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The Anix Framework to adopt Next Generation Architecture and modern technologies in enterprise

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Abstract

Today, organizations, big or small, are involved in a faster race to be the first. Because of competition, it becomes necessary for companies to become first to adopt NextGen architecture style, modern technologies, build faster, better products or services , innovate faster. Therefore, organizations have to make ensure their services are value additions and customers can easily access their services through all digital channels having unified digital experience. In addition to this it is very important to ensure that and that their applications are not only scalable, reliable but also easy to deploy. Hence, most of the organizations shifted away from their monolithic applications which are developed using old traditional architecture style that served them well for many years to microservices as a NextGen software architecture style.

Microservices as NextGen architecture style is important trend in IT Industry. Microservices plays important role in digital transformation of entire business portfolio.

Therefore, adopting Next Generation Architecture style (microservices) and modern technologies are just like adopting a change across the organization. This adoption across the organization is complex, challenging task and hence needs a systematic approach to adopt and get the desired benefits.

Hence, this paper proposes the effective and disciplinary framework called as Anix which provides nine vital signs and five frames to adopt the Next Generation Software Architecture Style (Microservices) , modern technologies across the enterprise. The proposed framework recommends how to build and optimize Technology health of the organization to deliver the better performance.

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I. INTRODUCTION

A monolith application is an application whose components cannot execute independently. It is a big fatty application which stores all modules into one executable file. Monolithic are mainly developed of centralized system and it is difficult to use in distributed systems. [2]

1 Large monolith applications are not only difficult to maintain but also difficult to evolve due to their complexity. 2 Monolith application has large code base and has million lines of code and maintaining such large code base and updating related libraries results in inconsistent applications and buggy application [5]

3 Adopting a change in monolithic application is tedious as for single change the entire application needs to be tested most of the time. Hence for large application there is a always risk of breaking its functionality due to changes made in it.[12]

4 Due the nature of monolithic application, it is mainly developed in one or two programming language, it is difficult to use the modern technologies into it.[8]

5 Monolithic applications are large in size and it limit the scalability. If we want to scale monolithic,

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we need to scale the entire application, and which would cause more resource consumptions [6]

The microservices architectural style has been recommended to cope with such problems. In recent years Microservices Architecture also called as MSA and modern technologies are the areas of attention in different industries and research. [5]

There are several companies who have started their technology evaluation early like Amazon, Netflix, LinkedIn, Google, Oracle and most of others migrated their legacy applications into modern digital platforms. [6]. The main focus of NextGen architecture style (MSA) is on building value addition autonomous, independent and lightweight services that meets the business and their customers' demands

[4]. This Next Generation architectural style mainly promotes single responsibility, high cohesion, low coupling, isolation, , share-nothing or no sharing philosophy, and more service choreography than orchestration [11]. The NextGen Architecture style promises increase in the development productivity, improved quality of applications, stability, reliability and availability using modern technologies such as docker, Kubernetes, DevOps pipeline. Most of the organizations using Domain Driven Design (DDD) as design technique for the identifications of Domain, Sub domains and bunded context, microservices and map microservices to bounded context and to sub domains and domains [2].

II. ANIX FRAMEWORK TO ADOPT NEXT GENERATION ARCHITECTURE AND TECHNOLOGIES

A. Background

The Anix framework is based on the on organizational effectiveness and change management philosophy presented by Scott Killer and Colin Price presented in their "Beyond Performance" book.

Today every company is a software company. Technology is the core aspect of its success. The Anix framework provides

guidance to adopt any technological change in your organization. It mainly focusses on building the technical health of organization in today's competitive world because the technical health of an organization is equally as important as its performance. First let's understand two important

concepts: performance and technical health. As per Scott Killer and Colin Price, Performance is what an enterprise delivers to its stakeholders in financial and operational terms, evaluated through such measures as net operating profit, return on capital employed, total returns to shareholders, net operating costs and stock turn. We have derived the definition of Technical Health as is the ability of an organization to understand modern technologies, determine, implement and renew itself faster than the competition so that it can sustain exceptional performance over time. For organizations of any size to achieve performance, technical excellence, they must be technically healthy. It means that they need to actively manage not only the performance of the organization but also the technical health. Managing technical health is not something you do in the future; it is about the actions you take today to deliver performance tomorrow. Therefore, both Performance and Technical health must be managed with same importance. It recommends nine vital signs, five frames and tests for organizational technology excellence [9]

B. Nine Vital Signs of Organization Technology health

- **Direction:** A clear and better decision-based directionso that organization head in right direction in terms of modern technologies adoption. The directionless modern technologies adoption create waste than any benefits
- **Leadership:** Lead by example and every leader musthave solid technical healthy

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- **Culture and climate:** mindset and behaviors playvery important role to either get reasons or results from employee. Hence need to build modern technology motivational culture

- **Accountability:** All employees are accountable toimprove their technical health to improve their organization performance

- **Coordination and control:** Learn, share andcoordinate collaboratively. Be agile to bring technology change in yourself first and then coordinate with your team members and then with your organization

- **Capabilities:** Building technology capabilities at alllevels of employee should be target and not just at development team level

- **Motivation:** Motivation is the backbone of anysuccess and motivational culture is required to improve the technology health of employees

- **External orientation:** drive technical value throughquality engagement with your suppliers, partners, and customers to build technical health and drive technical value

Innovation and learning: Continuous Innovationand learning act like vitamins to improve the technical health of the organizations

These nine vital signs of organizational technology health must be considered when you have decided to adopt NextGen architecture styles, modern technologies to build NextGen digital platforms for your organization

C. Five Frames

The Anix Framework describe the process for achieving organizational technical excellence in terms of five basic questions that need to be answered in order to make change happen:

1. **Aspire**: Where your organization want to go?

2. **Assess**: How your organization is ready to go there?

3. **Architect**: What organization need to do to go there?

4. **Act**: How do organization manage their journey?

5. **Advance**: How organization keep moving forward?

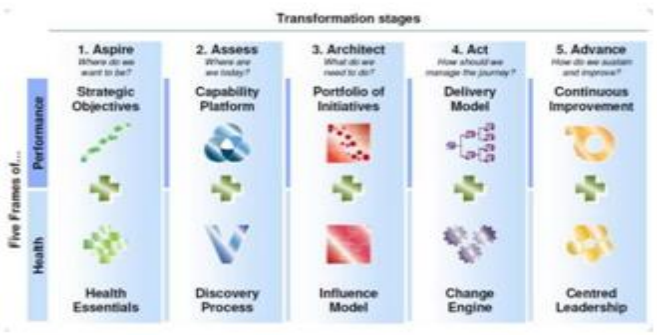

Figure 1.1 (Five Frames of Anix Framework)

D. Frame One -where we want to be?

On Technical Health side this means setting the right organization modern technology aspiration.

- Modern technology leaders such as CTO, Enterprise Architects, SMEs, Solution Experts, thought leaders should be personally involved in setting the aspirations.

- Which aspirations they choose for their organizations is depend on where the organization is at the start of the technology change process and vary by industry or sector.

- Below are three lessons that every organization use for setting their technical health targets: 1. Focus on the medium term future. 2. Maintain a balance between facts and intuition. 3. Set rigid but realistic achievable goals.

- The proximity of medium term goals—planning 6 months or one year ahead—allows techno managers to choose relevant goals and identify specific initiatives to reach them. Having a long-term vision at the start is helpful, but not

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enough, and a lack of long-term vision at the start is not a reason to delay starting.

The facts have plays a role in determining the organization's technical health aspirationsunderstanding a healthy fact base requires companies to ask themselves lots of questions, such as:

- What opportunities do we face?
- What competitive pressures do we face?
- What are demands of our customers?
- How does our technology stack up against benchmarks?

In today's fast changing world, the organization modern technology aspiration also needs to be revised and evaluate continuously. However, leverage technologies and architecture style which will remain in industry for at-least 5+ years.

E. Frame Two - How Ready Are we to Go there?

On the Technology health side, this means understanding the current technology stack, technology debts, architecture styles, engineering practices, level of automation, level of modern technical knowledge and few critical mindsets shifts that are needed Understanding the key limiting technology mindsets in your organization. Take the baseline about the modern technology change which you want to adopt to determine where we are today.

F. Frame Three – What Do We Need to Do to Go there?

On the technology health side, this means create a blueprint as shown in figure 1.2 to plan, decide and act on improving the required technology health. It is very important to understand how to make technical change happen at an individual level.

A modern technology thought leadership, experts identified internally or hired from market. Establish appropriate partnership with Technology companies such as Oracle, AWS, Microsoft and other key players based on your modernization needs. An intelligible list of actions is identified to bring about the desired shifts not only in mindsets but also in behaviors and technology paradigm.

Leaders have to influence their organizations by:

- Telling a simple but powerful story about technology health and why it is important.
- Establishing strengthening mechanisms by setting up the Enterprise Guild as shown in figure 1.2.
- Not only encourage people but build the skills required for technology change by giving target base technology improvement.
- Setting a strong example through role modeling.
- This would encourage employees to take the efforts to improve their technology health.

G. Frame Four – How Do We Manage the Journey?

This is most important stage. On the Technology health side, it means taking a structured and disciplinary approach, building broad modern technology ownership, building reference architectures, building ready to use reference applications and measuring impact. The below diagram explains the simple framework to continuously build the modern technology health to improve the performance of your organization.

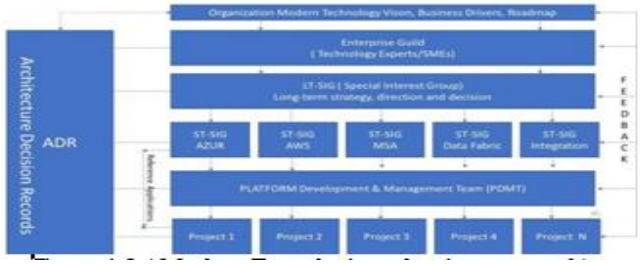

Figure 1.2 (Modern Tecnologies adoption approach)

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The **Architecture Decision Record** (ADR) is a repository where all next generation architecture decisions shall be documented and versioned using any version system. For example, the decision taken that microservices shall be developed using Spring Boot, Spring Cloud and Kafka as a messaging platform. As enterprise or program progresses on journey of new architecture style and modern technology adoption for their modernization journey, it helps to socialize, communicate and ensure that all teams are following architectural decisions. It also helps us to understand why specific architectural decision has taken or revised throughout the modernization journey.

The **Enterprise Guild** is group of Technology experts who work on short term, midterm and long-term modernization goals which are aligned to organization strategic goals and vision. They mainly provide modern technology directions The **Long-Term Special Interest Group** (LT-SIG) is the core technology special interest group who defines specific technology strategy. Mainly they build reference architectures. For example, data platform, enterprise log management, enterprise level DevOps pipeline, Cloud migrations, messaging platform, architectural patterns, technology capability group. This layer work as per the direction of Enterprise Guild and few members of this layer are member of Enterprise guild. The people from LT-SIG and ST-SIG team will be rotated at regular intervals.

The **Short-Term Special Integration Group** (ST-SIG) works on exploration of modern architecture styles and technologies. Mainly they build reference applications based on reference architectures. The reference applications will be ready to use solution for Platform/Product building teams using next-generation technologies. The people from ST-SIG and platform development team will be rotated at regular intervals.

H. Frame Five – How Do We Keep Moving Forward?

On Technical Health side, this means developing technology leaders, modern technology skill upgradations as per the logic mentioned in Frame four to drive the change and finally continuously build better people, build better software's and build better business

III. CONCLUSION

In last few years, microservices as NextGen architecture style, containerization, devops pipeline, could based digital platform hosting are gaining more and more momentum. Most of the organizations are going for digital platforms and opening more digital channels for their customers. If yourorganization is on the way of modernization, then your organization must have to follow systematic and structured approach to improve the technical health. There are multiple approaches available. However the proposed Anix framework is simple and easy to use framework to improve your technology health. The proposed framework built by considering next generation architecture style (microservices) adoption across the organization. This list of five "A's" covers: "Aspire" to a vision, "assess" your progress, design your path like an "architect," "act" to manage the journey and steadily "advance" forward. However, it will be very well extended to adopt all relevant modern technologies, architecture styles to build, optimize and maintain digital platforms, technology ecosystem of your organization

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