment with, and incorporation of, industry standards: the Health Insurance Portability and Accountability Act of 1996 (HIPAA) security, privacy and transaction standards; accessibility standards established under section 508 of the Rehabilitation Act, or standards that provide greater accessibility for individuals with disabilities.

Business Intelligence & Reporting Standards (BIS) – The Software solution should produce transaction data, reports, and performance information that contribute to program evaluation, continuous improvement in business operations, and transparency and accountability.

Agile, DevOps and CI/CD

While Agile, CI/CD, and DevOps are different strategies, they do support one another. There are no real differences except the levels at which each term operates.

Agile, is a large framework that encompasses the other two practices. In Agile, the tasks are divided to small time frames called Sprints to deliver specific features for a release. Iterative approach is taken and working software build is delivered after each iteration. Each build is incremental in terms of features and the final build holds all the features required by the customer. Agile model believes that every project needs to be handled differently and the existing methods need to be tailored to best suit the project requirements. It is a philosophy of software development that is implemented in various methodologies like Scrum, XP (eXtreme Programming), Kanban, Rapid Application Development (RAD) etc

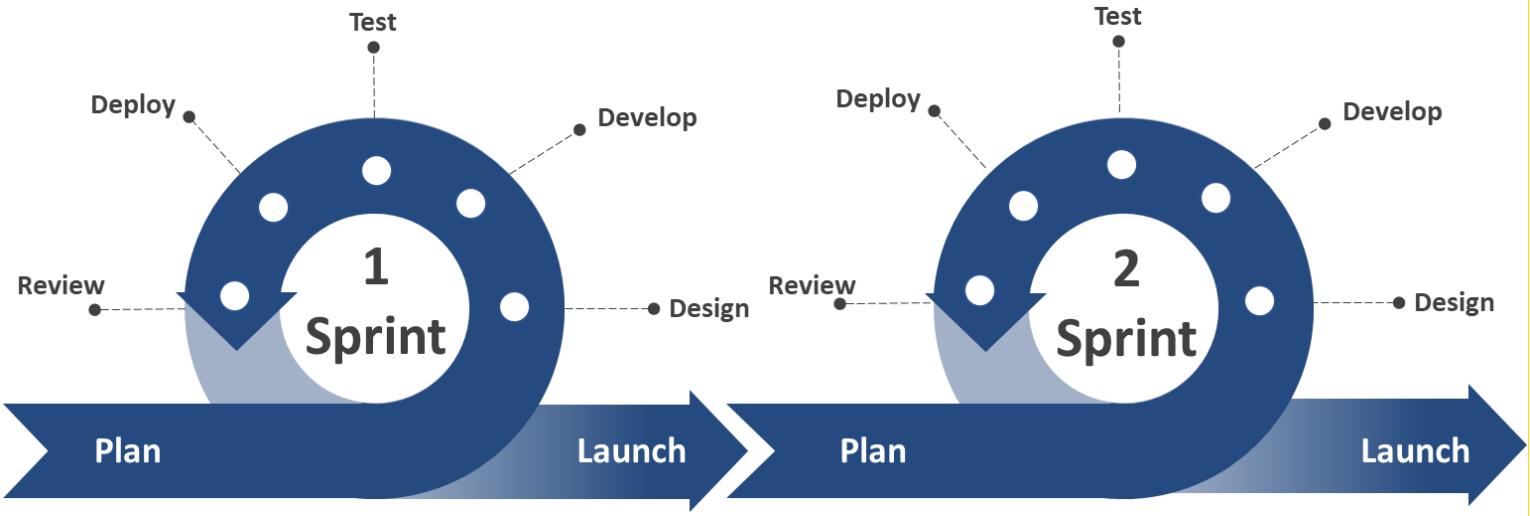

Figure 1.1: Simple Illustration of Agile in a nutshell

DevOps is an agile development practice, a state of mind, a way that software development or infrastructure is, and a way that software and applications are built and deployed. There is no separation between development and operations; they work simultaneously and without silos. Software development, testing, and deployment happen in both DevOps and Agile. However, pure Agile tends to stop after these three stages. In contrast, DevOps includes operations, which happen continually. Therefore, monitoring and software development are also continuous.

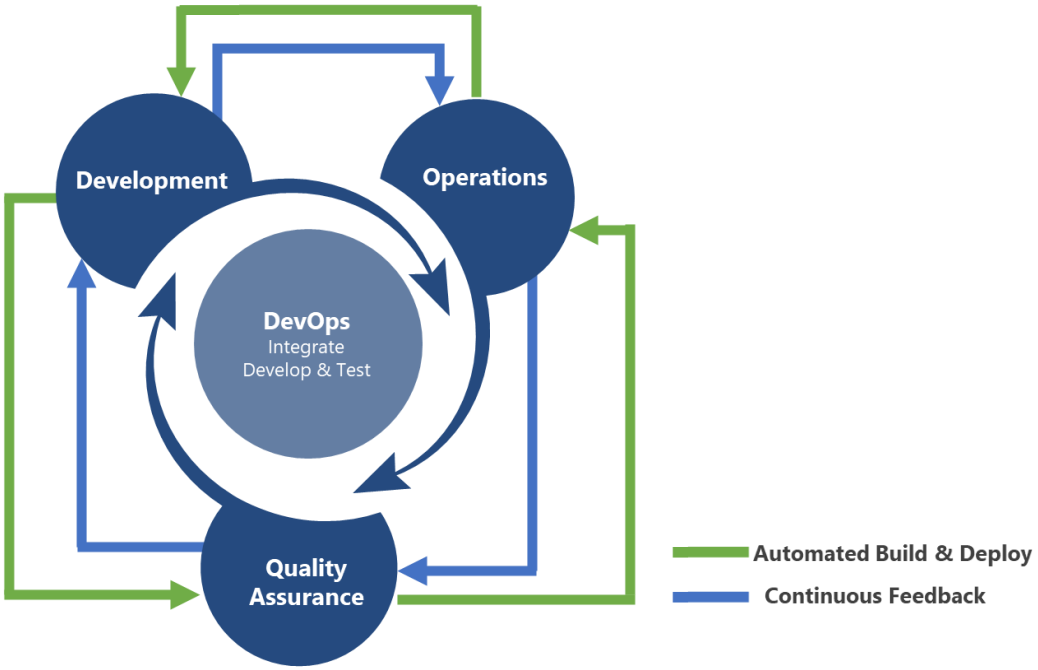

Figure 1.2: Simple Illustration of DevOps in a nutshell

CI/CD is a DevOps tactic referring to practices for software engineering and deployment, which makes use of the right automated testing tools to implement agile development and deliver frequent code changes reliably.

⇒ Continuous integration is a development process of automatically building and performing unit tests upon making changes to the source code. CI requires development teams to integrate code changes into a shared source code repository multiple times every day. The main principles of CI are that the developer

- Checks in code frequently.
- Automates the build and test portion.
- Tests the code locally before checking it in.
- Never merges any failed branches to the main branch.
- If a fail happens, fixes the code on priority; by the developer who caused the failed build or test.

⇒ Continuous Deployment / Continuous Delivery: Continuous Deployment is about automating the release of a good build upon testing to the production environment. Continuous deployment does not require manual verification because automated testing is incorporated throughout the development and release processes. On the other hand, Continuous Delivery is about ensuring that every good build is potentially ready for production release. It involves a set of processes that helps developers build a refined software version by continuously getting feedback from users and implementing necessary fixes. The business users can then decide when a successful build in UAT can be deployed to production which is automated, hence continuous delivery

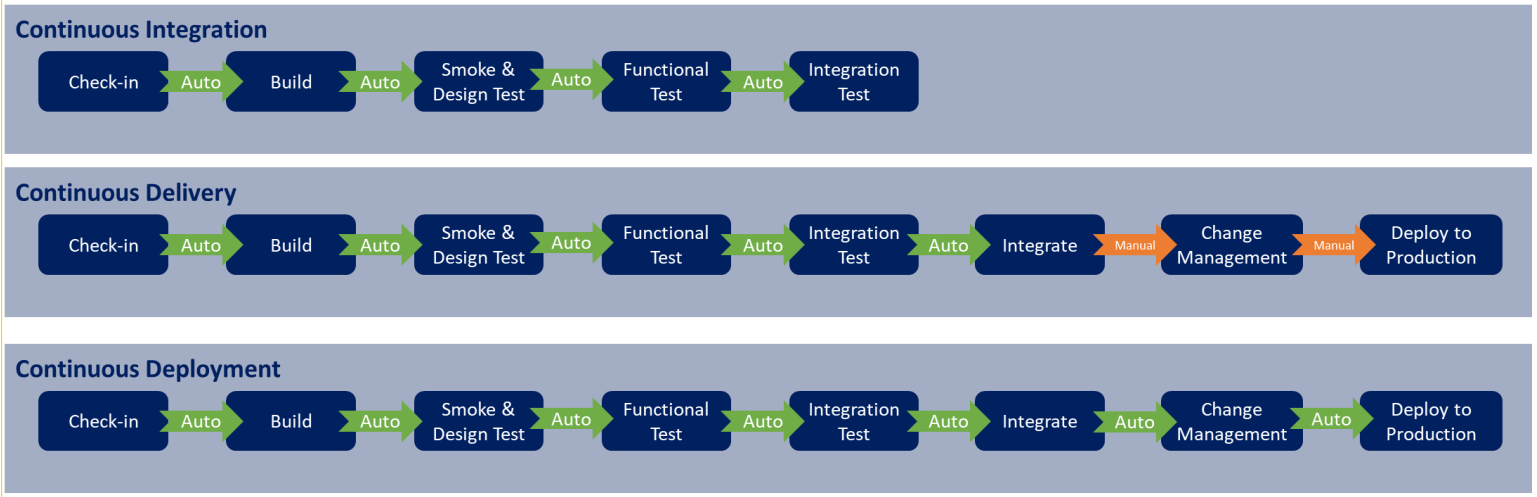

Figure 1.3: Simple Illustration of CI/CD in a nutshell

Agile focuses on the development process, CI/CD on practices, and DevOps on culture. All three practices have the same objective – create better software in lesser time. There is no watertight difference between them since these practices overlap almost all the time.

Transformation and Innovation in Healthcare

Application development, deployment and delivery is today a consumer driver market and has become more complex with the proliferation of multiple devices, apps, different operating systems and many websites. As users are spoilt for choice with a variety of digital experiences that promise faster updates and better user experience; virtually every sector has to transform digitally and meet the challenges of this modern, lean and Agile delivery model.

The healthcare and life sciences industry are greatly impacted by this transformation. It is rapidly developing data-driven technology solutions to further patient-centered care especially in the post-COVID world where health of healthcare IT and software is now more important than ever. Faster reporting and analytics, virtual medicine, telehealth are the decisive factors in patient care. Vast amounts of healthcare data and stringent requirements stipulated by organizations like FDA, HIPAA and GDPR place healthcare in a unique and unenviable position that a new, transformative continuous delivery model can help solve.

Agile + DevOps + CI/CD practice can help accelerate Healthcare industry

Increase in speed of Innovation

The practice can help innovate faster through automating and streamlining the software development and infrastructure management processes. With a single stream of automation from development to testing, from integration to production, will speed its way to consumers. By removing the barriers between two traditionally siloed teams - development and operations, it builds consistency across the platform, creates an environment optimizing both the productivity of developers and the reliability of operations resulting in improved innovation. It also enables software and applications to be built as more simple, independent projects using a microservices architecture which allows organizations to deliver and change quickly. This process can be advantageous when getting to market with a new drug or deploying a new means for better patient care which means gaining a competitive edge in the industry.

Agility from Automation

Given the constraints of the healthcare industry like security and intense regulation, delivering a high-functioning, secure and stable release is always challenging. One key parameter for success is a fully automated provisioning of both infrastructure and applications using industry-standard tools and workflows as it brings both repeatability and reliability to the process.

Developers will be utilizing tools, such as Github, Jenkins, Code Deploy, and others to manage the repositories and deployments, and to help drive consistency across environments.

The practice to automatically test and deploy features help codify the deployment process and streamline costs because your developing and releasing better code.

Adherence to compliance and Reduce Risk Profile

The healthcare industry must ensure the confidentiality, integrity and security of PHI in compliance with rules set forth by the regulatory bodies. Automated continuous testing powered by modern tools and integration support, allows teams to fix critical security issues early in development and enable faster, easier and cheaper integration than fixing bugs after deployment thereby reducing the possibility of quality and security issues making into production apps. With standardized, repeatable platform, automation of compliance workflows in all steps related to deployments and building feedback loops from production back to development to catch useful incidents in a timely manner will help ensure compliance across multiple environments.

Improve the Quality of Code and Application

With continuous release of microservices bad code won’t easily make it to production. The code often has automated testing running against it continuously so that it works by the time it makes it to production. Developers will have the ability to test and fix bugs rapidly leading to accelerated cycles and robust features. Higher quality code results in higher quality apps and services. With consistent reviews, the product will see more refinement, and be more in tandem with the end-users' expectations.

Data-driven approach

This practice in healthcare offers an alternative to traditional software development, improving and accelerating the implementation of big data tools. Although the process of extracting accurate and meaningful insights from healthcare data can be challenging, the analysis of big data healthcare sets can help providers reduce treatment costs, predict outbreaks of epidemics, avoid preventable diseases and improve patient quality of care and outcomes.

By combining development with operations team's practices to automate processes that historically have been manual and slow and backed by processes that facilitate speed with frequency and pace, we can achieve operational efficiencies, transforming how data-driven applications are designed, built and delivered.

Reduced Costs

Building an app is a time-consuming process, using tools to expedite the process is the key. Another key benefit is maintenance cost reduction. You don't have to take down the environment or healthcare app during peak periods because of redundancy/loop built into the process. Focusing on time-to-market will equip to adapt to the changes in the market and be more in tandem with the end-users' expectations. Time-to-market, as an indicator of profitability, will increase ROI.

ABOUT MBI SOLUTIONS, LLC

MBI Solutions, LLC founded in 2010 is an American Technology Services firm, HQ in Austin Texas, USA. The company and majority of its American resources have been together as a team on various transformational programs over several years. Our 150+ resources now, both at Onshore & Offshore deliver a wide range IT & Managed Services i.e. Apps Dev & Maintenance (ADM); Data, Analytics & Experience (DAX), Infrastructure Support & Cloud Migration (ICM), Testing, Automation & Consulting (TAC). MBI primarily serves large and mid-sized enterprises worldwide. The company's clients span major industries including HealthCare, Pharma, Banking - Financial services Retail-Education and Others i.e. Insurance, Manufacturing and Government.

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