



Meghalaya Enterprise Architecture: Value Realization Through the e-Proposal System

A Case Study from the:

The Open Group India Awards 2022 Submission:
Government of Meghalaya

February 2023

Meghalaya Enterprise Architecture: Value Realization Through the e-Proposal System

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Foreword

Countries and organizations are moving towards open standards. These have a highly significant role in enabling global collaboration, international exchange of products and services, strengthening regulatory requirements, realizing interoperability, facilitating market competition, channeling organizational efforts towards differentiated services based on innovation by standardizing the foundational aspects, and minimizing vendor lock-in resulting from proprietary solutions.

Since launching in 2017, The Open Group India Awards (the India Awards) has recognized organizations and teams in the South Asia, Middle East, and African regions that have reached the pinnacle of achievement in applying The Open Group standards, open-source software, and best practices in Enterprise Architecture, IT Management, Cybersecurity, and Digital Transformation. The central essence of the India Awards is aptly captured by the four Ds – namely, Digital Innovation, Delivery Reliability, Data-Driven, and Dynamic Workforce.¹

This document is a case study derived from the submission made by the Government of Meghalaya to the India Awards 2022. The India Awards provide a platform for organizations to demonstrate their experience in the adoption of the open standards developed by The Open Group. This case study documents the state's journey to Digital Transformation using the TOGAF® Standard, a standard of The Open Group. The aim is to infuse practical wisdom and understand how open standards are put into practice in various contexts.

¹ Courtesy: MERALCO, Philippines.

Executive Summary

The UN award-winning e-Proposal System (ePS) under the Meghalaya Enterprise Architecture (MeghEA) is the first of its kind in the Indian state of Meghalaya. This case study discusses the key business problems addressed, implementation approach, outputs and outcomes, and key success factors during the implementation of the project.

Introduction

Meghalaya (meaning “the abode of clouds”) is a north-eastern state of India with a population of 3.75 million, as of 2022.² In 2019, the Planning Department, Government of Meghalaya developed the Meghalaya Enterprise Architecture (MeghEA), based on the Government of India’s notified standard framework India Enterprise Architecture (IndEA). The vision of the MeghEA is as follows:

Making “Meghalaya the Digital Abode” by Connecting, Collaborating, and Empowering Citizens, Businesses, and Employees with empathy.

The Planning Department initiated a project to assess and draft a blueprint for the implementation of citizen-centric integrated digital services. In this context, the project outlined a detailed plan comprising service catalogs of 700+ services of the departments, a modernization plan of 50+ digital systems, and implementation of several new digital systems to enable delivery of integrated digital services. By doing so, the state would like to address the classic problem of “governance-collaboration among its units”. Also, the Government would now be able to implement re-usable digital technology components, commonly called Architecture Building Blocks (ABBs), which would enable the digital platforms to deliver end-to-end services to its citizens.

² Source: <https://www.census2011.co.in/census/state/meghalaya.html>.

Business Problem

The project has a broad scope, impacting the lives of 3.7 million people in the entire state of Meghalaya. In the Government of Meghalaya there are 55 stakeholder departments and 100+ directorates and agencies. A sector-wise high-level architecture for 50+ IT systems has been assessed and 800+ services have been identified. Out of them, a total of 700+ services have been identified to undergo Government process re-engineering and integration, covering 19 departments, initially.

The Government of Meghalaya adopted MeghEA to implement integrated digital services from sanction/administrative approval to final disbursement. MeghEA involved analysis of 1,000+ services of 19 departments, which are aligned to Sustainable Development Goal (SDG) indicators to derive what is critical and what is less critical. The identified 700+ services were categorized into six pillars for integrated service delivery:

- Human Development
- Primary Sector
- Entrepreneurship
- Infrastructure
- Governance
- Environment

The architecture blueprint consists of core building blocks such as digital identity, integration platform, single sign-on, and common building blocks such as scheme management capabilities, integrated financial management, email gateway, etc.

Below is the list of projects undertaken to demonstrate the value of the Enterprise Architecture in Meghalaya:

- A pilot implementation in the Finance Department is initiated since it is a cross-cutting Government department
It re-architected old systems such as the Budget Estimation Allocation Management System (BEAMS),³ Treasury, and Budget and integrated them with the state integration platform.
- e-Billing rollout by the Directorate of Accounts and Treasury in September 2021
- TreasuryNET 2.0 has been re-architected, made online, and centralized

With the above experience, another pilot of MeghEA in the form of the e-Proposal System (ePS), which is the focus of this document, commenced on September 17, 2021 in two departments: Soil & Water

³ This system is used to manage cash flow, allocate budget for departments, and disbursement of the final sanctioned amount. This is a static accounting system without any workflow.

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Conservation and Tourism. By February 2022, the success of the pilot led to state-wide rollout of the ePS for general schemes for all remaining departments and directorates.

The ePS has won the prestigious award given by the ITU in Category 1:

“AL C1. The role of governments and all stakeholders in the promotion of ICTs for development.”

Initially, 20 projects from China, Singapore, USA, Iran, Argentina, Saudi Arabia, and others were shortlisted by the jury in the first round of World Summit on the Information Society (WSIS) evaluation under the above-mentioned category. After final evaluation, five projects from India, Tanzania, Argentina, China, and Australia were declared as champion projects. Based on voting, the Government of Meghalaya’s Planning Department project MeghEA (ePS implementation) was declared as the winning project.⁴

Scope

The state intends to deliver all services to its stakeholders with a uniform and unified experience, enhance service delivery efficiency, improve the effectiveness of services, enhance employee productivity, and ensure data security and information privacy. This can be achieved by leveraging technology-enabled holistic transformation of state governance that calls for streamlining its internal processes, enabling data-driven decision-making by having a robust mechanism of service delivery aligned to local needs, and efficient implementation and effective monitoring.

The scope of the project was to develop the vision and scope of the state, derive detailed architecture requirements, and develop a state-wide blueprint for implementation. The scope also included development of a Solution Architecture for the Finance Department for pilot implementation along with pilot rollout.

Key Business Problems

In this document, the authors would like to refer to two key business problems faced during the implementation of MeghEA and how they have been addressed, for the reader’s reference.

Business Problem-1

In most cases, a department-centric approach to service delivery leads citizens to reach multiple departments/organizations to get services. This consumes a lot of human effort, opportunity costs, multiple follow-ups, etc. For example, social benefits for differently abled citizens required them to produce health certificates from the Health Department and apply with the same to the Social Welfare Department.

Business Solution-1

The services delivered can be integrated, using the strategic technical capabilities such as DigiLocker.⁵ Citizens’ certificates can be fetched from DigiLocker (with their consent) and can be delivered to the Social Welfare Department for final disbursement to bank accounts through integrated schemes.

⁴ More details can be found here: <https://www.itu.int/net4/wsis/stocktaking/Prizes/2022>.

⁵ A wallet that stores multiple useful documents and promotes paperless governance; refer to: <https://www.digilocker.gov.in>.

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Business Problem-2

A scheme approval requires multiple workflows by multiple stakeholders at district, directorate, and department levels, ultimately reaching the Finance Department. It will accumulate multiple piles of papers/files and take several months.

Business Solution-2

An integrated system allows one-time approval of the scheme, easy additional funding, integrated notification, zero paper, and integration with billing to transfer benefits. This will help to save working hours, use paperless transactions, and promote transparency in governance.

Success Criteria

The following matrix helps us to understand both the current and anticipated future state.

State No.	Service Type/Category	Current State	Future State
1.	Digital Identity	Lack of adoption of citizen identification or digital ID. Aadhaar ⁶ adoption is less than one third (1/3) of the total population of the state.	Digital ID provisioning for all citizens of the state.
2.	Digital Services	Around 200 e-Services are available. Most of the Government internal services are non-digital.	To make services digitally available to various stakeholders.
3.	Personalized Services	Services are yet to be personalized.	All services to be personalized based on citizen or employee profile. Further, Business-to-Business (B2B) services provided by different departments are also studied and made part of the MeghEA framework.
4.	Digital Payments	Availability of Government Receipt Accounting System (GRAS) ⁷	All payments through digital channels.

⁶ Refer to: <https://en.wikipedia.org/wiki/Aadhaar>.

⁷ This is basically a payment gateway to make tax payments to Government by citizens/businesses in the state.

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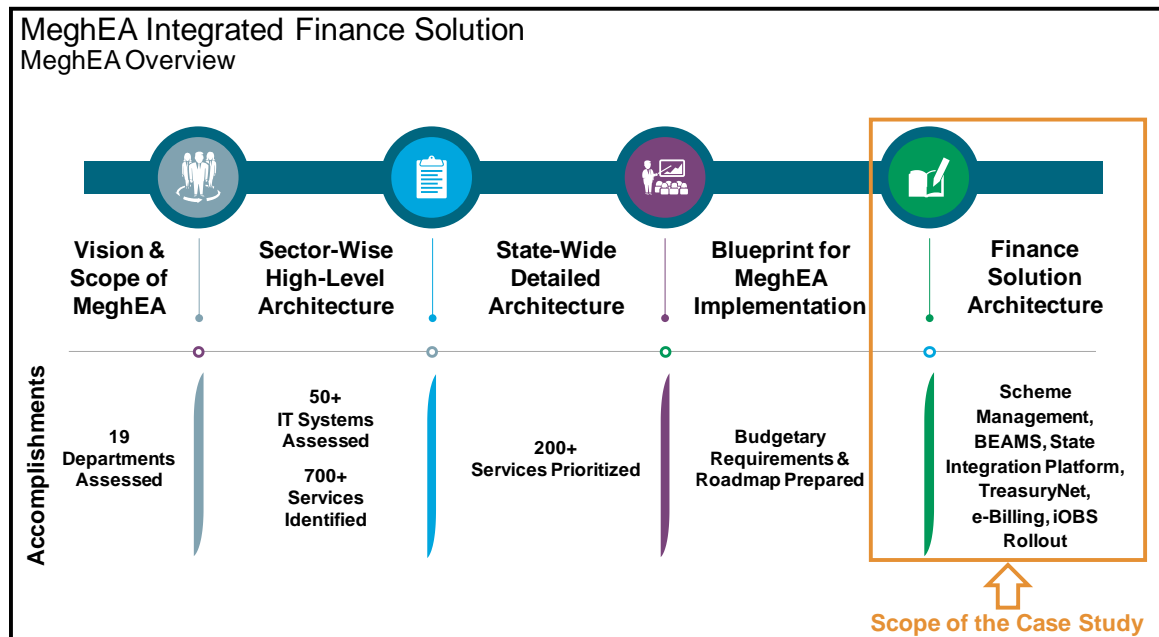


Figure 1: Overview of the MeghEA Integrated Finance Solution

In addition to the above, current and target states have been defined in more than ten (10) capabilities. A total of 236 indicators covering 16 SDGs have also been shortlisted with year-wise target details of the same.

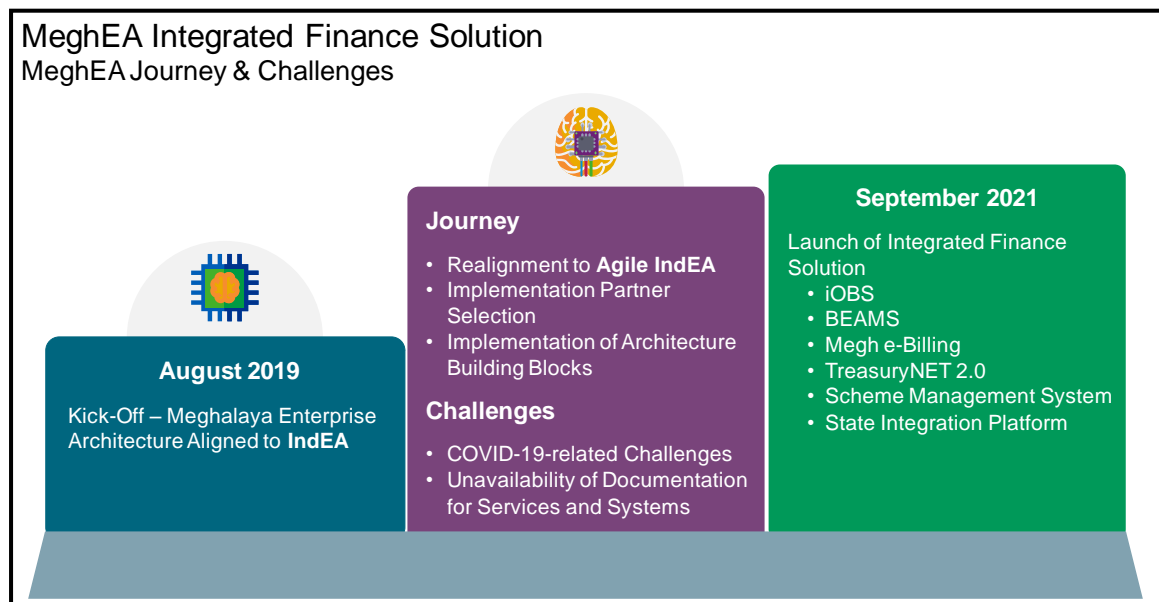


Figure 2: Journey of the MeghEA Integrated Finance Solution

Solution and Details of the Case Study Project

In this section, we would like to explain the guiding approach in aligning the strategies with MeghEA, key business problems addressed, and an overview of the Solution Architecture to understand how the project has been rolled out.

Guiding Approach

The state has developed its vision aligned to achieve the SDGs. Therefore, MeghEA conceptualization and implementation were also driven by the SDGs. All 700+ services were mapped to 236 SDG indicators. This approach helped with the faster buy-in by the all department stakeholders as they identified the need to develop the state strategically. Thus, improvement in service delivery has directly resulted in improvement in SDG performance. The ultimate goal of the state has been set “To be among the Top 10 states in 10 years in terms of SDG ranking”.

Implementation Alternatives

The following two alternatives were considered before embracing and implementing the MeghEA project. However, these approaches were rejected for the reasons mentioned below.

No	Alternative	Reasons for Rejection
1	Department-centric services	This would have deepened the silos. Instead, a strategic pillar approach was chosen based on the state's strategy.
2	Building one system for finance processes	The architecture was system-agonistic. Therefore, choosing already built (existing) systems and re-architecting them is considered to be the best approach. The core system is built on Service Oriented Architecture (SOA) for facilitating ease of integration.

Project Initiation

To begin with, all the services and processes in the Finance Department were studied, with officials handling activities in different branches of the Finance Department. The “as-is” processes were drafted using standard Business Process Model Notation™ (BPMN™) along with the stakeholders and timelines involved. The “to-be” process flows were also prepared along with the Solution Architecture for the Finance Department before starting implementation of the same. This, however, needed many regulatory changes and hence needed leadership buy-in. The regulatory changes were drafted and necessary approvals were processed before implementation of the system.

Solution Architecture

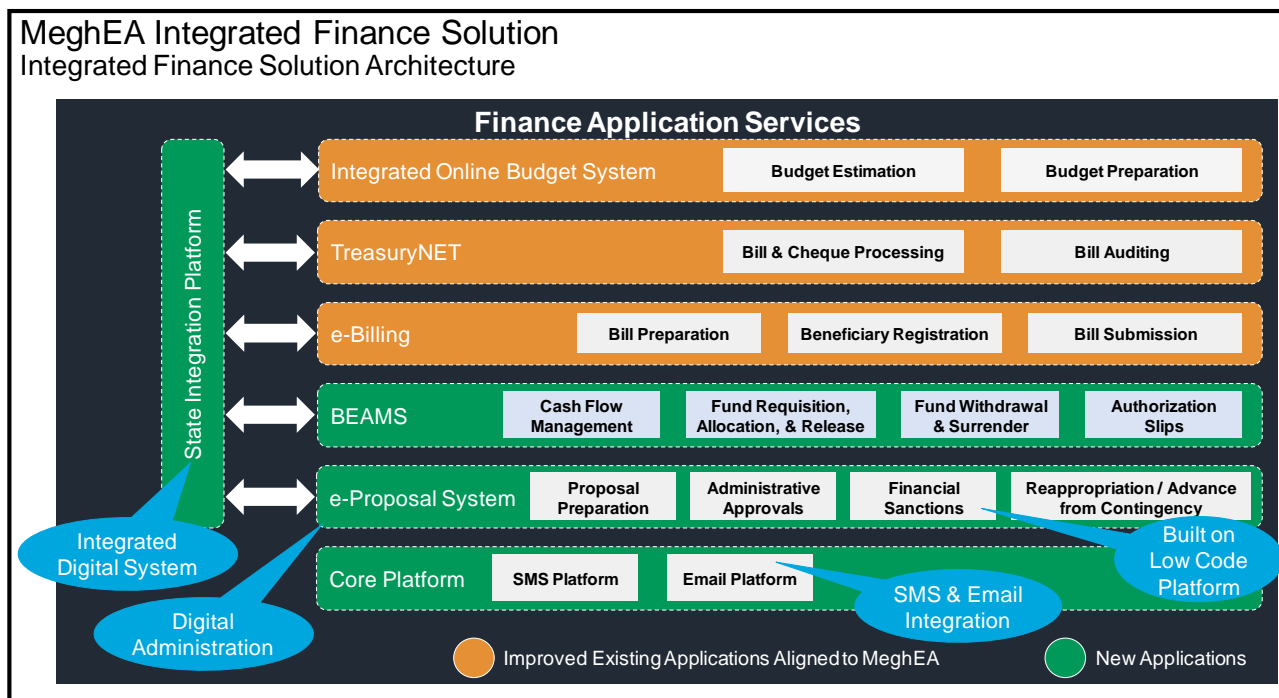


Figure 3: The MeghEA Integrated Finance Solution Architecture

As we see in Figure 3, the Integrated Finance Solution Architecture is a classic example of using both “existing” applications and “new” applications. The existing applications (i.e., Bill Auditing, Budget Estimation, Bill Submission, etc.) in the domains of e-Billing and TreasuryNET have been improvised to align to the Integrated Finance Solution Architecture, while BEAMS and the ePS have been designed, developed, implemented, and integrated as new solutions.

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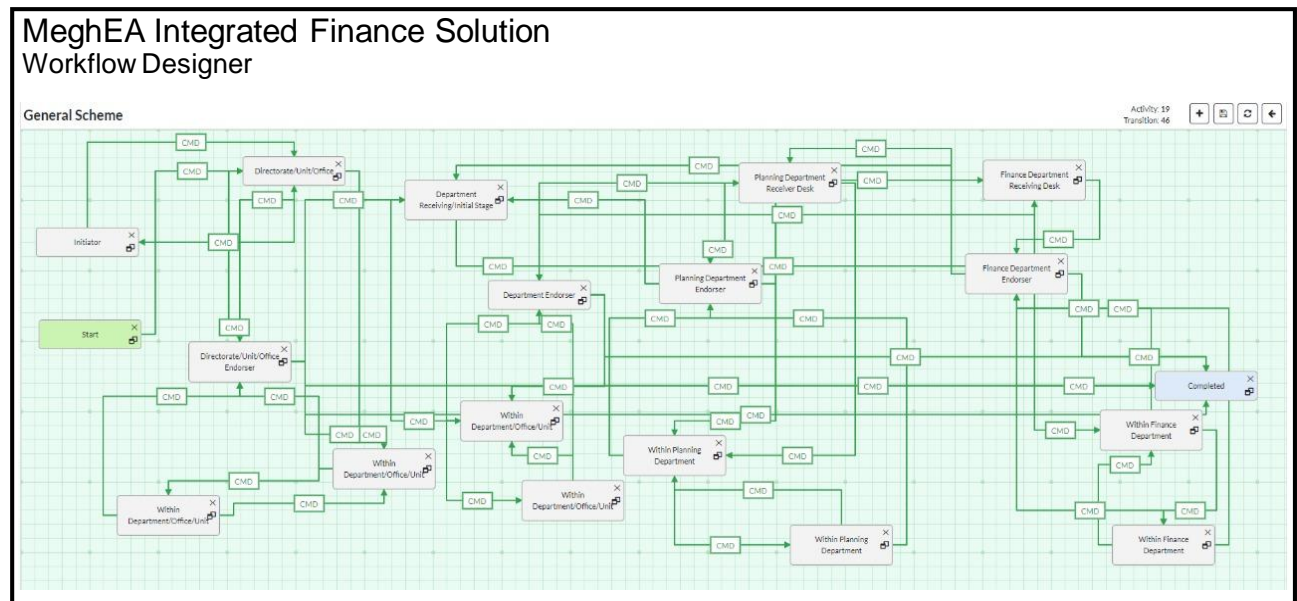


Figure 4: The Workflow Design of the MeghEA Integrated Finance Solution

Results and Benefits

The following are the major outputs/deliverables of the project.

1. Prioritization based on service assessment against Digital Service Standard (DSS) basis digital maturity – categorized to high, medium, and low maturity. 202 services identified as a priority services basis “value to stakeholders”, degree of complexity in service transformation.
2. Progress towards zero touch points in Government services through simplification, standardization, and automation of services.
3. Seamless sanctions and disbursement of funds.
4. Digital workflow implementation.
5. Digital administration.
6. Integrated real-time reporting.
7. Dashboard-based efficient monitoring of expenditures.
8. Digital tracking through systems, SMS, and email notifications.
9. Digital integration with finance systems: BEAMS, e-Billing, TreasuryNET

Outcomes achieved:

1. The processing time of the scheme has reduced from two (2) months to seven (7) days.
2. From sanction orders to minutes of meetings of committees, all were automated by using templates and digital publishing, leading to huge savings of paper and human effort.

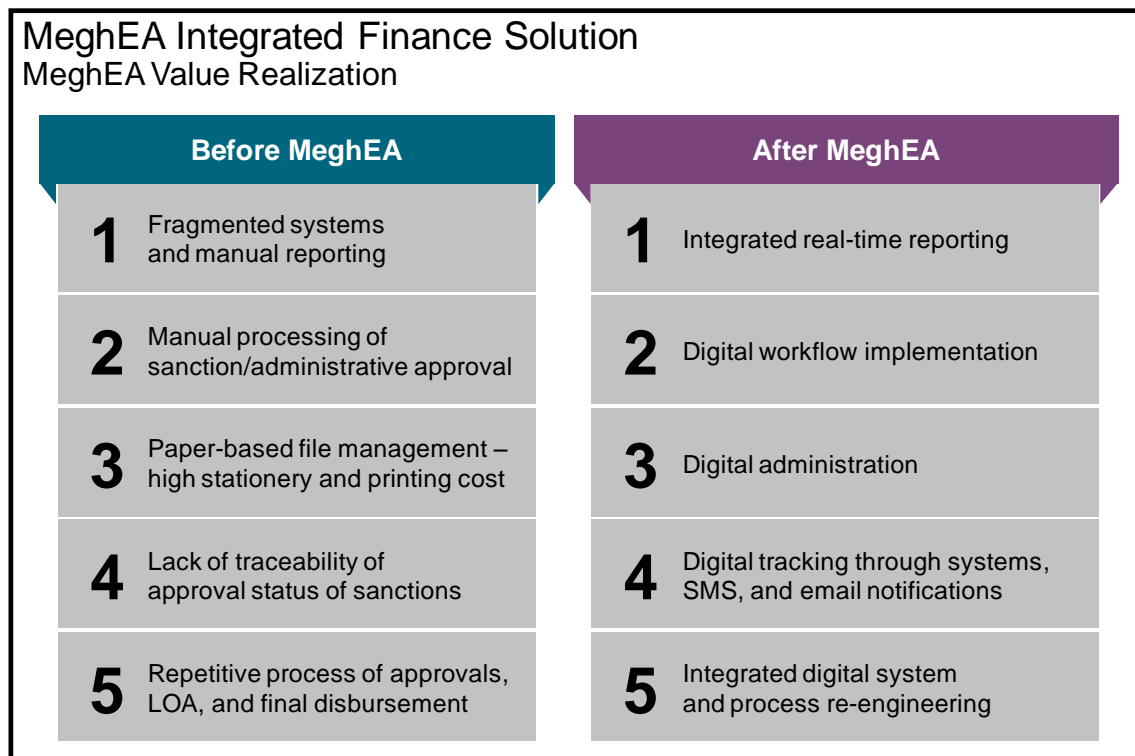


Figure 5: Value Realization of MeghEA

Qualitative and Quantitative Benefits

Qualitative:

1. Progress towards zero touch points in Government services through simplification, standardization, and automation of services.
2. Seamless sanctions and disbursement of funds.
3. Digital workflow implementation.
4. Digital administration.
5. Integrated real-time reporting.
6. Dashboard-based efficient monitoring of expenditures.
7. Digital tracking through systems, SMS, and email notifications.
8. Digital integration with finance systems: BEAMS, e-Billing, TreasuryNET.

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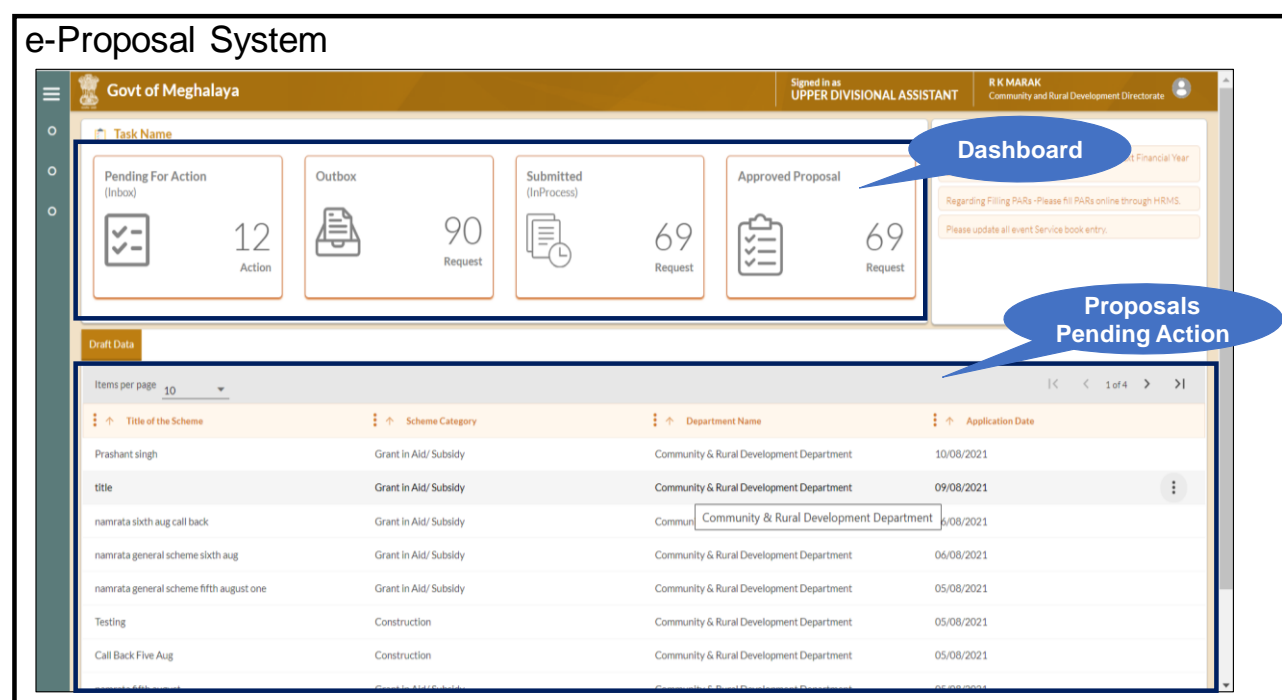


Figure 6: Overview of the e-Proposal System under MeghEA

Quantitative:

1. Seven (7) times faster and seamless sanctions and disbursement of funds.
2. Paperless approach: eliminates 75% of physical files in Government departments.
3. 120+ man years reduced through digital system-driven efficient tracking of proposals system, SMS, and email notifications.
4. 130+ man years reduced through dashboard-based efficient monitoring of expenditures and sanctions.
5. Quicker disbursement of the benefits to the citizens.

Sustenance of the Initiative

- As the services implemented are internal to the departments and state Government, there is no alternative way of financial sustenance

The next phase of the project would be implementation of citizen services, where a small convenience fee for digital service delivery may be levied to make the project self-sustainable.

- The organization has defined architecture review templates so that any new application to be developed/deployed in the state can be reviewed and alignment to MeghEA principles can be done before adoption; this would ensure seamless information flow between applications through the state API gateway

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- Further, the discussion between the department and the World Bank has matured for additional funding for the project implementation

The Preliminary Project Report for the same has already been submitted for necessary approvals. Until then, the department is already in the process of implementing finance services from state funds.

- The project is ongoing; there is a plan to implement the architecture in all other seven north-eastern states
- For this purpose, the team is documenting a set of learnings which include problems, solutions, and alternatives.

Report						
Items per page 100		< < 1 of 1 > >				
↑ Scheme	↑ Submitted Requests	↑ In-Process	↑ Approved Requests	↑ Sanction Generated	↑ Total Sanction Amount (INR)	↑ Total Release Amount (INR)
Construction Scheme-New work	738	668	70	57	2,52,71,49,658.8	0
General Scheme	9921	2614	7307	7093	34,53,64,77,282.15	11,74,80,60,874
Purchase of Vehicles/Equipments	32	18	14	13	3,31,00,724	75,67,464
Re Appropriation	152	103	49	0		
Repair/Maintenance of Vehicles	137	37	100	94	27,34,534	0
Advance from Contingency Fund	12	11	1	0		
PVE Ongoing	1	1	0	0		
Construction Previous Form	0	0	0	0		
On Going Proposal General Scheme	328	52	484	469	3,11,23,48,488.82	1,83,63,09,000
on going construction	27	27	0	0		
General AA Form	6	6	0	0		

Figure 7: Dashboard of the e-Proposal System under MeghEA

The dashboard shown in Figure 7 illustrates the features of the project, such as how many proposals related to schemes are submitted, how many of them are in progress, approved, and sanctioned, and the released amount for various Government domains such as vehicle purchase and contingency fund. The details are as of October 4, 2022.

Insights and Learnings

From our project experience, we would like to highlight the following as significant organizational challenges that we had to overcome during the implementation of the project.

- Leadership Buy-In: the Planning Department (being the nodal department) has coordinated with all key stakeholders and performed the analysis
- Change Management Committees: Honorable Chief Minister of the State, Honorable Chief Secretary (Civil Servant), and Commissioner Secretary of the Planning Department have led the three Change Management Committees, which nurtured the shape of the project outcomes

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- Data Collection: this was performed using a web-based system, which enabled faster and easier analysis of services
- Low Code Platform: this was chosen with perpetual license rights to enable the Government to design and implement digital services; this also meant detailed digital training (capacity building) to Government officials to enable them to design and implement services with minimal support from external vendors
- The transformation from file-based activity to service-based activity was the key challenge
Before the ePS, officials were used to working to the extent demanded by the file and not be concerned with the end outcome; with ePS, officials were asked to look beyond the file and align strategy with schemes
- Capacity building and training of the officials to enable them to use the ePS was also a key challenge
The same was achieved by focused training with simulation of an actual environment which involved class room training, train the trainer sessions, hands-on training in a testing environment, and on-the-job training as per requirements.
- To extend the system to all the departments, a mandate was issued from the Planning and Finance Departments to all Treasuries in the state that all bills produced for payment must accompany sanctions issued from the ePS
In the absence of the same, the bills should be rejected for processing. This had a greater buy-in from the Honorable Chief Minister of the State and Honorable Chief Secretary.

Key Decisions Made and Rationale

Below is the list of key decisions made with their respective rationale.

No.	Key Decision	Rationale
1.	Digital integration with finance systems: BEAMS	The budget provision and expenditure can be fetched directly from BEAMS instead of manually entering the data. Now the system directly communicates with BEAMS.
2.	Schemes mapped with SDGs, state strategy, and budget	The system is mapped with six state strategic pillars; i.e., Human Development, Primary Sector, Entrepreneurship, Infrastructure, Governance, and Environment, which are mapped with SDGs and then mapped with indicators and targets.
3.	To make services digitally available to various stakeholders	Only less than 200 e-Services are available. And, Government internal services are mostly non-digital.
4.	All services to be personalized based on citizen or employee profile	Currently, services are yet to be personalized.
5.	Digital ID provisioning for all citizens	Currently, there is a lack of adoption of citizen identification card or digital ID. Aadhaar adoption is less than one third (1/3) of the total population.
6.	All payments to be on digital channels	Currently, multiple channels exist for payments, leading to delay.

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Other Information

Human Resources Employed in the Project

(Please note that the information shared here is for reference/estimation only, and is therefore subjective.)

- Four (4) consultants for the period of one (1) year to study services, as-is processes, and challenges and prepare the target state along with the vision, scope, architecture requirements, and blueprint
- Two (2) consultants for the bid process management for almost one (1) year for preparation of Requests for Proposals (RFPs), tendering process, selection of implementation partner, preparation of functional requirements for implementation, and project management support
- Three (3) developers for the period of one (1) year with expertise on low code/no code platform; this includes customization of forms along with production support of six (6) months

Future State Architectures

MeghEA is conceptualized based on six (6) pillars; i.e., Human Development, Primary Sector, Entrepreneurship, Infrastructure, Governance, and Environment. The ePS is a key project implemented by the Finance Department, under the Governance strategic pillar. This section will refer to the key future state architectures – i.e., Business, Data, Application, and Technology – of the Governance pillar which could be useful for a “systems thinking” approach.

Future State Business Architecture

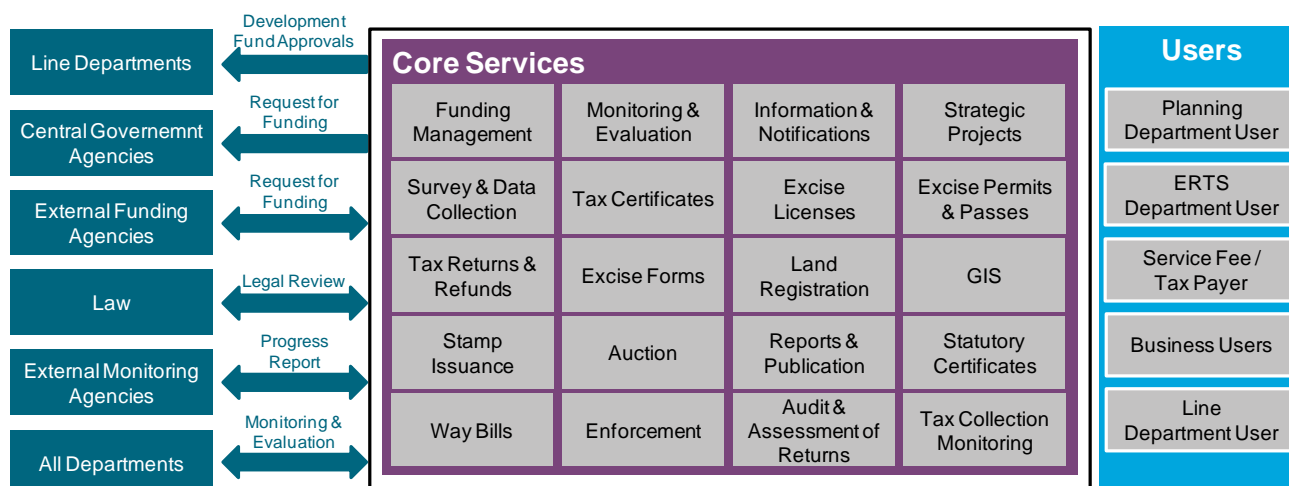


Figure 8: Future State Business Architecture – Governance Strategic Pillar of MeghEA

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Future State Data Architecture

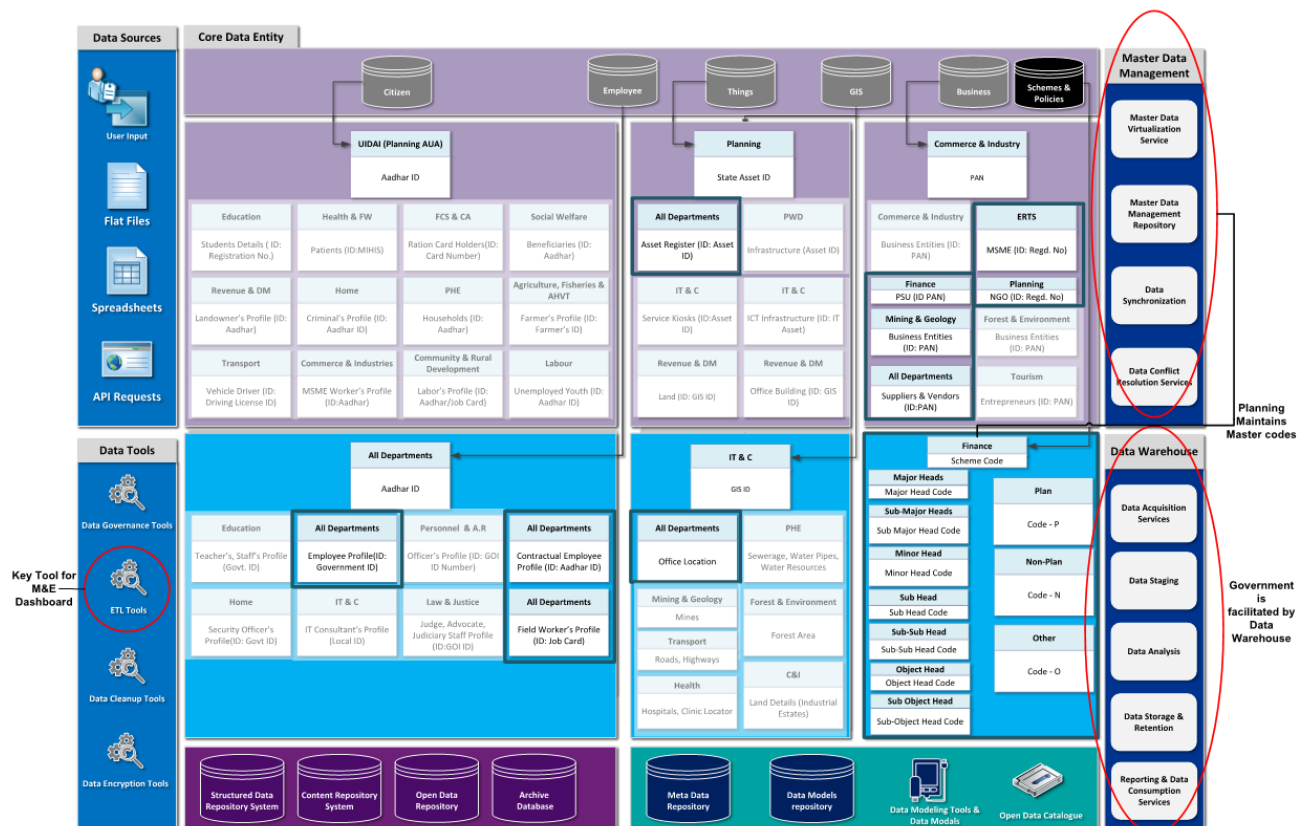


Figure 9: Future State Data Architecture – Governance Strategic Pillar of MeghEA

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Future State Application Architecture

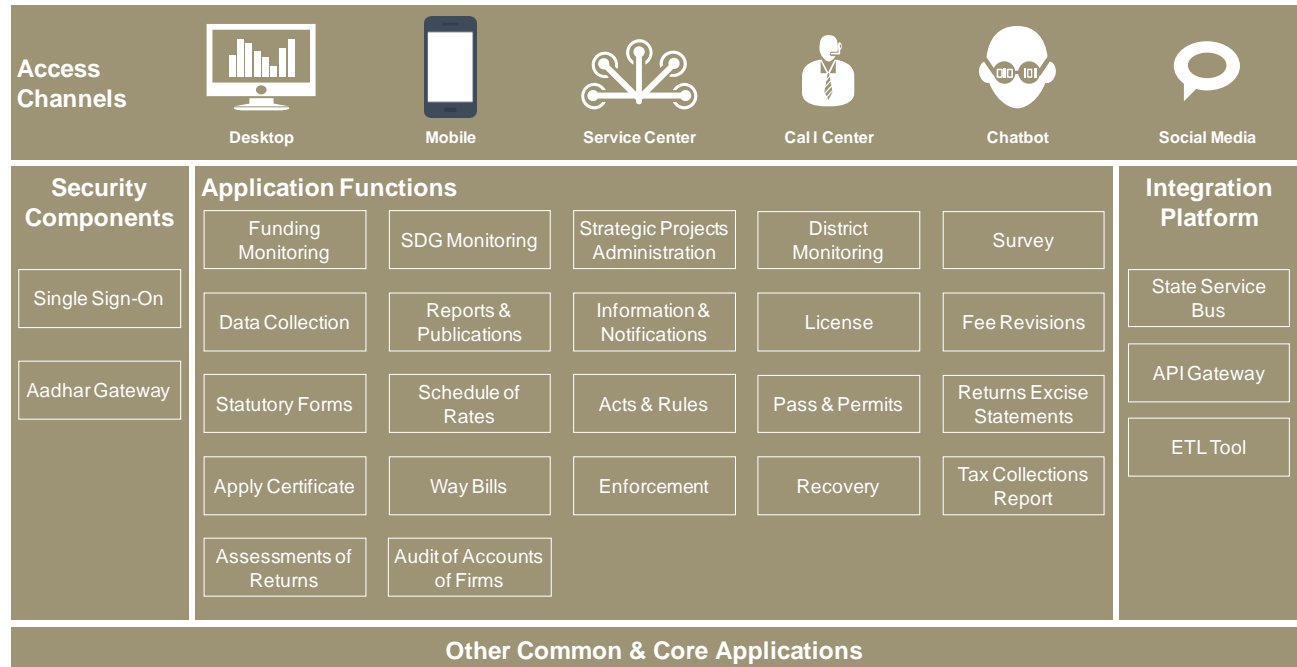


Figure 10: Future State Application Architecture – Governance Strategic Pillar of MeghEA

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Future State Technology Architecture

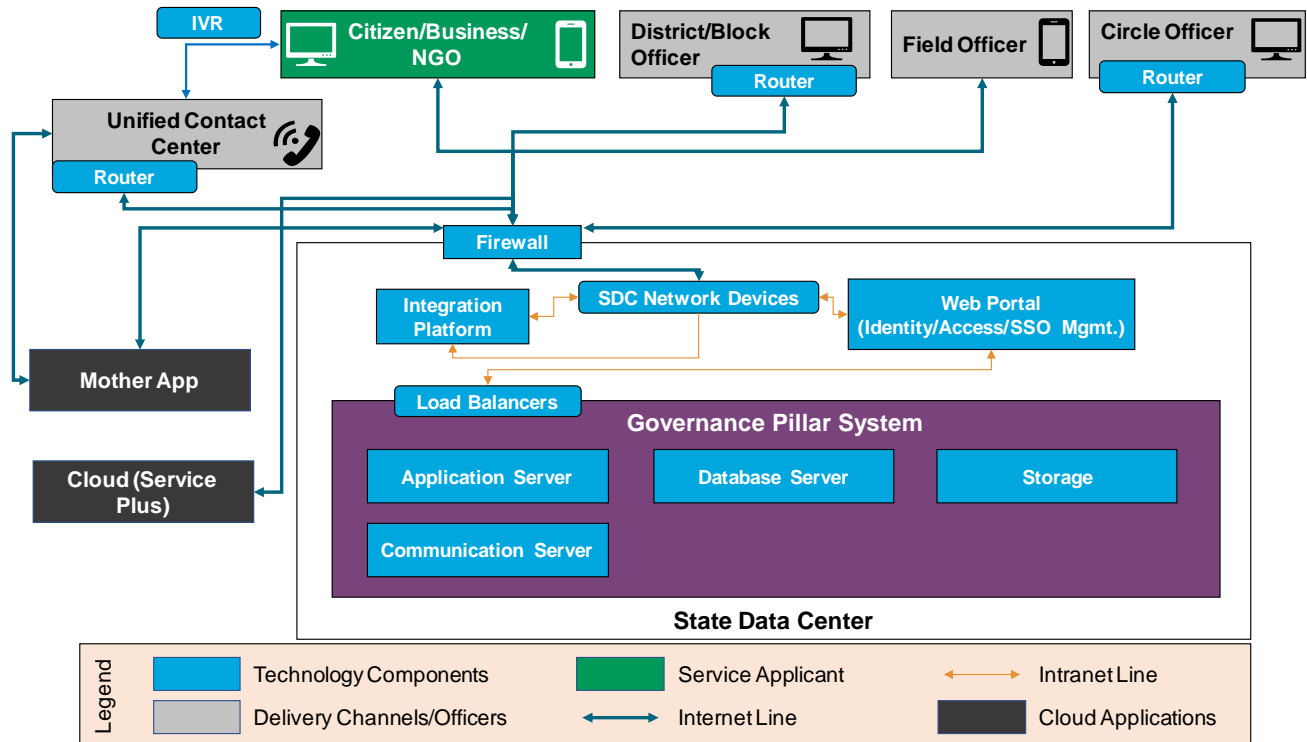


Figure 11: Future State Technology Architecture – Governance Strategic Pillar of MeghEA

Referenced Documents

(Please note that the links below are good at the time of writing but cannot be guaranteed for the future.)

- Detailed Architecture – MeghEA Strategic Pillar – Governance, Shillong, Government of Meghalaya (2021)
- National Institute of Public Finance & Policy: A Vision Document for the State of Meghalaya 2030, New Delhi: NIPFP (2013)
- Planning Department, G.o.: e-Proposal System User Manual, Shillong, Government of Meghalaya (2022)

Acronyms & Abbreviations

ABB	Architecture Building Block
API	Application Program Interface
B2B	Business-to-Business
BEAMS	Budget Estimation Allocation Management System
BPMN	Business Process Model Notation
DSS	Digital Service Standard
ePS	e-Proposal System
ERTS	Excise, Registration, Taxation, and Stamps
ETL	Extract, Transform, Load
GBA	Government Blockchain Association
GIS	Geographic Information System
GRAS	Government Receipt Accounting System
IndEA	India Enterprise Architecture
iOBS	Integrated Budget Information System
ITU	International Telecommunication Union
IVR	Interactive Voice Response
LOA	Letter of Acceptance
MeghEA	Meghalaya Enterprise Architecture
NGO	Non-Governmental Organization
SDC	Service-Oriented Device
SDG	Sustainable Development Goal
SMS	Short Messaging Service
SOA	Service-Oriented Architecture
SSO	Single Sign-On
WSIS	World Summit on the Information Society

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Currently, he is contributing to the "Capability Building Guidance", "Public Digital Platforms", and "Education Reference Model" sub-groups under The Open Group Government Enterprise Architecture Work Group.

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The Open Group is a global consortium that enables the achievement of business objectives through technology standards. With more than 900 member organizations, we have a diverse membership that spans all sectors of the technology community – customers, systems and solutions suppliers, tool vendors, integrators and consultants, as well as academics and researchers.

The mission of The Open Group is to drive the creation of Boundaryless Information Flow™ achieved by:

- Working with customers to capture, understand, and address current and emerging requirements, establish policies, and share best practices
- Working with suppliers, consortia, and standards bodies to develop consensus and facilitate interoperability, to evolve and integrate specifications and open source technologies
- Offering a comprehensive set of services to enhance the operational efficiency of consortia
- Developing and operating the industry's premier certification service and encouraging procurement of certified products

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