
IFMIS Interim-State Roadmap

Consultancy services to Develop an action plan for Assortment, Upgradation and Enhancement of the Existing IT based Public Financial Management (PFM) Systems in transition to Complete Integrated Financial Management Information System (IFMIS)

24th January, 2022

Final Report

To
The Coordinator,
Public Expenditure & Financial Accountability (PEFA) Secretariat,
Financial Comptroller General Office,
Anamnagar, Kathmandu, Nepal

Sub: *Submission of Report on IFMIS Interim-State Roadmap*

Ref: *Develop an action plan for Assortment, Up gradation and Enhancement of the Existing IT based Public Financial Management (PFM) Systems in transition to Complete Integrated Financial Management Information System (IFMIS)*

Dear Sir,

With reference to the above subject and contract, we herewith submit the revised report on IFMIS Interim-State Roadmap containing key recommendations and considerations for interim solution design and implementation, timelines for implementation, cost estimates, capacity building and change management strategy. This report forms part of the deliverable “**Interim Report**” (along-with previously submitted Diagnostic Report), as per the Terms of Reference.

Please do feel free to get in touch with the undersigned for any further information/clarification.

Yours faithfully,

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IFMIS Interim-State Roadmap Report	2.0	18.10.2021	<ul style="list-style-type: none"> Updated report based on the enhancements to PFM systems since February 2020
IFMIS Interim-State Roadmap Report	3.0	24.01.2022	<ul style="list-style-type: none"> Updated report incorporating feedback received from GoN and World Bank in December 2021

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Glossary

Term	Definition/Meaning
AMIS	Aid Management Information System
BCS	Budget Control System
BMIS	Budget Management Information System
CGAS	Computerised Government Accounting System
COTS	Custom off the Shelf
CTC	Chief Treasury Controller
DC	Data Centre
PDMO	Public Debt Management Office
DOMS	Debt Operations and Management System
DoR	Department of Roads
DPR	Detailed Project Report
DTCO	District Treasury Controller Office
FCGO	Financial Comptroller General Office
FMIS	Financial Management Information System
FMIS – R	Financial Management Information System – Road
FRS	Functional Requirement Specifications
GFSM	Government Finance Statistics Manual
GoN	Government of Nepal
Govt	Government
IFMIS	Integrated Financial Management Information System
ICT	Information & Communication Technology
IT	Information Technology
LMBIS	Line Ministry Budget Information System
MARS	Municipal Administrative Revenue Management System
MoCIT	Ministry of Communication & Information Technology
MoEAP	Ministry of Economic Affairs and Planning (Provinces)
MoF	Ministry of Finance
MoFAGA	Ministry of Federal Affairs and General Administration
MoHP	Ministry of Health & Population
MoPID	Ministry of Physical Infrastructure Development (Provinces)
MoPIT	Ministry of Physical Infrastructure and Transport
MoSD	Ministry of Social Development (Provinces)
MoUD	Ministry of Urban Development
NBL	Nepal Bank Limited
NITC	National Information Technology Center

Term	Definition/Meaning
NPSAS	Nepal Public Sector Accounting Standards
NNRFC	National Natural Resources & Fiscal Commission
NPC	National Planning Commission
NPR	Nepalese Rupee
NRA	National Reconstruction Authority
NRB	Nepal Rastra Bank
NTC	Nepal Telecom
OAG	Office of Auditor General
OCMCM	Office of Chief Minister and Council of Ministers (Provinces)
OLAP	Online Analytical Processing
OLTP	Online Transactional Processing
OMB	Open Market Borrowings
PAIS	Public Asset Information System
PEFA	Public Expenditure and Financial Accountability
PFCO	Provincial Financial Comptroller Office
PFM	Public Financial Management
PFMRP	Public Financial Management Reform Project
PLMBIS	Province Line Ministry Budget Information System
PMS	Pension Management System
PO	Payment Order
PwC	PricewaterhouseCoopers India Pvt Ltd
RBB	Rashtriya Banijya Bank
RFP	Request for Proposal
RMIS	Revenue Management Information System
SLA	Service Level Agreement
SNG	Sub National Government
SuTRA	Sub National Treasury Regulatory Application
TABUCS	Transaction based Accounting and Budget Control System
TC	Treasury Controller
ToR	Terms of Reference
TSA	Treasury Single Account

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1. Introduction

1.1. Project background

Government of Nepal (GoN) has launched Public Financial Management Reform Program (PFMRP) in 2009 for strengthening overall Public Financial Management (PFM) ecosystem in the country. The first phase of PFMRP (2010-2013) focussed on strengthening the PFM ecosystem and building capacity of the Public Expenditure & Financial Accountability (PEFA) Secretariat in Nepal. The following applications were developed to support the PFM operations in Nepal:

Systems developed and operated by Ministry of Finance (MoF):

1. Budget Management Information System (BMIS)
2. Line Ministry Budget Information System (LMBIS) (and provincial LMBIS)
3. Aid Management Information System (AMIS)

Systems developed and operated by Financial Comptroller General Office (FCGO):

1. Financial Management Information System (FMIS) (and an updated version under development)
2. Treasury Single Account (TSA) (and provincial TSA)
 - Electronic Fund Transfer (eFT)
3. Revenue Management Information System (RMIS)
4. Computerised Government Accounting System (CGAS)
5. Public Assets Information System (PAIS) (and subsequently Public Asset Management System (PAMS))
6. Debt Operations and Management System (DOMS)
7. Pension Management System (PMS)
8. Budget Control System (BCS)
9. Reimbursement MIS
10. NPSAS based consolidated reporting application (New Reporting Application) (*under development*)

Other agency specific systems:

1. Transaction based Accounting and Budget Control System (TABUCS) developed by Ministry of Health & Population (MoHP)
2. Financial Management Information System (FMIS - Road) developed by Department of Roads (DoR)
3. Municipal Administrative and Revenue Management System (MARS) developed by Ministry of Federal Affairs and General Administration (MoFAGA) (*piloted only in Kathamandu Valley Municipal Corporation and yet to be rolled out*)
4. Ministry of Federal Affairs and General Administration Management Information System ("MOFAGA MIS")
5. Sub-National Treasury Regulatory Application (SuTRA) developed by PEFA Secretariat
6. E-Government Procurement System (eGP) developed by Public Procurement Management Office (PPMO)
7. National Project Bank MIS (NPB MIS) developed by National Planning Commission

All the above stated systems were developed as standalone applications by various agencies and were subsequently enhanced to accommodate the PFM reform requirements. There are limited data exchange/interfaces between these systems. In the meantime, Nepal has moved to a 3-tier government structure from 2015.

Consequently, GoN has been focussing more on strengthening the PFM framework to improve overall governance at all the 3 levels of the government and enhancing the PFM systems to modern standards.

Through PFM RP Phase II, GoN has initiated the integration all the PFM systems for effective and efficient PFM performance. However, since the systems were developed in isolation, there are challenges for service integration and ensuring seamless data exchange. In such context, Public Expenditure and Financial Accountability (PEFA) Secretariat, the implementing agency of GoN, has engaged PricewaterhouseCoopers India Pvt Ltd (PwC) to reform the PFM systems, engaged PwC to assess the maturity and effectiveness of the existing PFM systems and provide recommendations on designing an intermediate solution for all the 3 tiers of the government and to provide a roadmap for development of a comprehensive IFMIS in two stages:

- ✓ An intermediate solution with a Reporting level IFMIS and
- ✓ A comprehensive Transaction level IFMIS

This report is the Deliverable – Intermediate solution with a Reporting Level IFMIS of this engagement. Its objective is to present the Implementation Roadmap for the interim state IFMIS, including the key recommendations, functional design, to-be process maps and functionalities, technical details, capacity building plan, procurement considerations and cost estimates.

The recommendations and their subsequent translation into the roadmap are based on our findings in the Diagnostic report and subsequently based on information/ feedback received from the client. The client's input and recommendations received on this report will be taken into considerations, for a final version of the report.

1.2. Scope and objectives of the report

The IFMIS roll-out strategy for the interim state should comprise the following, which is outlined in subsequent sections –

1. Overview and details of key recommendations with suggested policy and institutional reforms, ICT enhancements for implementation, and change management requirements (basis the presentation that was shared)
2. Conceptual design of interim-state – covers functional architecture and module descriptions, and interfaces between systems and with external systems. These are further detailed with the To-Be process maps, functional and technical requirement specifications in the annexures.
3. Phasing and roll-out plan for proposed interim-state – covers sequencing of modules and interfaces
4. Key considerations for implementation including procurement, deployment and governance plan.
5. Capacity building strategy, including stakeholder engagement, communication, and key recommended training programmes
6. Implementation workplan and timelines
7. Indicative Cost estimates
8. Key risks and mitigation strategy
9. Way forward, with key decisions for the client

1.3. Key assumptions and exclusions

The following details the list of key assumptions and exclusions relevant to this report:

1. The interim-state vision for IFMIS has been prepared on the assumption that the key existing systems in the PFM environment will be replaced with a single comprehensive IFMIS system (end-state IFMIS) in the medium to long term, with the major exception of the Consolidated Reporting Application
2. The various recommendations proposed in this report are based on the findings from the diagnostic assessment and subsequent discussions with the Government of Nepal and the World Bank. However, these recommendations are to be further validated/ fine-tuned based on pending information gaps and GoN feedback

3. As the NPSAS reporting application is still in conceptual phase, we have included details for the application which can be incorporated into the design of the application
4. The cost estimates and tentative timelines proposed are based on the following assumptions:
 - i) The Reporting Application is being developed as a new solution via contract with existing vendor
 - ii) The enhancements to existing applications shall be done via direct contracting with existing vendors/ IT support 3rd parties

1.4. Vision for interim state IFMIS

Owing to the complexity (in terms of efforts, time and costs) of transitioning to an end-state modern and comprehensive IFMIS environment that would involve replacing a large number of the existing IT systems in the PFM ecosystem, there exists scope to implement certain enhancements in the short term that would allow the Government of Nepal to achieve the following objectives:

- Creation of a **new IT application for whole-of-government reporting** that can *consolidate and process data from federal and sub-national government accounting & reporting systems (GoN is developing new FMIS to cater to this requirement)*
- To **plug critical functional gaps in key PFM systems in Nepal**, in order to minimize manual workarounds in business processes
- To **establish missing system interfaces in key PFM systems** for a *seamless data flow environment for collation of all information needed for preparing whole-of-government accounts*
- Supplementary **capacity building, policy and institutional reforms** for the planned ICT initiatives
- **Preparing for end-state IFMIS solution** by initiating key reforms that serve as prerequisites to operationalize a modern comprehensive (“end-state”) IFMIS solution

The interim- state IFMIS is envisaged as an interfaced series of various PFM system that can be commonly used across government for enabling whole-of-government financial reporting. The systems should be able to fulfil the following key operations:

- Support in key functions of Budget Management (estimation, aggregation, distribution and reallocation) via:
 - LMBIS for federal government entities
 - pLMBIS for provincial government entities
 - SuTRA for local governments entities
- Support in key functions of expenditure management (bill preparation, approval, payment and reconciliation) via:
 - CGAS and TSA for federal government entities
 - CGAS and TSA for provincial government entities
 - SuTRA for local governments entities
 - PAMS for asset management at all 3 tiers of the government
 - DOMS for debt management
- Support in key functions of receipt management (receipt payments, collections management and reconciliation) via:
 - RMIS for federal government entities
 - RMIS for provincial government entities
 - Local Receipt Applications for local governments entities (*to be replaced with SuTRA Receipts module which is under development*)
- Support in Accounting and reporting of all financial information via:
 - A New NPSAS based Consolidated Reporting Application - *An application for consolidating all financial data from all tiers of the government to generate whole-of-government reports*

Seamless interfacing between all the above systems, and with key external systems including e-GP, NRB and the Commercial Banks.

Consequently, this report details out the vision and implementation roadmap for the interim state IFMIS.

1.5. Key recent achievements of the Government of Nepal for achieving the objectives of interim-state IFMIS

The following summarize the key steps taken by the GoN in the past 12 months in order to achieve the objectives of interim-state IFMIS¹.

Note: *We have taken cognizance of such achievements, and have accordingly adjusted our recommendations and consequent roadmap, in order to optimize all efforts and minimize added development effort time.*

a. New Application Developed/ under development:

1. **New FMIS (ongoing):** This application will replace the old FMIS, and would be used for collating information for preparation of annual financial statements, as well as for preparation for management/ internal consolidated financial reports at federal, provincial and federal plus provincial combined levels.
2. **New NPSAS based Consolidated Reporting Application (ongoing):** This application will generate NPSAS compliant consolidated financial reports at federal, provincial, local level, and combined for all levels. The Reporting Application will interface with FMIS, SuTRA, TSA, RMIS, CGAS, PAMS and others (e.g. NRB) for collation of all information points for consolidated reporting, including business logic for inter-entity adjustments.
3. **Public Asset Management System (PAMS):** PAMS has been rolled out to all 3 tiers of the government in order to record details of all government assets. PAMS would also have the functionality to record purchase requests and generate purchase orders. Going forward, it will interface with other key PFM systems like CGAS, e-GP, FMIS and new Reporting Application for end-to-end management of assets.
4. **Development of Reimbursement MIS:** The Reimbursement MIS has been developed in order to manage expense reimbursements due from donor agencies/ external aid agencies for their funded projects. It interfaces with TSA in order to receive such information.

b. Functional Enhancement to existing applications (some are under development)

1. LMBIS has been enhanced to support the Line Ministries to reallocate budget within their departments on the system (based on configured business rules on value thresholds and authorization rights)
2. CGAS has been enhanced with sub-modules in order to
 - Record inter-governmental transfers
 - NPSAS based reports preparation, which would be sent via an interface to New Reporting Application
 - Features for contract and vendor data management etc.,
3. DOMS' functionalities are being enhanced to support internal debt management (estimated completion by February 2021). In addition, DOMS is also being enhanced for managing government loans and advances
4. Multiple online payment modes have been developed for the web-based payment portal of RMIS.
5. Enhancement to eFT including:
 - Integration with NCHL- National Payment Interface (NPI)

¹ These developments have been summarized based on information received from stakeholders during online discussion, and certain visits to the offices. They are not exhaustive, but only capture the key developments.

- Integration with Real Time Gross Settlement (RTGS)
6. SuTRA is being enhanced in order to support a functionality for receipt management. Going forward, this would enable discontinuation of receipt management operations in third-part applications, and would centralize all operations in SuTRA.

Note: Extensive list of functional requirement specifications (FRS) are provided in **Annexure 2: Functional requirements specifications for interim-state IFMIS**

c. Technical Enhancement to existing applications (*some are under development*)

1. Activity based accounting in all key systems (as against summary level), which would enable preparation of NPSAS based reports in the systems
2. Technical upgrade of all key PFM Systems in Nepal, including LMBIS, CGAS, TSA and RMIS (architecture, database etc.,)
3. Transition to a single TSA database for all federal and provincial level data (subsuming the earlier 8 different instances at federal and provincial level)
4. Extension of CGAS and RMIS to all provinces

Note: Extensive list of non-functional requirement specifications are provided in **Annexure 3: Non-functional/ technical requirements specifications for interim-state IFMIS**

1.6. Key observations on GoN's approach for consolidated reporting

The following section presents our key observations on GoN's approach for consolidated reporting, its potential impact on consolidation operations, and our recommended mitigation strategy.

Observation	Impact
The GoN is developing two separate applications for consolidating financial information and for reporting purposes	<ul style="list-style-type: none"> • Redundancy in efforts, cost and time • High complexity in system interfacing (<i>non-linear flow of information</i>), and in supremacy of data between the two new systems • Variations in reports between the two systems has potential to cause confusion
CGAS is being enhanced to support in preparation of NPSAS Reports, which would be sent to the new Reporting Application via an interface	<ul style="list-style-type: none"> • No single source of truth, as differing information will be sent from CGAS to FMIS and to the Reporting Application • Challenges to the validity of the data being used for consolidated reporting - <i>as reconciled data is stored in TSA (and not CGAS), being the Treasury System which interacts with Banks</i> • Degree of manual intervention needed to prepare NPSAS reports in CGAS – <i>can affect accuracy and quality of data</i>

Thus, in lieu of the GoN's approach to consolidated reporting and other ongoing enhancements/ developments, the report presents the additional enhancements and supporting reforms needed to meet all objectives of interim-state IFMIS.

2. Key recommendations for interim state IFMIS

2.1. Overview of key recommendations

This section provides overview of recommendations aimed at addressing the pending functional gaps for operationalizing consolidated reporting, as well as other identified inefficiencies and challenges across the various functional areas of the PFM environment studied under the scope of this engagement **for the interim state**. These recommendations include interventions aimed at upgrading the ICT environment and streamlining any identified process inefficiencies, regulatory and institutional strengthening, and improving the capacity of the staff.

Note: These recommendations factor the long-term goals of the GoN for IFMIS, and hence can serve as the first steps towards transitioning to the end-state IFMIS solution.

The following figure illustrates the **key to-be recommendations proposed to support the interim state IFMIS implementation**, along with the rationale for inclusion in the interim state and the corresponding benefits/outcomes envisaged from their implementation.

Table 1: Summary of Key Recommendations

Recommendation	Overview	Envisaged Outcomes / Benefits
<p>ICT Enhancements for Consolidated Reporting (Development of new applications/ enhancements to existing) – This category covers recommendations pertaining to developing new ICT application to cater to whole-of-government consolidated reporting requirements that are not supported by the existing ICT systems; or require significant functional enhancements to the existing systems that merits the development of new ICT applications. This is further elaborated in section 2.2.1.</p>		
<p><i>Developing a reporting application to support whole-of-government consolidated reporting</i></p> <p>Note: <i>The GoN is presently undertaking efforts to upgrade FMIS, and to develop a new application for NPSAS based reporting to meet the objectives under this recommendation</i></p>	<p>One of the key objectives for the interim state IFMIS is to implement enhancements to the existing ICT environment to support whole-of-governments accounts consolidation. Consequently, it is recommended to develop the necessary functionalities within the IFMIS environment to support this objective. This can be achieved through the following means -</p> <p>a. Option A – Enhancing the new reporting application being developed as a unified single system that will interface with the TSA, RMIS etc.) instances at the federal and provincial levels; and with the SuTRA system utilized by local governments to obtain the relevant financial data for government entities, and prepare consolidated reports² .</p> <p>Recommended for interim-IFMIS</p> <p>b. Options B - Develop the consolidated reporting as a separate application via customization of a strong BI Tool, with Data Warehousing</p> <p>Recommended for end-state IFMIS</p>	<ul style="list-style-type: none"> • Can provide a comprehensive financial overview of all government entities • Helps the government in decision making on development planning, and in cash management • Improves transparency of public finances if all public sector entities are included

² The system should be compliant with OAG and GoN guidelines to produce annual reports as per MALEP Form 271 (Province, Federal and Nation as a whole) and MALEP Form 272 for Local Governments.

Recommendation	Overview	Envisaged Outcomes / Benefits
<i>Promote publishing of fiscal information compliant with open data standards</i>	<p>Note: These options and our recommendations are detailed in subsequent sections.</p> <p>It is recommended to promote the publishing of fiscal information, compliant with open data standards, to promote fiscal transparency and accountability. Such data can include –</p> <ol style="list-style-type: none"> Budget data and budget execution reports Revenue collection data Expenditure data Monthly / quarterly / annual fiscal statements, etc. <p>This may be achieved by leveraging the consolidated reporting application (particularly in case of option 2), where the necessary reporting features may be utilized to generate and subsequently disseminate the required fiscal information.</p>	<ul style="list-style-type: none"> Promotes fiscal transparency and accountability
<i>ICT enhancements to LMBIS (including pLMBIS)</i>	<p>ICT Enhancements (Enhancements to existing systems) – Based on an assessment of the existing systems and the key issues and limitations identified during the diagnostic phase, the following presents the recommended enhancements to the existing systems proposed for the interim state. This is further elaborated in section 2.2.2.</p> <p>The enhancements to the LMBIS system cover strengthening the system controls over the budget preparation exercise.</p> <p>Automating certain budget reallocation processes, with sufficiency of business logic and consequent report generation capacities; and</p> <p>Establishing interfaces with other external systems to retrieve data to support in generation of budget estimates, including from DOMS and E-GP</p> <p>It is recommended that the LMBIS system be interfaced with the e-Procurement (e-GP) system to support the exchange of data relevant in the context of annual and medium-term budgeting. This may be achieved in the following manner –</p> <ol style="list-style-type: none"> For annual budgeting - LMBIS to support in recording budget estimates for the various budget codes for each procuring entity that will form the budget ceilings for preparation of the Annual Procurement Plan (APP) in the e-GP system after the budget is approved. (This assumes that the e-GP system comprises the functionalities for the APP preparation and management). For medium-term budgeting – Information on multi-year payment schedules from the contract management module of e-GP should be retrieved and 	<ul style="list-style-type: none"> Improved transparency and controls over budget virements Improved operational efficiency in budget preparation process

Recommendation	Overview	Envisaged Outcomes / Benefits
	included in the medium-term estimates captured in the LMBIS system during the budget preparation system. (This assumes that the e-GP system comprises the functionalities for a contract ledger – this may require enhancements to the e-GP system or separate contract ledger functionalities to be developed in the IFMIS environment).	
<i>ICT enhancements to CGAS</i>	<p>The enhancements to the CGAS system cover strengthening the budget execution controls within the system.</p> <p>In addition, interfacing with the e-Procurement system in order to validate in processing of works bills with contract/ vendor data, and to record commitments.</p>	<ul style="list-style-type: none"> Improved budget execution controls and transparency Take steps for commitments management
<i>ICT enhancements to TSA</i>	The enhancements proposed to the TSA system are aimed at enabling automated reconciliation of transactions in the system with the commercial banks/NRB.	<ul style="list-style-type: none"> Improved budget execution controls and transparency Reduced administrative burden in reconciliation of expenditure data
<i>ICT enhancements to SuTRA</i>	The enhancements to SuTRA are proposed to enable banks maintaining local government accounts to upload bank statements to support automated reconciliation.	<ul style="list-style-type: none"> Reduced administrative burden in compilation of accounts and reconciliation
<i>ICT enhancements to RMIS</i>	The proposed enhancements to RMIS are envisaged to enable automated reconciliation of the daily revenue collections (through interfaces with banking systems), and periodically with NRB	<ul style="list-style-type: none"> Reduced administrative burden in reconciliation of revenue collections
<p>ICT Enhancements (Developing interfaces) – As part of the above described new application development and enhancement needs, the following presents the recommended interfaces needed for the other systems in the PFM environment (These are explained in section 2.2.2)</p>		
<i>SuTRA</i>	SuTRA to interface with the proposed reporting application to send accounting/ financials data that would be used for whole-of-nations reporting	<ul style="list-style-type: none"> Reduced administrative burden for whole-of-government reporting Improved transparency and visibility over public finances
<i>e-GP</i>	e-GP to interface with LMBIS and CGAS in order to send information on committed project expenditure, annual procurement plans, and for data on vendors/contracts that can be used while preparing payment orders	<ul style="list-style-type: none"> Improved efficiency in budget preparation and execution
<i>PAMS</i>	PAMS to interface with the proposed reporting application to send accounting/ financials data on government assets that would be used for whole-of-nations reporting	<ul style="list-style-type: none"> Reduced administrative burden for whole-of-government reporting
<p>Other ICT related recommendations to support improved adoption of PFM IT systems</p>		
<i>Implementation of e-signatures</i>	It is recommended to promote and eventually mandate the adoption of e-signatures across the	<ul style="list-style-type: none"> Promoting functional equivalence of manual and digital documents that will

Recommendation	Overview	Envisaged Outcomes / Benefits
	various PFM IT systems, through necessary system enhancements and policy guidelines.	improve operational efficiency of PFM environment
Recommendations pertaining to policy reforms, process improvements and institutional strengthening to support interim state IFMIS vision – this is further elaborated in section 2.3.		
A. Budget Management		
<i>Developing a Loans & Investments management and reporting framework to estimate receipts from government investments</i>	To improve the accuracy of the receipts estimates of the Government, it is recommended that a framework be developed to strengthen the process of monitoring and reporting on the repayment of loans issued by the Government to various public sector enterprises (PSEs) and other beneficiaries, as well as to track the issuance of dividends / returns on investments made by the Government into PSEs. This will also contribute to improving transparency and accountability over the management of public funds channeled into PSEs.	<ul style="list-style-type: none"> Improving accuracy of receipts estimates Increasing transparency and accountability over loan repayments to the Government Improving control over debt arrear recovery to generate additional fiscal space
<i>Developing a framework for monitoring of revenue and expenditure arrears and corresponding recovery/ clearance plans</i>	Revenue arrears can be significant in cases of weak revenue administration capacity of the Government, and are often not recognized or tracked, particularly in a cash-basis / modified cash-basis accounting system. Consequently, strengthening the recording and monitoring of such revenue arrears would form an important step towards formulating recovery plans and enhancing the receipts of the Government.	<ul style="list-style-type: none"> Creating additional fiscal space through recovery of revenue arrears Improved transparency and accountability over recovery of revenue arrears for revenue earning departments Improved predictability over management of public finances by clearing stock and minimizing flow of expenditure arrears (also lends credibility to the budgeting exercise)
<i>Develop a framework for recording assets for all line ministries in order to improve financial reporting, as well as to improve the accuracy of recurrent expenditure related to use of good and services</i>	The recording of public assets with information such as the asset categories, asset values and depreciation schedules, etc. would form an important input towards accurate budgeting of certain categories of both capital and recurrent expenditure, such as expenditure on maintenance of buildings, procurement of vehicles, etc. Consequently, it is recommended to develop a framework for the recording and reporting of public assets which can be serve as the database for PAMS, and going forward, can aid in budget preparation exercise in end-state IFMIS	<ul style="list-style-type: none"> Improved visibility over non-financial assets and their value Potential for improving accuracy of budget estimation by linking asset maintenance and depreciation schedules to related expenditure

Recommendation	Overview	Envisaged Outcomes / Benefits
<i>Strengthen guidelines to improve accuracy of medium-term estimation of expenditure for both recurrent and capital expenditure</i>	While medium-term budgeting has been institutionalized in the Government of Nepal, there remains further scope to improve the accuracy of the same. Consequently, guidelines could be developed to streamline the preparation of medium-term budget estimates particularly for capital expenditure on schemes, infrastructure projects, etc. which would help improve the visibility of spending commitments over the medium-term and improve the accuracy of the budget estimates.	<ul style="list-style-type: none"> Improved budget accuracy and visibility of commitments through scientific and process driven estimation of expenditure estimates
<i>Strengthen the approach, guidelines and framework for Outcome based budgeting</i>	To improve the ability of the Government to make informed decisions about the effectiveness of public spending, there is a need to strengthen the existing practices of outcome-based budgeting by introducing guidelines to effectively track the outcomes across the spectrum of social and economic expenditure by leveraging socio-economic data to design relevant and measurable outcome indicators, and assessing the effectiveness of public expenditure against these indicators based on the targets achieved year on year.	<ul style="list-style-type: none"> Improved transparency and accountability over effectiveness of public expenditure
<i>Undertake a root cause analysis on virements to identify key policy and procedural reforms to optimize virement use</i>	One of the key challenges identified during the diagnostic assessment was the high prevalence of virements which are indicative of deficiencies in the annual budgeting exercise. Consequently, it is recommended that a root cause analysis be conducted to identify the factors contributing to the prevalence of virements and subsequently formulate guidelines to minimize the same.	<ul style="list-style-type: none"> Improving budget predictability Minimizing budget composition outturns
<i>strengthen Budget Manual and Guidelines for minimizing reallocations and virements by optimizing budget allocations</i>	Following the exercise to identify the factors contributing to the prevalence of virements, it is recommended to introduce/amend provisions in the budget manual and guidelines to address the identified factors and minimize the utilization of virements.	<ul style="list-style-type: none"> Improving budget predictability Minimizing budget composition outturns
<i>Mandate the submission of Fiscal Risk Statements by MoF to the Parliament, as part of the documents to be submitted during budget session</i>	Fiscal risk statements are a useful tool to support informed decision making about the long-term management of public funds and provide further information on the fiscal impacts of country specific risks such as climate related hazards, economic shocks, etc. which can help in fiscal contingency planning.	<ul style="list-style-type: none"> Providing information to support fiscal contingency planning

B. Cash and Debt Management

<i>Develop guidelines for submission of cash flow statements for revenue and</i>	Accurate cash flow projections, particularly for capital expenditure, allow for effective planning and management of the Government's cash balances and reducing the reliance on short-term liquidity driven borrowings to finance	<ul style="list-style-type: none"> Improving predictability over budget execution
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Recommendation	Overview	Envisaged Outcomes / Benefits
<i>expenditure by all line ministries</i>	cash-flow mismatches. Accordingly, it is recommended that a framework and guidelines for the submission of accurate cash flow projections be developed and institutionalized amongst the various revenue earning and expenditure departments of the Government.	<ul style="list-style-type: none"> Reducing debt burden through optimizing cash management
C. Accounting and Reporting		
Develop consolidation architecture and guidelines for consolidation of whole-of-governments financial reporting	As a prerequisite to developing the reporting application to support the whole-of-government accounts, the necessary consolidation architecture and accounting guidelines need to be developed which detail the coverage of consolidation, hierarchy of consolidation across the three tiers of governments, the elimination of flows based on the nature of transactions, the chart of account relationships, etc. based on which the necessary functional enhancements in the IFMIS environment can be developed.	<ul style="list-style-type: none"> Improved visibility over consolidated finances across all tiers of the government
Recommendations pertaining to capacity building to support interim state IFMIS vision – this is further elaborated in chapter 4 (Capacity building and change management strategy).		
<i>Capacity building to support reforms in budget management</i>	This would cover training to the relevant officials on the following aspects: <ul style="list-style-type: none"> Capacity building on updated guidelines on medium term, outcome budgeting and preparation of fiscal risk statements Capacity building on management of revenue and expenditure arrears Capacity building on updated guidelines on minimizing virements Capacity building of PDMO/FCGO staff involved in managing government loans and advances (and in corresponding use of DOMS) 	<ul style="list-style-type: none"> The capacity building programs outlined would help the various government officials to adopt the proposed reforms for the interim-state and effectively leverage the benefits of the proposed enhancements to the existing PFM IT ecosystem.
<i>Capacity building to support reforms in treasury management</i>	This would cover training to the relevant officials on proposed enhancements to CGA, TSA, RMIS and SuTRA at all government levels.	
<i>Capacity building to support reforms in cash management</i>	This would cover training to the relevant officials across the various government agencies on the preparation of cash flow forecasts.	
<i>Capacity building to support reforms in accounting and reporting</i>	This would cover training to the relevant officials on the following aspects: <ul style="list-style-type: none"> Capacity building of Statistics section at FCGO in whole-of-government reporting covering definition of consolidation hierarchy, and identifying and eliminating inter-governmental transactions as per the guidelines to be developed Conducting a HR Diagnostic study at provincial level to identify capacity 	

Recommendation	Overview	Envisaged Outcomes / Benefits
<i>Improve institutional coordination for ICT enhancements to PFM IT systems</i>	<p>gaps, and subsequently to devise a staffing plan to meet the requirements including feasibility of redeploying staff from other roles (e.g. at treasuries)</p> <p>The current ICT landscape involves a number of fragmented systems owned, maintained and enhanced by various agencies. Given the need for closely interfacing these systems to achieve a vision of an integrated PFM IT environment, it is recommended to establish mechanisms to support close coordination between the various agencies to implement any ICT enhancements.</p> <p>This may be achieved by establishing a dedicated technical team as part of the Project Management Office (PMO) to be created for the interim state IFMIS implementation. This is further elaborated in section 3.3 (Governance arrangements).</p>	<ul style="list-style-type: none"> • Reduced risk of disruption to business continuity • Improved coordination between agencies to implement ICT enhancements in a timely manner

Recommendations pertaining to institutional strengthening to support interim state IFMIS vision – further elaborated in section 3.3 (Governance arrangements).

The above recommendations are further elaborated in the subsequent sections and chapters. **In addition, supplementary to-be process maps reflecting the impact of the proposed recommendations on the existing business processes as documented in the diagnostic report are provided in Annexure 1.**

2.2. Conceptual design of interim state

The proposed enhancements to the ICT environment to support the interim state IFMIS vision and objectives have been conceptualized to facilitate the exchange of data amongst the various systems currently in use, and to address some of the critical functional limitations in the existing systems.

Based on the above, the following figure outlines the conceptual design of the interim state IFMIS environment, highlighting the various interfaces proposed between the existing systems.

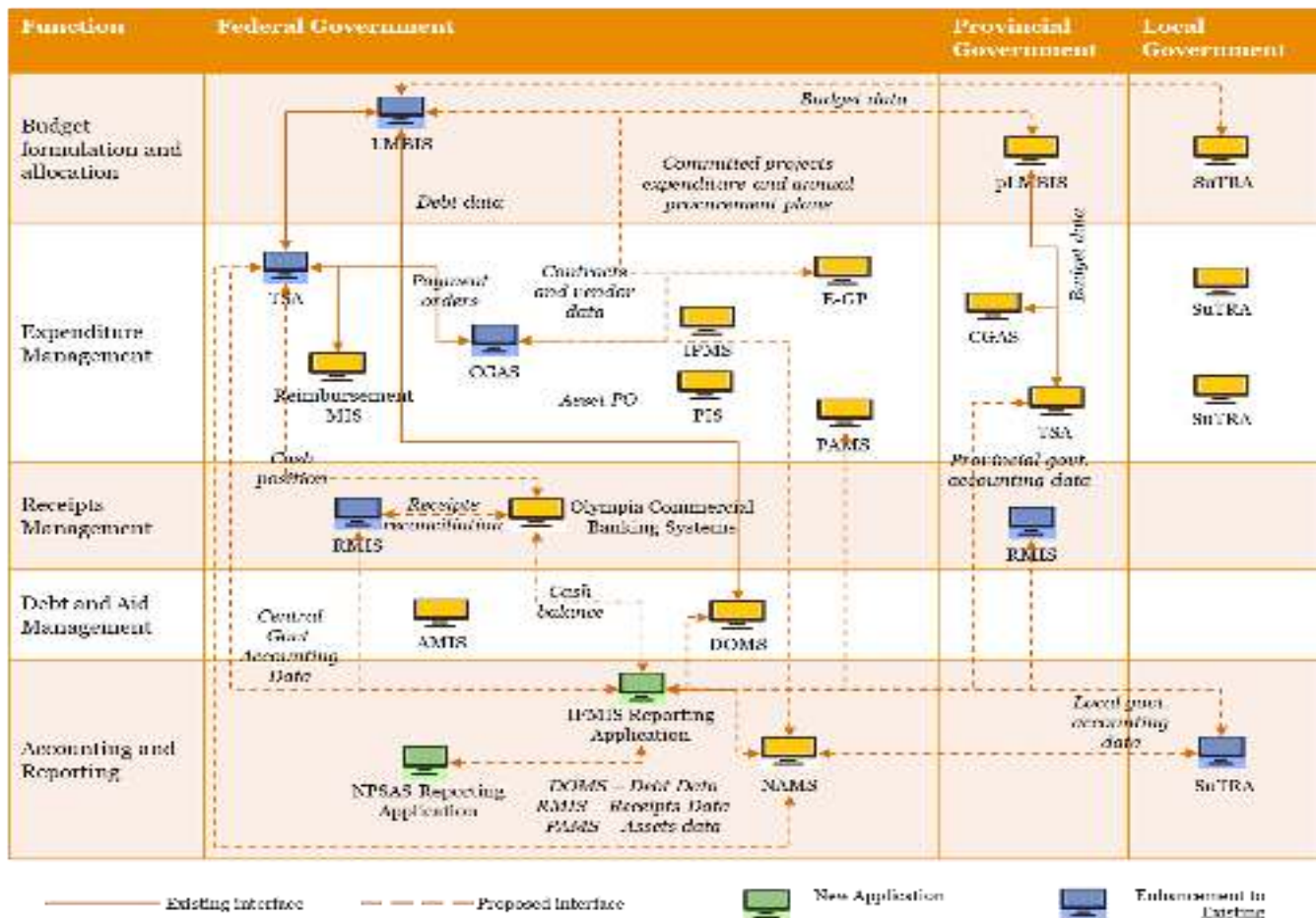


Figure 1: Proposed interim state IFMIS environment

Note: There are two distinct reporting applications proposed to support both financial reporting as well as NPSAS based whole-of-government accounts consolidation, which will interface with key PFM systems at the federal and provincial level (TSA, RMIS, PAMS) and the SuTRA system at the local government level. In addition, the systems would interface with NRB in order to fetch specific inputs/ data points needed for consolidation, and would support a portal for receiving any other information needed.

Furthermore, in the event of a Government decision to utilize audited financials as the base data for the consolidation exercise, an interface between the reporting applications and the accounting systems of the Office of the Auditor General (OAG). A conceptual overview of the proposed reporting application is provided below.

2.2.1. Conceptual overview of proposed reporting application to support consolidated whole-of-government reporting

The consolidated reporting application has been conceptualized to meet the Government of Nepal's objective of generating consolidated whole-of-government financial reports, and will support:

- **Consolidated reporting across all tiers of government (i.e. whole of government)** – this will cover all the government agencies across the federal, provincial and local government levels and will include all administrative sub-units of these agencies. The coverage for consolidation can be further expanded at later stages to include public sector enterprises (PSEs), PPPs, extra-budgetary funds, etc.
- **Provides overview of revenues, expenditures, assets and liabilities** – the reporting application will allow for reporting that can be consolidated and disaggregated by
 - Administrative classification
 - Economic classification

- Functional classification
- Geographical classification (*complemented by GIS layering – optional*)
- **Supports generation of customizable financial reports to support planning and decision-making by MoF, FCGO, OAG, etc.** – budget execution reports, govt. financial reports (balance sheet, cash flow, profit and loss, etc.) using either audited and/or unaudited financial data.

The following figure provides a conceptual view of the reporting application.

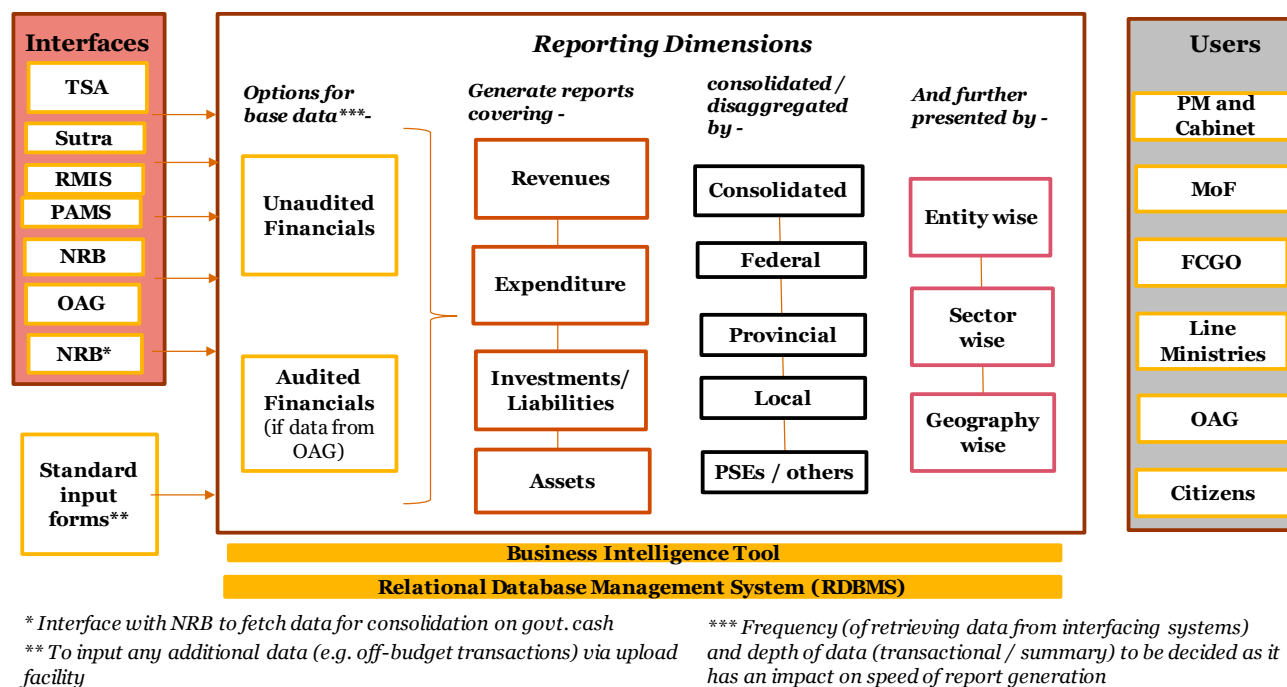


Figure 2: Conceptual view of reporting application

The application will support the consolidated reporting based on the above dimensions, based on the consolidation architecture (comprising the consolidation hierarchy and other business rules regarding the elimination of inter-agency transactions) which is to be configured by the users. The consolidation architecture is further elaborated from a functional perspective in the subsequent sections.

Financial data from the TSA, RMIS, SuTRA etc., PFM systems will be retrieved into the reporting application and processed into customized reports based on the defined consolidated architecture.

However, the ability of the reporting application to consolidate and disaggregate will be subject to the availability of the requisite data in the underlying systems that will be interfaced with the reporting application.

Some of the prerequisites for implementing the consolidated reporting application include the following:

Finalizing the consolidation architecture in terms of defining

- Entity coverage and hierarchy
- Identification and elimination of inter-entity transactions (to avoid double-counting)
- **Modifications/ changes to the Chart-of-Accounts in line with the consolidation architecture** including
- Administrative classification reflecting entity hierarchy
- Codifying inter-entity transactions needing elimination
- Introducing CoA codes for any transactions not presently covered, including any off-budgetary or extra-budgetary operations

Note: Any non-uniformity across the 3 tiers in terms of CoA usage and Reporting standards can impede the consolidation and needs to be addressed through a mapping exercise.

- **Ensuring all data points needed for Whole-of-government reporting** are harmonized in terms of format and availability (via system interface/ templated upload) in the Reporting Application from federal, provincial and local governments
 - Example: PSEs data can be optionally included once system is stabilized in a live environment

These prerequisites are further discussed in section 2.3.3.1.

Furthermore, given these dependencies on the availability of data to support the consolidation exercise, a phased approach to leveraging the reporting tool for developing consolidated reports is recommended, which is based on various parameters outlined in the table below.

Table 2: Proposed plan for implementing reporting application

Dimension	Vital	Essential	Desirable
Data Depth	Summary (Accounting level)	Level Transaction Level (Activity level)	
Data source	Unaudited Financials	Full NPSAS Financials	compliant Audited Financials
Reporting Coverage	Revenues Expenditure Debt	Investments Other Liabilities Physical Assets	
Consolidation Coverage	Federal Provincial Local		PSEs PPPs/ others

Reporting parameters -

Sectoral Reporting (indicative)	Education Health Social Welfare etc..
Geographical Representation	By city/ province/municipality etc., Geospatial visualization

Based on the above considerations, the following outlines the proposed solution design for the consolidated reporting application –

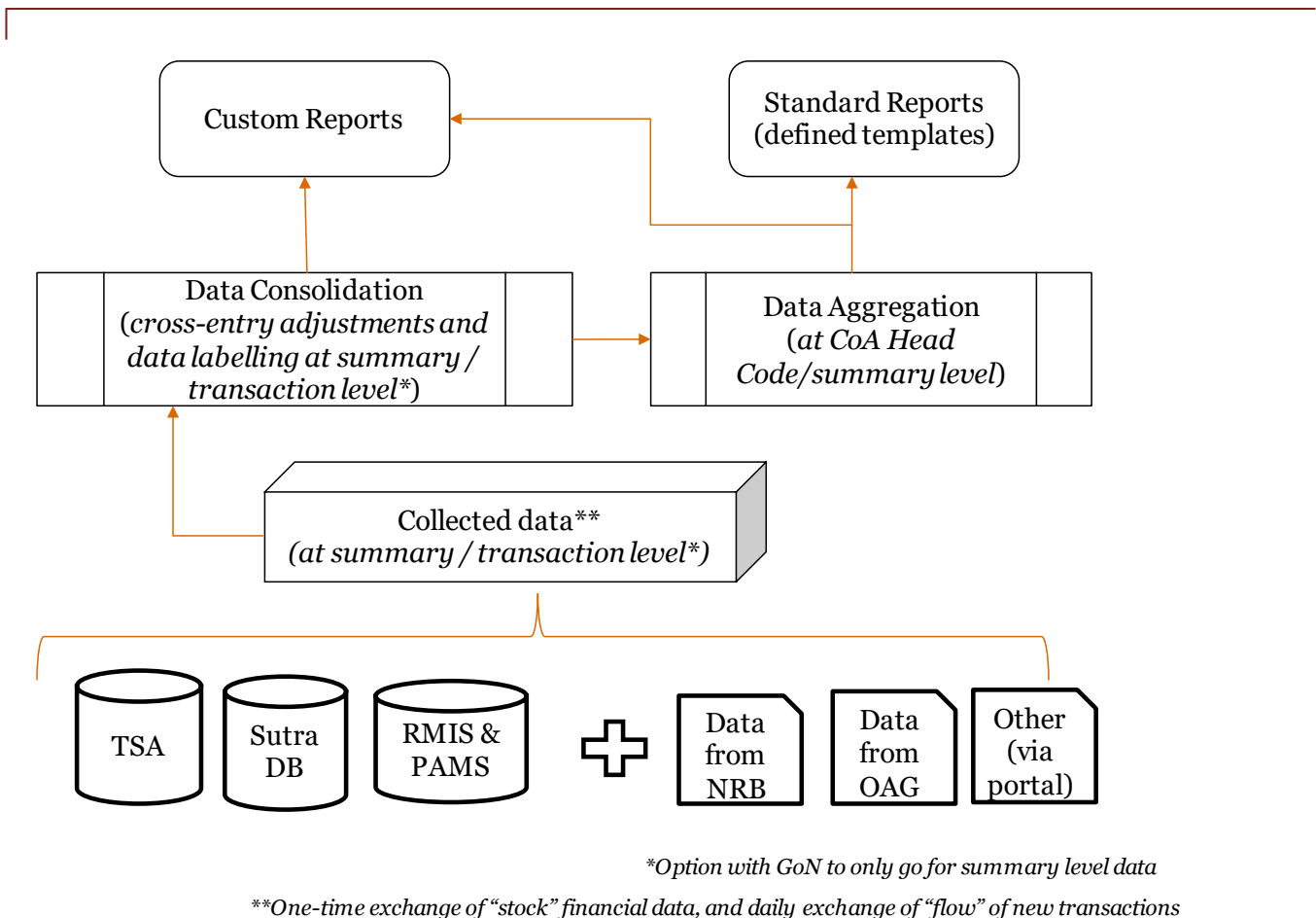


Figure 3: Proposed consolidation workflow

Data from the key PFM systems across the federal and provincial levels, along with data from the SuTRA system and other relevant sources, is to be collected and aggregated based on the consolidated hierarchy defined, following which the necessary cross-entry adjustments are to be made to the data. This will allow for consolidated data which can be used to generate various standard and customized data.

Given the significant volume of data across these databases, protocols can be established to facilitate a one-time exchange of the stock financial data with subsequent refresh protocols to update the base data with the flow of new transactions.

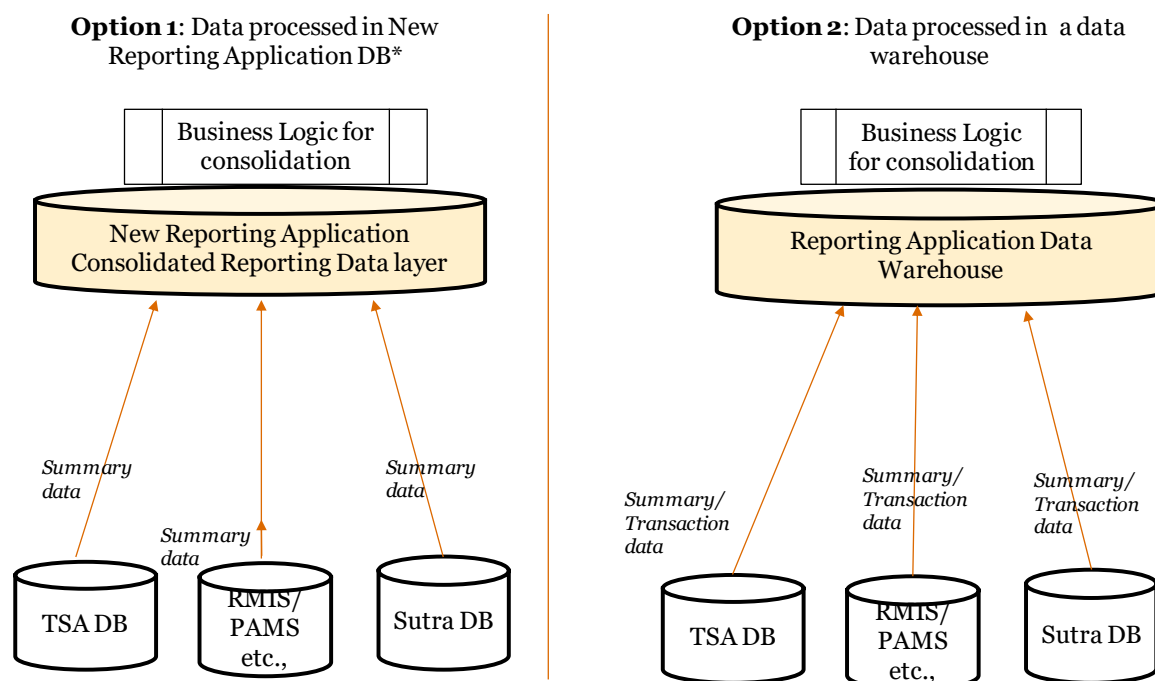
To operationalize this workflow, the reporting application should be interfaced with these databases, and should have the necessary functionalities for the aggregation, adjustments and reporting. However, there are two key considerations based on which the solution design can be further detailed out which include the following:

- **Data management capabilities** – given the number of transactions to be utilized for the consolidation exercise, the solution may require extensive data management capabilities, which may warrant the implementation of a data warehouse solution. Based on this consideration, the following options may be explored:

Utilizing summary data as an interim measure: If summary level data is used, the data volumes will be low and can be accommodated in the existing databases – *while this approach can limit reporting capabilities and analysis, it would allow for an interim solution to be setup within a short timeline with low investment.*

Utilizing transaction level data: If transaction level data is used, the data volumes will be high and may require a dedicated data warehouse solution to support the consolidation – *this approach can support exhaustive reporting but requires significantly higher costs and effort for implementation.*

Based on the above, the following development approaches can be adopted:



* Based on understanding that GoN is currently developing a new Reporting Application

Figure 4: approaches for data management

Option 1: Data processed in the database of the New Reporting Application

In this option, Summary financial data pooled from databases into New Reporting Application Data Base. The New Reporting Application will have the business logic to support aggregation and elimination of inter-agency transactions. Post adjustments, the summarized data can be used for generating reports.

Option 2: Data processed in reporting application database / warehouse

In this option, the transaction level financials data is collated in a data warehouse. The data warehouse shall have the capacity to process data at a transaction level to make all inter-entity adjustments, in order to consolidate information for reporting.

The following presents a comparative analysis of the proposed options for data management.

Table 3: Comparative analysis of proposed options for data management

Parameter	Option 1: Data processed in New Reporting Application DB	Option 2: Data processed in a data warehouse
Description of option	<ul style="list-style-type: none"> Summary financial data pooled from databases into New Reporting Application DB New Reporting Application to have the business logic to support aggregation and elimination of inter-agency transactions Summarized data can be used for generating reports 	<ul style="list-style-type: none"> The transaction level financials data is collated in a data warehouse The data warehouse to process data at a transaction level to make all adjustments, consolidation and summarization
Data volume	Low (summary data)	High (transactional data)

Parameter	Option 1: Data processed in New Reporting Application DB	Option 2: Data processed in a data warehouse
Cost of Development	Low	High
Development time	Low	High
Sustainability	Medium	High

Our recommendation:

For the interim state, it is recommended to adopt option 1 (i.e. utilizing summary level data consolidated in the reporting application database) which would allow for consolidated reports to be generated without significant investment in a data warehouse solution to support the consolidation of transaction level data.

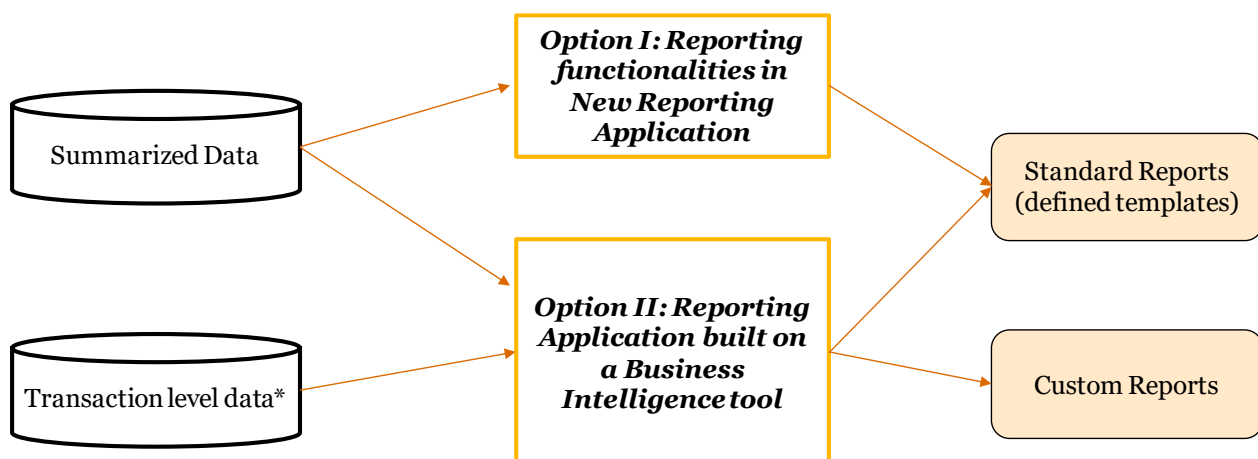
Note: Given that one of the objectives of the end-state IFMIS is to implement a dedicated IFMIS data warehouse, option 2 may be deferred to the end-state.

- **Reporting capabilities** – based on the reporting requirements and expectations of the key stakeholders (e.g. MoF, FCGO, OAG, etc.), there are various options available for implementing the consolidated reporting application.

If reporting expectations are limited to standard reports without extensive customization, then needed enhancements can be made to the under-development Reporting Application.

If reporting expectations are exhaustive, then a business intelligence (BI tool) can be explored to support the reporting requirements

The following figure outlines the options that can be explored with respect to the reporting capabilities:



* Data volumes will warrant a data warehouse solution for consolidation and elimination of inter-agency transactions

Figure 5: Options for reporting application

The following presents a comparative analysis of the proposed options for the reporting application:

Table 4: Comparative analysis of the proposed options for reporting application

Parameter	Option I: Develop in new Reporting Application	Option II: Reporting Application built on a Business Intelligence tool
Description of option	Develop consolidated reporting functionalities as part of New Reporting Application	Develop consolidated reporting functionalities in a Business Intelligence (BI) Tool
Reporting Capacities	Standard Reports	Standard Reports Custom Reports
Data Visualization	Low	High
Estimated Capex	Medium	High
Estimated Opex	Low	Medium (licensing cost)
Timelines for roll-out	Low (<i>direct contracting for enhancements</i>)	Medium (tendering & COTS customization)
Sustainability in long run	Medium (<i>risk of significant rework if interfaced with end-state IFMIS environment</i>)	High (<i>can be agnostically used across interim and end states</i>)

Our recommendation

Based on the above considerations, it is recommended to adopt Option 1: Develop comprehensive reporting application functionalities in the under development Reporting Application, given the budget and timelines available for the interim state.

Note: Also, this option is already being exercised by the GoN, with some variations.

For the end-state, it is recommended that **Option 2: Develop the consolidated reporting application as a customization on a strong BI Tool in end-state IFMIS** be adopted, which has the following characteristic features:

- ✓ Best report generation capacities – *future proofing GoN's emerging needs going forward*
- ✓ High sustainability – *built on modern technical platform, with relative ease of interfacing with a data warehouse and future end-state IFMIS environment, and for geographical visualization*
- ✓ Relatively lower costs and development timelines vis-à-vis a bespoke solution, for comparative features and functionalities

The various decision points required to finalize the implementation approach for the reporting application is outlined in Chapter 8.

Implementing the consolidated reporting application can benefit the various users from MoF, FCGO and other agencies in terms of providing relevant information to support decision making. The following table provides an outline of the envisaged benefits of the reporting application for various stakeholder groups:

Table 5: Envisaged benefits of reporting application for various stakeholder groups

User	Key Benefits
FCGO/ MoF	<ul style="list-style-type: none"> Consolidated view on government spending & revenues, and for insights on budget utilization and expenditure patterns, especially on large-scale programmes Information for more accurate cash planning and management
Political Leadership	<ul style="list-style-type: none"> Holistic view on government finances Key inputs for strategic decision making for planning future budgets
Line Ministries	<ul style="list-style-type: none"> Insights on performance of various departments/ offices, for improved decision making on virements and budget allocations
OAG	<ul style="list-style-type: none"> Information for audit (<i>including potentially for performance audit</i>), and for red-flagging potential accounting anomalies
Citizens	<ul style="list-style-type: none"> Citizen empowerment with up-to-date insights on government performance

The comprehensive functional requirements specifications pertaining to the reporting application are outlined in Annexure 2.

Note: The GoN can compare the functionalities in Annexure 2 with the system under development in order to identify key gaps needing further enhancement.

2.2.2. Proposed ICT enhancements to existing systems

In addition to the reporting application, based on an assessment of the existing systems and the key issues and limitations identified during the diagnostic phase, the following presents the recommended enhancements to the existing systems proposed for the interim state.

Table 6: Proposed ICT enhancements to existing systems

Recommendation	Overview
ICT enhancements to LMBIS (including pLMBIS)	<ul style="list-style-type: none"> System enforced timelines for various activities based on the budget calendar All communications & alerts for budget processes via system, including movement of budget related documents, reallocations requests etc., Allow Line Ministries to reallocate budget in LMBIS that does not require MoF approval Uploading of support documents while submitting reallocation/virement requests Workflow configuration for all MoF approvers for reallocations and virements Blocking available budget for release and making revisions to the appropriated budget per approved virement request Generating comprehensive reports on reallocations and virements ministry wise and expenditure category wise Support generation of budget utilization reports Developing interfaces with DOMS, and e-GP for information exchange to support budget preparation

Recommendation	Overview
<i>ICT enhancements to CGAS</i>	<ul style="list-style-type: none"> Enhance CGAS to support in enforcing trimester-wise expenditure ceilings for payment order processing Establish interface with e-Procurement (e-GP system) to obtain data on contracts to validate payment orders, and the details of vendors for executing the payments Extend CGAS to all line ministries in the Provinces for better expenditure management
<i>ICT enhancements to TSA</i>	<ul style="list-style-type: none"> Support auto reconciliation of expenditure in TSA via interface with commercial banks (alternatively, can provide facility in TSA for banks to upload e-scrolls) and with NRB
<i>ICT enhancements to SuTRA</i>	<ul style="list-style-type: none"> Interface with consolidated reporting application for seamless exchange of information between Federal and Local governments Interface with receipt systems for seamless revenue accounting and reporting Develop functionalities to allow banks maintaining local government accounts to upload bank statements on SuTRA
<i>ICT enhancements to RMIS</i>	<ul style="list-style-type: none"> Support automatic reconciliation of daily collections with partner banks via an interface with the Commercial Bank IT systems, and periodically with NRB <p>Note: In addition, to enhance the Online Payment Portal to support multiple payment options for online payments including credit/ debit cards, mobile wallets etc.,</p>

These enhancements are further elaborated in Annexure 2 - functional requirements specifications for the interim-state IFMIS.

2.3. Details of proposed policy, process and institutional recommendations

This section provides overview of recommendations aimed at addressing the current identified inefficiencies and challenges across the various functional areas of the PFM environment in the context of the interim state IFMIS environment.

2.3.1. Budget Management

2.3.1.1. Developing a Loans & Investments management and reporting framework to estimate receipts from government investments

A large number of public sector enterprises are supported by the Government through grants, loans and investments, where repayments and dividends are expected from these entities to the Government. However, there are often instances where the repayments of such loans and the issuances of dividends are not tracked / enforced which have a fiscal impact on the receipts estimates in the budget.

Accordingly, there is a need to develop a framework to track the various loans issued to PSEs and the compliance of these entities with the repayment schedule, and to track the returns on investments through dividends issued by these entities (assuming a structured dividend policy for PSEs exists).

The following table provides an overview of the proposed implementation approach for the same.

Table 7: Proposed implementation approach - loans and investments management and reporting framework

Category	Description
<i>Key Considerations</i>	<ul style="list-style-type: none"> <i>Legal and regulatory framework</i> – legal provisions to facilitate the reporting of PSE finances and to enforce the repayment of loans should be established / strengthened to

Category	Description
	<p>support this initiative. Furthermore, in the case of investments by the government towards PSEs, a structured dividend policy should be established that will define certain criteria / timelines for the issuance of dividends to the PSEs shareholders. These provisions (and their enforcement) would also help nudge the Government towards actively monitoring the financial health and performance of these PSEs, particularly where liabilities / investments are significant.</p> <ul style="list-style-type: none"> • <i>Covering contingent liabilities arising from guarantees on external debt of PSEs:</i> This framework should also incorporate provisions to report on the issuance and realization of guarantees issued by the Government on the external borrowings of PSEs, which may result in significant contingent liabilities without effective governance mechanisms.
	<p>The implementation approach proposed for establishing this framework is outlined below:</p> <p>Step 1: Amend legislative provisions relating to the reporting of loans and investments in PSEs (including guarantees) which include:</p> <ul style="list-style-type: none"> • Centralized recording of loans issued to PSEs along with the repayment schedule and compliance to the repayment schedule • Recovery plans for liabilities with a focus on high-value and dated loan repayments from PSEs (subject to the financial health and performance of the PSEs) • Defining criteria and timelines for the issuance of dividends (with corresponding guidelines on the reporting of PSE finances) • Centralized recordkeeping of guarantees issued by the Government to PSEs (covering contingent liabilities based on risk rating of guarantees, realized guarantees and fees levied (if any) on guarantees) <p>Step 2: Developing a database of loans, investment and guarantees issued to PSEs:</p> <ul style="list-style-type: none"> • Developing reporting templates and formats to support data collection and analysis • Compiling and updating data on a timely basis for reporting and analysis
<i>Implementation Approach</i>	
<i>Critical Success Factors</i>	Managing the political economy with respect to the governance and transparency of PSEs would be a critical success factor to institutionalize this framework.

2.3.1.2. Developing a framework for monitoring of revenue and expenditure arrears and developing corresponding recovery/ clearance plans

One of the key issues and challenges identified with the revenue administration is the lack of visibility over revenue arrears (which are often not recognized or actively tracked particularly in a cash-basis / modified cash-basis accounting system). Consequently, strengthening the recording and monitoring of such revenue arrears would form an important step towards formulating recovery plans and enhancing the receipts of the Government.

The following table provides an overview of the proposed implementation approach for the same.

Table 8: Proposed implementation approach – revenue arrears reporting framework and recovery plans

Category	Description
<i>Key Considerations</i>	<ul style="list-style-type: none"> • <i>Accounting framework</i> – while revenue arrears are not recognized in traditional cash / modified cash basis accounting systems, separate provisions should be introduced to facilitate the reporting of such arrears by the various revenue earning departments. • <i>Administrative capacity of revenue earning departments</i> – The administrative capacity of the revenue earning departments to record, track and enforce the collection of revenue arrears should be strengthened to support this initiative.

Category	Description
	<p>The implementation approach proposed for establishing this framework is outlined below:</p> <p>Step 1: Amend legislative provisions relating to the recording and reporting of revenue arrears which include:</p> <ul style="list-style-type: none"> Developing templates and timelines for reporting of revenue arrears with ageing and value analysis of such arrears – these could be incorporated into the annual budget formats to facilitate compliance from the concerned revenue earning agencies <p>Step 2: Developing a centralized database of revenue arrears across the various revenue earning agencies:</p> <ul style="list-style-type: none"> Collecting data on the revenue arrears across various departments and developing a centralized up-to-date database on the same – to address the stock of revenue arrears Establishing protocols for periodically updating the database of revenue arrears – to address the flow of revenue arrears <p>Step 3: Analyze revenue arrears data to develop recovery plans</p> <ul style="list-style-type: none"> The establishment of a centralized database of revenue arrears would allow for analysis of the data based on parameters such as (not exhaustive): <ul style="list-style-type: none"> Age of arrears Quantum of arrears (covering volume and value, including interest and penalties as applicable) In addition, arrears could also be analyzed from a risk perspective, i.e. taking into consideration the cost of recovery, probability of recovery, etc. which could form useful insights for developing strategies to support the recovery of revenue arrears Based on this analysis, specialized strategies could be further developed to support the recovery of outstanding arrears based on the risk rating, age and quantum of arrears (e.g. one time penalty / interest waiver for revenue categories having large volume of low value arrears such as property taxes).
<i>Implementation Approach</i>	
<i>Critical Success Factors</i>	<p>Incentivizing the recording and reporting of revenue arrears by rewarding the performance of departments / officials in reducing the quantum of revenue arrears (for the short term, with due consideration towards managing punitive action by officials towards taxpayers) and subsequently strengthening the revenue administration capacity to minimize the creation of new revenue arrears would support this initiative.</p>

In addition to revenue arrears, the accumulation of expenditure arrears can occur in situations where large budget outturns and weak commitment controls result in commitments being entered into by spending agencies without adequate funds to support payments. While strengthening the existing system of commitment controls and its linkage to the budgeting process would address the flow of this issue (i.e. minimize the creation of new arrears), there is a need to track the existing stock of expenditure arrears (as they are typically not recognized in a cash-basis / modified cash-basis accounting system), and to develop a plan to clear the stock of arrears based on parameters such as the nature of payments, quantum and age of the outstanding payments.

The following table provides an overview of the proposed implementation approach for the same.

Table 9: Proposed implementation approach – expenditure arrears reporting framework and clearance plans

Category	Description
<i>Key Considerations</i>	<ul style="list-style-type: none"> <i>Accounting framework</i> – while expenditure arrears are not recognized in traditional cash / modified cash basis accounting systems, separate provisions should be introduced to facilitate the reporting of such arrears by the various spending departments. <i>Broader reforms to strengthen commitment controls</i> – to minimize the future accumulation of expenditure arrears, the strengthening of commitment controls through

Category	Description
	policy initiatives / process reforms and ICT based controls in the IFMIS environment is imperative.
Implementation Approach	<p>The implementation approach proposed for establishing this framework is outlined below:</p> <p>Step 1: Amend legislative provisions relating to the recording and reporting of expenditure arrears which include:</p> <ul style="list-style-type: none"> • Developing templates and timelines for reporting of expenditure arrears (including tracking from the date of receiving the invoices) with ageing and value analysis of such arrears – these could be incorporated into the annual budget formats to facilitate compliance from the concerned spending agencies <p>Step 2: Developing a centralized database of expenditure arrears across the various spending agencies:</p> <ul style="list-style-type: none"> • Collecting data on the revenue arrears across various departments and developing a centralized up-to-date database on the same – to address the stock of expenditure arrears • Establishing protocols for periodically updating the database of expenditure arrears – to address the flow of expenditure arrears <p>Step 3: Analyze expenditure arrears data to develop clearance plans</p> <ul style="list-style-type: none"> • The establishment of a centralized database of expenditure arrears would allow for analysis of the data based on parameters such as (not exhaustive): <ul style="list-style-type: none"> ○ Age of arrears ○ Quantum of arrears (including value and volume) ○ Arrears based on expenditure category • Based on this analysis, a clearance plan could be further developed to clear the existing stock of outstanding arrears based on the category of expenditure, age and quantum of arrears (e.g. clearing outstanding salary / pension payments, low value payments for small businesses followed by large value payments for larger businesses, etc.).
Critical Success Factors	<p><i>Managing political economy</i> – fostering buy-in from key stakeholders (covering administrative and political leadership) to conduct an exercise to identify the stock of expenditure arrears, and to commit to allocating a portion of available fiscal space to clearing these arrears, would contribute to the success of this exercise.</p>

2.3.1.3. Develop a framework for recording assets for all line ministries in order to improve financial reporting, as well as to improve the accuracy of estimation of recurrent expenditure related to use of good and services

The physical and financial assets of the government form a significant part of the public sector balance sheet, however, these assets, particularly physical ones, are often not recorded and valued in the Government's financial statements. While this practice can largely be attributed to the limitations of the current modified cash basis accounting standards adopted in Nepal, efforts to establish a database could be initiated as a preparatory exercise to a long-term reform of adopting accrual-based accounting.

As an interim measure, establishing guidelines to support the recording of public assets across the various government entities can provide useful inputs to support the annual budgeting exercise, particularly with respect to expenditure categories such as maintenance expenditure, investments in capital goods such as vehicles, furniture and other office equipment, etc.

This initiative could complement and support the adoption of the PAMS system, to create an online database of assets that could support the budgeting exercise, as well as allow for the tracking of any expenditure pertaining to specific assets, which will contribute to the efficiency and transparency of public expenditure.

The following table provides an overview of the proposed implementation approach for the same.

Table 10: Proposed implementation approach – assets reporting framework

Category	Description
<i>Key Considerations</i>	<ul style="list-style-type: none"> • <i>Adopting a phased approach for recording of assets</i> – Given the significant volume of data to be collected for various categories of assets, a phased approach based on various asset classes is recommended for developing the asset database. This can commence with the recording of smaller physical assets such as vehicles and office inventory, followed by larger asset classes such as buildings and other equipment.
	<p>The implementation approach proposed for establishing this framework is outlined below:</p> <p>Step 1: Establish guidelines for the valuation and recordkeeping of various asset classes:</p> <ul style="list-style-type: none"> • Guidelines for the valuation and recordkeeping of various asset classes such as physical infrastructure, office inventory, etc. should be established which list out the valuation procedures, depreciation schedules, etc. along with the corresponding reporting formats and templates. These guidelines should also cover the updating of any changes to the asset inventory and value as appropriate. <p>Step 2: Enhancing the PAMS system to allow for the recording of the necessary data for various asset classes and expanding the coverage across the various government agencies:</p> <ul style="list-style-type: none"> • The functionalities of the PAMS system should be aligned with the aforementioned guidelines and reporting templates which will allow for the creation and maintenance of the centralized asset database, covering both financial and non-financial assets as per the direction of the Government of Nepal. • The PAMS system should also be rolled-out across the various government agencies (and subsequently tiers) with the requisite capacity building efforts to support the adoption and utilization of the system.
<i>Implementation Approach</i>	
<i>Critical Success Factors</i>	<p>Clarity and unambiguity in the guidelines pertaining to the valuation and recordkeeping of assets will allow the various government agencies to adopt this initiative easily. Furthermore, to enable adoption of the PAMS system, it is recommended that the “flow” i.e. new assets be mandatorily recorded on the system. Government agencies should be encouraged and supported to create separate teams to address the “stock” i.e. the existing and legacy assets being recorded on the system.</p>

2.3.1.4. Strengthen guidelines to improve accuracy of medium-term estimation of expenditure for both recurrent and capital expenditure

Strengthening the accuracy of medium-term budget estimates would help improve the predictability of revenues and expenditures to support fiscal planning. While medium-term budgeting has been introduced in Nepal in 2002, there remains scope to strengthen its’ accuracy and subsequently its’ utility value in the fiscal planning process.

This involves specific interventions aimed at improving the predictability for each category of the budget estimates on a medium-term basis. This would require potential revisions to the budget manual, formats and procedures in conjunction with the proposed functional enhancements to the LMBIS system. It would also require the development of databases for payroll/employees, pensioners, debt, projects and arrears, to support in obtaining data for forecasting expenditure and receipts over a medium-term period.

The following table provides an overview of the proposed implementation approach for the same.

Table 11: Proposed implementation approach – strengthening medium-term budgeting

Category	Description
Key Considerations	<ul style="list-style-type: none"> • <i>Establish consolidated project databases at the line departments</i> – Most departments do not have a consolidated projects database to monitor the financial progress and record multi-year expenditure estimates and commitments. This limits the capacity of the line departments to forecast project expenditure with a reasonable level of accuracy over a medium-term period. • <i>High dependency on data availability</i> – As indicated above, data on medium term debt projections, project/scheme expenditure and other committed expenditure (salaries, pensions, etc.) is required for fiscal forecasting over a medium term. Several challenges are currently faced with respect to the availability of consolidated information on projects, debt servicing, payroll, etc. on account of manual recording of information and other capacity constraints. This would require establishing and maintaining centralized databases for these categories and ensuring the availability of updated data in a sustained manner. It would also require various functional enhancements to the LMBIS as well as interfaces to obtain data recorded in the other relevant systems (e.g. PAIS, PAMS, etc.).
Implementation Approach	<p>Taking into consideration the various constraints and dependencies, a phased approach is recommended which is outlined below:</p> <ul style="list-style-type: none"> • Phase I: Preparatory Activities (for interim state) <ul style="list-style-type: none"> ○ Establishing guidelines to institutionalize the recording of various datasets required to support the medium-term budgeting exercise (e.g. payroll, pensions, projects, debt, assets, commitments, etc.) ○ Amending budget formats (if required) to allow for evaluating and recording the medium-term budgetary impact of project proposals ○ Implement an interface / integrate the budget preparation module with the e-procurement system to build the projects data in a progressive manner (other interfaces could cover the debt management system (DOMS) to obtain data on debt liabilities over a medium term) • Phase II: Institutionalizing Medium-Term Budgeting (for end-state) <ul style="list-style-type: none"> ○ Developing comprehensive datasets for projects, debt, payroll, pensions, arrears, etc. ○ Implementing functional enhancement to budget preparation module to record multi-year budget estimates, developing interfaces with other relevant modules of IFMIS to auto-populate expenditure estimates, and developing system intelligence to support in trend analysis and fiscal projections.
Critical Success Factors	<p>Efforts to develop and roll-out supporting systems that can provide data to support the preparation of medium-term budget estimates (e.g. DOMS, PAMS, e-GP, commitments system, IPMS, etc.) and to facilitate the various government departments to accurately record, update and maintain this data will form a critical success factor for this initiative.</p>

2.3.1.5. Strengthen the approach, guidelines and framework for Outcome based budgeting

While outcome budget statements are prepared and presented as part of the annual budget exercise, there remains scope for a deeper integration of performance indicators to the budget estimates and expenditure across various economic and social sectors to support decision making. Consequently, it is recommended that the existing guidelines and framework governing outcome-based budgeting.

The following table provides an overview of the proposed implementation approach for the same.

Table 12: Proposed implementation approach – strengthening outcome-based budgeting

Category	Description
Key Considerations	<ul style="list-style-type: none"> • <i>Availability of timely and accurate performance data</i> – A key consideration to support the outcome-based budgeting exercise is to ensure the availability of updated performance data for the indicators selected across the various economic and social sectors.
Implementation Approach	<p>The implementation approach proposed for establishing this framework is outlined below:</p> <p>Step 1: Amend legislative provisions relating to the outcome budgeting process:</p> <ul style="list-style-type: none"> • The existing legislative provisions relating to the outcome budgeting process could be strengthened which would involve the following changes: <ul style="list-style-type: none"> ○ Amending CoA to incorporate programme / outcome segments that can be used to readily aggregate budget estimates against defined outcomes / performance indicators ○ Incentivizing spending agencies to demonstrate outcomes by linking outcomes to subsequent year budget allocations (subject to managing political economy) ○ Increase the frequency of reporting of performance data in-year as opposed to an annual exercise that can allow for mid-year corrections. <p>Step 2: Capacity building for spending agencies on updated guidelines:</p> <ul style="list-style-type: none"> • Conduct capacity building for officials across the relevant spending agencies pertaining to monitoring performance data and linking the same to the budget execution reports to support decision making <p>Step 3: Enhance LMBIS system to support outcome-based budgeting</p> <ul style="list-style-type: none"> • The LMBIS system could be enhanced to support any potential enhancements to the CoA to institutionalize outcome-based budgeting, and to track and record expenditure against the defined outcome indicators
Critical Success Factors	<p><i>Managing political economy to institutionalize a performance/outcome based-budgeting perspective</i> – managing the political economy in terms of fostering buy-in from key stakeholders to promote this initiative is key to institutionalize this approach to support decision making, rather than conducting it as a standalone compliance exercise.</p>

2.3.1.6. Undertake a root cause analysis on virements to identify key policy and procedural reforms to optimize virement use

While budget virements are a useful tool to allow for any in-year corrections to the budget with the objective of maximizing the budget utilization, excessive utilization of budget virements can be indicative of inaccuracies in the budgeting process.

While reforms in the budgeting exercise (such as centralized budgeting and medium-term budgeting) supported by the availability of requisite data can mitigate the excessive use of virements, it is also recommended to conduct a root cause analysis on the existing utilization of virements to identify avenues to optimize their usage.

The following table provides an overview of the proposed implementation approach for the same.

Table 13: Proposed implementation approach – root cause analysis on virements usage

Category	Description
Key Considerations	<ul style="list-style-type: none"> • <i>Dependency on reforms to improve budget accuracy</i> – While efforts to optimize the usage of virements can be undertaken, this should be done in conjunction with reforms to strengthen the accuracy of the budget estimates prepared, which will complement the objectives of this initiative.
Implementation Approach	<p>The implementation approach proposed for conducting this analysis is outlined below:</p>
	<p>Step 1: Collect data on virements</p>
	<ul style="list-style-type: none"> • The data on virements can be collected from the relevant IT systems such as LMBIS, and should cover the following data points: <ul style="list-style-type: none"> ○ Government agency / paying office raising virement request ○ Nature of virement request (re-distribution to different administrative entities within the same budget code / reallocation from one budget code to another) ○ Categories of expenditure for which virements are used ○ Virement amounts ○ Volume of virement requests
<p>Step 2: Analyze virement data to identify trends and anomalies</p>	
<ul style="list-style-type: none"> • Conduct an analysis of the virements request to identify trends and anomalies that can provide insights into the specific categories of virements that may require policy interventions for optimizing their usage. Such analysis could include: <ul style="list-style-type: none"> ○ Frequency distribution of virements based on amounts, expenditure categories, volume across departments / paying offices, etc. ○ Regression and/or other statistical analysis to identify relationships b/w departments / expenditure categories / virement utilization, etc. 	
<p>Step 3: Identify specific usage patterns for virements where utilization can be optimized through policy interventions</p>	
<ul style="list-style-type: none"> • Based on the above statistical analysis conducted, specific patterns of virement usage such as excessive usage against a particular expenditure category, or by a specific expenditure department, etc. can be identified based on which specific policy interventions could be developed to optimize their usage. 	
<p>Policy interventions that can be explored to optimize the usage of virements are elaborated in the subsequent section.</p>	
Critical Success Factors	<p><i>The availability of the requisite statistical data to support the analysis exercise would form a critical success factor to identify specific patterns in the usage of virements that can be addressed.</i></p>

2.3.1.7. Strengthen Budget Manual and Guidelines for minimizing reallocations and virements by optimizing budget allocations

Upon identification of the specific instances / circumstances contributing to the excessive utilization of virements, it is recommended that amendments to the existing policies governing the use of virements be amended to address the same. These policy changes may be further reflected in the budget manual, budget circulars and other official notifications.

The following table provides an overview of the proposed implementation approach for the same.

Table 14: Proposed implementation approach – policy interventions to optimize utilization of virements

Category	Description
Key Considerations	<ul style="list-style-type: none"> Existing rules and guidelines governing use of virements – the existing rules should be reviewed to verify whether there are any deficiencies that need to be addressed, or whether the prevalence of virements can be attributed to deficiencies in the administrative processes of approving them (and associated controls over approval – both system based and manual). This will provide further clarity into the specific nature of interventions that can be explored to optimize the usage of virements.
Implementation Approach	<p>Some of the policy interventions that can be used include the following:</p> <ul style="list-style-type: none"> Strengthening the validation checks and approval controls over the use of virements particularly those involving transferring amounts from one budget code to another Limiting the categories of expenditure where virements can be exercised Mandating the submission and review of justification notes for exercising virements (apart from redistribution within the same budget code) Limiting the number / value of virements that can be exercised by a paying officer within a financial year <p>The above policy interventions should be supplemented by the necessary system enhancements to the LMBIS and other relevant applications to support enforcement.</p>
Critical Success Factors	Complementing the above initiatives with the other reforms to strengthen the accuracy of the budget preparation exercise would contribute to the success of this initiative.

2.3.1.8. Mandate the submission of Fiscal Risk Statements by MoF to the Parliament, as part of the documents to be submitted during budget session

The practice of submitting fiscal risk statements is an emerging trend being adopted across both developing and advanced economies, to support efficient fiscal planning and budgeting. For countries like Nepal, which are subject to fiscal vulnerabilities arising from natural hazards (e.g. earthquakes, floods, etc.), which have an impact in terms of unexpected costs towards relief and recovery, it is imperative to understand the probability and fiscal impact of such risks to support the budget planning exercise.

The following table provides an overview of the proposed implementation approach for the same.

Table 15: Proposed implementation approach – preparation and submission of fiscal risk statements

Category	Description
Key Considerations	<ul style="list-style-type: none"> Adequate capacity to identify and analyze the impact of various fiscal risks – adequate capacity building efforts are to be invested to train the relevant officials of the Ministry of Finance to conduct the analysis of the fiscal impact of various risks identified.
Implementation Approach	<p>As a first step, the contours of the fiscal risk report should be defined and can typically cover the following:</p> <ul style="list-style-type: none"> Coverage of fiscal risks – this could cover risks arising from macroeconomic or financial shocks, fiscal risks arising from pending litigations, SOEs, natural disasters, PPPs, etc. as appropriate in the context of Nepal Fiscal risk disclosure norms – this could cover the norms governing disclosure which could specify the risk thresholds, financial impact thresholds, etc. that require disclosure to the Parliament

Category	Description
	<ul style="list-style-type: none"> • Key fiscal risks identified for the reporting period and their fiscal impact • Key mitigation actions to address identified fiscal risks • Annexures with technical details of fiscal risk identification and analysis <p>Subsequently, the staff assigned to prepare this report should be provided adequate training on fiscal risk analysis to support them in this exercise. This can subsequently be presented to the Parliament as part of the budget session submissions.</p>
<i>Critical Success Factors</i>	Capacity building of the staff involved in preparing the fiscal risk statement in the areas of fiscal risk identification and impact analysis would contribute to the success of this initiative.

2.3.2. Cash Management

2.3.2.1. Develop guidelines for submission of cash flow statements for revenue and expenditure by all line ministries

There is currently no formal system for cash forecasting and management in Nepal. Expenditure is controlled against the daily cash position, which is not conducive for long term cash planning and management. The current environment does not support the MoF in maintaining a reasonable projection of cash flow requirements on a daily, weekly and monthly basis and to align its cash management operations to ensure sufficiency of funds in line with expenditure needs of the government or to plan for optimal utilization of the idle cash balances, if available.

Another key issue is the limited capacity for enforcing budget utilization controls. Quarterly ceilings are prescribed as part of the budget communication, however these ceilings are not always enforced resulting in a rush of expenditure in the last quarter, contributing to sub-optimal cash management. In this context, one of the key recommendations is to determine and enforce utilization ceilings on a monthly / quarterly basis.

One of the key interventions as part of this recommendation is to implement the mandatory submission of monthly / quarterly cash flow statements for revenue and expenditure, based on which the borrowing calendar for the year as well as the utilization ceilings can be specified department wise.

The following approach can be adopted for determining the monthly / quarterly utilization ceilings based on the cash flow projections:

Table 16: Proposed implementation approach – submission of cash flow statements

Category	Description
<i>Key Considerations</i>	<ul style="list-style-type: none"> • <i>Controlling the budget size:</i> It is recommended that the MoF define overall limits on the budget utilization as a percentage of the approved budget, based on the realistic estimates of revenue and capital receipts during the year. The overall utilization limit may then be allocated on a quarterly / month-wise basis based on the cash flow projections.
<i>Implementation Approach</i>	<p>To determine department specific monthly / quarterly utilization ceilings, it is recommended that the practice of submitting annual / quarterly / monthly cash flow statements by the line departments be institutionalized. This would include both revenue and expenditure ministries/ departments.</p> <p>To introduce this initiative, templates, guidelines and notifications are to be prepared for submission of cash flow statements. These cash flow statements can be analyzed against historical expenditure and revenue trends (adjusting for reporting and accounting delays) to which can form the basis for determining the utilization ceilings.</p> <p>The preparation of cash forecasts by the line ministries would require significant capacity building efforts contextualized to the nature of receipts / disbursements of the concerned department. With respect to the expenditure departments, the preparation of cash forecasts can be limited to capital expenditure on projects / schemes, with the MoF centrally preparing cash forecasts for the</p>

Category	Description
	<p>remaining expenditure categories (i.e. debt servicing, salary and pension expenditure and other establishment expenditures). The following list indicates the proposed methodology for determining the cash flow requirements for the various expenditure categories:</p> <ul style="list-style-type: none"> • <i>Salary and pension expenditure:</i> With the implementation of consolidated databases for employees and pensioners, the predictability of salary and pension expenditure is significantly improved. Considering that salary and pension expenditure does not significantly change on a monthly basis (with the exception of arrear and other non-recurring payments), cash flow requirements can be determined by equally allocating the annual budgetary provision month-wise. • <i>Debt servicing expenditure:</i> The development of a consolidated debt portfolio (in DOMS) will facilitate cash forecasting, by ensuring the availability of the debt repayment schedule for various debt instruments. • <i>Establishment expenditure (apart from salaries):</i> Based on the decision of the MoF, the possibility of equal allocation of the approved budget in a month-wise or quarter-wise manner can be explored, which can support in simplifying the cash forecasting for establishment expenditure. • <i>Capital expenditure:</i> The accuracy of forecasting capital expenditure is dependent on several variables including procurement and implementation timelines and delays, which can negatively impact budget predictability. In this regard, while cash forecasts can be obtained from the expenditure departments, given the limitations in the accuracy of the forecasts, it is recommended that the cash allocations be discretionary, without utilizing the cash flow statements.

It is proposed that annual cash flow statements be prepared and submitted at the beginning of the year following which monthly / quarterly ceilings can be determined and applied on the budget allocated and distributed to the various paying offices. Due consideration is to be given to the inflation of the budgetary estimates for expenditure and revenue as illustrated above. The quarterly / monthly ceilings can be updated based on the progress of expenditure and receipts over the corresponding fiscal year. The submission of monthly / quarterly updates to the cash plans for revenue and expenditure would also allow for dispensation of need for submitting revised estimates. The projections for capital expenditure can be periodically updated based on the monthly / quarterly payment projections indicated in the Financial Sanctions accorded for capital expenditure.

These cash flow projections can be used by the Finance Department for various purposes including the following:

- *Preparing borrowing calendar for Open Market Borrowings (OMBs) based on annual cash plan*
- *Improving utilization of idle and surplus cash balances through short term investments*
- *Managing ways and means position by controlling disbursements (supported by cyber treasury)*
- *Reducing payment delays through active cash planning*

Critical Success Factors

Ensuring that adequate capacity building efforts are directed towards supporting the POs in preparing revenue and expenditure forecasts would positively impact the introduction of this initiative. Furthermore, the implementation of the cyber treasury as well as introducing commitment controls in conjunction with cash forecasting would address the inter-dependencies and support in streamlining the budget execution cycle.

2.3.3. Accounting and Reporting

2.3.3.1. Develop consolidation architecture and guidelines for consolidation of whole-of-governments financial reporting

As a prerequisite to developing the reporting application to support the whole-of-government accounts, the necessary consolidation architecture and accounting guidelines need to be developed which detail the coverage of consolidation, hierarchy of consolidation across the three tiers of governments, the elimination of flows based on the nature of transactions, the chart of account relationships, etc. based on which the necessary functional enhancements in the IFMIS environment can be developed.

While the current CoA is largely aligned with GFS 2014, the following additional enhancements to CoA are desirable. It is advisable for the government to undertake a detailed analysis to enhance the CoA to meet its requirements and eliminate any overlap/redundancies.

- **Demarcation between administrative and program classification** – The code for administrative and programme classification appear in the same segment in the current CoA. The following structure may be adopted to avoid confusion.

SEGMENT 1	SEGMENT 2	SEGMENT 3	SEGMENT 4	SEGMENT 5	SEGMENT 6	SEGMENT 7
Organization classification	Program classification	Functional classification	Fund classification	Donor classification	Location classification	Economic classification

- **Location classification** – In the current CoA, location codes are not granular beyond the district level. Any further classification is not coded into the CoA. The purpose of location code segment is to identify where the expense is incurred. Ideally, each segment should have sufficient detail to meet all control, accountability, management, and reporting needs of various stakeholders.
- **Functional classification** – There is no COFOG based functional classification for sectors. An explicit functional classification can be useful in identifying the purpose of an expenditure in a particular sector. The government can re-assess its requirements and understand the pros-cons of adding such classification to the CoA. Considering the increase in length of codes these can be mapped with Organization or Programs, with the back end mapping separate reports can be generated as per COFOG classification.
- **Expenditure categorization** – In the current CoA, an extra digit is added at the end to identify the expenditure type – recurrent, capital, financing. This may be redundant as the first digit of economic classification indicates the same. There is no need for an independent segment in the COA if the related information could be derived from another segment.

The following table provides an overview of the proposed implementation approach for the same.

Table 17: Proposed implementation approach – developing consolidation architecture for whole-of-government reporting

Category	Description
Key Considerations	<ul style="list-style-type: none"> • <i>Amending CoA to reflect consolidation hierarchy and identification of inter-entity transaction flows to be eliminated</i> – The existing COA classification should be evaluated to assess whether it is compliant with the proposed consolidation hierarchy and has clearly defined codes that will allow for the identification of transactions to be eliminated during consolidation. • <i>Clarity on objectives, purpose and expectations from whole-of-government reporting</i> – deciding on the objectives and expectations from the whole-of-government reporting will form a key input into the design of the consolidation architecture. The expectations of different stakeholder groups pertaining to the outputs from the whole-of-government reporting application are to be outlined clearly which will provide valuable inputs into the design of the reporting application.

Category

Description

The following figure provides a high-level illustrative overview of the consolidation mechanism which will facilitate the whole-of-government reporting:

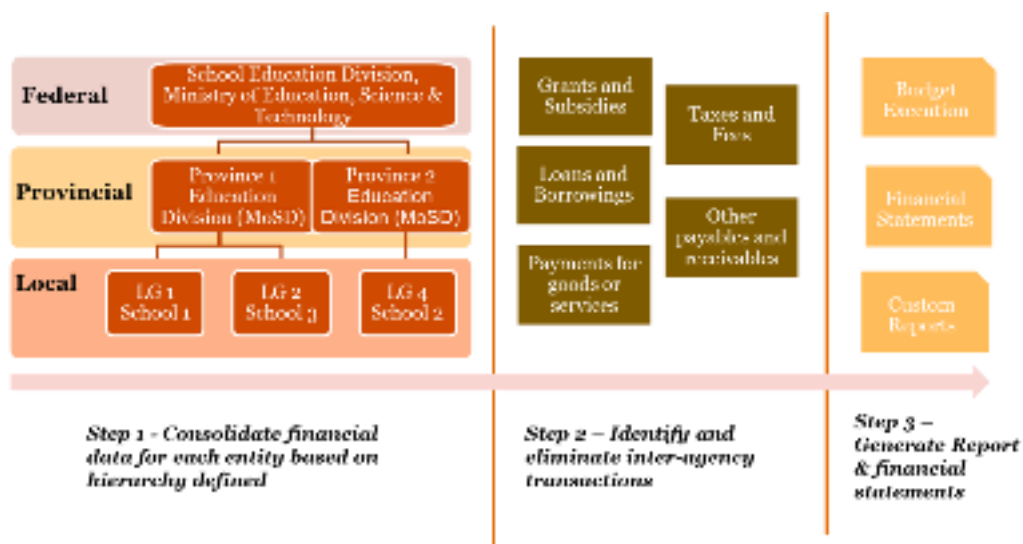


Figure 6: Illustrative overview of consolidation mechanism

To operationalize this mechanism, the consolidation architecture is to be defined which will entail the following:

Implementation Approach

Table 18: Dimensions of consolidation architecture for whole-of-government reporting

Dimension	Description
	<p>The coverage of entities to be included for the consolidation exercise should be defined which could include the following:</p> <ul style="list-style-type: none"> • Federal level government agencies • Provincial level government agencies • Local government agencies • Public Sector Enterprises (PSEs) • Other extra-budgetary funds / PPPs, etc. <p>The considerations based on which the coverage should be determined include the following:</p>
Entity coverage	<ul style="list-style-type: none"> • <i>Reporting requirements of the stakeholders</i> – if a decision is made to exclude the financial data of PSEs and other extra-budgetary funds, etc. then the consolidation can be limited to the three tiers of government • <i>Use of CoA</i> – uniform usage of the CoA across the entities to be included in the consolidation exercise will help in simplifying the consolidation of financial data across the selected entities. Alternatively, mapping / bridge codes are to be developed to facilitate the inclusion of any entities that are utilizing a different set of CoA codes (e.g. PSEs). • <i>Accounting standards</i> – the uniformity of accounting standards across the entities to be included in the consolidation exercise will have a positive impact on the consolidation in a similar manner to

Category	Description
	the CoA. The roll-out of the NPSAS across the various government agencies will facilitate this exercise.
Reporting expectations (reporting or accounts generation)	<p>A differentiation is to be made between the consolidation of whole-of-government financial data and ‘accounts’, as it will have implications on the timely availability of reports, the accuracy of the reports, etc.</p> <p>If the objective of the consolidation exercise is limited to reporting, then unaudited financial data from the existing FMIS / SuTRA / TSA systems can be utilized to generate the consolidated whole-of-government reports. However, unaudited financial data can be prone to errors and corrections (e.g. suspense accounts to be cleared, inaccurate recording of receipts and expenditure, etc.) and the reports generated have to be utilized keeping these limitations in mind.</p> <p><i>Note:</i> functionalities have been included in the reporting application to allow users to make any corrections / adjustments needed to the reports generated using unaudited financial data (with a necessary audit trail).</p> <p>Alternatively, if the objective of the consolidation exercise involves generating whole-of-government accounts, then the audited financial data from the OAG systems should be utilized for generating the various financial statements and accounts. However, the limitation of this approach is the timeliness in available of audited data, which typically takes around 3-6 months post closure of the annual books of accounts. This may affect the usability of the consolidated reports to support real-time decision making.</p> <p>Furthermore, the implementation of the NPSAS across the three tiers of the government would help in harmonizing the financial data across the three-tiers and facilitate the consolidation exercise.</p>
Reporting coverage	<p>The coverage of the reports should be defined which can cover the following aspects:</p> <ul style="list-style-type: none"> • Revenues • Expenditures • Assets • Liabilities
Elimination of inter-entity flows	<p>While consolidation of the revenues, expenditures and liabilities can be easily accommodated from the data available in the existing systems (FMIS/SuTRA for unaudited figures and OAG systems for audited figures), data on assets may be limited, particularly with respect to physical assets until the assets database on the PAMS system is completed.</p> <p>One of the key aspects of the consolidation is the elimination of the inter-agency flows during consolidation to avoid double counting in the consolidated figures. To operationalize it, as a first step, the categories of transactions that need to be eliminated during consolidation are to be identified along with the corresponding CoA codes. These categories include the following:</p>

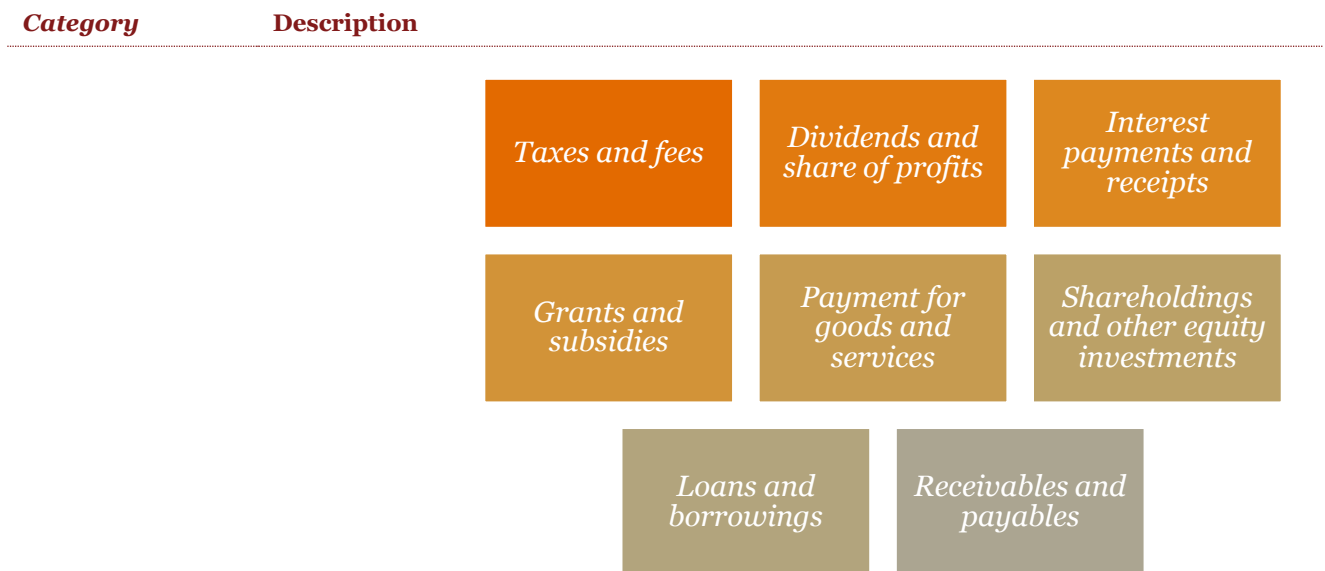


Figure 7: Illustrative list of transaction categories to be considered for elimination during consolidation

The applicability for elimination of the above categories is also based on other factors such as the entities included in consolidation, the materiality of the transaction, etc. which is to be defined while designing the consolidation architecture.

Upon defining the consolidation architecture, the same has to be translated as part of the business rules governing the reporting application.

<i>Critical Success Factors</i>	<i>Availability of required financial data in FMIS/TSA/SuTRA and other relevant systems to support consolidation exercise – the success of this exercise is largely dependent on the availability of harmonized data across the various relevant systems that can be aggregated and consolidated without significant additional efforts to clean the data.</i>
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3. Implementation considerations

The following sections present the procurement, and deployment considerations for the consolidated reporting application, based on the implementation options as suggested in section 2.2.1. In addition, the section presents the governance plan which would be needed in order to effectively manage the implementation activities as outlined earlier.

3.1. Procurement considerations

The following includes the key considerations that can form the basis of the procurement approach for implementing the proposed reporting application and the necessary enhancements to the existing systems.

- *For proposed application to support whole-of-government reporting -*

As outlined in section 2.2.1, there are various implementation options that can be explored for this application, which would require different procurement approaches as outlined below:

Table 19: Proposed approach for procurement based on implementation options

Implementation Options	Proposed procurement approach (based on defined implementation options)	Description of procurement approach	Procurement timelines
Implement added/missing functionalities for whole-of-government reporting within the new reporting application being developed	Amend / extend contract with existing vendor	If the required functionalities are implemented within the existing systems, it is recommended that the on-going contracts with the existing vendors be amended / extended to accommodate this implementation. This would also result in an expedited procurement process to allow for faster implementation.	Up to 2 months
Implement Business Intelligence (BI) tool with additional enhancements to configure business rules based on consolidation architecture	Direct purchasing of BI tool licenses and engage with an existing vendor for customization of the tool	If a decision is made to explore the purchasing of a business intelligence tool that can be enhanced with the necessary business logic to configure the consolidation architecture, then a direct purchasing approach can be adopted to purchase the required licenses for the BI tool, and a separate contract can be entered into with the existing vendor to support the configuration of the consolidation architecture in the BI tool.	Up to 3 months

- *For enhancements to existing applications -*

For the enhancements proposed to the existing systems, it is recommended that individual contracts (either through variations/amendments/extensions, etc.) be entered into with the existing vendors for the respective systems to implement the same.

3.2. Deployment considerations

The ICT enhancements proposed as part of the interim-state IFMIS have the following deployment considerations:

1. **New Consolidated Reporting Application:** Since the consolidated reporting application will be primarily used by staff at FCGO, as well as shall majorly interface with FMIS and SuTRA systems (which are hosted at the FCGO), it can be deployed at FCGO Data Center.
2. **Enhancements to existing applications:** The applications for whom enhancements are proposed (LMBIS, TSA, CGAS, SuTRA and RMIS) are all hosted at FCGO, and hence the enhanced applications can continue to be deployed at FCGO.

3.3. Governance plan

The interim-state IFMIS implementations are targeted to be completed within 12 months from the time of finalization of functional design and procurement approach. Due to the compressed timelines envisioned for completion of all reform activities, and their direct impact on the long-term plans for IFMIS (end-state reforms), there is a need for creating robust *Centralised Project Governance Structures*, that are dedicated, and can remain in effect throughout the lifecycle of interim reforms, as well continue to operate for end-state IFMIS requirements. Hence, such structures should be continued to manage the operations of IFMIS on a long term basis.

At each phase of this schedule, concerted efforts from various stakeholders in GoN are required for finalisation of business processes and requirements specifications, participation during system blueprint definition, design, configuration, acceptance testings, and training on the new applications and enhanced systems, among other functions. The project governance structures shall house the following teams;

- (i) Steering Committee (Insourced from within Government)
- (ii) Project Management Office (Insourced from within Government)
- (iii) Capacity building Team (Partly outsourced)

Note*: Additional teams that are identified on the basis of requirement during the course of the implementation can be floated supplementary to the above.

Recommendation

Formation of teams, identification of resources and assigning them on a dedicated basis for interim IFMIS and conducting sufficient capacity building for such staff and providing a positive work environment (space, infrastructure, facilities, and support resources) are crucial to the implementation exercise. These tasks must be undertaken on a priority basis, in fact as an immediate next step for interim IFMIS implementation. Augmentation of additional resources can be initiated based on the emerging needs during implementation.

Proposed Project Governance Structures

The diagram below presents an illustrative view of recommended project governance structure for IFMIS.

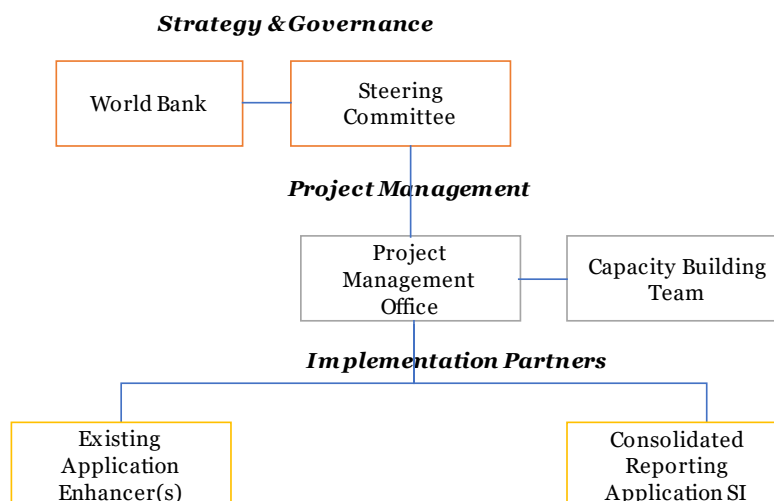


Figure 8: Proposed Governance Structure for interim IFMIS Implementation

The roles and responsibilities of the stakeholders are discussed in the table below.

Table 20: Roles of Proposed Agencies for Governing IFMIS

<i>Requirements</i>	<i>Brief Description</i>
IFMIS Project Steering Committee	<p>The Steering Committee will provide a tactical and strategic direction for the overall progress of the project. The Steering Committee may comprise of senior officials from PEFA Secretariat, FCGO, MoF and OAG. The GoN may also consider including representatives from the World Bank into the Steering Committee. As the final authority on all matters regarding interim IFMIS project implementation, the Steering Committee would discharge the following responsibilities:</p> <ol style="list-style-type: none"> a. Ensuring commitment to the project in terms of required administration and decision making b. Empower the IFMIS Project Management Team, for management of all the operations related to the project c. Issuing of circulars, instructions, etc. to effect changes to existing roles and responsibilities, adoption of reengineered processes and systems, etc., d. Ensuring the changes in legislations, policy and regulation where required e. Ensuring that all stakeholders take active part in the IFMIS project f. Provide strategic and tactical guidance in the implementation and post – implementation phases g. Ensuring the financial commitment for the project by providing adequate funding throughout project lifecycle.
Funding Agency: The World Bank	<p>The World Bank will provide strategic and technical advisory support to the Steering Committee and the Project Management Structures in:</p> <ol style="list-style-type: none"> (i) Overall planning and management of interim-state IFMIS implementation, (ii) Synchronisation of such efforts with other PFM reform initiatives under progress, especially for end-state IFMIS (iii) Ensuring that learnings and good practices from other geographies are incorporated into the project planning and implementation etc.
IFMIS Project Management Office (PMO)	<p>The IFMIS PMO, with a designated Project Manager shall be a full time and empowered team from within the Government, responsible for the overall planning, coordination and management of IFMIS implementation.</p> <p>The PMO shall provide project management support, technical advisory and coordination support for IFMIS implementation. The PMO shall comprise of dedicated resources from both the government and any identified external experts (especially for areas like consolidated reporting).</p> <p>PMO shall comprise of cross functional skill sets including functional team, technical team, operations and administration team.</p> <p>The Functional Team shall comprise of PFM experts from MoF, FCGO, OAG and line ministries to provide guidance on various functional aspects related to interim IFMIS reforms. Functional teams shall play crucial role in overall scoping and design for consolidated reporting application, and for applications undergoing enhancement, including review and finalization business process design, functional and system requirements specifications, integration/ interfacing requirements and lead user acceptance testing and certification of the system. These teams shall also play crucial role during pilot and rollout of the systems to provide necessary guidance and direction to the system integrator on the Government’s requirements.</p> <p>The Technical Team comprising of technical experts drawn from the MoF and FCGO who shall oversee the technical aspects of system implementation including IT infrastructure planning and implementation, ensuring availability of Data Center and</p>

Requirements	Brief Description
	<p>Disaster Recovery hosting facilities, network connectivity etc. as needed for implementation of new application, and for enhancing the existing applications. The technical team shall also be responsible for closely working with the IFMIS service providers to gain required know-how on system technical design, configuration, implementation and maintenance aspects and shall play a crucial role in supporting the MoF/ FCGO in sustaining the operations and maintenance of the system in the medium to long term, particularly post conclusion of O&M contract for the service provider(s). The technical team shall also support in coordinating the ICT enhancement efforts across the various agencies including MoF and FCGO.</p> <p>PMO shall also comprise of a Contract Administration resource(s) in finalisation of contracts, in monitoring the contract progress, payments, maintaining the project accounts and documentation, etc. This team shall also be responsible for managing the logistics and other administrative support needed for the PMO to effectively operate, communicate and manage the IFMIS implementation.</p> <p>The administrative responsibilities of the PMO would include:</p> <ul style="list-style-type: none"> ○ Coordinate with the Steering Committee on processes for identification and selection of personnel/agencies for performing various functions/roles identified for the project; ○ Fostering innovation to promote outstanding performance in the achievement of the agreed project objectives ○ Developing and maintaining a high-performance project culture ○ Monitoring and managing project performance ○ Review performance of the vendors and stakeholders and undertake corrective actions to achieve the project objectives ○ Coordinate with all the stakeholders and third-party agencies, vendors involved in the IFMIS Project ○ Overall project issue and risk management ○ Provide support to Steering Committee in ensuring that all the legal instructions and guidelines are issued wherever applicable for changes to policy and processes ○ Reporting project progress, successes, issues and risks to the Steering Committee and support the committee in taking corrective actions, where necessary, etc.
IFMIS Capacity Building Team	<p>Implementation of IFMIS will require conducting certain capacity building programmes, supplemented with effective communication for end-users in FCGO and line departments. For coordination and management of such programs, dedicated staff from the Government/change management consultancy firm will be required on a full-time basis during the implementation and stabilisation phases. The staff engaged for change management, capacity building and communications management will primarily focus on the following activities:</p> <ol style="list-style-type: none"> a. Coordinate and plan programs in consultation with the IFMIS PMO, service providers and other stakeholders b. Finalization, scheduling and conduct of capacity building programmes c. Quality assurance of the content and coverage of the programs d. Devising effective communication for stakeholders
IFMIS Implementation Partner/Service Provider (IPSP)	<p>The IFMIS Implementation Partner/Service Provider shall be responsible for the following key tasks:</p>

Requirements	Brief Description
<p>System Technical Quality Assurance Team (STQAT) for new application for consolidated reporting</p>	<p>a. Software supply/ enhancement, installation, customization, data digitization, migration, training and documentation for IFMIS</p> <p>b. Conducting training programs for the system users of the application</p> <p>c. Operations and maintenance of solutions during the remaining project period post go-live phase</p> <p>d. Establishment of a helpdesk for providing support and clarifications (if needed)</p> <p>In addition, they will be responsible for providing specifications and/ or supply, installation, configuration and maintenance of the IT infrastructure needed for the new application/ enhanced applications at Data Center and Disaster Recovery site. The scope of services for IT infrastructure service provider shall include supplying the connectivity (routers, switches), security (IPS, firewalls, anti-virus), computing (servers), storage (SAN, tape library) and the related system software needed for implementation of IFMIS.</p> <p>The primary goal of Quality Assurance, Acceptance Testing and Certification is to ensure that the new application (<i>including the system, deliverables and services</i>) meets requirements, standards, specifications and performance requirements as outlined in the contract between the Government and the service provider. The Quality Assurance and Testing shall verify the delivered solution against the below requirements of the IFMIS solution as outlined in the contract:</p> <ul style="list-style-type: none"> • Functional requirements • Technical requirements • Infrastructure requirements • Availability of services • Performance • Security • Manageability • SLA reporting System • Documentation (during design, configuration, customization, training etc.) • Data Quality • Any other as applicable

4. Capacity building and change management strategy

4.1. Communication Management Strategy

The implementation of Consolidated Reporting can have a significant impact on staff at FCGO, OAG and Accounting divisions at Line Ministries, especially as it would require considerable upskilling both on the functional elements involved in preparing consolidated reports on government finances (such as designing the consolidation architecture), as well as in technical skills in optimum use of the new application.

In addition, the enhancements proposed to the key existing PFM applications involve interfacing with banks for system enables reconciliation, new system interfaces for record/ processing of added data elements and operating in a reduced manual environment; all of such transitions bring challenges of resistance and need for upskilling.

It is critical importance to support them in adopting and sustaining the change. Hence, design of appropriate communication and broadcasting techniques for stakeholder acceptance, confidence, and trust in the system is required. Such a strategy should be on two levels:

Internal Communications to target the users of the systems under change; and

External Communications to target agency banks, civil society, and suppliers providing goods for system implementation. As internal communications deals with the entire gamut of stakeholders within the government, it should be given more importance in terms of investment of time as well as funds.

The following elaborates on the internal and external communication strategies for various stakeholder groups, and the proposed capacity building plan.

4.1.1. Internal Communications

4.1.1.1. Leadership at Mo/ FCGO & OAG

Targeted messaging in the management of change needs to involve unambiguous communication that highlights the goals and advantages of consolidated reporting. Awareness building targeted at these audiences involves focus on the following:

- a. *The scope, requirement, objectives and benefits of the consolidated reporting application*
- b. *Clear articulation of key changes led by system implementation on the current environment*
- c. *Coherent information on the implementation, approaches implement change, timelines and strategies for operational changes*
- d. *Sound and clear information access at each level of the organization on the role that is expected by each individual in said initiative*
- e. *Stress on the importance of their participation in making the transformation successful and sustainable*
- f. *Support resources and commitment needed in usage of the application*

It is important to communicate the same to these individuals at the outset and at regular intervals as it is the leadership in these agencies who aid the leadership at higher levels in smooth adoption of change.

4.1.1.2. Accounting & reporting staff at FCGO

Targeting accounting staff of spending agencies requires specific content that must focus on the following aspects:

- a. *The advantage of Consolidated Reporting Application implementation in transforming financial reporting and financial insights generation in Nepal*

- b. *Detailed descriptions of processes, workflows and proposed trainings on how consolidation would occur, including elimination of double entries and defining hierarchy between entities at different tiers of the government*
- c. *Benefits specific to the end-user staff, especially in terms of easing their workload on manual-intensive procedures*

4.1.1.3. Users of enhanced applications in GoN

Communication with the users of LMBIS, TSA, CGAS, RMIS and SuTRA should focus on the following:

- *Specific benefits of the enhancements, in terms of reducing manual procedures and redundant tasks*
- *Detailed descriptions of processes, workflows and proposed trainings to operate in the changed environment*

4.2. External Communications

4.2.1. Agencies and Banks

The agency banks and NRB form an important part of the stakeholder environment, given their role in supporting in the making payments, in revenue collection and reconciliation. Interim IFMIS reforms require extensive coordination between the IT teams of these agency banks and the IFMIS vendor and the project management unit to successfully design and implement the integration for the payment gateways, bank portals and other modes of information exchange. A communication strategy during the design and implementation stage can ensure smooth participation from the agency banks and NRB.

4.2.2. Use multiple Channels of Communication

It is important that the change management team communicate on change using multiple modes for effective awareness building. This includes workshops, seminars, and meetings with provincial and local government officers. Additionally, the team must also send out periodic newsletters to leadership in concerned stakeholder departments on the real-time progress of reforms.

4.3. Capacity Building Plan

Implementation of interim-IFMIS impacts several thousands of staff and stakeholders across the Government of Nepal. Capacity building thus plays a crucial role in supporting the stakeholders impacted by IFMIS implementation in adapting to the new business processes and systems. Each stakeholder associated with interim-IFMIS implementation is expected to play a certain role during the conceptualization, design, implementation and operations of the system. Accordingly, the capacity building programs must be designed to develop necessary knowledge, skills and attitudes in the staff to enable them to deliver the assigned responsibilities successfully. This section explores the capacity building needs mapped to the key skill requirements with regards to IFMIS implementation.

Table 21: Capacity Building Assessment for IFMIS End-Users

S. No.	Stakeholders	Capacity Building Assessment
1.	Consolidated Reporting Application users at FCGO and MoF (and any other)	<p>Since the application being planned for consolidated reporting is likely to be a new functional domain for majority of users of such an application, it is crucial to plan specific training programs on consolidated reporting including:</p> <ol style="list-style-type: none"> a. Principles of consolidated whole-of-government reporting including various models of consolidation, key financial components for consolidation, and case studies from select countries that are following consolidated reporting

S. No.	Stakeholders	Capacity Building Assessment
		<ul style="list-style-type: none"> b. NPSAS (IPSAS) and GFS based reporting requirements, including present status of such reporting in GoN, and key steps for bridging any reporting deficits, especially at provincial and local government level c. Techniques of consolidating accounts, including elimination of double entries and creating relationship hierarchy between entities d. Principles of cash and accrual accounting, and their impact/ need in long-term for consolidated reporting e. Use of the Consolidated Reporting Application in generation of consolidated reports, including options for generating custom reports, and for making adjustments to reported numbers f. Use of a BI tool for report generation, and potential for generating financial insights for the government g. Use of a GI tool for geospatial analysis of financial data, and potential for visualization of financial reporting insights for the government
2.	PFM Application Users at MoF, FCGO and Line Ministries	<p>Specific training programs need to be planned for end users based on the functions and transactions such users will be impacted with the enhancements and such programs shall focus on:</p> <ul style="list-style-type: none"> a. Enhanced/ new application features, reengineered business processes and workflows b. New/modified transactions c. New/modified reports d. Added data population responsibilities, especially with new interfaces
3.	Interfacing Agencies: PDMO and PPMO	<p>For users of DOMS at PDMO, and of e-GP at PPMO, the Government may plan and conduct training program on the following areas:</p> <ul style="list-style-type: none"> a. Changes to business processes related to submission/ exchange of information of debt (debt servicing schedule etc.,) and on government procurement (project expenditure/ contracts/ vendors) b. Changes to approach for information exchange between DOMS/ e-GP and interim-IFMIS systems c. The forms, formats and standards for information exchange
4.	Interfacing Agencies: NRB and Agency Banks	<p>For banks, the Government may plan and conduct training program on the following areas:</p> <ul style="list-style-type: none"> a. Changes to business processes related to expenditure and receipt management b. Changes to approach for information exchange between PFM applications and banking systems c. The forms, formats and standards for information exchange d. Security and compliance requirements for information exchange etc. <p>The target audience from the banking institutions for training requirements above could vary and hence need to conduct</p>

S. No.	Stakeholders	Capacity Building Assessment
		separate training programs for technical (IT staff on point c and d above) and non-technical staff (on points a and b above).
5.	Multi-year budget preparation for budget staff at MoF and Line Ministries	<p>Training programs need to be planned for users on the MoF and the budget preparation units of line ministries of on the following:</p> <ol style="list-style-type: none"> Multi-year budgetary framework (MTBF) Multi-year expenditure framework (MTEF) Multi-year fiscal framework (MTRF) Macroeconomic indicators and budget forecasting
6.	Cash Management (for staff at Line ministries and at FCGO)	<p>The GoN may plan and conduct training program on the following areas:</p> <ol style="list-style-type: none"> Periodic cash flows preparations, including cash flow forecasting Cash management techniques like payment prioritization and SLAs based payment scheduling
7.	Arrears Management	<p>Training programmes should cover the following topics:</p> <ol style="list-style-type: none"> Recordkeeping of expenditure and revenue arrears Developing and executing clearance plans for expenditure arrears Developing recovery plans for revenue arrears based on recoverability, cost of recovery, etc.
8.	Virements management	<p>Training programmes pertaining to virements should cover the following topics:</p> <ol style="list-style-type: none"> Analysis of legacy virements data Updated guidelines governing the submission, validation and approval of virements Updated controls over virements (policy and system-based)
9.	Assets database creation	<p>Training programmes pertaining to the assets database creation should focus on the following topics:</p> <ol style="list-style-type: none"> Guidelines on valuation and recordkeeping for various asset classes Guidelines on utilization of PAMS system to support recording and updating of assets data

5. Implementation workplan and timelines

The following table outlines the implementation workplan for the various recommendations proposed to support the achieve the interim-state IFMIS vision.

Table 22: Estimated implementation timelines non-ICT enhancements for interim-state IFMIS

Action points	Responsibility	Est. Time
Develop consolidation architecture and guidelines for consolidation of whole-of-governments financial reporting	FCGO / MoF	T + 2 months
Promote publishing of fiscal information compliant with open data standards, which includes the following:		
a) Develop / enhance guidelines on public disclosure of fiscal information, including the use of open data standards (T + 6 months)	FCGO / MoF	T + 12 months
b) Operationalize publishing of online fiscal information upon completing implementation of consolidated reporting application (T + 12 months)		
Implementation of e-signatures –		
a) Develop and disseminate guidelines on use of e-signatures for all PFM IT systems (T+2 months)	FCGO / MoF with support from System Implementation Partners	T + 10 months
b) Implement e-signatures during enhancements to existing systems (T+10 months)		
Implementation of proposed policy recommendations –		
The implementation approach, including key activities for each of the proposed policy recommendations is further elaborated in section 2.3 of this report. These interventions may be implemented based on the following considerations:	FCGO / MoF along with other stakeholders including concerned line ministries	In conjunction with corresponding enhancements to PFM IT systems as outlined in the table below
a) Priority of Government of Nepal regarding proposed reforms		
b) Availability of requisite capacity and technical expertise to develop required policies / guidelines and implement the same		

The following table outlines the proposed implementation timelines for the new reporting application and the other proposed enhancements to the existing ICT systems to achieve the interim-state IFMIS vision.

Table 23: Estimated implementation timelines for ICT enhancements for interim-state IFMIS

Interim State IFMIS Event	Est. Time
Establishment of Project Management Office and other institutional mechanisms for implementation of interim IFMIS	T + 2 weeks
Direct contracting for enhancements to existing applications including interfaces (which includes LMBIS, CGAS, TSA, SuTRA, RMIS as outlined in section 2.1)	T + 2 m
Completion of new reporting application enhancement, testing, pilot and roll-out ³	T+ 6 m

³ Based on the understanding that the GoN is already in the process of developing a new consolidated reporting application.

Interim State IFMIS Event	Est. Time
Capacity building on new consolidated reporting application	T + 8 m
Development, testing & piloting of enhancements to existing systems	T+ 10 m
Capacity building on enhancements to existing systems	T + 12 m
Interim IFMIS completion	T + 12 m

The interim state IFMIS implementation timelines is expected to cover a duration of 10 months, including pre-implementation activities, development and full roll-out. The following list the key assumptions based on which the timelines have been estimated.

- **Most enhancements to existing key systems to be treated only as a stop-gap**, with end-aim to transition to a modern IFMIS with a uniform technical architecture and long-term vendor support (*with the exception of solution for consolidated reporting*)
- Reforms in IT need to be preceded and complemented with required changes in policy, institutional and capacity building to ensure project success
- Our recommendations are built on the assumption that there will be a **full-time Project Management Team from the GoN** to coordinate these efforts

6. Cost estimates

This section includes indicative cost estimates for implementation of interim-state IFMIS in Nepal. The cost estimates have been prepared considering the following key factors:

- Functional scope of implementation of consolidated reporting application and other enhancements to existing ICT systems, including modules and interfaces needed for the system;
- Number of users for the system, etc.,
- Scope of work/services for selected solution providers;
- IT infrastructure required for implementation of PFM IT systems at the Data Center and DR site;

Note: The cost estimates prepared are based on secondary research on the cost items and based on the inputs gathered from our IFMIS experience in other developing countries, especially in South Asia.

The following table provides an overview of the cost estimates for the interim state IFMIS.

Table 24: Indicative cost estimates for interim state IFMIS

Cost Type	Cost Range for Development (USD)
New Reporting Application ⁴	100,000 – 150,000
Enhancement to Applications ⁵	150,000 – 200,000
Sub-total	250,000 – 350,000
Capacity Building	75,000 – 100,000
Consulting Support ⁶	75,000 – 120,000
Total	400,000 – 570,000
Option cost items in case of Reporting Application developed as customization to a BI Tool	
Licensing Cost (annual)	100,000 – 120,000
Data Warehouse ⁷	200,000 – 250,000
Database (including servers and OS)	60,000 – 100,000

These cost estimates are based on the following assumptions:

- Based on a blended average person-month rate of USD 3,000 (based on our prior experience of developer rates in South Asia. The cost could be higher by ~50% in case of other international vendors).
- Existing applications' licenses/IP assets are adequate and can be reused
- For developing the reporting application, the cost estimates do not consider any enhancements required to the existing systems that may be needed to facilitate the interface with the reporting application (e.g. purchasing API licenses)
- Costing for Reporting Application considers use of commodity hardware/ servers- Intel or AMD based systems

⁴ The cost estimated for the reporting application include cost for any potential additional functionalities that would need to be developed for comprehensive reporting functionalities

⁵ Includes cost of software development, SRS, UI/ UX, project Management and Vendor Testing.

⁶ Estimated cost for all policy, institutional and project management consulting requirements

⁷ Covers only operationalization (services) costs; assuming existing Oracle 11g database will be used

- Does not include cost of other supporting IT infrastructure like network & security devices or costs for any end-user hardware procurement (like computers, printers etc.,)
- The cost estimates do not include any 3rd party testing needs
- The cost estimates for the data warehouse component are optional (based on the expected volume of data) and only comprise the operationalization costs as it is assumed that the existing Oracle 11g database will be utilized.

Furthermore, a comparative analysis of the costs pertaining to the options for implementing the reporting application is outlined below:

Table 25: Comparative cost analysis of implementation options for consolidated reporting application

Cost (in USD)	Develop in New Reporting Application	Develop using a BI Tool with Data Warehouse
Enhancement/ customization cost	100,000 – 150,000	100,000 – 120,000
Licensing Cost	N/a	100,000 – 200,000
Cost Range for Reporting App	100,000 – 150,000	200,000 – 320,000
Data Warehouse**	N/a	200,000 – 250,000
Database (including servers and OS)	N/a	60,000 – 100,000

7. Key risks and mitigation strategy

This section details the identification and mitigation of possible risks towards ensuring a smooth implementation of the interim state IFMIS in Nepal. The framework for risk analysis includes evaluation of risks along with a corresponding mitigation plan for each.

Risk Evaluation: The overall impact of identified risks on a project is assessed subsequent to the estimation of their probability. Impact Level is an estimate of the overall consequences on the project, assuming no risk management steps are taken. The classification of risk is illustrated in the figure below

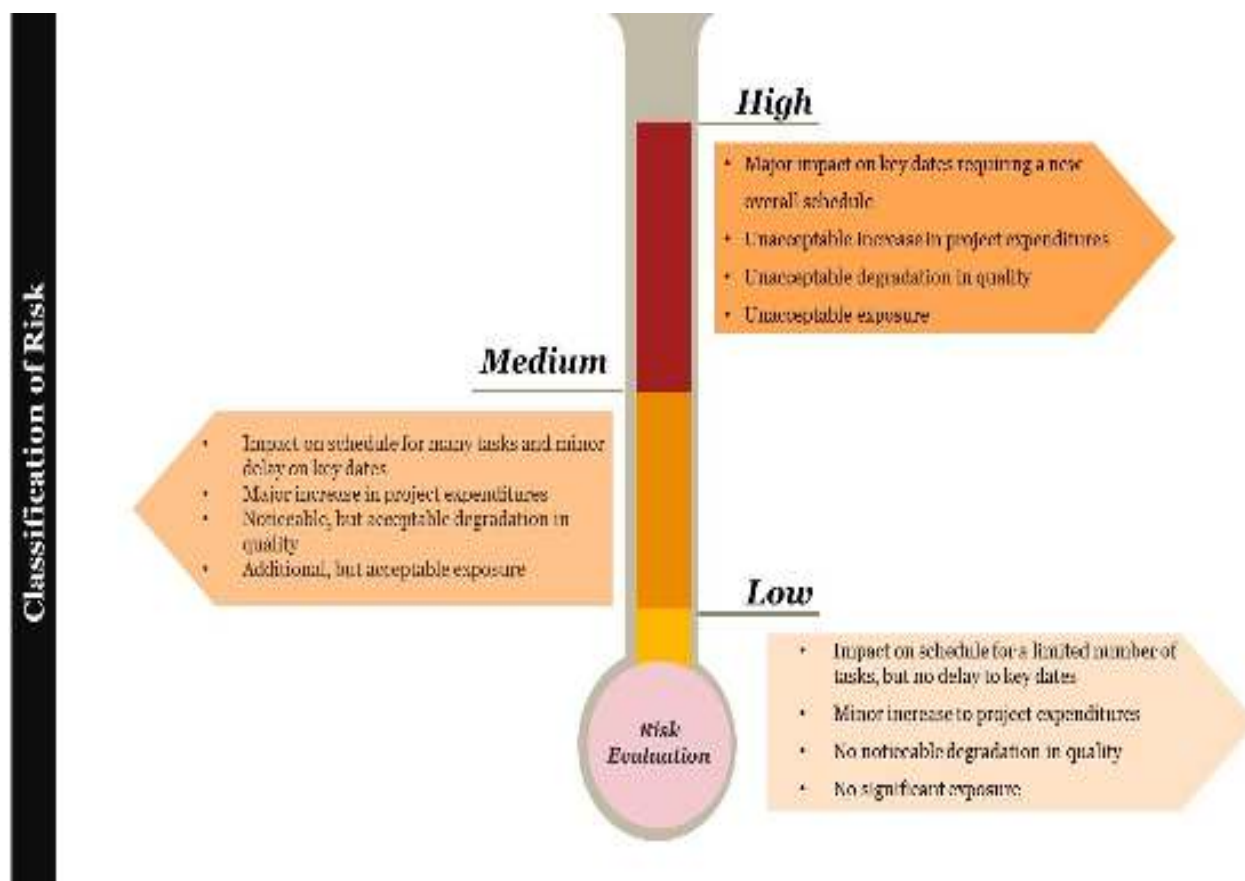


Figure 9: Risk classification parameters

As per the classification discussed above, it is necessary to engage in defining and developing a detailed **risk mitigation strategy** in order to minimize negative impact on the successful implementation of the IFMIS. The strategy would include, as mentioned a detailed mitigating actions along with the setting up of a communication network to support the desired initiatives. Additionally, it is important that Project Governance Structures perform a detailed risk assessment for the project and its dependencies at various phases of project implementation and address them accordingly to minimize or avoid the impact on the project. The following table details the risks identified, their effects and impacts, possibility of exposure to each risk and suitable mitigation plans to address them.

Risk	Impact	Risk Rating	Mitigating Action	Responsibility
Challenges with whole-of-government consolidated reporting				
Inaccuracies in consolidation architecture for	This would result in corresponding inaccuracies in the consolidated reports that	Medium	To minimize the possibility of errors, a concurrent review mechanism should be	MoF / FCGO, GoN

Risk	Impact	Risk Rating	Mitigating Action	Responsibility
whole-of-government reporting (covers errors in defining consolidation hierarchy / errors in elimination of inter-agency transactions)	are generated based on the consolidation architecture.		established while defining the consolidation architecture and subsequently configuring it on the system. In addition, a phased approach to defining the consolidation architecture in terms of the entity coverage, defining transactions for elimination, etc. can also help minimize the risk of errors during this exercise.	
Unavailability/limitations in availability of harmonized data across underlying systems (e.g. FMIS, SuTRA, TSA, etc.)	This would impact the ease of consolidation as additional efforts would have to be invested to harmonize the data in the required formats for consolidation.	High	To mitigate this issue, it is recommended that a common reporting template be developed based on which data from the underlying systems can be generated and presented in a harmonized format. This is to be incorporated into the solution design.	MoF / FCGO, GoN
Inherent inaccuracies arising from utilizing unaudited financial data from underlying systems (e.g. FMIS, SuTRA, TSA, etc.)	This would impact the accuracy of any consolidated reports generated, given that the unaudited financial data would be subject to further revisions (e.g. journal entries to correct incorrect CoA records, suspense entries, etc.)	Low	To mitigate this issue, it is recommended that additional functionalities be developed in the reporting application to allow the users to make adjustments to the consolidated figures (as an add on to the report in the form of an additional memo), as needed to correct such inaccuracies (while maintaining an audit trail of such adjustments)	MoF / FCGO, GoN
Inability of the reporting application to handle large data volumes (if transaction level data is to be used)	This would impact the ability of the reporting application to effectively consolidate and process the data to generate reports in a timely manner, which would impact the overall utility value of the application	Medium	To mitigate this issue, it is recommended that in the short term, summary level data from the underlying systems be utilized to generate the reports, with a full data warehouse implementation that can be taken up for the end-state IFMIS implementation (where interfaces do not have to be developed with multiple systems).	MoF / FCGO, GoN
<i>Challenges with enhancements proposed to other IT systems</i>				
Inaccuracies in design of proposed enhancements	This would result in time and cost overruns which may dilute the business case for implementing the proposed reforms for the interim state as opposed to the end-state IFMIS	Medium	To address this issue, it is recommended that working groups be constituted to initially evaluate whether the proposed enhancements are to be taken up for the interim state IFMIS / pushed to the end state. Following this decision, the constituted working groups should be closely involved throughout	MoF / FCGO, GoN

Risk	Impact	Risk Rating	Mitigating Action	Responsibility
Legacy application platforms not conducive for implementing proposed enhancements	This would result in significantly higher investments to enhance the existing applications beyond the proposed enhancements, which may result in a decision to adopt these enhancements for the end-state IFMIS environment.	Medium	<p>the implementation of the proposed enhancements to provide the necessary technical and functional inputs.</p> <p>To address this issue, it is recommended to evaluate the feasibility of implementing the proposed enhancements to the interim state based on parameters such as effort, implementation timelines, cost of implementation, etc. based on which a decision can be made to pursue implementing these enhancements in the interim-state, or to push them for implementation in the end-state IFMIS.</p>	MoF / FCGO, GoN
Challenges with procurement				
Price discovery higher than budgeted for proposed enhancements / consolidated reporting application	The impact of this issue is a dilution of the business case for implementing the proposed enhancements in the interim state.	High	To address this issue, it is recommended that the existing contracts be leveraged with minimal rate variations, for implementing the proposed enhancements to existing systems.	Project Management Team, IFMIS
Delays in finalizing procurement	Inability to obtain the break-up of the price bids from the vendors may lead to challenges during any contract negotiations and scope modifications.	High	It is recommended that the price bids be solicited for individual enhancements to the existing systems, to allow flexibility for the government during the contract negotiation. This will support in modifying the scope of work in the event of price realization in excess of the estimated project budget.	Project Management Team, IFMIS
Challenges with implementation				
Lack of IT infrastructure readiness	The lack of IT infrastructure readiness may result in time and cost overruns. This risk may be faced on account of various factors which include the incompatibility of existing IT infrastructure, delays in site preparedness, inadequate existing IT infrastructure, etc. These risks may result in the need for additional procurement of IT infrastructure and will impact the project implementation timelines.	High	It is recommended that any site preparation activities or networking arrangements required for rollout be specified in advance to ensure that adequate time is provided to meet these requirements. The responsibilities for these activities are to be clearly outlined in the project implementation plan.	IFMIS vendor

Risk	Impact	Risk Rating	Mitigating Action	Responsibility
Inflexibility of the system to accommodate changes to workflow and controls	The inflexibility of the system to accommodate any changes to workflow and enforcing validation controls would result in additional development efforts through change requests. This will lead to additional time and cost overruns on the project.	High	If significant additional efforts are needed to address challenges in the underlying system to implement the proposed enhancements, then it is recommended that the enhancements be addressed in the end-state IFMIS.	Project Management Team, IFMIS

8. Way forward and key decision points

This section provides an overview of the key decisions to be taken by the Ministry of Finance/ FCGO, based on which the functional design, procurement approach and bidding documents will be finalized. Other on-going initiatives of MoF/ FCGO that have an impact on the system implementation have also been elaborated.

The following table provides an overview of the key decisions required to be finalized by the MoF/ FCGO in consultation with the various stakeholders across various aspects related to policy decisions, process changes and technology.

Table 26: List of key decisions required to finalize design and procurement approach for interim state IFMIS

Area	Decision Required by GoN
Policies	<ul style="list-style-type: none"> • Whether policy recommendations for interim state should be implemented or pushed to end-state? • Decisions pertaining to consolidated reporting application – <ul style="list-style-type: none"> Key decision points for scope of the application <ul style="list-style-type: none"> ○ Validate objectives of the overall consolidation/ aggregation exercise for whole-of-government reporting (<i>In cognizance the current limitations with respect to data availability for consolidation</i>) ○ Validate output expectations from the reporting application - <i>only management reporting purposes / generating consolidated statutory accounts</i>) ○ Degree of data depth needed from interfacing systems – transaction level or summary level, and frequency of data exchange (real-time/daily/weekly) from interfacing systems ○ Validate scope of the reporting application - <i>standard reports vs custom reports</i> Key decision points for operationalizing the application <ul style="list-style-type: none"> ○ Finalize whether a single application is needed, or two applications need to be built separately for internal and external reporting ○ Finalize additional system functionalities, interfaces and coverage for short term and medium-long term (based on options outlined in previous slides) ○ Finalize development approach (make enhancements to New Reporting Application / develop a new application as customization of BI Tool) • Decisions pertaining to enhancements to existing systems – <ul style="list-style-type: none"> ○ Whether proposed enhancements and interfaces are to be implemented for interim-state or pushed to end-state?
Systems / Technology	
Procurement	<ul style="list-style-type: none"> • Decision on procurement approach to be adopted based on development approach for enhancements to consolidated reporting application

These decisions have an impact on the following:

- *Help finalize the additional development efforts needed for the New Reporting Application, in order to achieve desired functional coverage for consolidated reporting*
- *Help finalize the implementation approach (final design, procurement and deployment) needed for the New Reporting Application, in order to optimize time-cost efforts*
- *Efforts needed to develop any bidding documents, if required.*

9. Annexure 1: To-Be process maps for interim-state IFMIS

9.1. Budget Formulation

9.1.1. Interim to-be process map for Fiscal Planning & Resource Envelope Finalization

The following figure below illustrates the process of Fiscal Planning & Resource Envelope Finalization in the interim IFMIS to-be environment.

Key changes from as-is:

- *None* - The current process flow from as-is is being retained for the interim IFMIS to-be environment as all such operations remain outside the LMBIS system

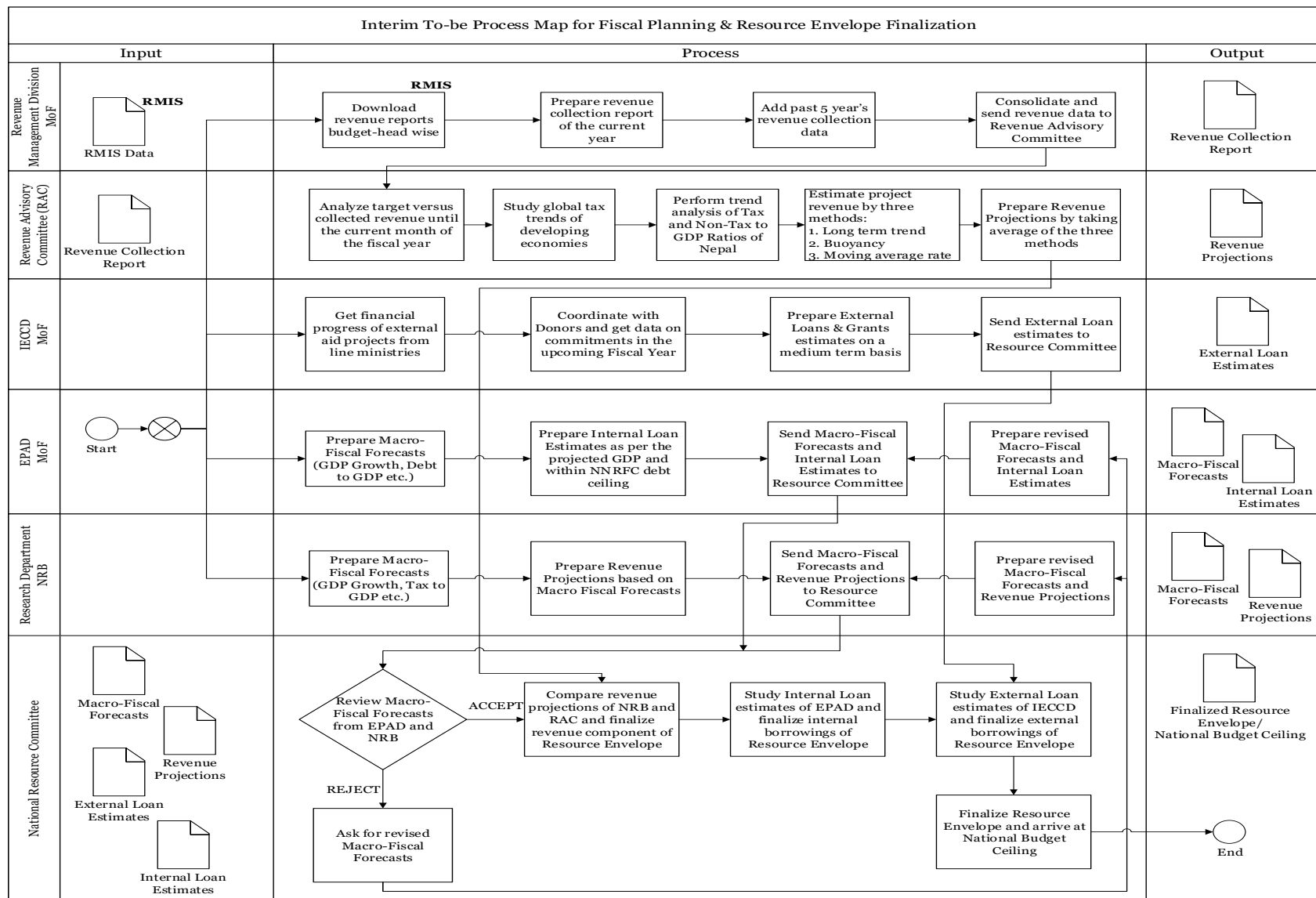


Figure 10: Interim to-be process map for Fiscal Planning & Resource Envelope Finalization

9.1.2. Interim To-be process map for Fiscal Transfers, Developmental Planning and Ministry Ceiling Finalization

The following figure below illustrates the process of Fiscal Transfers, Developmental Planning and Ministry Ceiling Finalization in the interim IFMIS to-be environment.

Key changes from as-is include:

- eGP system is in use in Nepal for e-public procurement and as such it has the data on payment milestones for all contracted projects and annual procurement plans. LMBIS will interface with eGP to fetch this data in order to provide inputs to the Budget and Programme division at MoF for preparation of overall line ministry wise expenditure ceilings
- DOMS is used for debt management in Nepal and as such captures the data on internal and external debt, annual debt servicing including for internal and principal components. LMBIS will interface with DOMS to fetch this data to provide inputs to the Budget and Programme division at MoF for preparation of overall line ministry wise expenditure ceilings
- LMBIS to support in generating auto notifications to communicate the budget ceilings to the line ministries to aid in preparation of budget estimates

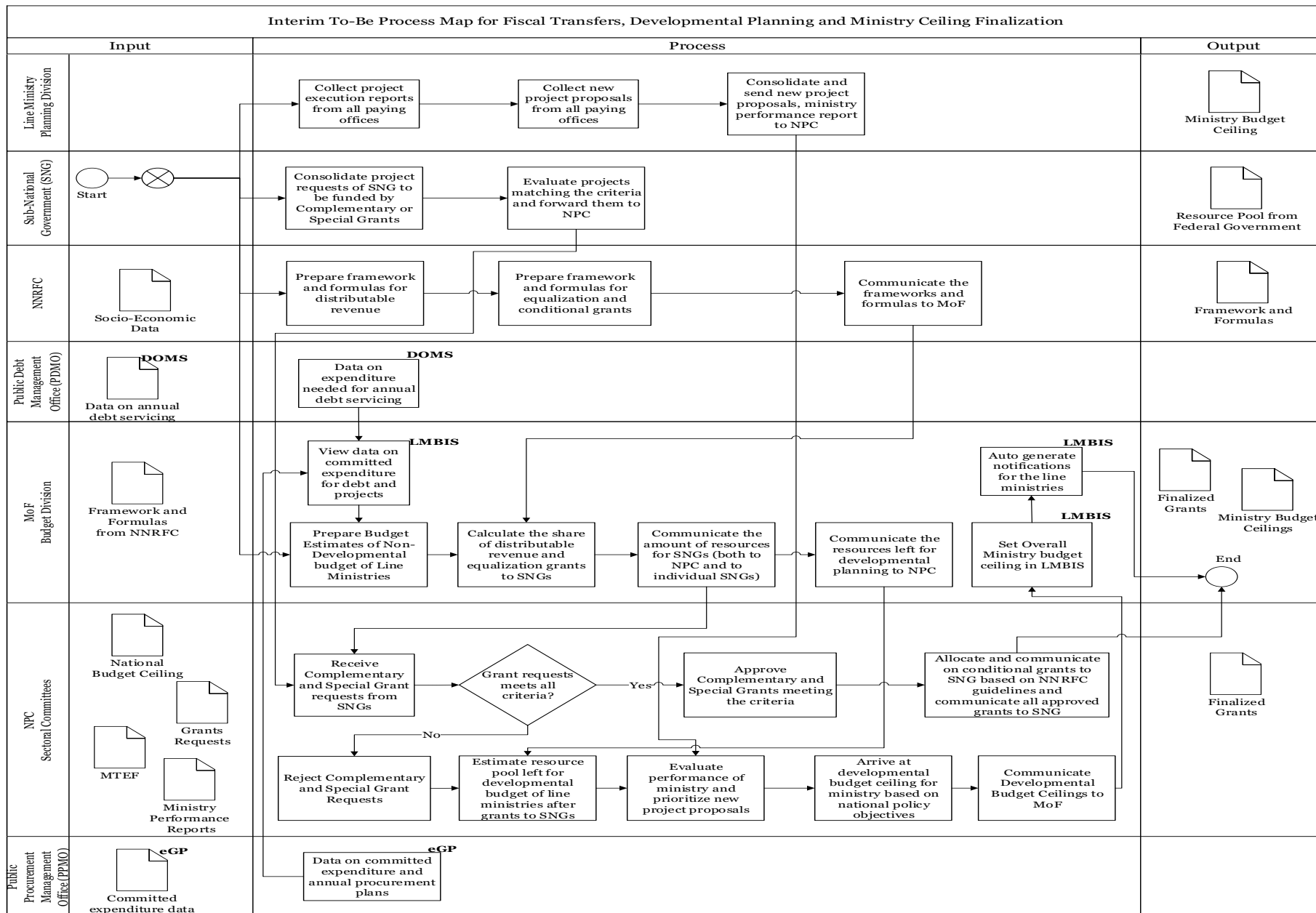


Figure 11: Interim To-be process map for Fiscal Transfers, Developmental Planning and Ministry Ceiling Finalization

9.1.3. Interim To-be process map for Budget Preparation in Line Ministry

The following figure below illustrates the process of Budget Preparation in Line Ministries in the interim IFMIS to-be environment

Key changes from as-is include:

- LMBIS to support in auto generating notifications to the users to trigger the budget estimate preparation exercise as per the budget calendar
- Paying offices will have access to debt servicing and project wise committed expenditure requirements via view of the same on LMBIS. Such information access would expedite the preparation of expenditure estimates

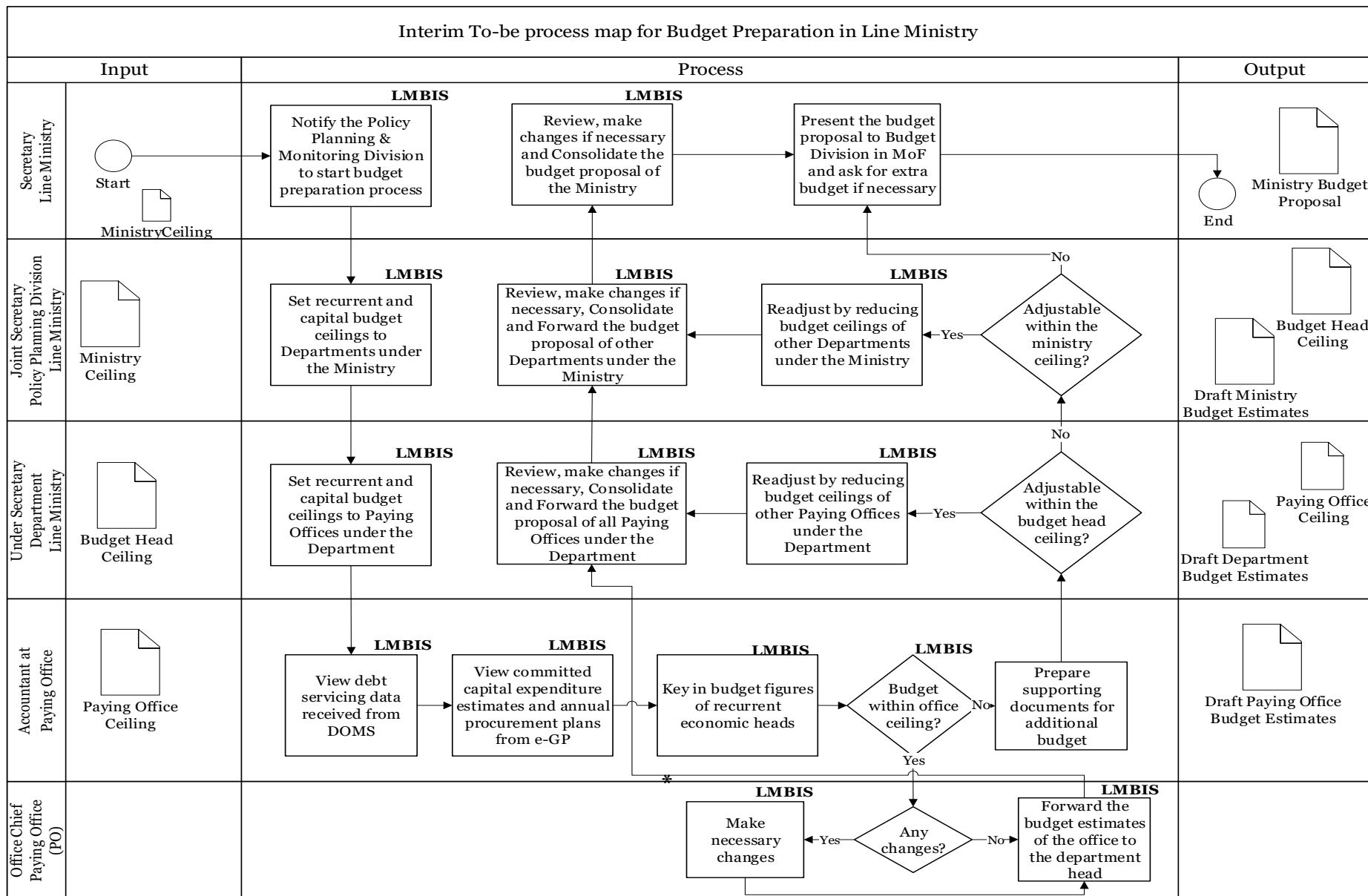


Figure 12: Interim To-be process map for Budget Preparation in Line Ministry

9.1.4. Interim To-be process map for Budget Consolidation and Appropriation

The following figure illustrates the process of Budget Consolidation in MoF and the Budget Appropriation in the Parliament:

Key changes from as-is include:

- *None* - The process flow for budget consolidation and appropriation remains unchanged as the enhancements proposed does not impact such activities in the interim IFMIS

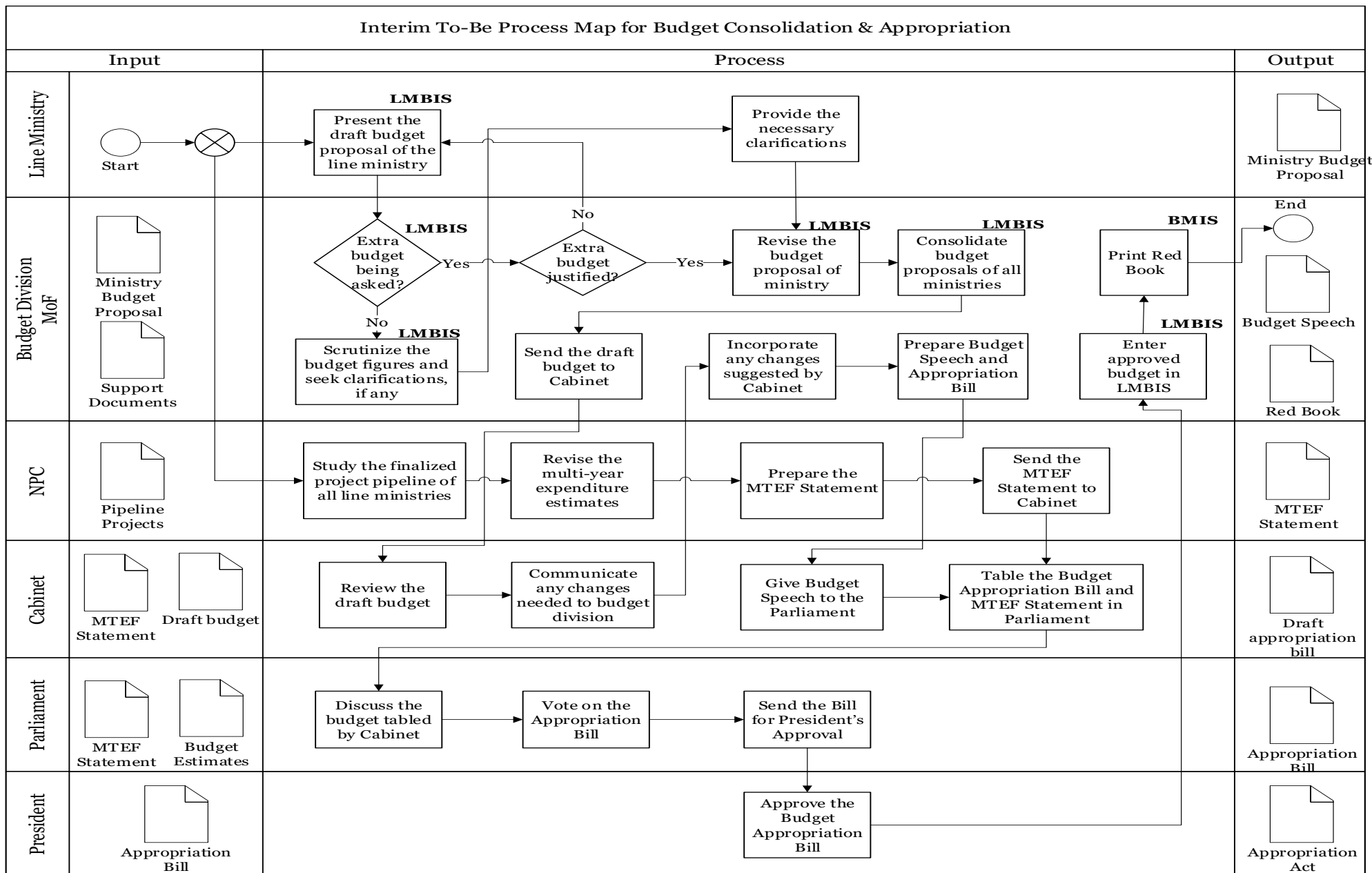


Figure 13: Interim To-be process map for Budget Consolidation and Appropriation

9.2. Budget Allocation

9.2.1. Interim To-be process map for budget allocation

The following figure illustrates the process of Budget Allocation:

Key changes from as-is include:

- The communications regarding budget authorization and allocation are made via email/system (where applicable) and through physical letters

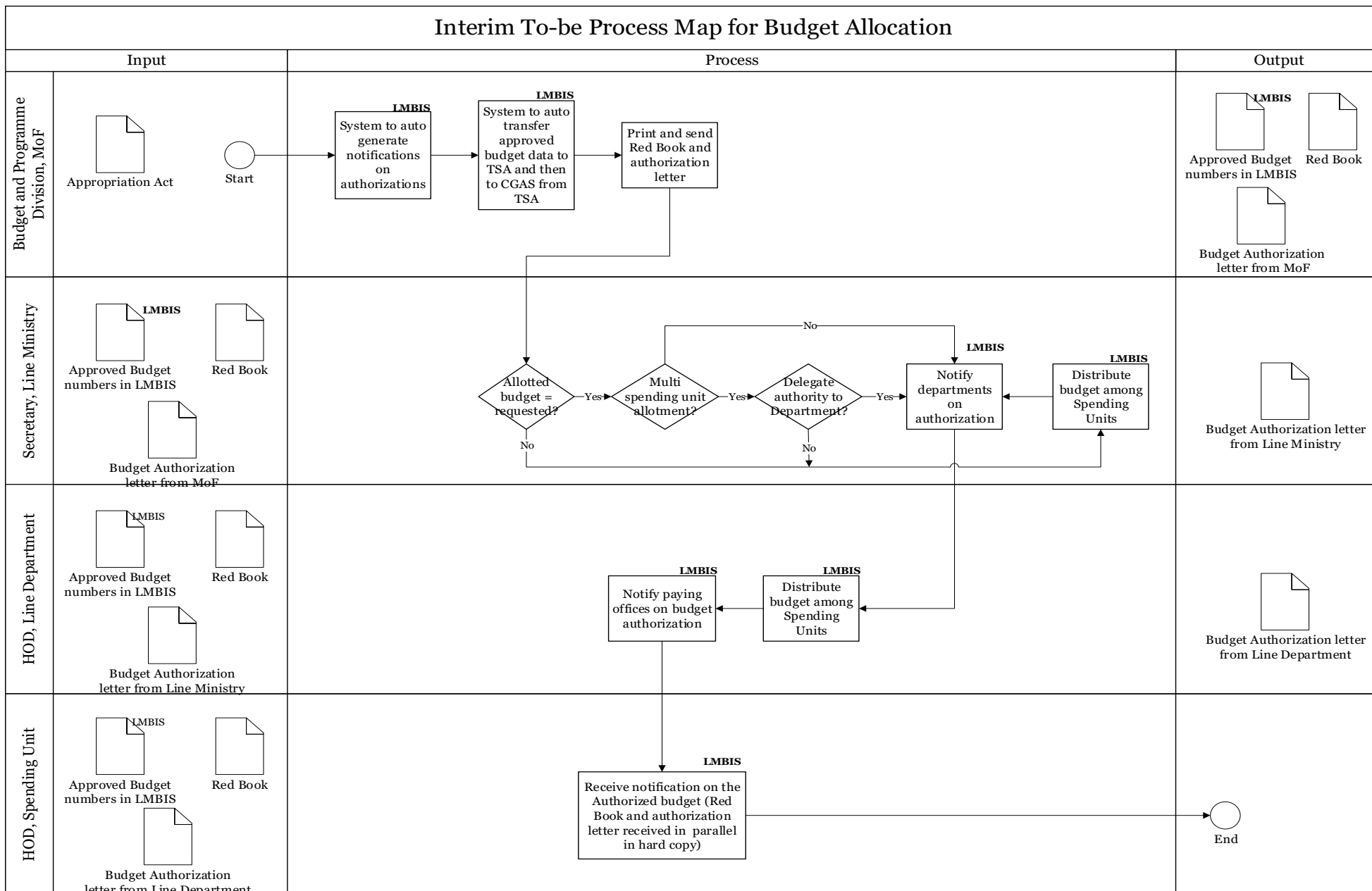


Figure 14: Interim To-be process map for budget allocation

9.2.2. Interim To-be process map for Budget Revision request

The following figure illustrates the process of Budget Revision in the interim IFMIS to-be environment:

Key changes from as-is include:

- LMBIS to facilitate a user at the paying office in uploading the supplementary documents (as scanned files) required to justify a reallocation/virement request raised on the system
- LMBIS to support in internal business logic in-order to auto categorize the reallocation requests as revisions or virements based on the configured rules and accordingly send the request for approval to the concerned user as per the defined workflows
- Post approval at the Line Ministry of a virement request, system to support automatically blocking the budget (in the proposed budget code to be debited) and forwarded to the concerned personnel at MoF for final approval*

**Note: Certain features may have been implemented in the LMBIS system post the lockdown as part of the on-going system enhancements at MoF*

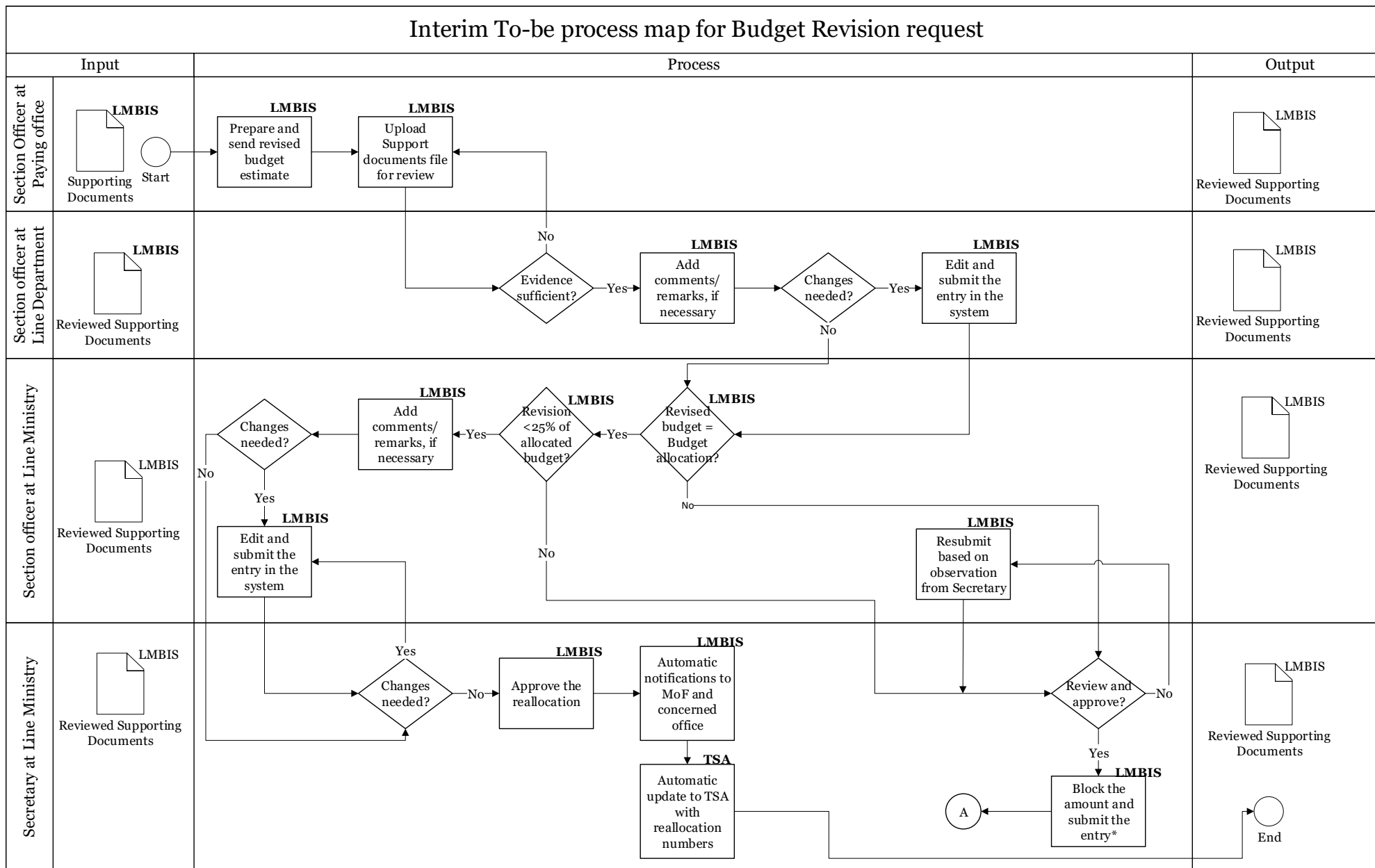


Figure 15: Interim To-be process map for Budget Revision request

9.2.3. Interim To-be process map for Virement request processing at MoF

The following figure illustrates the process of Virement request processing at MoF:

Key changes from as-is include:

- All the users at MoF involved in virement request processing, namely Computer Officer, Under Secretary, Joint Secretary, Secretary and the Minister to be configured in the system, mapped with the corresponding workflows required for according their approval
- System to support in auto generating notifications on the virement to the concerned users at the line ministry/paying office/FCGO/DTCO

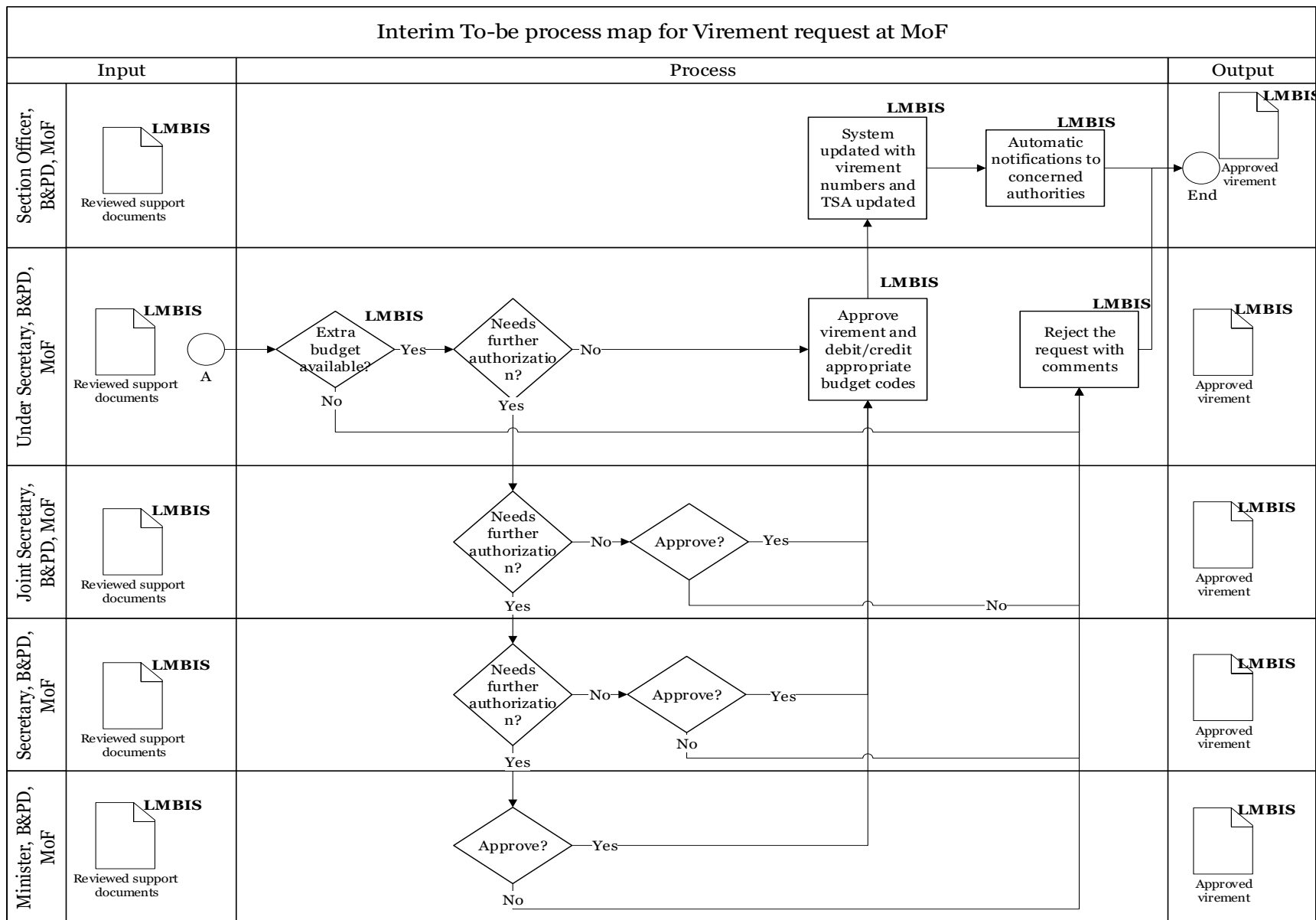


Figure 16: Interim To-be process map for Virement request processing at MoF

9.3. Expenditure Management

9.3.1. Interim To-be process map for Payment Order preparation (Works bill)

The following figure illustrates the process of Payment Order Preparation in the Paying Office:

Key changes from as-is include:

- System to support in enforcing trimesterly expenditure ceilings by automatically disallowing any payment orders exceeding the ceiling
- System to support in interfacing with eGP to periodically fetching vendors, contracts and payment milestone details from eGP which should be available as a view for a CGAS user to aid in payment order preparation

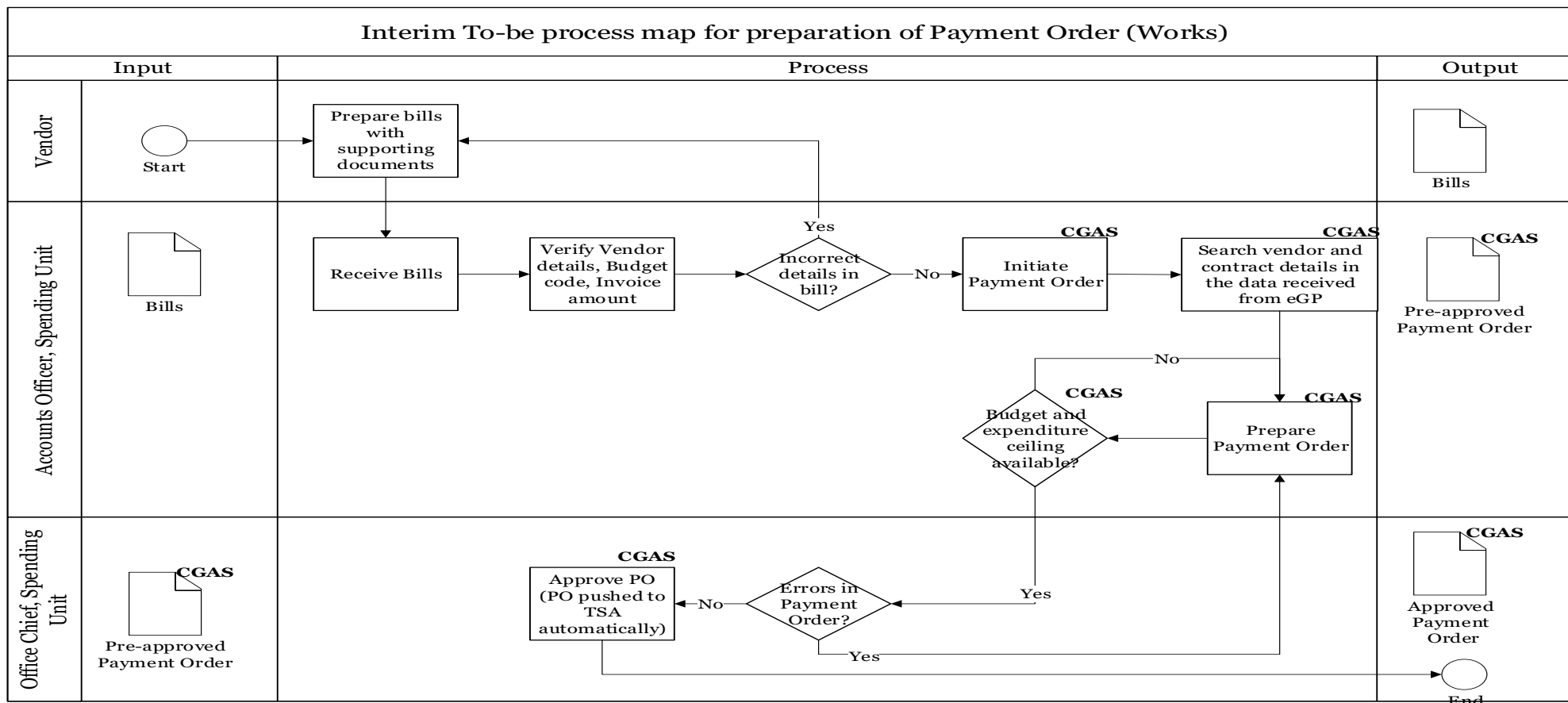


Figure 17: Interim To-be process map for Payment Order preparation (Works bill)

9.3.2. Interim To-be process map for Salary bill preparation

The following figure illustrates the process of Salary bill preparation in the Paying Office:

Key changes from as-is include:

- System to support in enforcing trimesterly expenditure ceilings by automatically disallowing any payment orders exceeding the ceiling

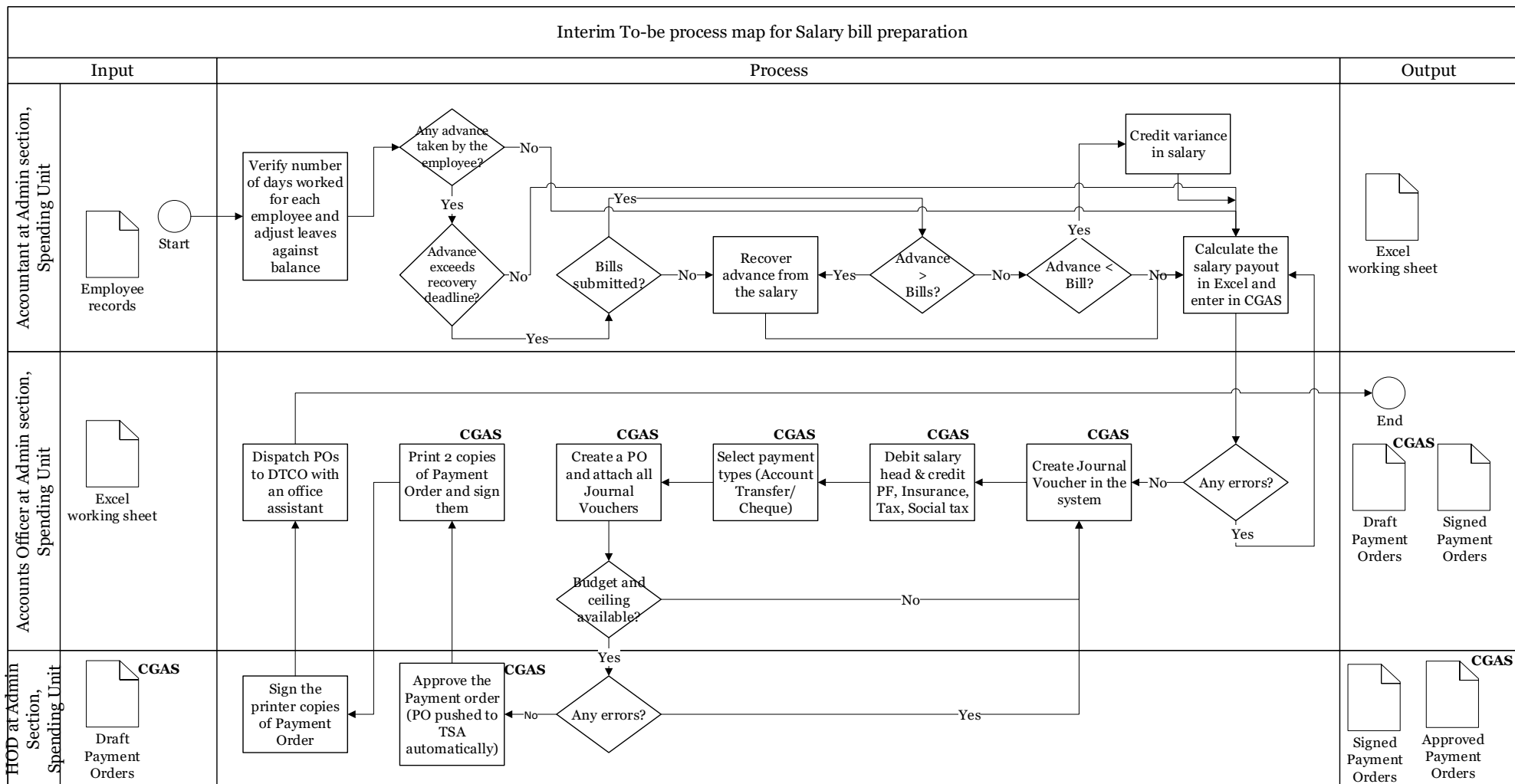


Figure 18: Interim To-be process map for Salary bill preparation

9.3.3. Interim To-be process map for PO processing and Reconciliation at Treasury

The following figure illustrates the process of Payment Order processing and Reconciliation at DTCO

Key changes from as-is include:

- System to support in auto reconciling expenditure data through a facility to upload bank scrolls int TSA
- Alternatively, auto reconciliation can be achieved through an interface with commercial banks and NRB systems

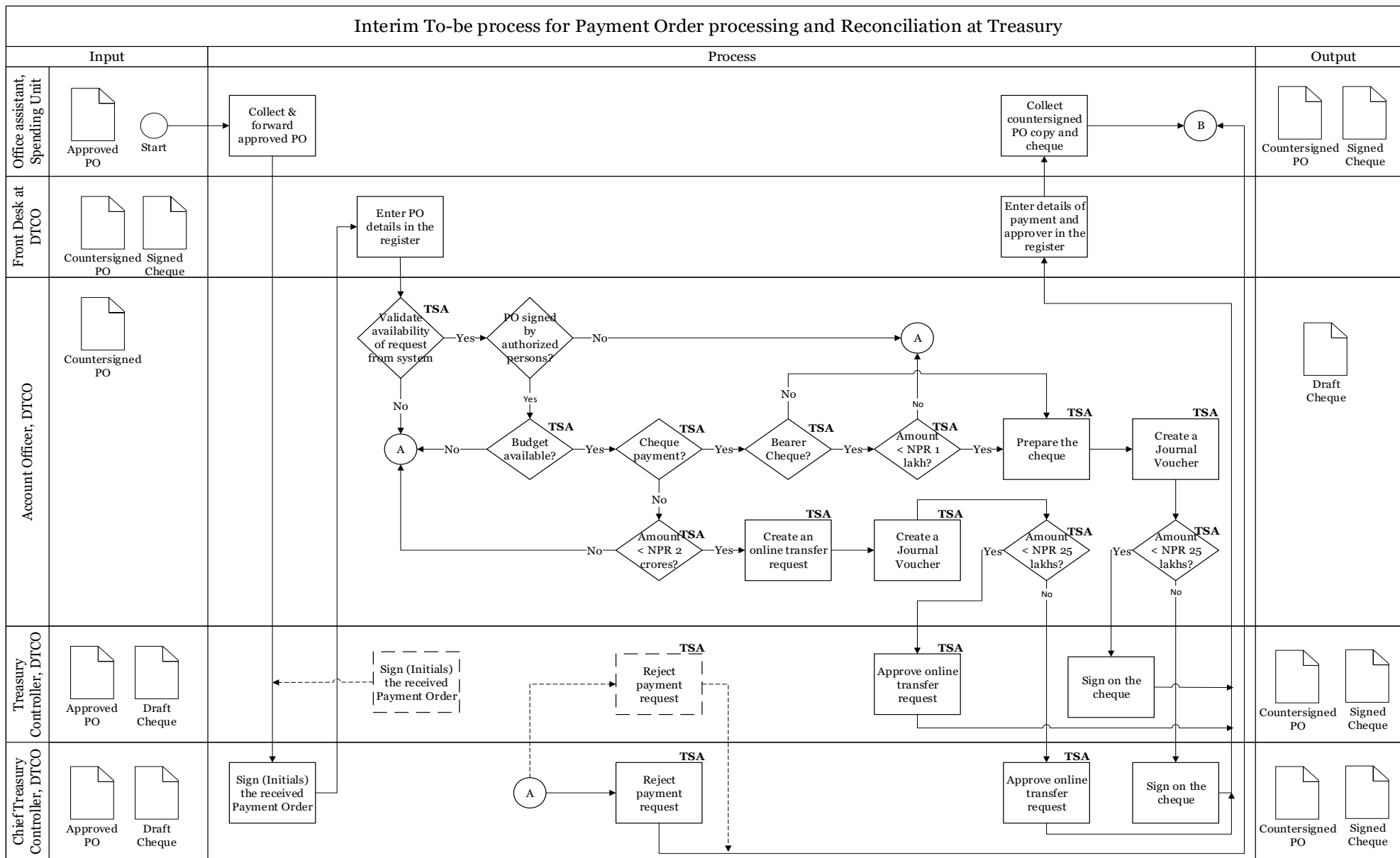


Figure 19: Interim To-be process map for PO processing and Reconciliation at Treasury

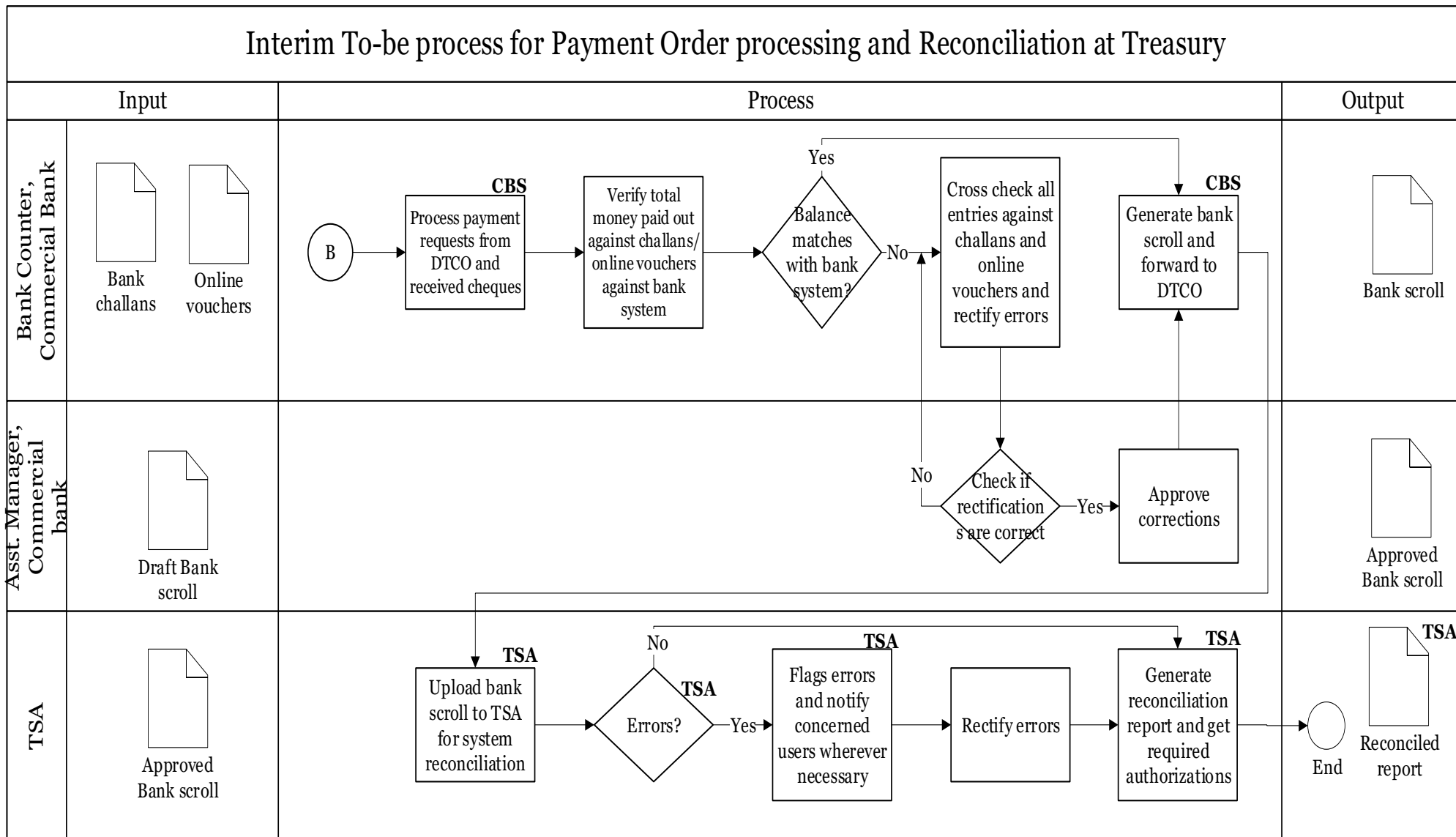


Figure 20: Interim To-be process map for reconciliation at treasury

9.3.4. Interim To-be process map for new Pensioner Registration and Payment

The following figure illustrates the process of new Pensioner Registration:

Key changes from as-is include:

- *None* - The process flow for pensioner registration remains unchanged as the enhancements proposed does not impact such activities in the interim IFMIS

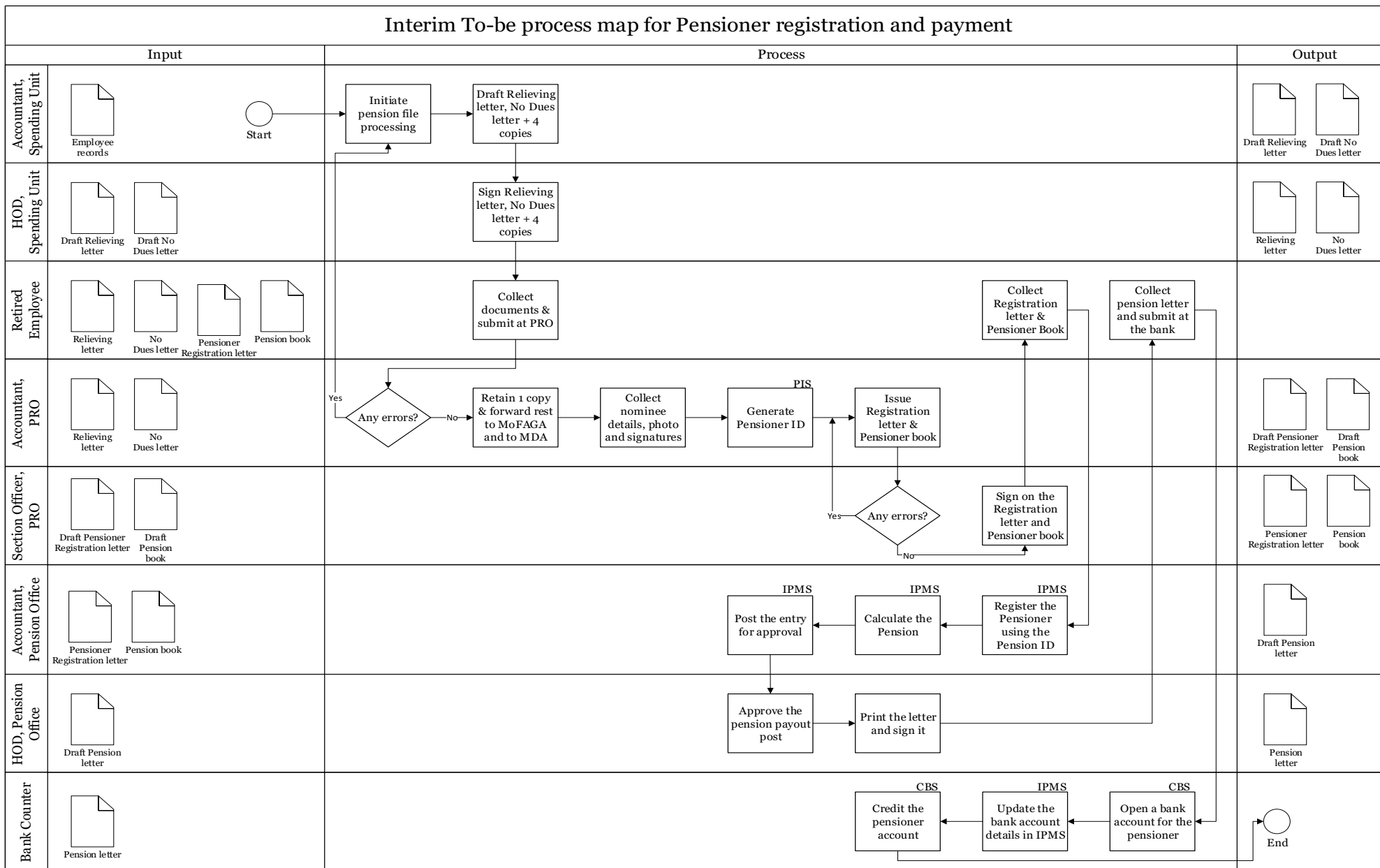


Figure 21: Interim To-be process map for new Pensioner Registration and Payment

9.3.5. Interim To-be process map for pension payouts to Registered Pensioners

The following figure illustrates the process of pension payouts to Registered Pensioners and reimbursement to banks:

Key changes from as-is include:

- System to support in enforcing trimesterly expenditure ceilings by automatically disallowing any payment orders exceeding the ceiling

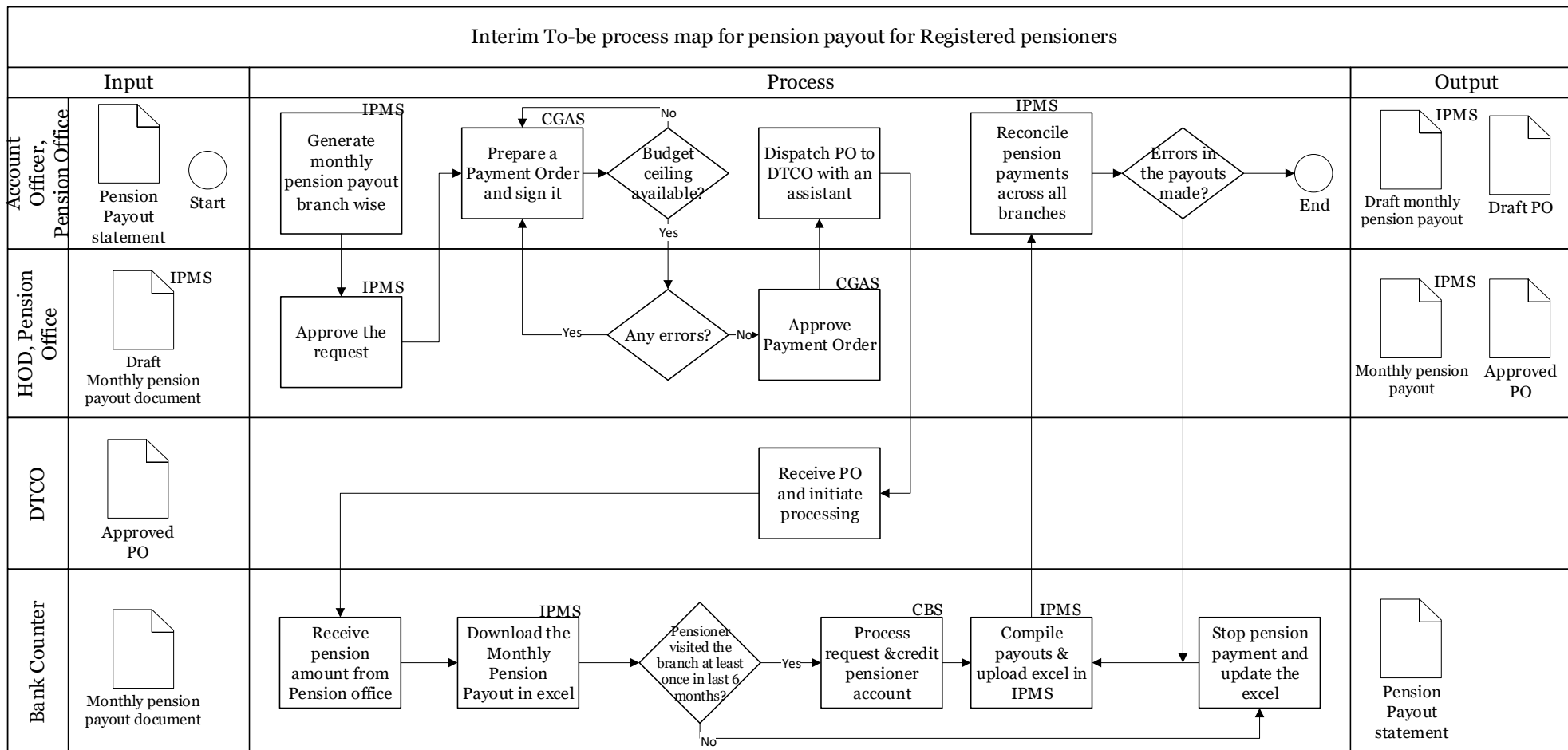


Figure 22: Interim To-be process map for pension payouts to Registered Pensioners and reimbursement to banks

9.4. Receipts Management

9.4.1. Interim To-be process map for Online Tax Payment

The following figure illustrates the process of online payment and collection of taxes under the purview of IRD:

Key changes from as-is include:

- System to support multiple payments options such as debit cards, credit cards, mobile wallets etc., for online payments

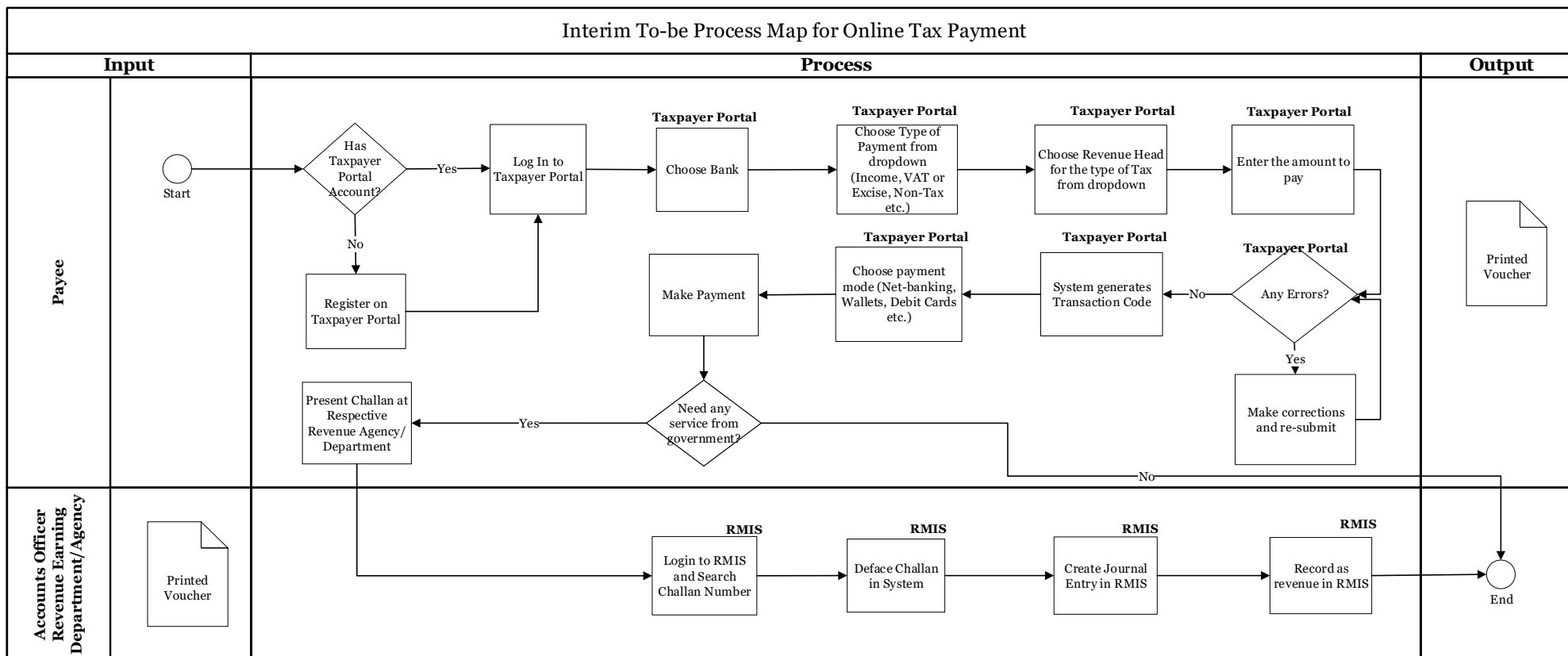


Figure 23: Interim To-be process map for Online Tax Payment

9.4.2. Interim To-be process map for Offline Tax Payment

The following figure illustrates the process of offline payment and collection of taxes under the purview of IRD:

Key changes from as-is include:

- None - The process flow for offline tax payment remains unchanged as the enhancements proposed does not impact such activities in the interim IFMIS

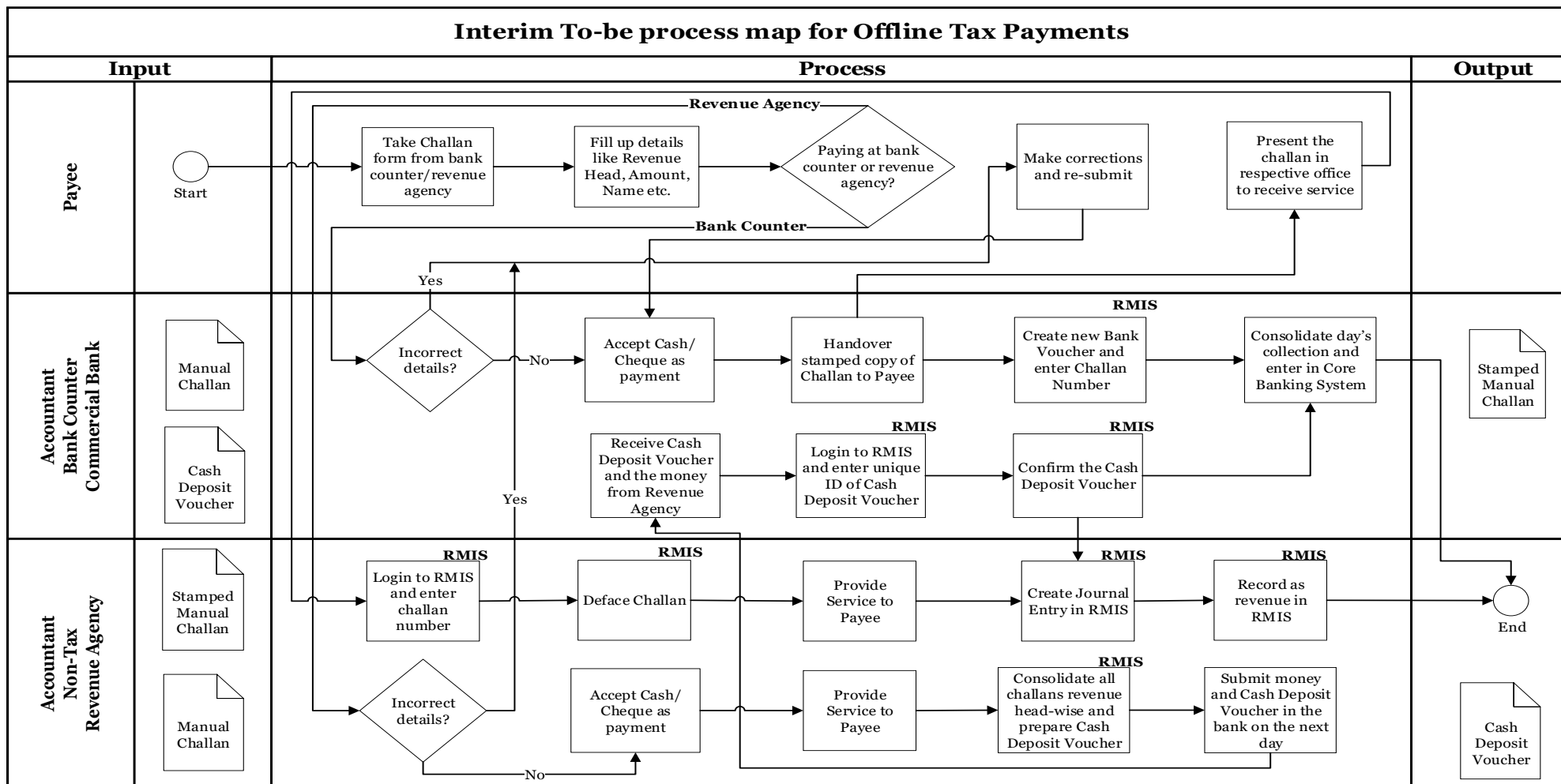


Figure 24: Interim To-be process map for Offline Tax Payment

9.4.3. Interim To-be process map for Daily Reconciliation of Revenue Receipts

The following figure below illustrates the process of daily reconciliation of Revenue receipts:

Key changes from as-is include:

- System to support in auto reconciling receipts data through an interface with commercial banks and NRB systems
- Alternatively, auto reconciliation can be achieved through a facility to upload bank scrolls into RMIS

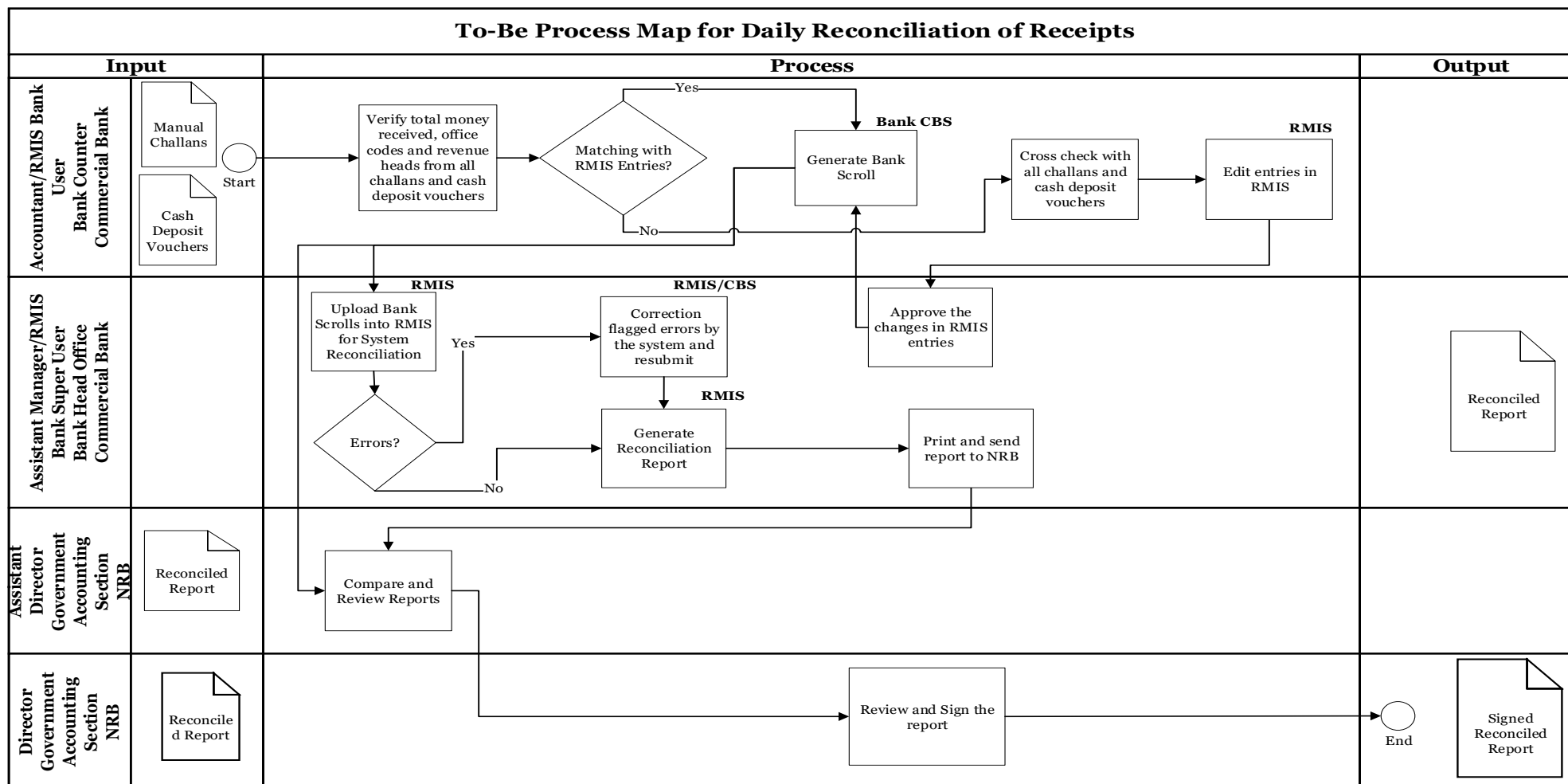


Figure 25: Interim To-be process map for Daily Reconciliation of Revenue Receipts

9.5. Debt & Aid Management

9.5.1. Interim To-be process map for Repayment of External Loan

The following figure below illustrates the process of External Loans Repayments:

Key changes from as-is include:

- CGAS to support in enforcing trimesterly expenditure ceilings by automatically disallowing any payment orders exceeding the ceiling

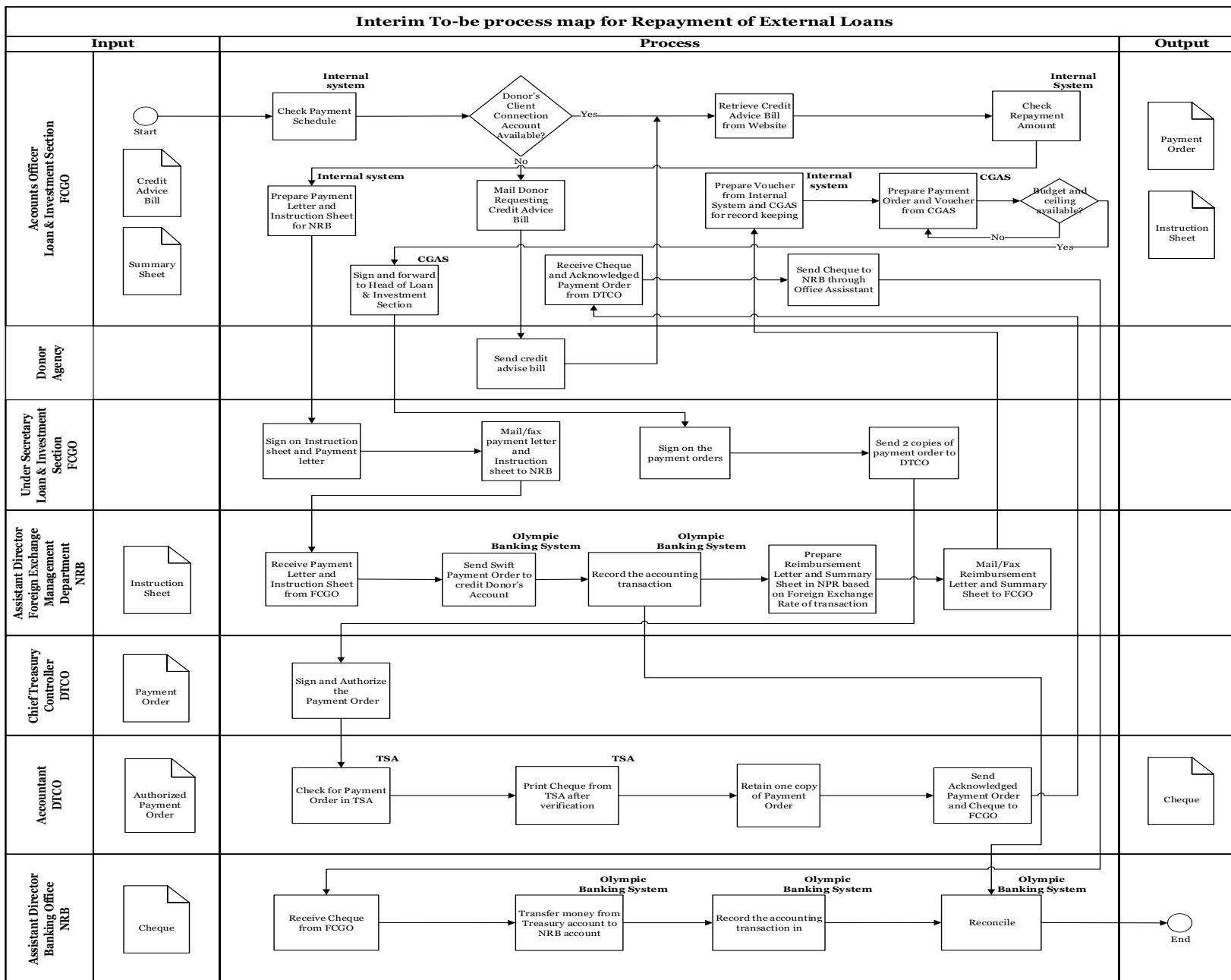


Figure 26: Interim To-be process map for Repayment of External Loan

9.5.2. Interim To-be process map for Repayment of Internal Debt

The following figure below illustrates the process of Internal Debt Repayments:

Key changes from as-is include:

- CGAS to support in enforcing trimesterly expenditure ceilings by automatically disallowing any payment orders exceeding the ceiling

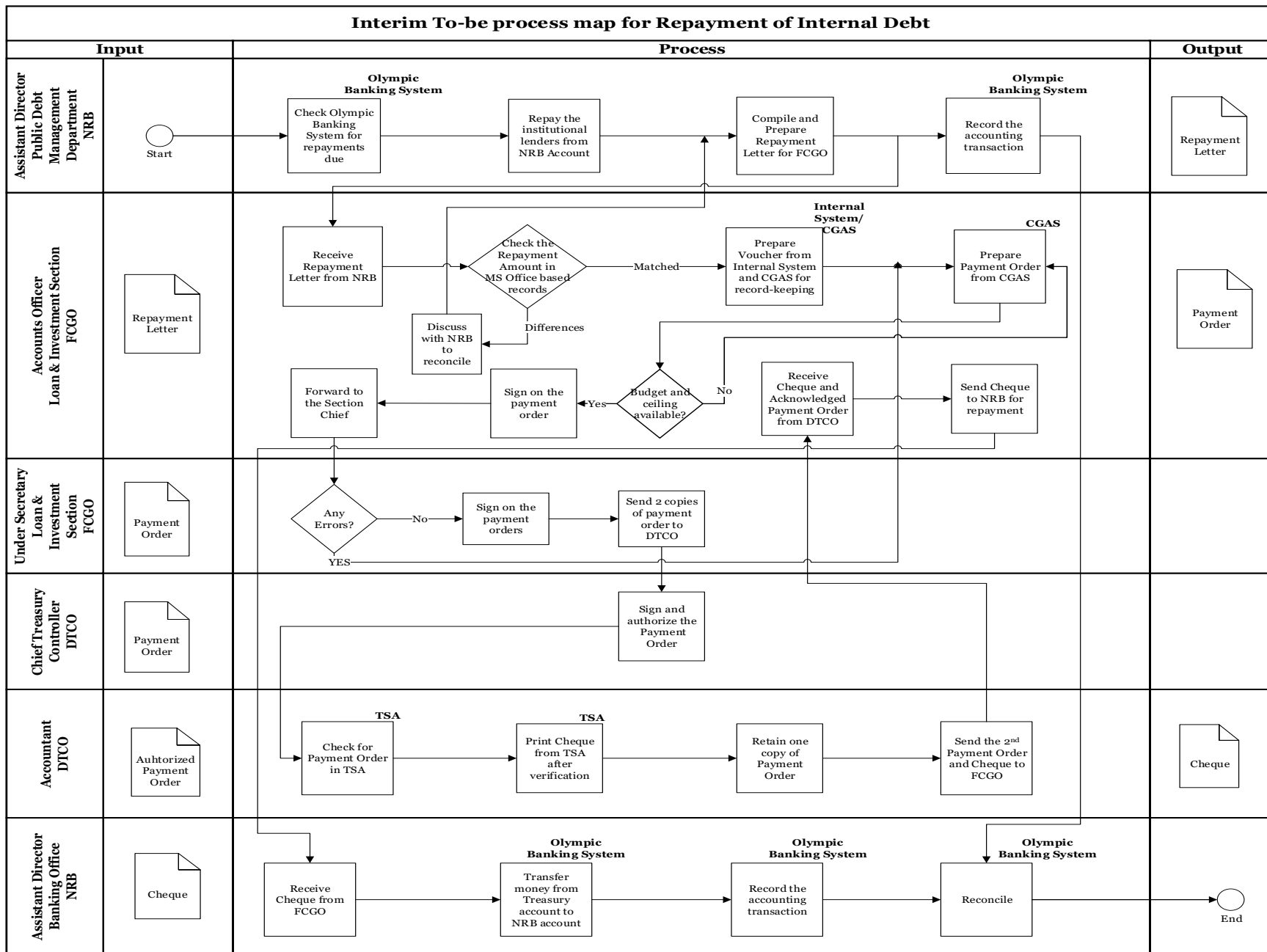


Figure 27: Interim To-be process map for Internal Debt Repayment

10. Annexure 2: Functional requirements specifications for interim-state IFMIS

10.1. FRS for Consolidated Reporting Application

The following details the functionalities of the Consolidated Reporting Application (“system”) to be developed for whole-of-government consolidated reporting.

The system shall support functionalities for the following key operations:

- Defining the consolidation structure, including creation/ modification of the relationship matrix between entities and corresponding chart of accounts
- Defining the business rules for identification and elimination of transactions to avoid double counting during consolidation
- Consolidation of financials between all 3 tiers of the governments, Public Sector Enterprises and other related entities of the government like Public-Private-Partnership projects/ SPVs etc.,
- Various options for Report generation, including
 - Standard defined reports that can be parametrized
 - Custom reports (in case the application is built on a BI tool)
 - Geospatial presentation of consolidated data (using the BI tool)
- Management Dashboards for various categories of users, with Visio-graphic representation of data

The following classifications used for defining the minimum level of the functional requirements:

- a) **Mandatory (M):** These include the mandatory requirements that the selected solution is required to cater to, without which the system cannot function. The System Integrator are required to showcase compliance towards all mandatory functionalities.
- a) **Optional (O):** These include the features of the system, which are not critical to the system functioning and can be implemented at a later phase.

#	Requirement	M/O
	<i>Defining consolidation structure</i>	
1.	<p>System should support in defining the consolidation structure, mapped to the Unified CoA used in Nepal, including the following key actions:</p> <ul style="list-style-type: none"> • Defining hierarchy and relationship between identified entities for consolidation using administrative classification of CoA (“consolidation hierarchy”) • Option to add markers to the defined Chart of Accounts in order to <ul style="list-style-type: none"> ○ Tag entries for consolidation ○ Tag entries requiring double-entry elimination/ knock-offs ○ Tag entries per defined consolidation metrics (e.g. Revenues, Liabilities, Assets etc.) ○ Tag entries for their sectoral classification (e.g. Agriculture, Social Welfare etc.,) ○ Tag entries for geographical classification (also to be used for geospatial representation) – optional 	M

#	Requirement	M/O
2.	<p>System should support in configuring business rules to flag the double accounting transactions related (but not limited) to the following based on the functional classification of the CoA and the tagging of the chart of accounts as described in the point above.</p> <ul style="list-style-type: none"> • Taxes and fees • Interest payments and receipts • Grants and subsidies • Payments for goods and services • Loans and investments into public sector utilities • Inter-entity receivables • Inter-entity payables • Fixed asset transfers 	M
3.	System should maintain an audit trail of changes to consolidation hierarchy, and all such tagging actions (refer point 1) undertaken on the Chart of Accounts, and should support a workflow requiring authorization for such changes with a defined user	M
4.	System should support in mapping the consolidation hierarchy and data processing rules with the data received from interfacing systems, in order to correspondingly bring in the incoming data entries to the appropriate data tables	M
5.	System should support the authorized user in adding/modifying/deleting the defined relationship hierarchy/ labelling rules for the CoA based on access rights, and requiring authorization for such changes with a defined user	M
6.	For all actions undertaken on the Relationship matrix/ CoA, system should generate auto-notifications for defined user groups at FCGO/ MoF/ OAG etc.,	M
	Collation of financial data for consolidation	
	<p>Interface with FMIS/ TSA/ RMIS <i>Note: To be decided by the government</i></p>	
7.	<p>System should support an interface with the FMIS/ TSA/ RMIS system in order to receive the following data points:</p> <ul style="list-style-type: none"> • Daily/ Monthly/ quarterly/ periodic/ annual unaudited financial data on the federal government • Daily/ Monthly/ quarterly/ periodic/ annual unaudited financial data for the 7 provincial governments <p>Note: <i>the periodicity of transfer to be decided based on decision of GoN, based on which data can be extracted from the interfaced systems per defined periodicity.</i></p> <p>The data received from FMIS should include, amongst others the following:</p> <ul style="list-style-type: none"> • Allocated/ revised budget including budget transfers • Expenditure, including realized and payables • Receipt Collections, including received and receivables • Debt and Liabilities • Financial and Physical Assets 	M

#	Requirement	M/O
	<p>Option: <i>The data received could be either at a summary level (e.g. CoA budget head level), or at a Transaction level, based on the defined capacities of the reporting system.</i></p> <p>Note: <i>In case the consolidated reporting application is built as part of the FMIS, then system should support in receiving such data from the FMIS database</i></p>	
8.	<p>The system should support in receiving such information via the interface in the following ways:</p> <ul style="list-style-type: none"> • Facility for data upload in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) • API based data transfers by linking the databases at backend 	M
Interface with SuTRA		
9.	<p>System should support an interface with the SuTRA system in order to receive the following data points:</p> <ul style="list-style-type: none"> • Daily/ Monthly/ quarterly/ periodic/ annual unaudited financial data for the 753 local governments <p>Note: <i>the periodicity of transfer to be decided based on decision of GoN, based on which data can be extracted from the interfaced systems per defined periodicity</i></p> <p>The data received from SuTRA should include, amongst others the following:</p> <ul style="list-style-type: none"> • Allocated/ revised budget including grants from center • Expenditure, including realized and payables • Receipt Collections, including received and receivables • Debt and Liabilities • Financial and Physical Assets <p>Option: <i>The data received could be either at a summary level (e.g. CoA budget head level), or at a Transaction level, based on the defined capacities of the reporting system</i></p>	M
10.	<p>The system should support in receiving such information via the interface in the following ways:</p> <ul style="list-style-type: none"> • Facility for data upload in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) • API based data transfers by linking the databases at backend 	M
Interface with NRB Banking System		
11.	<p>System should support an interface with the NRB Banking System in order to receive the following data points:</p> <ul style="list-style-type: none"> • Government cash balances • Any out-of-treasury government transactions handled by the NRB and not recorded in FMIS, including on market borrowings/ investments, foreign currency transactions etc., 	M

#	Requirement	M/O
	Note: <i>The periodicity of transfer to be decided based on decision of GoN, based on which data can be extracted from the interfaced systems per defined periodicity</i>	
12.	The system should support in receiving such information via the interface in the following ways: <ul style="list-style-type: none"> • Facility for data upload in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) • API based data transfers by linking the databases at backend • Web forms, for online entry of required data fields 	M
	Interface with OAG System (NAMS)	M
13.	System should support an interface with the OAG system in order to receive the following data points: <ul style="list-style-type: none"> • Annual audited financial data on the federal government • Annual audited financial data for the 7 provincial governments • Annual audited financial data for the 753 local governments Option: <i>The data received could be either at a summary level (e.g. CoA budget head level), or at a Transaction level, based on the defined capacities of the reporting system</i>	M
14.	The system should support in receiving such information via the interface in the following ways: <ul style="list-style-type: none"> • Facility for data upload in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) • API based data transfers by linking the databases at backend 	M
	Interface with PAMS	
15.	System should support an interface with the PAMS in order to receive information on the government assets for federal, provincial and local government level, <p>Note: <i>the periodicity of transfer to be decided based on decision of GoN, based on which data can be extracted from the interfaced systems per defined periodicity</i></p> Option: <i>The data received could be either at a summary level (e.g. CoA budget head level), or at a Transaction level, based on the defined capacities of the reporting system</i>	O
16.	The system should support in receiving such information via the interface in the following ways: <ul style="list-style-type: none"> • Facility for data upload in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) • API based data transfers by linking the databases at backend 	O
	A document/ information upload facility	M
17.	System should support a facility for an authorized user to upload/ submit information in defined templates for any added information needed for consolidation of accounts, including for (indicative): <ul style="list-style-type: none"> • Financial data of State Owned Enterprises/ Public Sector Units 	M

#	Requirement	M/O
	<ul style="list-style-type: none"> Out-of-Treasury transactions Extra-budgetary grants received by government agencies/ SPVs etc., Information on Extra-budgetary entities (with provision for mapping accrual to cash accounting procedures) External funding not committed during budget finalization, as received in-year (which stays outside the budget and is not part of government reporting) Unsettled advances Enter any notes Revenue, Tax, Grant, Investment, loan, internal and external Loan, irregularities, balance of extra fund, thirty party payment, Technical and commodity assistance, commitment accounting, Contingent Liabilities, Intergovernmental Transfer and other adjustment of the Entities. 	
18.	<p>The system should support an upload/ data entry facility in the following ways:</p> <ul style="list-style-type: none"> A user page with option to upload files in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) Web forms, for online entry against defined data fields 	M
	Data processing for consolidation	
19.	System should support in consolidating the financial information of all identified entities line by line for each entry as per the consolidation hierarchy and configured consolidation business rules	M
20.	<p>System should support in identifying combination of Chart of Accounts from the entries, that give rise to double counting across entities and apply corresponding actions needed to consolidate (based on consolidation business rules). Such actions can include:</p> <ul style="list-style-type: none"> Additions Subtractions Eliminations 	M
21.	System should support in undertaking a comparative analysis between audited and unaudited financials, in order to identify variances at CoA line item level, as well as at each level of consolidation defined in the system	M
	Generation of Standard reports	
22.	<p>System should support in generation of the NPSAS based Consolidated Financial Statement (NCFS) to submit to the Office of the Auditor General for federal, provincial and local level, and consolidated in any combination.</p> <p>Note: Compliance with Annex 14,15,16,17,18,19 and 7,8,9,10 of CFS</p>	M
23.	<p>System should support in generating the following standard reports for financial reporting (<i>subject to availability of the required data from the interfacing systems</i>)</p> <p>Revenue</p> <ul style="list-style-type: none"> Government Revenues by each revenue type, comprising budgeted revenue estimates (and revised estimates), year till date collections, comparative metrics from previous 3 years and pending receivables (if any) 	M

#	Requirement	M/O
	<ul style="list-style-type: none"> • Government Revenues by sector, comprising budgeted revenue estimates (and revised estimates), year till date collections, comparative metrics from previous 3 years and pending receivables (if any) • Government revenues from external grants from donor agencies • Revenue Arrears, including ageing analysis of government receivables by revenue type and write-offs • Revenue Arrears, including ageing analysis of government receivables by sector and write-offs • Off-budget government receipts by revenue type • Government revenues from Public Sector Enterprises by each PSE • Government revenues from PPP projects/ SPVs by each entity <p>Expenditure</p> <ul style="list-style-type: none"> • Government Expenditure by each expenditure category, comprising estimated and revised budget, year till date expenditure, comparative metrics from previous 3 years, and pending payables (if any) • Government expenditure by each programme, comprising estimated and revised budget, year till date expenditure, comparative metrics from previous 3 years and pending payables (if any) • Government expenditure by sector, comprising estimated and revised budget, year till date expenditure, comparative metrics from previous 3 years, and pending payables (if any) • Government expenditure by outcome indicator, comprising estimated and revised budget, year till date expenditure, comparative metrics from previous 3 years, and pending payables (if any) • Expenditure Arrears, including ageing analysis of government payables by expenditure type • Expenditure Arrears, including ageing analysis of government payables by sector • Off-budget government expenditure by expenditure type • Off-budget government expenditure by sector • Government expenditure in Public Sector Enterprises by each PSE • Government expenditure from PPP projects/ SPVs by each entity <p>Debt & Liabilities</p> <ul style="list-style-type: none"> • Loans and Liabilities of Government including total loan amount, repaid amount, net outstanding loan, principal and interest, interest rate, and yearly repayment schedule. These reports should be separately available for: <ul style="list-style-type: none"> ○ Sector wise ○ Lending/ donor agency ○ Liabilities of PSEs ○ External debt 	

#	Requirement	M/O
	<ul style="list-style-type: none"> ○ Internal Debt including institutional loans and Market borrowings via bonds and other financial instruments ● Debt analysis for all long term debt, including ageing analysis by each debt item ● Public deposits by each sector <p>Financial and Physical Assets</p> <ul style="list-style-type: none"> ● Total government assets by asset category (net value) ● Total government assets by sector (net value) ● Treasury position on cash and cash-like balances ● Financial assets of the government by sector ● Investments in Public Sector Enterprises by each PSE, including investment amount, dividends and net value of investment ● Investments in PPP projects/SPVs by each entity including investment amount, dividends and net value of investment ● Loans to PSEs and other government entities, including loan amount, interest rate, repaid amount and net outstanding ● Loans and advances to employees, including loan amount, interest rate, repaid amount and net outstanding ● Physical assets of the government by asset category, including purchase value, depreciation and net value ● Physical assets of the government by sector, including purchase value, depreciation and net value <p>Note: For all of the reports below, system should support in parametrization along the following dimensions:</p> <ul style="list-style-type: none"> ● Level (Consolidated/ Federal/ Provincial/Local/ PSEs/ other defined) ● Entity (Line Ministry/ Department/ Unit/ Branch/ HoD/ Paying Office) ● Geography (Province/ Administrative unit/ City/ Municipality etc.,) ● Comparative display between audited and unaudited numbers (if both available), with variance percentage ● Addition of specific reporting periods (daily/ weekly/ monthly/ quarterly/annual/ multiyear (3)) 	M/O
24.	<p>For all the reports, system should support a functionality for a defined user to record corrections against any select entry. In such cases, the report should support options for:</p> <ul style="list-style-type: none"> ● Recording both original and corrected numbers ● A case-note to record justifications for the changes made ● Auto-notification to concerned authority on the changed made 	M

#	Requirement	M/O
	<ul style="list-style-type: none"> Maintaining an audit trail of all actions, including time stamp, modified details and approver details 	
	Custom Report Generation using the BI Tool	
25.	<p>System should support generation of custom reports using a Business Intelligence (BI) tool for users configured with access rights. The configuration should include the following parameters (using the CoA and descriptions):</p> <ul style="list-style-type: none"> Financial Metric (Revenue, Expenditure, Liabilities, Assets) Revenue or Expenditure Type Level (Consolidated/ Federal/ Provincial/Local/ PSEs/ other defined) Sector Entity (Line Ministry/ Department/ Unit/ Branch/ HoD/ Paying Office) Geography (Province/ Administrative unit/ City/ Municipality etc.,) Audited/ unaudited Reporting periods (daily/ weekly/ monthly/ quarterly/annual/ multi-year) 	O
26.	Custom reports generator to facilitate the users with options for generating bar, line, pie, area, and radar chart types like heat maps, scatter plots, bubble charts, histograms, geospatial mapping, and combinations of each of these, such as bubbles on a map, etc., as well as the provision to mix and match various combinations	
27.	<p>For all the reports, system should support a functionality for a defined user to record corrections against any select entry. In such cases, the report should support options for:</p> <ul style="list-style-type: none"> Recording both original and corrected numbers A case-note to record justifications for the changes made Auto-notification to concerned authority on the changed made Maintaining an audit trail of all actions, including time stamp, modified details and approver details 	O
	Report workflows and approvals	
28.	<p>System shall support option for defining workflows for sending reports requiring authorization to configured users. Based on such definition, system shall support in auto-queuing reports on the dashboards of concerned users for approval actions</p> <p>In sync, system should generate notifications via email/ sms/ dashboard alerts for the users (<i>optional for email and sms alerts</i>)</p>	M
29.	<p>System shall support option to e-sign reports with the following options:</p> <ul style="list-style-type: none"> DSC based digital signature E-sign based on biometric verification E-sign based on OTP based verification <p>Note: <i>To be finalized based on decision of the GoN</i></p>	M
30.	System shall support option for sending the reports digitally to another defined user per defined rights, with an audit trail of corrections made to the report	M
31.	System shall support a user to save the report in a digital repository and/ or download or print the reports in defined formats including pdf, csv, XBRL etc.,	M

#	Requirement	M/O
	Management Dashboard for users in government	
32.	System should support in management dashboards for users based on authorization rights, with options to set configured reports on their screen, based on the parameters as defined above. Once defined, the system should support in displaying the custom reports on the dashboard of the user, with auto-update to the data based on defined periodicity.	M
33.	The dashboard should also display all options for navigation to relevant features of the reporting application, based on defined rights of the user, including: <ul style="list-style-type: none"> • For standard report generation • Notifications and alerts • Pending actions (approvals etc.,) • Report repository 	M
	Dashboard for citizens	
34.	System should support in a general dashboard for citizens where pre-defined information could be presented for public consumption including broad metrics like government spending by sector, geography etc., The authorized user should have the flexibility to customize the information available for public viewing online	O
35.	System should also support in creating downloadable reports on the public dashboard in defined formats	O
	Geospatial representation	
36.	System (in case based on a BI tool) should support creation of data visualization based on the location of the financial metric. For such integration, the system shall use the geographic markers on the financial data, and thus be able to spatially distribute it on the map of Nepal	O
37.	The system should thus support a geographic report page where the authorized user would have the option to select the following data fields: System should support generation of custom reports using a Business Intelligence (BI) tool for users configured with access rights. The configuration should include the following parameters using CoA and descriptions: <ul style="list-style-type: none"> • Financial Metric (Revenue, Expenditure, Liabilities, Assets) • Revenue or Expenditure Type • Level (Consolidated/ Federal/ Provincial/Local/ PSEs/ other defined) • Sector • Entity (Line Ministry/ Department/ Unit/ Branch/ HoD/ Paying Office) • Geography (Province/ Administrative unit/ City/ Municipality etc.,) • Audited/ unaudited • Reporting periods (daily/ weekly/ monthly/ quarterly/annual/ multi-year) Once selected, the system should display the numbers as a superimposition on Nepal's political map.	O

#	Requirement	M/O
	System should support the user to drill-down on a displayed number, so that the map is zoomed-into, an in process, automatically displaying the break-up of the generated financial metric across the zoomed-in area on the map. <i>(For example, in case a user selected to view Expenditure in Education Sector by province and city, system should display the expenditure numbers by province on the zoomed-out map. When the user zooms in to a particular district, system should display the expenditure figures on education by each major city/ sub-district per configured rules)</i>	
Workflow Definition		
38.	System to facilitate in defining customized workflow for each transaction and agency covered in the system implementation	M
39.	System to facilitate in defining the organizational hierarchy for all agencies covered in the system implementation (e.g. ability to define the hierarchy in each user departments such as hierarchy of offices for the department and users/offers in each office i.e. Level 1 Officer, Level 2 officer, Head of Department, Secretary, etc.,)	M
40.	For each function/transaction, system to support in defining the workflow for users within the office and across the offices in a department	M
41.	For each standard procedure defined in workflow, ability to define <i>initiation points</i> – identifying the users who can initiate the procedure.	M
42.	For each standard procedure defined in workflow, ability to define multiple sub-tasks	M
43.	For each sub-task defined in workflow, ability to define the level of users who can perform the task.	M
44.	For each sub-task defined in workflow, ability to define the functional group of the user who can perform the task	M
45.	Ability to define order of workflow in the system, by defining predecessor and successor tasks for each task	M
Audit Trail		
46.	The system to capture data for each task of a workflow process, with the minimum of the following: <ul style="list-style-type: none"> ✓ The user who performed a task ✓ Time and date of performing the task ✓ Subsequent action taken / status of the task 	M
47.	The system should track and provide information on the status of process in the workflow	M
48.	Ability to specify deadlines and priorities, determine whether tasks have been accepted, rejected, delegated, or completed, and build automated context trails that link objects to actions as they are performed on	M
49.	Users shall be able to query and track task assignments and be notified if scheduled deadlines are not met. The system shall be configurable to automatically redirect tasks	M
User Configuration		
50.	System to facilitate in mapping all the functions to users, government tier, ministries, departments, paying offices, locations, etc.	M
51.	System to facilitate in assigning selected user groups with authority to perform tasks identified in the workflow definitions	M
User Registration		
52.	System shall support access to Reporting Application Portal through internet from the desktop/laptop of the users	M
53.	The user registration and profile creation must be facilitated only through a secured channel to ensure non-repudiation of the data submitted by the users (through https).	M

#	Requirement	M/O
54.	System shall provide functionality for user registration (for internal users) for each user separately or in batch mode through file upload	M
55.	System shall provide online option for government agencies to submit a new user creation request for staff assigned	M
56.	System shall display minimum required information for successful registration with the system.	M
57.	Upon initiation of registration process, system shall display and seek acceptance from user on standard terms and conditions for registration with the portal and usage.	M
58.	System shall inform user of a failure in case the same user, e-mail address, if the same user is already registered in the system, inform the user of the failure through an appropriate message and propose alternative usernames	M
59.	System shall provide transaction reference number upon saving the user profile creation request and such reference number shall be used for tracking the status of the registration approval	M
User Registration Request Approval		
60.	System shall facilitate creation of a master user/super user (one or multiple users)/ User Registration Authority (URA) to review and approve the user id creation requests received from spending units.	M
61.	System shall mandate registration of master user/super user (one or multiple users)/ User Registration Authority (URA), with authority to review and approve the user creation requests, using digital signature or two-factor authentication only. Authentication of such users shall be allowed only based on digital signature/ secure token.	O
62.	The system should provide intimation to User Registration Authority (URA) upon submission of a user registration request.	M
63.	The system shall enable the URA to examine the user creation request and approve the same	M
64.	Upon finalization of decision from URA, system shall provide intimation to the user, at the email address indicated in the profile request, about the confirmation/rejection of request from the user	M
65.	System shall also facilitate sending such intimation through SMS to the mobile number indicated during the request submission process	M
66.	If registration request is approved by the URA, system shall generate a password, as per the password creation guidelines defined for the portal, and e-mail the user id and password to the e-mail address specified during the registration form submission.	M
67.	Upon completion of the first time login, system shall mandate the user to change the password in accordance with password definition guidelines of the portal.	M
68.	The user id of an individual shall be associated with the spending unit of the user on behalf of which the registration request is submitted and the user shall be allowed to perform any transactions only on behalf of such associated spending unit in the system	M
69.	User registration should include following security measures at a minimum: <ul style="list-style-type: none"> a. OTP validation for the user account creation to be sent to the mobile of the user being registered b. Email confirmation/validation for completion of user registration c. Captcha requests to validate user registration requests/sessions d. User registration data storage and transmission must be done in an encrypted manner 	M
User Privileges		

#	Requirement	M/O
70.	The system shall mandate certain privileges be assigned only to users registered with their user id/password or secure tokens or any other two-factor authentication mechanism defined for the system	M
71.	Each user should be associated to a unique identification number, which can be used by the audit trailing facility of the system, in order to record all user activities, and to identify the initiator/actor of each activity	M
72.	The system should ensure that a user is given access to information related only to the spending unit with which the user is associated	M
73.	The system shall maintain the detailed audit trails for creation of user ids, approval of user ids, changes in user details etc.	M
Renewal of User IDs		
74.	The system shall provide alerts to the registered users, 30 days prior to the date of expiry of the validity along with details of the process for renewal of the registration. System shall facilitate providing alerts to the users during login, through e-mail, SMS.	M
75.	Upon automatic cancellation of the registration on expiry of validity, the system shall provide alerts through e-mail to the user on expiry of the registration along with the steps to be taken for renewal of the registration	M
76.	Upon successful renewal, the system shall automatically use the user profile and associations the way it was at the time of expiry	M
77.	The system shall enable the user to withdraw the registration with system on a voluntary basis through submission of online application using the related online form provided in the portal.	M
User Settings/Preferences		
78.	The system should facilitate secure login for the users. Post-login, the users should be presented a dashboard as per privileges assigned to them and preferences expressed by the users in their 'settings'	M
79.	The system shall support in providing a separate user workspace/ inbox for each registered user and system shall provide all the notifications generated to the user in this workspace/ inbox	M
Interfacing requirements		
80.	System shall support open APIs to interface with any identified system for data exchange, including systems of PSUs, Government Local Bodies, Central Government Systems etc.,	M

10.2. FRS for proposed enhancements to existing applications

10.2.1. LMBIS Enhancements

The enhancements proposed to LMBIS for the interim IFMIS (and also to provincial LMBIS “pLMBIS” in the provinces) shall focus on making incremental improvements to the budget preparation exercise, in the following areas:

- System enforced timelines for various activities based on the budget calendar
- All communications & alerts for budget processes via system, including movement of budget related documents, reallocations requests etc.,
- Developing interfaces with DOMS, and e-GP for information exchange to support budget preparation

In addition, it would address some of the gaps in the budget relocation processes including:

- Uploading of support documents while submitting reallocation/virement requests
- Workflow configuration for all MoF approvers for reallocations and virements
- Blocking available budget for release and making revisions to the appropriated budget per approved virement request
- Generating reports on reallocations and virements ministry wise and expenditure category wise

S.No	Requirement
	<i>Budget circular, calendar, and other requirements for budget preparation and finalization by line ministries</i>
1.	System should facilitate in definition of a budget calendar with tasks and target dates for completion of each task in budget preparation exercise
2.	Definition of budget calendar and modifications to the same shall be subjected to review and approvals as per defined workflow in the system
3.	System shall support in generation of report on budget preparation status for each paying office vis-a-vis the tasks and defined target timelines
4.	System shall support in sending auto-generated notifications to the paying offices on the activities of the budget calendar, through system alerts and email notifications.
5.	System shall support an authorized user in configuring the intervals at which these notifications are to be sent.
6.	In case of non-compliance with the defined budget calendar or based on the pre-configured alerts schedule, system shall auto-generate necessary alerts and notifications for line ministries. Such alerts/notifications should be customized based on the status of budget preparation activity.
7.	System shall facilitate generation of reports for tracking budget preparation including on the following: <ul style="list-style-type: none"> • Line ministries/ Paying Offices that have initiated budget preparation and are in WIP stage • Line ministries/ Paying Offices that have not started budget preparation (“non-starters”) • Line ministries/Paying Offices that have not completed budget preparation
8.	System shall facilitate in uploading the budget preparation instructions (pdf/word format) and guidelines by NPC and MoF, which shall be accessible to the line ministries upon initiation of budget preparation exercise. System shall only allow authorized users to upload or change such documents/instructions.

S.No	Requirement
9.	The system should facilitate in uploading the budget circulars (pdf/word format) and ceilings set by line ministries and departments, which shall be transmitted electronically to all their sub-divisions/paying offices
10.	<p>System shall support in creation and maintenance of a budget rules database, which are to be enforced during budget preparation. For e.g.:</p> <ul style="list-style-type: none"> • Providing alerts in case of budget exceeding the ceilings • Mandatory fields that should not be left blank etc.
11.	System, based on the budget calendar, shall auto-generate alerts and email notifications for delays or non-submission of budget proposals.
Interface with eGP	
<p>Note: It is recommended that the LMBIS system be interfaced with the e-Procurement (e-GP) system to support the exchange of data relevant in the context of annual and medium-term budgeting. This may be achieved in the following manner –</p> <p>a) For annual budgeting - LMBIS to support in recording budget estimates for the various budget codes for each procuring entity that will form the budget ceilings for preparation of the Annual Procurement Plan (APP) in the e-GP system after the budget is approved. (This assumes that the e-GP system comprises the functionalities for preparation and management of the APP – this may require enhancements to the e-GP system).</p> <p>b) For medium-term budgeting – Information on multi-year payment schedules from the contract management module of e-GP should be retrieved and included in the medium-term estimates captured in the LMBIS system during the budget preparation system. (This assumes that the e-GP system comprises the functionalities for a contract ledger – this may require enhancements to the e-GP system or such functionalities to be developed in other IT systems relevant to the PFM environment (e.g., CGAS)).</p> <p>Based on the above, the following outline the functional requirements specifications to support these objectives (ref point 12 below) -</p>	
12.	<p>Functional enhancements to LMBIS –</p> <ol style="list-style-type: none"> a) The system shall allow the relevant department users to configure the budget codes for each department that are relevant for the preparation of the APP (i.e. budget codes excluding payroll, debt, social security contributions, revenue codes, etc.) b) The system shall push the data on approved budget estimates for select budget codes for each procuring entity (relevant for APP as selected by the relevant department users) to the APP module of the e-GP system through a system interface. c) The system shall retrieve the data on multi-year payment schedules (budget code, amount for the subsequent fiscal years) as recorded on the contract ledger for each procuring entity and reflect the same as part of the medium-term budget estimates for the corresponding budget codes and financial years. <p>Functional enhancements to e-GP –</p> <ol style="list-style-type: none"> a) The system (the e-GP APP module) shall facilitate capturing the following information for each procurement opportunity (Illustrative) : <ol style="list-style-type: none"> a. S. No. (System Generated –unique opportunity ID) b. Procurement Type (Goods/Works/Services) (mandatory field) (Drop down options to be provided) c. Procurement Method (mandatory field) (Drop down options to be provided as per Procurement Act & Rules) d. Pre-qualification process required (optional field) (Yes/No) e. Procurement Details (mandatory field) f. Item code (mandatory field) g. Item description (mandatory field) h. Estimated quantity (mandatory field) i. Unit of measurement (mandatory field)

S.No	Requirement
	<p>j. Remarks (any additional information related to the Procurement) (optional field) (Type 50/100 words limit)</p> <p>k. Estimated value- Currency (INR) (mandatory field)</p> <p>l. Budget head (Autofill by system through LMBIS interface) (allow manual changes)</p> <p>m. Source of funds (State Fund / Central Assistance / Externally aided projects / other) (Drop down options to be provided) (autofill by system through LMBIS interface)</p> <p>n. In case of others, specify (Text box with 50 words limit)</p> <p>o. Upload document (optional field) (Allows multiple attachments)</p> <p>p. Document description/ remarks (optional field) (Line item wise)</p> <p>q. (Note: Entries made form fields can be edited anytime during the Financial year)</p> <p>b) The system (e-GP) should utilize the approved budget estimates as ceilings (for the cumulative value of procurements included in each APP prepared by each procuring entity) for validating the APP data submitted by the procuring entities.</p> <p>c) The system (e-GP) shall retrieve any mid-year changes to the budget estimates and update the APP ceilings accordingly.</p>
	Budget Reallocation/Virements
13.	System shall support authorized users in defining the checklist of support documents required (a different checklist for every request type) for processing the request
14.	System shall facilitate in uploading documents (in word/pdf/excel/ppt) in support of the request for re-allocation/virements (formats) (checklist) (introductory paragraphs)
15.	System shall facilitate in generating alerts (via SMS, emails, system) for all requests of reallocation/virements to the concerned authorities
16.	System shall support in configuration of business rules to differentiate between a reallocation which does not require approval from MoF and virements which require the approval of MoF
17.	The system shall exercise the validation controls for approving any requests for re-allocation/virement as mentioned in the Federal Financial Procedures & Financial Accountability Act.
18.	<p>System shall support in auto-directing a reallocation request to the concerned approver based on the configured business rules that distinguish budget revisions, and virements per defined value thresholds</p> <p>Consequently, system shall support line ministries in making reallocations within their budget heads which do not require MoF approval, as per rules defined in the Federal Financial Procedures & Financial Accountability Act</p>
19.	System shall be configured with all the different levels of users at MoF (Computer Officer, Under-Secretary, Joint Secretary, Secretary and Minister) along with workflows mapped against each business case to accord their approval as per the financial power delegated internally in the Budget Division, MoF
20.	<p>System shall support in generating reports on reallocations and virements including on the following:</p> <ul style="list-style-type: none"> • Line Ministry wise reallocations differentiated by revisions and virements, including requested amount and final approved amount • Paying Office wise reallocations differentiated by revisions and virements including requested amount and final approved amount • Original budget vs reallocated budget by line ministry/ paying office, including % variance

10.2.2. CGAS Enhancements

The following enhancements allows GoN to exercise control through system in the following areas -

- Enforcing trimesterly expenditure ceilings on payment orders via system-enabled validation checks
- Having a view on the system to validate vendor and contract details while processing vendor payments via an interface with e-GP

S.No	Requirement
	<i>Enforcing trimesterly ceilings</i>
1.	While conducting validation checks on the created bills, system shall support in cross-checking the entered amounts against the available budget per defined budget ceilings for the period (trimesters). In case the entered amount is exceeding the configured budget ceilings, the system shall not allow for the payment order to be submitted, and would display a corresponding error message for the user.
2.	System shall support in recording the trimesterly ceiling amounts, wither based on the data received from LMBIS, and/or a facility for such numbers to be configured in the system by an authorized user.
3.	System shall support in generating notifications and reports for the concerned user on the set trimesterly ceilings, utilization of ceilings, and remaining amount
	<i>View on Vendor and Contracts (via interface with e-GP)</i>
4.	The system shall support in interfacing with the e-GP system, to order to receive data on the following: <ul style="list-style-type: none"> • Contract type/ duration/ description of work/ sanction no. • Vendor name, id and other details linked to the contract • Payment milestones by each contract
5.	The system shall support an authorized user in a department to search and access for contracts received from e-GP system via either entering the Sanction number/ contract reference number/ vendor name etc., Based on the search keyword, system shall support in providing a view of all entries matching the search, and for the user to drill down and view all details of a searched contract/ vendor.
	<i>Interface with OAG NAMS</i>
6.	In the event that the consolidated reporting application does not comprise the detailed transactional level data, then the system (CGAS) should be interfaced with the OAG NAMS system to push the detailed transactional data (including supporting documents) for auditing purposes.

10.2.3. TSA Enhancements

The enhancements to TSA are intended to enable seamless expenditure accounting and reconciliation.

S.No	Requirement
	<i>Interface with Bank Systems for reconciliation</i>
1.	The system shall support in interfacing with partner commercial banks' systems for the authorized personnel at the bank to upload/ share Daily payments report (by Treasury) for all payment types in a pre-set format and with required encryption
2.	The system shall support in auto-comparison of the entries in the statement with the entries recorded in system raise flags for any discrepancies.
3.	In case of no discrepancies, the system shall support in generation of a Day End Reconciliation Report.
4.	The system shall support in generation of exceptions reports for any discrepancies between the Treasury Scroll, and the Bank Report, including:

S.No	Requirement
	<ul style="list-style-type: none"> Variation in payment value Variation in bank a/c number Entries not found Variation in total payment Variation in total number of entries
5.	The system shall support in auto-mailing the exceptions reports to the configured Treasury Officer, and the Bank's authorized personnel.
6.	The system shall support the bank in reconciling for the transactions that are not reflecting in both bank's statement and system data, in the next working day's reconciliation process through a plus-minus memo system
7.	In case of successful reconciliation, the system shall support in generation of a revised Day End Reconciliation Report
8.	The system shall support in maintaining a log trail of all actions
	<i>Interface with NRB Systems for reconciliation</i>
9.	The system shall support in interfacing with NRB systems for the authorized personnel at the NRB to upload/ share monthly/periodic payments report (by Treasury) in a pre-set format and with required encryption
10.	The system shall support in auto-comparison of the entries in the statement with the entries recorded in system raise flags for any discrepancies.
11.	The system shall support in generation of exceptions reports for any discrepancies between the Treasury Scroll and the Bank Report, including: <ul style="list-style-type: none"> Variation in payment value by expenditure type Variation in total payment
12.	The system shall support in auto-mailing the exceptions reports to the configured Treasury Officer, and the NRB's authorized personnel.
13.	The system shall support the bank in reconciling for the transactions that are not reflecting in both bank's statement and system data through a plus-minus memo system
14.	In case of successful reconciliation, the system shall support in generation of a revised Period End Reconciliation Report
15.	The system shall support in maintaining a log trail of all actions.
	<i>Interface with OAG NAMS</i>
16.	In the event that the consolidated reporting application does not comprise the detailed transactional level data, then the system (TSA) should be interfaced with the OAG NAMS system to push the detailed transactional data (including any supporting documents) for auditing purposes.

10.2.4. RMIS Enhancements

The enhancements to RMIS are intended to support automatic reconciliation of daily collections with partner banks through automated transfer of information on collections, and system-enabled cross-validation of entries.

S.No	Requirement
	Reconciliation with banks

S.No	Requirement
1.	<p>The system shall support in interfacing with the banks' IT systems for the authorized personnel to upload/ share Daily Scroll of collections, for both electronic payments, and physical payments.</p> <p>The system should support in receiving such information via the interface in one the following ways (per GoN decision):</p> <ul style="list-style-type: none"> • Facility for data upload in RMIS in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) • API based data transfers by linking the databases at backend
2.	The System shall ensure validation controls to check for format compatibility and logical errors for the files uploaded from the bank. Any data files, failing to meet to the pre-defined validation controls, shall be rejected with notifications for the personnel at Bank/ DTCO
3.	The system shall support in converting the e-scroll data format to RMIS database structure.
4.	<p>The system shall support in auto-comparison of the entries in the bank scroll with the entries as recorded in the ledger of RMIS and raise flags for any discrepancies</p> <p>The system shall either not accept scroll upload on presence of any discrepancies or accept and flag entries that failed reconciliation post upload of Bank scroll</p>
5.	The system shall support in highlighting any discrepancies to the Bank's authorized personnel, with remarks on nature of discrepancy during the scroll upload process
6.	The system shall support the bank in submitting a revised bank scroll, with remarks on reasons for re-submission
7.	The system shall support in auto-update of the ledger of RMIS on successful reconciliation.
8.	The system shall support in maintaining a log trail of all actions.
9.	The system shall support in auto-updation of the challans with Bank Scroll number of successful reconciliations
10.	The system shall support in time-stamping all scroll submissions, and assessing penalty for late submission based on configurable business rules
11.	The system shall support the bank in reconciling for the transactions that are not reflecting in both RMIS's statement and e-scroll, in the next working day's reconciliation process through a plus-minus memo system
12.	The System shall facilitate in posting the journal entries for adjustments, transfers and corrections of errors of the revenue transactions, based on the revised statement of Banks, into the Ledger of RMIS
13.	<p>The System shall support in performing day closure upon successful reconciliation of revenue collections data and shall support in posting the un-reconciled amounts into suspense accounts till the reconciliation is completed.</p> <p>For day closure, system shall support in generation of a Daily Collections Report.</p>
14.	The system shall support in maintaining a log trail of all actions
	<i>Interface with NRB Systems for reconciliation</i>
15.	The system shall support in interfacing with NRB systems for the authorized personnel at the NRB to upload/ share monthly/periodic collection report (by Treasury) in a pre-set format and with required encryption
16.	The system shall support in auto-comparison of the entries in the statement with the entries recorded in system raise flags for any discrepancies.
17.	The system shall support in generation of exceptions reports for any discrepancies between the RMIS ledger and the Bank Report, including:

S.No	Requirement
	<ul style="list-style-type: none"> Variation in collection value by receipt type Variation in total collections
18.	The system shall support in auto-mailing the exceptions reports to the configured Treasury Officer, and the NRB's authorized personnel.
19.	The system shall support the bank in reconciling for the transactions that are not reflecting in both bank's statement and system data through a plus-minus memo system
20.	In case of successful reconciliation, the system shall support in generation of a revised Period End Reconciliation Report

10.2.5. SuTRA Enhancements

The enhancements to SuTRA are intended to enable seamless revenue accounting and reporting in SuTRA as per NPSAS formats. The enhancements shall also help in automating expenditure and revenue reconciliation by interfacing with the Partner Bank systems.

S.No	Requirement
	<i>Interface with Bank Systems</i>
1.	System shall be interfaced with Partner Bank's MIS in which the local governments maintain their treasury accounts.
2.	System shall display account balances and enable viewing and download of bank statements for all the treasury accounts maintained by the local governments
3.	System shall allow the authorized bank personnel to upload/share daily scroll of collections and payments.
4.	The System shall ensure validation controls to check for format compatibility and logical errors for the files uploaded from the bank. Any data files, failing to meet to the pre-defined validation controls, shall be rejected with notifications for the personnel at Bank and Accounting Section in Local Governments
5.	The system shall support in converting the e-scroll data format to SuTRA database structure.
6.	The system shall support in auto-comparison of the entries in the bank scroll with the entries as recorded in the ledger of SuTRA and raise flags for any discrepancies
	The system shall support in highlighting any discrepancies to the Bank's authorized personnel, with remarks on nature of discrepancy during the scroll upload process
7.	The system shall support the bank in submitting a revised bank scroll, with remarks on reasons for re-submission
8.	The system shall support in auto-update of the General ledger of SuTRA on successful reconciliation.
9.	The system shall support in maintaining a log trail of all actions.
10.	The system should support in receiving such information via the interface in one the following ways (per GoN decision): <ul style="list-style-type: none"> Facility for data upload in defined formats (e.g. CSV., Excel, XBRL, XML etc.,) API based data transfers by linking the databases at backend Web forms, for online entry of required data fields

11. Annexure 3: Non-functional/ technical requirements specifications for interim-state IFMIS

The following presents the non-functional requirements customized for the three presented options for developing the functionalities of the consolidation reporting application.

11.1. Non- Functional Requirements – enhancement to New Reporting Application

S.No	Requirement
1	General Requirements
1.1	The application shall be based on the Nepali Calendar
1.2	The system shall ensure the legal compliance to the IT security and privacy requirement as per the applicable laws and regulations.
1.3	The application code shall preferably be free of OWASP top ten vulnerabilities
1.4	Distributed Plug-Ins, if used, shall be used only from secure source sites and consumer sites without any IP liabilities to FCGO/Finance Department
2	Capacity and Performance
2.1	The application shall support 20 Concurrent Users
2.2	The application shall support 100 Active Users
2.3	The application shall support 40 Active Sessions
2.4	The application shall support minimum data load speed should be at least 1,000,000 rows per hour.
2.5	Maximum time taken to load a single page should not be more than 30 seconds.
3	User Management (The following requirements may be addressed subject to the ability of the platform to support)
3.1	The error messages shall not provide information about underlying system architecture or its vulnerabilities
3.2	The application shall have secured features to retrieve forgotten or lost user credentials such as password
3.3	The system shall have facilities to implement Password related controls such as Complexity, Lock out on failed attempts, User Account expiry, Password expiry, password recovery and reset
3.4	The system shall have facilities to define session timeouts in case of user inactivity as a configuration parameter.

S.No	Requirement
4	Authentication and Access Control
4.1	The system shall have features to restrict the user access to the information and functionality on a need to know basis and need to act basis.
4.2	The application access to the user shall be on a secured SSL channel.
5	Auditing and Logging (The following requirements may be addressed subject to the ability of the platform to support)
5.1	The system shall have comprehensive auditing and logging feature, where the actions performed by the users are logged with time stamp at the application level.
6	Exception Handling and Error management (The following requirements may be addressed subject to the ability of the platform to support)
6.1	There shall be standard approach to exception handling and error management to provide easy to understand error messages and to ensure all exceptions are handled at the system level
6.2	The error messages shall not provide information about underlying system architecture or its vulnerabilities
7	Data Security and Data Protection (The following requirements may be addressed subject to the ability of the platform to support)
7.1	The system shall have adequate measures implemented across to minimise the error in data capture through system level control, user interface mechanisms and business / validation rules.
7.2	System shall ensure available data based auto population, inferences and calculations wherever possible.
7.3	The system shall have adequate cryptographic measures to ensure data security at processing, storage and transit including interfaces with other systems.
7.4	The system shall have adequate malicious code detection mechanisms such as virus scans on the input data / interfaces / communication.
7.5	The application and the underlying infrastructure components should comply to Information Governance and security regime of FCGO/Finance Department. This shall include the data elements of the interim IFMIS in process, transmission and storage, including archived data.
8	Basic User Interface features (The following requirements may be addressed subject to the ability of the platform to support)
8.1	Information organization in the application UI (Eg. Menu, Navigation, Highlighting, Tool Tip, Search, Search Results etc) shall be sufficiently labelled
8.2	Information organization in the application UI shall be sufficiently structured, ie., Menu, Navigation, Search Results, Database Schema, Database Indexes shall have proper entity relationships that reflect the domain model of the platform.
8.3	Information organization in the UI (eg., Search Results, Promotions, Banners, Menu, Sitemap, Documents, Receipts, etc.) shall follow proper taxonomy and metadata.
9	Standard Reporting Requirements

S.No	Requirement
9.1	System shall enable generation of all types of periodic reports in the required formats to meet the accounting, regulatory and legal compliances
9.2	System shall have provisions to generate reports based on parameters such as period, transaction type, account head etc. The details of such requirements may be identified during the SRS phase.
9.3	The system shall have provision to generate the reports in various file formats
10	Integration Interfaces (The following requirements may be addressed subject to the ability of the platform to support)
10.1	The system shall have easy to integrate interfaces such as web services to integrate with other systems and applications in compliance with Nepal GEA Interfacing guidelines.
10.2	The system shall have multiple options to interface with FMIS, SuTRA and other systems including Legacy systems of earlier generations. The exact interfacing requirements shall be finalized during the requirement study.
10.3	There shall be adequate capabilities and provisions in the system to ensure security of integration channels and interfaces.

11.2. Non- Functional Requirements – Customizing a BI tool with Data warehousing

S.No	Requirement
1	General Requirements
1.1	The application shall be based on the Nepali Calendar
1.2	The application shall support all the popular web browsers such as Google Chrome, Microsoft Edge, Safari, Internet Explorer, Firefox, etc.
1.3	The application shall support the necessary Third Party Access APIs, Message Broker APIs, Web Service APIs complying with open standards.
1.4	The application shall support the leading open standards and the use of open source platforms and tools are preferred.
1.5	Platform shall ensure the Security and Confidentiality of Non-Public beneficiary (Employees, Citizens, Suppliers and other relevant entities) Information. It shall be designed to protect the security, confidentiality and integrity of non-public beneficiary information through “administrative, technical and physical” safeguards.
1.6	Browser caching and intermediary caching mechanisms such as content delivery networks shall be used to improve the page loading speed and performance
1.7	The system shall ensure the legal compliance to the IT security and privacy requirement as per the applicable laws and regulations.
1.8	The application code shall be free of OWASP top ten vulnerabilities
1.9	Distributed Plug-Ins, if used, shall be used only from secure source sites and consumer sites without any IP liabilities to FCGO/Finance Department

S.No	Requirement
2	Capacity and Performance
2.1	The application shall support 20 Concurrent Users
2.2	The application shall support 100 Active Users
2.3	The application shall support 40 Active Sessions
2.4	The application shall support minimum data load speed should be at least 1,000,000 rows per hour.
2.5	Minimum data load speed should be at least 1,000,000 rows per hour.
2.6	Maximum time taken to load a single page should not be more than 30 seconds.
2.7	The system shall be designed for high availability, resilience and recoverability at application, software platform and Infrastructure levels.
2.8	The system architecture shall be designed to ensure vertical and horizontal scalability at all levels of the system (Application, Platform and Infrastructure) as applicable
2.9	The tool shall facilitate in creation and publishing of Datasets
`2.10	The tool shall enable setting up of scheduled data synchronization
`2.11	Provided solution should not influence the performance of the frontend of the Platform.
`2.12	Data processing by the scheduler preferably may support parallel processing.
`2.13	Daily data extraction should be completed in 1 hour
`2.14	Data transformation on daily updated data should not more than 30 minutes
3	User Management
3.1	Application shall have a login, forgot password and Registration functionality on its main page
3.2	The application shall have secured features to retrieve forgotten or lost user credentials such as password
3.3	The system shall have facilities to implement Password related controls such as Complexity, Lock out on failed attempts, User Account expiry, Password expiry, password recovery and reset
3.4	The system shall have facilities to define session timeouts in case of user inactivity as a configuration parameter.
4	Authentication and Access Control
4.1	The system shall have features to restrict the user access to the information and functionality on a need to know basis and need to act basis.
4.2	The application access to the user shall be on a secured SSL channel.
5	Alerts and Notifications
5.1	There shall be an alert mechanism capable of triggering the alerts and messages based on the events such as batch jobs for data replication and report generation. The alerts and message should be configurable.

S.No	Requirement
6	Auditing and Logging
6.1	The system shall have comprehensive auditing and logging feature, where the actions performed by the users are logged with time stamp at the application level.
7	Exception Handling and Error management
7.1	There shall be standard approach to exception handling and error management to provide easy to understand error messages and to ensure all exceptions are handled at the system level
7.2	The error messages shall not provide information about underlying system architecture or its vulnerabilities
8	Data Security and Data Protection
8.1	The system shall have adequate measures implemented across to minimise the error in data capture through system level control, user interface mechanisms and business / validation rules.
8.2	System shall ensure available data based auto population, inferences and calculations wherever possible.
8.3	The system shall have adequate cryptographic measures to ensure data security at processing, storage and transit including interfaces with other systems.
8.4	The system shall have adequate malicious code detection mechanisms such as virus scans on the input data / interfaces / communication.
8.5	The application and the underlying infrastructure components should comply to Information Governance and security regime of FCGO/Finance Department. This shall include the data elements of the interim IFMIS in process, transmission and storage, including archived data.
8.6	Upon upload of any document or completion of any transaction, the system must perform following minimum validation checks, in order to ensure the documents compliance with the system specifications. <ul style="list-style-type: none"> System checks that document is digitally signed (if digital signatures are used) System verifies the validity of the digital signature of the user against the Certificate Authority' revocation list (if digital signatures are used)
9	Basic User Interface features
9.1	Information organization in the application UI (Eg. Menu, Navigation, Highlighting, Tool Tip, Search, Search Results etc) shall be sufficiently labelled
9.2	Information organization in the application UI shall be sufficiently structured, ie., Menu, Navigation. Search Results, Database Schema, Database Indexes shall have proper entity relationships that reflect the domain model of the platform.
9.3	Information organization in the UI (eg., Search Results, Promotions, Banners, Menu, Sitemap, Documents, Receipts, etc.) shall follow proper taxonomy and metadata.
10	Standard Reporting Requirements
10.1	The system shall have facilities to generate dynamic reports in an intuitive manner by the users.
10.2	System shall enable generation of all types of periodic reports in the required formats to meet the accounting, regulatory and legal compliances

S.No	Requirement
10.3	System shall have provisions to generate reports based on parameters such as period, transaction type, account head etc. The details of such requirements may be identified during the SRS phase.
10.4	The system shall have provision to generate the reports in various file formats
10.5	The system shall support free text based search features
11	Integration Interfaces
11.1	The system shall have easy to integrate interfaces such as web services to integrate with other systems and applications in compliance with Nepal GEA Interfacing guidelines.
11.2	The system shall have multiple options to interface with FMIS, SuTRA and other systems including Legacy systems of earlier generations. The exact interfacing requirements shall be finalized during the requirement study.
11.3	There shall be adequate capabilities and provisions in the system to ensure security of integration channels and interfaces.
12	Datawarehouse Requirements
12.1	This shall be an Off-the-shelf datawarehouse product from a reputed solution provider having adequate support ecosystem in terms of post implementation support and development support.
12.2	Shall be compatible with existing databases, including those of legacy systems
12.3	Shall have an intuitive user interface and API interface
12.4	The ETL shall ensure accurate processing and transformation of transactional data to analytical data

12. Annexure 4: Solution Approach for unified IFMIS platform

12.1. Objective of a unified platform

To enable seamless interfacing / integration between the various PFM related IT systems in the interim state, a unified platform approach is recommended, which will help in achieving optimum system performance and a highly scalable solution design. Consequently, this section outlines the various features required for a unified IFMIS platform, and the high-level roadmap to achieving the same.

The objectives of adopting a unified IFMIS platform includes the following:

- a. Achieving high availability of systems through a scalable domain architecture and horizontally managed server expansion strategy
- b. Improving application performance and quality through a continuous process of shift left testing and establishing an automated test platform across teams with a robust test data generation system
- c. Reducing operational costs during maintenance phase through adopting a continuous operation and monitoring framework to capture application and infrastructure performance along with the capability of incident resolution, auto ticketing support and centralized dashboard
- d. Improving speed in delivery stack by replacing manual mode of code review, build, deployment, integration testing and monitoring



Figure 28: Unified platform solution and its benefits

12.2. Proposed Reference Architecture

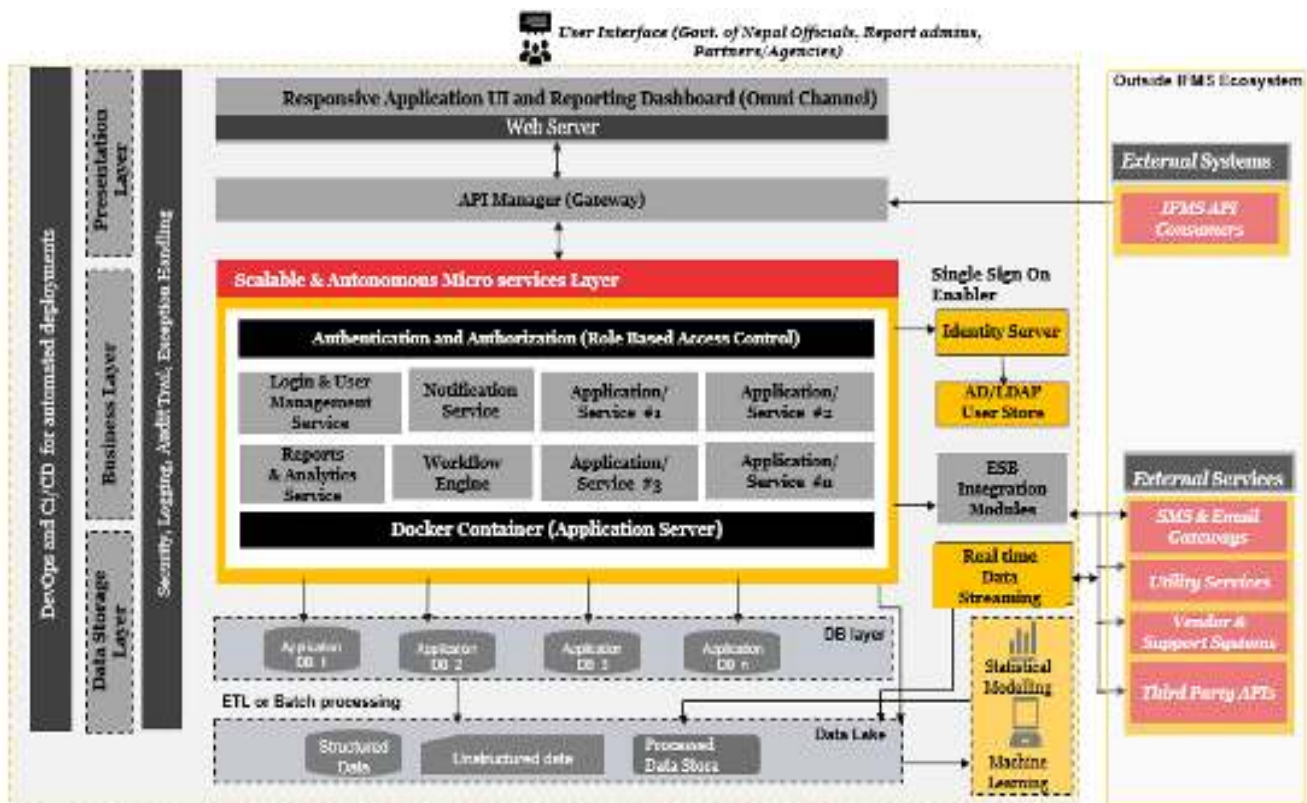


Figure 29: Reference Architecture of the proposed unified IFMIS platform

The figure above consists of all the essential building blocks or components to meet the architectural and functional requirements of the envisaged IFMIS platform to onboard all applications on a high performing standardized common platform.

The utility of each component is described below:

12.2.1. Presentation Layer

- It provides a uniform User Interface to access all of the application and reporting features by different Govt. official groups and their counterparts.
- It can be built up using popular UI technologies like Angular/React JS etc. which provides faster creation of rich and light weight single page application front end having responsive behavior across multiple devices and supports multilingual features.
- Use of D3.js and chart.js can give advanced visualization (pie charts, bar graphs, nested tables etc.) features to reports and dashboards.
- The technologies suggested above are all open source and free.

12.2.2. API Manager (API Gateway)

- API manager consists of the API Gateway, API store for any web client (application front end) or API consumers who had subscribed to use the services (API end points) of the envisaged IFMIS platform.
- API gateway shares a secured validation of each of its API consumers using a client secret key whereas API store has API publishing/subscribing developer portal where any implementation can register, publish and test API end points.

- An API manager can be highly beneficial for throttling, rate limiting, security policy incorporation and monetization of APIs for the service layer from this unified platform.

The following figure outlines the functional structure of an API manager.

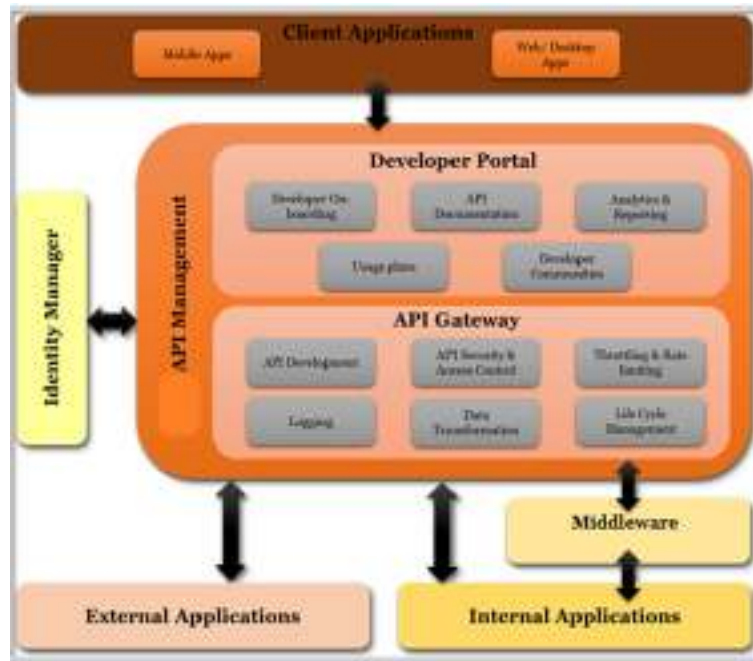


Figure 30: API Manager structure

Components of API Manager given below:

API Gateway:

- The Gateway simplifies the process of exposing, securing, and managing backend applications, network systems, or infrastructure via APIs.

Developer Portal:

- The API Developer Portal is a catalogue of the APIs that are exposed on the API Gateway.
- Enables application developers, enabling them to discover, explore, purchase (or profit from), and test APIs and register to access and use the APIs.

Advances Features:

Analytics engine

- Provides insights for business owners, operational administrators, and application developers.

Backend as a Service (BaaS)

- Features including social graphs, user management, data storage, push notifications, and performance monitoring.

API monetization

- Enable API providers to package, price, and publish their APIs so that partners and developers can purchase access or take part in revenue sharing.

12.2.3. Authentication and Authorization:

All APIs to be exposed for the client application/system, can be published to the API store of the API Manager which assigns a client id/secret for that application/system. For a user login from that application, the client

secret, user id and password are passed in the Login API request. If user id and password are validated by login service, then API manager Identity server creates an Access token (OAuth 2.0) for that user of that client application based on client id, client secret, user id and password. This token is returned to the client application in the Login API response for that user. All subsequent API requests from that client application for that logged in user will send this token in Authorization Header to be validated by API manager/Identity server and then APIs will get invoked in the corresponding micro service layer.

If the same APIs are used by different client application/system, then these APIs need to be published again in API manager under a new client id/secret assigned for the new application.

Custom authorization service is used fetch the role-based access control data from the relevant data store and sent back to browser with response of the Login API. The same authorization details are being sent for subsequent calls till the session of the user remains live.

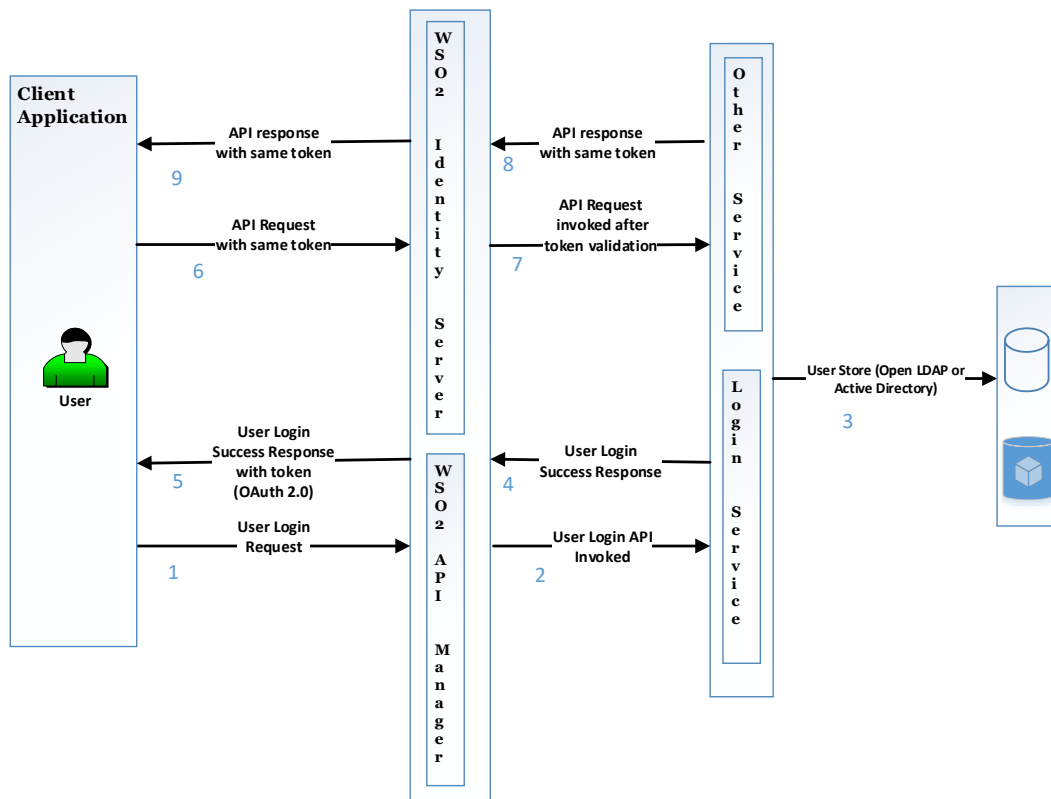


Figure 31: Authentication and Authorization

12.2.4. Single Sign-On

Single sign-on (SSO) is one of the key features of the Identity Server that enables users to provide their credentials once and obtain access to multiple applications. The users are not prompted for their credentials when accessing each application until their session is terminated. Additionally, the user can access all these applications without having to log into each and every one of them individually. So, if users log into application A, for example, they would automatically have access to application B as well for the duration of that session without having to re-enter their credentials.

The following are some of the advantages we can have with SSO:

- Users need only a single username/password pair to access multiple services. Thus, they do not have the issue of remembering multiple username/password pairs.
- Users are authenticated only once at the identity provider and then they are automatically logged into all services within that "trust-domain". This process is more convenient to users since they do not have to provide their username/password at every service provider.
- Service providers do not have the overhead of managing user identities, which is more convenient for them.

- User identities are managed at a central point. This is more secure, less complex and easily manageable.

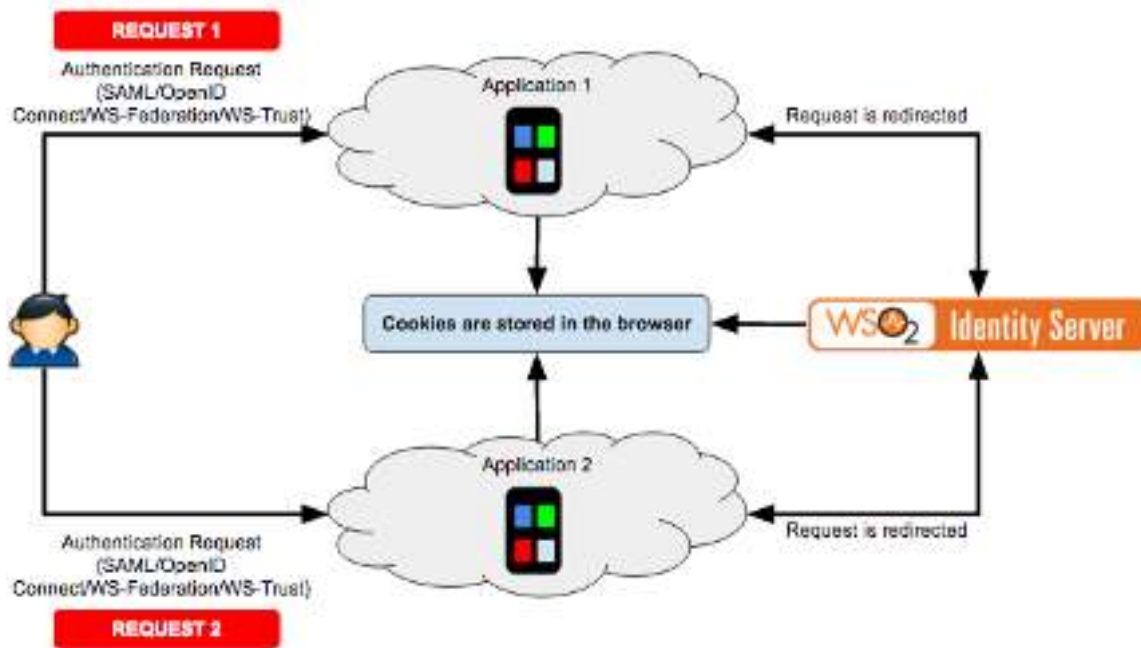


Figure 32: SSO using Identity Server

In the above figure, the users access **Application 1** first followed by **Application 2**. Once again, the users use the same browser to access these applications. The users are redirected to the Identity Server (or any authentication server that is configured for this task). If the users are already logged in to the Identity Server, the user is authenticated in **Application 1** via an authentication token sent by the Identity Server to **Application 1**. When **Application 2** is accessed, the same thing happens, and the users are redirected to the Identity Server and authenticated.

12.2.5. Integration Design

In the service layer, 3 components are considered as given below:

- API manager/Gateway for external systems or API consumers who need to access the service layer of the unified platform.
- ESB mediation module for integrating with external systems which are not part the envisaged platform, but data needs to be pulled from those systems for data lake ingestion. We can use the WSO2 ESB product which has a community edition.

ESB provides in built adaptors to connect with many legacy systems which may not be directly exposed over RESTful APIs. ESB tools also provide easy and faster execution of transformation rules for messages being sent or received over the bus.

- Microservice layer is proposed for RESTful calls within same application modules or between multiple applications which will be co-hosted in same platform. Containerized deployment using docker swarm or Kubernetes would allow to create an auto scaled, high performing and fault tolerant service layer. This layer can be built with packages of Spring Boot, Node JS, Netflix OSS etc. added with ORM frameworks for executing CRUD operations on Oracle Database storing master and transactional data for each of the applications. The individual Microservice layer will also play the role to fetch the processed and cleansed data from Data warehouse and deliver to reports and dashboard interfaces or other consumers.

12.2.6. Real time data integration for reporting application

The government can consider procuring suitable distributed streaming platform that enables users to publish and subscribe to streams of records, store streams of records, and process them as they occur. Companies are turning to change data capture (CDC), a newer technology where the most current or real-time changes are

collected from the source database as they occur, and then sent to be replicated to the other datasets. Simply put, CDC creates a stream. The data stream is collected and delivered through various platforms.

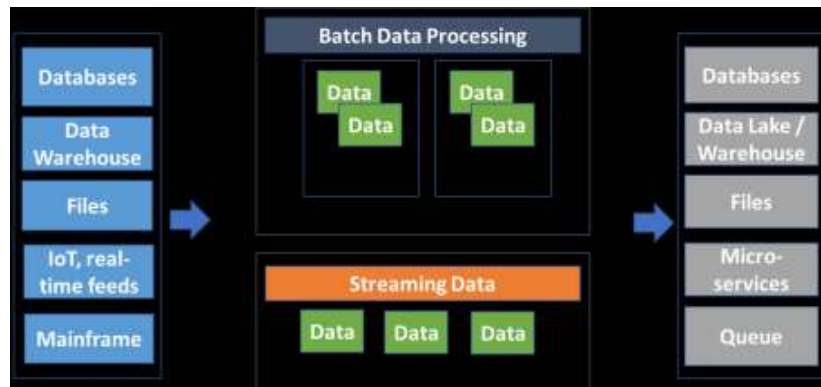


Figure 33: Batch Process Vs Data Streaming

12.2.7. AI/ML for the IFMIS platform

Artificial intelligence (AI) is the ability of machines to think like humans. It stems from the idea that "given enough data and compute power, machines will be able to think and learn using mathematical simulation of the human brain.

Most of the technology labeled as AI is actually machine learning, or the data-driven use of advanced algorithms to simulate small parts of human thinking and decision-making processes.

Machine learning is becoming popular in the modern data warehouse, which captures large amounts of data from multiple sources and devices and stores it on a single platform for easy retrieval and analysis. The reason for data warehouses is simple: Machine learning works best the more data you throw at a problem.

Machine-learning tools can also quickly adapt to new trends. An organization simply needs to build data about the new trend into the algorithm, and the machine-learning environment should make any necessary adjustments that are required automatically.

Since the envisaged reporting modules are dependent on huge volume of data as well data collected in diverse data types or formats, so use of AI/ML may ease the task where it is needed to do historic data analysis.

Though data warehouse consists of the structured and unstructured data dumped from various sources, but data presented to AI/ML tool will be in refined, cleansed and transformed state.

Python is undoubtedly a leader for incorporating AI/ML with 57% of data scientists using it and 33% preferring it over other programming languages. The language is elegant, lightweight and as simple to use as a programming language can be.

It is also a versatile language with a good set of libraries it can also power web apps or some heavy scripting in business usage.

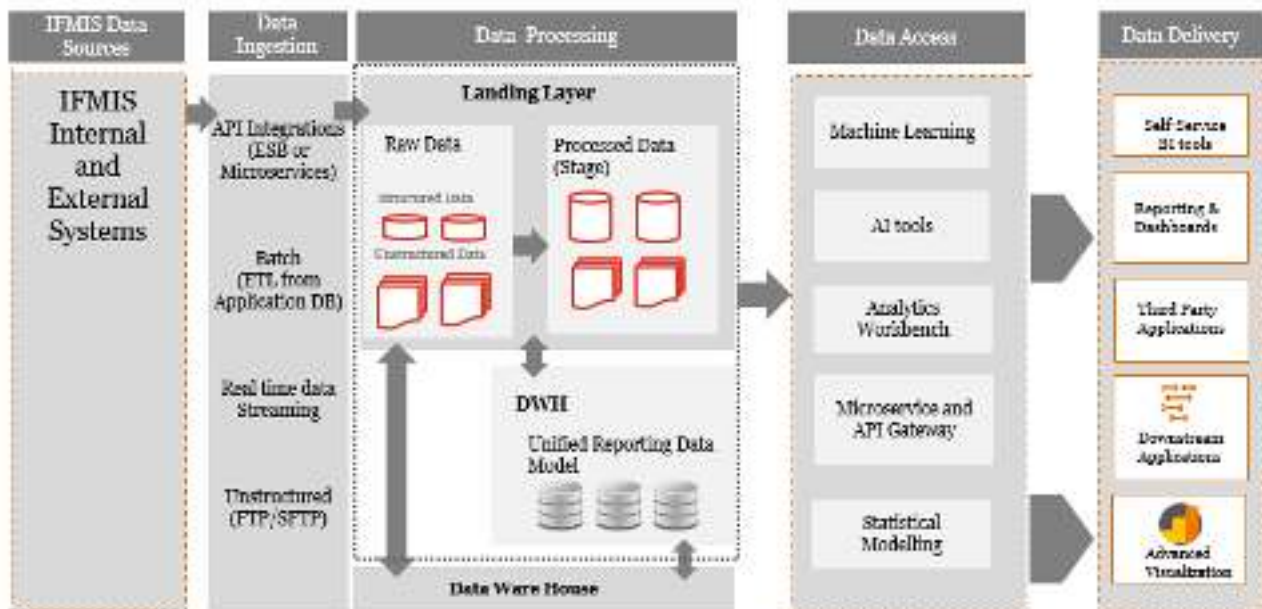


Figure 34: AI/ML on processed data of Data warehouse

12.2.8. Data warehouse:

Since most the existing applications hosted by Govt. of Nepal are using Oracle DB as back end data store, so we can leverage Oracle data warehousing for the envisaged reporting platform for Govt. of Nepal. The main activities of around the warehousing are given below:

- Configuring an Oracle database for use as a data warehouse
- Designing data warehouses
- Performing upgrades of the database and data warehousing software to new releases
- Managing schema objects, such as tables, indexes, and materialized views
- Managing users and security
- Developing routines used for the extraction, transformation, and loading (ETL) processes
- Creating reports based on the data in the data warehouse
- Backing up the data warehouse and performing recovery when necessary
- Monitoring the data warehouse's performance and taking preventive or corrective action as required

The consolidated storage of the raw data as the center of your data warehousing architecture is often referred to as an Enterprise Data Warehouse (EDW). An EDW provides a 360-degree view into the business of an organization by holding all relevant business information in the most detailed format.

Most data warehouses use a staging area which simplifies data cleansing and consolidation for operational data coming from multiple source systems, especially for enterprise data warehouses where all relevant information of an enterprise is consolidated. Figure below illustrates this typical architecture.

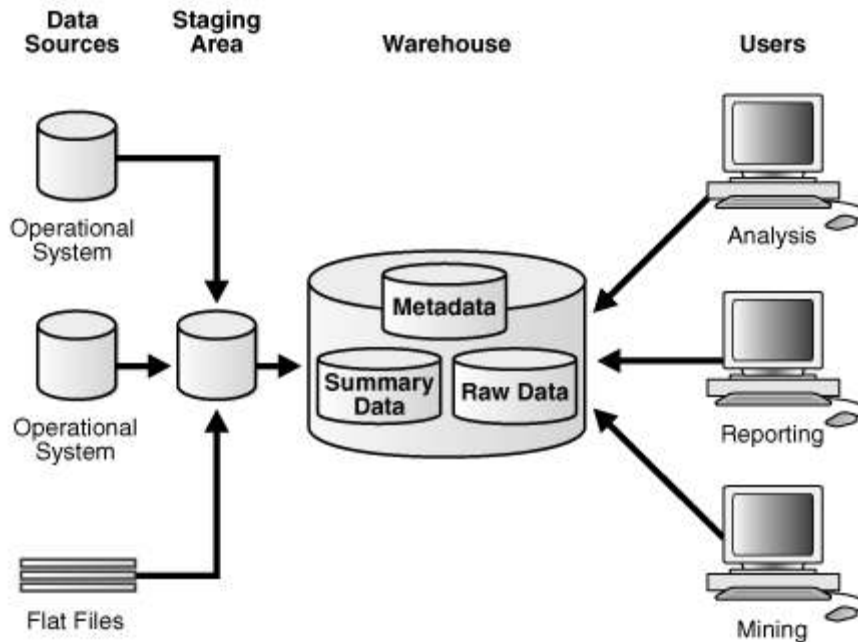


Figure 35: Architecture of Data warehouse with staging area

12.2.9. Data Governance:

Data Governance (DG) is the program of overall management of availability, usability, integrity and security of data used in an enterprise.

Most companies already have some form of data governance for individual applications or business departments, although it is not necessarily comprehensively institutionalized. The systematic introduction of data governance is therefore often an evolution from informal rules to formal control.

Formal data governance is normally implemented once a company has reached a size at which cross-functional tasks can no longer be implemented efficiently.

Data governance is a prerequisite for numerous tasks or projects and has many clear benefits:

- Consistent, uniform data and processes across the organization are a prerequisite for better and more comprehensive decision support
- Increasing the scalability of the IT landscape at a technical, business and organizational level through clear rules for changing processes and data
- Central control mechanisms offer potential to optimize the cost of data management (increasingly important in the age of exploding data sets)
- Increased efficiency through the use of synergies (e.g. by reusing processes and data);
- Higher confidence in data through quality-assured and certified data as well as complete documentation of data processes
- Achieving compliance guidelines
- Security for internal and external data by monitoring and reviewing privacy policies;
- Increased process efficiency by reducing long coordination processes (e.g. through clear requirements management)
- Clear and transparent communication through standardization. This is the prerequisite for enterprise-wide data-centric initiatives
- Further, specific benefits result from the specific nature of each data governance program

Data Governance

	...For Control	...For Growth
Purpose	Focused on risk and financial data to support regulatory and BAU requirements	Focused on business use of data to drive growth through new data sources and capabilities
Data Scope	Regulatory: Stringent controls and governance over sub-set of data to meet regulatory requirements MIS & Analytics: Governance over broader set of data assets to sustain competitive advantage and grow / maintain business	Innovation & Change: Management of large set of new and emerging data assets in real-time –driven by explosive growth in digital channels and social media

Oracle Enterprise Data Quality is a data quality solution that handles both customer and product data and has unique approaches geared to handling the unique characteristics of each data domain. In addition, it plays an important role in helping organizations manage data quality as part of data governance projects by ensuring that data of poor quality is cleansed, standardized and ready to meet compliance mandates, thereby making sure that "dirty data" does not cascade throughout the enterprise and infiltrate IT systems.

12.2.10. Data Archival:

Business and regulatory needs are driving enterprises to store data for longer times in their production databases, causing them to significantly grow. The increase in size leads to larger storage requirements, database performance issues and longer backup and recovery times. The Commvault Oracle Database Archiving feature provides a solution by securely for archiving inactive Oracle data to both an archiving database and backup media, while providing access of the archived data from the production database.

Database administrators define the tables and the criteria to select inactive rows for archiving. All related tables from the existing database relationships or new user-defined virtual relationships can be included for archiving. Archived data can also be retained in both the archive database and on the media using different retention settings. Tools include archive data size prediction, which supports previewing the archive criteria for each table and also the data that will be archived.

Archive Operation

The Commvault archiving process is shown in the picture.

The software copies the production database table data to the archive database, which can be on a different host. Archive tables are created on the archive database. The data on the archive database is then backed up to the backup media. It remains on the archive database until the configured data retention expires. The backup media includes two pieces of information, the archived data search index and the archived data. Data remains on the backup media for the specified media retention, which is independent from the archive database retention. The archived rows are pruned from the production database (when configured). Data retention settings can be configured for both the archive database and the backup media.



Figure 36: Commvault archiving process

Restore Operation

Users can search archived data on the backup media to determine if a given table or row was archived and if so, retrieve the details to the staging or production database.

The restore archive operation takes data from the backup media and moves it to a staging database, which can be the archive database. The data is then imported into the source database. Once the data has been successfully restored to the production database, it is removed from the staging database.

Data is automatically restored as follows:

When the data is on the archive/staging database, the data is restored from the archive/staging database to the production database.

When the data is not on the archive/staging database, the data is restored from the backup media to the archive/staging database and then to the production database.

All of the data, or a subset based on user defined queries can be imported into the source database. Once it has been successfully imported, the data is removed from the staging database.

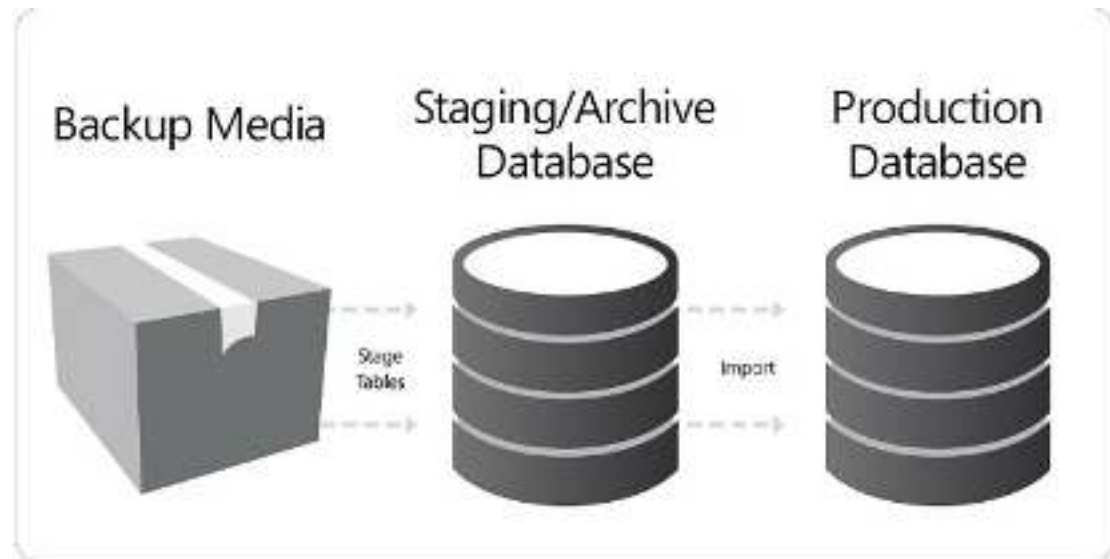


Figure 37: Restore operation

Key Benefits

- Lower production database storage costs while optimizing performance by safely archiving inactive data and removing it from the production database
- Multiple production databases can use the same archiving/staging database
- Tools include a way to preview both the size of the archive data as well as the table rows that will be archived. Based on the results, you can modify the script to add or remove all relevant data.
- Automatically include database defined child/parent tables as part of the archive.
- Create additional table relationships to meet business rules.
- Application users and reporting applications can query and access the archived data along with the production data with no operational or configuration changes.
- Restore all or part of the archived data by creating queries.
- Automatically clean the archived database after a restore.

Terminology

Production (source) database - The database containing production data that needs to be archived.

Archive database - Production data is copied to this database during the archive process. For archives, data is copied here prior to moving to the backup media. The database must be in the OPEN mode (up and running) for archiving.

Backup Media - The storage media used for long term retention of archived data.

Staging (destination) database - The database used during the restore operation. Data is moved from the backup media to here and then moved to the production database. Data is not retained on the staging database after a successful restore. The archive database can serve as the staging database. The database must be in the OPEN mode (up and running) for archiving.

Archive Table - A table from which inactive rows are archived based on archive criteria.

12.2.11. DevOps

Containerized deployment and automated CI/CD pipelines can be used with the components of the service layer of the envisaged IFMIS unified platform to improve the time to production and operational cost for new enhancements on existing applications. Docker swarm is a container orchestrator which can be leveraged for

hassle free deployment and management of microservices runtime. Kubernetes is also getting high popularity now a days over Docker Swarm.

A central code repository like Git can hold code base of all applications and modules which can be integrated through Jenkins to establish the CI/CD pipeline.

12.2.12. Audit Trail

Creating Audit history for every user action and transactional data changes is highly recommended for any unified platform where several applications are co-hosted and through which huge number of interdependent transactional data flow happens.

12.2.13. Security

In addition to Network and firewall level security polices, the applications should maintain a consistency to cover top 10 OSWAP vulnerability issues. Following up a common security standard for all applications for an enterprise helps in updating policies across the platform in shorter span of time.

12.2.14. Logging

A centralized logging mechanism like ELK can be adopted for the service layer to ease out the operational and maintenance challenges. A dashboard can help to trace out the end to end transactional flow to help faster debugging and RCA in case of application support activities.

12.3. Enterprise Roadmap

The Enterprise roadmap for the all the components specified in the earlier sections can be aligned in four quarters in 12 months duration.

Single sign on, integration design & implementation, data governance strategies and defining data archival policies and mechanism can be taken up in first quarter. This can be followed by defining and setting up all policies and mechanism necessary for authorization and identification and implementing the API management landscape. Post the components established in first and second quarter then data warehousing and DevOps can be integrated into the unified platform solution. And post all the backbone components are designed and setup the aspirational and future outlook vision such as AI/ML adoption can be embarked upon.

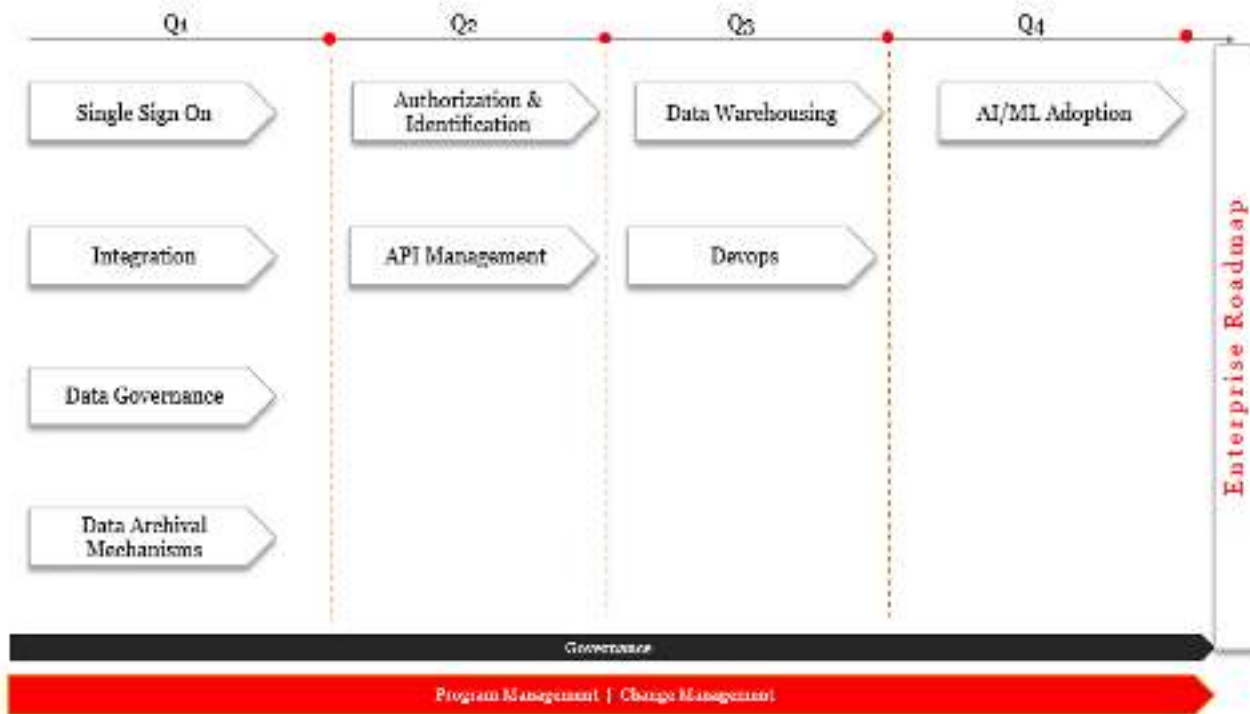


Figure 38: Enterprise roadmap

12.3.1. Q1 Work Items:

- Establish the platform as per the to be architecture and onboard applications on the new platform
- Perform the integration of the applications onboarded to the new platform with external systems which are outside the to be IFMIS ecosystem
- Implement single sign on feature for the applications onboarded on the new platform
- Initiate the Data Governance strategy and implementation
- Incorporate Data Archival mechanisms

12.3.2. Q2 Work Items:

- Establish user role based access control on functionalities and features for services available on the new platform
- Introduce API management capabilities to authenticate, authorize, rate limit and manage APIs exposed over the to be platform
- Apply security policies at network, firewall and application layers

12.3.3. Q3 Work Items:

- a. Establish the Data warehouse for reporting modules
- b. Data warehouse will be dumped with data cleansed, transformed and processed from application data sources
- c. Introduce continuous integration and continuous delivery to automate build and deployment activities for the applications onboarded on the to be IFMIS architecture. This calls for a DevOps setup.

12.3.4. Q4 Work Items:

- a. Once the Data warehouse is established, analytic tools with AI/ML incorporation can aid to creation of complex reports
- b. AI/ML can be used for the advanced reporting features as per the need and demand

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