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Mobile Computing : Technology Enabler for Digital India

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Abstract:

Government of India Started the Digitalization project for providing government services via electronic media to reduce paper work and make transparency in transaction with less cost, time and efforts. The creation of digital infrastructure, delivering, services digitally, digital literacy are the components of Digital India. The Power of doing the Computing operation rapidly without the geological barriers has done because of Mobile Computing. It is general term for anything that involves in performing the computational services over the Internet. These services are broadly divided into three major concepts: hardware, software and communication.Thus the Mobile Computing Technologyand Digitalization helps the end users/citizens to share, access and updating information as per their authentication from remote location and this information is securely stored in systems.

Keywords: *Digital India, Mobile Computing, Digitalization, WiMax, PDA, GPS.*

1. Digital India:

Digital India Scheme Launched on 1 July 2015 by Prime Minister Narendra Modi, it is both enabler and beneficiary of other key of Government of India schemes, such as BharatNet, Make in India, Startup India and Standup India, industrial corridors, Bharatmala, Sagarmala, and UDAN-RCS.Digital India project prepared the nation to be well-connected, efficient, and productive. the main aim if this project is reach out to the most-remote corner of the country irrespective of climatic, geographical, political, and land topology to enable two-way interaction with the Government whether central, state, or local Gram Panchayat. The Government of India entity Bharat Broadband Network Limited (BBNL) which executes the BharatNet project is the custodian of Digital India (DI) project.BharatNet will connect all the 625,000 villages of India by December 2018.

In today's digital world, there is a good mix of technologies that support cost containment, collaboration, security, services-on-the-go, social connect, and in-built intelligence that provide remote access to any information or service available across the world. Technologies also bring in a set of complexities that need to be managed and governed to bring in their strengths and control their weaknesses or lacunae. India with its diversity and geographical layout will need to work with the technologies like cloud-computing, mobility (web-based approach), analytics, social and security in a very well-coordinated and organized structure. Government of India together with the State government have adopted multiple pursuits and launched programs to connect with people by experimenting with available technology.

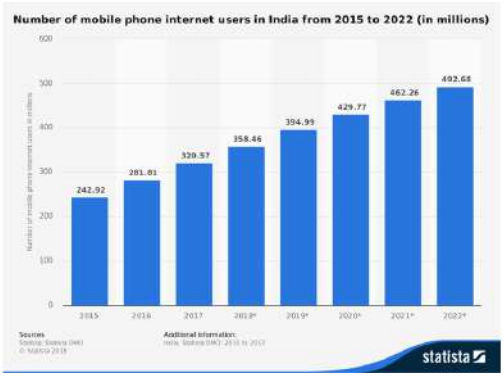

Fig.1.1Number of mobile phone internet users in India from 2015 to 2022 (in millions)
Source:https://www.statista.com/statistics/558610/number-of-mobile-internet-user-in-india/

The above graph show that how users of mobile or smart phones are increasing now a days and in India. As per survey made, up to 2022 the users are increased by 492.6 millions in India. It indiated that how the life will change.

The success of Digital India will depend on the coordination among the state and central bodies. New era should bring in lean, agile and productive government run initiatives that reach citizens irrespective of social-economic, geographical or regional diversity. The digital connect should be safe, secured, cost effective with optimal resources and strategically interfaced.

2. Pillars of Digital India:

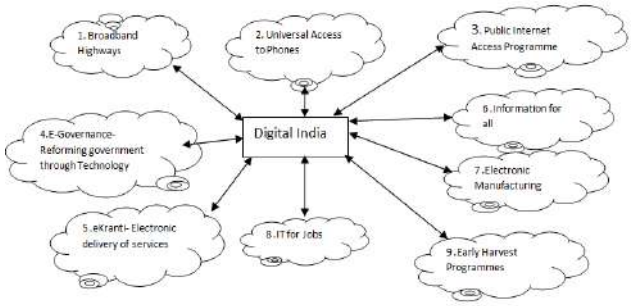

Fig.1.2 Nine pillars of Digital India

3. Digital strategy and objectivesof Digital India:

3.1 Government to enable devices, systems, applications, infrastructure and data that is smart (effective and optimal), secure and cost-sensitive (flexible to change for any new technology migration)

3.2 Empower citizens of India with data and information that is available with government across all departments. Information to be digitized with government services that are accessible online anytime, anywhere on any device

3.3 Enable availability of government data and service and hence facilitate innovation to bring several opportunities to general public e.g. farming, education, health-care Digital enablers

4. Mobile Computing

Mobility has become a very popular word and rapidly increasing part in today's computing area.

Mobile Computing = Mobile + Computing

An incredible growth has appeared in the development of mobile devices such as, smartphone, PDA, GPS Navigation and laptops with a variety of mobile computing, networking and security technologies. In addition, with the development of wireless technology like WiMax, Ad Hoc Network and WIFI, users may be surfing the Internet much easier but not limited by the cables as before. Thus, those mobile devices have been accepted by more and more people as their first choice of working and entertainment in their daily lives.

So, what is Mobile computing exactly? In Wikipedia, it is described as a form of human-computer interaction by which a computer is expected to be transported during normal usage. Mobile computing is based on a collection of three major concepts: hardware, software and communication. The concepts of hardware can be considered as mobile devices, such as smartphone and laptop, or their mobile components.

Software of mobile computing is the numerous mobile applications in the devices, such as the mobile browser, anti-virus software and games. The communication issue includes the infrastructure of mobile networks, protocols and data delivery in their use. They must be transparent to end users.

Fig.1.3 Mobile Computing Architecture

1) Features: the features of mobile computing are as follows:

a) **Mobility:** mobile nodes in mobile computing network can establish connection with others, even fixed nodes in wired network through Mobile Support Station (MSS) during their moving.

b) **Diversity of network conditions:** normally the networks using by mobile nodes are not unique, such networks can be a wired network with high-bandwidth, or a wireless Wide Area Network (WWAN) with low-bandwidth, or even in status of disconnected.

c) **Frequent disconnection and consistency:** as the limitation of battery power, charge of wireless communication, network conditions and so on, mobile nodes will not always keep the connection, but disconnect and consistent with the wireless network passively or actively.

d) **Dis-symmetrical network communication:** servers and access points and other MSS enable a strong send/receive ability, while such ability in mobile nodes is quite weak comparatively. Thus, the communication bandwidth and overhead between downlink and uplink are discrepancy.

e) **Low reliability:** due to signals is susceptible to interference and snooping, a mobile computing network system has to be considered from terminals, networks, database platforms, as well as applications development to address the security issue.

2) Challenges: Compared with the traditional wired network, mobile computing network may face various problems and challenges in different aspects, such as signal disturbance, security, hand-off delay, limited power, low computing ability, and so on. Due to the wireless environment and numerous mobile nodes. In addition, the Quality of Service (QoS) in mobile computing network is much easier to be affected by the landforms, weather and buildings.

6. The Benefits of Mobile Computing

- **Connectivity:** You can stay connected to all sources at all times.
- **Social Engagement:** You can interact with a variety of users via the Internet.
- **Personalization:** You can tailor your mobile computing to your individual needs.

5. Visions of Digital India and Mobile Computing:

Vision enabled by Mobile Computing which are coincides with visions of digital India:

- Mobile computing is a versatile and potentially strategic technology that improves information quality and accessibility, increases operational efficiency, and enhances management effectiveness. This is because of its capability to enable users to remain connected while on the move.
- Mobile Computing - the support of mobility and the access to information and services at the same time
- Common Service Centre information and private space on public cloud.
- Individual documents and certificates using hybrid cloud.
- Collaborative digital platform using public cloud Service Enablement.
- Highly secured data of classified nature should be hosted within the firewall and available on secured private cloud. This will have multiple security checks on secured network.
- Open information and services from the Government bodies can use public cloud provided by one of the vendors such as Amazon Web Services, Microsoft Azure or Google Cloud.
- For few services that would require aggregation, customization and integration with other service providers.

To enable Digital India it is necessary to evaluate the type of services that will be provided to citizens. Digital India should have strategy wherein the Government will be providing information and services to internal and external stakeholders. This requires having a strong architecture principle and policy to host data and services to relevant mobile delivery model.

6. Future scope of MobileComputing

The summary of a few reports from popular research analyst firms are as below:

Scope of mobile computing in India is quite good. From new features to new apps, smartphones have managed to keep people hooked to their device. Not only smartphone have become an important part of the daily life but it has become a habit.

With over 2.5 billion people downloading new apps every day, there is no doubt that mobile apps will surely take a big step in shaping the future of interaction. App development ideas have always matched the steps of change in features of smartphones. Now you can imagine the future. In future there is no alternative of Mobile Computing. It is the most important part of our routing life and it will give the comfort and reduce our human brain stress by doing automatic work done.

7. Risk in Mobile Computing:

The list of conceivable dangers faced by mobile computing users are many.
They include:

- Malware
- Viruses
- Stolen or lost hardware
- Phishing schemes
- Spam
- Insecure or malicious applications
- Unsecured Wi-Fi connections

ESG recently published a new research report titled, The State of Mobile Computing Security, that looks at mobile computing security holistically across devices, applications, data, and IT security operations. Based upon this research, it appears to me that security issues around mobile computing have been way overstated. The esearch indicates that mobile computing risk is really associated with:

1. **Basic IT operations blocking and tackling.** Enterprise organizations realize that it is risky to let unknown and unmanaged devices frolic around their networks at will. To mitigate this risk, many organizations have created cross-functional mobile computing tiger teams within IT,
2. **Data security.** When asked to identify mobile computing security challenges, 43% of security professionals point to "protecting data confidentiality and integrity when sensitive data is accessed by a mobile device over the network," while 41% say, "protecting data confidentiality and integrity when sensitive data is stored on a mobile device." These results shouldn't be a surprise, we've been struggling with discovering, classifying, and protecting sensitive data since companies decided to process departmental data on Digital VAX systems rather than putting all of their MIS eggs in the IBM mainframe basket. Of course mobile computing exacerbates this risk but mitigation comes down to user training, acceptable use policies, security controls, and strong monitoring. Nothing new here.
3. **Mobile application development.** Research reveals that 42% of enterprise organizations are developing a "significant amount" of mobile applications while another 38% are developing a "modest amount" of mobile applications. These mobile apps vary - 45% of organizations are developing hybrid applications, 41% are building native iOS apps, and 39% are coding with HTML 5.0. The scary thing here is that less than half of organizations are currently including best practices for secure application development.
4. **Third-party applications.** No surprise here - Angry Birds, Dropbox, and Facebook represent a threat vector for malicious code and data exfiltration. Little wonder then that 40% of enterprise have implemented security controls (i.e. Web controls from Blue Coat, ProofPoint, Trend Micro, etc., NGFW from Check Point, Cisco, Fortinet, Juniper, McAfee, Palo Alto, etc., application controls from Bit9, Symantec, Viewfinity, etc.) to detect and/or block this behavior.

Yes, security professionals are concerned about mobile malware - in fact 80% believe that mobile malware threats will become "significantly" or "somewhat" more dangerous in the next few years. Security professionals' fear is certainly supported by the fact that Android malware is growing in the triple digits as many researchers claim. That said, this malware seems to be consumer-focused and centered in Asia today, so it doesn't represent an enterprise threat in its current iteration.

8. Conclusion:

The Government of India Aims to transform the county to adequate the upcoming digitalization revolution. As the vision of India is digitally empowered our society and knowledge economy. The Digital India has taken many step to do this transformation and would insure that all government services available to Indian Citizen electronically. It include all sectors like Hospital, Education, Public, Transport, etc. It would also bring in public accountability through mandated delivery of government's services electronicallytobecome India digitally empowered, technology plays an important role. Therefore Mobile Computing technology having highest future demand for smooth functioning, security and fulfilling the goals set for Digital India.

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