PRIMUS PARTNERS

PRIMUS RESEARCH

Technology Newsletter

May 2023

IN THIS NEWSLETTER

1 Editorial

The need, importance and urgency of adoption of technology today is unprecedented. The Digital India program has brought technology at the forefront of everything that we do. India is today on the cusp of being a trillion-dollar digital economy, and it is an exciting time for technology in India.

In this edition, we look at how technology and its implementation has changed over the last decade, so that tech practitioners would know how to approach a tech solution today. Terms such as microservice, containerization, Rest API, which were not so prevalent few years back are today very much part of the tech vocabulary.

We bring to you interesting and relevant happenings from around the world in terms of policies, regulations, projects, sector updates and much more.

And finally, we hear from the experts as they talk about their journey in driving digital transformation. In this episode, we present to you the views of Shri Amarjeet Singh Cheema, Associate Director, Health Informatics Group at Centre for Development of Advanced Computing (CDAC).

2 Topic of the Day

The Changing Face of Software Development

In the last decade, software development has undergone a paradigm shift that has fundamentally altered the way we think about and build software applications. The shift has been driven by a combination of technological advancements, changing customer expectations, and an evolving business landscape. In this article, we will explore how software development has changed and what this means for businesses and developers.

One of the most significant changes in software development in the last decade has been the **move away from large, complex enterprise applications to smaller, more focused public-facing applications.** This shift has been driven in part by the rise of cloud computing, which has made it easier and cheaper to build and deploy software applications. With cloud computing, businesses no longer need to invest in expensive hardware and infrastructure to support their software applications. Instead, they can rely on cloud providers to provide the infrastructure and support needed to run their applications.

The move to smaller, more focused applications has also been driven by changing customer expectations. **Customers today expect software applications to be easy to use, fast, and reliable.** They want applications that are tailored to their specific needs and can be accessed from any device, anywhere in the world. This has led to the rise of mobile applications and web applications that are designed to be responsive and work seamlessly across different devices and platforms. Large ERP systems or other backoffice applications are still in use, however organizations are mostly doing incremental updates and building layered functionalities on top of them (e.g. building better UI/UX, Mobile App or creating Dashboards). The focus has been shifted to smaller public facing apps with limited functionalities. Some of the key focus areas are building Mobile Apps with specific focus users like Customers and Vendors, Social Media Integration etc.

Another key change in software development in the last decade has been the **increasing complexity of non-functional requirements.** Non-functional requirements(NFR as we call them) are the flexibility, manageability, performance, security, scalability, and other factors that determine how well an application performs in the real world. As applications have become more complex and interconnected, non-functional requirements have become more critical. Developers must now consider factors like security, performance, and scalability from the earliest stages of the development process to ensure that their applications meet the needs of their users.

Another trend in software development in the last decade has been the rise of open-source software. Open-source software is software that is developed and distributed under an open-source license, which allows anyone to use, modify, and distribute the software for free. Open-source software has become increasingly popular in recent years because it allows developers to leverage the work of others and build on top of existing software libraries and frameworks.

Topic of the Day

The Changing Face of Software Development

In response to evolving demands, the field of software development has undergone a shift towards greater agility and iteration. Developers now employ agile methodologies such as Scrum and Kanban to create software through incremental steps, enabling swift testing and refinement of new features and functionalities. This approach facilitates prompt adaptation to changing customer needs and market conditions, resulting in the delivery of reliable and scalable software. It is important to note that software development represents only a portion of the overall landscape. The architecture of platforms and the management of non-functional requirements (NFR) are equally, if not more, significant. These aspects encompass various layers, including the configuration of technology stack components (e.g., API Gateway, containerization, in-memory databases, messaging services) and cloud infrastructure (e.g., load balancing, IOPS, storage services). Consequently, the role of architects has become increasingly critical in modern software projects and product development endeavors. Some of the keywords that we hardly knew a decade ago are now an important part of the software development and implementation lifecycle, such as:

Microservice: Microservices are isolated building blocks in an application. These are built as a collection of small, independent services that can be built, installed, and scaled individually, allowing for portability, flexibility, scalability, and easier maintenance.

Containerization: Containerization technology enables the packaging and isolation of software applications and their dependencies into self-contained units called containers. This technology ensures consistent and efficient deployment across various computing environments.

REST API: The REST API comprises a collection of architectural guidelines used in constructing web services. These principles facilitate communication and data exchange between systems over the internet, employing a standardized set of HTTP methods.

Agile Development: Agile Development refers to a software development approach that places emphasis on iterative and incremental progress, collaboration, and adaptability in response to evolving requirements. This methodology enables the accelerated delivery of software of excellent quality.

CI/CD: CI/CD is a combination of tools and technologies that automates software delivery. Continuous Integration involves automated integration of source code into a centralized repository and Continuous Deployment involves automation of build and deployment-related activities. Together they ensure faster and reliable software delivery and source code management.

PaaS (Platform as a Service): PaaS are cloud services which takes care of the Infrastructural(CPU, Memory, storage etc) & Non-Functional Requirements(scalability, performance, security etc) as a part of the service. So the developers could focus on build, deploy and manage the applications.

.**Cloud Native Apps:** Cloud Native Apps are applications designed and developed specifically to run in cloud environments. The purpose is to leverage on the advantages of cloud computing(particularly PaaS services) such as scalability, resilience, and elasticity.

3 In The News

Policies and Regulations

There is a general concern about AI and especially generative AI across the globe, and different countries are planning legislations or guidelines to be framed.

Top level meeting in US Government over concerns related to AI

US Vice President Kamala Harris presided over a meeting with Top Tech CEOs and Leaders including Sundar Pichai (Google), Satya Nadella (Microsoft), Sam Altman (OpenAI) amid concerns over the ever-growing power of AI and for an effort to establish government regulations and oversight.

Source: https://timesofindia.indiatimes.com/world/us/artificial-intelligence-alarms-microsofts-satya-nadella-and-googles-sundar-pichai-go-to-the-white-house/articleshow/99994516.cms

European Union moves closer to law related to AI

EU is planning to bring in a law focused on AI that will apply to organizations providing for using AI in EU or to organizations located elsewhere but the output of their AI systems being used in EU. The lawmakers have agreed to a 'political deal' on the same, and the law is expected to be put to vote later in the year.

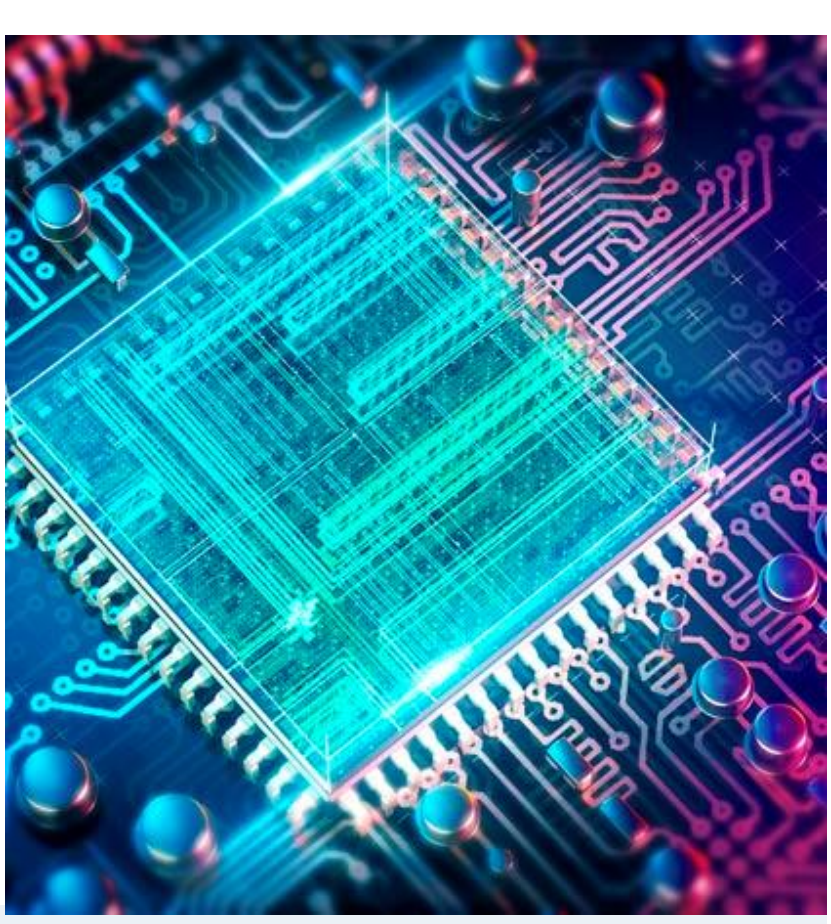
Source: https://diginomica.com/european-union-edges-closer-passing-ai-act-time-essence

The new Digital India Act expected to come soon

Government of India is expected to come up with a new Digital India Act, probably replacing the present IT Act 2000. The draft is scheduled to be released for comments by July / August and is expected to focus on aspects such as data localization, cyber bullying, AI, social media etc.

Source: https://www.thehindubusinessline.com/info-tech/india-to-introduce-new-digital-india-act-to-regulate-big-tech/article66799883.ece

Latest in Tech



Microsoft is building AI Chip

Microsoft is reportedly working on a new AI chip named Athena, which has been in the works for three years. The chip is expected to offer users an integrated solution for scale-out AI and put Microsoft at the forefront of the AI industry. The company has already provided engineering samples of the chip to leading tech firms. Athena is expected to compete with similar chips developed by other tech giants such as Amazon, Facebook, and Google. The company has nearly 300 workers on the Athena AI chip project, and the first generation of the chip will be manufactured by TSMC's 5nm manufacturing process.

Source: https://www.digitalinformationworld.com/2023/04/microsoft-is-looking-forward-to-launch.html

Meta expands Horizon Worlds social VR platform to teen users with new safety features and parental controls

Meta is expanding its social VR platform, Horizon Worlds, to teenage users in the US and Canada with age-appropriate protections and safety defaults. Meta has invested in new safety features, including back-end protections and parental supervision tools, which enable parents and teens to manage the experience before making Worlds available to the age group. The company plans to roll out Horizon Worlds to teens slowly to carefully examine usage before expanding more broadly.

Source: https://techcrunch.com/2023/04/18/meta-opens-up-its-social-vr-platform-horizon-worlds-to-teens/

Google unveils "experiment updates" page for Bard

Google unveils "experiment updates" page for Bard, its conversational AI service, to provide a central location for users to learn about recent updates to the platform, including new features and bug fixes. Google says the page was created to allow people to easily see the latest Bard updates for testing and feedback. The page will also help improve transparency and build trust among users. In addition to this, Google announced two other updates, one of which will enhance Bard's math and logic skills, while the other will provide more search options for users.

Source: https://www.engadget.com/google-bards-new-experiment-updates-page-lets-you-know-whats-new-091039433.html

In The News

Sector Updates

While the Indian IT sector would see growth, however tailwinds would remain.

Indian IT Sector expected to cross USD 245 billion in FY 23

The Indian IT sector is expected to cross USD 245 billion in FY 23, as per Nasscom. The country's export revenue from the IT sector is expected to cross USD 194 billion.

Source: https://timesofindia.indiatimes.com/business/india-business/indian-it-sector-to-touch-245-bn-in-fy23-nasscom/articleshow/98344616.cms?from=mdr

Indian IT industry created 4.5 Lakh jobs in 2022

The Indian IT industry has created more than 450 Thousand jobs in 2022. The industry employs nearly 50 lakh people in total. The software product industry is expected to cross USD 100 billion by 2025. Digital technologies such as AI, Cyber, Cloud, Data analytics are set to drive the next set of growth in the industry.

Source: https://www.livemint.com/news/india/indian-it-sector-created-4-5l-jobs-in-2022-alone-anurag-thakur-says-cloud-computing-ai-etc-to-be-in-focus-now-11682077979943.html

Hiring in the IT sector slowed down in FY 23

Net employee increase fell by about 66% in FY 23 as compared to the previous financial year in the top tier IT companies in India.

Source: https://www.businessinsider.in/business/corporates/news/hiring-in-it-companies-like-tcs-wipro-infosys-hcl-tech-plunges-by-66-in-fy23/articleshow/99960690.cms

Projects and Initiatives

Government Aims to Digitise 3,100 Crore Documents

The Indian government is set to launch phase-III of the e-Courts project, which will see over 3.1 billion documents, including legacy records and pending cases, digitised at a cost of Rs. 2,038.40 crore. The project will also involve the installation of 1,530 solar facilities, costing Rs. 229.50 crore, to ensure seamless availability of information communication infrastructure. The e-Courts project aims to create a technology-driven system that simplifies administrative processes and enables litigants and lawyers to file cases from anywhere and at any time. The project has a four-year timeline and a financial outlay of Rs. 7,210 crore.

Source: https://www.gadgets360.com/internet/news/ecourts-project-phase-3-digitisation-3100-documents-legacy-records-pending-cases-solar-infrastructure-3978521

Google launches Passkeys Feature

Google has launched the passkey feature, which has a potential to replace passwords in future. Presently, it is expected to be an additional option for people to sign in, while in future it may replace the need to have passwords. Passkeys are an easier and safer way to sign in and access websites, portals and apps and can be a game changer in future. They are said to be more resilient to online attacks and will make the internet a far safer place than what it is today.

Source: https://zeenews.india.com/technology/say-goodbye-to-passwords-with-googles-new-passkeys-feature-what-is-it-and-how-to-use-it-2602793.html

White House announces USD 140 million investment in AI

The US Government has announced a USD 140 million investment in AI to setup seven AI research hubs and building trustworthy AI ventures. AI based research would focus on aspects such as climate change, agriculture and public health.

Source: https://www.cnbc.com/2023/05/04/white-house-announces-ai-hub-investment.html

4 Hear from the Expert

Shri Amarjeet Singh Cheema

Associate Director, Health Informatics Group,
Centre for Development of Advanced Computing (CDAC)

Q. What are your thoughts on the current Digital Health Landscape in India?

The current digital landscape is ready and well equipped with the efforts of the Indian Government. There was a time when we were talking about the limitations and issues in digital landscape such as internet connectivity, non-availability of user-friendly solution, limitation in knowhow of standards adoption and HMIS (Hospital Management Information System) working in silos due to non-availability of exchange Eco system.

Digital Health Landscape Journey can be defined as:

Stage 1: Minimum Compliance to standards

Earlier the connotation of digital health was with electronic medical record where two approaches were taken – one, in which we captured the clinical summary in the form of digital record and the second, in which the medical transcription by scanning the documents and uploading as part of digital record. This practice has been followed since early 2012, where the focus of hospitals was on the data capture part with bare minimum data, while nobody talked about standardization of this data as per the international standards such as ICD, HL7, SNOMED, which was a key standard for interoperability. However, in early stages of digital health in India, there were very limited dialogues on interoperability or health standards.

Stage 2: Focus on Standards and Interoperability

So, in 2016, the government released guidelines with 35 standards that every HMIS should be compliant with and adhere to. The terminology standards such as ICD-10, SNOMED CT should be used for capturing the clinical data. The second part is the exchange standard, where the earlier focus was on HL7, now it is converted towards FHIR. The guidelines around it were published in 2016 and as a mandate hospitals and solution providers had to comply with it. The key challenge with these standards is the interoperability between multiple HMIS applications which are exchanging data that are hospital specific. This needs specific integrations which turns out to be a bottleneck at a later stage. The whole concept of digital health record is defeated because we all are working on one or the other standards, but the challenge is there is no ecosystem available. Standards were established but the ecosystem was not ready to provide seamless exchange of EMR among multiple hospitals through a digital ecosystem.

Hear from the Expert

Sh. Amarjeet Singh Cheema, CDAC

Stage 3: Ayushman Bharat Digital Mission (Current Digital Landscape)

With the launch of Ayushman Bharat Digital Mission (ABDM) in April 2018, the ecosystem is readily available and healthcare providers and citizens have started to embark on it. ABDM is based on federated architecture, a platform is built where hospitals can submit any digital records in standard formats and other hospitals can easily read it, reducing integration, and cutting down manual efforts for hospital specific integrations. Currently, everything is ready, and we can easily leverage the digital ecosystem and reap benefits out of it.

Q. Could you provide insights into the Health Informatics products and solutions currently being developed by CDAC that are expected to have an impact on the Digital Health Landscape?

Centre for Development of Advanced Computing (CDAC), is an autonomous society under Ministry of Information and Technology, having around 12 centres spread across India where 4 centres are working on digital health products. CDAC Pune centre is expert in health standards, and they are the national resource centre of EHR Standards for India known as NRCeS for SNOMED CT and implementation of Health standards. CDAC Trivandrum has specialised in oncology specific medical devices software. CDAC Mohali is working on e-Sanjivani, which is a telemedicine solution for Government of India and most of the government hospitals are using it now for the tele-consultations. CDAC Noida has its strength in Hospital Management Information System for the last 22 years. Most of the government and state agencies have onboarded on our platform and automated their hospitals.

We have three products – Hospital Management Information System (HMIS) which is e-Sushrut implemented across PGI, AIIMS, Indian Railways and other large government hospitals, state-wide hospitals and various PSUs. Apart from this, we have e-Raktkosh, which is a one nation one platform for blood availability sponsored by the Ministry of Health and Family Welfare (MoHFW) where 3000+ government and private blood banks have been onboarded. Another product is e-Aushadhi, which is a Drugs and Supply Management System that is also implemented across India.

Now CDAC Noida's vision is towards the machine learning based decision support system and to develop a tool so that all hospital applications can be easily compliant to ABDM. It is basically ABDM compliant FHIR connector where any legacy system can be easily on boarded, while the core competency of Noida Centre is HMIS which will be leveraged in development of this.

Q. What role does the National Health Stack play in shaping the Digital Health Landscape in India?

The problem which I discussed in my first question is that we had no ecosystem for exchanging health information earlier. So, this National Health Stack comes out to reduce this gap. It is enabled with the right tools, it has the right technology, has the standards published, has the infrastructure released and now also provides incentives to hospitals and solution providers to encourage and use this. Being a government agency, the National Health Authority, is enforcing these standards time-to-time and also whenever possible, releasing the required workflows that should be adopted to convert manual efforts to digitalization. One of the examples in our current scenario is Scan and Share, where most of the government hospitals have implemented it and it is providing relief to

Hear from the Expert

Sh. Amarjeet Singh Cheema, CDAC

patients by not standing in queues. They can now scan the QR Code and directly visit doctors. Hospitals, patients, doctors and even registries (HFR or HPR) are directly reaping benefits out of this technology by giving the authentic information to the user. Also, with the launch of Unified Health Interface (UHI), in upcoming days, the integration of all products in a single platform will be possible, where you can get the appointment details, hospital information etc. on a single app. So, such initiatives by the government have been taken and in the coming years we all are going to see the change in our medical prescriptions and medical records.

Q. From a Digital Health perspective, what are some key technology challenges that we should prioritize?

The first challenge is availability of HMIS at hospital end. Hospitals should be onboard with the latest technology solutions. The second challenge is that the application should be robust and scalable. If we talk about applications in earlier days, there were no scalable applications or even no cloud enabled applications. And the main problem they are facing right now is the load. Because with the launch of ABDM and the increased digital awareness fueled with the COVID-19, we all are using digital ways to connect with the doctors. The legacy applications are not robust enough to take this load due to their development in accordance with old architecture.

With the launch of ABDM, hospitals have reduced the technological level challenges.

However, the main challenge is still not fully addressed i.e., the readiness of the doctor to capture the digital records. We have different flavours of doctors as well as different flavours of implementations.

If you talk about doctors, Senior doctors perceive the entering of clinical information synonyms with a data entry task. Their demand is always to minimize the data entry work or for a solution like voice to text, wherein they can speak which can then be translated to text or some technology enabled writing pads where they can write, and that data can be captured in a digital form. So, the major challenge is how to onboard these doctors who are reluctant to enter the records in a HMIS system.

The aim of ABDM is not to generate the ABHA Number nor it is to create the ecosystem but to create clinical records of the patient in the digitized form. Very less percentage (%) of records are in the digital form and are far away from achieving a perfect 100%. So, this is the biggest challenge that the doctors are not keen to handle, or we can say that solutions are not equipped with tools to address the usability requirements.

On the other hand, the newly established hospitals are very keen to address this clinical information capture where the systems have less loads and footfalls. The motivation for them is to establish themselves in the market and they are very much using clinical system to capture the digital information.

Another challenge is the trust issue and data security. For example, there is a well-established hospital in the market for over 20 years who is not keen to enter these clinical records for some security issues. Basically, they are reluctant to share their data on the national ecosystem. Five years back, internet connectivity and cloud enablement were a major challenge. Now we have access to high-speed internet, cloud enablement is available which eases the data security part along with SOC operations which improves the infrastructure to foster the data security part of the challenge.

The ecosystem for digital health records is ready, the only challenge is how to onboard the cloud partner, the solution partner and enforce the hospital users to capture these records in digital format.

Hear from the Expert

Sh. Amarjeet Singh Cheema, CDAC

Q. Could you share some of the critical learnings from the nationwide rollout of your Hospital Information Management System?

See, basically if we talk about the learnings, in the current scenario the applications should address the basic non-functional requirements related to the usability, manageability, performance and scalability. Basically, the performance, scalability and usability directly impact doctors because when you create one form which doesn't have good UI/UX or shortcut keys, the doctor may be reluctant to use it to capture the clinical information. So, we need a design thinking approach while developing such kind of applications in reference to the users' requirements. It's a challenge because the earlier applications were not thought about like this in terms of good UI/UX and usability.

The second thing is the load and the scale the application should handle and achieve. We need to ensure about cloud enabled microservices based architecture, how the load will be addressed as it increases day by day with more and more patients coming to hospitals and more doctors using these modules and with many modules now in the rollout phase. It is imperative to plan and develop applications that can handle the scale and load with the current and future demands of users.

The third challenge is awareness of digital records and how we onboard the doctors as well as patients. We want that the clinical record should be captured, and patients should be educated about it, so that they can tell the doctor that they need the clinical records. Because right now if you talk about yourself, you may not be having your ABHA Number while we speak. This is the challenge and the awareness of ABHA Number, ABDM needs to be communicated to every citizen of India, so that people generate ABHA Number and start using it on the HMIS system.

About the Expert: Sh. Amarjeet Singh Cheema

Mr. Amarjeet Singh Cheema works as an Associate Director and Head of the Department at the Health Informatics Group, C-DAC Noida. He has recently completed his successful tenure with NHA as Director IT Operations. He has also worked as a Joint Advisor (IT) in TRAI. He has 22+ years of experience in the Health Informatics field and has led several projects of national importance.

He is certified CMMI Associate and has received C-DAC Noida's Best Leadership Award and Director General C-DAC Better Performing Fellow C-Dacian Award. He is passionate about transforming research into practical applications. The systems designed by him are being used by millions of users and have received several prestigious awards over the years. He has more than 25 publications in reputed national and international conferences/journals and 04 copyrights.

PASSION

for providing solutions to help clients achieve their goals

RESPECT

for all and alternate viewpoints

INTEGRITY

of thoughts and actions

MASTERY

of our chosen subject to drive innovative and insightful solutions

US

representing the Primus collective, where each individual matters

STEWARDSHIP

for building a better tomorrow

About Primus Partners

Primus Partners has been set up to partner with clients in ‘navigating’ India, by experts with decades of experience in doing so for large global firms. Set up on the principle of ‘Idea Realization’, it brings to bear ‘experience in action’. ‘Idea Realization’— a unique approach to examine futuristic ideas required for the growth of an organization or a sector or geography, from the perspective of assured on ground implementability. Our core strength comes from our founding partners, who are goal-oriented, with extensive hands-on experience and subject-matter expertise, which is well recognized in the industry. Our core founders form a diverse cohort of leaders from both genders with experience across industries (Public Sector, Healthcare, Transport, Education, etc.), and with varied specialization (engineers, lawyers, tax professionals, management, etc.).

BENGALURU

91 Springboard
Business Hub 175, 176
Bannerghatta Rd,
Dollars Colony,
Bengaluru – 560076

CHANDIGARH

2nd Floor, Netsmartz,
Plot No. 10, Rajiv
Gandhi Chandigarh
Technology Park,
Chandigarh – 160019

DELHI

15, Tolstoy Rd
Atul Grove Road, Janpath
Connaught Place,
New Delhi – 110001

KOLKATA

Siddhartha Apartments
4th Floor, 188/2,
Block J, New Alipore,
Kolkata - 700053

MUMBAI

601, 6th floor,
Raheja Centre,
Nariman Point,
Mumbai - 400021