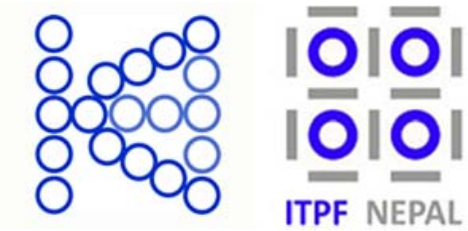
Final Consolidated Version

E-Governance Master Plan (eGMP)

(2015 - 2019 AD)

Submitted to

Department of Information Technology
Ministry of Science and Technology,
Government of Nepal



Knowledge Holding International Pvt. Ltd. (KHint)

In association with

Information Technology Professional Forum (ITPF)

July 2014

Acknowledgement

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Knowledge Holding International Pvt. Ltd. – KHint

July 2014, Kathmandu.

Acronym and Abbreviations

ADB - Asian Development Bank
AMC - Annual Maintenance Contract
B2B - Business to Business
BPO - Business Process Outsourcing
BRM - Business Reference Model
CAN - Computer Association of Nepal
CCA - Controller of Certification Authority
CDMA - Code Division Multiple Access
CEO - Chief Executive Officer
CIO - Chief Information Officer
DDC - District Development Committee
DoCSI - Department of Cottage and Small Industry
DoI - Department of Industry, Government of Nepal
DoIT - Department of Information Technology
DoTM -Department of Transport Management
EGMP - Electronic Government Master Plan
eGMP2 - Electronic Government Master Plan Version 2 (2015-2019)
ETADS - Emerging Technologies and Desktop Standards
EU - European Union
FGD - Focused Group Discussion
FNCCI - Federation of Nepal Chamber of Commerce and Industries
FOSS - Free/Open Source Software
FY - Fiscal Year
G2B - Government to Business
G2C - Government to Citizens
G2G - Government to Government
GDP - Gross Domestic Product
GEA - Government Enterprise Architecture
GIS - Geographical Information System
GMPCS - Global Mobile Personal Communications by Satellite
GoN - Government of Nepal
HLCIT - High Level Commission for Information Technology
IaaS - Infrastructure as a Service
ICT - Information and Communication Technology
IP - Intellectual Property
IRD - Inland Revenue Department
ISP - Internet Service Providers
IT - Information Technology
ITCC - IT Coordination Council
ITES - Information Technology Enabled Services

ITPF - Information Technology Professional Forum
ITS - Information Technology Services
ITU - International Telecommunication Union
KHint - Knowledge Holding International Pvt. Ltd.
KIPA - Korea IT Industry Promotion Agency
KMS - Knowledge Management System
KPAs - Key Performance Areas
KPO - Knowledge Process Outsourcing
M&E - Monitoring and Evaluation
MIS - Management Information System
MoAD - Ministry of Agricultural Development
MoCS - Ministry of Commerce and Supplies
MoF - Ministry of Finance, GoN
MOIC - Ministry of Information and Communication
MoEST - Ministry of Environment, Science and Technology
MPFS - Master Plan for Forest Sector
NEA - Nepal Engineers Association
NeGIF - Nepal eGovernment Interoperability Framework
NeGMPCC -National eGMP Coordination Council
NID - National Identification Database
NITC - National Information Technology Center
NPC - National Planning Commission
NRB - Nepal Rastra Bank (Central Bank of Nepal)
NPR / NRs. / Rs. - Nepalese Rupees
NTA - Nepal Telecommunication Authority
O&DM - Organization and deployment Method
OECD - Organization for Economic Cooperation and Development
OCC - Office of Certifying Authority
OCR - Office of Company Registrar
PaaS - Platform as a Service
PKI - Public Key Infrastructure
PMO - Prime Minister's Office
PMT - Project Management Team
PSTN - Public Switched Telephone Network
R&D - Research and Development
SAARC - South Asian Association for Regional Cooperation
SaaS - Software as a Service
SEZP - Special Economic Zone Project
SEZs - Special Economic Zones
SOA - Statement of Accounts
SRS - System requirement Specification
SWOT - Strength, Weakness, Opportunity & Threat

TA - Technical Assistance
TNA - Training Needs Assessment
TOR - Terms of References
TOT - Trainings of Trainers
TPC - Trade Promotion Centre
TTO - Technology Transfer Office
UAT - Users Acceptance Test
UN - United Nations
VDC - Village development Committee
VOIP - Voice over Internet Protocol
VSAT - Very Small Aperture Terminal
WiMax - Worldwide Interoperability for Microwave Access

Executive Summary

Technology has changed and grown in leaps and bounds since the Government of Nepal last prepared a master plan for e-Government. In order to keep up with the changing times the Government of Nepal needs to update policies and strategies that better reflect these changes. The citizens of Nepal have an increased capacity and appetite for services delivered via the internet and mobile phones. Businesses are better equipped and better connected to each other and their clients and need their dealing with the Government to be as easy and as fast, if not faster, as with their own clients. The rural areas of Nepal are better connected to the central Government offices by virtue of broadband internet that provide high speed and high quality internet services.

This report reviews the e-Government Master Plan done in 2007 and other relevant policies and regulations that may require update such as IT Policy, Electronic Transactions Act, National IT Roadmap etc. It also reviews and analyses the action plans that have already been implemented under the previous eGMP and the ADB ICT Development Project that funded most of them to look for areas that were missed or may need change this time around. The report also reviews in brief the changes: technological and regulatory, that have happened in Nepal after the first eGMP.

e-Agriculture, e-Education, e-Health and e-Tourism are four priority streams that have been specified in the eGMP2 as areas that have the most volume of demand for e-services from the Government. Agriculture, Health, Education, Local Government, Roads, Tourism etc. are some of the priority areas that have been identified in this version of the e-Government Master Plan. Strategies and working policies for these priority sectors have been defined and key projects have been identified for them and are listed in the annex in detail. Cost estimates and work plan are attached as well.

For successful implementation of the updated eGMP2, the team recommends that legal frameworks be updated and changed to better deal with changing times. With the Department of IT in place, the team also recommends that each Government agency have a qualified IT officer and team in place to support the IT requirements. With time and some effort for the next five years, the second phase of eGovernment Master Plan is set to support the new technologies and the demands of a more tech savvy Nepal.

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Part I: Project Overview

1. Project Background

The project is preparation of eGovernment Master Plan for the period of 2015 – 2019. The consortium of Knowledge Holding International Pvt. Ltd. (KHint) and IT Professional Forum (ITPF) has been entrusted by DoIT, Government of Nepal for the preparation of this second stage of eGMP.

The expansion of awareness of Democracy, liberalization in the use of Information Technology in the form of personal computers, laptops and smart phones as well as the convergence of communication technology via Internet have led to a rapid transformation of public power. With the current trend of handheld communication devices and mobile phones gaining popularity and vendors producing more and more affordable varieties of them, the lives of people have become even more interconnected, with the devices and with each other.

In order of utilize the influence of ICT on people's lives, Governments have had to create major paradigm shifts to incorporate ICT into channels of economic and social service delivery. E-Government is defined as the use of ICTs such as the Internet and the web as a tool to achieve better government by enabling better policy outcomes, higher quality services, and greater engagement with citizens (OECD, 2004). Often times, people understand it as an extension of IT services, where computer hardware and software are obtained to do the same work that people used to do earlier. However, we fail to see it as a way of government innovation where IT is only the tool and channel used to bring about positive process improvement to the services provided by the government. For it to be truly effective, legal and regulatory framework appraisal, infrastructure development, as well as civil society enrichment needs to happen in parallel.

As a part of this shift towards e-Government, the Government of Nepal put forward the IT Policy 2000, 2004 (draft) and 2010, Telecommunications Policy 2004, Electronic Transactions Act 2006, Electronic Transactions Rules 2007 etc. This report will review and analyze these policies and acts with respect to their value to eGMP2.

The E-Governanment Master Plan (eGMP) for the Government of Nepal was previously formulated by Korea IT Industry Promotion Agency (KIPA) working with the then High Level Committee for Information Technology (HLCIT) for the years 2007- 2011. KIPA had signed a MOU with the then High Level Commission for Information Technology (HLCIT) for the said task. The eGMP prepared by KIPA could not be endorsed by Government of Nepal (GON). The project has been revised on 28 February, 2013. The Rural e-Community part of the project from the scope of ADB's ICT Development Project has been excluded from the project plan. With the changing technological scenario and changes in the national IT environment, the master plan needed to be reviewed and recommendations be made to strengthen it in accordance to contemporary opportunities.

2. Project Goal

The main goal of this project is to assess the current state of e-Government in Nepal and to draft a revised eGMP2 (e-Government Master Plan version 2); identifying the need for new e-Government programs, while capitalizing on contemporary technological and other opportunities.

The eGMP2 aims to provide the eGovernment builders with the following:

For citizens:

The eGMP2 links Government services to citizen demands for better and more efficient service.

For the private sector and civil society organizations:

The eGMP2 provides places for participation in the Government's development goals and promotes partnerships between private sector and Government in governance.

For government:

The eGMP2 provides a roadmap for implementing e-Government programs in order to add value to governance, increase service efficiency, achieve transparent government and create interoperability between government services and departments.

3. Project Scope

This eGMP2 builds on past work completed for the first eGMP while incorporating current trends and aspirations to create a plan for the future. The plan recognizes that establishing e-Governance is not simply a technical issue, but also includes many institutional and legal/policy level concerns that need to be overcome.

Establishing the eGMP2 is a long term project keeping into consideration the volume of infrastructure development, HR development and systems implementation that goes into it. However, it is considered better to shorten the duration, in order to reflect on the changes in the social and technological environment and review the plan to make changes accordingly. The eGMP2 is to be prepared for a period of 5 years from B.S. 2072 to B.S. 2075 (2015/016 AD– 2019/020 AD).

The following scope of work has been defined for this project.

As-Is Analysis of e-Government State

i. Assess and highlight the features of current eGovernment programs being implemented in different government agencies and assess the action plans implemented so far that have been recommended by existing eGMP consultative report.

ii. Assessment of current state e-government readiness.

iii. Analysis of current policies, acts, rules, regulations pertaining to eGovernment.

iv. SWOT analysis for implementing e-Government Plans and Programs

Preparation of Plan

i. Determine e-government vision and mission.

ii. Determine goals and strategies for G2G, G2C and G2B services.

iii. Identify programs and projects to be implemented based on strategies and determine expected outputs and outcomes from the projects.

iv. Recommend legal framework, tentative Cost Estimate and Action Plans for the implementation.

The eGMP review and eGMP2 cover the projects and services of the following Government bodies:

- Constitutional bodies
- Ministries, Departments and their subsidiaries
- Federal Government bodies
- Local Government bodies
- GON funded authorities

4. Project Schedule

The project schedule is divided into four major phases:

- Preparation
- As-Is Analysis
- To-Be Model Establishment
- Action Plan Formulation

In keeping with the major phases, the following time schedule for action and milestone delivery was followed for the preparation of eGMP2:

Activities / Weeks >	1	2	3	4	5	6	7	8	9	10	11	12	13
Mobilization of Teams and Project Kick-Off Meeting													
Literature review on the Project													
Meeting with MOST, DOIT, NITC, OCCA													
Inception Reporting, Presentation and approval													
Preliminary Assessment on the Project													
Reporting, Presentation and approval													
Plan Formulation													
Drafting of the Plan													
Mid Term Progress Reporting													
Draft Plan Submission/Presentation													
Final Workshop													
Final Report Submission													

Table 1: Project Time Schedule

5. Project Team

The project working team (PWT) required for the development of revised eGMP consisted of the following members:

a) Mr. Sushil P. Pradhan, Team Leader

b) Mr. Suresh K. Regmi, ICT Expert

c) Mr. Shashi Bhattarai, Planning Expert

d) Ms. Nayana Amatya, Technical Documentation Expert

Besides the PWT, an advisory board consisting of an external panel of ICT experts was also consulted. The Department of Information Technology (DoIT) Project Management Team (PMT) worked directly with the PWT to monitor and evaluate progress.

The following figure showcases the complete team.

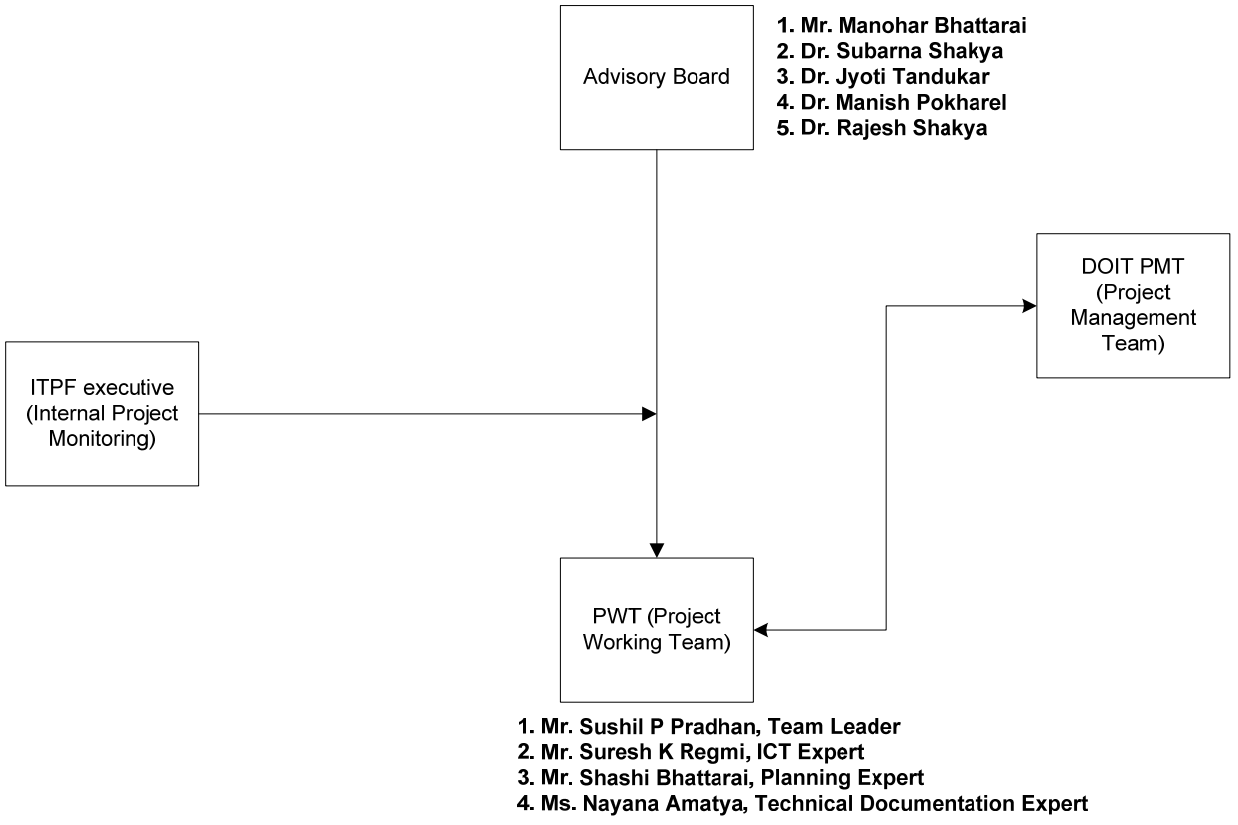


Figure 1: Project Team

Part II: As-Is Analysis of Policies

6. Overview

The Gross Domestic Product (GDP) in Nepal was worth 19.29 billion US dollars in 2013 (World Bank, 2013). The main sector of the economy is agriculture, which employs over 70% of the population and accounts for 33% of GDP. Tourism has been a steadily growing industry in importance and is an important source of revenue. Also, the country has been working on exploiting IT based industries and services. Although Nepalese economy has been steadily growing in recent years, lack of governmental institutions, growing population and remnants of social instability are sources of concern. The recent change into a Federal Democratic Republic nation and the assurance of the start of political stability has bolstered citizen's hopes for a more efficient government.

The Government now is faced with the problem of minimizing cost while maximizing resources, in order to ensure efficiency in delivery of its services, promote healthy competition and transparency in its operation. Such demand from the citizens requires that the Government take effective measures. The Government of Nepal must now move from stand-alone software systems and data silo for separate government organizations and departments, towards a better integrated system and data center; towards interoperability between government organizations' data and resource maximization; towards an e-Government model that creates valuable and citizen-centric services.

In order to determine the current status of information and communication technology and the prevalent laws and regulations related to it, the team carried out a brief assessment study and analysis on the current status of e-government services and requirements of the next phase.

Study was carried out for the National IT Policy, Telecommunications Policy, Electronic Transaction Act and Rules as well as relevant Master Plans (approved and drafts) developed by related agencies such as Nepal Telecommunications Authority (NTA) and Ministry of Education.

6.1. Status of Telecommunications and Data Transmission Network

Nepal Telecommunications Authority (NTA) MIS reports a voice telephony service penetration of 88.49% and internet penetration rate of 30.69% as of Chaitra 2070 B.S. (Nepal Telecommunications Authority, May, 2014). That is a marked increase from the 40% that was reported in the first eGMP.

There are three basic telecommunications providers and two GSM cellular mobile providers in the country. In addition two more providers offer WLL services as well. There are 43 ISPs licensed that connect the citizens with internet while 4 rural ISPs service the rural area too.

A summary of telephone subscribers as at April 2014 is as follows:

	Fixed		**Mobile**		**Others**		**Total**
	PSTN	***WLL***	***GSM***	***CDMA***	***LMS***	***GMPCS***	
NDCL	650,428	121,991	8,571,479	1,062,135			10,406,033
NCELL			11,328,328				11,328,328
UTL		47,937			460,904		508,841
STM	5,230				155		5,385
NSTPL		2,644			147,356		150,000
STPL	598				1,049,764		1,050,362
Others						1,742	
Total =	**656,256**	**172,572**	**19,899,807**	**1,062,135**	**1,658,179**	**1,742**	**23,450,691**

Table 2: Voice Telephony Services (NTA MIS, May 2014)

The implication of the widespread use of telephones especially GSM mobile telephones is that more and more citizens are becoming ICT aware and use it on a daily basis. The Government needs to incorporate mobile technology in its plan when building programs to reach them.

6.2. E-Government Master Plan (2007 – 2011) Review

The E-Governance Master Plan for the Government of Nepal was previously formulated by Korea IT Industry Promotion Agency (KIPA) working with the then High Level Committee for Information Technology (HLCIT) for the years 2007- 2011. KIPA had signed a MOU with the then High Level Commission for Information Technology (HLCIT) for the said task.

The vision and mission can be summarized in the figure below:

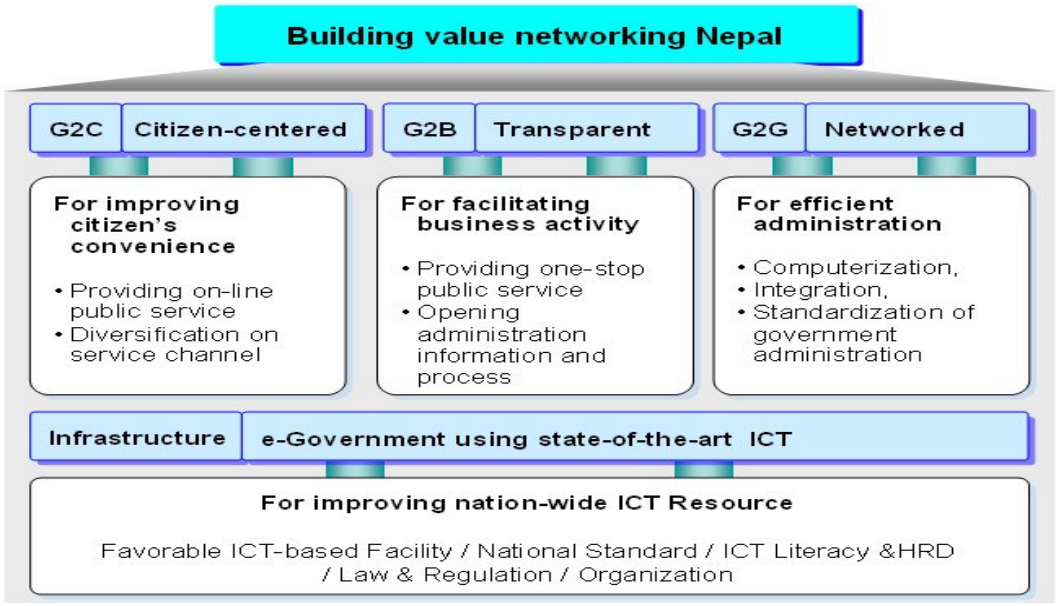


Figure 2: Vision Mission of eGMP

There were 33 projects recommended by the eGMP. Out of these, 8 were selected to be implemented in the first phase of the action plan. They are:

- Groupware for Government
- Government Portal
- Enterprise Architecture
- National ID
- E-Education
- Communication Network
- PKI
- Integrated Data Center

While the eGMP prepared by KIPA could not be completely endorsed by Government of Nepal (GON), parts of the eGMP recommendations have been followed. The following projects were formulated and implemented from the eGMP so formulated with the consent of GON:

1. Korean International Cooperation Agency (KOICA) picked up the project of Government Integrated Data Center (GIDC) and implemented it.

2. Asian Development Bank (ADB) did a Grant Agreement with GON on 23 May, 2008 and called it an ICT Development Project with GRANT NUMBER 0106-NEP (SF) worth 25 Million USD. The project was expected to be completed by 30 June 2014.

6.3. ADB ICT Development Project (No: 38347, Grant#: 0106)

Asian Development Bank and the Government of Nepal (GoN) entered a Grant agreement on May 23, 2008 worth $25,000,000 for the ICT Development project. GoN matched the grant by adding an amount of $6,200,000 for the project. The generic outcome of the Project was to

i. Make ICT more accessible, affordable, inclusive, sustainable, and useful to remote and rural communities;
ii. Make public services more citizen-centric and business-friendly through ICT;
iii. Improve accessibility, efficiency, and transparency in Government service delivery with the application of ICT;
iv. Enhance ICT business and industry.

The Project comprised of the following Parts:

PART 1: RURAL E-COMMUNITY

a. Wireless Broadband Network
b. Village Networks
c. Tele-centers
d. Community Mobilization and Capacity Development

PART 2: GOVERNMENT NETWORK

a. Government Information and Data Center
b. Government Groupware

PART 3: e-GOVERNMENT APPLICATIONS

a. Government Enterprise Architecture
b. National Identification System
c. Public Service Recruitment Management System
d. Land Records Management System
e. Online Vehicle Registration and Driving Licenses

PART 4: HUMAN RESOURCE DEVELOPMENT FOR E-GOVERNANCE

a. Build awareness, knowledge and skill of stake-holders
b. Establish computer labs for capacity development of training institutions
c. Revise existing training curriculum of training institutions etc.

The project has been revised on 28 February, 2013. The Rural e-Community part of the project from the scope of ADB's ICT Development Project has been excluded from the project plan mainly due to duplication of effort from other Government and private sector.

7. Analysis of Policies

The first-ever policy put in place by the Government of Nepal (GoN) specifically targeting the IT sector is the Information Technology Policy 2000. In line with that policy, the National Information Technology Centre was established in 2002. This policy was reviewed 2004 and a draft policy was published but not endorsed. Some 6 years later, the policy was revised and IT Policy 2067 (2010 AD) was put in place.

Other legal instruments that have prepared the foundations for the growth of IT and establishment of e-Government in Nepal are the Telecommunications Act 1997 and Electronics Transactions Act 2006.

7.1. IT Policy 2067 (2010)

The National IT Policy 2067 (2010 AD) stated a vision "*To place Nepal on the global map of information technology within the next five years*". It replaced the previous version of IT policy that was envisioned in 2057 BS (2000 AD). One of the policies in this is to give special priority to the promotion of different IT-enabled services, including Business Process Outsourcing. The policy puts emphasis on information security; and data protection and privacy in information technology. The 53 policies and strategies in IT Policy 2010 aims to enable IT sector so that it becomes successful in making significant contribution on Gross Domestic Product (GDP).

The policy identifies IT sector as a knowledge-based industry and suggests adopting a single window policy to attract domestic and foreign direct investment to the sector. The policy also emphasizes on the usage of IT for e-governance, and agencies that deal with health, education and businesses which can function with IT related strategic plans. The other provisions included are intellectual property rights, Voice over Internet Protocol (VoIP), e-commerce, e-trade, security and data protection, wireless and broadband networks, free/open source software and e-certification.

The objectives of the IT Policy 2067 are:

- Make IT accessible
- Increase employment through IT
- Build a Knowledge based society
- Establish Knowledge based industries

For the accomplishment of the objectives strategies have also been defined. The following policies have been prescribed for the implementation of those strategies:

- To declare information technology sector a priority sector
- To adopt one window system for the development of information technology

- To prioritize research and development in the field of information technology
- To create an atmosphere conducive to attracting investment in the private sector, keeping in view the private sector's role in the development of information technology
- To provide Internet facilities gradually to all Village Development Committees of the country
- To assist educational institutions and encourage domestic and foreign training to fulfill the requirement of appropriate manpower at various levels pertaining to information technology
- To computerize the system in all government offices and build their websites for the flow of information
- To encourage the use of computers in private sectors
- To develop physical and virtual information technology parks at various places with private sector's participation in the development of information technology
- To use information technology to promote e-commerce, e-education, e-health among others, and to transfer technology to rural areas.
- To establish a National Information Technology Centre
- To establish a fund at the national level by mobilizing resources from Government of Nepal, donor agencies and private sectors so as to promote research and development of information technology and other related activities
- To establish a venture capital fund with joint participation of public and private sectors
- To include computer education in the curriculum starting from the school level and broaden its scope
- To establish Nepal in the global market through the use of information technology
- To enact necessary laws for providing legal sanctions to the use of information technology
- To use information technology gradually in all government activities and provide legal sanctions to them

The Action Plan developed for the propagation of those policies is summarized below:

- Participation of private sectors in infrastructure development
- Infrastructure development
- Information Highway. Broadband information network – (SASEC project?)
- IT park in Banepa. (1% customs duty on IT related import for industries in IT Park for the next 5 years)
- Human Resource Development
- Emphasis shall be given to provide computer education from the school level
- "Computer education to all by 2010 A.D."
- Scholarships
- Dissemination of Information Technology
- Distance Learning systems to be introduced.
- 3-year program to extend use of computer in government offices
- Websites for all ministries, departments and district offices created within 1 year
- Public awareness campaign on utility of IT

- Provisions shall be made to open voice-mail to talk point-to-point for own business without a link to the public switched telephone network
- Promotion of E-commerce, etc.
- Necessary legal infrastructure shall be created for the promotion of tele-medicine, distant learning, tele-processing and e-commerce
- Formulation of Intellectual Property protection law
-
- Facilities
- 1% customs duty levied for imports by IT institutions (*NITC recommendation)
- Software and related services from companies declared “Essential services”
- IT development Fund operated by NITC

7.2. The Electronic Transactions Act, 2063 (2006)

The Electronic Transactions Act 2063 was promulgated from December, 2006. The main purpose of this Act is to legalize the electronic transactions and digital signatures for both private and public transactions, protecting electronic documents from unauthorized access and to control the illegal activities or the cyber-crimes. This act has 12 sections and 80 clauses.

The Act legalized all electronic transactions and digital signatures and has made provisions for the controller to facilitate and control the certification authority, and the certification authority facilitates the subscriber. The act also has provision for separate judicial bodes, IT Tribunal and Appellate Tribunal that look into cases related to computer crime and the cyber-crime. The IT tribunal is headed by the District Court Judge and looks into all the preliminary cases, while the appellate tribunal is responsible for major cases.

Theft of computer source code, unauthorized access, destruction of computer and computer system, illegal publication, violation of privacy, providing wrong information, computer fraud etc. are known cyber-crimes. The punishments for these vary, from a fine of Rs 50,000 to Rs 300,000, and a jail sentence from six months to 3 years.

The act has created many opportunities and benefits in the field of electronic transactions and other IT related activities. The legalization of electronic transactions has the potential of making economic transactions faster, safer and cheaper since it usually eliminates the need for middle men. Official files and documents can be stored electronically; safely, consuming less space and accessed more effectively. Digital signatures increase the speed of doing business, since documents no longer need to be sent via couriers; and reduce the cost by using less paper. The use of digital signatures and electronic documents reduces risks of documents being intercepted, read, destroyed, or altered while in transit. It also has the added benefit of adding authenticity, security and non-repudiation to an electronic document.

Weaknesses:

- Electronic Payment Gateway provision is still missing from the Act.

- System Audit for large scale systems a must and should be prescribed in regulatory framework.
- IT should be placed in creating strategy and not just as a hardware maintenance plan.
- IT Security Guidelines need to be developed in context of Nepal.
- GEA has been developed and needs to be used in Government IT projects.

7.3. Telecommunication Policy 2060 (2004)

Telecommunication Policy 2060 was brought forward to update Telecommunication Policy, 2056 (1999 A.D.). The main focus of this policy is on complete liberalization of the telecommunications sector and adoption of technology neutral approach. It opens entry to all the qualified person and organizations who want to develop and operate telecommunications service(s). It also paved the way for the commercialization of the incumbent monopoly viz. Nepal Telecommunications Corporation (NTC) which now works as a joint venture (Government /Private Investors) Company (NDCL). But the Policy has not yet been implemented fully as the Act and Regulations have not been amended to reflect the spirit of the new Policy.

Objectives:

- Service available in inhabited areas
- Meet the demand in urban areas. Corporate telecommunication service shall be available to the business areas.
- Arrangement for consumers to choose telecommunications in urban areas - extended to rural areas also
- Poverty alleviation and development of rural areas

Relevant Strategies

- Universal Access to the Telecommunication Service
- Development of Corporate Service
- leased line, data and other similar corporate service shall be available to the government bodies and private business sector in the urban areas through more than one service provider
- Extension of telecommunication service and Cyber Law shall be made
- Institutional development shall be gradually made by increasing human resource and economic capacity of Ministry of Information and Communication and Nepal Telecommunication Authority.
- Role and responsibility of the Ministry of Information and Communication; and the Ministry of Science and Technology shall be clearly defined to avoid duplication

Working Policy

- Rural Telecommunication Fund shall be set up for rural telecommunication development operated by NTA
- Open license shall be granted to the service provider to provide the corporate telecommunication service (limited spectrum)

- Necessary arrangement including cyber law shall be made from the collective effort of the concerned Ministries, bodies and the private sectors
- All the central bodies of His Majesty's Government shall be connected to the internet by the end of fiscal year 2061/62 (2004/2005); Documents and information will be published on their websites. Relevant employees will be trained towards internet literacy and e-governance by 2062/63 (2005/2006)

7.4. NTA Ten Year Master Plan (2011 – 2020 A.D.)

Nepal Telecommunications Authority has put forward a ten year Master Plan as its vision into the future and reflects its desire for improving its performance as a forward looking regulator. It takes into account mandates set by the Telecommunications Act 2053, and Telecommunications Policy 2060 of the Government of Nepal to support the overall social and economic development of the country by providing reliable and universally accessible telecommunications services to all its inhabitants at a reasonable cost.

Relevant Strategies

- Free and Fair Competition
- NTA will provide equal treatment to all the service providers and ensure that new entrants will face less barriers concerning seamless entry, at reasonable cost, into the incumbent operators' network.
- Consumer Interest Protection mechanism
- Consumers will be well informed about their rights of receiving reliable and quality telecommunication services.
- Universal Access
- Development, operation and availability of all types of public telecommunications services using both terrestrial and satellite technologies as well as other ICT shall be encouraged.
- Universal Service Obligations
- Operators shall provide on demand services to urban as well as rural consumers when adequate infrastructure is developed.
- Promotion of business and non-business telecommunications services
- Operators shall be required to provide leased line.
- Development of non-business and non-profit telecommunications networks shall be encouraged to provide cost effective and efficient services including benefits of e-governance and disaster recovery plans
- Liberalization of telecommunications sector
- The telecommunications sector is open for entry to all qualified service providers.
- Human Resource Development
- NTA will make effort to develop skills of people in management of telecommunications sector.
- Institutional development for policy implementation
- NTA will regularly review its organizational structure for successful implementation of the master plan provisions and advise the Government for the same.
- Encourage development of telecommunications network for utilization of ICT

- NTA will encourage operators to develop countrywide telecommunications network, such that on ICT services are made available at least up to all VDCs.
- Rural Telecom Development Fund (RTDF)
- NTA will utilize the RTDF, to provide telecommunications services to all the inhabitants of rural areas, including those living below the poverty line.
- Utilization of ICT services for developmental activities
- NTA will encourage Upgradation of network capabilities.
- Emergency Telecommunications and Climate Change
- NTA will work on an integrated approach to ensure the provision of early warning system, emergency communications and disaster recovery planning.

Relevant Working Policy

- Forward the draft Broadband Policy to the GoN for adoption
- Rural Broadband Services (RBS) to all the VDCs of predefined 39 districts
- Prepare a checklist enumerating the measures to be taken by consumers to properly utilize telecom/ICT applications and to take effective measures to guard against security breaches for the safe use of telecom/ICT applications
- Be instrumental in implementation and making necessary amendments in relevant legislative frameworks.

7.5. ICT in Education – Master Plan (2013 – 2017 AD)

Ministry of Education aims at providing necessary skills on ICT to students; as well as using ICT as an important tool to improve classroom delivery, increase access to learning materials and improve effectiveness and efficiency of overall educational governance and management. This Master Plan on Information and Communication Technology in Education will act as a guide for the activities and programs on ICT in education in Nepal for next five years (2013-2017).

The main focus of this plan is to effectively integrate ICT in teaching and learning process across all education sub-sectors so that access to education will be expanded, quality of education will be enhanced and equity will be promoted.

Plan Components

- Development of ICT Infrastructure
- Basic ICT infrastructure in schools
- Extend internet connectivity
- Establish a Data Centre and Educational Resource Sharing Platform in Resource Centers
- Development of Human resources
- Develop ICT Skill standards for teachers and other HR associated with education sector
- Enhance capacity of HR associated with education sector through training and continued learning

- Conduct training for school teachers and prepare them for ICT enabled teaching-learning environment
- Development of Digital Learning Materials
- Develop, update and revise the existing ICT curricula
- Develop interactive digital teaching learning and training materials; for non- formal, distance and open learning; for disabled and differently abled students
- Establish and operate content management system
- Enhancement of Education System
- Strengthen and improve MIS, Office Automation System, Examination Management System
- Establish/strengthen ICT based M&E system
- establish networking among the agencies working in the field of ICT
- Support R &D activities in education
- Establish and strengthen E-governance system in education sector
- Construction of advanced nation-wide infrastructure
- Building the nationwide communication network and improving the capacity in accordance with network traffic
- Expanding internet coverage and improving capacity of the ICT infrastructure
- Enhancement in access to internet and devices (hand held as well as PCs) in a cost effective manner
- Development of national standard
- Developing the nation's Unified Code System
- Establishing system and security standard at the government level
- Establishing a national standard model of business, IT systems and technology to enhance interoperability and prevent duplication
- National ICT literacy and HRD development
- Establishing HR development programs
- Providing education opportunities and developing useful ICT education program for citizens to facilitate e-government participation
- Improvement of Law and Regulation
- Establishing favorable law and regulation on e-government
- Establishing favorable laws to prevent redundant ICT investment
- Establishing and revising the legislations to drive systems supporting new technology
- Organization of e-Government
- Separate ICT cadre in Government service
- Empowering the e-government project committee
- Establishing an authorized organization to promote e-government systematically and efficiently at the government level
- Enhancement of ICT Business ecosystem
- Promoting innovation and entrepreneurship in ICT
- Enhancement of in country capacity of ICT support and services

7.6. Strategic Plan Guidelines Study

This study is being carried out by DoIT through external consultants. The draft report has been submitted by Med D Serve Nepal Pvt. Ltd, which is what the team has reviewed.

The Strategic Plan Guidelines define the guidelines for IT needs assessment. They also define guidelines for ICT strategic plan development, in order to assist how the Government uses ICT to improve their services towards citizens, businesses and other government organizations.

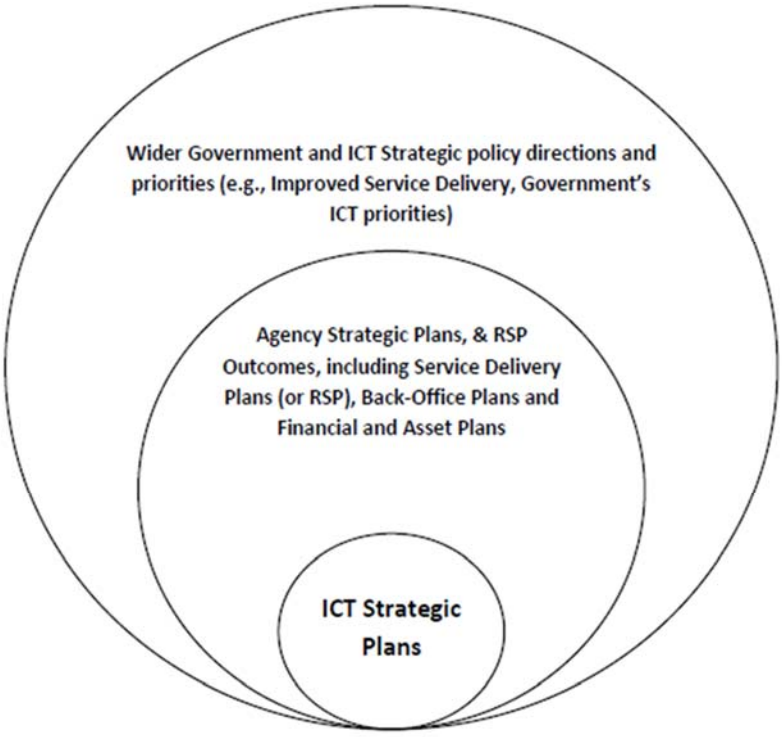


Figure 3: Relationship of ICT Strategic Planning to Strategic Management Framework

The guidelines describe the following factors that need to be considered in the strategic plan:

- Legal issues and requirements
- Technical aspects
- Business processes
- Security aspects etc.

The guidelines prescribe that the strategic plan should contain at least the following components.

- Vision and Mission Statement
- High-Level Goals
- Internal and External Stakeholders
- Objectives or Initiatives
- Business Case

- General Timing
- High-level Cost Estimates

Some of the noteworthy guidelines are summarized below:

- Encourage organization to investigate and make use of ICT solutions to support their current administration procedures and controls;
- Advise and encourage administrations that are considering the use of automation to follow a pre-defined process/plan covering all their needs;
- Promote the use of international standards in the interchange of electronic data among agencies and their stakeholders; and
- Advise organizations on current and possible future developments which could improve their e-Services.
- Review of deployment of existing IT infrastructure including servers, networks and security measures.
- Study of existing information systems and e-services and on-going ICT development and e-Government projects in government agencies.
- Study of organizational vision towards IT and assess the IT personnel strength and their involvement as human resource.
- Identify and analyze the gaps and recommend the areas of transformation using ICT tool that will be best suited amongst people, process and technology.
- Identify the need of ICT Strategic Plan that will portray the complete IT roadmap for MDA of Government of Nepal.

7.7. National IT Roadmap (2071 – 2075)

The National IT Roadmap for 2071 BS to 2075 BS has been developed according to the vision, mission and goals set in the IT Policy 2067. It focuses on the development of IT sector in Nepal with the latest technological development.

Goals:

i. Establishing IT Sector as one of the most contributing sector out of ten sectors in Nepal (in terms of GDP)
ii. All government services will be online
iii. Nationwide ICT Infrastructure Development to support ICT Industry & fair ICT access to Rural areas of Nepal

Strategies:

i. To create standard environment for IT enabled economic development and use of ICT
    - Review of relevant old policies & formulation of new policies
    - Assessment and Monitoring ICT activities
    - Development of necessary infrastructure and operations
    - System development for ICT development and fiscal management

- Preparation of National Standard Documents

ii. Promotion of e-Government

- Development of e-Government Road Map and eGMP
- Development of necessary infrastructure and upgrading
- Standardization of quality in GON ICT developments
- HRD Development

iii. Proliferation of ICT for Development

- Infrastructure Development & reducing Digital Divide
- e-Health & Telemedicine
- e-Education
- e-Agriculture
- e-Tourism
- ICT Projects for Industry & Commerce Promotion
- Public Awareness Campaigns for ICT

iv. Focus on ICT HRD Development and Knowledge-based Society

- HRD for ICT
- R&D Programs
- Implementation of latest technologies and concepts in ICT

v. Promotion of ICT Industry in Nepal

- Establishing Nepal as IT/ITES, BPO, KPO centers of the world
- Implementation of IT Park effectively
- Capacity Development of ICT Industry in Nepal
- Making easier to do business by ICT Industry in Nepal

7.8. Review of Draft IT Umbrella Act

The draft IT Umbrella Act – 2071 is being drafted and discussed with its stakeholders. It was first presented and discussed in a workshop on 27 June, 2014. The Umbrella Act is being drafted with a view of overriding the existing Electronic Transactions & Digital Signature Act (ETDSA) 2063 and incorporating many other IT related topics/issues. The Draft Umbrella Act consists of the following topics:

- Inclusion of Electronic Records as Evidence
- Digital Signature Provisions
- E-Contract & e-Commerce Provisions
- Controller and Certification Authority Provisions
- Functions, Duties and Responsibilities of Clients of Digital Certificates
- E-Government
- Domain Name Registration & Management
- Data Security and Data Centers Provisions

- Cyber Security Provisions
- IT Service Providers / Intermediary Provisions
- Cyber Crime Provisions
- IT Tribunal Provisions
- Miscellaneous

The proposed draft had considered different legal provisions for electronic form of Freedom of Speech / Press. However the team suggests that there be a **generic** law for Freedom of Speech / Press which should also include provisions of electronic media, since electronic media is only a different channel for media/press.

The proposed draft still lacks provisions for the following topics:

- Payment Gateway Provisions
- Electronic Signature Provisions
- Privacy Provisions

The following relevant issues are still are not mentioned in the Umbrella IT Act:

- Foreign Investment and Technology Transfer
- Nepal Telecommunications Authority (NTA)
- Foreign Currency
- Internet Banking
- Intellectual Property
- Taxation etc.

8. Assessment of current ADB ICT Development Project (eGovernment) programs

8.1. Assessment of action plans implemented

Under Secretary, Office of the Prime Minister and Council of Ministers presented the "Scenario of ICT Development Project and its updated status" at a regional workshop in Pokhara on February 20, 2014. The current eGovernment Programs assessment has been based on that presentation.

8.1.1. Government Network

The Supply of Equipment, Installation, and Commissioning Communications and Government Network Set-Up Training and Capacity Development, Operation Testing and UAT of Lot 1 and Lot 2 equipment has been completed and roll out of system is under the process. National Portal was deployed and is running. Groupware equipment was shipped on 16 September 2013. The disbursement of Lot 1 and Lot 2 was completed and 97 % physical progress has been reported. 90 % payment of Lot 3 has also been disbursed.

National Information Technology Center (NITC) made the first publication for bid submission of additional hardware on 16 September 2013 in national daily newspapers, but was canceled due to some technical reason. NITC published re-bid submission for the second time on 12 February 2014.

8.1.2. Public Service Recruitment Management System

The contract was awarded to Infinite Computer Solutions (India) Pvt. Ltd. on 12 February 2013. Several meetings and workshops have been held with stakeholders and the Software Requirement Specification (SRS) as well as a demo version of the application was completed by the contractor. Five of the personnel have completed an Observation tour. 10% advance payment and payment against completion of SRS have been disbursed. Near about 50% physical progress has been reported by Public Service Commission.

8.1.3. Land Records Information Management System

The contract was awarded to RMSI Pvt. Ltd. on 1 April 2013. Several meetings and workshop were held with stakeholders. Accordingly, the SRS has been completed and the first build of the application was being finalized by January 2014. The process of digitization has initiated in 7 LRO. Department of Land Reform and Management (DoLRM) had commenced hardware procurement and network design. 10% advance payment, payment against observation tour and payment against SRS was disbursed. More than 50% physical progress has been reported by DOLRM.

8.1.4. Electronic Driving License and Vehicle Registration System

Contract has been signed with Madras Security Printers Pvt. Ltd. for the commencement of this program. Consequently, 10% advance amount was requested from ADB as per the terms of payment and disbursed on 8 January 2014. The contractor has established an office in the premises of Department of Transport Management (DoTM) has submitted an initial system study report and is initiating the system analysis process.

8.1.5. National Identification Database (NID)

The National Identification management center (NIDMC) had completed the first stage evaluation and was in the process of initiating the second stage evaluation process as of January 2014.

8.1.6. Government Enterprise Architecture (GEA)

GEA and NEGIF was developed and uploaded in NITC website. NITC is also developing a National Policy operating guidelines for GEA and NEGIF.

8.1.7. National Portal

The National Portal of Nepal is up and running since October 2013.

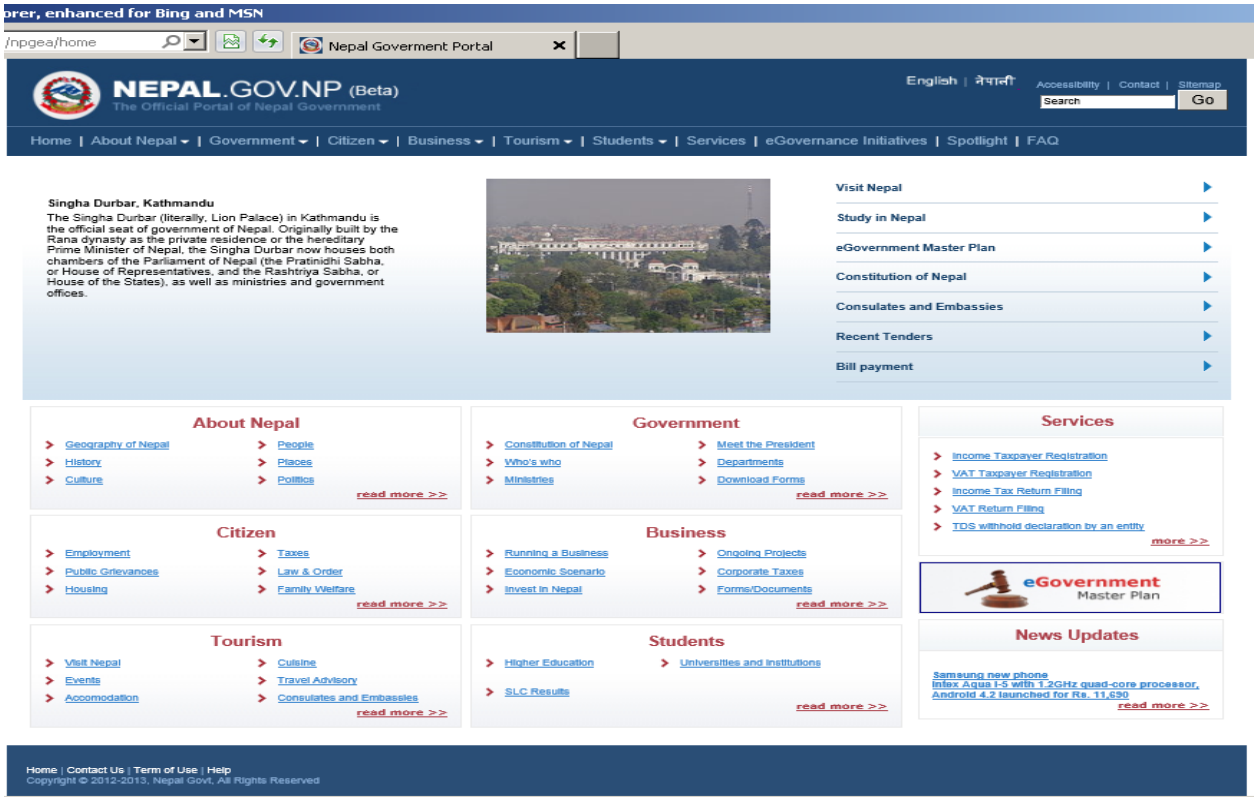


Figure 4: National Portal of Nepal

8.1.8. HRD

The Ministry of General Administration (MOGA) is the implementation agency for this program. The required hardware equipment was delivered and was being installed in all the government institutions as of January 2014. The TOT training (Training program in Thailand – May 22- June 2, Information Communication for e-Governance) for Government personnel along with the personnel of EA was conducted.

The National Center for Education organized a Three-day Orientation Course on ICT and e-Governance for Joint Secretary Level. Local Development Training Academy, Staff College and other training institutions have completed several TNA for VDC, DDC and municipalities. Almost 600 Government personnel have been trained as of January 2014.

8.2. SWOT analysis for implementing e-Government Plans and Programs

Strength	Weaknesses
Quality and quantity of ICT HR available in country	Lack of ICT manager in country
Good penetration of telephone services and 3G technology	Poor project implementation capability
Increasing awareness of ICT in Society	Low political and bureaucratic commitment
Support from international agencies	Poor infrastructure (electricity)
Significant young population	Difficult geographic terrain
Growing Literacy rates	Poor monitoring and maintenance system
	Lack of necessary rules and regulations
	ICT implementations disparate and dispersed
Opportunities	**Threats**
Developing pace of the neighboring countries in ICT (India and China)	Lack of political willingness
Learning experiences from developed countries and those that have implemented e-Governance	Nation in transition phase
Clean slate in ICT, i.e. many things can be initiated	Challenging speed of technology can be difficult to cope with
Possibility of leap frog in development and good governance through ICT	Timely allocation of resources
	Coordination with end users may be difficult
	Infrastructure development is still slow paced

Part III: The Changed Scenario

9. Change Overview

9.1. Institutional Changes

The scenario of Nepal and its ICT sector has changed vastly since the first eGMP was developed by KIPA. The biggest change came as the abolition of the monarchy and the establishment of a federal multiparty representative democratic republic of Nepal in 2008.

To promote the overall ICT sector of Nepal, the Government of Nepal established the High Level Commission for Information Technology (HLCIT) under the chairpersonship of the Prime Minister. The major objective of HLCIT was to provide crucial strategic direction, and help take appropriate policy measures for the development of the ICT sector in the country. Another objective was harnessing ICT to meet key developmental challenges, including governance reform, and boosting economic growth for poverty reduction. Unfortunately, it was dissolved in 2010, and therefore, ceases to exist today.

The Department of Information Technology was established in 2013, which focuses on implementing e-Governance and covers IT related law, plans and policies. It is also based in Banepa IT Park and is working on bringing it into full operation. The National IT Coordination Council was created as well.

Many e-Government applications have been implemented and are providing service to public:

- Inland Revenue Department provides e-services to all taxpayers.
- Office of Company Registrar (OCR) for registration of companies and is interconnected to IRD.
- Public Service Commission, Department of Land Reform and Management, Department of Transport Management, Ministry of Foreign Affairs and many others, are in the process of providing G2B and G2C services

There has been a significant increase in the number of ICT officers working directly in GON. There are now four First Class Officers and more than 300 Officers in total, thus displaying the changing trend and attitude within the Government towards the utility of Information Technology.

9.2. Increased Capacity

The capacity of the country to support newer technology and the appetite of the citizens has increased in the recent years. Telecommunication penetration rate increased from 65.5 % in 2006 to 80.51% in 2012. The latest figures from April, 2014 show a 88.49% penetration rate. The internet access has increased from 26% in 2012 to 31.69% in April, 2014.

Technical capacity of private ICT service providers have also increased dramatically. Applications developed by local vendors have proven to be more sustainable than those developed by foreign vendors. People have become internet friendly e.g. IRD collects 100% returns via Web (around 80,000 VAT returns per month and 200,000 Income tax Returns per year), and there was a collection of around 700,000 applications for the Youth Employment Scheme.

9.3. New Technology

There is now easy access to Internet, Skype, WeChat services and email even in villages, due to the high penetration rate of mobile services and data services on them. The decreasing cost of hardware and proliferation of mobile technology has made it easy to own new technology. New applications that are being developed and released are mostly web-based and in SOA and are user-friendly enough to be used in mobile phones, tablets and computers alike.

Cloud Computing

In the simplest of terms, cloud computing means storing and accessing data and programs over the Internet instead of your computer's hard drive. Cloud Computing is an emerging concept of sharing resources to achieve economies of scale, offering Software as a Service (SaaS) where businesses and organizations subscribe to applications they access over the internet; Platform as a Service (PaaS) where organizations can create custom applications for use and Infrastructure as a Service (IaaS) where players like Amazon, Google and Rackspace provide a backbone that can be rented out by other companies and organizations; on competitive prices and reducing the need for expensive hardware. The Cloud here is a metaphor for the Internet. With an online connection, cloud computing can be done anywhere, anytime.

Big Data and Business Analytics

Advancements in Big Data and Business Analytics offer cost-effective opportunities to improve decision making in critical development areas. Big data analytics refers to the process of collecting, organizing and analyzing large sets of data ("big data") to discover patterns and other useful information. Not only will big data analytics help understand the information contained within the data, but it will also help identify the data that is most important to the organization and future business decisions.

The speed-driven pairing of big data and analytics, powered by the cloud, is beginning to determine how firms perform and compete. It is helping organizations remake internal operations. It is being woven into decision making — by both managers and employees. And, it is providing precise, real-time insight into everything from inventory to sales to employee performance to customer needs. To compete, other organizations need to move from gathering data to quickly acting on insight provided by the data.

Internet of Things (IoT)

The Internet of Things (IoT) is a computing concept that describes a future where every-day physical object will be connected to the Internet and be able to identify themselves to other devices. The term is closely identified with RFID as the method of communication, although it also may include other sensor technologies, wireless technologies or QR codes. The IoT is significant because an object that can represent itself digitally becomes something greater than the object by itself. No longer does the object relate just to you, but is now connected to surrounding objects and database data.

The Internet of Things is making an approach to ubiquitous computing revolution highly achievable. It however brings into view new issues as well: consumer privacy, data security etc. For businesses and

consumers alike, the Internet of Things is helping create smarter, more efficient devices. For enterprise IT and security professionals, it's also creating a headache.

Many businesses and organizations are eager to deploy smart devices and the Internet of Things (IoT) to capitalize on the many benefits. That excitement, however, may be clouding their judgment when it comes to the security risks. IoT is coming the government needs to update laws and regulations to accommodate the explosive growth of Internet-connected smart devices or risk falling behind the global technology curve.

Mobile Computing and Apps

Mobile Computing and Mobile Apps are making computing on the go and on your hands even easier. Citizens are increasingly using their mobile phones for more than mere voice communications, it has become a means for banking, information collection, education, entertainment, e-business and more. More and more users and businesses use smartphones not only as communication tools but also as a means of planning and organizing their work and private life and therefore have become the source of new risks. Smartphones collect and compile a large amount of sensitive information to which access must be controlled to protect the privacy of the user and the intellectual property of the company. Rules and Laws need to be updated regularly to keep up with the changing technological demands.

In line with this changing trend, the government strategy for service provision should be directed towards a mobile computing and apps in order to reach a larger mass more easily.

Broadband Internet

Broadband / WiMax technology has reached rural areas and made fast internet access a possibility at considerably cheaper cost throughout the country. High-speed, high capacity broadband connections to the internet is an essential part of modern infrastructure. In building a digital Government, it is doubly imperative that the services that the Government is providing or planning to provide reaches the intended audience faster, and easier.

Part IV: To-Be eGovernment Plan

10. E-Government Vision and Mission

10.1. Overview

After a rigorous review and analysis of the e-Government Master Plan 2007 – 2011 and analysis of the prevailing policies, acts and regulations concerning ICT and e-Governance, the team determined areas that required intervention and update and projects that need to be implemented for e-Governance to be successfully realized in Nepal. These are presented as the To-Be model of eGovernment Master Plan or the eGMP2 in this section.

10.1.1. Three Dreams of eGMP2

The updated eGMP2 has been centered on three Ideas (Dreams): Effectiveness, Accessibility and Accountability.

- Effectiveness:

- All government offices will be paperless or use less paper.
- All government operations will use ICT as a tool to perform their activities to increase efficiency.
- All government organizations will share their data for decision making and will eliminate data duplication in different departments.
- All government organizations will aim for ubiquity, i.e. provide their service through e-applications, thereby removing the requirement of citizen to go to government offices.
- Government decision making will be based on correct, up-to-date information system of people, resources and their transactions
- Citizens/business access will be identified with a single Identification, i.e. there will be unification of: Citizenship Number, Voter's ID, Social Security ID, National ID etc.

- Accessibility:

- Information will be at the finger-tips of citizens (from internet, mobile or any other new technology)
- Any person (citizen/business/employee) will have access (web/mobile/any other new platform) to the Government services
- Citizens/business will be able to pay taxes, bills and will be able to get required information via web portals (Government, Private).
- All government, business and citizens will be connected to each other through broadband network

- Accountability:

- All aspects of government institutions will be completely transparent. Information will be made available in any suitable electronic medium
- Effective complaint lodging, management & resolution system will be available

10.1.2. Four Pillars of eGMP2

The updated eGMP2 is established on four pillars: sustainability, capacity building, service delivery and enforcement. All four criteria must be met for eGMP2 to be successful. Each of the four pillars is holding the balance for eGMP2.

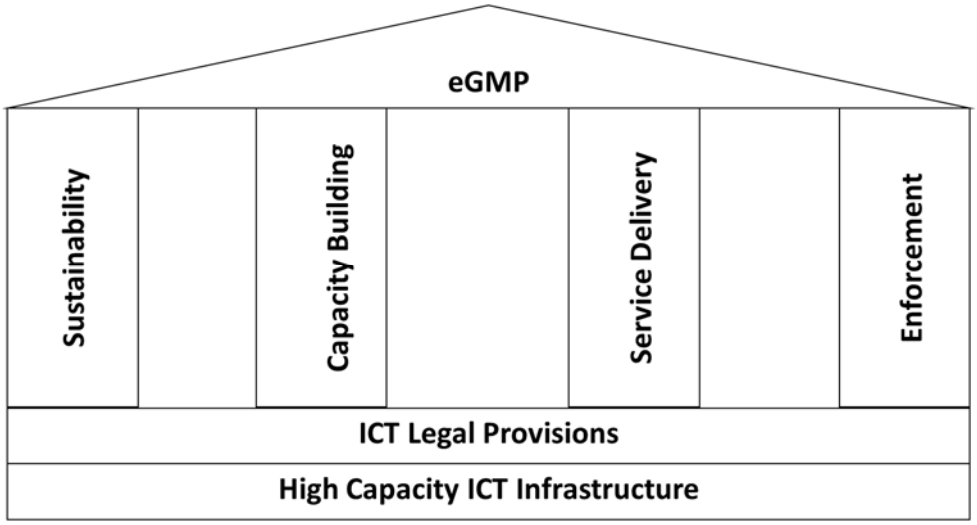


Figure 5: 4 pillars of eGMP2

I. Sustainability

- Demand Responsive / Self-ownership Projects (Bottom Up Approach)
- Shared Benefits (Citizen/Business, Government/Employees, Social/Economic)
- Services outsourced/Local Technical Availability
- Assurance of AMC
- Revenue Sharing

II. Capacity Building

- Awareness Campaigns (Citizen/Business)
- Chief Information Officers (CIO) in every Government of Nepal (GON) Centers & IT Cell
- HRD and Motivation

III. Service Delivery

- Client Satisfaction Surveys
- Rewards for Accomplishers
- Use of new technology and media for better delivery

IV. Implementation

- Top Management Commitment
- Motivation for efficiency in work
- Monitoring and Evaluation (M&E)

10.1.3. Basis of eGMP2

EGMP2 has further technological prerequisites that it is based on.

I. High Capacity ICT Infrastructures

- Broadband Communications to each VDC, DDC
- e-Signature/PKI Infrastructure
- Payment Gateway
- GON Cloud, Data Center/Disaster Recovery

II. ICT Legal Provisions

- ETADS
- E-Payment etc.

10.1.4. Stakeholders of eGMP2

The stakeholders of eGMP2 have been identified in the following figure.

Figure 6: eGMP2 Stakeholders

10.2. Vision

The vision of the updated eGMP2 has been built on the foundation of ICT infrastructures and legal provisions related to ICT and held up by the four pillars of sustainability, capacity building, service delivery and implementation all leading to effective governance. In this respect, the vision statement for eGMP2 is stated as:

Using ICT for Good Governance

- Driven towards the achievement of three key components of electronic services by government
    - G2C,
    - G2B and
    - G2G
- mGov -> Government services through mobile device to be incorporated part of e-Gov services wherever applicable
- Transparent and efficient services to citizens and business
- Through efficient government's networked administrative channel
- To create good governance for overall economic development of the country

10.3. Mission

The eGMP2 mission statement has been drawn up as following:

Improve the quality of life of Nepalese citizen without any discrimination; balancing regional and ethnic differences and supporting federalism in Government activities; realize socio-economic development with a transparent government by providing value-added quality services through ICT in Government priority sectors and support the Right to Information initiatives of Government of Nepal.

11. Goals and Strategies

11.1. Goal Overview

A general goal for eGMP2 is presented as follows.

- Increase efficiency of Government Bodies through the use of ICT
- Provide services to Citizens and Businesses
- Provide easy and appropriate mechanism of sharing information between Government bodies and reduce duplication of information
- Promote local ICT industry

11.2. Strategies

Strategies have been defined for the propagation of the eGMP2 goals.

- Continuation of ongoing e-Government projects and systems to make them sustainable in the long run.
- Pilot project with GoN funding and local expertise
- Proliferate after successful implementation of pilot projects, with external funding (if required).
- Improve local ICT capabilities to support and sustain e-Government drive.
- Focus on projects for G2B and G2C services with services delivery and revenue collection in perspective
- Promote innovation in providing new GoN services

11.3. Working Policy

E-Government policies should be aligned with the main Government policies and our Government plans have identified certain priority sectors which are needed to be addressed by working policies for e-Government plan as well. Besides the priority streams set in Government plans, there must be some additional priority streams for IT infrastructure that will be necessary to host and sustain the projects to be identified in e-GMP.

Today Government priority sectors are:

- Agriculture
- Education
- Health
- Tourism
    - Including Boarder Management
- Local Governance
    - e.g. Vital Registration

Different priority streams in the e-Government plans are thus discussed as below:

11.3.1. E-Agriculture

E-Agriculture is an emerging field of agriculture and rural development (Mangstl, 2008). It involves the conceptualization, design, development, evaluation and application of innovative ways to use information and communication technologies (ICTs) in the rural domain, with a primary focus on agriculture. Promoting and providing sustainable policy, action plans and interventions in e-agriculture will support the advancement of agro-projects and investments that use ICT.

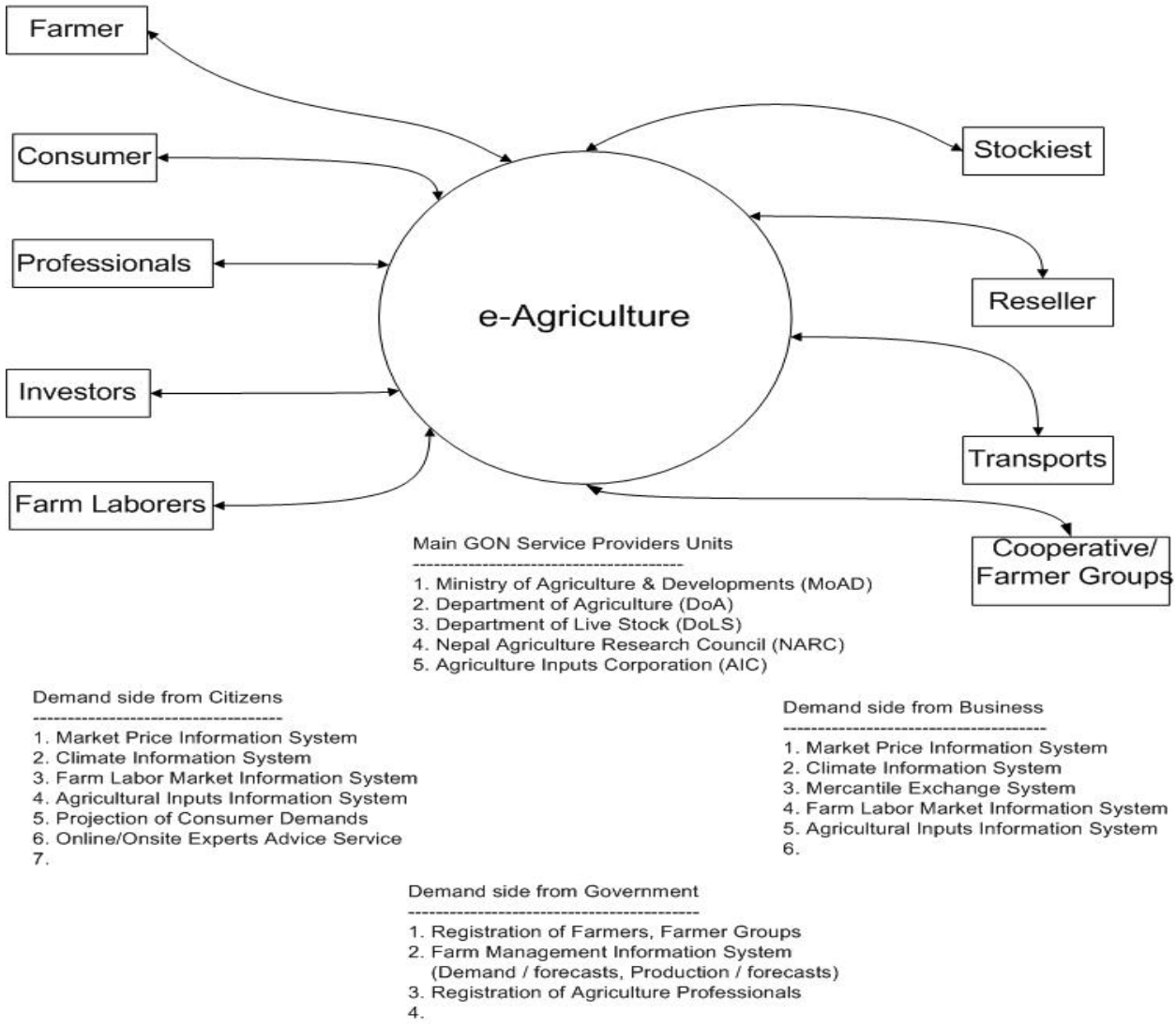


Figure 7: e-Agriculture demand/supply context diagram

11.3.2. E-Education

Education is one sphere that has paralleled civilization throughout its development, adapting tools available at the time to fulfill the needs of students and teachers. These tools are often obvious and traditional such as notebooks and pencils and blackboards or innovative and complex as websites, virtual environments, multimedia videos and interactive online games etc. The term e-Education refers to the application of Information Technology to the delivery of learning experiences. Web-based mode of instruction and virtual environments allow more freedom in terms of the usual time constraints and physical limitations; and encourage online collaborations and innovative learning strategies.

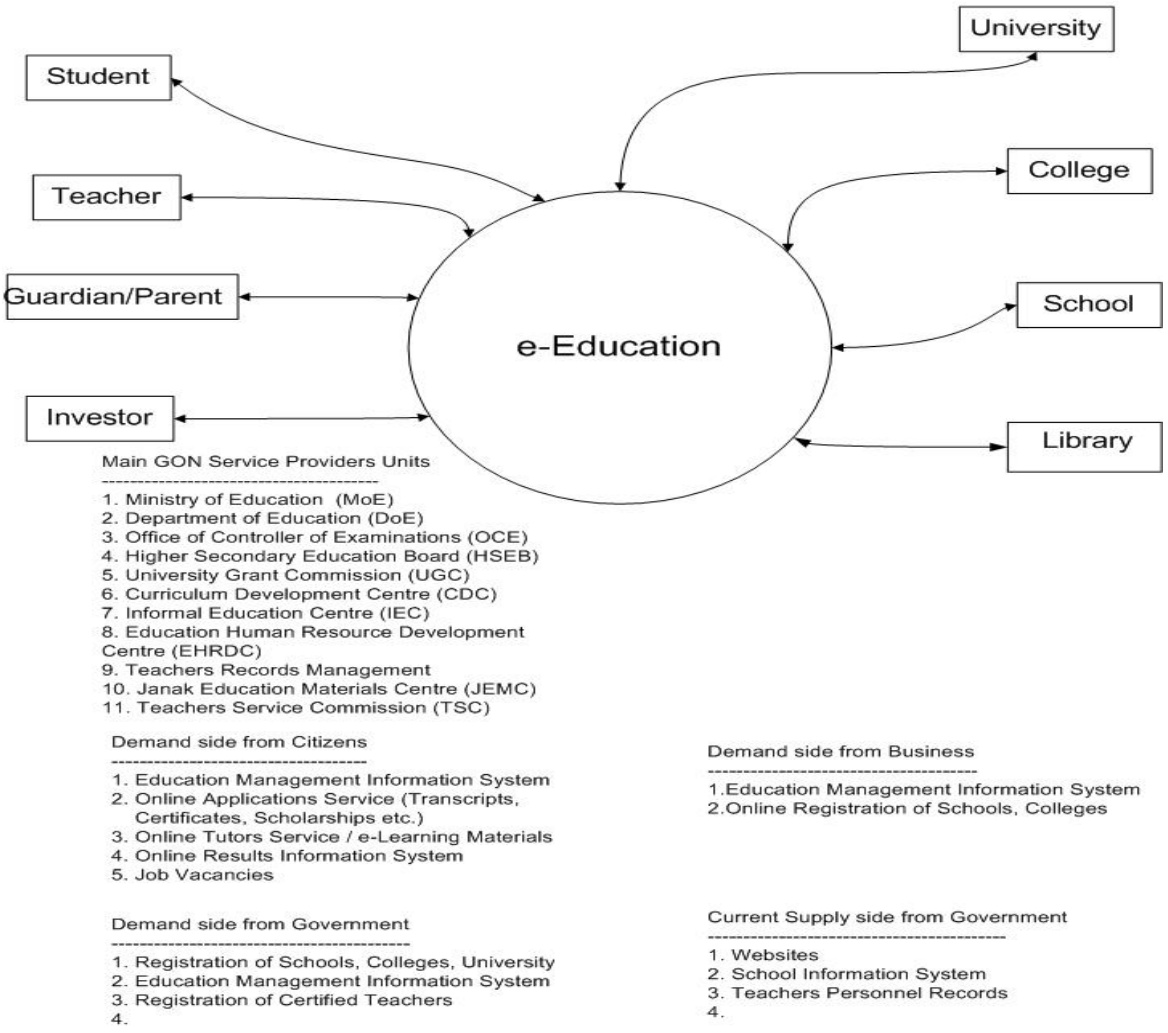


Figure 8: e-Education demand/supply context diagram

11.3.3. E-Health

E-Health refers to health services and information delivered or enhanced through the use of Internet and related technologies; and in the broader context a commitment for networked, efficient health care. E-Health encompasses known and used services such as tele-medicine, m-Health and electronic health records and moves from usage of self-monitoring healthcare devices to more complex services such as Healthcare Information System, Health Knowledge Management, Virtual healthcare etc.

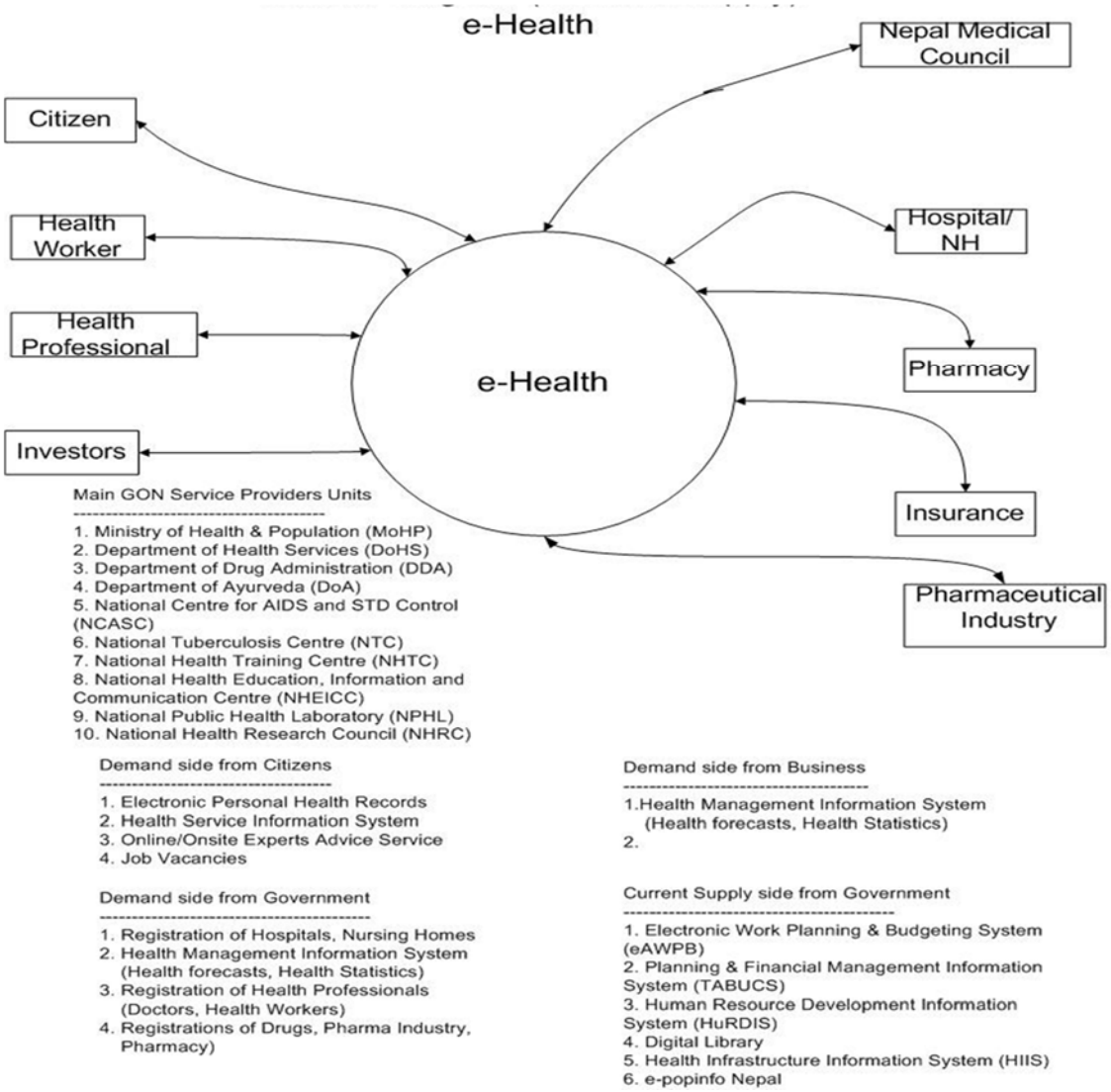
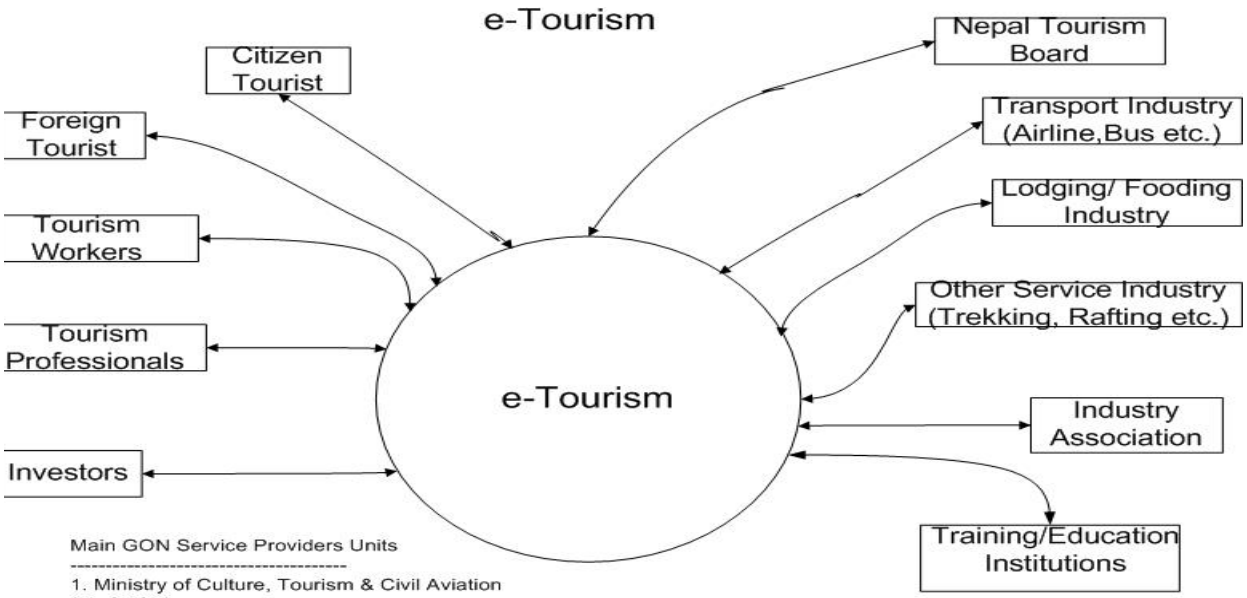


Figure 9: e-Health demand/supply context diagram

11.3.4. E-Tourism

Tourism is one of the most important and profitable industries for Nepal. E-Tourism can be defined as the analysis, design and implementation of IT and electronic commerce solutions to the travel, tourism, boarder management and hospitality industry. It was originally associated mostly with online / computer reservation systems; but now includes systems for managing and monitoring travel, including travel tracking and flight tracking systems etc. With the lower cost and endless possibilities of e-commerce, use of ICT and internet aids small tourism enterprises the key factor of competitiveness as well as access to information and customers. E-Tourism allows for the development of new products targeted for niche customers, improves customer satisfaction and fosters entrepreneurship.



Main GON Service Providers Units

1. Ministry of Culture, Tourism & Civil Aviation (MoCTCA)
2. Department of Immigration (DoI)
3. Civil Aviation Authority of Nepal (CAAN)
4. Nepal Academy of Tourism & Hotel Management (NATHM)
5. Nepal Airlines Corporation (NAC)
6. Nepal Tourism Board (NTB)

Demand side from Citizens/Tourists

1. e-Visa
2. Tourism Information System
3. Tourism (Trekking, Mountaineering, ..) Permit Management System
4. Job Vacancies

Demand side from Business

1. Tourist Information System (Arrivals/ Departures, Tourist Forecasts, HR Requirements etc.)
2. Business Registration System
3. Business Taxation System
4. Payment Gateway

Demand side from Government

1. Registration of Hotels/Restaurants, Other Service Providers
2. Business Registration/Taxation System
3. Registration of Tourism Professionals (Professionals, Workers)
4.

Current Supply side from Government

1. Business Registration / Taxation System
2. www.welcome.com
3. www.tourism.gov.np
4. Tourism Statistics, Forms

Figure 10: e-Tourism demand/supply context diagram

12. Project Identification

Different projects were classified according to different type of e-Government projects (G2C, G2B, G2G, Infrastructures etc.) with goals, strategies and programs. A list of all the e-Government projects (See Annex A) in all categories of projects were prepared and floated as a survey to the members of advisory team and prominent professionals. Marking was sought from the participants of the survey in the following areas:

IMPORTANCE	
Emergency	Effect /Impact
(0 - 10)	(0 – 10)

FEASIBILITY	
Technological	Institutional
(0 - 10)	(0 - 10)

Each project was marked for the *Importance* of the project with relation to *Emergency* and *Effect/Impact* of the project as assessed by each participant of the survey. '10' mean the highest score and '0' mean the lowest score for each category. Similarly the projects were assessed for the *Feasibility* of the project with relation to *Technological feasibility* and *Institutional feasibility*. Scoring system was done similarly as in the *Importance*.

'10' for *Emergency* means it has top most urgency and need to be implemented immediately. '0' for *Emergency* mean no urgency at all. Similarly it has meaning for all the areas of marking.

The list of the projects was provided in the form of Excel worksheet with participants of the survey to put their score marks. A portion of a typical filled form was as followed:

	Importance		**Feasibility**	
Project Name	**Emergency**	**Effect / Impact**	**Technology**	**Institutional**
Personal PAN & Integrated Taxation System Implementation	7.3	8.0	7.5	7.3
ePayment Gateway	9.0	9.2	7.8	6.8

Average marks were taken from all the survey participants for each project in the list and projects were identified with average score exceeding in both *Importance* and *Feasibility* areas.

The projects were then consolidated according to the working policy of the current e-Government Plan.

The following philosophies were adopted to list the project in different categories.

12.1. G2C Projects / Services

The Government to Citizen service are the most visible e-services the Government can provide its citizens to aid in day to day government administrative activities and are perceived as the key activities that citizens use to determine how easy it is to deal with the government (local or state). The following goals and strategies are listed to provide a practical approach to implementing G2C services under eGMP2.

- Goals
    - To build a citizen-oriented civil service by providing on-line mobile device friendly government services with business process re-engineered to the conventional civil service physical channels.
- Strategies
    - On-line public service
        - Providing governments services to citizens via internet channels on-line with seamless access to government administration
    - Diversification of civil service with business process re-engineering
        - Convenient servicing of civil petitions through various ways such as visits, on-line, e-mail, and telephone
- Programs: Some of the suggested priority services for implementation are listed below:
    - NID Implementation
    - E-Registration System
    - Online Passport Application System
    - Social Insurance Information System
    - e-Vehicle Registration
    - e-Driving License Examination
    - e-Pension
    - etc.

12.2. G2B Projects / Services

The Government to Business service are the more profitable e-services the Government can provide its citizens and business organizations, since they lead to a better tax-paying and employment generating environment for the general populace. The following goals and strategies are listed to provide a practical approach to implementing G2B services under eGMP2.

- Goals
    - To provide integrated information and service in each industry and businesses to enhance the enterprise competitiveness through the seamless and transparent G2B services

- Strategies
    - One-stop public business service
    - Supporting business activities and regulatory requirements anytime and anywhere with business specific services and information
    - Opening up of online administration information and processing
    - Opening government administration information and procedures based on the eGMP
    - Online / electronic business petition to enhance business competitiveness
    - Clarifying the procedures of business petitions

- Programs: These are the priority services recommended.
    - Central e-Procurement system
    - e-Customs
    - Online Business Registration, renewal and approval management system
    - Public service recruitment, training and employment information system

12.3. G2G Projects / Services

The Government to Government service are the invisible e-services the Government can provide its agency (local and state) and aid in them providing better, easier and faster service to the citizens. The following goals and strategies are listed to provide a practical approach to implementing G2G services under eGMP2.

- Goals
    - To business process re-engineering with standardize government administration process, computerize and shared administration information to enhance effectiveness.

- Strategies
    - Business process re-engineering and standardization of government administration
    - Making a standard for administration procedure by executing BRM (Business Reference Model) and introducing a groupware Executing e-Approval and e-Document
    - Computerization of government administration
        - Changing government administration into an automated and paperless office
        - Enhancing government's administration process
    - Integration of government information system
        - Integrating all computerized administrations through KMS execution
        - Establishing an integrated government ICT center

- Programs: These are the priority programs recommended under G2G services.
    - Formulate directive and perform IT Audit of government IT Systems
    - Test existing and upcoming government software to ensure that they meet
    - e-Tax,

- Immigration Management System
- e-Land
- e-MIS, Groupware, e-Pollution, e-Authentication, KMS and GIS

12.4. Infrastructure Projects / Services

The glue that binds all of the above mentioned G2C, G2B and G2G services is the infrastructure underneath it all. For a up-to-date e-service, an up-to-date hardware and networking infrastructure is required. The following goals and strategies are laid out to support all the eGMP2 activities.

- Goals
    - To fulfill the requirements for realizing the e-government which are expanding nationwide ICT infrastructure, strengthening ICT education, and installing favorable policies, laws and organizations
- Strategies
    - Construction of advanced nation-wide infrastructure
    - Development of national standard
        - Developing the nation's Unified Code System
        - Establishing system and security standard at the government level
        - Establishing a national standard model of business, IT systems and technology to enhance interoperability and prevent duplication
    - National ICT literacy and HRD development
    - Improvement of Law and Regulation
    - Organization of e-Government committee
    - Enhancement of ICT Business ecosystem
- Programs, Expected Outputs, Outcomes
    - Operating and updating of PKI
    - Implement/update electronic authentication and security system
    - Establish electronic payment gateway
    - Institutionalize and strengthen Cyber Forensic Lab
    - Internalize and implement GEA and NeGIF
    - Integrate all government e-Services to National Portal
    - Implement Government Groupware
    - Establish Government Cloud
    - Develop central digital repository for government publication
    - Expand the capacity of GIDC and establish DR Center.
    - Establish central IT Training Center for government

12.5. Implementation and Continuation of ADB ICT Development Project (e-Government)

The ADB ICT Development Project that laid the foundation to the Government of Nepal's initiative towards a connected Government and e-Government Master Plan (eGMP) is still pertinent to the effective evolution of eGMP2. The following goals and strategies are laid out to support the continuation of projects initiated under it and implementation of projects yet to start.

- Goals
    - To fully implement the current ADB ICT Development project as e-Government programs and to review and replicate if found successful throughout the country.
- Strategies
    - Compete the programs as has been proposed in the ADB plan
    - Review & assess the effectiveness of the programs in terms of implementation, internalization, sustenance and ease of use
    - Propose projects for continuation and provision of budgets
    - Execute the continuation programs
- Programs, Expected Outputs, Outcomes
    - Implementation of National ID program throughout the country
    - Implementation of Public Service Recruitment Management System
    - Implementation of Land Records Information Management System throughout the country
    - Implementation of Electronic Driving License and Vehicle Registration System

13. Legal Framework

The draft IT Umbrella Act 2071 being drafted by DoIT will have to address the legal framework necessary for eGMP. The draft IT Umbrella Act 2071 has been reviewed already in the Chapter 7.8 earlier.

Regarding Rules and regulation need for implementing e-GMP the following laws can also be considered:

1. Electronic evidence (e-Evidence) law.
2. Electronic Transaction (e-transaction) law
3. Privacy (e-privacy) law
4. Freedom of information law.
5. Cyber-crime and computer misuse (e-crimes) law
6. Intellectual property (e-property) law
7. Fiscal incentive law
8. Competition (e-competition) law etc.

14. EGMP2 IT Organization

In the previous context of ICT projects implementations and support in GoN, ICT organizations in Ministries, Departments and offices/projects were having human resources upon case to case basis. A Ministry or Department had established an IT cell/unit within them as per their requirement and it might have taken some time to create such units with the approval from concerned Ministries. Also, it was a case of individual persuasion to get a Computer Engineer transferred from one Ministry to another.

With the establishments Department of Information Technology (DoIT), it is now hoped that DoIT will be an umbrella / mother IT organization for all IT employees within GoN. DoIT can now be home organization from where they get deputed to different Ministry/Department/Project/Centers as necessary.

The following are the main organizations within GoN currently working in ICT sectors specifically:

SN	Organization	Functions/Remarks
1	Department of Information Technology (DoIT)	Recently established in 2012. GON body under MOEST. Executing body of IT in GON Sector
2	National IT Centre (NITC)	Established in 2002 as a development committee under MOEST. IT infrastructure providing center.
3	Office of Controller of Certification (OCC)	Established since 2008 as GON center. PKI Infrastructure providing and CA licensing authority
4	IT Coordination Council (ITCC)	Announced to be established under PM as Coordinating and Policy Making body under GoN but never operated.

Table 3: GoN organizations working in ICT sectors

NB: High Level Commission for Information Technology (HLCIT) was dissolved in 2010. Later the organization structure evolved with the establishments of DoIT and ITCC (yet to be operated). The absence of HLCIT and non-formation of ITCC has a high level body being able to coordinate across the ministries can be a blocking factor for the effective implementation of eGMP.

At present, in GON, the First Class IT officers (Joint Secretaries) are positioned in the following Ministry/Department/Center:

- Director General, Department of Information Technology (DoIT), MOEST

- Controller, Office of Controller of Certification (OCC), MOEST
- IT Specialist, Inland Revenue Department (IRD), Ministry of Finance (MOF)
- Joint Secretary (IT), Election Commission of Nepal (ECN)

NB: Executive Director of NITC is deputed from IT Experts with equivalence of Special Class GON officer.

Amongst the top priority sectors of e-Gov implementations, the following ministries do not yet have IT Organization Unit/Section/Division at their level or any of their subordinate Departments:

- Ministry of Agricultural Development (MoAD)
- Ministry of Health & Population (MoHP)
- Ministry of Education & Sports (MoES)
- Ministry of Culture, Tourism and Civil Aviation (MoCTCA)
- Ministry of Home (MoH)
- Ministry of Physical Infrastructure & Transports (MoPIT)
- Ministry of Land Reform & Management (MoLRM)

In the absence of proper human resources and its presence in formal ways in the organization structure of the organization, it will be quite difficult to implement large scale e-GOV projects for its effective implementation. Even though projects may be introduced and implemented by employing consultants and service providers, it cannot be sustained in a long run. It becomes more difficult when such consultants and service providers come from a foreign land and on a project basis.

EGMP is GON's Master Plan for implementation of eGovernment projects within next 5 years of time. EGMP can only be effective with a strong organization structure to implement the plan and with a proper chain of command administratively and technically.

There is a strong need for IT Organization and Deployment Method (O&DM) study in major Ministries/Departments where programs & activities in eGMP will be more focused.

14.1. Organization Model

All the Ministries/Departments/Centers within GoN, where there is a focus of e-GMP programs and activities, it is proposed that an IT Cell which can be Unit/Section/Division as required be created as will be identified by O&DM study. The cell must consist of a Chief Information Officer (CIO) backed by appropriate IT organization with appropriate number and skill sets of human resources of different levels. Depending upon the size of the IT cell, the position of the CIO can be First/Second/Third Class officer.

IT Cell that will exist in different Ministries / Departments / Projects/ Centers are generally a supporting unit in order to implement IT related projects for the effective usage of respective domain in ICT platform. The main goal is to do things effectively for the respective organization with the appropriate use of ICT. IT Cell should act as an ICT service provider to the entire organization. It will be a duty of the CIO of the IT Cell to liaise with the concerned organization's main objective.

These IT Cells will be and should be envisaged from the actual requirement perspective of the typical organizations where eGMP projects will be implemented. Some typical organizational structures of such IT Cells can be as follows:

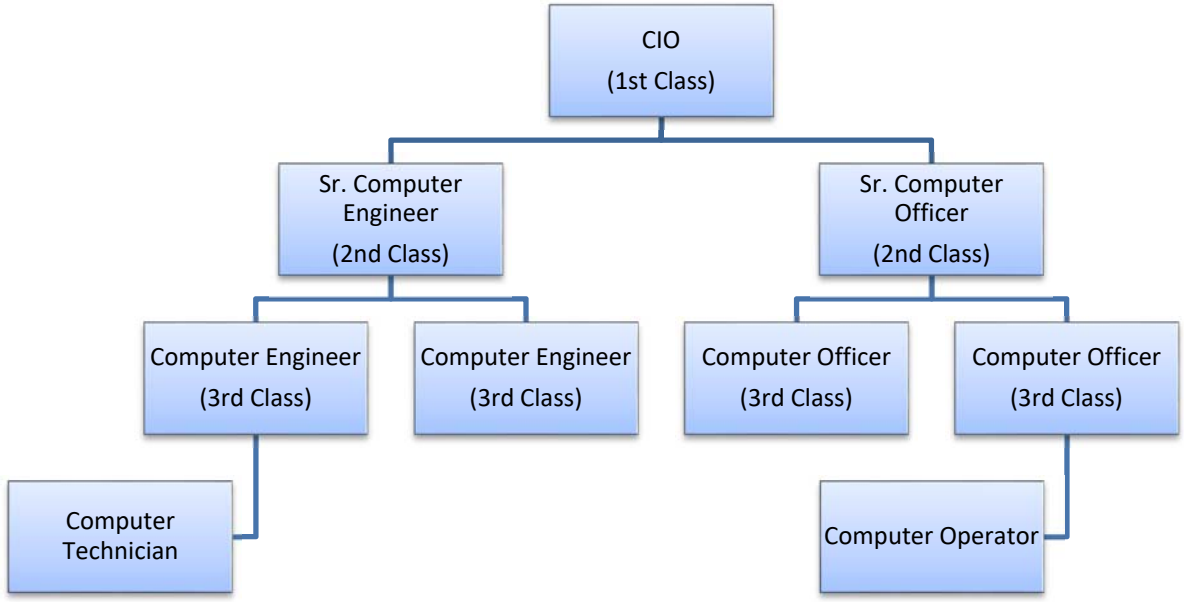


Figure 11: A Typical Organization Structure of 'A' Class IT Cell (Division)

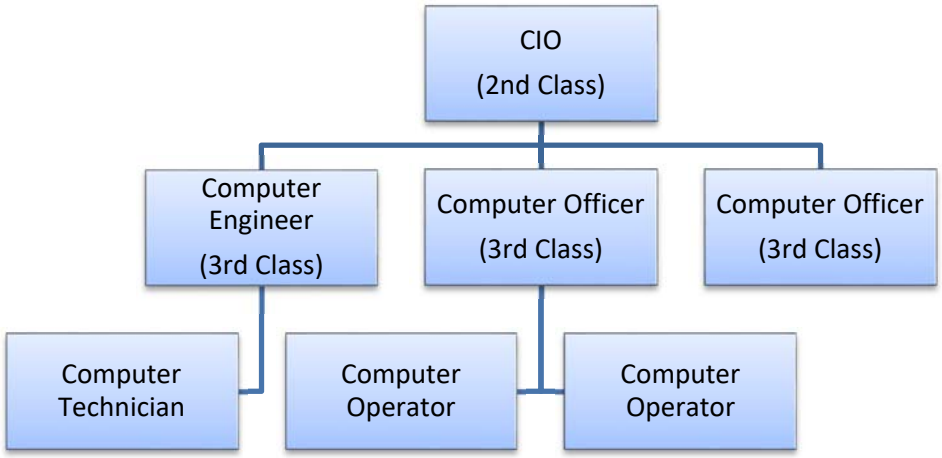


Figure 12: A Typical Organization Structure of 'B' Class IT Cell (Section)

14.1.1. National eGMP Coordination Council

EGMP2 is a multi-organization, multi-stakeholder initiative and hence requires an enormous amount of coordination amongst Ministries. In order to carry the eGMP project with a high priority and with appropriate purpose, methodology and within time, there will be a requirement high powered body to have a proper coordination amongst ministries & other stakeholders. Hence a high-powered body under the Chairmanship of Prime Minister has been proposed as **National eGMP Coordination Council (NeGMPCC).** EGMP2 must be a national priority, in order to make it effective for the benefits of all stakeholders (Citizens, Businesses & Government Bodies). NeGMPCC will be apex body for the planning, implementation and monitoring of eGMP.

NeGMPCC body should consist of the following:

- Prime Minister – Chairperson
- Minister of Environment, Science & Technology (MoEST) – Co-Chairperson
- Chief Secretary – Vice Chair
- e-Gov Expert (Academia) – Member
- e-Gov Expert (Practicing Professional) – Member
- Representative from Citizen – Member
- Director General, Department of IT – Member Secretary

The main functions of NeGMPCC will be as follows:

- Ease the way for Good Governance through e-Government,
- Choose eGMP projects to be implemented in a priority basis as requests obtained from stakeholders to NeGMPCC,
- Approval of eGMP plans,
- Sourcing/requesting for funds through Ministry of Finance,
- Periodic progress reporting and monitoring,
- Coordinate & provide guidelines to stakeholder agencies for the effective implementation of the eGMP projects.

A working committee should be formed with the following structure for a detailed planning and effective implementation of eGMP:

- Director General, Department of IT - Chairperson
- CIOs of major Ministries for eGMP Implementations - Member
- Executive Director, NITC - Member
- Director (eGMP) of DoIT - Member Secretary

14.1.2. DoIT, IT Division/Section/Unit & ICT Service

Department of Information Technology (DoIT) should be the Secretariat of the NeGMPCC besides other responsibilities. DoIT should be placed as the central resource center for IT officials/experts within GoN

like we have Financial Comptroller General Office (FCGO) for all account officers. For all IT human resource with GoN, DoIT will be the mother organizations and officers will be deputed to different Ministries/Departments/Centers from DoIT as per the general norms of the Government and with the consideration of sub-specialization of IT human resources.

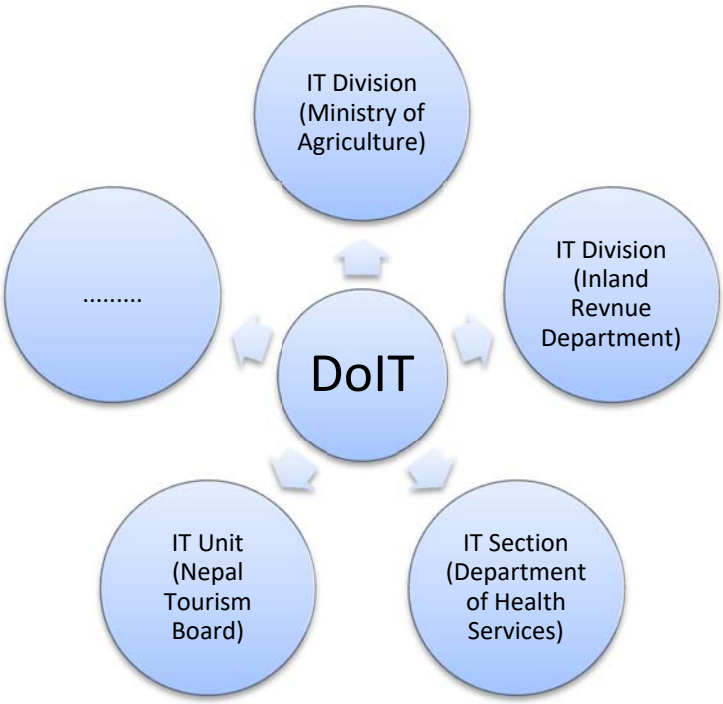


Figure 13: Relationship of DoIT with IT Division/Section/Units in GoN Agencies

IT Division/Section/Unit will have primary responsibility towards the organization that they will be working and a secondary responsibility towards DoIT as their mother organization.

- Chief of IT Divisions should be a First Class IT Officer/Engineer and should be termed as CIO – 'A' Category
- Chief of IT Sections should be a Second Class IT Officer/Engineer and named as CIO – 'B' Category
- Chief of IT Unit will be a Third Class IT Officer/Engineer and named as CIO – 'C' Category

IT should be defined as a separate Service Type ('Sewa') and there can be multiple sub-service types ('Samuha') such as Hardware Engineering, Communications & Network Engineering, System Engineering/Operations, and Software Engineering/Developers etc.

Part V: Recommendations

Developing an eGMP has been worldwide trend and Nepal has practiced this for the second time. We need to learn from our previous experience of developing an eGMP and practicing it with genuinely implementing with all the determination, initiatives and resources.

The following are some of the recommendations for the development and implementations eGMP for **best utilizing the ICT in the Good Governance in the country**:

- First of all, developing eGMP needs ample discussions with all the stakeholders including representatives of citizens, businesses and respective government officials. Our focus for the next 5 years should be clear and GoN should fully agree to it.
- Enough emphasis should be given to make Nepalese people (politicians, Government officials, businesses, professionals and citizen) aware that eGMP is for their benefits in the long term.
- EGMP should be approved by the cabinet so that it becomes a national document and not merely a document of the agency which has initiated its drafting. Goals, strategies, projects as identified by eGMP should be treated by all GoN machinery with the same objectives, priorities and outcomes.
- GoN must execute it most effectively as has been envisaged by the plan. The programs should be adequately addressed in the fiscal policies and budgets drawn by the Government every year.
- Proper care should be given to awareness programs for all the users in order to actually implement any of the projects identified. Even the best projects conceived, developed, implemented will not be effective if it will not be practically used by the ultimate users of the system.
- EGMP should primarily be the document of people in Nepal. Emphasis must be given in the execution of the eGMP project by Nepalese officials and professionals. Only for any key specific areas where the technical and managerial expertise lacks in Nepal, it should be sought from the international market.

Key Success Factors Needed to Realize the E-Government:

- Manage factors needed to successfully implement the e-Government
- Measure factors that assess the progress to verify whether the e-Government plan is implemented in the purported direction, consistently and continuously

Managing Factor

- Head of the government's strong will to raise national competitiveness through realizing e-government, and strong standing of the implementation organization
- Organizational and institutional system that allows effective and continuous implementation of the e-government plan regardless of change in regimes, and systematic communication among government departments
- Advancing communication network based on forecast of future demand and bold introduction of cutting edge technologies

- Fostering domestic ICT workforce by expanding participation of domestic ICT companies in the e-government project and securing foundations to promote ICT companies and continue the promotion
- Introduction of a fund mechanism that can attain both large scale-Government Master Plan investment and risk diversification at the same time

Measuring Factor

- Monitoring and assessing progresses and managing performance by checking progresses regularly and step by step, confirming that the e-Gov project is going in the right direction (By the formation and execution of **National eGMP Coordination Council (NeGMPCC)** as envisaged in the organization Model above.
- Establish a system that assesses usage status after the completion of the project, compares performance against the original plan, and reflects the assessment result to the future projects
- Assessment of performance against original plan for aggressive and continuous progress of the project and implementation of an accurate incentives/remuneration system based on performances
- Seeking advice based on superior levels of technologies after assessing adequacy of technological level per implementation step

This master plan may be reviewed and amended by the **National eGMP Coordination Council (NeGMPCC)** every two years in accordance with technological developments and expansion of services as a result of the rapid change in the information technology sector.

The changed details in the e-government master plan should be put in statutory form and stored and managed in a database. Also the results of implementing the amended plans should be reported and evaluated. Through executing this procedure, the e-government master plan will continuously evolve so that the e-government in Nepal can be established in a more efficient and effective way.

Annexure

List of possible e-Gov Projects

SN	Name of System	Concerned Agencies
1	Visa Management System	Department of Immigration
2	Embarkation and Disembarkation records	Department of Immigration
3	School Information System	Department of Education
4	School registration management System	Department of Education
5	Teacher's Records	Department of Education
6	Web application for custom forms (G2B)	Department of Customs
7	Import/Export database	Department of Customs
8	DRI-CIS (Mobile based application)	Department of Revenue Investigation
9	Revenue Leakage Reporting System	Department of Revenue Investigation
10	Case Management System	Department of Revenue Investigation
11	Money Movement database	Department of Money Laundering Investigation
12	MRP system	Department of Foreign Affairs
13	e-application for MRP required (G2C)	Department of Foreign Affairs
14	Permit Management	Department of National Park and Wildlife Conservation
15	Human Resource Management	Ministry of General Administration
16	Pension Management System	Ministry of General Administration
17	Database of health workers	Ministry of Health and Population
18	Health Information System	Ministry of Health and Population
19	Drug Inventory System	Ministry of Health and Population
20	Drug Administration & Management System	Department of Drug Administration
21	Agriculture Market Information	Department of Agriculture
22	Disease/Pest Control Information (G2C)	Department of Agriculture
23	Trader Management System	Department of commerce
24	Foreign Employment Companies Management System	Department of Foreign Employment
25	Grievance Management System	Department of Foreign Employment
26	Foreign employee Management System	Department of Foreign Employment
27	Labor Market Information System (supply and Demand)	Department of Labor
28	Digital Parcel (Required)	Department of Survey
29	Land Record Management System (Malpot)	Department of Land Reform and Management
30	Law Database	Ministry of Law, Justice, Constituent Assembly & Parliamentary Affairs
31	Road Statistics	Department of Roads
32	Road Maintenance Management System	Department of Roads
33	Driving License	Department of Transport Management
34	Vehicle registration System	Department of Transport Management
35	Road Permit System	Department of Transport Management
36	Road Statistics	DOLIDAR

37	Road Maintenance Management System	DOLIDAR
38	Weather Forecast Portal	Department of Hydrology and Meteorology
39	IT manpower registration system	Department of Information Technology
40	Government ICT Project Database	Department of Information Technology
41	National Data Registry	Department of Information Technology
42	Industry Registration System	Department of Industry
43	Trademark Management	Department of Industry
44	Patent Management	Department of Industry
45	Cottage/Small Industry Registration System (G2B)	Department of Cottage and Small Industries
46	Cooperative Management System	Department of Co-operatives
47	Economically Deprived people management system	Department of Co-operatives
48	Youth Employment Scheme Management	
49	Water Billing and electronic payment system	
50	Case Management System	Supreme Court
51	Recruitment System	Public Service Commission
52	Case Management System	Commission for Investigation of Abuse of Authority
53	Complaint Management system	Commission for Investigation of Abuse of Authority
54	Case Management System	Commission for Human Rights
55	Complaint Management system	Commission for Human Rights
56	Vital Registration	KMC
57	Business Registration	KMC
58	Building Permission	KMC
59	Rental Tax	KMC
60	Property Tax	KMC
61	Business Tax	KMC
62	e-mail	Central Government Systems
63	Conferencing	Central Government Systems
64	Human Resource Management (Core)	Central Government Systems
65	Human Resource (Specific)	General Software Required for all Government Bodies
66	Accounting	General Software Required for all Government Bodies
67	Document Management System	General Software Required for all Government Bodies
68	Memo Management System	General Software Required for all Government Bodies
69	e-mail (Government)	General Software Required for all Government Bodies
70	Conferencing(Government)	General Software Required for all Government Bodies
71	Fixed Asset	General Software Required for all Government Bodies
72	Inventory	General Software Required for all Government Bodies
73	Attendance Management System	General Software Required for all Government Bodies
74	Payroll	General Software Required for all Government Bodies
75	Project Monitoring	General Software Required for all Government Bodies
76	Budget Planning	General Software Required for all Government Bodies
77	Complaint Management	General Software Required for all Government Bodies

E-Agriculture Action Plan

Introduction

Agriculture contributes 36% to the national GDP of Nepal. Approximately 66% of the population is employed in agriculture; hence, it is a priority sector for the development of the country.[1] **Ministry of Agriculture & Development (MoAD)** is the responsible organization for the development of agriculture sector. The main objectives of MoAD are:

- To reduce poverty through increased agricultural production and productivity.
- To make Nepalese agricultural products competitive in the regional and world markets by developing the foundation of commercial and competitive agricultural systems.
- To conserve the natural resources, environment and ecological diversity and utilize them for sustainable agricultural development.

The following are some of the government organization/units that are working for the development of the sector under MoAD:

- Department of Agriculture (DoA)[2]

  DoA supports and helps achieve food security and poverty alleviation by the transformation of agriculture through diversification and commercialization. Specific objectives of DoA are:

  - To increase agricultural production based on geographical diversity.
  - To support food security by increasing food production and maintained the internal supply of food stuffs.
  - To increase the production and productivity of raw material for the agro-industries.
  - To support the produces those have comparative advantages appropriate market management.
  - To increase the availability of off-farm employment by supporting small industries and enterprises.
  - To support export promotion and import substitution of agriculture.
  - To support export poverty alleviation by increasing the opportunity employment for small, marginal and women farmers.
  - To screen and standardize the technologies by doing adoptive reuse.
  - To strike balance between agricultural development and conservation.

[1] http://www.moad.gov.np
[2] http://www.doanepal.gov.np/

- Department of Live Stock (DoLS)[3]

  DoLS has the following specific objectives:

  - Increase livestock production and productivity and eliminate the problem of malnutrition
  - Improve the economic and social condition of the poor, socially disadvantaged people and women through improved livestock farming
  - Develop and improve existing livestock farming as the main income source of the farm family and help in maintaining environmental balance and conservation
  - Extend disease control services for security and conservation of livestock and public health
  - Assist in the production of livestock and products which are exportable and import substitutable
  - Involve private sectors in commercial livestock farming; resource center development and conservation; and market management
  - Increase self-employment opportunities by encouraging livestock sector and livestock based industry and trade
  - Extend quality control services in favor of livestock sector, livestock industries and the consumers
  - Identify, conserve, promote and develop the indigenous livestock breed, which are going to be extinct.

- Department of Food Technology & Quality Control (DoFTQC)[4]

  DFTQC has the following three major objectives:

  - Maintain safety and quality of food and feed products in the country by implementing updated food and feed act and regulations
  - Promote entrepreneurship by developing and disseminating appropriate technologies.
  - Improve nutritional status of the people through food-based approaches.

- Nepal Agriculture Research Council (NARC)[5]

  Nepal Agricultural Research Council (NARC) was established in 1991 as an autonomous organization under "Nepal Agricultural Research Council Act - 1991" to conduct agricultural research in the country to uplift the economic level of the people. The main objectives of NARC are:

  - To conduct qualitative studies and researches on different aspects of agriculture
  - To identify the existing problems in agriculture and find out the solution.
  - To assist government in formulation of agricultural policies and strategies

[3] http://www.dls.gov.np/content.php?id=203
[4] http://www.dftqc.gov.np/content.php?id=219
[5] http://www.narc.gov.np/about/index.php

- Agriculture Inputs Company Ltd.(AIC)[6]

  Agriculture Inputs Corporation (AIC) was established in 1965 as a public sector enterprise to procure and distribute high quality and improved agricultural inputs (fertilizers, seeds, agro-chemicals and implements) at a reasonable price across the country. On May 8, 2002 government converted AIC into Agriculture Inputs Company Ltd. (AICL) and National Seed Company Ltd. under Company Act 1997 as a state owned enterprises. AICL has been assigned by the government to procure and distribute fertilizers across the country. The main objectives of AICL are as follows:
  - Produce, procure and import different types of mineral fertilizer and distribute it across the country on the basis of local demand.
  - Import raw materials for the production of different product mix of fertilizers and distribute and export as well.
  - Maintain buffer stock of fertilizers received under grant/aid from the government, donor countries and organizations to control supply interruption.
  - Procure and distribute the subsidized fertilizer across the country.
  - Conduct other business and service oriented activities to ensure reasonable profit.
- Dairy Development Corporation (DDC)[7]

  Dairy Development Corporation, established under corporation Act 2021 BS, is-a fully state owned corporation, initiated for the economic advancement of the poor farming communities for milk collection, production and distribution of dairy products. The main objectives of DDC are:
  - Provide a guaranteed market for milk to the rural farmers with fair price.
  - Supply pasteurized milk and milk products to urban consumers.
  - Develop organized milk collection system to meet increasing demand for pasteurized milk and milk products.
  - Develop an organized marketing system for milk and milk products in urban areas.

Some other Agriculture Related Institutions besides MoAD and its subsidiary organizations are as follows:

- Department of Irrigation (DoI)
- Department of Hydrology & Meteorology (DoHM) etc.

G2C applications in e-Agriculture should benefit farmers, consumers, farm laborers, agriculture professionals, investors to farming etc. G2B applications in e-Agriculture should benefit businesses related with agriculture which are cooperative/farmer user groups, transporters, resellers and stockiest etc.

Functionalities constituting the e-Agriculture will be as follows (but not limited to):

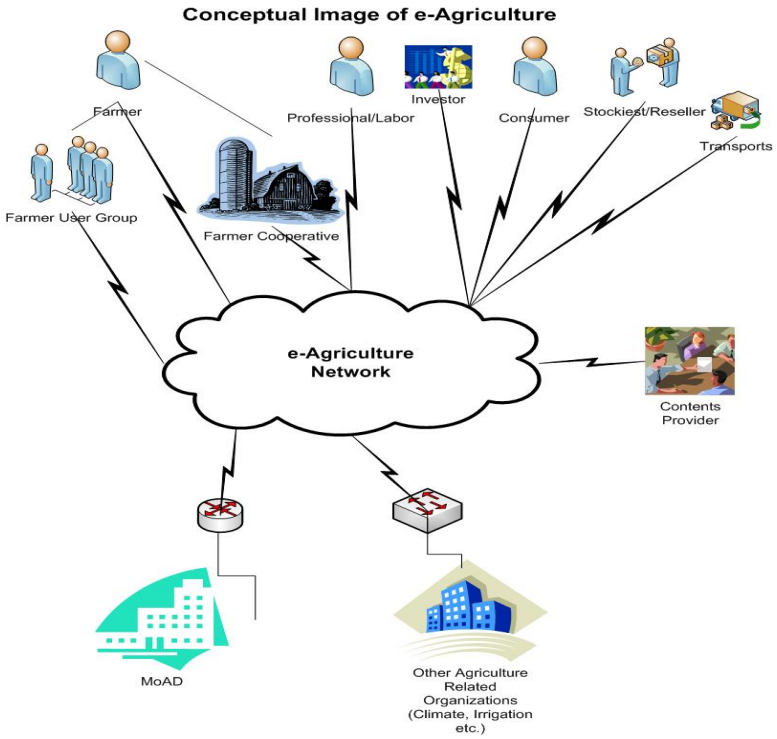
- Market Price Information System (Brokering/Trading System, e-Auction)
- Agriculture Inputs Information System
- Online/Onsite Expert Advice Service/System
- Disease/Pest Control Information
- Farm Management Information System (Demand/Production Actual/ Forecasts)

[6] http://www.aicl.org.np/home/about_us.php
[7] http://www.dairydev.com.np/list/Objectives/4/81/24

- Climate Information System
- Registration of Agriculture Professionals/Farmer Groups/Agriculture Cooperatives

Conceptual Overview

E-Agriculture has been envisaged as G2C/G2B activities where there can be maximum engagements between GON organizations with Citizens and Businesses in general. The following figure depicts the conceptual image of e-Agriculture:



Current Situation

In the past, there have been multiple instances when Government, Funding Agencies and even private sector have attempted to create an Agriculture Market Information System but it has not been successful so far. The main reason for not being able to implement the Agriculture Market Information System is not the technology but it is a real challenge to sustain the system without a proper thought and resources of maintaining the system long after it is implemented.

In today's scenario, agriculture information is segregated as separate islands of information, updating of information is not regular and hence available information are also not up-to-date. One of the reasons for information being not up-to-date in the Government information system is that the information are not created from the natural e-transactions that may take place amongst the information creators and services provided by Government.

Ministry of Agriculture has received a fund from a project of Building Resilience to Climate Related Hazards (BRCH), one of the five projects funded through the Nepal Pilot program for Climate Resilience (PPCR) under the Strategic Climate Fund, for implementing Agriculture Management Information System (AMIS).

The main objective of AMIS is to deliver timely and relevant agro-climate and weather information to farmers to increase productivity and reduce losses from meteorological and hydrological hazards. A key aspect of the AMIS is development and implementation of a web-based information portal that will deliver timely and relevant agro-climatic and weather information, and early warnings to facilitate operational decision making by the farming communities. The portal will (but not limited to):

- Create a two way communication system between MoAD and farmers. The interface will be web and mobile phone based that will allow farmers to receive information such as advisories and forecasts in a timely manner and contact MoAD with any queries for further clarification and advice;
- Create information portal displaying actionable information and tools in an easily understandable language for farmers to help mitigate climate-related production risks;
- Utilize SMS to provide relevant local weather information and agro advisory services in a timely manner to farmers;
- Provide a section on Frequently Asked Questions (FAQs) and answers.

Improvements and Outputs

The main goal of e-Agriculture is to create an electronic platform where agriculture information can be shared between Government, Farmer's Cooperatives, Businesses, Farmers, Farm Labors, and Businessmen for the overall improvement of the sector and for a win/win situation to all the stakeholders in the value chain. Agriculture related information from farm lands, agriculture inputs (seeds, manure, medicines etc.) to production, marketing, sales can be shared among the stakeholders.

At present, there are many information islands in the forms of separate systems associated with different Government units, other stakeholders. Information islands will be brought to a single portal and hence it will be easier to look for related information and utilizing it to maximization of profits by all stakeholders.

The medium of information inputs and dissemination could be computers, laptops, PSTN phones, mobile phones, FM radio stations, e-books etc. Information can be designed to be hosted in multi-languages as far as possible so that language should not be a barrier to any citizen for accessing information. Information can be designed to be hosted in various forms: textual, audio, video so that it can be utilized by all people. Similarly mobile apps can be developed and utilized by all the stakeholders always to keep the information at their fingertips.

A mechanism to collect the correct information, its verification, processing, dissemination related with agriculture driven by a web portal will be designed, developed and implemented.

Implementation Strategy

The major chunk of work in e-Agriculture will be contents and its framework development. A framework to host all the components of e-Agriculture with some of the components of the contents will be incorporated in the first phase. The contents development will be continuous work and is needed to be carried out in an ongoing manner and should be coordinated by Agriculture Promotion Division under Ministry of Agriculture Development (MoAD). The e-Agriculture portal will also be made available through the Government Portal.

Information System Planning (ISP) and Business Process Re-engineering (BPR) should be carried out for detailing the work and identifying the best implementation strategy.

System design of the frameworks and the knowledge base for the first phase will be carried out and application will be developed based on n-tier SOA architecture.

Development of the frameworks and the contents will be accomplished as per the system design and Testing will be adequately done before implementation of the system.

Implementation should not be just done technically but there should be sufficient care in promoting the contents to the citizens/businesses at the local level to make use of the available system effectively. Sufficient promotion of the system developed showing its advantages should be proliferated from different communication channels/mediums including TV, Radio, and Newspapers making use of the state-of-the-art systems.

Work Plan

Detailed work for the implementation of **e-Agriculture** is as follows: Each column in Time Scale is one month.

	Tasks	M + 1	M + 3	M + 5	M + 7	M + 9	M + 11	M + 13	M + 15	M + 17	M + 19	M + 21	M + 23	M + 25	M + 27
1	ISP/BPR RFP Preparation														
2	Tendering & Contracting														
3	System Design														
4	System Development														
5	Infrastructure Setup														
6	Implementation														
7	Promotion / Cont. Develop.														

Cost Estimates

The following will be the budget estimates for the e-Agriculture project:

Project Cost Estimates (e-Agriculture)

Types of Service	Calculation Basis	Miscellaneous	Amount (in NRs)
ISP/BPR & RFP Preparation	1 x TL x 3pm, 1 x SA x 3pm	500000	2,900,000
Tendering & Contracting		1000000	1,000,000
System Design	1 x TL x 1pm, 1 x SArch x 2pm, 1 x SA x 3pm, 1 x SE x 2pm, 1 x DBA x 1pm	500000	3,750,000
System Development	1 x TL x 3pm, 1 x SArch x 2pm, 1 x SA x 6pm, 1 x DBA x 1pm, 6 x SE x 10pm, 3 x QA x 5pm,	1000000	21,000,000
Infrastructure Setup	3 Servers/DC, 3 Servers/Backup, 3 Servers/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	30000000	30,000,000
Implementation (Training, Installation & Commissioning, Data Migration)	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 2pm, 1 x DBA x 2pm, 4 x SE x 2pm, 2 x QA x 2pm, 1 x DE x 2pm, 1 x SysE x 2pm, 5 x DC x 2pm	1200000	7,600,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 6pm, 1 x QA x 2, 1 x DE x 1pm, 1 x SysE x 4pm	1000000	6,650,000
Total			**72,900,000**

Expected Outcomes

The following are some of the outcomes of the implementation of e-Agriculture:

- Farmers will be better informed on climatic condition, agriculture inputs, markets for their production,
- Farmers will get online/onsite support from respective experts for the information, intervention for any disease in plants/livestock etc.
- Investors in agriculture will be better organized with market information.
- Government will be able to forecast more accurately for the production of agricultural outputs.

E-Education

Introduction

The Ministry of Education (MoE) as the apex body of all educational organizations is responsible for overall development of education in the country. This Ministry is responsible for formulating educational policies and plans and managing and implementing them across the country through the institutions under it.

The Central Level Agencies (CLAs) under the Ministry are responsible for designing and implementing of programs and monitoring them. Five Regional Education Directorates (REDs) are responsible for monitoring the programs undertaken by the district level organizations. Seventy-five District Education Offices (DEOs) and One Thousand Ninety-one Resource Centers (RCs) at local level are mainly the implementing agencies of the educational policies, plans and programs. Moreover, all the functional units of the MoE and other constituent and autonomous bodies within the framework of the Ministry are parts of the organizational structure geared for achieving its goals and carry out its functions.

There are separate central unit under the Ministry of Education for Curriculum Development, Teacher Development, Examination, Non-formal Education and Teachers 'Records Management. There are 29education training centers across the country under the Government's educational training central - National Center for Education and Development (NCED). Besides, as a teacher support mechanism there are 1053 resources centers functioning under the District Education Offices (DEOs) across the country.

The following are some of the government organization units that are working for the development of the sector under MoE:

- Department of Education (DoE)[8]

  Department of Education (DOE) develops and monitors overall program and activities in school education. DOE implements all educational programs in the districts through District Education offices (DEOs). School management committee (SMC) in each school has the responsibility of planning and implementing school's activities and managing the school.

- National Center for Education and Development (NCED)

  NCED was established in 1993 under the Ministry of Education (MOE), as an apex body for human resource development in education sector. NCED provides trainings for teacher development, capacity development of educational personnel under the Ministry of Education and conduction of research activities in education. The Council for Educational Human Resource Development, headed by the Minister of Education, provides policy guidelines to NCED.

[8] http://www.doe.gov.np/

- Office Of The Controller Of Examinations (OCE)

  The Office of Controller of Examinations (OCE) is established under the Government of Nepal/Ministry of Education. Its main functions are to manage and conduct the School Leaving Certificate (SLC) Examinations.

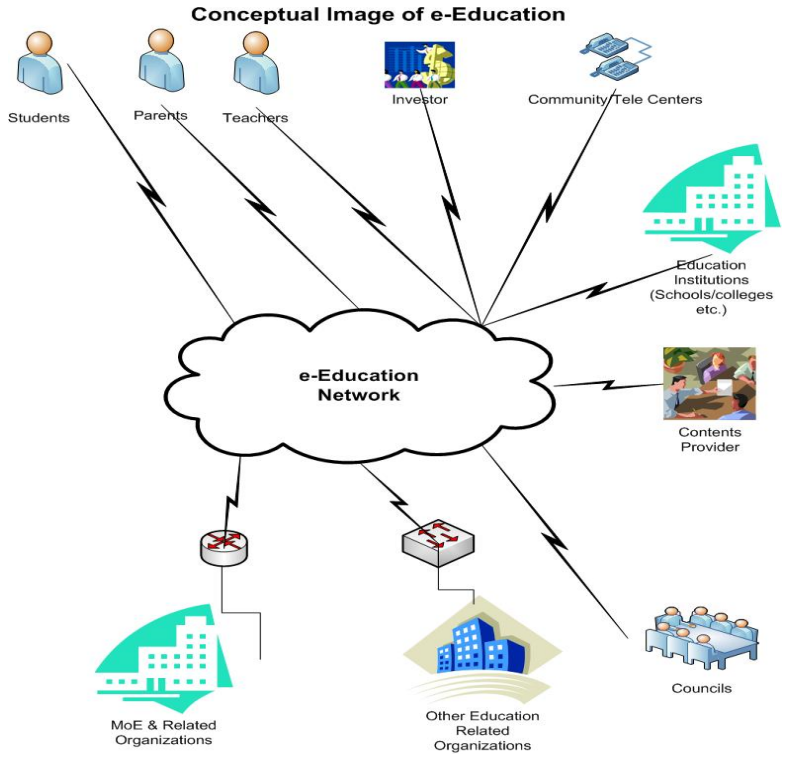
G2C applications in e-EDUCATION should assist in the development of educational sector of the country.

Functionalities constituting the e-Education will be as follows (but not limited to):

- ICT in Education Master Plan (2013-2017) (G2C projects)
- Education Management Information System
- School Information System
- School Registration System
- Student Registration System
- Student Application System
- Mark sheets, Certificates
- Scholarships
- Online Results Information System (SLC and 10+2)
- Teachers Personnel Records
- Teachers Enrollment System
- e-Book (School Text Book)
- Online Tutors Service/e-Learning/e-Teaching Materials

Conceptual Overview

E-Education has been envisaged as G2C/G2B activities where there can be maximum engagements between GON organizations with Citizens and Students. The following figure depicts the conceptual image of e- Education:



Current Situation

Ministry of Education in the bid to improve education sector launched School Sector Reform Plan (SSRP) 2009-2015. Plan included following activities to provide Education for All (EFA) and achieve Millennium Development Goal (MDG).

Following are the major sectors included in the plan:

- EARLY CHILDHOOD EDUCATION AND DEVELOPMENT
- BASIC AND SECONDARY EDUCATION
- LITERACY AND LIFELONG LEARNING
- TECHNICAL EDUCATION AND VOCATIONAL TRAINING
- TEACHER PROFESSIONAL DEVELOPMENT
- CAPACITY DEVELOPMENT
- MONITORING AND EVALUATION

Plan put ample emphasis on Information and Communication Technologies (ICT) to improve the speed of internal communication and staff access to essential working documents and information as a part of capacity development.

MoE has also started ICT in Education Master Plan (2013-2017) with the vision to ensure extensive use of ICT in education sector and contribute for access to and quality of education for all.

This Master Plan includes four major components on ICT in education: ICT infrastructure including internet connectivity, human resources, content development and system enhancement. These four components also cover the four pillars of ICT in education: infrastructure, connectivity, teaching learning materials and human resource. The master Plan covers five major sub-sector of education, namely, School Education, Higher Education, Teacher Education and Training, and Continue Education and Life-long Learning. Besides, it also includes Governance and Management in Education.

All the educational resources will be stored and managed in the data center (preferably virtual cloud based data centers) and will be shared through educational resource sharing platform.

However, Implementation of ICT in MOE has not been very successful so far. Multiple attempts have been made to implement Education Management Information System properly, but MOE is still to use online collection of the trimester data which is to be reported by schools.

Improvements and Outputs

The main goal of e-Education is to use ICT to improve capacity development (CD) process. Extensive use of ICT in MOE will increase the capability of MOE decision making and monitoring and evaluation activity.

ICT in Education should be implemented fully to provide learning contents to remote part of country via Community/tele centers.

At present, accurate information about school and students are collected trimester and data is used to generate EMIS. There is very little use of ICT in education so far, however ICT in Education Master Plan (2013-2017) envisages use of ICT in learning process with content development and make them available to students and teacher.

Availability of book to school students in remote areas of the country has always been a problem, hence launching e-Book and making them available in school or community centers/tele-centers will be extremely useful and cost effective.

NCED portal should be enhanced to include more learning material for teacher to learn teaching methods and other self-learning content.

OCE portal should include mechanism to receive application for certificates and mark-sheets as G2C services. It should also have online result dissemination system. The medium of information inputs and dissemination could be computers, laptops, PSTN phones, mobile phones, FM radio stations, e-books etc.

Information can be designed to be hosted in multi-languages as far as possible so that language should not be a barrier to any citizen for accessing information.

Implementation Strategy

The major work in e-Education will be contents as far as e-learning are concerned. For M&E web based application should be developed to collect timely and accurate information collection from schools, DEO and RED. Web portal should be developed to disseminate information and for G2G and G2C services. The e-Education portal will also be made available through the Government Portal.

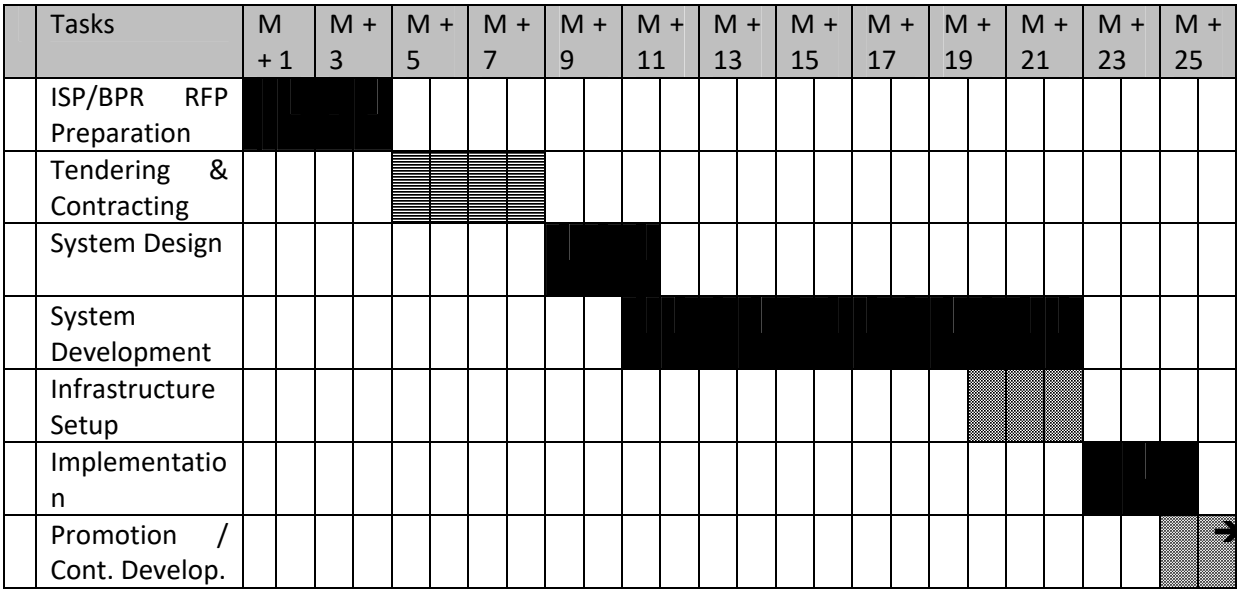
Information System Planning (ISP) and Business Process Re-engineering (BPR) should be carried out for detailing the work and identifying the best implementation strategy.

System design of the frameworks and the knowledge base for the first phase will be carried out and application will be developed based on n-tier SOA architecture compatible with Government Enterprise Architecture. To reduce the cost of implementation application can be hosted in Government Cloud if it becomes available.

Development of the frameworks and the contents will be accomplished as per the system design and Testing will be adequately done before implementation of the system.

Work Plan

Detailed work for the implementation of **e-Education** is as follows: Each column in Time Scale is one month.



Cost Estimates

The following will be the budget estimates for the e-Education project:

Project Cost Estimates (e-Education)

Types of Service	Calculation Basis	Miscellaneous	Amount (in NRs)
ISP/BPR & RFP Preparation	1 x TL x 3pm, 1 x SA x 3pm	500000	2,900,000
Tendering & Contracting		1000000	1,000,000
System Design	1 x TL x 1pm, 1 x SArch x 2pm, 1 x SA x 3pm, 1 x SE x 2pm, 1 x DBA x 1pm, 1 x DE x 1pm	500000	3,950,000
System Development	1 x TL x 3pm, 1 x SArch x 2pm, 1 x SA x 6pm, 1 x DBA x 1pm, 6 x SE x 10pm, 2 x QA x 6pm,, 1 x DE x 4pm	1000000	20,400,000
Infrastructure Setup	3 Servers/DC, 3 Servers/Backup, 3 Servers/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	40000000	40,000,000
Implementation (Training, Installation & Commissioning, Data Migration)	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 2pm, 1 x DBA x 2pm, 3 x SE x 3pm, 2 x QA x 2pm, 1 x DE x 2pm, 1 x SysE x 2pm, 5 x DC x 2pm	1200000	7,800,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 6pm, 1 x QA x 2pm, 1 x DE x 1pm, 1 x SysE x 4pm	1000000	6,650,000
Total			**82,700,000**

Expected Outcomes

The following are some of the outcomes of the implementation of e-Education:

- MOE will have accurate and timely database of school and teachers for better decision making and monitoring.
- Students will have learning tools available in internet.
- School student will have access to e-Book and e-library either in school or in community centers/ tele-centers.
- Teacher will be able to access to teaching methods in web portal.
- Students will be able to apply for certificates and mark-sheets via web portal.
- MoE will have strong planning and monitoring capability.
- Examination processing will be done in time.

E-Health

Introduction

A saying that 'Health is Wealth' is very much true for any country. A state wants good health for its citizens in order to accumulate wealth for the advancement of the nation. ICT can be an effective tool to store and access health related information which can be generated and used by all its stakeholders and also can be used to effective service delivery of health services to every citizen through the use of Telemedicine.

Ministry of Health & Population (MoHP)[9] plays a leading role in improving the health of the people including mental, physical and social well-being, for overall national development with the increased participation of the private sector and non-government institutions in the implementation of programs. The Ministry is also responsible to make necessary arrangements and formulate policies for effective delivery of curative services, disease prevention, health promotion activities and establishment of a primary health care system.

The following are some of the government organization units that are working for the development of the sector under MoHP:

- Department of Health Services (DoHS)[10]
    - The overall purpose of the Department of Health Services (DoHS) is to deliver preventive, promotive and curative health services throughout Nepal. The following are the tasks of DoHS:
    - To provide GoN with necessary technical advice in formulating health related policies, develop and expand health institutions established in line with these policies.
    - To determine requirement of manpower for health institutions and develop such manpower by preparing short and long term plans.
    - To ensure supply of drugs, equipment, instruments and other material at regional level by properly managing these resources.
    - To mobilize assistance in the implementation of approved programs by preparing, asking for preparation of objective programs related to various aspects of public health (family health, family planning, child health, infectious disease control, eradication of malnutrition, control of AIDS and STDs).
    - To manage the immediate solution of problems arising from natural disasters and epidemics.
    - To establish relationships with foreign countries and international institutions with the objective of enhancing effectiveness and developing health services and assist the Ministry of Health in receiving foreign aid by clearly identifying the area of cooperation.

[9] http://mohp.gov.np/
[10] http://dohs.gov.np/#

- To create a conducive atmosphere to encourage the private sector, non-governmental organizations and foreign institutions to participate in health services, maintain relation and coordination, control quality of health services by regular supervision and inspection.
- To systematically maintain data, statements and information regarding health services, update and publish them as required.
- To fix designated positions of employees up to 2nd class, inter-directorate transfer, initiate departmental action and provide reward, etc.
- To clear audit irregularities of central level offices, projects and regional level offices.

- Department of Ayurveda[11]
  - DoA has similar objectives as DoHS in the field of Ayurveda and Homeopathy.

- Department of Drug Administration (DDA)12
  - DDA regulates all functions relating drug like misuse and abuse of drugs and its raw materials, to stop false and misleading advertisement and make available safe, efficacious and quality drug to the general public by controlling the production, marketing, distribution, sale, export-import, storage and use of drugs.

MOHP has the following centers for the improvements of the Health sector:

- **National Health Education, Information and Communication Centre (NHEICC)**
- **National Health Training Center (NHTC)**
- **National Center for AIDS and STD Control (NCASC)**
- **National Tuberculosis Center (NTC)**
- **National Public Health Laboratory (NPHL)**

Associated with MoHP, there are the following councils for the improvement of the quality of health professionals and other research activities:

- **Nepal Medical Council (NMC)**
- **Nepal Health Research Council (NHRC)**
- **Nursing Council**
- **Council of Paramedics**
- **Ayurvedic Council**

G2C applications in e-Health should benefit citizens, health workers, health professionals, doctors, investors to health sector etc. G2B applications in e-Health should benefit businesses related with health, drugs such as hospitals, pharmacies, drug importers, pharmaceutical industries, insurance companies, councils etc.

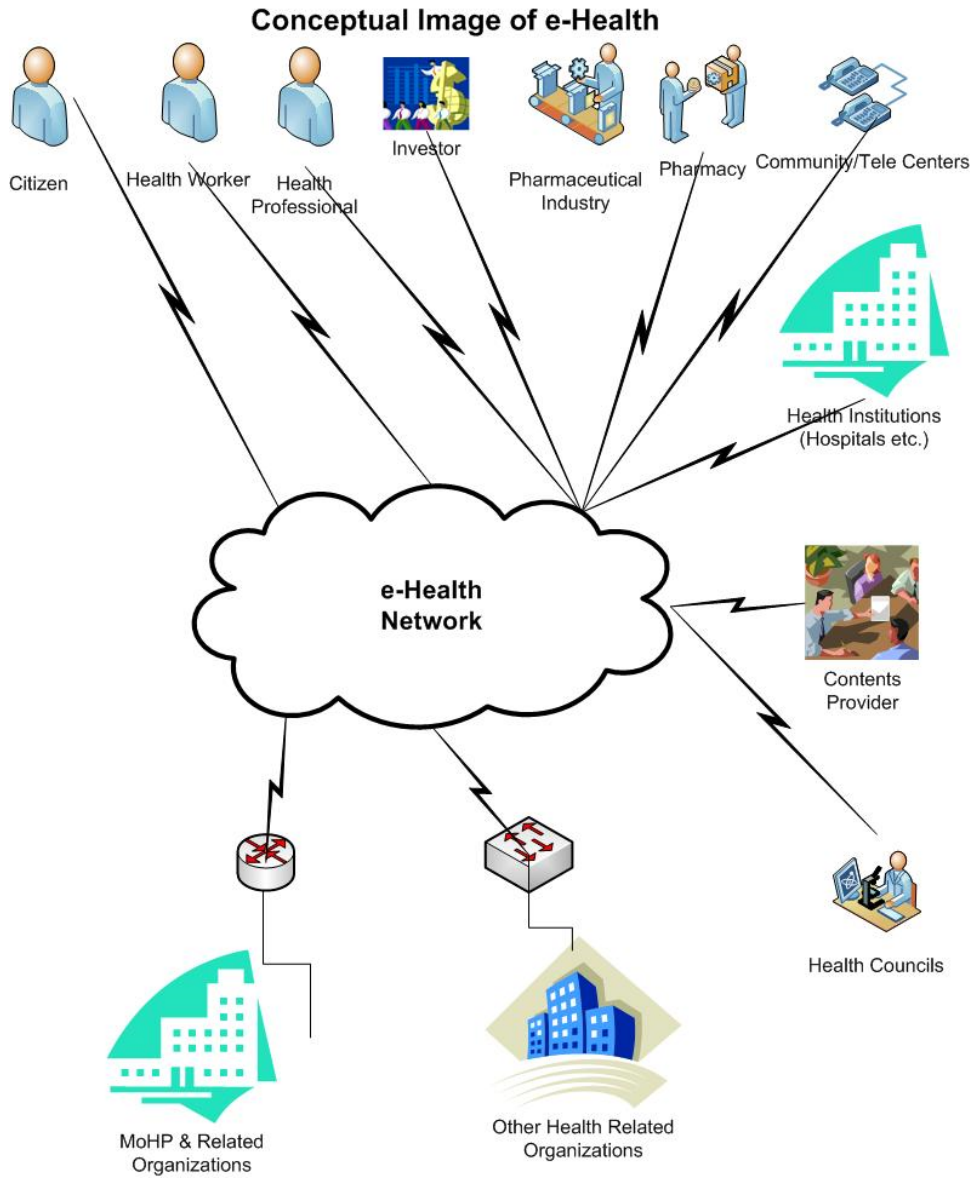
[11] http://www.mohp.gov.np/index.php/2014-03-21-09-41-44/dept-of-ayurveda-doa
[12] http://dda.gov.np/index.php

Functionalities constituting the e-Health will be as follows (but not limited to):

- Health Service Information System
- Registration of Hospitals, Nursing Homes
- Registration of Health Professionals (Doctors, Health Workers)
- Health Management Information System (Health forecasts, Health Statistics)
- Online/Onsite Expert Advice Service/Telemedicine

Conceptual Overview

E-Health has been envisaged as G2C/G2B activities where there can be maximum engagements between GON organizations with Citizens and Businesses in general. The following figure depicts the conceptual image of e-Health:



Current Situation

Health Sector Information System

Health Management Information Section under Department of Health Services (DoHS) manages health service information from community to the DoHS through predefined process and procedure. This system is almost 19 years old, although robust and well set, that provides the basis for planning, monitoring and evaluation of Health system at all levels. The major functions of the HMIS are:

- To collect and manage the health service delivery information for all level of health service delivery outlets including services at the communities by Female & Child Health Volunteers (FCHVs) and community level health workers.
- To verify, process, analyze the collected data and operate data bank.
- To provide feedbacks on achievements, coverage, continuity and quality of health services to programs divisions/centers, RHDs, hospitals and district public/health offices
- To draw indicators and relevant information and support to the program management
- To disseminate health information through efficient methods and technologies
- To publish a comprehensive Annual Report of Department of Health Services
- To develop competent human resource for Health Information Management System

The poor performance of recording and reporting tools and processes, lack of intended infrastructure and resource constraint are the restraints to bringing out expected results.

Health Infrastructure Information System (HIIS)

HIIS has been incepted and is in the process of institutionalization in the health system. This is guided by NHSP, periodic Development Plans, Health Sector Information System-National Strategy (HSIS-NS) and information, Communication and Technology Policy of the Government of Nepal. This adoption is also reinforced by e-health, Health GIS and the need for integration of information systems. Health Facility Mapping Survey (HFMS) has been carried out in 57 districts with technical and financial support from WHO and further processing for remaining 18 districts is ongoing. The completion of this survey is expected to result in geographic feature embedded planning, monitoring and evaluation in the health system.

Digital Library

MoHP is expected to disseminate new knowledge, promote learning and build national consensus on health sector policy options for scaling up health services. An essential framework to support this work is an efficient and effective information system that provides easily accessible information to policy makers, donor partners and the general public. The digital library contains a searchable catalogue of over 2983 copies of documents and a searchable database of 551 full text documents. Most of the key policy documents and health acts are available in Nepali and officially translated into English.

Other systems that are being implemented under MoHP are:

- Planning and Financial Management Information System (TABUCS)
- Human Resources Development Information System

All these systems are running in isolation and are not integrated.

Improvements and Outputs

The main goal of e-Health is to create an electronic platform where health information can be shared between Government, Health Institutions, Health Professionals, Citizens and Investors for the overall improvement of the sector and for a win/win situation to all the stakeholders in the value chain. Health related information from health resources, drugs related information, health statistics, and notices from authorities can be shared among the stakeholders. Telemedicine can also solve many patient requirements for early diagnosis of disease and subsequent early intervention.

At present, there are many information islands in the forms of separate systems associated with different Government units, other stakeholders. Information islands will be brought to a single portal and hence it will be easier to look for related information and utilizing it to maximization of profits by all stakeholders.

The medium of information inputs and dissemination could be computers, laptops, PSTN phones, mobile phones, FM radio stations, e-books etc.

Information can be designed to be hosted in multi-languages as far as possible so that language should not be a barrier to any citizen for accessing information. Information can be designed to be hosted in various forms: textual, audio, video so that it can be utilized by all people. Similarly mobile apps can be developed and utilized by all the stakeholders always to keep the information at their fingertips.

A mechanism to collect the correct information, its verification, processing, dissemination related with health driven by a web portal will be designed, developed and implemented.

Implementation Strategy

The major chunk of work in e-Health will be contents and its framework development. A framework to host all the components of e-Health with some of the components of the contents will be incorporated in the first phase. The contents development will be continuous work and is needed to be carried out in an ongoing manner and should be coordinated by DoHS & DoA under Ministry of Health & Population (MoHP). The e-Health portal will also be made available through the Government Portal.

Information System Planning (ISP) and Business Process Re-engineering (BPR) should be carried out for detailing the work and identifying the best implementation strategy.

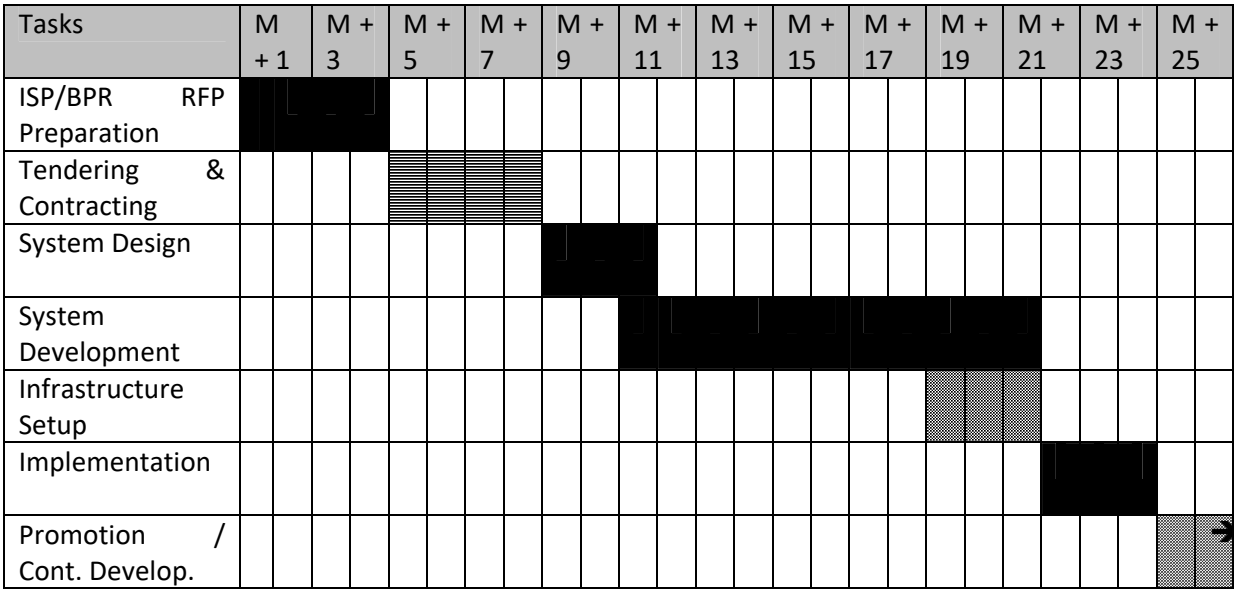
System design of the frameworks and the knowledge base for the first phase will be carried out and application will be developed based on n-tier SOA architecture.

Development of the frameworks and the contents will be accomplished as per the system design and Testing will be adequately done before implementation of the system.

Implementation should not be just done technically but there should be sufficient care in promoting the contents to the citizens/businesses at the local level to make use of the available system effectively. Sufficient promotion of the system developed showing its advantages should be proliferated from different communication channels/mediums including TV, Radio, and Newspapers making use of the state-of-the-art systems.

Work Plan

Detailed work for the implementation of **e-Health** is as follows: Each column in Time Scale is one month.



Cost Estimates

The following will be the budget estimates for the e-Health project:

Project Cost Estimates (e-Health)

Types of Service	Calculation Basis	Miscellaneous	Amount (in NRs)
ISP/BPR & RFP Preparation	1 x TL x 3pm, 1 x SA x 3pm	500000	2,900,000
Tendering & Contracting		1000000	1,000,000
System Design	1 x TL x 1pm, 1 x SArch x 2pm, 1 x SA x 3pm, 1 x SE x 2pm, 1 x DBA x 1pm, 1 x DE x 1pm	500000	3,750,000
System Development	1 x TL x 3pm, 1 x SArch x 2pm, 1 x SA x 6pm, 1 x DBA x 1pm, 4 x SE x 10pm, 2 x QA x 5pm,	1000000	16,000,000
Infrastructure Setup	3 Servers/DC, 3 Servers/Backup, 3 Servers/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	30000000	30,000,000
Implementation (Training, Installation & Commissioning, Data Migration)	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 2pm, 1 x DBA x 2pm, 3 x SE x 2pm, 2 x QA x 2pm, 1 x DE x 2pm, 1 x SysE x 2pm, 5 x DC x 2pm	1200000	7,200,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 6pm, 1 x QA x 1pm, 1 x DE x 1pm, 1 x SysE x 4pm	1000000	6,450,000
Total			**67,300,000**

Expected Outcomes

The following are some of the outcomes of the implementation of e-Health:

- Citizens will be better informed on health & drugs related information and statistics.
- Citizens will get online including telemedicine/onsite support from respective health professionals for the information, intervention for any health related matters.
- Investors in health sector will be better organized with market information.
- Government will be able to take early preventive measures as well as remedial measures in health related sector.

E-Tourism

Introduction

Travel and Tourism represents an increasingly important sector of the Nepalese economy. The tourism industry has experiencing rapid growth and has been identified as a key driver of growth in the services sector. The industry continues to be a key foreign exchange earner, contributing to GDP (gross domestic product) growth, investment and employment generation as well as strengthening the services account of the balance of payments. The expansion of the industry also has an effect on the growth of other related service industries, particularly food and beverages, accommodation, transport, entertainment, shopping and other small and medium-sized industries.

The market for tourism relies on Information and Communication Technologies (ICT) contributing immensely to the tourism business. ICT, especially the Internet, have substantially changed the playing field for tourism stakeholders, providing new challenges and opportunities in promoting and selling their products and services. The Internet has also dramatically changed the way in which consumers / citizens (national and international) plan, buy and process their holidays. Using ICT to exchange information about products and services enables all actors involved in tourism to be aware of services offered.

In Nepalese economy, travel and tourism sector's total contribution is 9.8% to the national GDP and 8.5% in the employment respectively[13]. Tourism is a priority sector for the development of the country. Ministry of Culture, Tourism and Civil Aviation (MoCTCA) and Ministry of Home Affairs (Department of Immigration) are the responsible organization for the development of tourism sector. The following are some of the government organization units that are working for the development of the sector under MoCTCA and MoHA:

- Civil Aviation Authority of Nepal (CAAN)
- Nepal Tourism Board (NTB)
- Nepal Airlines Corporation (NAC)
- Nepal Academy of Tourism and Hotel Management (NATHM)
- Lumbini Development Trust
- Pashupati Area Development Trust

Nepal Tourism Board (NTB)

Nepal Tourism Board is a national organization established in 1998 by an act of Parliament in the form of partnership between the Government of Nepal and private sector tourism industry to develop and market Nepal as an attractive tourist destination. The Board provides platform for vision-drawn leadership for Nepal's tourism sector by integrating Government commitment with the dynamism of private sector. NTB is promoting Nepal in the domestic and international market

[13] World Travel and Tourism Council (WTTC), Travel and Tourism Economic Impact 2013 for Nepal

and is working toward repositioning the image of the country. It also aims to regulate product development activities.

Objectives of Nepal Tourism Board (NTB)

- To introduce Nepal in the International arena by developing it as a fascinating tourist destination.
- To develop, expand and promote tourism business upon protecting and promoting natural and cultural heritage, and environment of the country.
- To create maximum employment opportunities by increasing national production and foreign currency earning through the development, expansion and promotion of tourism.
- To establish Nepal's image in a high and dignified way in the international tourism community by developing Nepal as a safe, reliable and attractive tourist destination.
- To conduct or cause to be conduct functional research, as per necessary, for finding out ways and means to solve problems encountered in tourism sector so as to provide qualitative service s to the tourist.
- To assist in establishing and developing institutions necessary for tourism development.

MoCTCA is also responsible with the following Institutions which are related with the Tourism

- Department of Archeology
- National Archives
- National Museum
- Patan Museum
- National Art Museum, and other Cultural and Heritage (including world Heritage sites) development and presentation committees

Some other Tourism Related Institutions besides MoCTCA and its subsidiary organizations are as follows:

- Department of Immigration (DOI), Ministry of Home Affairs (MoH)

The Immigration Acts, the Immigration Rules, and the Immigration Procedures have the followings dispensation for the regulation of the movements of foreigners and Nepali nationals into and from Nepal, for which Department of Immigration is responsible for the followings:

A. Department of Immigration

- Tourist Visa Extension
- Non Tourist Visa (Business, Study, Marriage, working and Residential)
- Trekking Permits
- Authentication of arrival and departure
- Criminalization on violation of immigration laws

B. Immigration Offices

- On arrival Tourist Visa

- Arrival Registration
- Departure Registration

G2C, G2B and G2G applications in e-Tourism should benefit Tourists (national, regional and international), tourism related businesses or entrepreneurs and investors, tourism related citizens (professionals, employees and laborers etc. G2B applications in e-Tourism should benefit businesses related with tourism which are tour and travel operators, hotels, travel and trekking agents, airline operators, passenger transporters, souvenir and handicrafts resellers and stockiest etc.

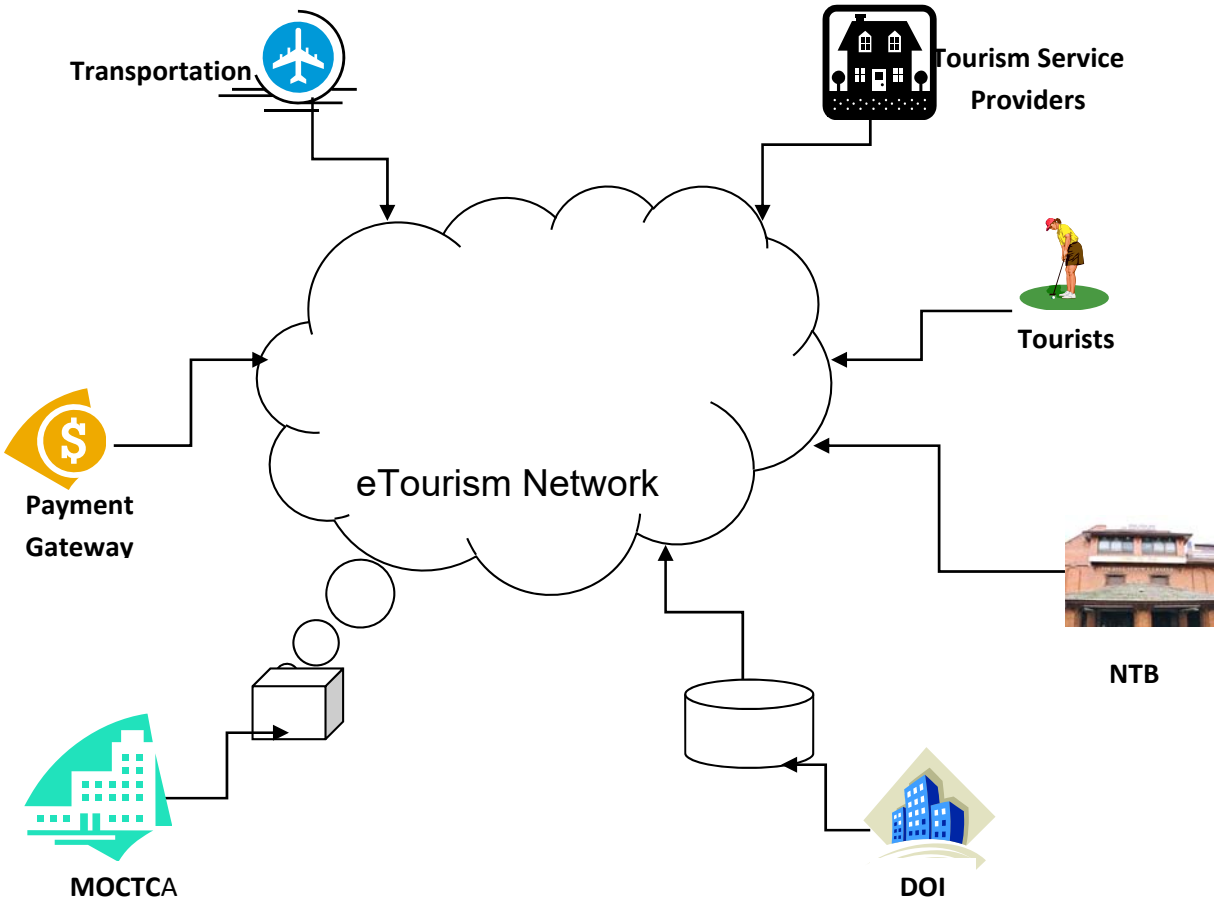
Functionalities constituting the e-Tourism will be as follows (but not limited to):

- Tourist Information System (TIS) – National Tourism Portal: robust, enhanced and integrated eTourism Portal serving all the stakeholders relating to tourism in Nepal serving not only the end users. Tourists (citizens, international as well as national), but the whole spectrum of tourism research, planning, business development and much more. The portal is also expected to take feed-in from the following systems.
- Tourism Permit Management System (Trekking, Mountaineering etc.) would be a separate system and also to be integrated with the National Tourism Portal.
- Tourism Business Registration and Accreditation System, inclusive of including but not limited to Hotels/Restaurants, Homestay and Other Service Providers
- Registration of Tourism Professionals/Workers, Tour guides etc.
- Immigration Management System, electronic or online visa management and award system (e-Visa).
- Embarkation/Disembarkation Records – Tourist Information Management and dissemination, this would also be feeder system for TIS.

Moreover, tourism business to flourish, ePayment gateway is essential, which yet to be implemented in Nepal, the eTourism conceptual framework displays ePayment Gateway, however the infrastructure needed for eTourism to be dealt by the separate agency, but the line ministry needs to lobby for the establishment of the ePayment infrastructure. E-Tourism vision will be incomplete without the electronic payment system is ready in the country.

Conceptual Overview

E-Tourism has been envisaged as G2C/G2B/G2G activities where there can be maximum engagements between GON organizations with Citizens (National or International) and Businesses in general. The following figure depicts the conceptual image of e-Tourism:



Current Situation

There exists multiple and widespread tourist information system and portal in Nepal. The main official government tourist portal is maintained by Nepal Tourism Board (welcomenepal.com). Other citizen / tourist interest websites maintained by Government are www.Tourism.gov.np maintained by Ministry of Culture, Tourism and Civil Aviation (MoCTCA), www.Nepalimmigration.gov.np maintained by Department of Immigration and Government portal of Nepal (www.Nepal.gov.np).

Private sector maintained are also of immense information, some of the notable sites are:

- www.Tourism-Nepal.net
- www.NepalTourismDirectory.com
- Village Tourism Forum Nepal www.VITOFNepal.org
- www.VisitNepal.com
- www.IncredibleNepalTourism.com
- www.See-Nepal.com
- www.NepalTourismPackage.com

There have been multiple instances of Government, Funding Agencies and even private sector that have attempted to create an automated electronic system for tourism but it has not been successful and integrated so far. The main reason for not being able to come up with the robust tourism related portal and process automation is not the technology; the real challenge is to sustain the system and the resources of maintaining the system long after it is first implemented.

In today's scenario, tourism information and processes is segregated as separate islands of information, updating of information is not regular and hence available information are also not up-to-date. One of the reason for information being not up-to-date in the Government information system is that the information are not created from the natural e-transactions that may take place amongst the information creators and services provided by Government.

Improvements and Outputs

The main goal of e-Tourism is to create an electronic platform where tourism information and processes can be shared between Tourists, Government, Tourism business and Citizens for the overall improvement of the sector and for a win/win situation to all the stakeholders in the value chain.

Tourism related information from country of origin, travel processing, during travel to departure should be able to be shared among the tourism stakeholders as per the need of the actors in the tourism business ecosystem.

At present, there are many information islands in the forms of separate systems associated with different Government agencies and other stakeholders. Information islands will be brought to a single portal and hence it will be easier to look for related information and utilizing it to maximization of profits by all stakeholders.

The medium of information inputs and dissemination could be Internet, mobile and PSTN phones, Televisions, FM radio stations, e-books etc.

Information can be designed to be hosted in multi-languages as far as possible so that language should not be a barrier to any tourists / citizen for accessing information. Information can be designed to be hosted in various forms: textual, audio, video so that it can be utilized by all people. Similarly mobile apps can be developed and utilized by all the stakeholders always to keep the information at their fingertips. Targeted mobile apps for specific tourist products and service could play catalytic role in the promotion of tourism business in the country.

A mechanism to collect the correct information, its verification, processing, dissemination related with tourism driven by a web portal will be designed, developed and implemented.

Identified eTourism Projects

- Tourist Information System – enhanced and integrated eTourism Portal
- Tourism Permit Management System (Trekking, Mountaineering)
- Business Registration of Hotels/Restaurants, Other Service Providers /Homestay

- Registration of Tourism Professionals/Workers
- Immigration Management System/(e-Visa)
- Embarkation/Disembarkation Records

Implementation Strategy

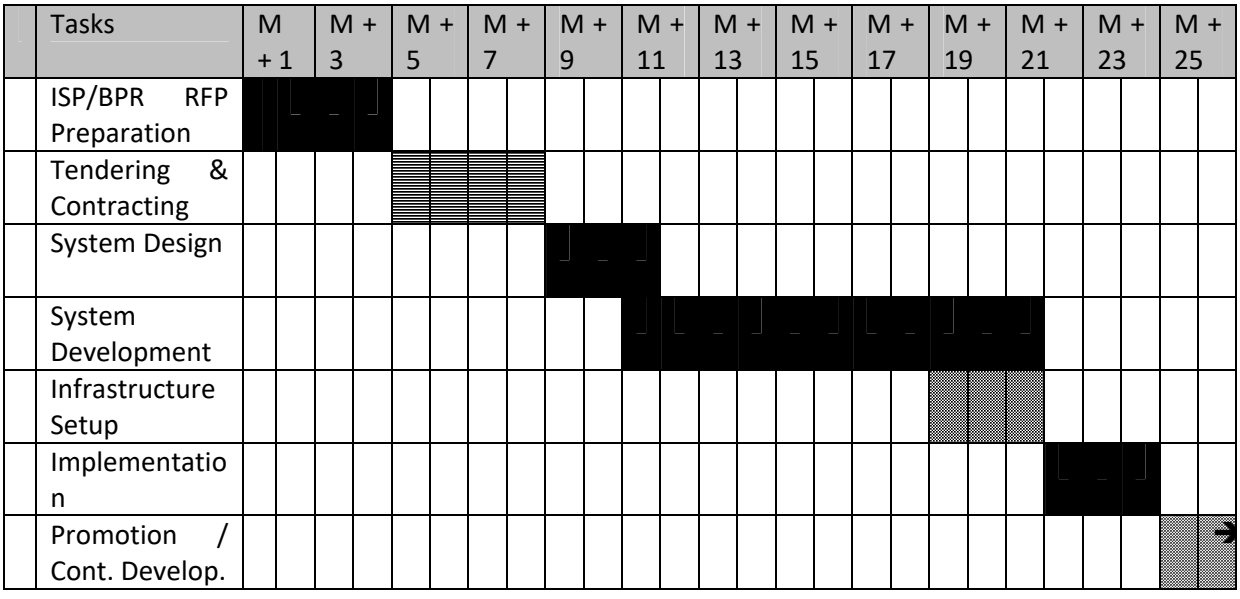
The major chunk of work in e-Tourism will be tourist process simplification, contents and its framework development. A framework to host all the process of e-Tourism with some of the components of the contents will be incorporated in the first phase. The contents development will be continuous work and is needed to be carried out in an ongoing manner and should be coordinated by Nepal Tourism Board with Ministry of Culture, Tourism and Civil Aviation (MoCTCA) and Department of Immigration. The e-Tourism portal will also be made available through the Government Portal.

Information System Planning (ISP) and Business Process Re-engineering (BPR) should be carried out for detailing the work and identifying the best implementation strategy. System design of the frameworks and the knowledge base for the first phase will be carried out and application will be developed based on n-tier SOA architecture. Development of the frameworks and the contents will be accomplished as per the system design and Testing will be adequately done before implementation of the system.

Implementation should not be just done technically but there should be sufficient care in promoting the contents to the citizens/tourists/businesses at the local and international level to make use of the available system effectively. Sufficient promotion of the system developed showing its advantages should be proliferated from different communication channels/mediums including Internet, TV, Radio, Newspapers making use of the state-of-the-art systems.

Work Plan

Detailed work for the implementation of e-Tourism is as follows:



Cost Estimates

The following will be the budget estimates for the e-Tourism project:

Project Cost Estimates (e-Tourism)

Types of Service	Calculation Basis	Miscellaneous	Amount (in NRs)
ISP/BPR & RFP Preparation	1 x TL x 3pm, 1 x SA x 3pm	500000	2,900,000
Tendering & Contracting		1000000	1,000,000
System Design	1 x TL x 1pm, 1 x SArch x 2pm, 1 x SA x 3pm, 1 x SE x 2pm, 1 x DBA x 1pm, 1 x DE x 1pm	500000	3,750,000
System Development	1 x TL x 3pm, 1 x SArch x 2pm, 1 x SA x 6pm, 1 x DBA x 1pm, 4 x SE x 10pm, 2 x QA x 5pm,	1000000	16,000,000
Infrastructure Setup	3 Servers/DC, 3 Servers/Backup, 3 Servers/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	30000000	30,000,000
Implementation (Training, Installation & Commissioning, Data Migration)	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 2pm, 1 x DBA x 2pm, 3 x SE x 2pm, 2 x QA x 2pm, 1 x DE x 2pm, 1 x SysE x 2pm, 5 x DC x 2pm	1200000	7,200,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 6pm, 1 x QA x 1pm, 1 x DE x 1pm, 1 x SysE x 4pm	1000000	6,450,000
Total			**67,300,000**

Expected Outcomes

The following are some of the outcomes of the implementation of e-Tourism:

- Tourists / Citizens will be better informed on Tourism (International and domestic) related information.
- Tourists / Citizens will get online/onsite support and approval from respective agencies for the information, process, permits etc.
- Investors in tourism industry will be better organized with tourism sector information.
- Government will be able to forecast more accurately for the development and deployment of tourism infrastructure and services.
- Most efficient medium for the promotion of Tourism in the country

Government Cloud

Introduction

Cloud computing is a type of computing that relies on *sharing computing resources* rather than having local servers or personal devices to handle applications. In cloud computing, the word cloud is used as a metaphor for "*the Internet*," so the phrase *cloud computing* means "a type of Internet-based computing," where different services such as servers, storage, processing and applications are delivered to an organization's computers and devices through the Internet. Cloud computing is comparable to grid computing, a type of computing where unused processing cycles of all computers in a network are harnesses to solve problems too intensive for any stand-alone machine. Governance and security are crucial to computing on the cloud, whether the cloud is in your company's firewall or not.

Major three cloud computing service models are as below.

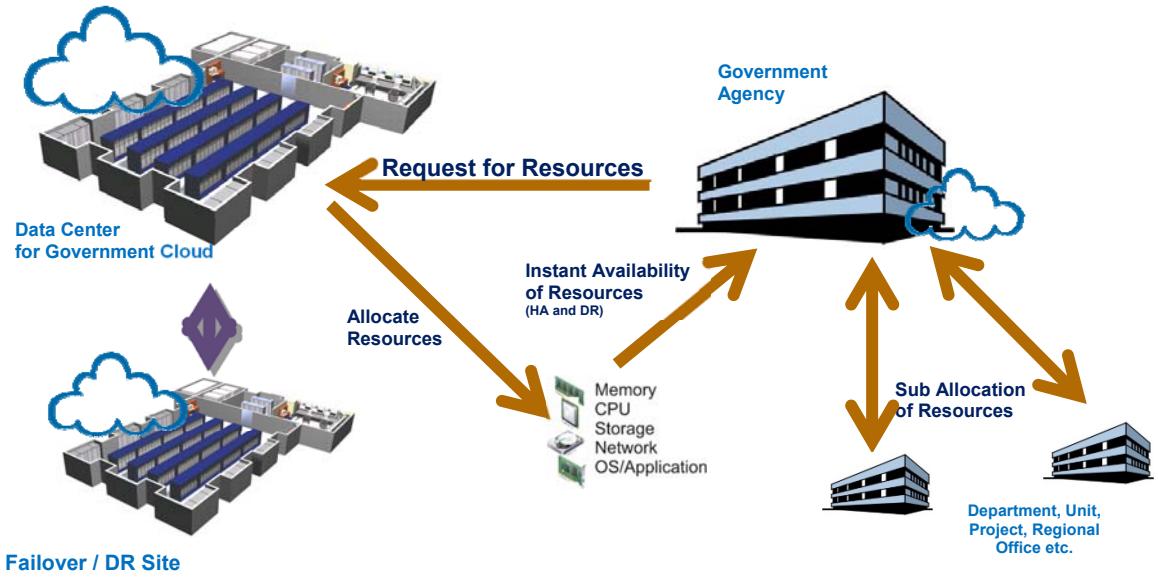
- **Infrastructure as a Service (IaaS).** The IaaS layer offers storage and compute resources that developers and IT organizations can use to deliver business solutions. Infrastructure as a Service is the delivery of computer hardware (servers, networking technology, storage, and data center space) as a service. It may also include the delivery of operating systems and virtualization technology to manage the resources.

- **Platform as a Service (PaaS)**. The PaaS layer offers black-box services with which developers can build applications on top of the compute infrastructure. This might include developer tools that are offered as a service to build services, or data access and database services, or billing services.

- **Software as a Service (SaaS)**. In the SaaS layer, the service provider hosts the software so users don't need to install it, manage it, or buy hardware for it. All you have to do is connect and use it. SaaS Examples include customer relationship management as a service.

Conceptual Overview

- Government Integrated Cloud Infrastructure provides means to share IT resources on demand by various government organizations from a central pool of IT resources using cloud technology.
- IT resources are implemented and managed centrally, which will provide on demand computing resources to government organizations
- Government agencies/organizations will request for IT resources to the Central Cloud Service Provider and the Service Provider will provide resources instantly with required Memory, CPU, Storage, Network as well as OS and Applications



The Government Agency/Organization can in turn sub allocate the resources to Agencies/Organizations under its domain or to various projects on-need basis Functions.

Current Situation

- Each government agency procures its own hardware and software and usually requires a long time to complete the process. The equipment and services procured through this process is carried out on a competitive basis but price plays a key role. Hence, portions of the spending being spent on IT are being duplicated across organizations. Similarly, each additional IT system also requires support and sustainability mechanism, which is not present in most of the implementations and leads to failure in continuity of a system. In most of the organized maintenance, support service and subscription renewals are not prioritized.
- The spectrum of IT has become vast and suddenly IT personnel are required to manage and maintain broad range of components, whether the deployment is small or large and these components. This requires a big team of IT personnel, which is not possible in each and every organization of Nepal government.
- Scaling up of resources as-and-when required is not always possible in most of the cases, each additional application or IT project is adding more resources without fully utilizing existing resources. On the other hand Business continuity with IT services continuity and disaster recovery do not exist when required solutions are sought for each component of the system.
- Proprietary systems are being introduced, tying up systems to a single vendor solution, this vendor lock results in higher cost in the future. Solutions are built around hardware and are mostly vendor centric. Standards are not followed and national standards do not exist.

Finally, Government Integrated Data Center (GIDC) exists as a focal organization for data center services. It provides co-location services as well as domain registration and hosting services as managed services. GIDC currently does not provide managed computing resources.

Improvements and Outputs

The Government has already invested in core ICT infrastructure build-up. The Government Cloud can initially be built on the existing infrastructure, or by its augmentation. Cloud computing will enable optimum utilization of this infrastructure and reduce duplication of cost and effort.

Applications developed by one entity (for e.g. government departments and private organizations) can be made available on the e-Gov AppStore. These applications can be deployed and re-used by other departments with the required customizations. As a result government departments will have the freedom to focus on their core objectives including policy, programs and process improvements or new applications development where a similar application does not already exist.

The Government Cloud will provide a single directory of services providing integrated visibility and control helping departments to dispense with the requirement of lengthy procurement and maintenance of ICT infrastructure, an exercise which many find difficult to perform.

Applications and infrastructure deployed on the common Government Cloud platform can take advantage of the virtualized nature of the cloud to scale as required. This essentially becomes more useful for applications where there is a burst of demand for ICT resources at regular intervals.

Faced with the continued budget challenges all government departments need to find ways to deliver their services to citizens and business as economically as possible without compromising the achievement of desired outcomes. Government Cloud shall provide the framework for government department to enable roll out of such services much faster compared to current the traditional mode. Easy and quick access to ICT resources will lead to a faster and more agile service delivery of citizen-centric services by the government.

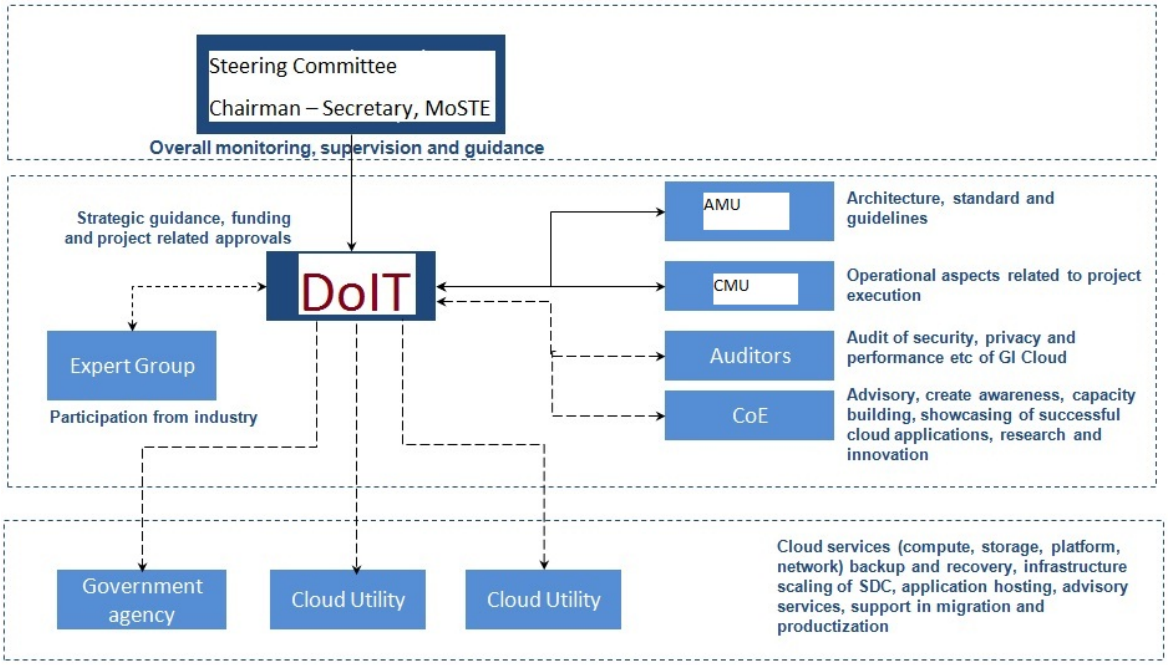
A security framework for the entire Government Cloud will lead to less environmental complexity and less potential vulnerability. This will also help bring out the essential interoperability across various cloud environments in the country.

The pay-per-use model of pricing in cloud will ensure that ICT resources and applications are made available without significant investment in infrastructure purchase and maintenance. Ease of procurement of software as a service provides an opportunity to agencies going for first time automation to leapfrog as they can buy services directly without going through the entire IT evolution cycle.

Since most cloud offerings are based on prebuilt standardized foundation of technology that facilitates better support, Government Cloud will reduce government's effort in managing technology. Easy provisioning of computing resources will ensure more consistent technology upgrades and expedite fulfillment of IT resource requests. Cloud will facilitate user mobility and collaboration through shared data and applications stored in the cloud when authorized – anytime, anywhere availability.

There are outstanding issues that are being faced and dealt by all government departments in order to maintain the reliability, portability, security, privacy, and citizen-confidence & trust in government services. Government Cloud shall prescribe the standards around interoperability, integration, security, data security and portability etc. Government Cloud shall consist of framework for citizen services to comply with standard practices, eliminate vendor lock-in scenarios, etc.

Implementation Strategy



The institutional set up for GI Cloud is represented in the figure above. It consists of the following:

- Steering Committee
- DoIT will be the administrative department responsible for implementation and monitoring of the entire Government Cloud initiative and assisted by Expert Group, CoE, Auditors, and Cloud Management Office etc.
- Expert Group

Steering Committee

- The Steering Committee for Government Cloud is a committee with decision making and approval authority formed under the Chairmanship of Secretary, MoSTE, with representation from ministries and other government entities. The Steering Committee will be serviced by DoIT.
- Major functions of the Steering Committee will include the following:
    - Setting vision
    - Providing strategic/regulatory direction and guidance to stakeholders
    - Laying down common set of guidelines and standards for Government Cloud
    - Dispute resolution and timely intervention as and when required

Department of Information Technology (DoIT)

- It is envisaged that the DoIT will primarily have three functions –operational management, architecture guidelines and standards creation. Separate specialized units will be established, viz. the Architecture Management Unit (AMU) to assist in formulation of architecture guidelines and

standards and Cloud Management Unit (CMU) responsible for management and monitoring of the entire Government Cloud initiative. DoIT will function under the strategic guidance of the Steering Committee and will have the following major functions:

- Steer the Government Cloud initiative
- Demand assessment for the Government Cloud
- Provide seed funding to the agencies for establishment of the National Clouds and the Cloud Utilities
- Monitoring and supervision of the operations of AMU and CMU
- Approval where required for hosting applications on the eGov AppStore
- Capacity building, change management and awareness creation exercise

Cloud Management Unit (CMU)

- The CMU will act as a Program Management Office of DoIT and will closely work with AMU, the government agency and the respective Cloud Utilities to ensure smooth implementation and operations of the Government Cloud eco-system. The CMU will report directly to DoIT and will help in co-ordination, management and monitoring of the entire Government Cloud initiative. Major functions of CMU include the following:
- Handling of day-to-day operational aspects related to project execution
- Defining the operational model for all Cloud Utilities
- Conduct follow-ups, monitoring progress and regular reporting to the Empowered Committee

Architecture Management Unit (AMU)

- In order to assist DoIT to realize the complete architecture vision of Government Cloud and ensure standardization across technology, platform and standards the AMU will be established.
- The AMU will define and implement architecture guidelines and standards specific to GI Cloud. Major functions of AMU include the following:
- Developing the Government Cloud reference architecture
- Defining guidelines for new application development, architecture, standards, RFP, SLA, contract management etc. in consultation with industry and based on international best practices

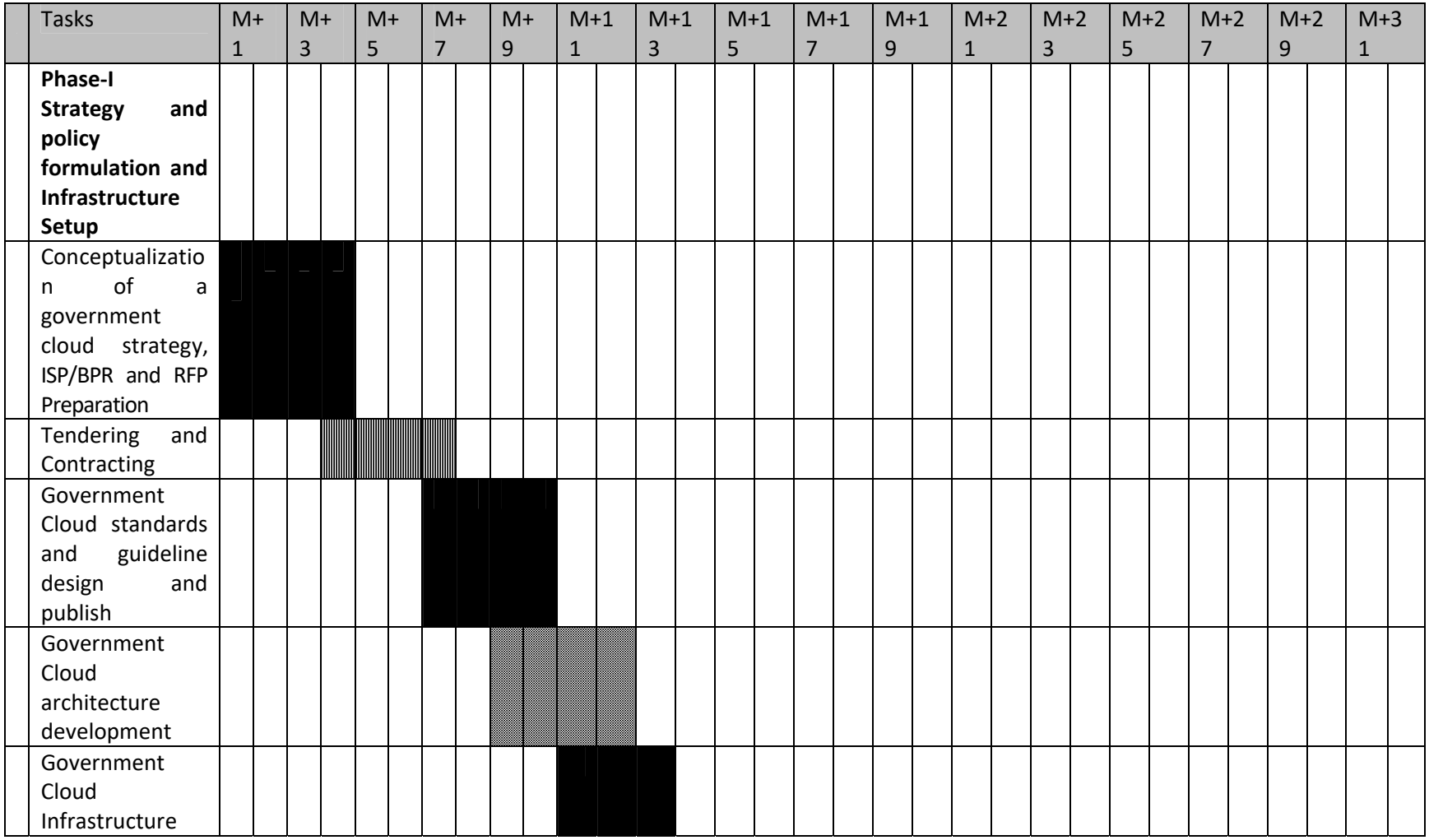
Expert Group

- In addition to the Steering Committee and the various units supporting DoIT, It is proposed to create a 'Government Cloud Expert Group' with experts from the industry to deliberate on the standards/ guidelines. Major functions of the Expert Group include the following;
- Assistance in development of policies/ guidelines
- Providing inputs in development/implementation of the Government Cloud Components.

The expert group will also provide inputs in the various capacity building exercises to be conducted as part of the Government Cloud initiative.

Work Plan

Under the policy guidance of Ministry of Science, Technology and Environment, Department Information Technology, will act as a lead implementing agency and implementation of government cloud shall be in three phases as described below.



	setup and testing																														
	Implementation (Training, Installation & Commissioning, Data Migration)																														
	Start providing IaaS to select agencies																														
	Phase II Extended Implementation																														
	Extend IaaS for critical e-Government programs																														
	National e-Gov and AppStore/Cloud Service Directory																														
	Set Business/Funding model and payment mechanism																														
	Change Management & Capacity Building																														
	Phase III: Extension, Monitoring and Optimization																														

	Service for all central and departmental level offices																																			
	Design, implement, monitoring mechanism and review of the overall Government Cloud program																																			
	Incorporate suitable modifications as per learning or change requirements																																			

General Implementation Guidelines:

- Government departments to first evaluate the option of using the Government Cloud for implementation of all new projects funded by the government. Existing applications, services and projects are evaluated to assess whether they should migrate to the Government Cloud.
- All government clouds to follow the standards and guidelines set by Government of Nepal.
- At the time of conceptualization of any new Mission Mode Project (MMP) or other government project the existing services (IaaS, PaaS, and SaaS) of Government Cloud to be evaluated first for usage.
- All new applications to be cloud ready.

Cost Estimates

The following will be the budget estimates for the Government cloud project for Phase 1. Phase 2 and 3 involve maintenance of infrastructure from phase 1 and extension cost and will thus need to be deliberated towards the completion of phase 1.

Infrastructure

Description	Qty	Rate	Total
24 Ports Gigabit Ethernet Managed L2 Switch	4	180,000.00	720,000.00
L3 Switch with Dynamic Routing, 24 Port + 4 SFP in HA mode	2	650,000.00	1,300,000.00
UTM Firewall with 8 GBPs UTM Throughput	2	1,700,000.00	3,400,000.00
Blade Server chassis with 10 gbps backbone fabric,redundant mgmt, 4+1 redundant power supply	4	1,500,000.00	6,000,000.00
Server with 10GBPS Backbone 2 x 8 Core processor,128GB RDIMM , 2x146 SSD 15K	8	900,000.00	7,200,000.00
2 x 10 GBPs Blade Storage SAN with 14x15k 300GB SAS HDD, dual controller	3	1,900,000.00	5,700,000.00
10 GigE Backbone switch	2	550,000.00	1,100,000.00
10 GBPs SAN 2.5" 24*900GB 10K HDD SAS	1	2,900,000.00	2,900,000.00
Network, Application and Server Monitoring with 55" Display (2Unit) with workstation	1	1,100,000.00	1,100,000.00
UPS in HA and Load Balancing configuration, 5Kva each with 2xBattery Pack	2	980,000.00	1,960,000.00
Rack 42 U	2	160,000.00	320,000.00
KVM with 17 inch monitor, 8 port KVM	1	140,000.00	140,000.00
Rack mount STS	2	125,000.00	250,000.00
16-slot Fiber Converter Chassis	1	240,000.00	240,000.00
Cables and accessories	1	300,000.00	300,000.00

Rackmount PDU with ampmeter and required power cables, converters, cable managers	4	150,000.00	600,000.00
		Sub-Total	**33,230,000.00**

License and Application Cost

Virtualization management application license. Comprehensive solution for resilient, compliant and secure private cloud with disaster recovery automation, visibility into application performance, and regulatory compliance	8	1,750,000.00	14,000,000.00
Cloud Management Platform with Self Service Portal, Resources Sub Allocation, Delivery Management	1	11,000,000.00	11,000,000.00
Server Operating System	3	100,000.00	300,000.00
Antivirus for 5 servers	5	3,500.00	17,500.00
		Sub-Total	**25,300,000.00**

Service Costs

Systems design	1	900,000.00	900,000.00
Implementation Support	1	2,600,000.00	2,600,000.00
Support and upgrade for 3 years	1	1,600,000.00	1,600,000.00
Training and Datacenter visit (6 Personnel)	1	2,200,000.00	2,200,000.00
Documentation	1	600,000.00	600,000.00
		Sub-Total	**7,900,000.00**

Managed Service Delivery

Microsoft Windows Server/ RHCE	10	980,000.00	9,800,000.00
User CAL for Microsoft Server (only if windows OS is used)	1000	4,000.00	4,000,000.00
Database Server (2Core/Processor)	10	145,000.00	1,450,000.00
		Sub-Total	**15,250,000.00**

Expected Outcomes

The most notable benefits expected from the implementation of Government Cloud are as follows:

- Optimum utilization of infrastructure
- Rapid deployment and reusability
- Manageability and maintainability
- Scalability
- Efficient service delivery and agility
- Security
- Cost reduction
- Ease of first time IT solution deployment
- Reduced effort in managing technology
- Increased user mobility
- Standardization
- Other Benefits
    - Automatic configuration for failover and disaster recovery regardless of the type of application, data and system.
    - Sharing of information and resources become easier and manageable.
    - IT budget can be used towards innovation like applications, automation, and service delivery.
    - IT personnel can spend more time on innovation, improvements and service delivery.
    - Step towards legalization of software licenses.
    - Centralized secure application delivery.
    - Central data repository.
    - Centralized hosting, secure data interchange and integrated portals.
    - De-duplication of IT resources, data and services.

E-Roads

Introduction

Road transport and accessibility is the prime mover of the economy of any country. Roads in Nepal is playing will play key role in economic prosperity of country. Access to information on Roads to all concerned stakeholders for enhancement of productivity is considered key element in the e-Government. The e-Roads component in the e-Government has role on all the components of e-Government, namely G2G, G2B and G2C.

Giving a glance on Nepal roads information, a total of 19,875 km of strategic roads including 6,770 km of blacktop, 3,950 km of gravel and 9,155 km of earthen roads have been constructed by the end of FY 2066/67. Similarly, 1,313 numbers of bridges are in place and 71 out of 75 district headquarters are connected to the strategic road network[14]. In order to administer and manage the development of roads, roads are classified into Strategic Road Network (SRN) and Local Road Network (LRN). SRN comprises of National Highways, Feeder Roads and strategically important urban links and its responsibility lies with DoR. LRN comprises of District, Urban and Village Road Networks and its responsibility lies with respective District Development Committees / Municipalities / Village Development Committees under the coordination of Department of Local Infrastructure Development and Agricultural Roads (DOLIDAR)[15]. In addition, 22,000 km roads have been identified as village roads, which are mostly seasonal and include short non-through roads linking single villages to roads of a higher class.[16] (DOR 2011).

Government Agencies responsible for Roads and related services are identified as follows:

- Ministry of Physical Infrastructure and Transport (MoPIT)
- Department of Roads (DoR)
- Department of Transport Management (DoTM)
- Roads Board Nepal (RBN)
- Ministry of Federal Affairs and Local Development (MoFALD)
- Department of Local Infrastructure Development and Agricultural Roads (DoLIDAR)
- Ministry of Urban Development (MoUD)
- Kathmandu Valley Development Authority (KVDA)

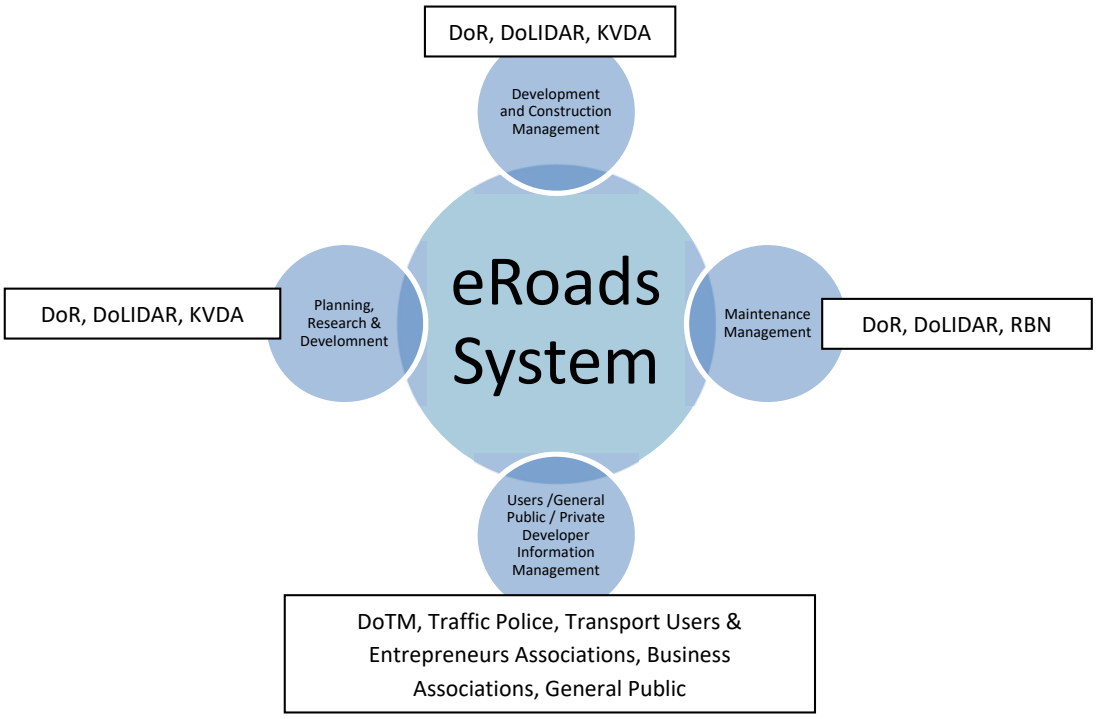
Key Government agency relating to Roads is Department of Roads (DoR), The Objective of DoR[i] are specified as follows:

- To maintain road network effectively and efficiently (Asset Preservation)
- To provide access to all district headquarters to strengthen social, economic and administration linkages
- To improve existing access to district headquarters for safe, reliable and cost effective travel
- To develop roads to supplement poverty reduction, program and to improve accessibility to mid-hills and the Terai.

[14] http://www.dor.gov.np/road_statistics.php
[15] http://www.dolidar.gov.np/
[16] Business Plan for Department of Roads 2010-2013, MPPW, July 2011 (ADB TA 7158-NEP)

- To develop and expand the existing Strategic Roads Network (SRN) to facilitate effective and efficient movement of goods and services and to foster economic growth;
- To develop and adopt cost effective measures by initiating innovativeness in road pavement and bridge design
- To develop roads to support other infrastructure development and to link areas of significance social and economic importance; and
- To encourage private sector participation in the development maintenance and management of roads.

Conceptual Overview



Current Situation

Highway Management Information System (HMIS) at Department of Roads is on-going and is in learning by doing mode. Several initiatives in isolation are going on at Roads Board Nepal and other related organization like Department of Transport management. There is seen ample scope for the integrated e-Roads system to serve G2G, G2B as well as G2C mode of eGov.

Management Information System (MIS)

Department of Roads is planning to go for a major transformation towards a wide and broad, computer based Management Information System (MIS). MIS consisting of application like Human Resource Management System, the Road Network related Database Management Systems and Development and Maintenance of Internet based system.

Geographical Information System (GIS)

HMIS[17] is updating data based GIS Mapping of Nepal Road Statistics in two scales 1:25000 and 1:50000 in tens of details of the data. The projection system adopted is the modified universal Transverse Mercator projection on Everest spheroid 1830 having zone width of 3 degrees as per department of survey. Attribute of data like AADT, IRI, SDI Pavement type (BT, GR, ER) etc. are being considered into the GIS Database.

As per The World Bank's Adie Memoire, March 20-31, 2014 for Road Sector Development Project, final report on defining a Highway Information Managements System, with final framework and action plan, is being endorsed from the Ministry of Physical Infrastructure and Transport. As per the report's recommendation development of a comprehensive policy for road data management in DOR will be taking place. Road inventory development of the entire road network under DOR is expected to be completed in near future.

Electronic Procurement System at Department of Roads (DoR)

E-Procurement web portal of DoR is designed to facilitate the bidder to submit their bids through eSubmission. However, this is alternative for submission of bid through manual submission. E-Submission of bid is used to increase transparency, non-discrimination, equality of access, and open competition. The DoR's e-Procurement site provides easy to use internet access for tender information, information on award of contracts and an alternate facility to submit bids through electronic media to all interested bidders as specified in the instructions to bidders.

Roads Board Nepal (RBN)

RBN is preparing Annual Roads Maintenance Plan (ARMP) in a web based ARMP database with the integration to spatial data (GIS maps). This system is helping DoR especially, the District Road Offices (DROs) having access to road data and achieving a consistency and reliability of the planning. For the same purpose the RBN plans to continue the support for the road condition survey. RBN is also updating its accounting in computer system (World Bank's Adie Memoire, March 20-31, 2014).

Improvements & Outputs

It is observed an integrated eRoads system will generate the following improvements and outputs:

- Reduction on the duplication of works being done at the various related government agencies identified above
- Enhancement of G2G process in planning, operation and management of all Roads related activities
- Integrated system for G2B access to business and procurement related to Roads
- Enhanced system for general public for access to Roads related information, warnings, status of Road etc., enhancing G2C processes

The expected output is overall good Road governance system.

[17] http://www.dor.gov.np/hmis/index.php

Implementation Strategy

Information System Planning (ISP) and Business Process Re-engineering (BPR) should be carried out for detailing the work and identifying the best implementation strategy with close consultation with all Roads related government agencies.

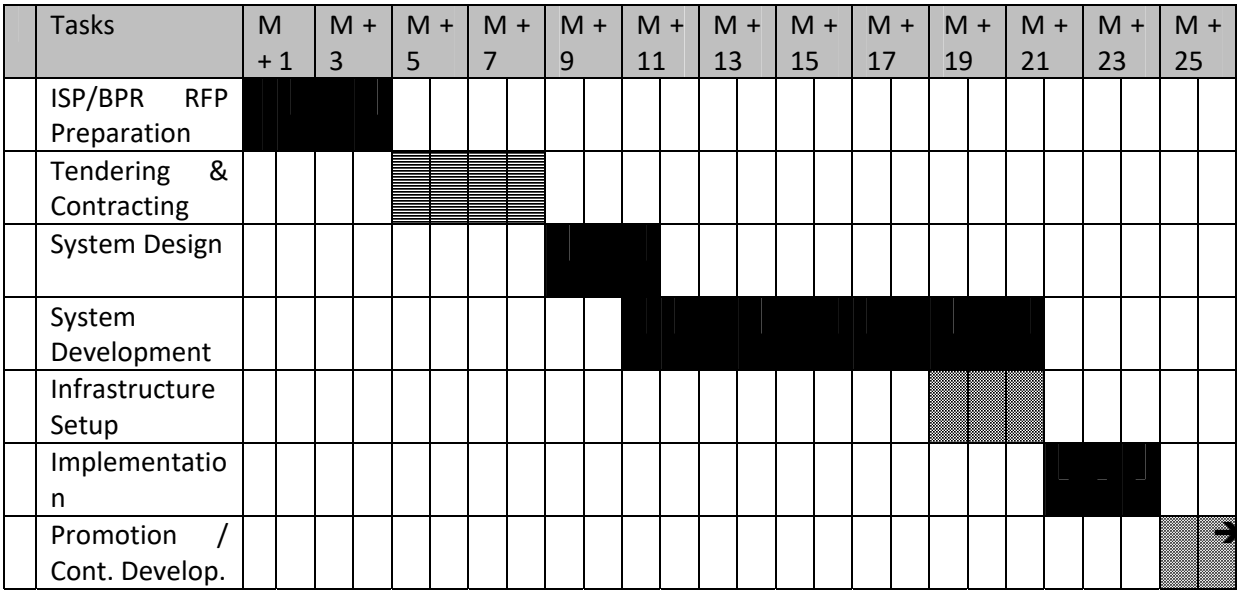
System design of the frameworks and the knowledge base for the first phase will be carried out and application will be developed based on n-tier SOA architecture.

Development of the frameworks and the contents will be accomplished as per the system design and Testing will be adequately done before implementation of the system.

Implementation should not be just done technically but there should be sufficient care in promoting the contents to the citizens/Road users/businesses at the local and international level to make use of the available system effectively. Sufficient promotion of the system developed showing its advantages should be proliferated from different communication channels/mediums including Internet, TV, Radio, Newspapers making use of the state-of-the-art systems.

Work Plan

Detailed work for the implementation of e-Roads is as follows:



Cost Estimates

The following will be the budget estimates for the e-Roads project:

Project Cost Estimates (e-Roads)

Types of Service	Calculation Basis		Amount (in NRs)
	Human Resources	Miscellaneous	
ISP/BPR & RFP Preparation	1 x TL x 1pm, 1 x SA x 2pm	300000	1,400,000
Tendering & Contracting		1000000	1,000,000
System Design	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 2pm, 1 x SE x 2pm, 1 x DBA x 0.5pm, 1 x QA x 0.5pm, 1 x DE x 0.5pm, 1 x CE x 1pm	300000	2,825,000
System Development	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 4pm, 1 x DBA x 0.5pm, 4 x SE x 4pm, 2 x QA x 2pm, 1 x DE x 2pm, 1 x CE x 1pm	500000	7,350,000
Infrastructure Setup	3 Servers/DC, 3 Servers/Backup, 3 Servers/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	20000000	20,000,000
Implementation (Training, Installation & Commissioning, Data Migration) in 5 districts	1 x TL x 0.5pm, , 1 x SA x 1pm, 1 x DBA x 2pm, 2 x SE x 2pm, 1 x QA x 2pm, 1 x DE x 1pm, 1 x SysE x 1pm, 5 x DC x 2pm	600000	4,400,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 3pm, 1 x QA x 2, 1 x DE x 1pm, 1 x SysE x 4pm	500000	4,675,000
Replication (Remaining 70 districts Phasewise in 2 years)			22,000,000
Total			**63,650,000**

Expected Outcomes

The following are some of the outcomes of the implementation of eRoads:

- Citizens / Business Community will be better informed on Roads related information and processes.
- Business community and Citizens will get online/onsite support and approval from respective agencies for the information, procurement, business, process, permits etc.
- Investors in transport industry will be better organized with Roads sector information.
- Government will be more efficient for the development and deployment of Roads infrastructure planning, development, operation and management.
- Most efficient medium for the promotion of Transport system in the country

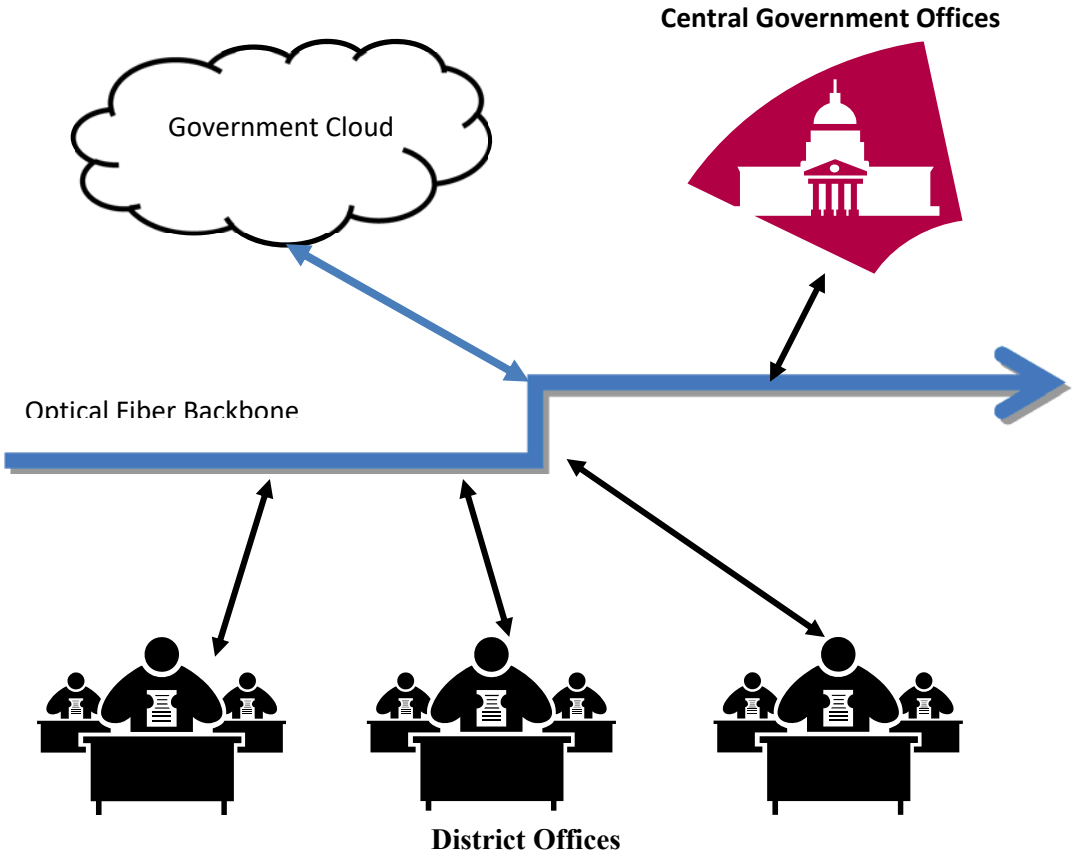
Government Network to District

Introduction

Looking at the current trend of the world, a backbone infrastructure of optical fiber network has become a must for developing information and communication technology in the country. Further taking into account the government's plan and need to utilize ICT and internet technologies to provide effective services to its citizens, it has become vital to connect each of the 75 districts in Nepal to the center with high speed broadband internet.

According to the 2009 NTA study, it has to construct 6,291 km optical fiber to connect all the districts of Nepal. The primary estimate for the construction put the cost of the project at Rs 8.40 billion. Along with optical fiber for higher speed internet access, broadband technology such as microwave towers and base transceiver stations are required to be constructed for high speed internet to be available in all districts of Nepal.

Conceptual Overview



Current Situation

The Government of Nepal amended the Telecommunications Policy 2004, paving the way for the Nepal Telecommunications Authority (NTA) to implement its District Optical Fiber Network Programme. Originally planned in 2009, the program is aimed at connecting all district headquarters with optical fiber, a backbone infrastructure for broadband service, using resources of Rural Telecommunication Development Fund (RTDF).

The plan is to make broadband internet service accessible in rural parts of the country, on the basis of public-private partnership approach in the Mid-Hill Highway of the country. South Asia Sub-regional Economic Cooperation (SASEC) Information Highway project funded by the Asian Development Bank is also in implementation phase, which will extend optical fiber alongside Banepa-Bardibas road. Furthermore, Nepal Telecom (NT) has already taken optical fiber to more than 58 districts already. NT is expanding 600-km optical fiber network in the hilly region in cooperation with NEA and Butwal Power Company. The optical fibers in the hilly region will also be taken through poles of NEA due to smaller settlements with low population. Nepal Telecom (NT) will expand network of optical fibers to all the districts in the current fiscal year 2071/72 to improve quality of mobile, land line and data services.

Improvements and Outcomes

The main goal of the bringing Government Network to District level is to create a nationwide high speed link between the district offices and the central government offices such that G2C, G2B and G2G services can become decentralized. Citizens from far districts, district administration officers and businesses operating in these districts would be the main beneficiaries.

At present district operate in silo with very slow access to information from the center and each other which in turn makes it slower still for Citizens and businesses to gain service and information.

Implementation Strategy

The major portion of work to bring Government network to District level would be building the required infrastructure. While this work has been started by Nepal Telecom (NT) and other telecom providers themselves, the Government and Nepal Telecom Authority will need to coordinate such that effort need not be duplicated where the optic fibers have already been placed. Broadband infrastructures like optical fiber, microwave towers and base transceiver stations are costly to build. Such infrastructures can be shared to make broadband reasonably inexpensive.

Voice over Broadband Service (VoBS) is a technology that needs to be encouraged at policy level in order to bring affordable communication to the masses.

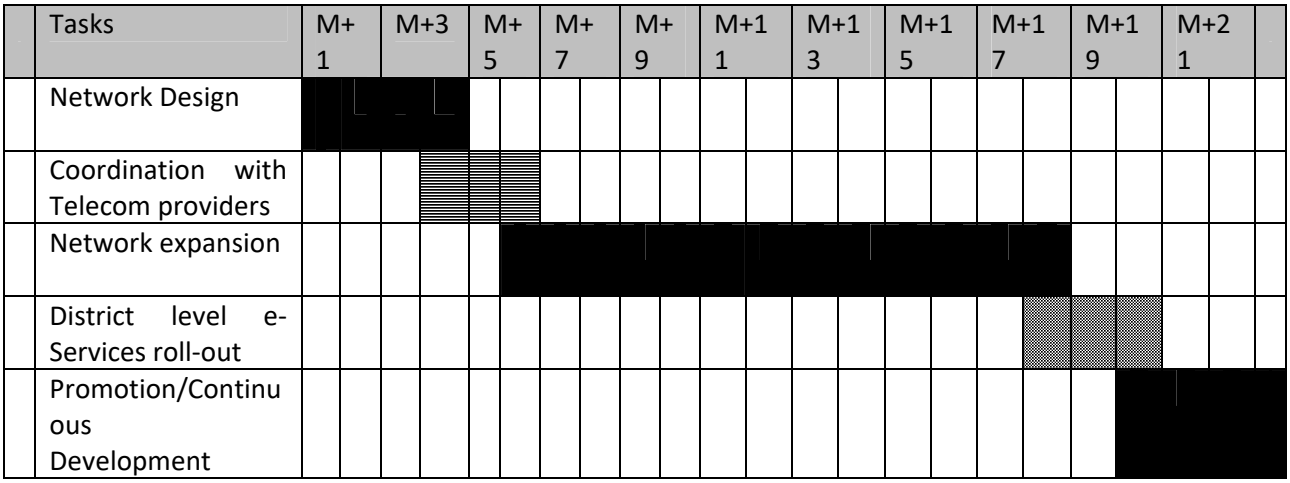
Backbone infrastructure of optic fibers can be shared among telecommunication service providers to provide high speed internet as well as high quality voice communication services. Sharing of infrastructure would minimize duplication of effort and bring down the overall cost.

Telecom providers in Nepal have until now focused mostly on getting quantity communications access to the masses. The focus now should be put on promoting access to quality service.

Nepal needs an appropriate Broadband Policy in order to boost broadband use and access. Demand for mobile broadband is increasing globally because of the increasing popularity of smartphones. In local context too, there is a need for content and applications to promote the use of broadband connection and help sustainable development. With the infrastructure in place, concepts of e-Education, e-Agriculture, e-Tourism, e-Roads, e-Health etc. can reach the actual users.

Work Plan

Detailed work for the implementation of Government Network is as follows:



Cost Estimates

Types of Service	Calculation Basis		Amount (in NRs)
	Human Resources	Miscellaneous	
ISP/BPR & RFP Preparation	1 x TL x 1pm, 1 x SA x 2pm, 1 x TE x 1pm	300000	1,700,000
Coordination/ Tendering & Contracting		1000000	1,000,000
Network Design	1 x TL x 1pm, 1 x SArch x 2pm, 1 x SA x 2pm, 1 x SE x 2pm, 1 x QA x 1pm, 1 x DE x 1pm, 2 x TE x 2pm	300000	4,150,000

Network Development and Expansion	1 x TL x 2pm, 1 x SArch x 1pm, 1 x SA x 4pm, 5 x SE x 2pm, 5 x TE x 2pm, 2 x QA x 2pm, 1 x DE x 2pm	500000	9,200,000
Infrastructure Setup	Network as per telecom provider, Servers/DC/Backup/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	40000000	40,000,000
Implementation (e-Services roll-out, training) in 5 districts	1 x TL x 0.5pm, , 1 x SA x 1pm, 1 x DBA x 2pm, 2 x SE x 2pm, 1 x QA x 2pm, 1 x DE x 1pm, 1 x SysE x 1pm, 5 x DC x 2pm	600000	4,400,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 3pm, 1 x QA x 2, 1 x DE x 1pm, 1 x SysE x 4pm	500000	4,675,000
Replication (Remaining 70 districts Phasewise in 2 years)			22,000,000
Total			87,125,000

Expected Outcomes

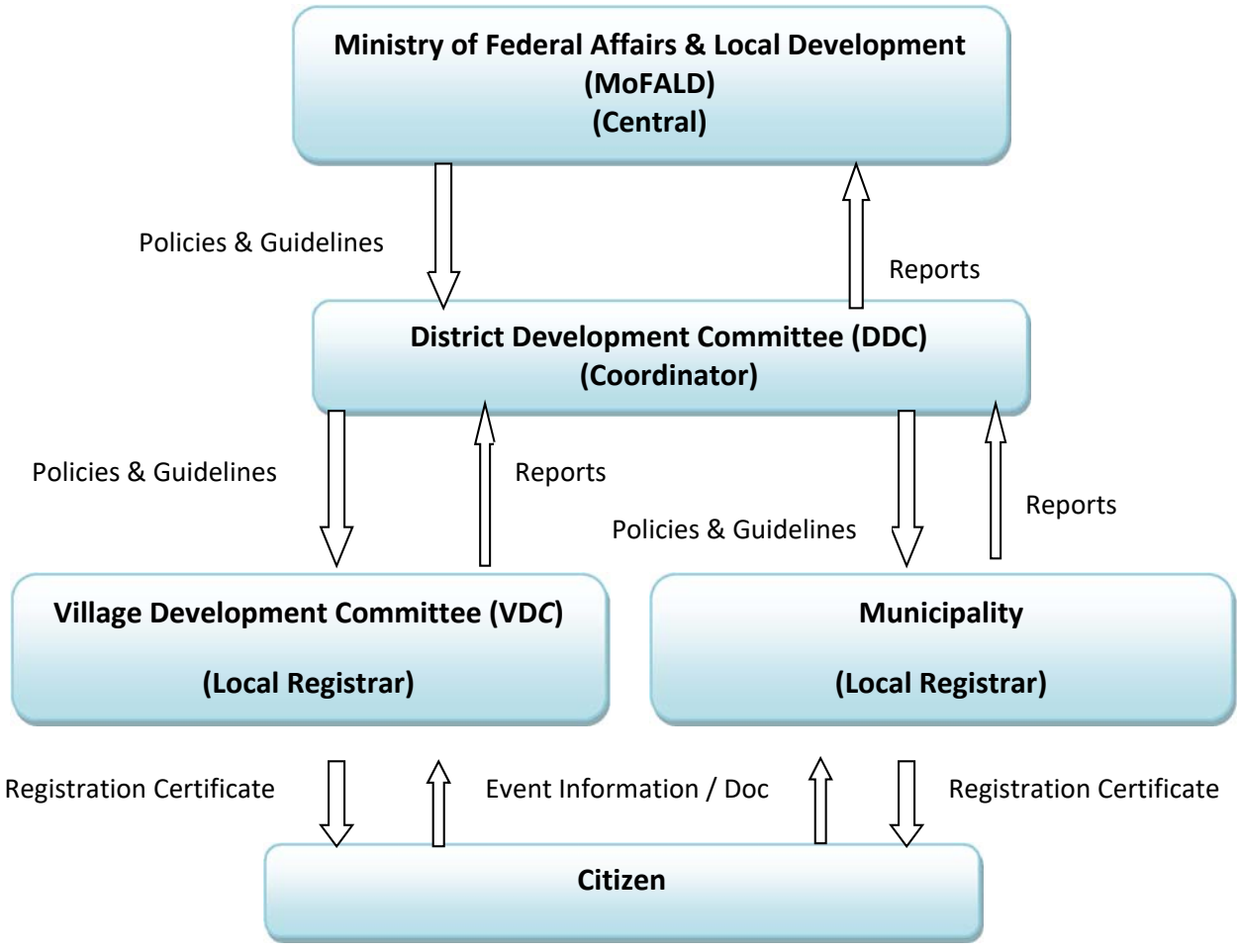
- High speed broadband internet connectivity from all district headquarters.
- Faster service delivery from district to the citizens
- Decentralized G2C service delivery mechanism
- District administration empowerment
- User satisfaction increase

e-Vital Registration

Vital Registration in Nepal has started since 1977 with pilot implementation in 10 districts. By 1990, it covered all 75 districts. Ministry of Federal Affairs and Local Development (MoFALD) is the the main organization responsible for the vital registrations in the country. There exists a separate Population and Vital Registration Management Section in MoFALD to look after the Vital Registration process & monitor the operation and make suitable policies, guidelines for its effective implementation. Chief of the Population and Vital Registration Management Section is the Registrar for the Vital Registration.

In order to practically implement the Vital Registration System in the country, the Local Government bodies such as District Development Committee (DDC) acts as coordinator to report to MoFALD and to monitor all Local Registrar offices. Village Development Committees (VDC) and Wards of Municipalities have been nominated as the Local Registrar Offices actually register the vital events (births, deaths, marriages, divorces, migration etc.) and issue the corresponding certificates.

The following figure depicts the workflows between the organizations involved in the Vital Registrations:



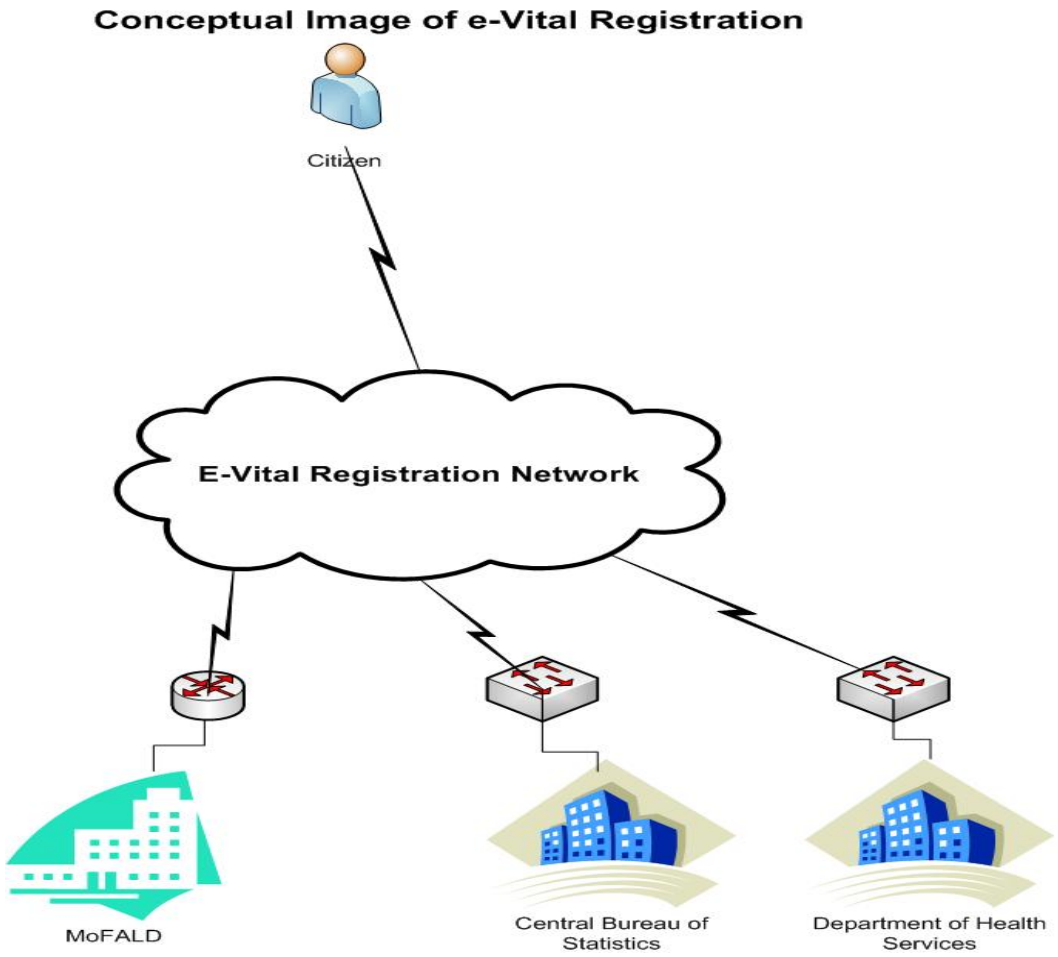
Apart from MoFALD and local government organizations of Nepal, other agencies that are important from the vital statistics point of view are:

- Central Bureau of Statistics (CBS)
  CBS carries out population census every ten years and also does a lot of other surveys related with vital statistics.

- Department of Health Services (DoHS)
  DoHS conducts surveys related with Vital statistics time to time in certain areas of the country.

Conceptual Overview

e-Vital Registration has been envisaged as G2C/G2G activities where there can be maximum engagements between GON organizations with Citizens in general. The following figure depicts the conceptual image of e-Vital Registration:



Current Situation

At present, citizens must have to visit VDC / Ward of Municipality (as applicable) to register the application for any of the vital events and again later to receive the certificate after decision is made by the corresponding officer. Sometimes the person may have to visit the local registrar office a couple of times to check if the certificate is ready. In the case that the office is far from citizen's residence, it can become a problem.

Improvements & Outputs

The main goal of e-Vital Registration is to ease the process of vital registration by the citizen from the local government (G2C) and obtaining the respective certificates without much of the hassle. The application for the vital registration should be possible through electronic forms in the web, any necessary documents for proofs (like birth/death certificate from Hospital/Female Health Worker/Volunteer etc.) can also be uploaded. The sufficiency of the necessary documents to be uploaded can be verified after submitting the complete application including the documents uploaded and any errors/insufficiencies will immediately notified. The document workflow in the VDC or Ward of Municipality for the registration will be made transparent and the applicant can know the status of the application at any point of time. It is assumed that Cyber Kiosks will be opened at various parts of the country and applicant may not be in his/her village while lodging the application.

Different mediums (such as STD phones, mobile phones or web) could be used to keep track of the application.

The registration certificate can be issued in the electronic form immediately after the completion of registration process and physical printed copy of the certificate can be made available through any local registrar in the country or embassy/consulate offices outside the country.

Implementation Strategy

Information System Planning (ISP) and Business Process Re-engineering (BPR) should be carried out for detailing the work and identifying the best implementation strategy.

System design of the frameworks and the knowledge base for the first phase will be carried out and application will be developed based on n-tier SOA architecture.

Development of the frameworks and the contents will be accomplished as per the system design and Testing will be adequately done before implementation of the system.

Implementation should not be just done technically but there should be sufficient care in promoting the contents to the citizens/businesses at the local level to make use of the available system effectively. Sufficient promotion of the system developed showing its advantages should be proliferated from different

communication channels/mediums including TV, Radio, and Newspapers making use of the state-of-the-art systems.

Work Plan

Detailed workplan for the implementation of e-Vital Registration is as follows:

	Tasks	M + 1		M + 3		M + 5		M + 7		M + 9		M + 11		M + 13		M + 15	
	ISP/BPR RFP Preparation																
	Tendering & Contracting																
	System Design																
	System Development																
	Infrastructure Setup																
	Implementation																
	Promotion / Cont. Develop.																→

Cost Estimates

The following will be the budget estimates for the project:

Project Cost Estimates (e-Vital Registration)

Types of Service	Calculation Basis		Amount (in NRs)
	Human Resources	Miscellaneous	
ISP/BPR & RFP Preparation	1 x TL x 1pm, 1 x SA x 2pm	300000	1,400,000
Tendering & Contracting		1000000	1,000,000
System Design	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 2pm, 1 x SE x 2pm, 1 x DBA x 0.5pm, 1 x QA x 0.5pm, 1 x DE x 0.5pm	300000	2,525,000
System Development	1 x TL x 1pm, 1 x SArch x 1pm, 1 x SA x 5pm, 1 x DBA x 0.5pm, 3 x SE x 15pm, 2 x QA x 2.5pm, 1 x DE x 2pm	500000	7,350,000
Infrastructure Setup	3 Servers/DC, 3 Servers/Backup, 3 Servers/DR, Firewall, Load Balancer, SAN, Power Supply, Networking, DC/DR Site Preparation etc.	20000000	20,000,000
Implementation (Training, Installation & Commissioning, Data Migration) in 5 districts	1 x TL x 0.5pm, , 1 x SA x 1pm, 1 x DBA x 2pm, 2 x SE x 2pm, 1 x QA x 2pm, 1 x DE x 1pm, 1 x SysE x 1pm, 5 x DC x 2pm	600000	4,400,000
AMC/Promotion	1 x SA x 1pm, 1 x DBA x 4pm, 2 x SE x 6pm, 1 x QA x 2, 1 x DE x 1pm, 1 x SysE x 4pm	500000	4,675,000
Replication (Remaining 70 districts Phasewise in 2 years)			22,000,000
Total			**63,350,000**

Expected Outcomes

The following are some of the outcomes of the implementation of e-Local Registration:

- Citizens can file their vital registration document from anywhere in the world.
- Citizens can monitor the progress of the application online and using various mediums (web, PSTN phones, Mobiles etc.)
- E-Registration certificate can be obtained from anywhere in the world.
- Government will have up to date information of vital statistics.