GOVERNMENT OF KERALA
KERALA STATE PLANNING BOARD

FOURTEENTH FIVE-YEAR PLAN
(2022-2027)

# WORKING GROUP ON
# E-GOVERNANCE

Perspective planning division
March 2022

## FOREWORD

Kerala is the only State in India to formulate and implement Five-Year Plans. The Government of Kerala believes that the planning process is important for promoting economic growth and ensuring social justice in the State. A significant feature of the process of formulation of Plans in the State is its participatory and inclusive nature.

In September 2021, the State Planning Board initiated a programme of consultation and discussion for the formulation of the 14th Five-Year Plan. The State Planning Board constituted 44 Working Groups, with more than 1200 members in order to gain expert opinion on a range of socio-economic issues pertinent to this Plan. The members of the Working Groups represented a wide spectrum of society and include scholars, administrators, social and political activists and other experts. Members of the Working Groups contributed their specialised knowledge in different sectors, best practices in the field, issues of concern, and future strategies required in these sectors. The Report of each Working Group reflects the collective views of the members of the Group and the content of each Report will contribute to the formulation of the 14th Five-Year Plan. The Report has been finalised after several rounds of discussions and consultations held between September to December 2021.

This document is the Report of the Working Group on "E-Governance." The Co-Chairpersons of Working Group were Dr. Amit Prakash and Sri.Biswanath Sinha IAS. Sri. V. Namasivayam, Member of the State Planning Board co-ordinated the activities of the Working Group. Dr.V Santhosh, Chief, Perspective Planning Division was the Convenor of the Working Group and Dr. Praveen P, Assistant Director was Co-Convenor. The terms of reference of the Working Group and its members are in Appendix 1 of the Report.

Member Secretary

## PREFACE

This report brought out by the Working Group on "e-governance" constituted by the State Planning Board as part of formulating the Fourteenth Five Year Plan includes a general narration of the e-governance programmes Framework in the State along with different schemes of e-governance now being undertaken for execution by various Departments. It also attempts an evaluation of the schemes undertaken during the Thirteenth Five Year Plan Period.

We would like to place on record the invaluable inputs made by the Members of the Working Group in developing this report and the services rendered by the concerned Member of State Planning Board, Sri. V. Namasivayam, concerned division Chief Dr. V. Santhosh and staff of the Perspective Planning Division, State Planning Board in compiling this report, which we are sure would serve as a blueprint for the comprehensive and effective management of e-governance in the State through the next five years and beyond.

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## SUMMARY

This report brought out by the Working Group on "e-governance" constituted by the State Planning Board as part of formulating the Fourteenth Five Year Plan includes a general narration of the e-governance programmes framework in the State along with different schemes of e-governance now being undertaken for execution by various Departments which includes IT Mission, IKM, E-health mission, C-DIT, ICFOSS, IIITMK, Digital University, NIC etc. It also attempts an evaluation of the schemes undertaken during the Thirteenth Plan Period. Department of Information Technology realizes the need to integrate the e-governance initiatives in the state. It is in this context that the e-Government strategy for Kerala has been designed, with a focus on facilitating effective delivery of government services to customers.

**Key ideas and recommendations emerging from the Working Group**

The Working Group recommends changes to the existing schemes under the 13th Five year and also made certain general recommendations are given below:

- There is a need for all Government investments in e-governance applications and infrastructure to come up with a clearly articulated theory of change and impact matrix. Indicators related to good governance values of Government of Kerala, such as participation, transparency, effectiveness, equity etc. need to be included in such matrices apart from number of registrations and transactions or turnaround times after the data is entered in the digital application.
- A committee of experts drawn from different functional domains of e-governance as well as with an understanding of the various governance and development sectors could prove useful in assisting the Government of Kerala ensure that its e-governance projects contribute positively to a better quality of life for all its citizens, including those from marginal and underserved social groups. An appropriate agency within the Government, such as the KSITM, could serve as the coordinating agency and secretariat for such an activity.
- It has been observed that e-governance projects have been traditionally carried out by multiple Departments and agencies to cater to their specific needs and requirements without adherence to common standards that can ensure integration and interoperability, whenever the need so arises.
- A need is now being felt in Kerala to draft an agency or unit within the Government to identify the right set of e-governance standards and customize them to cater to the specificities of the State's context. This agency could also come up with a mechanism to scrutinize all e-governance designs for conformance to the appropriate set of standards.
- This aforesaid agency/unit could also perform a coordination role by maintaining a project repository which could serve as a useful single point of information source for all e-governance projects in the State. Such a repository can contribute to reducing duplications and also ensure better tracking and monitoring of project implementations.
- Various efforts related to e-governance across the Departments of Government of Kerala, as enumerated in the earlier section, have led to creation of large data sets

involving important details related to citizens and organizations and their transactions with state agencies. Data protection and privacy concerns, therefore, need to be built into the design and use of e-governance systems.

- The state needs to carefully consider the trade-off between civil liberties and public interest when making decisions to deploy systems such as facial recognition systems, or AI/ML-based predictive systems in law enforcement or judicial systems. Thus, the state's decision to collect data or deploy such systems needs to be embedded in constitutional values and emerge out of public consultations.
- Conduct a comprehensive survey of all existing legacy digital systems and critical digital infrastructure to identify risks and plug points of failures.
- Develop cyber security framework and standards to guide the development of new digital applications and creation of new digital infrastructure.
- Conduct regular cyber security audits and assessments of critical digital infrastructure and applications.
- Develop a comprehensive Disaster Recovery and Business Continuity Plan (DR-BCP) covering all e-governance applications along with the concerned Departments to ensure minimal impacts in cases of failures.
- Disseminate information related to safe online behavior to citizens and various other users of the State's e-governance technologies.
- Coordinate with academic and training organizations to develop short-term and long-term programmes on various aspects of cyber security to enhance capacities within the Government as well as agencies working on e-governance applications and infrastructure.

The 14th Five Year Plan Working Group Committee on e-governance feels that when implemented its Recommendations can have a very positive impact on the ICT oriented e-services scenario in the State very positively when they are implemented.

## CHAPTER-1
# INTRODUCTION

E-Governance, or the practice of designing and using digital technologies for better governance outcomes, has evolved from single function process automation and static department websites to inter-organizational and real-time citizen facing systems. While E-Governance is generally seen as contributing to efficient departmental operations and faster turnaround times for citizen services, research studies and analyst reports continue to highlight the importance of access, inclusion, voice and representation of marginal social groups. Concerted and sustained efforts by governments to address these critical dimensions of digital divide, therefore, become important to ensure that technologies align well with the governance ethos.

The Government of Kerala is committed to equitable development. It is committed to making efficient public services available to all citizens and to ensuring that public institutions are responsive to people's needs in a modern, technologically advanced world. Information and communication technology (ICT) is seen as essential to meeting these commitments.

Kerala has sturdy historical foundations on which to build its e-governance structure. It has strong institutions of local government and active people's participation in administration and development. The IT policy of the State, announced by the Government of Kerala in 2017, envisages a knowledge-powered digital society and the overall social and economic empowerment of all citizens. Young people in Kerala are educated, employable, and responsive to the demands placed by modern technology.

The Government of India's Digital India programme, with which the Government of Kerala is in broad agreement, has three major components. These are: (1) to create digital infrastructure for citizen access as well as industrial and commercial purposes; (2) to provide services for citizens and businesses from online and mobile platforms and (3) to ensure the digital empowerment of people by building digital literacy and sharing government performance data in open platforms.

**Deliberations on E-Governance during the Kerala Looks Ahead (KLA) Conference organized in February 2021:**

The sessions on E-Governance at the conference had a focus on three thematic areas: (i) Citizen access to services and empowerment, (ii) Decision support systems and analytics, and (iii) Legal and policy dimensions. National and international experts drawn from the academia, government and its research units, inter-governmental and multi-lateral organizations, industry and the civil society participated in these sessions. The talks and ensuing discussions touched upon affordable and accessible digital infrastructure, technology design approaches that integrate well with local practices, coordination across departments through interoperable frameworks for better decisions, need for state agencies to build trust with citizens on matters related to digital data, and engagement with regulations on privacy and implications for automated decision-making applications.

There was agreement that if benefits of E-Governance are to reach a wide range of social groups, attention to local production capacities and sensibilities continues to be relevant and important. Design approaches for E-Governance projects should incorporate flexibility to cater to variations in local practice and it may be useful to integrate and synergise agile approach to current medium term plan driven methods. While the medium term plans provide the necessary direction and integration prerequisites between various initiatives, agile approach provide necessary speed to respond to changing requirements.

E-Governance projects should be evaluated on positive governance outcomes using criteria such as citizen benefits, ease of doing business, accountability, equity and inclusion. It was also agreed that while new technologies like Artificial Intelligence (AI) can enhance quality of decision support systems, the issues of bias and discrimination will have to be explicitly attended to. There is a need to ground the issues of privacy and security (and, technology innovations generally) in constitutional values. Moreover, wider public consultations on technology design features and data practices considered essential in E-Governance applications can be useful to ensure that democratic values are upheld and strengthened.

The E-Governance strategy for Kerala's XIII Five-Year Plan needs to draw upon the aforesaid strengths of the State, its experience with the policy and practice of using ICT in its governance programmes as well as the recommendations on ways ahead that have come out in the KLA Conference.

After a brief review of existing schemes and programmes being executed by various government agencies and departments, and an analysis of their impact on better governance and convenience for diverse citizen groups, this document proposes key initiatives that Government of Kerala could focus on during the next five years. The guiding principle, as noted above, continues to remain overall socio-economic progress of the State by further strengthening democratic values and citizen's participation through the use of appropriate digital technologies.

## CHAPTER- 2
# KEY E-GOVERNANCE AGENCIES AND SCHEMES IN KERALA

Kerala has made significant progress in its transformational journey towards being an inclusive and efficient "Digital State". Some of the State's remarkable achievements over the last five years are given below:

- Kerala was declared as the 1st Digital State in the country by Government of India in 2016
- Hi-Speed Rural Broadband Network was first commissioned in India at Idukki
- Kerala is the first State in the country to issue over 4 crore e-Certificates.
- 100 per cent of the Grama Panchayaths in Kerala are connected through optical fibre network

A brief description of key departments and agencies in Kerala that are contributing to e-governance over the past few years and their major schemes and initiatives is given below.

**I. Kerala State IT Mission (KSITM)**

Kerala State IT Mission is an autonomous nodal IT implementation agency of the Department of Information Technology, Government of Kerala which provides managerial and technical support to various initiatives of the Department. KSITM performs diverse roles including, enactment of ICT related policies, development of guidelines and standards for e-governance, ICT facilitation for the Government entities, providing end to end support and guidance to State Departments in digitisation efforts, act as a bridge between Government and industry, undertake Capacity Building initiatives and bridge the digital divide, establish and sustain common IT Infrastructure and take up various e-Governance initiatives. The focus activity is delivering the best of the digital services to the citizens keeping in mind "Citizen First" approach.

The major initiatives of KSITM over the last few years are given below (details provided in the Annexure):

- e-SEVANAM & m-SEVANAM: Online Service Delivery System of Government of Kerala
- Kerala State Spatial Data Infrastructure (KSDI): a mechanism to provide geospatial data sharing at all levels of Government, the commercial sector, the non-profit sector, and academia.
- Kerala Public WiFi (KFi): a free wi-fi project that aims to establish 2,000 wi-fi hotspots across the State to provide free internet to the citizens.
- e-Procurement (https://etenders.kerala.gov.in): a Mission Mode Project (MMP) of the Government of India, under National e-Governance Plan aimed at increasing transparency in all government procurement; the project had commenced in 2011.
- e-Office: a Digital Workplace Solution to automate File Management in Government offices.
- Government Contact Centre-Kerala (GCC-K): a government call centre/helpline commissioned as a software-based, State-of-the-Art Contact Centre solution.

- e-District: a State Mission Mode project under Digital India, conceptualized to provide integrated, seamless, and online delivery of citizen services at the district level through automation of work flow, backend digitization, integration and process redesign.
- FRIENDS (Fast Reliable Instant Efficient Network for Disbursement of Services): a single window 'no queue' integrated remittance centre, where the citizens have the opportunity to pay all taxes and other dues to the Government, under one roof at no extra cost.
- Aadhaar Enrolment: KSITM has been approved as the nodal agency for Aadhaar enrolment in the State, as well as the Authentication User Agency(AUA) and e-KYC User Agency (KUA) for offering the Authentication and e-KYC services offered by UIDAI.
- Computer Emergency Response Team, Kerala (CERT-K): was set up in May 2010 and since then, CERT-K has been instrumental in building resilience into the critical information infrastructure of Kerala.
- Capacity Building: through the Virtual IT Cadre project which seeks to form and train an effective IT team for driving e-Governance projects within various departments in the State.

**KSITM** also manages the core infrastructure for e-governance in the State, which consists of Kerala State Wide Area Network (KSWAN), Secretariat Wide Area Network (SECWAN), State Data Centre, and State Service Delivery Gateway (SSDG).

- KSWAN is the backbone of the State Information Infrastructure (SII), and around 4,000 offices of the Government are connected to KSWAN through wireless connectivity, and a larger number through leased lines and LAN.
- State Data Centres (SDCs) are at the heart of the State's e-governance infrastructure, hosting various applications and websites of the Government entities and provisioning associated services. The objective of the State Portal and SSDG project is to provide a "one- stop" shop to the citizens for Government services, both informational and transactional.
- Kerala State Portal "https://kerala. gov.in" provides all Government related information and departmental services routed through services gateway (SSDG). A new website layout is designed by interacting with various stakeholders and intellectuals for accommodating all the contents from kerala.gov.in, with around 100 additional new pages and satisfying the Government of India guidelines for websites and State Portal Framework guidelines.

**II. Information Kerala Mission (IKM)**

Information Kerala Mission is a pioneering e-governance effort by the Government of Kerala for implementing the computerization activities of the Local Self Government Institutions of Kerala. It was started in June 1999. IKM is registered as an autonomous institution under the Travancore - Cochin Literary, Scientific and Charitable Societies Registration Act, 1955. All e-governance programs related to developing software for efficient and responsive systems for smart governance and improving public service delivery with comprehensive citizen interface covering various activities of the Local Self Governments are being carried out by IKM.

Some initiatives of IKM over the last few years are given below (details provided in the Annexure):

- ILGMS (Integrated Local Government Management System): a comprehensive digital platform for Local Government Institutions to cater to their entire requirement of governance. ILGMS consists of one horizontal domain and many vertical domains, which comprises their entire day-to-day activities. The ILGMS developed in a three-tier architecture using open source technologies.
- Citizen Service Portal: a single point to deliver online LSG services to citizen without going to the Local Government Offices.
- Plan Monitoring – Sulekha: a comprehensive e-governance initiative for effective real time formulation, approval and expenditure tracking process of the annual Plan projects of Local Self Government Institutions.
- Civil Registration – Sevana: for carrying out all operations related to birth, death and marriage as per the acts and rules.
- Social Security Pension – Sevana Pension: for managing the disbursement of seven Social Security Pension schemes to over 50 lakhs beneficiaries
- Accrual based double entry Accounting – Saankhya: for handling accounting operations in Local Self Government Institutions and also for generating annual financial statements and various MIS reports
- Taxes and Revenue – Sanchaya: an application software for streamlining Revenue System in local governments.
- Building Permit – Sanketham: a web based software for issuing digitally signed online building permits and plans
- Workflow application – Soochika: for recording and acknowledging all inwards/thapals received in an office and also handling the workflow
- Asset mapping and monitoring – Sachithra: for maintaining asset registers, valuation, transfer, maintenance and renewal/disposal of assets
- Establishment – Sthapana: for smoothening establishment functions, pay roll preparation and handling provident fund details of local government employees

**III. e-Health Kerala Project**

The e-Health Kerala Project, based on the concept of "One citizen one Electronic Health Record", is a unique, robust and sustainable Healthcare Information Technology solution supporting nearly 50,000 healthcare service personnel consisting of Doctors, Paramedical and other non-clinical staff at the Primary, Secondary and Tertiary care centres maintained by the State Government. The project's vision is to build an Integrated Healthcare Cloud which will hold the complete healthcare data about all the citizens in the state.

The e-Health project is designed, developed, Implemented and supported by the e-Health Project Management Unit, the IT Division of Department of Health and Family Welfare, Government of Kerala.

e-Health has two major components which are tightly integrated:

- e-Health HMS - Hospital Management System, and
- e-Health PH - Public Health Management System.

e-Health is currently functional at 280 Hospitals in the State, which includes 236 Family Health Centres out of which 100 FHCs are working in paperless mode, 15 CHCs, 2 General Hospitals, 3 District Hospitals, 2 Taluk Hospitals, W&C Hospital, State PH Lab, Chest disease Centre etc.

The IT infrastructure required for the functioning of e-Health is being setup at each and every hospital which includes hospitals at primary, secondary and tertiary levels. It includes Local Area Network (LAN) – both active and passive components, UPS cabling for all e-Health points, necessary hardware including centralized UPS, and connectivity – both primary and secondary.

e-Health hospitals are linked with e-Health cloud server at State Data Centre using leased line connection. For ensuring redundant connection at all hospitals, in addition to a primary connection, a secondary connectivity is also provided. KSWAN backbone is used and from the KSWAN PoP, BSNL Fibre optic connection of BSNL is used to connect to hospitals. Secondary connectivity is taken from a different service provider like Railtel, Vodafone etc.

The Public Health Management System has been rolled out across the State in all rural areas. 9500 Tablet PCs have been distributed to field staff of Health Department with Android based Public Health Mobile application. The demographic data capture is progressing in full swing in all districts.

More details about the e-Health project are given in the Annexure.

**IV. International Centre for Free and Open Source Software (ICFOSS)**

Government of Kerala established ICFOSS as an international centre in collaboration with Free Software Organisations in India and abroad to promote development and application of free software and free knowledge. It is a nodal agency in all matters relating to free and open source software including consultancy, research and development, academics, studies and service, training, publishing, certification, international co-operation and collaboration.

The major FOSS related key e-governance initiatives provided by ICFOSS to various departments include Kerala State Electricity Board Limited (KSEBL), e-Health PMU (Department of Health), Kerala Legislative Assembly, CMDRF, State E&IT Department, Jalasamrudhy project under Haritha Kerala Mission, KSDI, KSITM. ICFOSS has also been engaged in the Technical Evaluation committees of various departments.

In addition to the above initiatives, ICFOSS also provides various trainings and capacity building activities to the employees of various state government department/PSUs, in FOSS software, hardware, technology and tools, as part of FOSS migration activities. The training and capacity building programs has also been extended to higher education level, to promote migrating towards FOSS solutions at educational institution level.

**V. Kerala Start-up Mission (KSUM)**

Kerala Start-up Mission (KSUM) is the nodal agency of Government of Kerala for implementing the entrepreneurship development and incubation activities in the State. Kerala Start up Mission, formerly known as "Techno-park Technology Business Incubator"

is India's first successful non-academic business incubator. It started operations in 2007. The objective of the Mission is to identify and develop entrepreneurial talent among youth and students in Kerala, address the technology based entrepreneurship development requirements in the traditional sectors of Kerala, build appropriate training programmes suitable for Kerala's socio-economic culture, identify niche market for technology products and services, interfacing and networking among academic, research and development institutions, industries and financial institutions, establishing a platform for speedy commercialisation of the technologies developed in the institutes to reach the end-users.

**VI. Centre for Development of Imaging Technology (C-DIT)**

C-DIT has been functioning as an Information and Communication Technologies (ICT) solutions provider in the Government sector. Some projects undertaken by C-DIT are:

- Reorganisation of Chief Minister's Public Grievance Redressal system and Distress Relief Fund assistance mechanism into an integrated online portal www. cmo.kerala. gov.in.
- Online Blood Disorder Registry, Ashadhara for the National Health Mission.
- Integrated Co-operative Department Management System for the Registrar of Co-operative Societies/ Department of Co-operation.
- Portal for the management of Thozlilai Sreshta Award for the Labour Commissionerate.
- Suggestion System for the Office of the Registrar of Co-operative Societies.
- Design and development of software for conducting online examination and on screen evaluation of written answer sheets for Kerala Public Service Commission and question bank for the Kerala Public Service Commission.
- Digitisation of old manuscripts and documents for State Archives and Registration departments.

**VII. Digital University Kerala and IIIT-K Pala**

On January 18, 2020, the Government of Kerala upgraded IIITM-K (Indian Institute of Information Technology and Management-Kerala) to the Kerala University of Digital Sciences, Innovation and Technology (also known as Digital University Kerala). The University started functioning from the new campus of IIITM-K in Techno-city and the new building was inaugurated in February 2021.

The University is envisaged to become a unique centre of excellence of global repute by conducting education, research and extension activities in areas of digital technologies, science and humanities. The University is aiming to create capacity building in masters and doctorate programmes in the areas of artificial intelligence and natural language processing, internet of things, electronic systems and automation, imaging technologies, data analytics and big data, cyber security, block chain, ecological informatics and geospatial analytics. The University will start schools in the areas of computer science and engineering, digital sciences, electronics systems and automation, informatics, digital humanities and liberal arts. The new University will initially create about 200 job opportunities in academic and research-level.

Government of Kerala had started IIIT-K in 2015-16 at Pala, Kottayam under PPP mode to lead, organise and conduct research and innovation in IT and allied fields of knowledge. This is a joint initiative between Government of India, Government of Kerala and Industrial Partners with 50 per cent, 35 per cent, and 15 per cent share participation.

In addition, there are various other agencies, primarily the Kerala unit of the National Informatics Centre (NIC), that contribute to e-governance applications and infrastructure in the State.

## CHAPTER-3
# KEY ISSUES AND CHALLENGES RELATED TO E-GOVERNANCE IN KERALA AND BROAD RECOMMENDATIONS FOR THE 14TH FYP

The key issues and challenges, as well as opportunities for improvement, highlighted by the aforesaid e-governance related agencies in their written submissions as well as by the members of the Working Group during its various meetings are listed below:

**I. Impact Evaluation and Programme Monitoring**

E-governance projects are often measured in terms of how they speed up government procedures. This criterion is important, but not adequate. E-governance projects must be evaluated in terms of a range of criteria. These include the contributions made by e-governance to the goals of citizen benefits, accountability, equity, social coverage and other governance indicators.

It has been observed that there appears a gap in the way impact of e-governance is currently being assessed by most implementing organizations. While data on number of transactions is available for example, the same is not analysed along with transactions not related to the e-application transactions. Hence the extent of coverage through e-governance and the impact of the applications on easing the efforts of citizens is not known. The citizen preferences for online applications and access constraints if any is not analysed to improve the governance process. As noted, this is important for the Government to ensure resources are being allocated efficiently and effectively as well as to improve future designs of applications and infrastructure.

Most e-governance projects are being justified on the broad premise and belief that any form of digital technology is always better than traditional ways of governance and providing public services. This is no longer a foregone conclusion and there are numerous research studies that have highlighted the need to attend closely to specific context while ascertaining impact.

There is a need for all Government investments in e-governance applications and infrastructure to come up with a clearly articulated theory of change and impact matrix. Indicators related to good governance values of Government of Kerala, such as participation, transparency, effectiveness, equity etc. need to be included in such matrices apart from number of registrations and transactions or turnaround times after the data is entered in the digital application.

A committee of experts drawn from different functional domains of e-governance as well as with an understanding of the various governance and development sectors could prove useful in assisting the Government of Kerala ensure that its e-governance projects contribute positively to a better quality of life for all its citizens, including those from marginal and underserved social groups. An appropriate agency within the Government, such as the KSITM, could serve as the coordinating agency and secretariat for such an activity. An independent evaluation of all the flagship e-governance initiatives will be helpful to fine-tune and achieve the intended objectives.

**II. Standards, Frameworks and Coordination**

It has been observed that e-governance projects have been traditionally carried out by multiple Departments and agencies to cater to their specific needs and requirements without adherence to common standards that can ensure integration and interoperability, whenever the need so arises. While this loosely decentralized approach has allowed a general level of comfort in working with digital technologies among Government users and its proliferation within Government Departments, there is a growing need being felt for some level of standardization, especially to ensure component reuse and avoid duplication of efforts leading to better efficiency in resource utilization.

As e-governance becomes more pervasive in India and across the world, various standards and frameworks related to citizen engagement, data specification and process handling have been formulated by Governments (including Government of India), inter-governmental organizations like the United Nations and professional bodies like IEEE. A need is now being felt in Kerala to draft an agency or unit within the Government to identify the right set of e-governance standards and customize them to cater to the specificities of the State's context. This agency could also come up with a mechanism to scrutinize all e-governance designs for conformance to the appropriate set of standards. Care needs to be, however, exercised that the process remains agile and responsive and does not descend into an additional layer of administrative red-tape.

This aforesaid agency/unit could also perform a coordination role by maintaining a project repository which could serve as a useful single point of information source for all e-governance projects in the State. Such a repository can contribute to reducing duplications and also ensure better tracking and monitoring of project implementations.

Digital means of governance must be made available to all sections of the State's population. In order to do so, particular attention has to be paid to local production capacities and knowledge of local social, economic and political conditions. Design approaches for e-Governance projects should incorporate flexibility to cater to variations in local practice. There may be a need to move from purely plan-driven methods to more agile and responsive methods, as is being done in the e-Health project. Identifying and customizing guidelines and frameworks to incorporate emerging approaches and methodologies like agile, design thinking, human-centred design etc. could be another useful contribution by the agency/ unit mentioned above.

**III. Data Protection, Handling and Privacy**

Data plays a critical role in modern economy. Increasingly due to Big Data analytical computing capabilities data is considered as one of the important factors of production. Hence policies governing accessing and sharing of data is of importance especially in the context of enhanced concerns over privacy. The benefits of sharing have to be balanced with privacy concerns and risks of misuse of data. The corporate concentration in the platform economies and privacy concerns in the internet in general further enhanced citizen's concern over data collection by governments and the adequacy of the system to safely store and share only for specified purposes. There is also increasing demand from citizens for

"Open Government" by enabling more data sharing about government functioning. In this context by limiting data monopolies and facilitating interoperability help to balance the benefits of data sharing with that of privacy risks. This requires a strong legally-protected and legally-mandated data flows along with highly resilient technical architecture.

Various efforts related to e-governance across the Departments of Government of Kerala, as enumerated in the earlier section, have led to creation of large data sets involving important details related to citizens and organizations and their transactions with state agencies. The current practices of data capture and handling by Government Departments as well as its sharing with other Departments are, however, being considered problematic due to the following reasons:

- Many a times, when digital data of citizens (especially those relating to their sensitive personal information) is captured, an appropriate consent for its use, including an explanation of the purpose for which it will be used, is not taken. This can lead to infringement of citizens' privacy through secondary use which may be detrimental to the citizens' quality of life.
- At present, most of the data sets currently reside in silos and with the data capturing Departments, but they can be helpful if they are made available to other Departments and agencies. In the absence of suitable data sharing policies and data transfer protocols which can ensure sensitive data is not compromised and privacies are not infringed, even anonymized summary data transfers become difficult. This is exacerbated when data structures maintained by different agencies are incompatible and not interoperable.
- details of current initiatives, and also the goals of this Working Group indicate, Kerala as a State seeks to implement e-governance systems to aid efficiency, transparency and convenience for citizens and the state alike. The corner stone of e-governance systems is the data that such systems collect, aggregate, process, and share. Data protection and privacy concerns, therefore, need to be built into the design and use of e-governance systems.
- The Indian Personal Data Protection bill is expected to be legislated soon, but with or without it, Kerala should pioneer a robust data protection regime in the design and implementation of its e-governance systems. While security is one element of this, every step of the data lifecycle also needs to incorporate (the broader concept of) privacy by design. At the absolute minimum, the deployment of e-governance systems - which tend to collect personal and sensitive information from/about a large number of individuals including names, addresses, biometric markers, caste, incomes among others - need to follow data minimisation (collecting only that data which is essential for a specific purpose), purpose limitation (not using data beyond what it is collected for) and lawful, fair and transparent processing of data. Throughout, the informed consent of individuals is critical to the processes of data collection, aggregation and processing that various government departments undertake.
- These and other relevant principles should take the form of Guidelines or Rules for Data Protection at the state-level. An interdisciplinary committee of Government

officers, academic experts, civil society practitioners could be sought out to craft these rules following public consultation.

- While informed consent is a necessary first step, it is not sufficient for addressing privacy concerns. Often, individuals (especially those from marginalised groups) may not possess meaningful choices to decline the collection of their data in their transactions with the state. Therefore, the collection and use of data by the state needs to be embedded in accountability frameworks and constitutional values. As the ease of data collection and sharing grows with digital technologies, the state must not take the decision to collect data, or to process it in particular ways (say to predict certain outcomes or take preventive measures), lightly. The state needs to carefully consider the trade-off between civil liberties and public interest when making decisions to deploy systems such as facial recognition systems, or AI/ML-based predictive systems in law enforcement or judicial systems. Thus, the state's decision to collect data or deploy such systems needs to be embedded in constitutional values and emerge out of public consultations.
- This requirement for a public consultation and due diligence on trade-offs for various sections of society needs to be enshrined in regulation.
- To oversee public consultations on and impact assessments of data circulation in e-governance initiatives in Kerala, the setting up of an independent public ("fourth branch") institution is recommended. This body should consist of data experts from varied disciplines (who understood the technologies, economics, and societal implications of data protection), and civil society participants besides state representatives.
- This body could be modelled along existing entities such as State Information Commissions, State Environment Impact Assessment Authorities (present in Kerala) or some form of the Data Protection Authority (proposed by the Indian Personal Data Protection Bill and widely discussed: https://carnegieindia.org/2021/06/24/building-effective-data-protection-authority-in-india-event-7620). Various Data Protection Authorities set up in the European Union in accordance with GDPR might also provide a model to learn from: https://dataprivacymanager.net/list-of-eu-data-protection-supervisory-authorities-gdpr/

The presence of an oversight agency like the one mentioned above can also contribute to better policies and robust mechanisms for data capture and their sharing across agencies, should the need so arise.

**IV. Cyber Security**

With improved internet connectivity and availability of online public services, the focus of e-governance is shifting toward issues of transparency and trust - and new possibilities for re-conceptualizing how technology is organized and deployed are opening up. As citizens engage in a wide variety of transactions on the internet, their sensitive data can increasingly get exposed to and compromised by cyber criminals. Instances of cyber frauds and crimes involving financial transactions, discrimination and bullying on the basis of religion/gender/caste, sexual abuse and intimidation etc. are on the rise and need to be suitably dealt with.

While the Computer Emergency Response Team of Kerala (CERT-K) works to ensure the safety and security of the State's critical digital infrastructure, there is a need to come up with a more comprehensive response to matters that relate to the security of the citizens in the online space. This could involve creating a better awareness on online transactions involving sensitive data, formulation of standards and guidelines for application developers and infrastructure providers as well as enhancing forensic and other capabilities to assist law enforcement and create an environment of trust among the citizens.

A suitable agency within Government of Kerala should be identified which could take up the following functions related to the State's cyber security concerns:

- Conduct a comprehensive survey of all existing legacy digital systems and critical digital infrastructure to identify risks and plug points of failures.
- Develop cyber security framework and standards to guide the development of new digital applications and creation of new digital infrastructure.
- Conduct regular cyber security audits and assessments of critical digital infrastructure and applications.
- Develop a comprehensive Disaster Recovery and Business Continuity Plan (DR-BCP) covering all e-governance applications along with the concerned Departments to ensure minimal impacts in cases of failures.
- Disseminate information related to safe online behavior to citizens and various other users of the State's e-governance technologies.
- Coordinate with academic and training organizations to develop short-term and long-term programmes on various aspects of cyber security to enhance capacities within the Government as well as agencies working on e-governance applications and infrastructure.

## Annexures I

I. New and Ongoing Initiatives: Tables with new and ongoing initiatives proposed by respective Departments

| Sl.No. | Name of the application/ infrastructure, and brief 15-20 word description of what it will do | Name(s) of departments to be involved in design and implementation | User groups (citizens, businesses etc.) to be impacted and expected nature of impact (including measurement criteria and targets) | Timeline/ Key milestones | Budget proposed (for the 14th Plan) (In Lakhs) |
|---|---|---|---|---|---|
| **IT MISSION** | | | | | |
| 1 | Digitalisation (Getting all certificates into DIGILOCKER to remove any paper based certificates. Issuance and Verification shall be online) | KSITM (nodal) and other departments that are issuing and verifying certificates | Citizens and Businesses – No more physical certificates needed | 2 years | 86 |
| 2 | Location Aware Services (Disaster Management, Spatial analysis of health conditions, Re-mapping of constituencies and wards, grievance redressal, project planning and monitoring (Especially in road and river works), flood forecast and elimination etc are some of the big possibilities) | KSITM and relevant departments | Citizens, Business and Government | 3 years | 300 |
| 3 | Office Automation (All routine tasks in every office to be automated, TAPAAL to be fully online) | KSITM, departments | Citizens, Business and Government | 2 years | 2100 |
| 4 | Citizen Service delivery platform | KSITM, departments | Citizens, Business and Government | 2 years | 1100 |
| **E-HEALTH MISSION** | | | | | |
| Sl.No. | Name of the application/ infrastructure, and brief 15-20 word description of what it will do | Name(s) of departments to be involved in design and implementation | User groups (citizens, businesses etc.) to be impacted and expected nature of impact (including measurement criteria and targets) | Timeline/ Key milestones | Budget proposed (for the 14th Plan) |
| 1 | **Kerala Cancer Care Suite**:<br>**Objective :**<br>1.To provide better quality and quick treatment for cancer patients.<br>2.To build a state level cancer patients database for GoK, which can be used by tertiary treatment institutions for seamless treatment through e-HealthKerala.<br><br>3. To provide a larger pool to find a matching donor for a patient who needs bone marrow transplantation thereby reducing time and cost.<br>**Subsystems :**<br>**1.**Kerala Cancer Control Strategy - IT Backbone.<br>2.Kerala Bone Marrow Registry<br>3.Kerala Cancer Registry | e-Health PMU,<br>Cancer Care Hospitals in Kerala | Cancer Hospitals,<br>Cancer patients | March 2023 | 300.00 |
| 2 | **Palliative Grid Home Care System in Kerala**<br>**Objective :** To digitalise the patient management under state palliative homecare system, which will emerge as a palliative grid bringing different programs under one roof.<br>Palliative patients are those who have undergone treatment at hospitals and their E H R will be created and available with e- | e-Health PMU,<br>Dept. of Health, GoK | Palliative Care nursing staff, | | 100.00 |

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| | Health Cloud system. Hence the Palliative Care system shall be integrated with e-Health, the centralised system for healthcare management across the state.<br>**Palliative Care subsystems :**<br>1.Public portal for Palliative Care<br>2.Palliative Care Mobile App for field staff<br>3.Integration with e-Health | | | | |
| 3 | **e-HealthKerala integration with 'Ayushman Bharat Digital Mission'**.<br>The Ayushman Bharath Digital Mission (ABDM) aims to develop the backbone necessary to support the integrated digital health infrastructure of the country.<br>**Scope of ABDM**<br>Health and Well-being for ALL, at ALL Ages; Universal Health Coverage; Citizen-centric Services; Quality of Care; Creation of a holistic and comprehensive health eco-system<br>**Digital Systems envisaged in ABDM**<br>**1.National Heath ID** - for every resident who wishes to obtain their health records digitally.<br>**2.Healthcare Professionals Registry (HPR)** - Comprehensive repository of all healthcare professionals involved in healthcare service delivery both in modern and traditional system of medicine<br>**3.Health Facility Registry (HFR)** - Comprehensive repository of all health facilities of the nation across different system of medicine and included both public and private health facilities.<br>**4.Health Records** - Health- | ABDM and e-Health (SDHM) | | March 2023 | 500.00 (1 crore per year for the resources) |

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| | related information on an individual that conforms to national standards and that can be drawn from multiple sources while being managed, shared and controlled by the individual.<br>**Rolling out of ABDM in Kerala:**<br>❖ **Creation of National Health IDs**<br>❖ **Registration of Health Facilities**<br>❖ **Registration of Healthcare Professionals**<br>❖ **Using Grievance Redressal Portal of ABDM**<br>**Integration of eHealth with ABDM:**<br>The health facilities under the Govt. sector in Kerala have to use the Hospital Management System [HMS] of e-Health. The implementation of HMS is in progress and currently implemented at about 331 hospitals, which includes Medical College Hospitals also.<br>As per the requirements of **ABDM**, software for integration of e-Health with **ABDM** using APIs has to be developed. | | | | |
| 4 | **Grass root level data capture system for Non-Communicable Diseases and Tuberculosis**<br>For identifying the NCD and Tuberculosis patients in the population, the government of Kerala decided to do grass root level survey of NCD and TB patients with the help of ASHA workers.<br><br>Currently, ASHA workers from Primary Care Hospitals are regularly collecting details of Non Communicable Diseases and Tuberculosis from patients by visiting their houses at regular intervals. This is done as a manual process and it is very hectic process to do manual consolidation of the data for reporting and statistical purposes.<br><br>It is decided to develop mobile application so that ASHA workers can do disease survey using a mobile phone.<br>The major functionalities of the Mobile App are :<br>1. NCD population Survey<br>2. TB Population Survey<br>3. Annual Population Follow-up Survey | NHM and e-Health | | March 2023 | 100 |
| 5 | Setting up PACS system for e- | e-Health along with DHS | | March 2023 | 200.00 |

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| | Health | and DME | | | |
| 6 | Setting up Disaster Recovery System for eHealth | e-Health | | March 2023 | 1000.00 |
| 7 | Health Innovation Centre<br>Kerala Start-up Mission (KSUM), which is the nodal agency for innovation and entrepreneurship in the State, has expertise in running incubation centres, innovation labs and various schemes of Government of Kerala for promoting innovations since 2006. KSUM has also setup Innovation Zones within Kerala State Electricity Board and Kerala Water Authority previously through which many innovators were given opportunity to pilot their products and solutions.<br><br>To extend this further, KSUM intends to collaborate with Department of Health, Government of Kerala to setup an in-house Innovation Centre exclusively for developing innovative technology products for Health and associated organisations coming under the Department.<br>**Objectives of Innovation Centre**<br><br>1. Compile an indicative list of problem statements and identify the problems which can be addressed by using technology.<br>2. To source or scout for ideas and solutions for solving the listed problems and to facilitate the adoption of useful ideas and technologies after due testing.<br>3. Providing a platform for researchers and innovators in different technologies to converge and develop cost effective, timely and efficient solutions to support law enforcement.<br>4. To come up with mechanisms and draft regulations for testing and adopting new technologies.<br>5. To support aspiring entrepreneurs engaging in this field with a platform to showcase their ideas and pitch for funding further development / scale.<br>6. To strengthen the innovation culture within the department by providing the opportunity to work with start-ups to co-develop tech solutions for existing problems.<br>**Focus Areas** | | | | 100.00 |

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| The innovation centre will bring together the experts from various technology domains from a wide range of start-ups, experts, research and corporates and will be majorly focusing on the following verticals under the Health Department:<br><br>1. AI-powered drug discovery<br>2. Assistive tech<br>3. Neurotechnology<br>4. Mental health tech<br>5. Sleep tech<br>6. Psychedelics<br>7. Fertility tech<br>8. Nanomedicine<br>9. Anti-aging<br>10. Medical robotics<br>11. Gene therapies<br>12. Medical exoskeletons and prosthetics<br>13. CRISPR diagnostics<br>A virtual space for setting up the Health Innovation Centre (HIC) is provided by the KSUM. The innovation zone will be operationally funded by the Department of Health through the | | | | | |
| | financial support of Government of Kerala.<br><br>KSUM will develop, own and execute the program plan for HIC. This will define the core objectives of HIC and put together various activities that will facilitate in achieving them. The Department of Health will be an integral partner to the program by providing technical, non-technical and financial support to start-up working in the innovation zone. | | | | |

| **INFORMATION KERALA MISSION** | | | | | |
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| IKM plans to add new features to the existing applications rather than developing new applications. Features such as integration with a common Single Sign On infrastructure of the Government are planned. Integration with GIS/KSDI for asset registers, property tax and building permit are also planned. | | | | | |
| **CYBER SECURITY** | | | | | |
| Sl.No. | Name of the application/ infrastructure, and brief 15-20 word description of what it will do | Name(s) of departments to be involved in design and implementation | User groups (citizens, businesses etc.) to be impacted and expected nature of impact (including measurement criteria and targets) | Timeline/ Key milestones | Budget proposed (for the 14th Plan) |

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| 1 | Need to form the new Independent E-Governance IT Cell or entity or wing or team using Permanent Government Employees whom headed and prior experienced in E-Governance projects of managing to simplify and develop the government processes and systems more efficiently, implement and secure delivery of government services more effective across various government agencies. | Government of Kerala – IT Department | The E-Governance IT Cell will be as a project management system which Observe, Monitor, Secure and Track all the E-Governance IT Project across all the Kerala Government State Departments and agencies which will results Accountability Transparency & Efficiency of the organization E-Governance projects. This team will be setting up standards, guidelines, milestones, evaluating risk, performance, delivery output etc... Through we can identity key facing problems and issues including existing legacy systems and Critical Infrastructures such as Power, Water, etc... This will help the Government of Kerala's Future Developments in much more effective right decisions in developing solutions and funding finance for the projects. Also give them a broader vision on sustainability and continuity of these projects | Within 30 to 90 days to set up | As per GOK decision |
| 2. | Independent E-Governance Cyber Security Standards Framework & E-Governance Compliance Governing Committee as per CERT-IN Guidelines and Industry Security Standards. | Government of Kerala – IT Department , along with a set of nominating each permanent senior Government officers of each Government department and agencies along with Industry Experienced CERT-IN empanelled agencies | The purpose of information security governance is to ensure that agencies are proactively implementing appropriate information security controls to support their mission in a cost-effective manner, while managing evolving information security risks. Information security governance has its own set of requirements, challenges, activities, and types of possible structures. Information security governance also has a defining role in identifying key information security roles and responsibilities, and it influences information security policy development and oversight and ongoing monitoring activities<br>A | Within 30 to 90 days to set up | As per GOK decision |
| 3 | Total shift of policing to the Digital platform. The public need not go to the Police station; they can virtually avail all services. The police officers will also have a digital tool to render all their internal services. | Kerala Police Cyberdome | All citizens and all Police officers. Citizens will be able to use various digital channels to communicate with the police, report crime, carry out routine transactions and to avail all policing | Between 3 to 5 years | 300.00. |

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| | | | services, which will ensure more transparency, saving of time and better service delivery. The digital tool/app for police officers can ensure speedy and more efficient disposal of routine duties in addition to avail various service related process without a need to be physically present at the office concerned. | | |
| 4 | Building of Kerala Police Data System – for integration of all data bases and for use of AI for predictive policing. | Kerala Police Cyberdome | Big Data analysis can provide an abundance of information. AI driven predictive policing could lead to more objective decision-making and can help officers in making decisions based on objective evidence rather than on bias. Predictive policing has the potential to make policing fairer, fast, more accurate and effective. Predictive policing can transform law enforcement by enabling police to anticipate and prevent crime instead of simply responding to it. AI driven Predictive policing can equip police with the ability to use information to save lives, reduce injuries, | Between 3 to 5 years | 1000.00 |
| | | | improve safety and security by anticipating evolving threats. | | |
| 5 | Development of a Drone System where Drones can be used for improving policing services, Disaster management etc. | Kerala Police Cyberdome | **Unmanned Aerial Vehicles (UAV) - Drones for Surveillance, Disaster Management, Search & Rescue Operations**<br><br>Camera drone allows law enforcement officials to have a better vantage point during emergency situations where quick deployment may take time. The reliance on ground assets to respond to emergency may not be possible. Drones can increase efficiency and effectiveness of emergency response. Drones for public safety act as a force multiplier. It can be used for various purpose<br><br>**Search and rescue**<br>Drones can conduct aerial survey and cover large area in short time during natural calamities. It can easily spot humans during emergency situations and act as first responders. Drones can be used for rescue operations at | Between 3 to 5 years | 1000.00 |

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| | | | night if equipped with thermal camera.<br>**Monitoring of suspect**<br>Drones enable law enforcement officers to monitor suspect maintaining a safe distance and give officer real-time, actionable intel.<br>**Surveillance**<br>Drones can offer a bird's view to law enforcement officers without compromising safety. It can also help to Crowd Monitoring. Law enforcement can use drones for monitoring of gathering, concerts, protest and spot possible troublemakers in the group.<br>**AI based Drones for effective policing**<br>Development of AI based drones to get real-time data for Improving the ability to make well-informed decisions for future policing. | | |
| **Kerala Housing Board** | | | | | |
| 1 | **Online rent Management System.**<br>Application for managing the Rental service of Housing Board. Around 1700 commercial rooms, are rented out to general public. | Housing department. Under Revenue Minister | Major User groups are General Public and Govt. Departments, PSU etc. Finance Department, Audit Departments | Easy for the Govt. Departments to monitor their rental dues. Monthly targeted revenue collection is 3 to 4 | Total 30 Crore for infrastructure |
| | 10 lakhs sq ft area in Revenue Towers and commercial buildings are rented out by KSHB to various govt departments/PSU/various tenants. | | | crore. | development, Hardware Purchase and software development charges. |
| 2 | **Online Project Management Application** for managing the construction projects executed by the Board. Around 950 crore construction projects are executed by the board (including KIFFB)in various districts. | Housing department. Under Revenue Minister | Major User groups are KSHB Offices, Contractors, Site Engineers, Work awarded agencies, Govt, Audit Departments | Construction works approximately 950 crore are now under taken by the board | |
| 3 | **Online Financial Mangement and Counter management**<br>Application for managing the Financial activities of the board. Which is capable of preparing monthly accounts, preparing bills, payment vouchers, ledgers, journals Balance Sheets etc. | Housing department. | General Public, Govt Offices, Employees. Finance/ Audit Departments | Now using an in house application which made operational from 2007. | |
| 4 | **Online Application facility For GRIHASREE Housing scheme and MN Lakham Veedu Naveekarnam.** | Housing department | General Public, Govt Offices, Employees | Around 3500 applications are processed subsidy disbursed. | |

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| 5 | **Online Application for Purchase of Flat, Plot, Plot** with Buildings etc.<br>134 acres of vacant land available in the ownership of KSHB in different districts. Board proposes different projects in this land | Housing department | General Public, Govt Offices, Employees | Market value around 4000 crore for this land. | |
| | | | **ICFOSS** | | |
| 1 | e-Governance Help Desk : To provide support to Govt. departments/PSUs in trouble shooting issues on open source Hardware, software and Tools | ICFOSS, | G2G, G2C – High Impact | Setting up of Call - centre with Chatbot facility in local language | 85.00 |
| 2 | Open ERP Solution: Customisation and deployment of ERP solutions to Govt and PSUs | ICFOSS | G2G – High Impact | | 95.00 |
| 3 | Automated Weather Stations: For real time monitoring of water level, across the state | ICFOSS | G2G and G2C – High Impact | | 50.00 |
| 4 | Digital Achieving of handwritten Malayalam documents using OCR | ICFOSS | G2G and G2C – High Impact | | 150.00 |
| 5 | Open Hardware Lab: Functioning of Open hardware and Software Lab at ICFOSS for applied Research and Development activities in FOSS solutions. | ICFOSS | G2G and G2B – High Impact | | 500,00 |
| 6 | LoRaWAN: Establishment of LoRaWan networks across the State | ICFOSS | G2G, G2C – High Impact | | 175.00 |
| 7 | Localisation of AI based ChatBot | ICFOSS | G2G and G2C – High Impact | | 95.00 |
| 8 | Sign Language Generation System for Malayalam | ICFOSS | G2G and G2C – High Impact | | 140.00 |
| 9 | Maayalam Handwritten Documents Recognition | ICOFSS | G2G and G2C – High Impact | | 90.00 |
| 10 | Dron Navigation Technology | ICFOSS | G2G – High Impact | | 70.00 |

**B. For Ongoing E-Governance Applications/Infrastructure related initiatives:**

| S.No. | Name of the application/ infrastructure, and brief 15-20 word description of what it is | Name(s) of departments involved in design and implementation | User groups (citizens, businesses etc.) impacted (please also mention if impact measurement/evaluation was carried out during the last Plan period) | Expenditure incurred (during the 13th Plan) Upto 05-02-2022 (in lakhs) | Budget proposed (for the 14th Plan) (in lakhs) |
|---|---|---|---|---|---|
| **IT MISSION** | | | | | |
| 1 | CONSTRUCTION OF CENTRE FOR E-GOVERNANCE | KSITM | KSITM Staff | 2869 | **500** |
| 2 | System Administration (Purchase of SW license, Networking Equipments, OPEX, IT Hardware etc) | KSITM | KSITM Staff | 74.85 | **400** |
| 3 | STATE DATA CENTERS (OPEX, AMC, SDC2 expansion, Audit charges, bandwidth, Non-IT upgrade, Object storage, servers and infrastructure upgrade, DR etc) | KSITM | All Departments | 11288.91 | **26500** |
| 4 | KSWAN (OPEX, AMC, Auditor, | KSITM | Departments | 5376.25 | 8500 |
| 5 | SECWAN (OPEX, NOC renovation, infrastructure upgrade, AMC, auditor) | KSITM | Secretariat | 2522.34 | 4025 |
| 6 | Public WiFi (OPEX, advertising) | KSITM | Citizens | 4222.06 | 9350 |
| 7 | Department WAN(OPEX, infrastructure upgrade, AMC) | KSITM | Public Office & Vikas Bhavan | 28.78 | 200 |
| 8 | VC (OPEX, upgrade) | KSITM | All Departments | 271.25 | 330 |
| 9 | Government Contact Centre (OPEX, o n-board new departments) | KSITM | Departments | 448.28 | 985 |
| 10 | CERT (OPEX, license, HW and SW purchase, portal revamp) | KSITM | All Department | 168.65 | 1175 |
| 11 | SW team (OPEX, team expansion, new infrastructure) | KSITM | Departments | 0 | 350 |
| 12 | Digital Kerala Architecture plan | KSITM | Departments and Citizens | 2.29 | 4000 |
| 13 | State Portal (AMC, audit, revamp) | KSITM | Departments and Citizens | 157.77 | 250 |
| 14 | m-sevanam and SMS | KSITM | Departments and Citizens | 220.07 | 500 |
| 15 | Aadhaar Enabled Services(Out-reach programs, OPEX, redundant ASA) | KSITM | Departments and Citizens | 499.7 | 925 |
| 16 | e-District (ICT infra, HR costs, capacity building) | KSITM | Departments and Citizens | 2305.85 | 3075 |
| 17 | e-Office(HR costs, automating eOffice deployment, IT upgrade) | KSITM | Departments | 1998.57 | 4975 |
| 18 | e-Procurement (Infra upgrade, OPEX) | KSITM | Departments | 391.75 | 500 |
| 19 | Kerala Spatial Data Infrastructure (OPEX, Portal revamp, Infra upgrade) | KSITM | Departments, Citizen | 146.25 | 380 |
| 20 | FRIENDS (OPEX, AMC, Security) | KSITM | Citizen | 791.25 | 750 |
| 21 | Promotional Campaign | KSITM | Citizen | 185.71 | 200 |
| 22 | Kerala e-Governance awards | KSITM | Departments | 13.01 | 50 |
| 23 | Capacity Building on e-Governance | KSITM | Department staff | 189.23 | 100 |
| 24 | PG Diploma in eGovernance | KSITM | Department staff | 20.65 | 60 |
| 25 | Virtual IT Cadre | KSITM | Department staff | 145.09 | 220 |
| 26 | Akshaya project (OPEX, revamp, | KSITM | Citizens | 1917.96 | 2205 |

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| | trainings, innovation) | | | | |
| 27 | IT Cell (Capacity Building at Secretariat, Training Hall enhancements) | KSITM | Secretariat | 60.24 | 150 |
| **E-HEALTH MISSION** | | | | | |
| 1 | eHealth Hospital Management System | eHealth Project Management Unit, Dept of Health & FW, Govt of Kerala | Residents of Kerala | 12000.02 | 300 Crore for expansion to all health institutions in the next 5 years. |
| 2 | eHealth Public Health Management System | " | Residents of Kerala | | |
| 3 | eHealth Web Portal | " | " | | |
| 4 | eHealth Telemedicine System | " | " | | Will be in overall eHealth budget. |
| **INFORMATION KERALA MISSION** | | | | | |
| 1 | ILGMS (Integrated Local Government Management System):<br>Integrated workflow and file management system interfacing with other functional modules implemented as microservices | Local Self Government Department [includes Directorates of Panchayats, Urban Affairs] | Citizen, Businesses,<br>Local Governments,<br>Directorates | | |
| 2 | Plan Monitoring – Sulekha:<br>Formulation, approval, revision, expenditure tracking and monitoring of plan projects of local governments | State Planning Board,<br>Local Self Government Department | Local Governments,<br>District Planning Committees,<br>Directorates<br>Over 2 lakh projects amounting to around ₹6000 crore created and monitored every year. Project-wise data available from 2007. | | |
| 3 | Civil Registration – Sevana:<br>Births, Deaths and Marriages Registrations, issue of certificates and workflow related to changes/ corrections (being replaced by ILGMS) | Office of Chief Registrar Kerala;<br>Department of Economics and Statistics;<br>Census Dept. | Citizen,<br>LocalGovernments,<br>Chief Registrar for Births, Deaths and Marriages;<br>Department of Economics and Statistics;<br>Census Dept.<br>Hospitals<br>Over 8 lakh registrations every year. Data available from 1970. | | |
| 4 | Social Security Pensions – Sevana Pension:<br>Application, verification, approval and disbursement of social security pensions | Directorate of Panchayats (DBT Cell),<br>Finance Department | Citizen,<br>Local Governments,<br>DBT Cell,<br>Finance Department<br>Over 50 lakh beneficiaries; over ₹9000 crore disbursed through DBT and direct to home | | |
| 5 | Accrual based double entry Accounting – Saankhya:<br>Accounting system for local governments (being replaced by ILGMS) | Directorate of Panchayats,<br>Directorate of Urban Affairs,<br>State Audit Dept. | Local Governments,<br>Directorate of Panchayats,<br>Directorate of Urban Affairs,<br>State Audit Dept. | | |

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| 6 | Taxes and Revenue – Sanchaya:<br>Property tax, Trade licenses, other revenue sources; with online ePayment facility | Local Self Government Dept [Directorates of Panchayat and Urban Affairs] | Citizen, Businesses, Local Governments, Directorate of Panchayats, Directorate of Urban Affairs<br>Over 1.3 crore door numbers for property tax; over ₹2000 crore annual demand; over ₹100 crore collected online. | | |
| 7 | Asset mapping and monitoring – Sachithra:<br>Register of assets owned by local governments | Local Self Government Dept. Office of Chief Engineer (Local Infrastructure Development and Engineering Wing) | Local Governments,<br>Engineering Wing,<br>Citizen and Businesses (through right-of-way portal)<br>Over 10 lakh assets including roads, buildings and land of local governments | | |
| 8 | Recording agenda notes and minutes – Sakarma:<br>Agenda notes and minutes of meetings of the Council and Committees of local governments | Local Self Government Dept. | Local Governments,<br>Local Self Government Dept.<br>About 30,000 meetings with total 5 lakh decisions are handled every year. | | |
| 9 | Building Permits – Sanketham | Local Self Government Dept.<br>Town & Country Planning Dept<br>Coastal Zone Management Authority | Citizen,<br>Businesses<br>Local Governments,<br>Local Self Government Dept.<br>Town & Country Planning Dept<br>Coastal Zone Management Authority<br>Over 11 lakh applications received and 8 lakh permits issued. | | |
| 10 | Workflow application – Soochika:<br>Electronic file management, workflow and file tracking | Local Self Government Dept. | Citizen<br>Businesses<br>Local Governments<br>(being moved to ILGMS) | | |
| 11 | Establishment – Sthapana:<br>Payroll, and PF fund management | Local Self Government Dept.<br>Directorates of Panchayat and Urban Affairs | Employees of local governments,<br>Directorates of Panchayat and Urban Affairs | | |
| **Total Expenditure estimated** | | | | **1700.24** | **5000.00** |
| **Kerala Housing Board** | | | | | |
| 1 | Mobile Application for online management of Working Womens hostel and EWS housing scheme. | Development charge paid by Kerala State IT Mission | Women's working in public and private sector.<br>(Application under the testing stage.Web application for online application facility is also required.) | 4.5 lakhs | 10.00 |
| **ICFOSS** | | | | | |
| 1 | Support to Kerala State Electricity Board Limited (KSEBL) on replacing the spot billing machine with smart devices. | ICFOSS | G2G – High Impact | | |
| 2 | Service support to Kerala State Electricity Board Limited (KSEBL) for the implementation of Dam Surveillance System | ICFOSS, KSEBL | G2G, G2C- High Impact | | |
| 3 | Technical support and troubleshooting to eHealth PMU under the Department of Health, for extracting | ICFOSS | G2G, G2C – High Impact | 15 Lakhs | 80.00 |

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| | data from various chemical analyser systems implements at various Public Health Laboratories, across the State and to provide training to eHealth Team. | | | | |
| 4 | GIS - Network Analysis for K-FON (Kerala Fiber Optic Network) project for Kerala State Electricity Board Limited (KSEBL) | ICFOSS, KSEBL | G2G – Moderate Impact | | |
| 5 | Development Support to Chief Ministers Distress Relief Fund (CMDRF) for extracting informations from complaints the CMO Portal, with the help of OCR system. | ICFOSS, CMDRF | G2G, G2C – High Impact | 30 Laksh | 90.00 |
| 6 | Web based solution Development and support to State E&IT department in releasing an e-governance reference manual, consolidating various government orders issued by the department. | ICFOSS, E&IT Dept | G2G – Moderate Impact | | 90.00 |
| 7 | Creation of IT Glossary for the State Department | ICFOSS, E&IT Dept | G2G – Moderate Impact | | 60.00 |
| 8 | Open Hardware Lab: Establishment of an Open hardware and Software Lab at ICFOSS for applied Research and Development activities in FOSS solutions. | ICFOSS | G2G, G2C – High Impact | 150 lakhs | 500.00 |
| 9 | E-Gov Lab: Establishment of an eGov Lab for domain based application building and R&D in the filed of FOSS. | ICFOSS | G2G – Moderate Impact | 15 Lakhs | 80.00 |
| 10 | Automated Weather Stations (AWS): Commissioning of Automated Weather Stations for monitoring realtime water level at 6 Panchayats | ICFOSS, KDISC | G2G – Moderate Impact | 20 Lakhs | 110.00 |
| | in Kattakada Assembly Constituency area, Thiruvananthapuram as part of the Jalasamrudhy project under Haritha Kerala Mission, Government of Kerala and 14 in Chittur Palakkad, as part of the support to KDISC. | | | | |
| 11 | LoRaWAN: Establishment of LoRaWan networks at 14 districts in the state of Kerala. | ICFOSS | G2G, G2C – High Impact | 30 Lakhs | 175.00 |
| 12 | Aerial Mapping of canal system of of the Kole Wetlands of Thrissur using drones | ICFOSS, | G2G – Moderate Impact | 15 Lakhs | 75.00 |
| 13 | GIS Mapping: GIS mapping as part of Mapathon Kerala and OpenSDI for migration of KSDI infrastructure to latest Open Source Solution platform. | ICFOSS, KSDI | G2G – High Impact | | |
| 14 | Digital Achieving of handwritten Malayalam documents using OCR | ICFOSS | G2G and G2C – High Impact | 12 lakhs | 70.00 |
| 15 | Localisation of AI based ChatBot | ICFOSS | G2G and G2C – High Impact | 18 | 95.00 |
| 16 | Sign Language Generation System for Malayalam | ICFOSS | G2G and G2C – High Impact | 22 | 140.00 |

## Annexure II
## Detailed Notes from respective Departments

**1.Kerala State IT Mission**

The Government of Kerala acknowledges the critical importance of Information Technology as an instrument for the State's overall development and remains deeply committed to its dissemination, both as a crucial engine of economic growth and as a tool for increasing productivity, speed & transparency in governance and improved quality of life for the common man.

Kerala State Information Technology Mission (KSITM) is a Society registered under the Travancore Cochin Literary Scientific & Charitable Societies Registration Act (Act 12 of 1955). It is an autonomous nodal IT implementation agency for Department of Information Technology, Government of Kerala which provides managerial support to various initiatives of the Department.

KSITM performs diverse roles including, e-governance and development of human resources, disseminating information across citizens and Government, interfacing between Government and industry, bridging digital divide, investor interactions and achieving speed and transparency in governance. The activity of thrust is e-governance; conceptualization and implementation have been guided by citizen centricity and enhancing citizens' efficiency Governments have worked to integrate the departmental silos in a common framework to cut down redundancy, improve efficiency and to establish data driven governance for effective scheme design and delivery. Responsiveness of the governments to the trends of this digital revolution, its drive to enable this transformation in the governance will be critical in determining the citizen orientation of the government, its ability to spur the economic development of the society. Government of Kerala, envisioned establishing knowledge powered Digital Kerala to enable Digital lifestyle for all the citizens through application of digital technologies in the areas of digital governance, Digital commerce, principles of ubiquity, inclusion, freedom. The policy also lays out establishment of a citizen centric digital government to persistently improve service delivery standards and service quality through adoption of latest digital technologies.

### Key Top initiatives of KSITM

**• e-SEVANAM & m-SEVANAM**

**Online Service Delivery System of Government of Kerala.**

Kerala eService Portal e-SEVANAM is launched as a Good Governance initiative, has used technology to aggregate almost all online services (G2C &G2B) of Government of Kerala, in a single platform for the Citizens of Kerala. Further, the impact of the Covid pandemic has also accelerated the need for swift access to Government Services at the comfort of their home. This has been the driving factor for many departments to shift their services from offline to online mode.

Citizens no more has to search here and there, but can quickly find their online services in e-SEVANAM through the Universal search bar and need not bother which department

provides what. For instance, one can search for "Birth" for all Birth Certificate related online services. Similarly, Target User Category helps to find the Services that would be helpful for them. For instance, the Students category shows services related to scholarships, schemes, grants, challan payments, technical education and so on.

In addition to the consolidation of 500 +services of 60+ departments in a single platform, all mobile-friendly services, about 450+ services are rendered through a uniform mobile application called m-SEVANAM developed by NIC Kerala, which is available in Play store and ios. Online Dashboard of Services with status of services on a State and District level are also launched as part of e-SEVANAM.

Going forward more services will also get added to these platforms, which would help the state turn into a knowledge-powered economy and also in realizing its vision of being the most e-ready state in the country, ensuring digital inclusion.

This prestigious initiative was accelerated by IT Mission by co coordinating with all departments and its nodal officers to integrate their services in this single window platform.

**• Kerala State Spatial Data Infrastructure (KSDI)**

Mapathon Keralam: Mapathon Keralam is aimed to create detailed living map of Kerala through a participatory process. With the help of various voluntary and community organizations mapping groups will be created across Kerala. In addition to any geo-spatial data that is developed, campaign will leave behind local capability in mapping at every local body on the state.

Spatial Data Infrastructure was ungraded leveraging latest technologies. New Geo-Portal based on Free and Open Source Software (FOSS) platforms developed jointly with International Centre for Free and Open Source Software (ICFOSS).

Developed a spatial information system for Town and Country Planning Department. The scope of the portal is to utilize GIS technology to make access the information within the department including zones and regulations for public and departmental people.

Apart from the above, KSDI handles data request from various departments. Analytical and application development support has been given to various agencies.

- Mapping activities are being carried out in local bodies. Map of 15 themes including most of the roads and water resources across Kerala.
- High resolution LSG boundary map of local bodies (1:4000 scale) enabling local body level planning is completed.
- Developed variety of maps for analysis and communication with regards to Covid pandemic in responds to needs of National Health Mission (NHM), C-DIT, District Administrations, Department of Health Services (DHS) etc.

**• Kerala Public WiFi (KFi):**

Kerala is the first state in India to declare internet access a basic right. In order to accomplish this, Government of Kerala had established 2000 public wifi hotspots across the state which will provide free internet services to the citizen. The hotspots locations have been identified

by the district administration which includes bus stands, tourist places, parks, public places, Jana SevanaKendras, Govt. offices etc. In addition, Public WiFi facility has also been made available in 222 fishing villages along the Kerala coast. As per administrative sanction issued vide G.O. (Rt) No.94/2018/ITD dated 02.04.2018, approval was obtained for establishing 2000 Wi-Fi hotspots across the State. The tender was invited by Kerala State IT Mission for the establishment of 2000 Public Wi-Fi Hotspots. BSNL was appointed as the agency for the setting up and maintenance of Wi-Fi hotspots for a period of three years. K-Fi provides free internet access to the citizens by using their smartphones/tablets/laptops etc. Various m-Governance, e-Governance applications of the Central & State Govt. are made available through K-Fi services.

Using this K-Fi, people can access 1GB free internet per day from the hotspots using their smart phones, mobile devices or Laptops and perform social and business activities. Moreover, people can access various e-Governance, m-governance services, public content available in the State Data Centres without any limit. Also tourists can avail information on the major destinations, hotels, ticket and travel bookings using the hotspot services. The citizens can easily connect with common service centers, government offices, government services, websites, on line payment modes etc on a faster and economic mode.

**• e-Procurement (https://etenders.kerala.gov.in):**

e-Procurement is a Mission Mode Project (MMP) of the Government of India, under National e-Governance Plan aimed at increasing transparency in all government procurement & the project commenced in 2011. All Government of Kerala depts./Boards/Universities/ Organisations were directed to adopt e-Tendering for all tenders with value above Rs. 25 lakh. In 2015, the mandate was revised across all Government organisations in the state, for all tenders above Rs. 5 lakh. KSITM is handling the PMU as well Helpdesk Support, on a state-wide mode. The PMU undertakes administrative level requests from tenderers as well as bidders, apart from co-ordinating the activities of the service providers, NIC-SBI. The Helpdesk is carrying out support services to the tenderers & bidders, including technical support over phone, remote access & administration, training etc.e-Procurement is made mandatory for all tenders above Rs. 5 lakhs which ensured Wider participation & Competitive bidding. PKI enabled Digital Signature Certificate (DSC) along with the user-id and password for authenticity and security. Successfully integrated e-Payment system (SBI MOPS).

**• e-Office**

e-Office File Management system (e-File) is a Digital Workplace Solution to automate File Management in Government offices. The e-Office project in Kerala envisions modernizing government offices and getting rid of manual paper file processing and replacing it with a digital workflow system. In the process, the government offices will be transformed to 'paperless office' gaining the immense benefits of faster decision making aided by electronic mode of communication. Though e-Office was piloted in 2014 itself, during the last five years steady progress has been achieved in the rollout of e-Office wherein it was deployed in all Departments of Secretariat, several Directorates, 14 Collectorates, and 22 RDOs and taken even up to the grass root level to some Taluks and Village Offices. Numerous

offices with other e-Filing systems like DDFS has migrated / requested to move to e-Office. During the period from 05.July.2016 onwards, e-Office has been implemented in 100+ new offices. Implementation is under full swing in remaining offices also on priority. E office new version migration will be underway very soon which will encompass extra ordinary features in the digital file flow system.

- Number of active users in e-Office is 40,259
- Secretariat – 4060,
- District Revenue – 5548,
- Directorates and other Govt. Institutions – 30,651
- Nearly 25,000 users are added in the last 3 years to e-Office.
- Total Institutions e-Office implemented : 100+
- NIC has planned to rollout e-Office latest version e-File v7 in Kerala by end of 2021.

**Table 2** Details of e-office systems in various Departments

| | |
|---|---|
| Secretariat | 100% - All 54 departments |
| Collectorates | 100% - All 14 Collectorates |
| Sub Collectorates /RDOs | 20 RDOs |
| Directorates/ Commissionerates/ Other Govt. offices | 100+ implemented; 20 in progress |
| Taluks /Village Office | 15 Taluks, 214 Village Offices, 2 RROs |
| Training on e-Office | > 30,000 end-users |
| e-File movements per month | > 10,00,000 |

For More details : https://itmission.kerala.gov.in/projects/e-office

**• Government Contact Centre-Kerala (GCC-K):**

On 16.02.2019, the Call Centre has been commissioned to a software-based, State-of-the-Art Contact Centre solution. To date, approximately 145000 calls have been handled at GCC-K utilizing this latest solution.

Labour Helpline, the Call Centre facility for the Commissionerate of Labour commenced on Sept 29, 2021 from the Headquarters of Kerala State IT Mission, at Pattom, Thiruvananthapuram. This is functioning as an extension of KSITM's Government Contact Centre-Kerala.

Revenue Information Service (RIS), the Call Centre facility for the Revenue Department was inaugurated on Oct 1st, 2021 by Shri. K. Rajan, Hon'ble Minister for Revenue, Government of Kerala, by calling the Toll Free number 1800-425-5255.

Round the clock support has been provided to the public when the State was affected by the flood, in 2018 and 2019. During the flood, the Contact Center acted as the centralized assistance unit to deliver support services in making donations to CMDRF, coordination of rescue operations, etc. In addition, in 2019, Certificate Adalat services started as part of Flood Rescue operations.

During the Lockdown period, the GCC-K functioned on all days from March 2020 till July 2020 (107 days except the starting of Triple Lockdown), without any break-in-Service. Samoohika Sannadha Sena Volunteer Registration, IVRS based Ration Kit Donation system, Civil Supplies related services (food requirements), Legal metrology services (Additional pricing), Kerala Water Authority services(scarcity of water), etc. were the major Helpline services handled by GCC-K, during these Lockdown days.

- During Triple Lockdown (since 20.07.2020), as instructed by the District Administration, the GCC-K acted as the Disaster Management Call Centre (Emergency Call Centre) to help the citizens affected in the lock-down or containment zones.
- On boarded several major Helpline Services like Legal Metrology, Food Safety, Kerala Water Authority, ANERT, m-Kerala & SSDG, e-Office, Digilocker etc.

**• e-District**

e-District which is a State Mission Mode project under Digital India, was conceptualized to provide integrated, seamless, and online delivery of citizen services at the district level through automation of work flow, backend digitization, integration and process redesign. The project targets delivery of high volume citizen services provided by the district administration, at Taluk or Village level, through back-end computerization to enable online availability of these services through Common Service Centres (CSC) and State portal.

At present e-District have implemented 25 Revenue Certificate Services across the State. The facility enabled for citizens to apply certificates with the help of Akshaya Centres or through public portal and get the digitally signed certificate through online without visiting village offices. More Than 6 Cr digital certificates were issued through e District portal successfully.

**• FRIENDS (Fast Reliable Instant Efficient Network for Disbursement of Services)**

FRIENDS is a single window 'no queue' integrated remittance centre, where the citizens have the opportunity to pay all taxes and other dues to the Government, under one roof at no extra cost. An on-going project of KSITM, FRIENDS is now operational in all 14 districts of Kerala.

The enterprise enabled 'any-where any-payment system' titled 'FRIENDS Re-Engineered and Enterprise Enabled Software' (FREES), developed by National Informatics Centre, Kerala is a centralised web enabled system that help the citizens to pay utility bills at any FRIENDS centre. FREES Application has centralised database system with the feature utility payment can be done on any FRIENDS or AKSHAYA all over Kerala with a single user interface. Through this system new services or agency can be added without changing the software. It has online data fetching and updation from and to the departmental servers-for Vehicle Tax, Water Bill and Property Tax.

**• UIDAI**

Govt of Kerala has been assigned as the state registrar for Aadhaar enrolment. IT Department

Kerala has been approved as the nodal department and Kerala State IT Mission (KSITM) has been approved as the nodal agency for Aadhaar enrolment in the state. Akshaya Project under KSITM acts as the Enrolment agency and conducts Aadhaar enrolment through the Akshaya Centres. In addition UIDAI has approved, Kerala State IT Mission as the Authentication User Agency(AUA) and e-KYC User Agency (KUA) for offering the Authentication and e-KYC services offered by UIDAI. BSNL acts as the Authentication/e-KYC Service Agency (ASA/KSA) for these services by transmitting the transactions from and to UIDAI server.

**Aadhaar Enrolment**

Kerala has achieved about 100% of Aadhaar generation. Currently 22% of 0-5 year old, 87% of 5-18 year old and 110% of 18 years and above have received Aadhaar.

**Aadhaar**

1. Pensioner Registration and Life Certificate mustering for Social Security and Welfare Board Pensioners numbering about 50 lakhs. Weeded out bogus beneficiaries.
2. Ration Card Beneficiary identification using Aadhaar biometrics for 80 lakh cards. Upto 12 lakh transactions per day during peak days. Bogus beneficiaries were identified.
3. Integration of Aadhaar services in e Health for identification of beneficiaries.
4. Integration of Aadhaar for PSC candidate verification during profile registration and Aadhaar seeding.

**• Digilocker**

DigiLocker service is currently integrated for the following departments as Issuers:

• e-District project - revenue certificates.
• Food and Civil Supplies Dept – Ration Card
• Pareeksha Bhavan – SSLC (2018,2019, 2020 will be integrated soon)
• Motor Vehicle Department – Driving Licence and Vehicle Registration
• PSC – One Time Verification (OTV)

Efforts are on with NIC, IKM and respective departments to include HSE and VHSE certificates, Birth, Death and Marriage Certificates and other certificates of LSGD into Digilocker. Also SSLC certificates from 2002 to 2017 needs to be integrated into Digilocker, for which consent of Pareeksha Bhavan is awaited. Universities also need to be on boarded to DigiLocker through persistent efforts, although many discussions were conducted with them through workshops and mail communications.

1. Integration of SSLC certificates from 2018
2. Integration of Ration Card for authenticated beneficiaries.
3. Certificate Adalat during 2018 and 2019 floods for retrieving lost certificates.
4. Integration of KPSC for publishing OTV certificates

- CPRCS-Centralized Procurement Rrate Contract System
- Developed & maintained a portal that aggregates the hardware requirements by the entire State Government depts., agencies, Universities etc.
- Created an end-to-end, easy-to-use online mechanism for procurement of IT hardware

for GoK depts.& agencies

- Desktops, Laptops, Printers, Photocopiers, Scanners & UPSs of different configurations suitable for office use offered through this platform.
- Rate contract entered into with OEMs. As such, price achieved for the above-mentioned hardware much below the market price & those offered through other online platforms
- Payment to treasury by depts through BIMS integrated with CPRCS.

**• Computer Emergency Response Team, Kerala (Securing the e-Governance Infrastructure)**

Computer Emergency Response Team-Kerala (CERT-K) was set up in May 2010 and since then, CERT-K has been instrumental in building resilience into the critical information infrastructure of Kerala.

CERT-K has become the state centre to address the states information security needs and safeguard the local society drive towards technological excellence. CERT-K is working to harmonize the secure use of technology through best practices, standard policies, risk mitigations and dissemination of valuable information. CERT-K helps to protect citizens as well as critical businesses and organizations against cyber security risks. It also contributes to the national cyber security posture, advices on policies and security standards and empowers the confidence in technology users.

**• VIDEO CONFERENCING**

Experience Seamless Collaboration For any Government body, communication is a fundamental and imperative requirement. Efficient and secure communication forms the foundation stone for the inter-departmental exchange of ideas. Every move within the Government is guided by thoughtful, strong and effective communication. To crack the walls of conventional conference rooms, Government of Kerala has collaboratively crept into Video Conferencing Solutions.

First online Cabinet Meeting held in Kerala amid covid19 crisis. Chief Minister participated from his official residence and other cabinet ministers took part in the meeting from their office or residence. This is the first time in the history of Kerala such an online initiative has happened &it was decided to go online mode after the state has seen s spike in the Covid 19 crisis. This Virtual Cabinet Meeting was successfully organized by Kerala State IT Mission through its Video Conferencing Solution. During this Covid pandemic period more than 5000+ such online meetings were organized by KSITM for Chief Minister's office and for other ministers and departments and more than 20,000 plus people have participated in VC and around the world, to whom Chief Minister has interacted.

**• Capacity Building**

The Virtual IT Cadre project seeks to form and train an effective IT team for driving e-Governance projects within various departments in the state. Virtual IT Cadre training will help build a strong in-house team to conceptualize, implement and manage e-Governance projects within state government departments.

Virtual IT Cadre' interacts with the Department of Information Technology/ Kerala State

IT Mission for all technical matters and maintains a dotted line relationship with both the agencies. After training, 'Virtual IT Cadre' members continue with their normal role in their respective departments and would also help in the implementation of e governance projects in the departments.

The Institute of Management in Government (IMG) and Indian Institute of Information Technology and Management - Kerala (IIITM-K) jointly conduct a one year Post Graduate Diploma in e-Governance which aims at high standards in Information Technology, Management and Governance.

Marketing and Promotional initiatives plays a very vital role in spreading awareness of how access to ICT enabled services which can be benefited to the common citizen effectively. Increased awareness of e- governance initiatives of KSITM and its benefits to the common citizen needs to be made available to the public and civil servants through an enhanced marketing & communication system. Marketing activities primarily involves Advertisements, Sponsorships, Press releases, Promotional campaigns, Media promotion, Promotional Collaterals, Social Media management, Hoisting & Participation of key ICT events recommended by Govt., Participation in key Exhibitions etc. Print, Electronic and Social media Campaigns and expenses, associated expenditures. Promotional activities are initiated based on the requirements by the respective projects, on availability of funds & necessary approvals.

**Infrastructure Initiatives:**

**• State Data Centre:**

**Table 3** Details of State Data Centres

| Description | SDC 1 | SDC 2 |
|---|---|---|
| Location | 4th Floor, Co-Bank Towers, Palayam,Thiruvananthapuram | -1 Floor, Thejaswini Buildings, Technopark, Thiruvananthapuram |
| Date of Commissioning | 2005 | 2011 |
| Total Space | 5000 Sq.ft | 4391 Sq.ft |
| Server Farm Area | 1000 Sq.ft | 1525 Sq.ft |
| Server Racks | 37 | 52 |
| Total No. of Servers | 356 | 536 |
| Total No. of Servers (Co-Located) | 294 | 483 |
| Total Storage Capacity | 161 TB | 675 TB (500 TB SAS + 175 TB NLSAS-BACKUP) |
| Total Internet bandwidth | 3 Gbps | 2 Gbps |
| Rated Power (in KW) | 244.2 KW | 463.74 KW |
| Diesel Generators | 1 x 380 KVA | 3 x 400 KVA |

| | | |
|---|---|---|
| UPS | 3 x 60 KVA, 1 x 90 KVA, 1 x 6 KVA | 4 x 160 KVA, 2 x 20 KVA |
| Number of Applications (Co-Hosted) | 261 | 534 |
| Cloud Infrastructure | VMware Cloud | Red Hat Virtualization |
| Total No. of Virtualized Machines provisioned in Cloud | 551 | 1185 |

**Expansion of State Data Centre-2**

- KSITM is in process of building up a new server farm area at State Data Centre-2, Techno-park as an expansion to the existing Data Centre. A built up area of 2700 sq.ft has been identified for which the Non-IT works such as civil, electrical, networking passive components, building management systems etc. will be carried out. By doing this expansion approximately 60 server racks can be accommodated which will be sufficient for the next 5 years. The estimated project timeline is 9 months.
- Software Technology Parks of India (STPI), Thiruvananthapuram under Ministry of Electronics and Information Technology, Govt. of India has been engaged as the Project Management Consultant (PMC) for doing the RFP preparation and tender evaluation, verification and conducting UAT for an amount of Rs. 81,70,500/-(excluding taxes).

**Kerala State Wide Area Network (KSWAN)**

Kerala State Wide Area Network (KSWAN) was established in the year 2008 by Govt. of Kerala under the technical and financial assistance of Ministry of Electronics & Information Technology (MeiTY), Government of India which forms the digital back bone of the State Information Infrastructure (SII), connecting 14 District PoPs, 152 Block PoPs and 63 Mini POPs to the State Data Centers located at Thiruvananthapuram.

The KSWAN acts as backbone of the state communication network supporting e-governance initiatives of the state and is presently connected to around 4000 Government institutions under various Govt. departments through Wireless, Leased Line and LAN. KSWAN is seamlessly integrated with two State Data Centres (SDC-1 & SDC-2) which enable the network to provide large number of G2G, G2C services hosted in SDCs to the Govt. Institutions through a secure intranet. As the Govt. Departments are implementing e-office, KSWAN connectivity is mandatory in such offices. The Departments having e-governance applications which are hosted in the State Data Centres will be benefited using KSWAN, since KSWAN is providing a secured intranet access with a dedicated bandwidth to the institutions at lower cost.

## Other Highlights

**• Vidyakiranam-Scheme–Bridging-the-Digital-Gap-CPRCS**

The Vidyakiranam Scheme by the Government of Kerala seeks to empower young students without the economic means to be a part of the new wave of education powered by digital technology. By urging the participation of individuals, groups, associations, or organizations

alike, government hope to enable these students with quality laptops/tablets to put them on the same starting line as the rest of the students in the world. A laptop to change their future. KSITM step into the project to empanel the OEMs and suppliers to supply Laptops, Tabs and chrome book with standard specifications at a significantly subsidized price. Accordingly KSITM has invited request for proposal for Supply, Installation, Commissioning, and Maintenance of Students Laptops with comprehensive manufacturer warranty under CPRCS project from OEMs and authorised suppliers and to empanel them accordingly and is progressing steadily.

- SUGAMA PORTAL : RoW Permission Portal(rowservices.kerala.gov.in): At present an agency that requires Road Cutting permission / RoW Permission needs to visit multiple offices of different road owning agencies, with varied documentation requirements and multiple rates adopted by agencies sometimes with no time limit specified for disposal. KSITM now implements a solution for Road Cutting Permission &Utility Shifting application for the agencies to avoid the above hurdles. Users may utilize the Online application for obtaining approval in hassle-free way. The portal ensures Online submission of application for Road Cutting Permission/ Right of Way Permission without the need of approaching any office. Online submission of relevant documents such as road sketch, GIS Map of cutting etc.To provide permission within a time limit. It facilitates the users to download the final signed approval certificate online.
- KSITM has successfully conducted live webcasting of polling booths for the General elections to Kerala Legislative Assembly 2021.50% of the total polling booths,(20441 booths) were suggested by ECE for live webcasting. During the last assembly election 2016, web casting was done in 3137 sensitive polling booths. There are sensitive booths, critical booths and booths which are LWE (Left Wing Extremist prone). KSITM has initiated this live webcasting with the support of akshaya centres at districts, co-ordinated by District project managers and KSITM state office at Thiruvananthapuram in conjunction with state election commission and CEO Office at Trivandrum with KSITM officials deployed. Monitoring of Live webcasting was also assisted at CEO office control room. Critical Applications were properly enabled during the election day and also on the day of counting as well with ksitm officilas deployed at CEO office, Trivandrum. Those booths where internet connectivity is not available, video recording has been arranged. The webcasting solutions are provided by keltron and internet connectivity was offered by BSNL and un-interrupted power supply was ensured by KSEB.KSITM state office control room was also setup and technical supports were provided timely to all the polling stations and issues were resolved on a real time basis and ensured smooth conduct of elections. At district level there are control rooms were set up by district administration to regulate the and monitor the entire streaming process with the help of District project managers and the centralized monitoring is done by CEC.IT Mission director, being the nodal officer for IT enabled election initiatives, looks after the entire initiatives centrally at state office and co-ordinate with CEC office.

- Vidyashree Scheme is a scheme launched by state government of Kerala to provide laptops to the students belonging to weaker section of the society and the Kudumbashree members. The scheme is launched to ensure online education for students during this COVID-19 pandemic. KSITM has developed the Vidhyashree portal and empanelled the OEMs which has digitalized the distribution of educational laptops to the students in the workflow system by linking with KUDUMBASREE, KSFE and different OEMS. The KSFE Vidyashree Scheme applications has been registered through the portal by CDS member. More than 80000 applications were received through the portal so far.(www.vidyashree.kerala.gov.in).
- Akshaya has successfully undertaken the Mustering for the pensioners across the state and more than 50+ lakhs pension beneficiaries benefited out of this.
- KSITM at Oxygen WAR room at Government Secretariat with technical Support 24/7: Covid 19 Jagratha portal, developed by Kozhikkode district administration and NIC during covid pandemic regime, integrates the Oxygen module management in order to ensure smooth supply and demand of oxygen at hospitals on war foot basis, by coordinating hospitals and its nodal officers, suppliers, manufacturers, distributors, etc. KSITM provides technical support for state war room officials for generating reports by deploying technical officials.

**IT / Non-IT Upgradation**

- The procurement of the Storage Infrastructure, Network infrastructure upgrade is in progress which are planned to complete in this financial year.
- The non IT upgradation (UPS & Air conditioners) works at State Data Centre-1 are in progress.
- Augmentation of Server capacity for the Cloud infrastructure is in progress and the work was awarded for the supply of 8 High End Servers.

**• KFi-Public Wi-Fi:**

There are currently 2023 free Wi-Fi hotspots operating in public places across the state via K-Fi or public Wi-Fi system.1 Gb data at 10mbps is available absolutely free at public places for citizens. In addition, steps are being taken to enable up to 50 additional hotspots in selected locations. About 5427 GB of data is used daily in Wi-Fi hotspots.

**Table 4 :** Active Departments & Services under Aadhaar.

| Department Name | Services |
|---|---|
| Civil Supplies Department | Authentication,ekyc |
| e-District Project | Authentication |
| Finance Department | Authentication |
| General Education Department | Authentication |
| Scheduled Caste Development Department | Authentication |
| ANERT | ekyc |

| | |
|---|---|
| e-Health | ekyc |
| Kerala Public Service Commission | Authentication,ekyc |
| Local Self Government Department | Authentication |
| SPARK | Authentication |
| Kerala State Financial Enterprises Limited | ekyc |

• **KFON ; Kerala Fibre Optic Network** will support the inclusion of almost all digital assets onto a common platform, which will ensure confluence of data from multiple sources, applications, objects and people. The establishment of this project will provide high quality, reliable, cost effective and sustainable network to Government of Kerala. The provisioning of the core network will ensure connectivity to the data centres and control rooms with scalable capacities to allow for expansion in the future. This project will have multi fold benefits across the government departments and citizens will feel the effect.

The core project requirements are of prime importance and are listed as below
Create a highly scalable and resilient core optical fibre network across the State and also to provide non-discriminatory access to service providers & to be an Infrastructure Service Provider and provide free/subsidized internet to targeted sections of households through service providers to

- Setup an access network to connect to 30,000+ government and educational institutions and provide infrastructure support for 20 lakhs households and 2 MSOs
- Network shall be built on KSEB transmission circuits and distribution poles with substations as PoPs & Collaborate with service providers to promote digital services in rural areas

The proposed number of users in the first phase: 8500x 15= 127500 users

### 2. Information Kerala Mission

**Introduction**

Information Kerala Mission is a pioneering e-governance project set up by the Government of Kerala for implementing the computerization activities of the Local Self Government Institutions of Kerala. It was started in June 1999. As per the G.O.(Rt)No.343/2012/ LSGD dated 22.12.2012, on 10th February 2014, IKM was registered as an autonomous institution under the Travancore - Cochin Literary, Scientific and Charitable Societies Registration Act, 1955. With registering as a Society, all e-governance programs of the Mission Group namely, developing software for efficient and responsive systems for smart governance and improving public service delivery with comprehensive citizen interface covering various activities of the Local Self Governments shall now on be carried out by the IKM Society.

IKM is an attempt to strengthen local self-governance through ICT (Information Communication Technologies) applications. IKM has adopted a human-centred approach to e-governance. This approach is characterised by the holistic and proactive evaluation of

existing systems and legacy systems, attempts to simplify and transform existing systems and effecting integration of systems. Systematic attempts at process reforms are also part of it. These would enable faster and objective decision-making, more citizen-friendly interfaces and better accountability. The software applications are developed through active user participation. Emphasis is placed on demystification of technologies and establishing adequate technical support systems. Training and hand holding are given high priority.

## E-Governance Programmes

### ILGMS (Integrated Local Government Management System)

ILGMS (Integrated Local Governance Management System) is a comprehensive Digital Platform for Local Government Institutions to cater their entire requirement of governance. ILGMS consists of one horizontal domain and many vertical domains, which comprises their entire day-to-day activities. The ILGMS developed in a three-tier architecture using open source technologies.

Currently ILGMS rolled out in 309 Grama Panchayats(out of 1200 Local Bodies) with Workflow, File Management, Financial Accounting and Civil Registration domains. Implemented single sign on and the workflow integrated with existing e-governance software. In near future it would be escalated in to all LSGIs irrespective of nature of the LSGIs (urban and village)

The software has converted the implemented LB's to paperless offices with guaranteed service delivery time as per Right to Service Act. All the services in these LB's are provided through ILGMS only. The experience and learning's have been analysed in detail and have been adapted in the future versions.

### Citizen Service Portal

Citizen Service Portal is a single point to deliver online LSG services to citizen without going to the Local Government Offices. The services also included the services under right to service act. Currently it is implemented in all 941 Grama panchayats and enabled 213 services including e-payment.

Citizen Service portal is exclusively designated for LSG services and certain services has already been shared with state service portal .The rest of services will be integrated soon. The 213 services have already been categorised. The categorised list is attached as annexure.

### Plan Monitoring – Sulekha

The plan monitoring system is as a comprehensive e-governance initiative for effective real time formulation, approval and expenditure tracking process of the annual Plan projects of Local Self Government Institutions. Sulekha is integrated with other applications developed and deployed by IKM. It syncs with applications that perform functions like accounting (Saankhya) for expenditure tracking and proposed to sync with revenue and licensing (Sanchaya), workflow (Soochika) and council agenda and minutes (Sakarma), thereby effectively combining various aspects of the planning process. The application generates various graphs and charts for analysis and decision support online. The expenditure details of all LSGIs are made available in the website in order to facilitate better decision support system.

Currently Sulekha data is used for Economic Review, Swaraj Trophy, Ardra Kerala Puraskaram and by various departments. The Plan dashboard provides a clear picture of the Plan progress which is monitored by Coordination Committee chaired by LSGD Minister.

**Civil Registration – Sevana**

The civil registration software is capable of carrying out all operations related to birth, death and marriage as per the acts and rules. E-filing of marriage registration, SMS facility on registration and giving alerts on schedule of immunization and web-based real time retrieval of details on live registrants of birth and death are also possible. More than 99% of the births occurring in the state are registered online using the hospital kiosk - registration unit system. Sevana is an independent system, also integrated with the single platform.

**Social Security Pension – Sevana Pension**

The disbursement of seven Social Security Pension schemes to 51.38 lakhs beneficiaries are done through a web based version of the 'Sevana Pension' Software developed by Information Kerala Mission. The process of transferring the pension amount directly to the beneficiaries' savings bank account or direct to home through Primary Agriculture Cooperative banks is done since 2015. Aadhar linked beneficiaries avoids duplication of beneficiaries.

**Accrual based double entry Accounting – Saankhya**

Saankhya is an Accrual Based Double entry accounting Software for handling accounting operations in Local Self Government Institutions and also for generating annual financial statements consisting of balance sheet, income & expenditure statement and receipts & payment statements along with various MIS reports in one shot. Massive deployment of this kind is first time in the country that will shortly ensure real time web based access to the financial details of the local bodies of Kerala. The accounting software is implemented in all LGs. Additional modules for tax effort calculation for finance, application for SFC to enter the Income and expenditure details and gap fund Application hosted in the website.

The local bodies in Kerala have adopted Double entry accounting since 2011 using SAANKHYA Double Entry Accounting software. The system is supported by State Level Saankhya support team from the top to Accountant cum IT Experts at Local body level. The AFS generated from Saankhya software has been audited by KSAD since 2011.

**Taxes and Revenue – Sanchaya**

Sanchaya is an application software for streamlining Revenue System in local governments. This application handles Property Tax, Profession Tax, Rent on Land and building and Trade Licences. Citizen can pay their Property tax through online payment facility. Building Owners can download their Ownership certificate and Age certificate through citizen portal. E-filing facility is available for Traders for license application submission with online payment

**Building Permit – Sanketham**

A web based software for issuing digitally signed online building permits and plans strictly according to priority has been developed. E-filing of application, registration of architect/user, application submission, site plan & site verification, plan approval, E-file the

completion certificate, local government approve the use certificate/ occupancy, automatic permit fee calculation & demand generation, e-payment of both registration and building permit fee through the payment gateway are made available. SMS facility is also made available on every stages of application process. On 1st January 2021 onwards 1,82,500 applications Inwarded and 1,24,790 permits issued through Sanketham. So far 8,12,764 building permits have been issued through this system. Currently Sanketham is being used only in GPs (Grama Panchayats)

**Workflow application – Soochika**

The application software Soochika is for recording and acknowledging all inwards/ thapals received in an office and also handling the workflow. This is mostly handled in the Janasevanakendrams and the 'front offices'. Full update of the details of each file was successfully done in few Local bodies, and is made accessible to the public through a touch screen in the Janasevanakendram and also on the website.

Citizens can now track the status of their files through web based 'Soochika' software. SMS facility has been activated to update citizen of the progress of file movement at every stage through their mobile phones. With the deployment of file tracking software, LSGIs of Kerala are moving towards the concept of a paperless office. Soochika functions in integration with other software developed by IKM. The software handles the both front office and the backend operations of the local body thereby realizing a paperless concept and ISO certification. Various reports including seat wise distribution register, inward register etc made available in this module to ease the work of the front office staffs. During the period under consideration, the following activities were carried out:

- Facility for adding scanned attachment to make the office paperless
- Provision for generating subject wise enclosure, subject preferred list, service act Register Saankhya, and Soochika Acknowledgement slip in Malayalam
- Subject Delivery period automation
- Reports modified with in iText Sharp to
- Admin Settings for back end operations
- Interruption adding for working in power failure Mode

**Asset mapping and monitoring – Sachithra**

A web based application software for maintaining asset registers, valuation, transfer, maintenance and renewal/disposal of assets and for evolving effective administration controls and for equitable and need based distribution of available resources is in the final stages of development. Various kinds of reports can also be generated as per user definitions. Inter-software integration and development of depreciation module is in progress.

When the web module is operational, it will be integrated with Sulekha plan monitoring and Saankhya.

**Establishment – Sthapana**

Sthapana is the application Software for smoothening establishment functions, pay roll preparation and handling provident fund details of local government employees. A fully web

based software for computerizing and maintaining Provident Fund accounts of Panchayat and Municipal employees is made operational. All PF related services including nomination facilities, Service details of employees, online download of credit can be operated through the software. The stand-alone software in existence in the local bodies for management of establishment functions and pay roll preparation is being fully web-based. Sthapana web includes incumbency register, health insurance details of panchayat employees and NPS module. NPS processing includes back log processing, missing credit and monthly subscription.

**Premises mapping – Sachithra (GIS)**

A comprehensive spatial/non-spa¬tial digital database including socio economic data in the Malappuram Municipality area was generated with the state-of-the-art techniques of Remote Sensing and Geographic Information System. By integrating thematic layers and attribute data of societal importance, a web based user-friendly information system has been designed and developed in open source platform. The decision support modules provide flexible environment for data handling, resource query, update analysis and provide inputs into the master/zonal planning and utilities management.

The premises mapping technology used by IKM was indigenously developed during 2002-03 whereas the Mapathon project was evolved by KSDI during 2019-20 only. We were relying on the cadastral map and field measurement book earlier and now we are integrating cadastral map with satellite map whereas KSDI is doing their mapping without the cadastral data. IKM is capturing all the tangible assets like buildings, road-railways, landmarks, water bodies etc, within the boundary of the concerned local body during the mapping programme. KSDI is mapping the official assets only. Moreover IKM is a GIS data generating agency and KSDI is a repository of GIS data generated by State Govt agencies.

The project Malappuram municipality premises mapping titled State Urban Information System powered by National Urban Information System was aimed at preparing and locating a digitally-engineered system of information with the help of high frequency satellite imagery, Geographic Information System (GIS) and DGPS (Differential Global Positioning System) of the area under Malappuram Municipality to develop an interactive web application and submit it to the District Town Planning office, who was the owner of the project. Since DTP Malappuram doesn't have the technical expertise to complete this work, they have approached IKM and the project was completed and the website published. NCESS was also partnered with IKM for this project. The satellite imagery was procured from National Remote Sensing Centre (NRSC). The entire field work was done during 2012-13 and the physical as well as socio economic details of the municipality were collected. Adalat was conducted before finalising the database. The concerned staff members of Town Plan and municipality were provided training for using the web application hosted with the data collected, being the main beneficiary of the data. The living standard of the residents and the land use were identified and recorded with the program.

**Recording agenda notes and minutes – Sakarma**

Sakarma is the web based application in which it deals with Online meeting management

and decision support system for Local Self Government Department. The meetings are conducted strictly on the basis of Panchayath Raj & Municipal Act. Certain time schedules are insisted for the meeting day fixation. Public can view the details and reports of Meeting notices and minutes for all localbodies. Providing SMS service for intimate the meeting in time.

**School attendance management system - Sahaaya**

A web based software using Free and Open Source technology to manage attendance and exam details of students of schools. The key facility in this software is to send SMS to parents about their student's activities. There is provision to send instant SMS to PTA members and parents of the absentees. This software can manage student details such as admission, promotion, transfer, monitoring of attendance of each students and its report, identity card generation. The software has been deployed in selected Government schools as per requirement.

**Web development- Samveditha**

A CMS (content management system) based web application software for displaying Government acts, rules, government orders, Manuals and Court Interpretations relating to local body has been developed in an open source system.

The website currently is being accessed by a large number of users including the public, officials, and the academic community. Update facility is now available for individual local governments directly and also through various application software routinely used by them. The local governments need not take special efforts to update the website, in many cases. Many of the data on the website are kept updated by synchronizing with the various application software used by the local governments for their day-to-day computerized functions. The local databases are synchronized with the web data using the Local Government Wider Area Network (LGWAN) through KSWAN and LSGVPN. The website also serves as a portal for various online services. Details of the social welfare pensioners, decentralized plan projects (including expenditure), property tax, government orders, file status, provident fund accounts of employees, details of elected representatives, GIS maps, civil registration certificates, Government orders, tender notification of various local bodies, etc. are available from the web portal. Websites of all Local Governments developed using Open Source Content Management System is being maintained.

## 4. Grass root level impact:

- Since public services that are being provided to the citizens are became online, Citizens can avail the services online This resulted in corruption free environment
- This online services also caused reduced work load for staff in LSGIs. This implied a faster service to citizen by LSGIs
- Increased efficiency
- Increased responsiveness
- Increased transparency
- Corruption free bureaucracy

- For availing online services, citizen need not to go to LSGI office he/ she can avail the services from any place where he is living then, thereby citizen can save time, money and avoid travel. This helps reducing the environment pollution
- Since reduced work load of LSGI staff, staff can take up other jobs that are not coming under their section (assigned work). This helps increase overall performance of the LSGI.

**5. Challenges for the e-governance roll out**

- Insufficient IT infrastructure: - During the e-governance in local governance IKM started software development since 1999 from distributed system to centralized web applications. Now it is going to refactor the monolithic architecture to micro-service enterprise applications. State e-governance data centre has lack of IT infrastructure facility for deploying such applications in containerization, auto scaling, etc. Also bandwidth is a challenging factor in SDC and LSGI. After rollout of ILGMS software, most/all of the LSGI functions are depending on the online web applications. So the last mile connectivity is a challenging in LSGI also. It may resolve after the complete rollout of KFON.
- At present one of the major issues that are being faced by LSGIs is in- sufficient web server capacity. This results in slower speed of the web sites and other issues too.
- Infrastructure issues:
- At present the issues that are reported to the headquarters are being resolved. Instead, solution to the root cause to be given. There by recurring issues can be avoided.
- There should a mechanism to give time bound solution to the issues that are reported
- There is no mechanism for to take the feedback from the feedback management software and making changes in the software's accordingly.
- Software developers shall be given training on latest technologies
- Lower wages. IKM employees have lower salary structure compared to the other institution of similar nature this results is in experienced employees leaving IKM and join other institutions
- There should be frequent trainings programmes to end users.

**6. Future Programmes**

- ILGMS Architecture refactoring. Migrating monolithic to microservice architecture. ILGMS is an enterprise application software for the comprehensive egovernance requirement of Local Governments.
- Develop additional functional domains in ILGMS Platform
- ILGMS is implemented stage wise, primarily with 3 domains namely Work flow,Civil Regstration and Finance module.Other modules like pension,building permit,HR,plan ,meeting management,asset is under development.
- Adding intelligence in eGovernance Software.
- Data Analytics and building MIS. : During the e governance in last 20 years, large volume of data has been generated for Local Governments. Analysis of this data will lead to better planning and governance.

- Integration with other departments.
- Exploring the Possibility of AI and IoT in e-governance and incorporate it in possible software.
- GIS based asset mapping. Integration with other software and map GIS co ordinates.

**Suggestions and improvement**

- Strengthen IKM in Technical and Technological area
- Making salary structure on par with industry standard
- Business process re-engineering to be rolled out. (E.g. There are services that can be availed on line but the beneficiaries are to avail it by coming directly to LSGIs. Such things are to be changed)
- Integration of software's that are being used by other departments
- Level of IT literacy of LSGI staff need to be scaled up
- Avoiding data duplication by various departments.(Various departs using different software's for same purpose.

**7. IKM's Mission**

- To provide a vibrant Information Technology and e-governance environment to the Local Governments in Kerala.
- Implementing e-governance programs, by developing software for efficient and responsive systems for smart governance and improving public service delivery with comprehensive citizen interface covering various activities of the Local Self Governments shall now carried out by IKM
- Improving public service delivery and transparency in local governments. (Implementing online services to public).

**3. e-Health Kerala project**

The e-Health Kerala Project, based on the concept of "One citizen one Electronic Health Record", is a unique, robust and sustainable Healthcare Information Technology solution supporting nearly 50,000 healthcare service personnel consisting of Doctors, Paramedical and other non-clinical staff at the Primary, Secondary and Tertiary care centres maintained by the State Government.

The ultimate vision is about building an Integrated Healthcare Cloud which will hold the complete healthcare data about all the citizens in the state.

e-Health project is designed, developed, Implemented and supported by e-Health Project Management Unit, the IT Division of Dept. of Health & FW, Govt of Kerala.

**e-Health has two major components which are tightly integrated :**

- e-Health HMS - Hospital Management System and
- e-Health PH - Public Health Management System.

**The Main components of e-Health framework are :**

- Centralized Healthcare Information System with Central Electronic Medical Records (EMR) Repository which has the functionalities of Hospital Management System and Public Health Management System.

- A Central Repository of Demographic Data, Public Health Data and Electronic Medical Records pertaining to the State will get dynamically updated. Each citizen record in the demographic data repository will be identified by a Unique Health ID [UHID] which will be used by all the services provided by e-Health Kerala.
- A high Bandwidth reliable Network connecting all hospitals ( in Public Sector) in Kerala and also linking them to Central Healthcare Data Repository .

**e-Health Software Application consists of following components:**

- Integrated Application deployed at State Data Centre and Disaster Recovery Centre
- A field level Android application for Public Health management deployed in the Tablet PC of field staff for capturing demographic data of individuals and for disease Surveillance.
- eHealth Citizen Portal for Public Access
- Distributed lean Application deployed at Hospital lean Servers to manage connectivity interruptions
- Direct data transfer to National Health Portals of MCTS, NCD, IDSP, HMIS, NIKSHAY etc
- Integration with KMSCL, CCTNS (Police Dept), KASP etc

**Public Health Information Management System [PH] :**

- Public Health Management System strengthens health care service at grass root level by using Android application in Tablet PC and empowers health workers for data capture, retrieval, analysis and instantaneous reporting. It eliminating Field Diary and Registers for grass root level Health workers. Tablet PC isdistributed to all the 9600 Public Health staff.

**Major features of PH System :**

**• Digitised Family Health Register :**

**• Demographic Survey -** Information about each family members viz. Name, DoB/Age, Relationship, Place of Birth, Gender, Blood Group, Marital Status, Physical Condition, Domicile, Education, Occupation, Habits Family details; House details; APL/BPL Religion& Caste etc are captured

- Family Survey : Address, House Type, Electrification status, Latrine Type, Drinking water Source & Storage ,Waste disposal details are captured
- Village Survey : Details of Public Institutions, Educational InstitutionsPublic utilities, Shop and Establishment are captured
- GIS-based digitized public health survey

**• Disease Surveillance :**

- Proactive MIS for health indices, disease prediction and for decision making
- Health Data Analytics
- Direct integration with GoI Public Health Programs (RCH, IHIP, HMIS, IDSP, NLEP, NPCB, RNTCP, NIKUSHT, NIKSHAY etc.)

**e-Health Cloud :**

- eHealth Software is hosted at State Data Centre as a Cloud based system with sufficient reliability, security and redundancy.

**e-Health IT Infrastructure :**

- The IT infrastructure required for the functioning of e-Health is being setup at each an every hospital which includes hospitals at primary, secndaynd teritiary levels. IT infrastructure included Local Area Network (LAN) – both active and passive components, UPS cabling for all e-Health points, necessary hardware including centralized UPS, and connectivity – both primary and secondary.
- LAN – CAT6/6A cabling, termination, switches, routers, Wireless APs etc.
- UPS cabling – new UPS wiring and UPS power at all e-Health points
- Hardware – Mini PCs, ink tank/token/sticker printers, QR code/Barcode scanners, professional displays, lean / PACS servers,
- UPS – Centralise UPS from 5KVA up to 125 KVA
- 9500 tablets with SIM based connectivity for public health activities

**e-Health Wide Area Network :**

- e-Health hospitals are linked with e-Health cloud server at State Data Centre using leased line connection. For ensuring redundant connection at all hospitals, in addition to a primary connection, a secondary connectivity is also provided. KSWAN backbone is used and from the KSWAN PoP, BSNL Fibre optic connection of BSNL is used to connect to hospitals. Secondary connectivity is taken from a different service providers like Railtel, Vodafone etc.

**eHealth Kerala is unique in the Healthcare IT sector for several reasons :**

- Dept. of Health & FW, Govt. of Kerala is moving to the digital era through e-Health Kerala project
- e-Health is leveraging the Aadhaar to provide Unique Health ID (UHID) to all the citizens.
- Integrated Public Health and Hospital management System of e-Health enables the linkage of the entire gamut of the healthcare institutions in the state starting from the Sub Centre to the Medical College
- e-Health ensures that the quality and confidentiality of Medical Data meets national and international standards.
- e-Health Kerala is a centralized system and any hospital can become part of it through a very simple on-boarding process.
- Generates patient EHR compliant to National / International Standards
- ICD 10
- SNOMED-CT (Systematized Nomenclature of Medicine -- Clinical Terms)
- LOINC (Logical Observation Identifiers Names and Codes) – Lab investigations
- HL7 (For transfer of clinical and administrative data between software applications and for interfacing with Lab equipment)

**• Advance appointment :**

- **Advance Token:** When doctor advises Review visit, , advance token will be generated and time slot is indicated. Advance Token can be taken from Reception Counter
- **Online Appointment:** Registered Users can book future appointments through e-Health Web Portal, e-Health KIOSKs and e-Health Mobile App. A confirmatory SMS will be sent to the registered mobile number

**The benefits to Government, Doctors, Patients, and Institutions are tremendous:**

- View of patient EHR, online view of Lab / Radiology report, past medications etc. Standards based E H R and clinical terms
- Less crowded OPDs, no need to carry any physical record
- Online medicine and equipment inventory management
- Patient friendly Integrated Queue Management
- Advance appointment booking for OP Consultation.
- Online Tele consultation facility
- Proactive MIS for health indices, disease prediction and decision making.

**Integration with external systems :**

- e-Health is integrated with other Government agencies like KMSCL ( Medical Services corporation), CCTNS ( Kerala Police), Ayushman Bharath (KASP) etc for quick and efficient data transfer.

**Integration with National Portals :**

- e-Health is integrated with Health portals of Dept. of Health &FW, Govt. of India for online data transfer.

**e-Health Citizen Portal:** www.ehealth.kerala.gov.in

- A web page for each Hospital giving all Information about the Hospital
- Patient Sign up, UHID creation, E H R View
- Online appointment booking, Pay ward booking etc.
- Facility to locate Specialists
- Facility to locate specialty treatment facilities
- GIS Maps
- Upcoming Healthcare Programs
- e-Health Dashboard View
- Gallery

**e-Health Akshaya Portal :**

- Patients can book appointment for consultation , get their UHID from Akshaya Portal

**e-Health Telemedicine :**

- MeHealth Mobile Telemedicine App is used for Tele consultation. This App can be downloaded from Google Playstore.
- UHID Registration using AADHAR
- Scheduling of appointment for Tele consultation
- Video consultation with doctor
- Prescription download

- Doctors can scheduled Review consultation as tele-consultation
- Patient EHR gets updated

**e-Health Dashboard :**
- e-Health dashboard is publicly available at the URL www.dashboard.ehealth.kerala.gov.in.
- Dashboard gives the details of live e-Health hospitals, usage statistics etc.

**Data Security**
- Block Chain based Aadhaar Data Vault

**Integration of e-Health with external systems**
- Aadhaar e-KYC
- KSMSCL Integration
- CCTNS Integration
- NDHM Sandbox integration
- DR integration
- Payment gateway Integration
- IKM Sevana Integration
- e-Sign- eHasthashar Integrations
- GIS integration
- Mobile Telemedicine Integration of CDAC
- MSDG-SMS Integration
- D-Signer-NIC – Integration
- Relay Services of NIC for email

**Integration of e-Health with Gov.t of India Health Portals**
- NCD
- IHIP
- IHMI
- RCH
- NIKSHAY
- NIKUSHT
- NVBDCP
- NMHP
- NPCB

**Ayushman Bharath Digital Mission**
- The Ayushman Bharat Digital Mission (ABDM) aims to develop the backbone necessary to support the integrated digital health infrastructure of the country. It will bridge the existing gap amongst different stakeholders of Healthcare ecosystem through digital highways.
- e-Health Kerala started the processes for integration with ADBM.

**Current status of eHealth implementation**

**1. Hospital Management System**
- e-Health is currently functional at 280 Hospitals in the state .

This includes:
- 236 Family Health Centres out of which 100 FHCs are working in paperless mode

- 15 CHCs,
- 2 General Hospitals, 3 District Hospitals, 2 Taluk Hospitals, W&C Hospital, State PH Lab, Chest disease Centre etc.
- e-Health Roll Out is nearing completion at 153 Family Health centres. Work is in progress at 201 Family Health centres
- e-Health Rollout nearing completion at Trivandrum District
- At Medical College Hospital Trivandrum, e-Health is functional at all Outpatient departments ( Reception, Queue Management, OP Clinics, Pharmacy, Lab , Billing ) and partly functional at IP Departments.
- e-Health is functional at OP Dept. at MCH Kollam, MCH Alapuzha, MCH Kottayam, MCH Kozhikode, MCH Ernakulam, MCH Manjeri and MCH Palakkad.
- e-Health infratsructure is nearing completion at MCH Trissur and work is in progress at MCH Kannur, MCH Idukki and MCH Konni
- e-Health infrastructure is nearing completion at 153 FHCs and work is in progress at aroung 220 FHCs

**e-Health Usage Statistics at Hospitals (upto Aug 2021) :**

| | | |
|---|---|---|
| 1. Total Transactions | - | 9,19,62,566 |
| 2. New Registrations | - | 1,24,90,082 |
| 3. Permanent UHIDs | - | 14,07,862 |
| 4. OP Consultations. | - | 2,28,17,863 |
| 5. Lab Prescriptions. | - | 49,07,169 |
| 6. Pharmacy Prescriptioms | - | 57,79,783 |
| 7. Billing Transactions. | - | 96,37,569 |
| 8. IP Admissions. | - | 1,62,825 |
| 9. Advance appointments. | - | 6,00,724 |

**2. Public Health Management System**

- Rolled out across the state at all rural areas.
- Distributed 9500 TABLET PCs to field staff of Health Dept. with Android based Public Health Mobile application.
- Demographic data capture is progressing in full swing at all districts. Total Member Survey has reached about 2.65 Crores (80% of Kerala Population) and House Survey 68 Lakhs.
- The field level survey was initially limited to House Survey and Member Survey.
- For a smooth conducting of field survey, with the help of LSG representatives, ward level committees were formed and classes were conducted to build awareness about e-Health Public Health system and usage of Tablet PCs for field survey.
- In many places, member survey was done by scanning the Aadhaar Card of persons at local camps.
- The camp mode data collection was a great success and hence this method was adopted in all districts.
- Disease Surveillance applications: Started survey of Non Communicable diseases. For another diseases , software development is in progress
- Public Health data collected is integrated with corresponding national portals of Govt. of India.

**Implementation Strategy**

- Now implementation is in Rollout phase
- IT infrastructure is being setup and more and more hospitals based on the fund availability from various sources like Plan funds from DHS & DME, NHM funds, LSG funds etc.
- Procurements are done via open tender process via Keltron who is the TSP.
- All components are are with 5 year warranty except UPS batteries with 3 year warranty.
- For connectivity, Leased Line / MPLS connectivity is provide by BSNL, Railtel, and Vodafone etc.
- District Project Engineers (DPE) one at each district is posted to manage the implementation at district Level
- Hand-hold support staff / trainees are posted at district level to handhold the hospital staff during initial stages of implementation.
- Institutional Implementation Team (IIT) and Institutional Laison Officer (ILO) are identified at each hospital to oversee, support and laison with PMU during implementation.
- After the initial infrastructure setup, the subsequent requirements are to be met by the individual hospitals from available funds.

**e-Health Usage Statistics – Public Health Management ( upto Aug 2021) :**

- Tablet PCs distributed to Field staff of Health Dept. – 9500
- Citizen Survey - 2, 59,21,080. (79.5%). (Demographic Survey )
- House Survey - 68,23,272

**Figure 1** Illustration of the benefits of e-Health

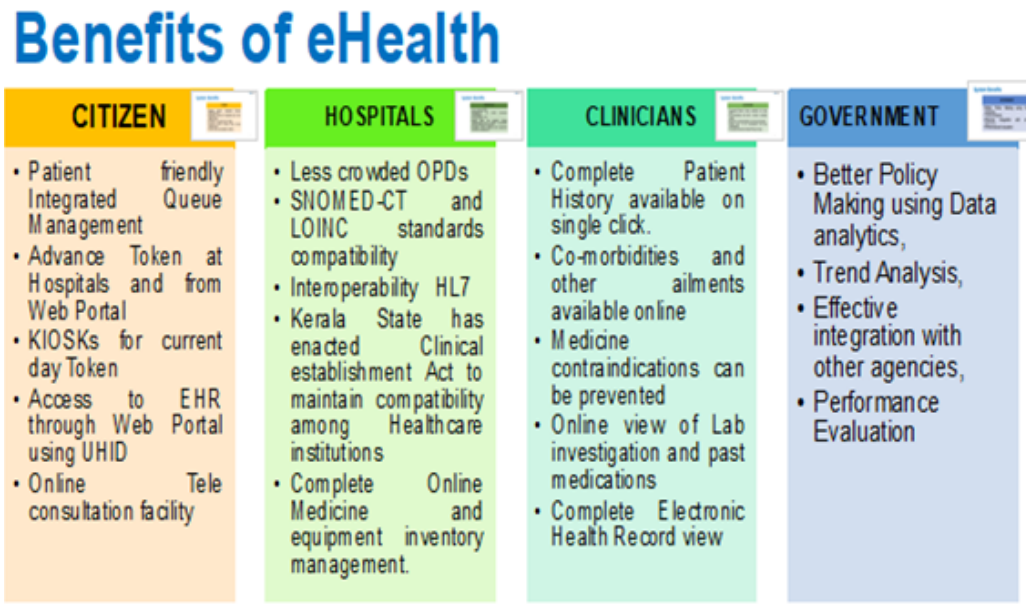


**Figure 2** e-Health Kerala Site Dash Board

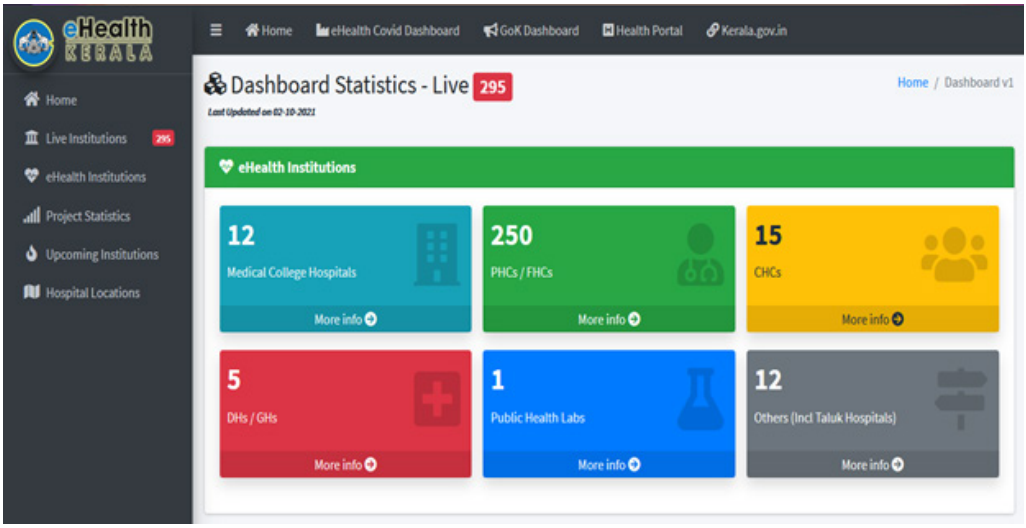



**Figure 3** e-Health Kerala Site  OP Dash Board

**Figure 4** e-Health Timelines

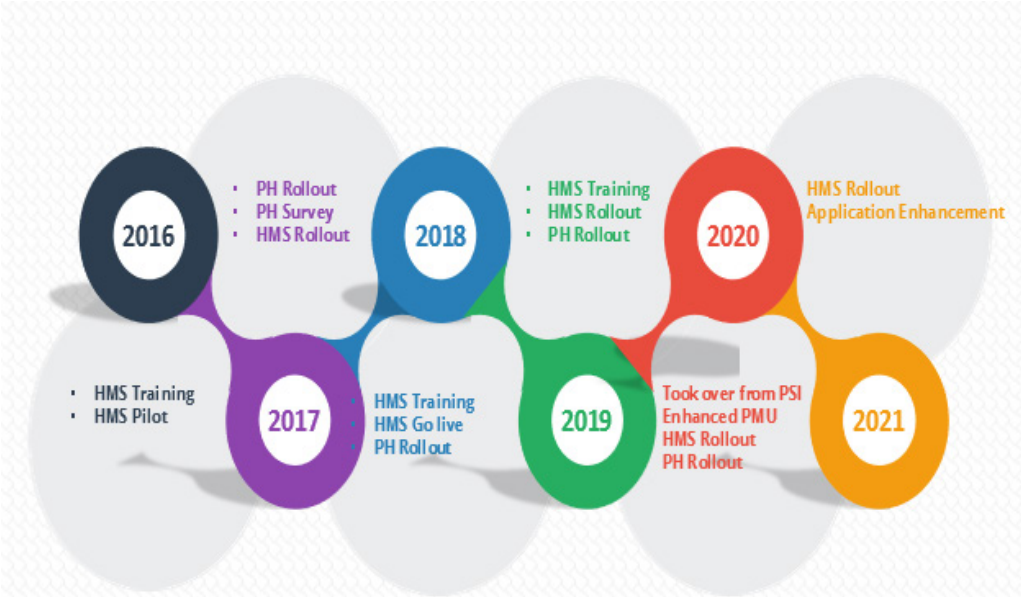
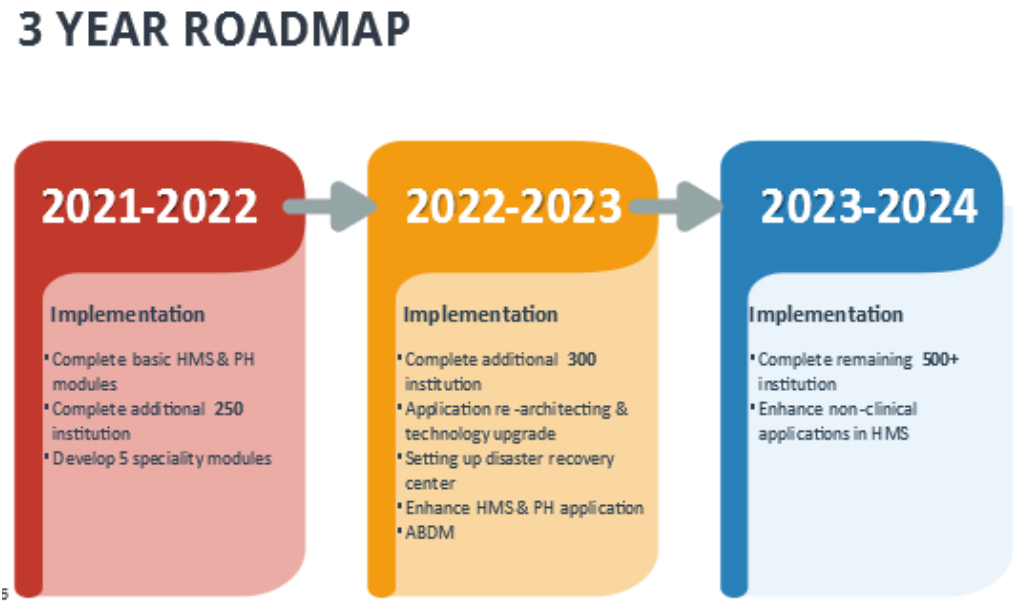



**Figure 5** e-Health 3 Year Road Map



**Challenges Faced:**

1. Fund availability, procurement issues, time constraints etc.
2. Reluctance to use by some sections of users
3. Lack of ownership from stakeholder departments
4. Change in Scope of Work during implementation
5. Non-availability of IT infrastructure in a timely manner
6. Price hike in IT infrastructure
7. Issues in Implementation and adoption due partial implementation
8. Issues in availability of skilled and experience technical manpower resources
9. Lack of proper office space
10. Contractual Issues in both hardware and software
11. Need for new works and reworks after implementation
12. Public Health activities not via e-Health in urban areas.

**4. National Informatics Centre (NIC)**

The need for transforming conventional government offices into more efficient and transparent offices, thereby eliminating huge amounts of paperwork, reducing the time delay in providing the services to the citizen etc. has been felt. The government has to find ways and means to improve the services by integrating various services to support governance by ushering in more effective and transparent inter and intra government processes.

The next stage of e-Governance should undergo a paradigm shift from present stereotyped approaches, and evolve around the stakeholders in different capacities i.e farmers, migrants, beneficiary families etc. In fact to take it forward we also need to look at the following:

a) As a welfare State, Governments need to provide a citizen UNIQUE ID at Birth (Birth Registry) and then seed same through systems in Immunization (WCD), Health Registry, School Education, High School Education, Professional Education, Skills Registry, and so forth until the Death Registry when the Id can be defunct or disabled to avoid any misuse in Digital systems.

b) The present phases of e-governance have already created large data sets but in silos under custody of different departments which create challenges due to non-availability of data sharing policies. Probably a State Data Authority under the Department of Economic & Statistics or the Planning Board should be proposed which manages the complete data set of the State with different access permissions for the generator of the data sets and different permissions for those authorised to access part of the data sets. Such an Authority can easily manage the statutory compliances which will be needed going forward on the Data front including the Personal data protection rules.

Kerala in this way could become an early mover on a radically different e-Governance framework. The following components can be the basic building blocks of the Frame Works,

**Single Sign on concept.**

The Government of Kerala has already launched the e-Sevana portal which is an one point access for availing various government services. As various agencies are involved in the

development and implementation of the back-end automation of individual systems, different logins are created in the system.

The ease of use of the services by the citizen is of prime importance and using a different user-id and password for each service is very cumbersome. It is required to introduce 'single sign on' concept which ensure that citizen can avail any service of Government of Kerala using a single sign-on credentials. Wherever ADHAAR Authentication is required the same can also be introduced as an optional requirement.

**Unified Registry**

The Government of Kerala is implementing various schemes which benefit the citizen for which the scheme implementing authorities/Departments have developed various information Systems. This has resulted in the creation of islands of information systems and databases which varies organization-wise semantically and structurally. The mission towards the consolidation to a common beneficiary master database, which will be the Unified Registry of beneficiaries in Kerala, can be achieved by designing a common structure with semantics and to integrate all current databases to the common structure with suitable API based interfaces or ELT mechanism.

A rule engine can be built into the system which defines various exclusion and inclusion criteria of various schemes. Any beneficiary availing any benefit from any of the schemes through e-services portal of government of Kerala will be registered in the unified registry and verifies the eligibility of the beneficiary to avail the scheme after verification in the Unified registry. A handshaking mechanism has to be provided between the unified registry and treasury system to ensure unauthenticated transactions.

**Bio-metric mustering**

The scheme implementing authorities have to ensure that all the beneficiaries availing the services of Government of Kerala has are doing the mustering at periodic intervals as per the government of Kerala Guidelines. This ensures that the benefits are not going to the wrong hands and ghost beneficiaries etc.

**AADHAAR vault**

AADHAAR vault is a centralized storage for all AADHAAR numbers/VIDs collected by the government departments (sub-AUA) for specific purposes under AADHAAR Act and Regulation, 2016. A global AUA authorized to store AADHAAR numbers must mandatorily implement an AADHAAR vault solution as per circular 11020/205/2017 dated 25/07/2017. AADHAAR vault would be implemented by Kerala State IT Mission (global AUA).

AADHAAR vault is a highly secure AADHAAR data management solution that is independent and isolated from the integrating applications. The objective of AADHAAR vault is to reduce the footprint of AAADHAAR numbers within the department applications and environments to reduce the risk of unauthorized access.

**Public Distribution System and the Registry of PDS beneficiaries**

Public Distribution system is one of the Services which is availed by maximum number

of beneficiaries and has special significance. Now all the ration card related services can be availed without visiting any office and can the services online through web Portal, Mobile App or through Citizen Service centres. The department has also introduced e-ration card completing eliminating the need of a paper card (laminated card).

The sales of all the commodities in all the 14500+ ration shops in the state are done through ADHAAR Enabled Point of Sale systems. It is required introduce the sale of the commodities through online portal and ensure home delivery of the commodities. This ensure that the commodities are reaching the home of the beneficiaries especially the under privileged and aged beneficiaries. Data analytics and AI are to be used to predict the requirements of the beneficiaries and give suggestions to the beneficiaries. This also enables the prediction of stock requirements in each retail shop.

There is need to strengthen the inventory and supply chain management system of the commodities from FCI Godowns/Procurement centres to the Retails shops. This system has to be more transparent and robust so that any leakages in the system can be plugged-in.

**Government to Citizen Services**

Government has introduced services portal for availing various services from the government. However, traditionally there are large numbers of petitions/applications submitted by the citizen to the various government authorities which are coming in unstructured format.

The Government has initiated various steps to process the Tapals/Applications/petitions in the government using various file management systems. Primarily these systems are used to improve the internal efficiency and productivity of the internal processing of the system in the government. However, the same systems can be used provide better service to the citizen. The unstructured petitions and applications can be accepted on-line or through Service centres and the same can be digitally send to the File management system electronically with SMS/email alerts to the citizen with proper security. Provision can be also be made to give the reply to the citizen through the same system.

The government system is large networked systems and the petitions/applications needs to transferred to various other offices; sometimes this may be required to send to multiple officers or various levels of officers across Kerala. By properly integrating the petition management system to the internal file processing system the citizen can get the status of the petition/application at any point of time. As the complete flow is done electronically there is no time required for the movement of files between offices and the citizen can get the issues resolved much faster than the traditional system.

**Digitally integrated Government**

The e-Governance and citizen services cannot be improved without improving the efficiency and productivity of the internal system of the government. Many age old practices needs to be eliminated and all the government systems are to be digitally connected and work as a single unit to provide better services to the citizen.

Sue emphasis has to be given to digitally connect and integrate all the 26000+ Government Offices, additional 5000 Public sector undertakings/Autonomous organizations which are

spread across Kerala. The Connectivity of the offices does not imply mere connectivity between the offices through electronic means. It is the integration of services and internal work flow management systems of each and every offices with other offices and ensure exchange of information in he required format without any manual interference and the updation of the exchange of information to the al concerned including citizen through alert/notifications etc.

**e-Governance services in Finance Sec**tor

Finance sector is one more the crucial and most important sector where e-Governance services needs to be strengthened. The Finance department has done very good work through the integrated Finance management system which includes, Budget System, Budget allocation system, Bill information system, E-treasury, e-Huber, Ledger Account management system, Ways and means Management System, Digital payment system, Pension management System, Human resource management and Payroll System, Treasury Savings bank etc. However, there are lot of scope for improvement and the systems needs to be further refined, integrated and new technologies are to be introduced for providing services to the citizen in an efficient, accountable and transparent way.

The expected outcome of the reforms of the financial system is to know the financial status of the government at any point of time (every second). To achieve the same all the systems which are working as isolated or disconnected systems needs to be connected to the main stream and it has to ensure that all the financial transactions are happening only through the digital system.

The Payment to the beneficiaries are transferred efficiently in a transparent manner.
E-Audit needs to be introduced where ever required so that the Citizen them can audit the system and find out any type of malpractice in the system.

**IT Infrastructure requirements**

The strengthening of the IT infrastructure is having a key role in transformation of e-governance in the state. As more and more services are going online and the Internet and Mobile penetration is increasing every day and the data centre requirements and bandwidth requirements for availing the services needs to be strengthened. The systems are to be designed with 7-8 Years projects with the sufficient buffer to add new systems and increased storage requirements.

A well designed three ways Business Continuity Plan needs to be designed and implemented on priority to take care of any eventuality. As more systems are going digital and it is essential to have the Three Way DR and business continuity plans to be implemented on top priority.

**Security of the Data and Applications**

As more and more system go digital, the vulnerabilities in the digital system also increases, We have to ensure that there is Strong security system to counter any type of Cyber threats. All the applications needs to be mandatorily internal security audited with sufficient experience in Cyber security are in position to take care of the same.

**5. Indian Institute of Information Technology and Management-Kerala (IIITM-K).**
The Indian Institute of Information Technology and Management-Kerala was set up in 2000 as a premier institution of excellence in science, technology and management. It emphasises quality education to students and develops professionals and leaders of high calibre imbued with values of entrepreneurship, ethics and social responsibility. The institute focuses on education, research, development and training in basic and applied information technology and management. IIITM-K is the implementing agency for the various e-governance initiatives of Government of Kerala and Government of India. It coordinates national and international conferences and workshops to provide opportunities to students to interact with world class experts and researchers. There are four specialised post graduate programmes (MSc) being offered by the Institute in computer science with specialisation in cyber security, machine intelligence, data analytics, and geospatial analytics. Along with the above four specialised courses, the Institute also offers MPhil ecological informatics, MPhil computer science, and PG diploma in e-governance. The MPhil and MSc degree are awarded by Cochin University of Science and Technology (CUSAT) and post graduate diploma by Directorate of Technical Education, Government of Kerala.

**Digital University.**
On January 18, 2020, the Government of Kerala upgraded IIITM-K to make the "Kerala University of Digital Sciences, Innovation and Technology." The University started functioning from the new campus of IIITM-K in Techno-city and the new building was inaugurated in February 2021. The University is envisaged to become a unique centre of excellence of global repute by conducting education, research and extension activities in areas of digital technologies, science and humanities. The University is aiming to create capacity building in masters and doctorate programmes in the areas of artificial intelligence and natural language processing, internet of things, electronic systems and automation, imaging technologies, data analytics and big data, cyber security, block chain, ecological informatics and geospatial analytics. The University will start schools in the areas of computer science and engineering, digital sciences, electronics systems and automation, informatics, digital humanities and liberal arts. The new University will initially create about 200 job opportunities in academic and research-level.

**6. International Centre for Free and Open Source Software (ICFOSS).**
Government of Kerala established ICFOSS as an international centre in collaboration with Free Software Organisations in India and abroad to promote development and application of free software and free knowledge. It is a nodal agency in all matters relating to free and open source software including consultancy, research and development, academics, studies and service, training, publishing, certification, international co-operation and collaboration. ICFOSS has carried out many FOSS-based training programmes, workshops, seminars, research programmes, projects, Malayalam computing activities, student internships and projects, summer camps, faculty development programmes, and fellowship programmes.
Brief on E-Governance Applications/Infrastructure related initiatives

**e-Governance Help Desk :**

Based on the several requests from various departments and OEMs in solving their Hardware and software related issues on FOSS migration and among the several initiatives taken to support and to facilitate in assisting the government agencies in FOSS migration, ICFOSS has setup a Help Desk to resolve FOSS related hardware and software compatibility issues in Government of Kerala. ICFOSS will be supporting the KELTRON team by finding solution to the generic issues filtered and shared to ICFOSS, through proper channel. The main objective of the Help Desk is to facilitate a smooth transition in FOSS migration, both to the departments and to the service providers, in hardware and software related issues.

As part of capacity Building programs at department level, ICFOSS use to conduct Advance Ubuntu and System Administration training to Line Department employees, so as to support the department in troubleshooting / error handling activities. In addition to this the e-Governance Help Desk will act an a supporting hand to the department toward FOSS migration activities. ICFOSS proposes to rolling out the e-Governance Help Desk, chat facility, in local language, in the year 2022-23.

**Open ERP Solution**

Enterprise Resource Planning (ERP) is an application suite built to manage and integrate core business process, from small to large enterprises, across various sectors including government. ERP helps in optimising efficiency, reduce operational cost, improve data security and their by making forecasts more realistic and accurate. Many Government entities require the need of a full-fledged ERP Solution. However, the high implementation and running cost of ERP solution is a major huddle to the government departments / agencies. Taking this into account, ICFOSS, with the help of FOSS community team has started initiatives for installation and customisation open-source integrated ERP solutions, on a consultancy mode, at a much reliable cost.

**Automated Weather Station**

Rain Gauge is an instrument to measure the amount of liquid precipitation over an area in a predefined period of time. Rain measurement is important to study the rainfall effects, to take precautions and to make predictions which would be helpful in understanding and preventing situations like unexpected foods, drought and other intense climatic conditions. The Automated Weather Station is able to sense the ambient environmental parameters, measure rain, temperature, humidity, wind velocity & direction and transfers the data to server and these data remotely for any further processing. Automated Weather Station consists of a Rain Gauge along with Temperature and Humidity sensors and wind velocity with direction sensors, a controller hub that reads the sensor data and undertakes telemetry and a cloud/web platform for data management and visualisation. Aws uses LoRaWAN technology, which uses low power, and has a very less operational cost while ensuring communication range of a few Kms. It is completely battery operated which last for a couple of years. The cloud based visualisation web dashboard enables monitoring of the

rainfall and other parameters with storage of its historic data. Automated weather stations help in monitoring the real time water level, across the state.

**Open Hardware Live Lab (OHLL):**
ICFOSS has set up an Open Hardware Lab for the promotion of R&D as well as entrepreneurship. The lab has been utilized by start-ups for rapid prototyping and is expected to enable small to medium scale production shortly. Open Hardware Live Lab is envisaged as a state of the art smart living space to showcase Open Hardware Projects to the start-up, DIY, hacker, academia and the Government. The reference design released by the lab is expected to drive innovations in the Open Source Hardware ecosystem.

The objectives of the OHLL is to control Node featuring flow-based development using generic API's, evaluate bleeding edge technologies for use in smart living spaces, create Open Source Development boards for smart interaction and to publish reference designs including source code and hardware designs. ICFOSS has a dedicated team of Research professionals for handing and in providing capacity building initiatives of OHLL to the stakeholders.

**Digital Achieving of handwritten Malayalam documents using OCR**
Government of Kerala releases, organised and collects trillions of documents related to its State administration, Policies, Procedures, amendments, Government Orders, circulars etc. related to state administration and make them available for inter department use and for the general public. These documents has accrued since the founding of the State. However its look and feel has been changed over the years, dramatically.

Preserving data digitally is a complex problem. To achieve, this goal, a solution for multilingual service and tool for content archive and exchange of contents need to be in place. The proposed solution enables preservation of digital records, with retrieval and document search facility. This system also helps in preserving data and providing a way forward towards the availability of accessing the information on a inter-department approach. The solution will be an integrated module of Handwritten OCR.

**LoRaWAN Network**
LoRaWAN is a low power wide area network, a technology for small battery operated devices to communicate over Long Range. LoRaWAN CoE is an existing project under open IoT. ICFOSS is doing extensive work to bringing out applications and use cases and potential projects which can be realized using in LoRaWAN technologies and its capabilities. The objective of the LoRaWAN project is to conduct R&D on LoRaWAN security & computing end devices, technology research on data transmission and packet loss and to bring in more potential use cases inthe filed of LoRaWAN. Extensive researh is undergoing in the field of LoRaWAN. As part of building LoRaWAN network, ICFOSS proposes to establish LoRaWAN network across the state of Kerala.

**Localisation of AI based Chat Bot:**
A chat bot is a conversational agent which interacts with humans via natural languages. Text, as well as speech, is used as the input to these systems. Localisation of AI based Chat

Bot project focuses on development of a regional language (Malayalam) supported Chat bot on a language-independent natural language processing library. This is a retrieval based model which can converse in Malayalam. ICFOSS has developed a POC of a Malayalam chat bot which works in specific domain. The solution supports the Malayalam keyboard typing and keyword extraction in its user input text. To overcome the drawbacks of the existing system, and with the advent of Artificial Intelligence (AI), ICFOSS is conducting research for the development of an AI based Chat Boat which support Malayalam language.

**Sign Language Generation System for Malayalam**

Sign languages are the three dimensional representation of thoughts and feelings through expressions, movements and gestures. Malayalam text to ISL translation system is an MT system which converts Malayalam to its corresponding ISL videos. The purpose of this translation system is to enhance the communication between hearing impaired people with others. The scope of this system is not limited to general communication; it can be applicable to education, research and business. ICFOSS is focusing a translation system using an open source approach. The system will be an integration of signal code with videos. The solution is being enhanced as a two-way communication system which will be able to identify and convert ISL text/speech to its corresponding ISL videos and vice versa

**Malayalam Handwritten Documents Recognition**

ICFOSS has developed a a web based OCR system, which converts file into editable text and will retrieve information from the input documents. The OCR system supports regional Malayalam languages and help in its extraction. R&D initiatives are in place to enhance the existing OCR solution to identify and convey handwritten texts to digital format. For the same a handwritten OCR system for Malayalam for extracting Malayalam handwritten text from manuscripts (Modern Writing Style) is currently under development. The input of the system can be scanned images, documents and real time devices like tablets, Mobile phones, etc. which are then converted into digital text. A POC has been developed as an online solution which recognises Malayalam words. The current system is being developed into a full-fledged product and data collection activities.

**Drone Navigation Technology**

Drones are used across a variety of industries such as agriculture, logistics, surveillance, etc. But what makes the drone really useful is its ability to do autonomous flights. Autonomous flights need a stable GPS signal. But whenever those GPS signals become unstable or unavailable, for instance under a bridge, indoors or in a tunnel, the drone can no longer fly on its own. The project focuses on developing a solution for better indoor drone navigation. This can have applications like scanning details of inventories deployed in a large warehouse using autonomous drones. The objective of the project is to develop an open hardware module for drones to support navigation.

**7.Kerala Startup Mission (KSUM).**

Kerala Start-up Mission (KSUM) is the nodal agency of Government of Kerala for implementing the entrepreneurship development and incubation activities in the State. Kerala Start up Mission, formerly known as "Techno-park Technology Business Incubator"

is India's first successful non-academic business incubator. It started operations in 2007. The objective of the Mission is to identify and develop entrepreneurial talents among youth and students in Kerala, address the technology based entrepreneurship development requirements in the traditional sectors of Kerala, build appropriate training programmes suitable for Kerala's socio-economic culture, identify niche market for technology products and services, interfacing and networking among academic, research and development institutions, industries and financial institutions, establishing a platform for speedy commercialisation of the technologies developed in the institutes to reach the end-users.

**8. Centre for Development of Imaging Technology (C-DIT).**

C-DIT has been established in 1988 as an autonomous institution under Government of Kerala. From 1998 onwards C-DIT has been functioning as an Information and Communication Technologies (ICT) solution provider for the Government of Kerala. Accordingly C-DIT has been instrumental in providing several e-Governance applications and solutions for various government departments and offices. Majority of the government websites including the Kerala Government State portal and many online applications, including e-Sevanam Citizen Service Portal, are developed and deployed by C-DIT. In addition to software and website development, C-DIT has diverse technological expertise in other areas such as visual communication, interactive multimedia, optical image processing, hologram production, digitization, software testing, web hosting on cloud and facility management. C-DIT has played a key role in various prestigious IT initiatives of Kerala such as FRIENDS, Sutharyakeralam, Malayalam computing and Peoples Plan Campaign.

The major programmes undertaken by C-DIT are:

- Reorganisation of Chief Minister's Public Grievance Redressal system and Distress Relief Fund assistance mechanism into an integrated online portal www. cmo.kerala. gov.in.
- e-Sevanam which is a single window platform for availing all government online services.
- Donation portal for receiving donations to the Chief Minister's distress relief fund.
- Online examination system which has been successfully implemented in Kerala Public Service Commission, Entrance Commisionerate and a few other government organizations.
- On Screen Marking System, a computerized solution for the evaluation of descriptive answer scripts. This is being used in Kerala Public Service Commission.

**Official Web portal of the Government of Kerala**

The official web portal comprises the state portal, document portal which acts as single point repository of government orders, cabinet decisions and other documents, noticeboard portal which is a repository of tenders, publications and notices. In addition the state portal also includes single platform for feedback, online survey, opinion poll and discussion forums.

**Dashboard**

The dashboard portal is unique in its kinds, whereby acting as a single platform for displaying

different statistics of various government departments and organizations. Question bank system for the Kerala Public Service Commission.

**Vidyakiranam**

To bridge the digital gap amongst the student community in the state, this application enables inclusive participation of individuals, groups, associations, or organizations in government initiatives towards empowering education by digital technology.

**Vidyasree**

This project envisages to uplift the government initiatives towards providing digital technology to all the sections of the academic community by active voluntary participation of individuals, groups and organizations.

**Covid Relief**

Application for providing and monitoring ex-gratia benefits to dependents of Covid 19 victims.

**Sannadhasena**

This is integrated platform for rolling out the activities of the volunteer task force of Kerala. This includes various entities such as Directorate of Samoohika Sannadhasena, Local self-government institutions and other government departments and bodies.

**eKshema for the SJD**

- Application for providing seamless integration and collaboration among all the offices under the Social Justice Department
- eJeevika for WCD
- eCare for Handicapped Welfare
- eMonit for Irrigantion Department
- Smart office for Revenue Department
- WINGS application for PWD
- eSuraksha for KSSM

**eGrantz**

Online Centralised System for Disbursement of Scholarships/Schemes for all Pre-matric and Post-matric Students of SC, ST& OBC community in the state of Kerala.

- Integrated Co-operative Department Management System for the Registrar of Co-operative Societies/ Department of Co-operation.
- Digitisation of old manuscripts and documents for State Archives and Registration departments.
- Online admission portal for ITIs for the Scheduled Caste Development Department.
- Design, hosting and maintenance of over 200 Government websites and social media platforms MIS/ERP systems for various Government departments.
- Successfully carried out Facility Management System for all the RT offices under MVD Vehicles Department.
- Providing infrastructure facility for training to Government employees in handling SPARK software.

**Way forward**

C-DIT envisages to venture into new technological areas in Data Analytics, AI/ML, Block chain and Cloud computing. Positioning of required expert manpower and providing training to the existing personnel are very much essential for the adoption and implementation of new technologies.

**APPENDIX-1**
**PROCEEDINGS OF THE MEMBER SECRETARY**
**STATE PLANNING BOARD**
**(Present: Sri. Teeka Ram Meena IAS)**

Sub: - Formulation of Fourteenth Five Year Plan (2022-27) – Constitution of Working Group on **e-Governance** – reg.

Read: 1. Note No. 297/2021/PCD/SPB dated: 27/08/2021
2. Guidelines on Working Groups

**ORDER No.SPB/437/2021/PPD/W(4) Dated: 7 /9/2021**

As part of the formulation of Fourteenth Five Year Plan, it has been decided to constitute various Working Group under the priority sectors. Accordingly, the Working Group on **e-Governance** is here by constituted with the following members. The Working Group shall also take into consideration the guidelines read 2nd above in fulfilling the tasks outlined in the ToR for the Group.

*Co-chair persons*

1. Shri. Biswanath Sinha IAS, Principal Secretary, Room No. 264,2nd Floor, South Block, Secretariat,Phone: 0471-2336602, 2518444,Mobile: 9895122282, E-mail: secy.itd@kerala.gov.in
2. Dr. Amit Prakash, Associate Professor, Centre for IT and Public Policy, International Institute of Information Technology (IIIT) Bangalore, E-Mail prakash@iiitb.ac.in Mob:9886780944

*Members*

1. Dr. Janaki Srinivasan, Associate Professor, IIIT Bangalore, janaki.srinivasan@iiitb.ac.in
2. Representative from Centre for e-Governance
3. Sri. Seeram Sambasiva Rao IAS, Director of Survey and Land Records Survey and Land Records Department E-mail- dslrkerala@gmail.com
4. Executive Director, Information Kerala Mission, Swaraj Bhavan, Ground Floor, Nanthancodu, Kowdiar.P.O, Thiruvananthapuram - 695 003, Phone: +91 471 2773100, E-mail: mail.ikm@kerala.gov.in
5. Dr. Elizabeth Sherly, Director, ICFOSS, Trivandrum, director@icfoss.in, 9995361511.
6. Sri. R. Ajithkumar, Asst. Professor, IIITMK, E-mail-ajithr@iiitmk.ac.in, Mob: 9447758575
7. Sri. Misha SV, Project Manager (Sevana), Information Kerala Mission, Swaraj Bhavan, Ground Floor,Nanthancodu, Kowdiar.P.O,Thiruvananthapuram 695 003, E-mail-misha.ikm@kerala.gov.in Mob: 9446564002
8. Sri. Anish A, Project Manager (Sulekha), Information Kerala Mission, Swaraj Bhavan, Ground Floor, Nanthancodu,Kowdiar.P.O,Thiruvananthapuram 695 003, e-mail-anish.ikm@kerala.gov.in Mob:9895136238
9. Sri. Rajesh Babu, Chief Cyber Security Officer, Mirox Cyber Security & Technology Pvt Ltd, 0471-4016888 , www.miroxindia.com, , rb@miroxindia.com
10. Bindu S Kumar, Senior Technical Director, NIC, E-mail bindu.sk@nic.in, mob: 9446072208
11. Sri.Riza M M, Sub Registrar and Nodal Officer, IT Registration Department, E-mail-regadmn@kerala.nic.in Mob: 9895128526

**Convener**

Dr V. Santhosh, Chief, Perspective Planning Division, State Planning Board, E-mail-drsanspb@gmail.com ,Chiefppdspb@gmail.com, Mob: 8547434266

**Co-Convener**

Dr. P. Praveen, Assistant Director, Perspective Planning Division, 9446107617

**Terms of Reference**

1. Suggest measures to ensure that all government services are available online to all people.
2. Suggest measures to strengthen the conversion of government work to digital form.
3. Suggest measures to ensure cyber security with respect to (1) and (2).
4. Evaluate current data sharing arrangements between departments and propose measures for an Open Data Model to facilitate an advanced analytical decision support system.
5. Evaluate and recommend IT infrastructure including a scalable data centre to meet the objectives of the enhanced e-governance services.

**Terms of Reference (General)**

1. The non-official members (and invitees) of the Working Group will be entitled to travelling allowances as per existing government norms. The Class I Officers of GoI will be entitled to travelling allowances as per rules if reimbursement is not allowed from Departments.
2. The expenditure towards TA, DA and Honorarium will be met from the following Head of Account of the State Planning Board "3451-00-101-93"- Preparation of Plans and Conduct of Surveys and Studies.

Sd/-
Member Secretary

To

The Members concerned

Copy to

PS to VC
PA to MS
CA to Member (Sri. V. Namasivayam)
Sr. A.O, SPB
The Accountant General, Kerala
Finance Officer, SPB
Publication Officer, SPB
Sub Treasury, Vellayambalam
Accounts Section
File/Stock File

Forwarded/By order
Sd/-
Chief, PPD, State Planning Board

**PROCEEDINGS OF THE MEMBER SECRETARY**
**STATE PLANNING BOARD**
**(Present: Sri. Teeka Ram Meena lAS)**

Sub: - Formulation of Fourteenth Five Year Plan (2022-27) - Constitution of Working Group on **e-Governance** - Co-opted - Members - reg.

Read: l. Order of even no. dated: 07/09/2021
2. Minutes of the meeting held on 23 /09/2021
3. Guidelines on Working Group.

**ORDER No.SPB/437120211PPDIW(4) Dated: 29/09/2021**

As part of the formulation of Fourteenth Five Year Plan, Working Group on e Governance has been constituted vide paper read as 1st above. In the first meeting vide reference 2nd cited, it was decided to co-opt the following experts as members in the Working Group.

1. Sri.Snehil Kumar Singh lAS, Director, Kerala State IT Mission,
2. Sri.Muhammed Y Safirulla lAS, Project Director, e-Health Kerala
3. Sri.Ajith Brahmanandan, Sr.Technical Director(Scientist-F). Kerala State Centre, Thiruvananthapuram,NIC
4. Sri.Vinod Raj .V, Technical Manager, e-Health, Kerala.

As per the guidelines on Working Group, the Co-Chairperson is authorised to co-opt additional members in Working Group in consultation with State Planning Board to' advise the Group on the subject matter.

In the above circumstances, Sri.Snehil Kumar Singh lAS, Director, Kerala State IT Mission, Sri. Muhammed Y Safirulla lAS, Project Director, e-Health Kerala, Sri.Ajith Brahm anand an , Sr.Technical Director (Scientist-F), Kerala State Centre,Thiruvananthapuram, NIC and Sri.Vinod Raj.V, Technical Manager, e-Health, Kerala are hereby co-opted as Members of the Working Group on e-Governance.

This office proceedings read as 1st above stands modified to that extent

Sd/
Member Secretary

To
The Persons concerned

Copy to
PS to VC
PA to MS
CA to Member (Sri. V. Namasivayam)
Sr. A.O, SPB
The Accountant General, Kerala/Finance Officer, SPB
Publication Officer, SPB
Sub Treasury, Vellayambalam
Accounts Section/File/Stock File

Forwarded/By order
Sd/
Chief, PPD, State Planning Board