Digital Government Transformation in India: Emergence, Convergence and Coherence

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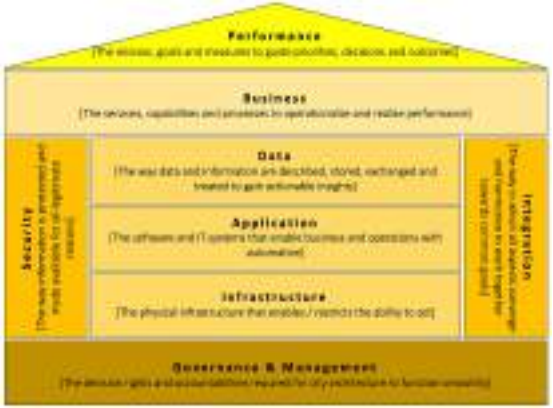
The Foundation
(India Enterprise Architecture Framework)

The vision of IndEA is "**to establish best-in-class architectural governance, processes and practices with optimal utilisation of ICT infrastructure and applications to offer ONE Government experience to the citizens and businesses through digital services enabled by Boundaryless Information Flow™**." The IndEA comprises of eight distinct yet inter-related reference models, each covering a unique and critical architecture view or perspective.

- **Part 1 [India Enterprise Architecture Framework]**: This details the eight reference models based on TOGAF® and other Open Group Standards.
- **Part 2 [IndEA Adoption Guide – A Method Based Approach]**: This describes how IndEA can be adopted by government entities with TOGAF® ADM as the underlying methodology.
- **Part 3 [Digital Service Standard]**: This elaborates the lifecycle of initiating, designing, developing, deploying, measuring and governing digital services as a way to enable the architecture.
- **Part 4 [Agile IndEA Framework]**: This standard blends agile practices into architecture activities and describes the steps needed to build a minimum viable architecture through the use of reusable building blocks.

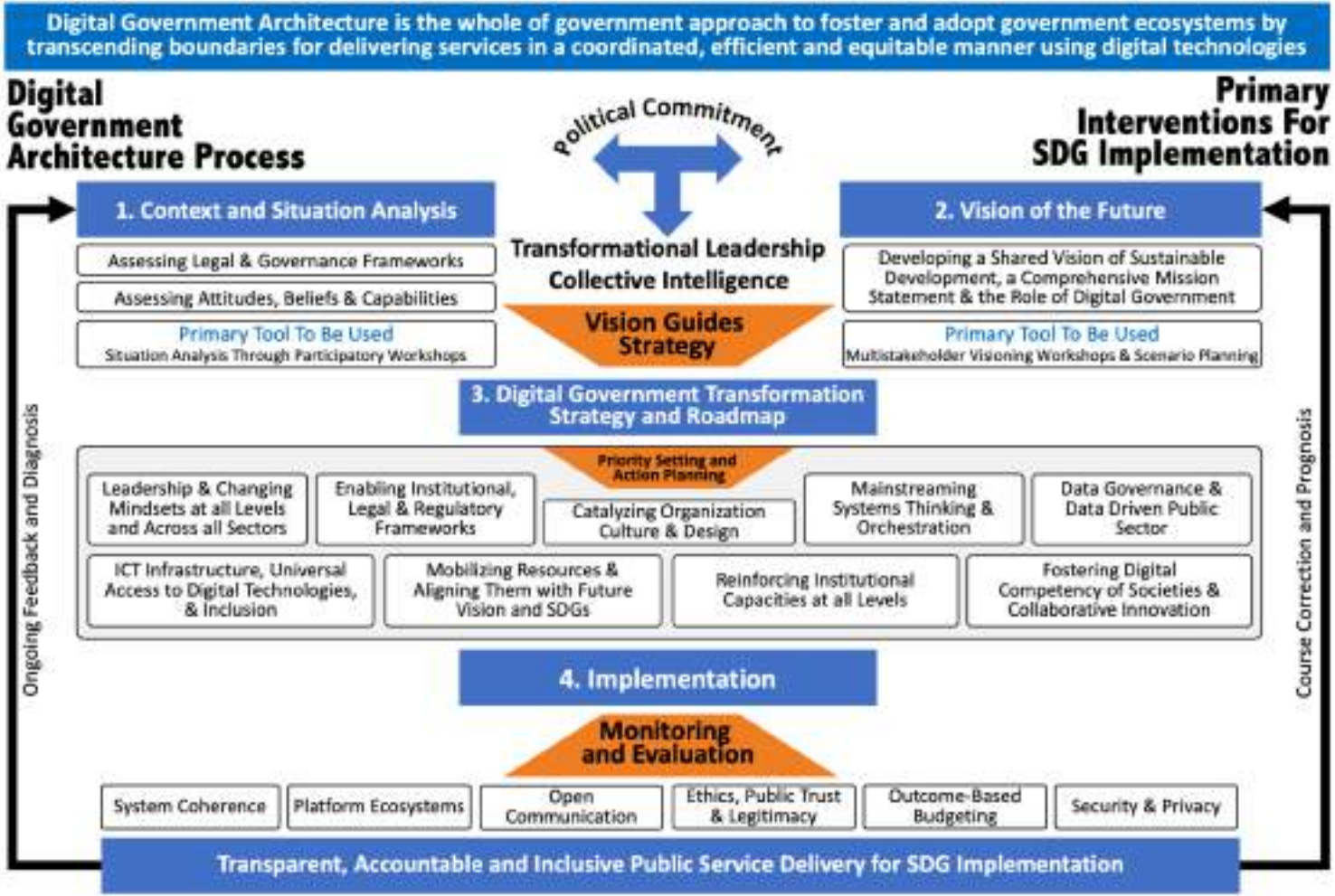


The Open Group Architecture Framework (TOGAF) is one of the most used frameworks for enterprise architecture today in the public and private sectors, providing an approach for designing, planning, implementing, and governing an enterprise's digital architecture.

[World Bank. 2021. GovTech Maturity Index: The State of Public Sector Digital Transformation. World Bank, Washington, DC.]

Leadership Imperatives for Digital Government Transformation

1. Embrace transformation, and work to sustain it.
2. Articulate a clear strategy and communicate it relentlessly.
3. Establish an enterprise architecture to evolve into, as daily decisions taken to define the technology strategy.
4. Deploy a real governance process to track the many technology projects underway, and coordinate and integrate them whenever possible.
5. Just spending money on technology does not result in more growth or better performance; in fact, in some cases it can actually damage the business if it accentuates divisions and inconsistencies across groups. Instead, it is the architectural, managerial, and organizational approaches to transformation that best explain the substantial and enduring differences among firms.
6. Pivot transformation around a suitably configured process with clear interim milestones as guardrails.



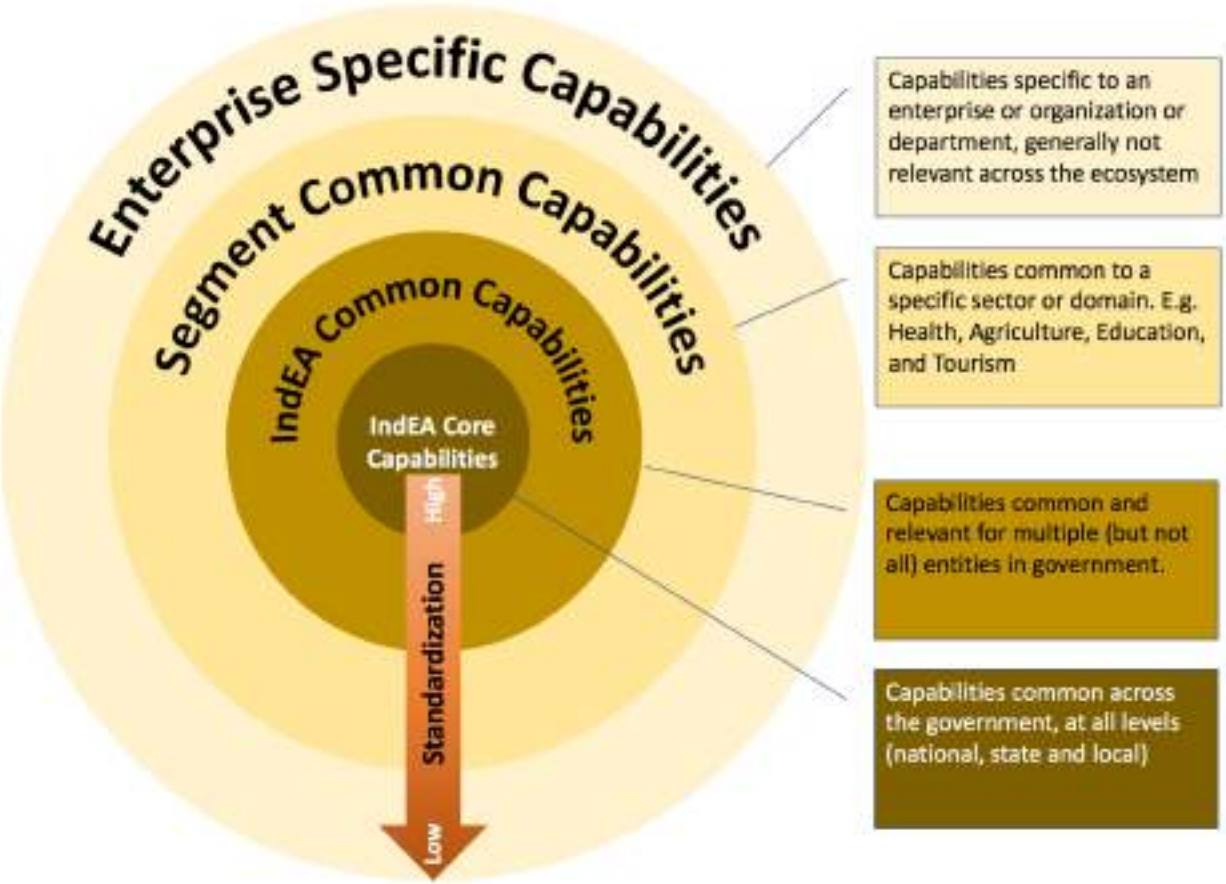
Core Building Blocks	**Core Building Blocks to be established in WAVE 1** 1. **Digital identity** – Enable unique identification and authentication of users, organizations or other entities 2. **Digital Registries** – Centrally manage databases that uniquely identify and describe persons, service providers, facilities, assets, procedures, products, sites or other entities related to the organization. 3. **Integration management** – Provide a gateway between external digital applications and other Building Blocks, thereby ensuring interoperability and implementation of standards, which is essential for integrating various Building Blocks and applications 4. **Messaging** – Facilitate notifications, alerts, or two-way communications between applications and communications services, including short messaging service (SMS), unstructured supplementary service data (USSD), interactive voice response (IVR), email or social media platforms 5. **Cloud Infrastructure** – For hosting data and applications, getting all the benefits of cloud. 6. **Security and access** – Provide ICT administrators the ability to centrally configure and manage user and group access permissions to network resources, services, databases, applications and user devices
	Core Building Blocks to be established in WAVE 2 1. **Mobility management** – Securely enable employee use and management of mobile devices and applications in a business context 2. **Analytics and business intelligence** – Provide data-driven insights about business processes, performance and predictive modelling 3. **Artificial intelligence** – Package machine intelligence capabilities as reusable services to perform work, extract insights from data, or provide other business capabilities 4. **Geographical information** – Provide functionality to identify, tag and analyze geographic locations of an object, such as a water source, building, mobile phone or medical commodity

Common Solution Building Blocks	**Common Solution Building Blocks to be established in WAVE 1**
	1. **Registration** – Records identifiers and other general information about a person, place or other entity, typically for the purpose of registration or enrolment in specific services or programmes and tracking of that entity over time 2. **E-Payments** – Implement and log financial transactions receipts and payments online in multiple ways. 3. **Workflow management** – Help to optimize business processes by specifying the rules that govern the execution of a sequence of activities and the exchange of associated information in order to orchestrate the process flow from initiation to completion. 4. **Case management** – Register or enrol of a user and provide longitudinal tracking of services, often across multiple service categories, departments and locations 5. **Feedback** – Provide the ability for consumers and providers of services to send, track and address any issues pertaining to service quality, including any kind grievance redressal. 6. **Consent management** – Manage a set of policies allowing users to determine the information that will be accessible to specific information consumers, for which purpose, for how long, and whether it can be shared further 7. **Reporting and dashboard** – Provide pre-packaged and custom presentations of data and summaries of an organization's pre-defined key performance metrics, often in visual format
	Common Solution Building Blocks to be established in WAVE 2
	1. **eLearning** – Support facilitated or remote learning through digital interaction between educators and students 2. **Collaboration management** – Enable multiple users to simultaneously access, modify or contribute to a single activity, such as content creation, through a unified access portal 3. **Content management** – Support the creation, editing, publishing and management of digital media and other information 4. **Scheduling** – Provide an engine for setting up events based on regular intervals or for triggering specific tasks in an automated business process, based on specific combinations of status of several parameters 5. **Terminology** – Provide a registry of definitions and terms with defined nomenclature standards, metadata, synonyms and sometimes a knowledge map for a particular domain of knowledge (e.g. health) which can be used to facilitate semantic interoperability.

Federated Architecture in Action

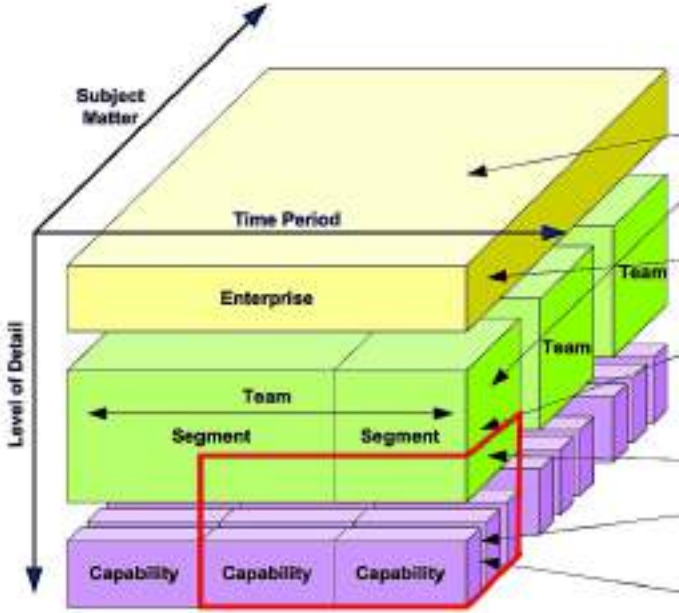
Points to Remember:

1. This enables a federated approach, and does not advocate centralization.
2. Commonalities lead to benefits from economies of scale, without curbing innovation.
3. Layering depends on the level for which architecture is being developed, and how the construct of 'enterprise' is scoped.
4. With maturity, certain specific capabilities can become common ones.
5. Capabilities can belong to any of the eight architecture domains.

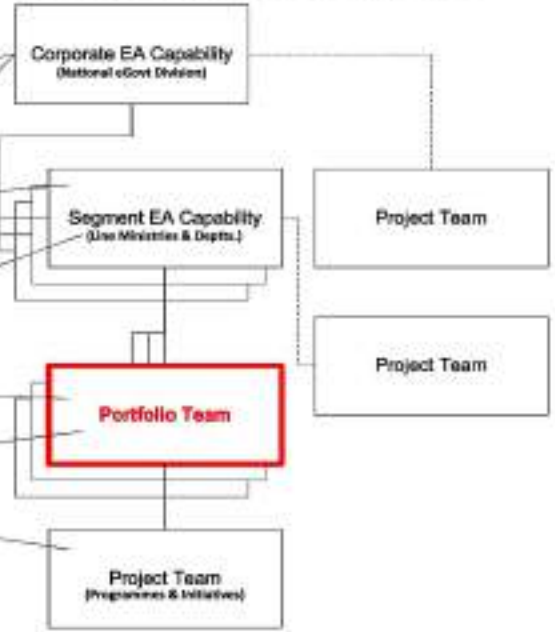


IndEA Partitioning Structure

Realization Initiatives



Teams Conducting Architecture

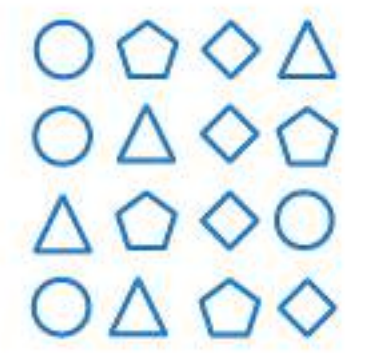


IndEA initiatives are at three levels:

- **National or State level** covers the entire country or the state and defines the high-level vision, principles, and strategic directions for the entire enterprise architecture by defining the relevant reference models
- **Segment level** defines the ecosystem architecture for a specific sector (or business domain) selected based on national priorities
- **Capability level** defines the architecture for a single business capability and at this level is the most detailed and leads directly to capability implementation (solution architecture and implementation)

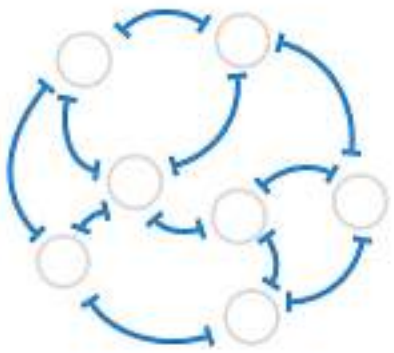
What's Driving "Public Digital Platforms"

1. Government as an enabler instead of a **solution provider**
2. Emergence of **service delivery** to raise ease of living, ease of doing business and governance
3. Desire for **open distributed governance**
4. **Data driven government** and public sector
5. Alternative forms of **government funding**
6. Civil service **reforms and transformation**
7. Shift towards a **digital economy** and a **digital society**
8. Foundation for creating entire **ecosystems**



Economies of Scale

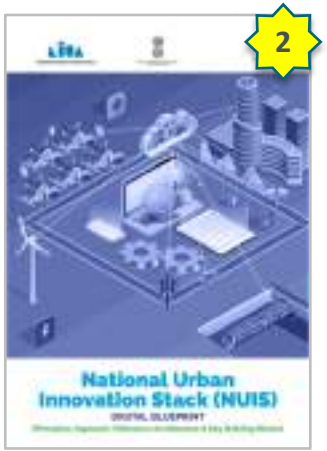
Value is created by getting more efficient at producing parts through standardization to achieve mass production



Economies of Connections

Value is created through the synergistic organization between parts, via connectivity, data and insight.

Examples of India-Scale Public Digital Platforms



* Efforts are currently underway to create PDPs for *Power & Energy, Woman & Child, Skills & Employment, Logistics, Transportation, Industry Consortium (MSME), Criminal Justice System*, and *Tourism* among others, all taking a sectoral whole-of-government perspective to the scope and ecosystem being covered.

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India's National Digital Health Mission

1. How do we improve patient experience, safety and quality of care?
2. How do we integrate care across settings we don't control?
3. How do we do more with less money?
4. How do we create more value for patients, payers and the community?
5. How do we deliver care in the right setting?
6. How do we find enough staff and deliver experiences that keep them working here?

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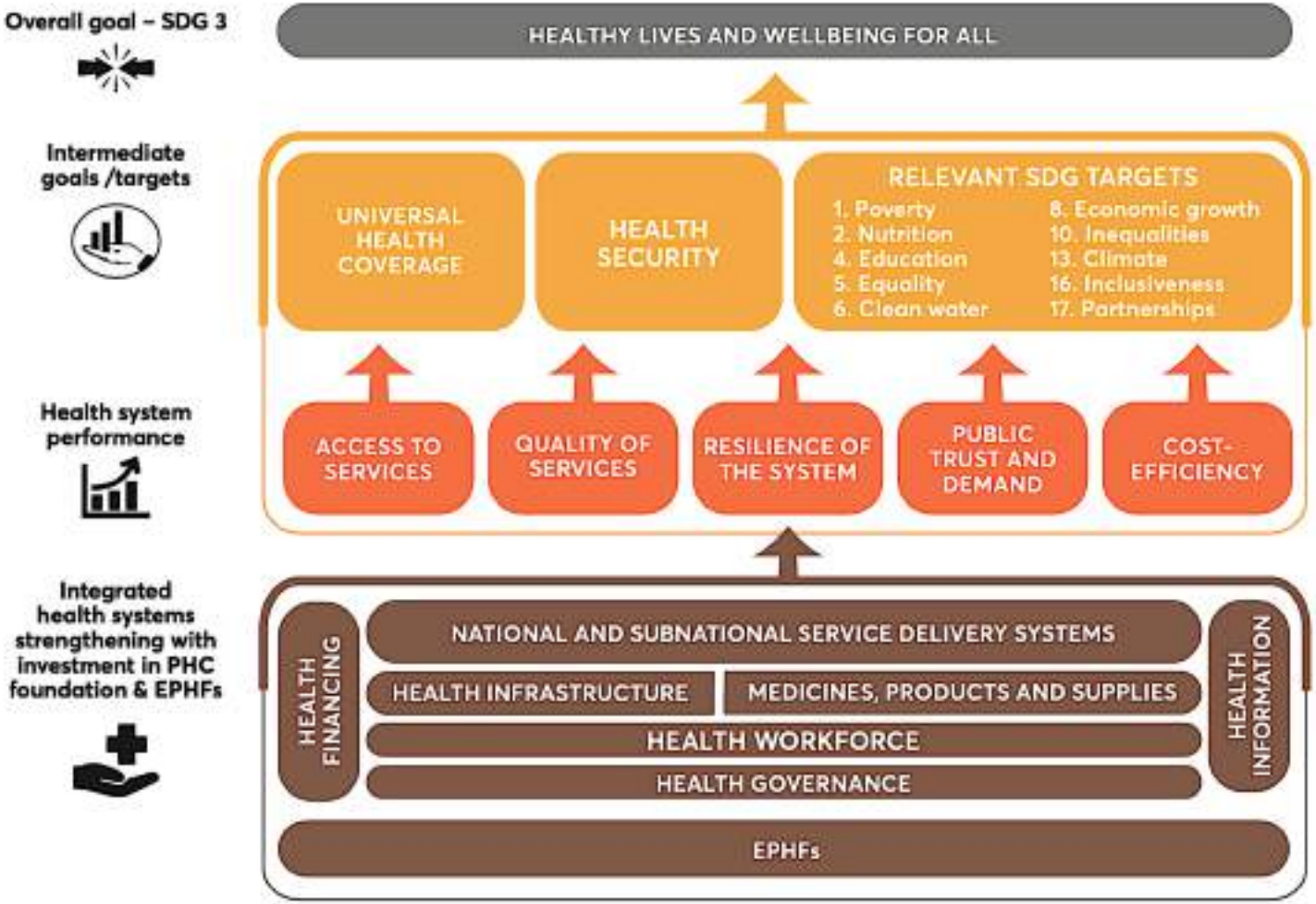
NDH Architecture Vision and Strategy



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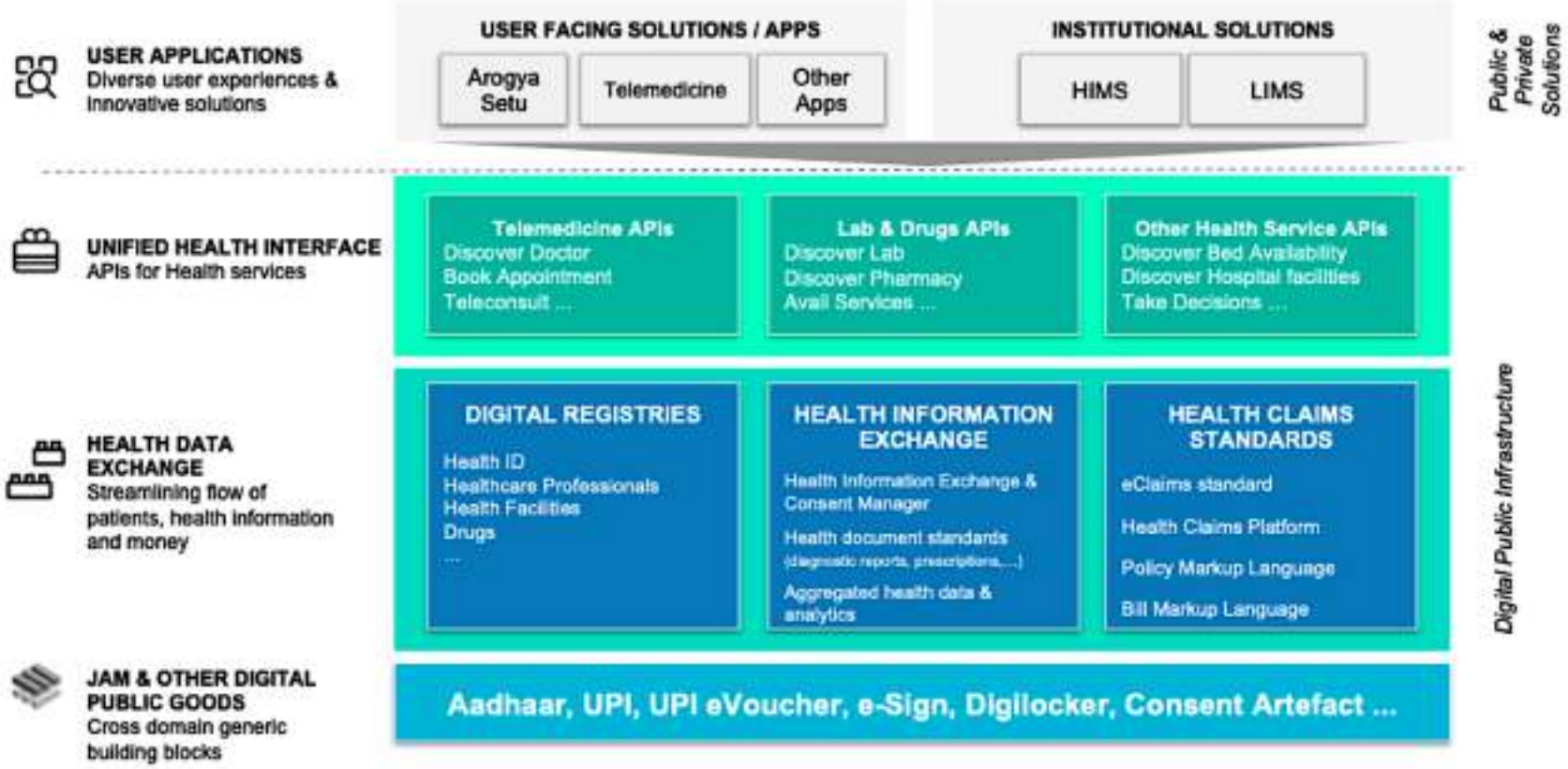
National Digital Health Architecture



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Example Implementation Use Case

Health Sector SDG	**Sector : Health** **SDG 3 : Good Health and Well Being**
SDG Targets	• 3.1. By 2030, reduce maternal mortality reduce ratio to less than 70 per 100,000 births • 3.2. By 2030, end preventable deaths of newborns and children under age of 5, with reduction in neo-natal mortality to less than 12 per 1000 live-births and under-5 mortality to less than 25 per 1000 live-births
Hi-Impact Service	**Government to Citizen Service** : Care services for mother and child spanning the prenatal and postnatal periods resulting in a healthy mother and child.

	1	2	3	4	5	6	7
Use Case Steps	**LINKAGE WITH A COMMUNITY HEALTH WORKER** • Seema, an ASHA worker meets Geeta and her family.	**ENROLMENT IN THE MOTHER & CHILD TRACKING SYSTEM** • Seema registers Geeta into the MCTS	**ARRANGING THE FIRST VISIT TO THE PEDIATRIC CLINIC** • Seema arranges for Geeta's first visit to the pediatric clinic	**HEALTHCARE PROFESSIONAL (PEDIATRICIAN) VISITS** • Geeta visits the pediatric clinic with her baby	**PROCUREMENT OF MEDICATION AND NUTRITION ITEMS** • Seema helps Geeta in getting medicines and nutrition supplies	**GETTING THERAPY FROM THE THERAPIST PER INSTRUCTIONS** • Seema takes Geeta to the therapy centre for therapy	**RECOGNITION AND INCENTIVE FOR PARTICIPATION** • Seema and Geeta are provided incentive for participating
Key Activities	• Spreading awareness • Encouraging enrolment in the community health programme • Creating content for promotion and awareness	• Generating or using identification • Enabling permissions and privileges • Creating EHR for Geeta, and giving activation permissions	• Making appointment • Work planning and coordination • Tracking attendance	• Creating and managing cases • Diagnosis of the problems (if any) • Discussion with patient • Referral notes and prescription	• Sending e-prescription to the pharmacy • Confirming patient identity and details • Handing medicines as per prescription to the patient	• Retrieving EHR of mother and child • Interacting with the child • Performing exercises • Providing advice and instructions	• Completing visit record for participating in the community health programme • Receiving payment for completing the intervention
Reusable Building Blocks	• **Scheduling** • **eLearning** • **Registration**	• **Authentication** • **Registration** • **Shared Data Repository** • **Workflow** • **Digital Identity**	• **Shared Data Repository** • **Messaging** • **Scheduling** • **eLearning** • **Digital Identity**	• **Shared Data Repository** • **eLearning** • **Digital Registry** • **Scheduling** • **Messaging**	• **eMarketplace** • **Workflow** • **Payment** • **Digital Identity**	• **Workflow** • **Scheduling** • **Data Collection** • **Artificial Intelligence** • **Collaboration Management**	• **Workflow** • **Payment** • **Feedback**

Note: The reusable building blocks come from the IndEA Core Platform and the National Digital Health Blueprint (NDHB).

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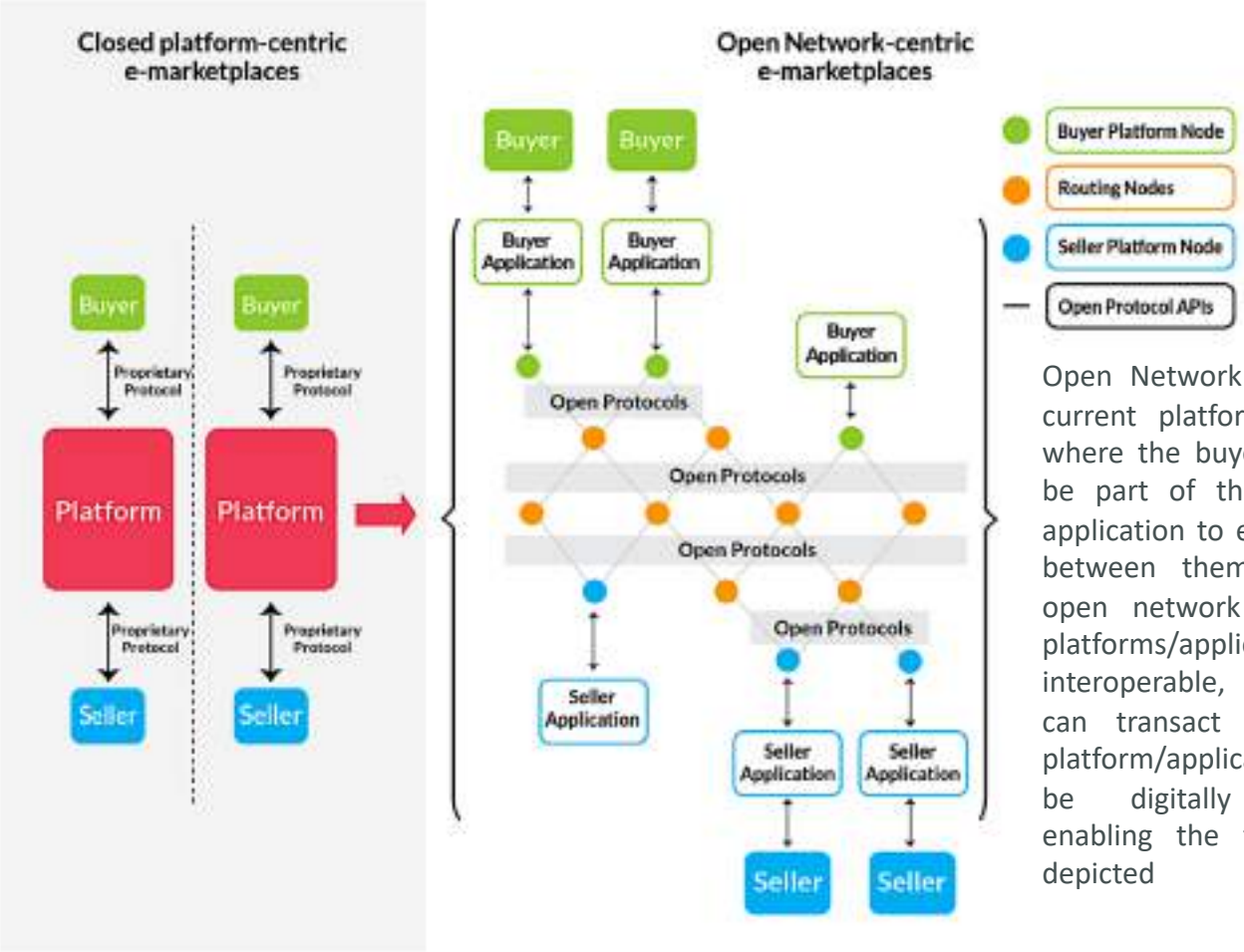
Open Network for Digital Commerce



Open Network goes beyond the current platform- centric model where the buyer and seller must be part of the same platform/ application to enable transactions between them. Instead, in an open network so long as the platforms/applications are interoperable, buyers and sellers can transact no matter what platform/application they use to be digitally visible/available enabling the flow of value as depicted

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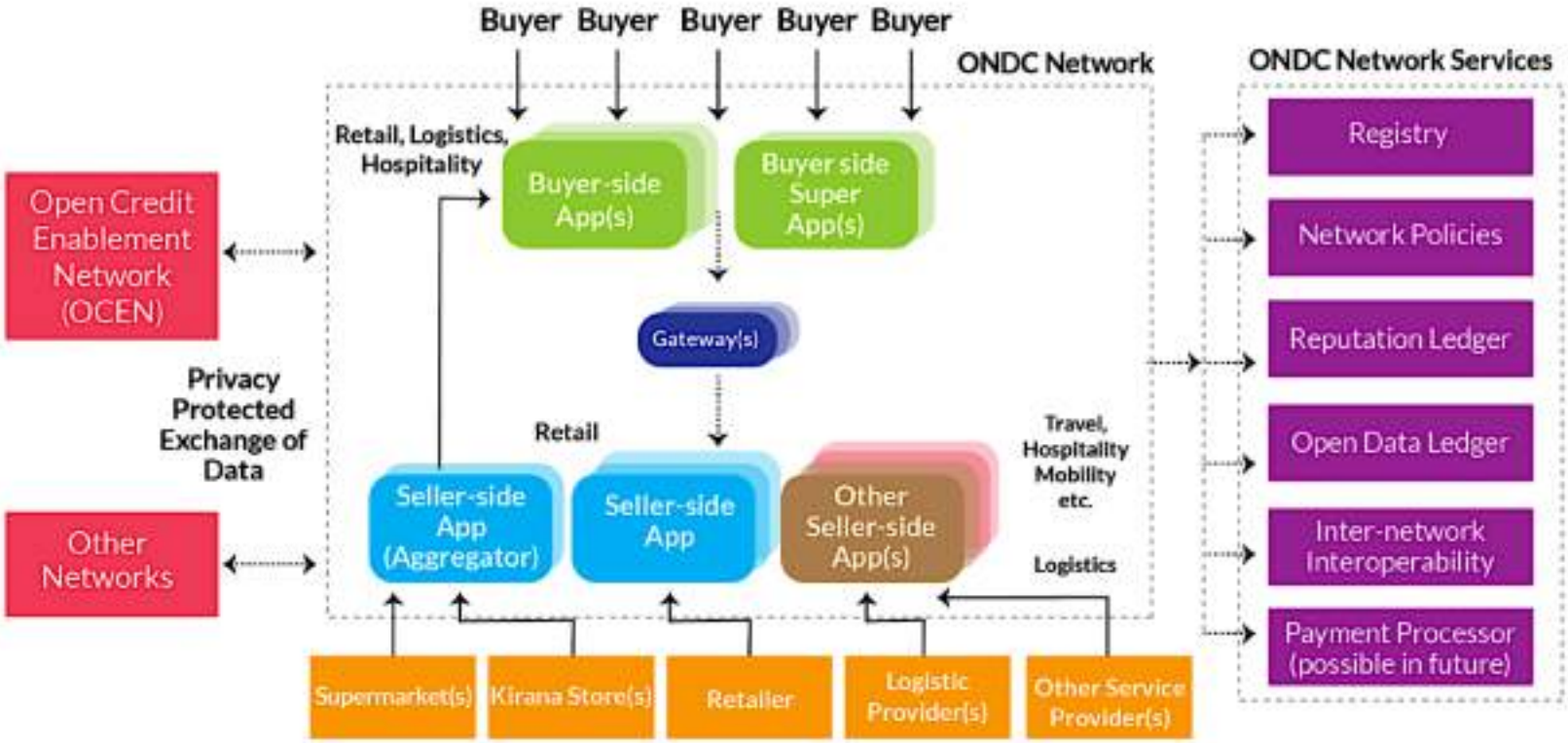
Components of the ONDC



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Impact and Implications

1. **Disintermediation**: A buyer placing an order on *Amazon* could have her product delivered by *Flipkart* as that may be the most efficient and cost-effective way. To the buyer, the platform that takes the order request, and the platform that finally fulfills it is irrelevant and should not matter. The end-user experience will be seamless as it will accelerate the fundamental paradigm shift from a **proprietary platform-centric** to an **open platform-agnostic** model.
2. **Rationalization**: Merchants wanting to sell their products and services will benefit by avoiding or minimizing multi-homing costs. They get access to the entire set of buyers in all locations without having to worry about the different rules and procedures each platform currently places on them.
3. **Demonopolization**: Disruptors will be disrupted. The business models of current online retail platforms will be completely disrupted as buyer and seller data opens up, as against the current practice of closed exclusive access.
4. **Standardization**: All online platforms are digital platforms. Widespread adoption of the ONDC will discourage proprietary solutions and encourage the use of standards in digital services, shared APIs, registries, data, reusable building blocks, trust and identity systems, security intervention, open network, and open protocols among others.
5. **Amplification**: The integration of the entire country into a single unified entity will exacerbate the network effects by minimizing silos and giving a common experience to all users. The ONDC will be a huge impetus to the digital economy by bringing scale hitherto unthought-of and clearly not available anywhere else.
6. **Agile Regulation**: This will make governance and regulatory approaches more agile, flexible and resilient through the development of experimental regulation such as regulatory sandboxes, anticipatory approaches (e.g. horizon scanning, scenario analysis, and strategic foresight activities), multi-stakeholders use of guidelines, and standards, and the promotion of national initiatives.
7. **Digital Sovereignty**: This is the leitmotiv of Digital India. The ONDC is a step further in this direction where we increase our ability to take charge of our own digital destiny. Data sovereignty is a critical part of this. The ONDC will effectively establish India as a digital single market in all its dimensions where innovation will thrive and data flow freely, in particular among MSMEs.
8. **Innovation**: The current platforms will be forced to innovate to be able to have and retain their own exclusive set of sellers, buyers, and other stakeholders. They will have to innovate to build new usage scenarios, where proprietary platforms will still offer unique benefits.

|| Public Digital Platform Reference Architecture ||

Users / Participants

- Citizen/People
- Government & Regulator
- Supplier & Intermediary
- Startup/ Entrepreneur
- Marketer/ E-Commerce
- Developer
- Research Institution
- Financial Institution

Access Channels

- Web Browser
- Mobile Device
- Chatbot
- Phone / IVRS
- Service Centre
- Call Centre

Business Capabilities

- Partner Onboarding
- Partner Management
- Offering, Services & Catalog
- Experience Design
- Promotion & Marketing
- Digital Services & Provisioning
- Market Access
- Charging & Revenue Model
- Incentive & Subsidy
- Trust & Reputation
- Registration & Fulfillment
- Search & Discovery

Data Capabilities

- Data Governance & Control
- Common/Shared Data
- Master & Meta Data
- Data Interoperability
- Data Standards
- Data Protection, Privacy & Security
- Data Analytics
- Open Data & Monetization
- Consent, Aggregation & Anonymization
- Data Registry
- Data Quality
- Data Value Chain

Application Capabilities

- Cloud Ecosystem
- Interface & Integration
- Application Standards & Protocols
- Application Architecture
- Agile-by-Design
- Application Lifecycle Management
- Monitoring & Notification
- Accelerator & Sandbox
- Common Solution Building Blocks
- Application Modernization
- Orchestration & Coordination
- Universal Access & Inclusion
- Core Building Blocks
- Service Orientation

Infrastructure Capabilities

- Access Device
- Network Infrastructure
- Integration Services
- Communication Services
- Storage & Archival Services
- Performance Monitoring & Operation
- Technology Modernization
- Security Services
- QoS & CoS
- Compute Services

Governance Capabilities

- Federation
- Structure & Org Design
- Policy & Regulation
- Budget & Funding
- Conformance & Verification
- Zero Trust & Secure-by-Design

Integration Capabilities

- Shared Vision
- Agreements & Contracts
- Risk Management
- Digital Competence
- Collaborative Innovation
- Market Management

Core Platform Principles

Governance

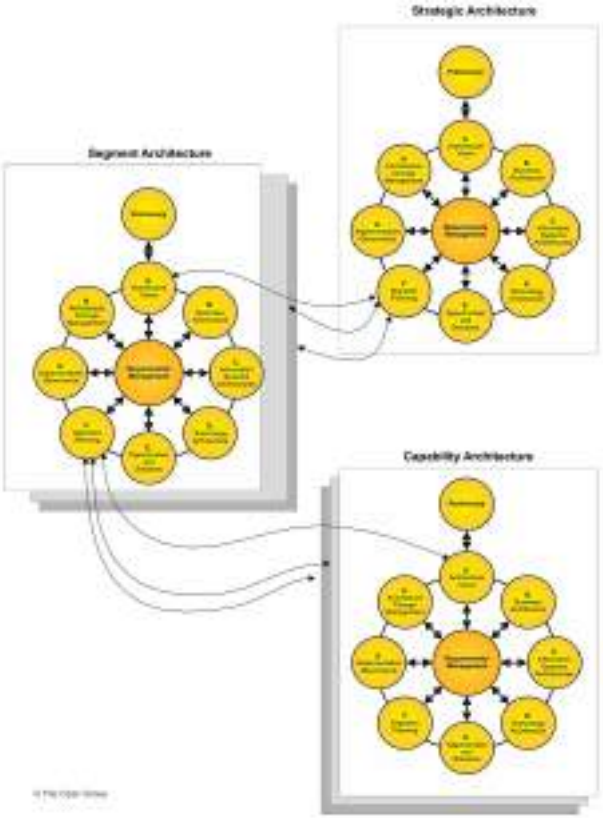
- Clear Rules of Engagement and Accountability
- Data-Led Decision Making
- Sustainable Economic Model
- Conformance and Verification
- Systemic Perspective to Interventions and Change

Technology

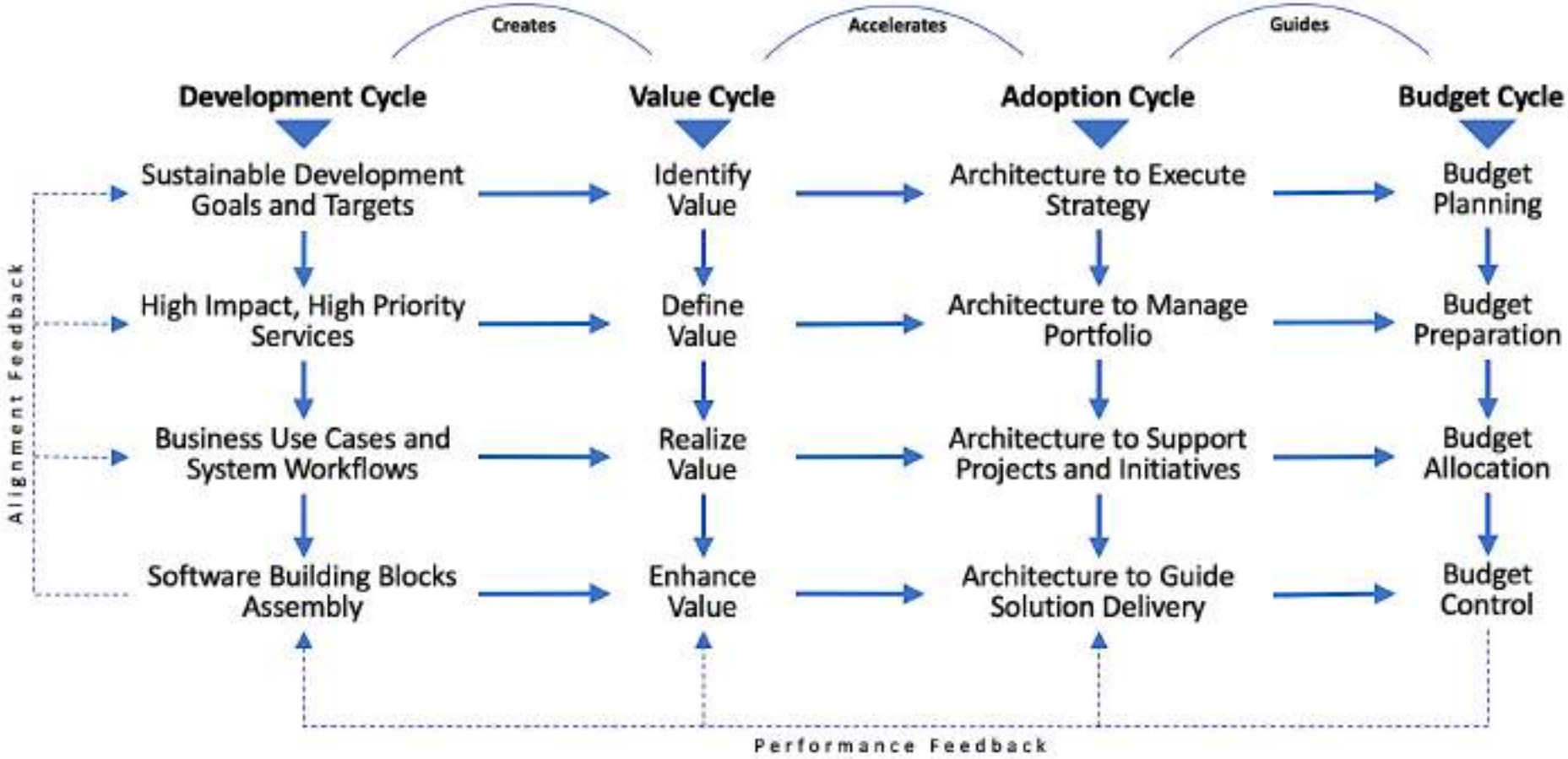
- Open, Modular and Interoperable Design
- Federated Approach and Agility-by-Design
- Zero Trust Architecture
- Use of Accelerators and Sandboxes
- Design for Self-Service

Process

Universal Access and Inclusion
Collaborative Design and End-User Engagement
Responsive Grievance Redressal
Value Enhancement Through Co-Innovation
Induce Participation and Competition

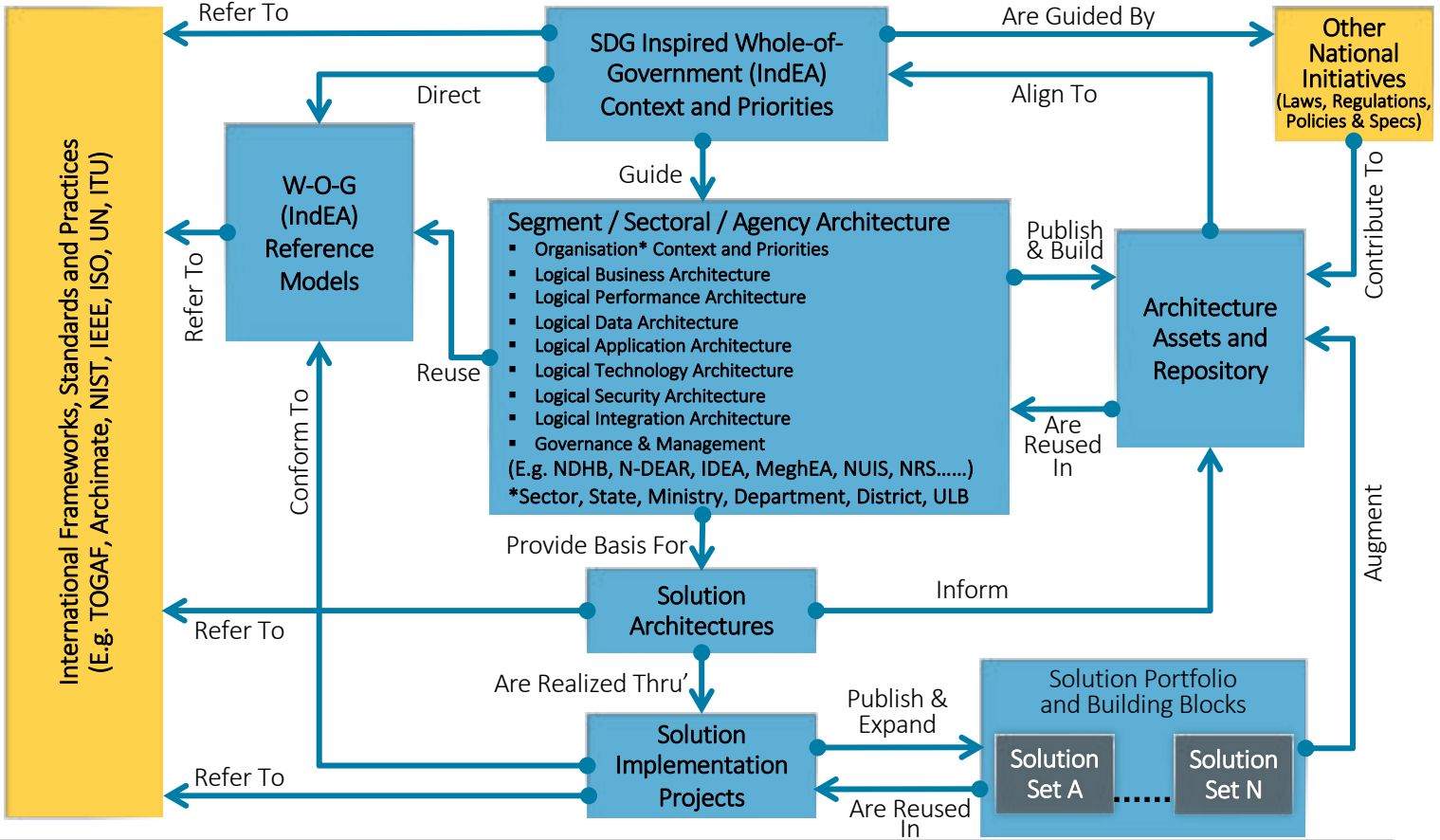


Agile IndEA Capability Progression Map

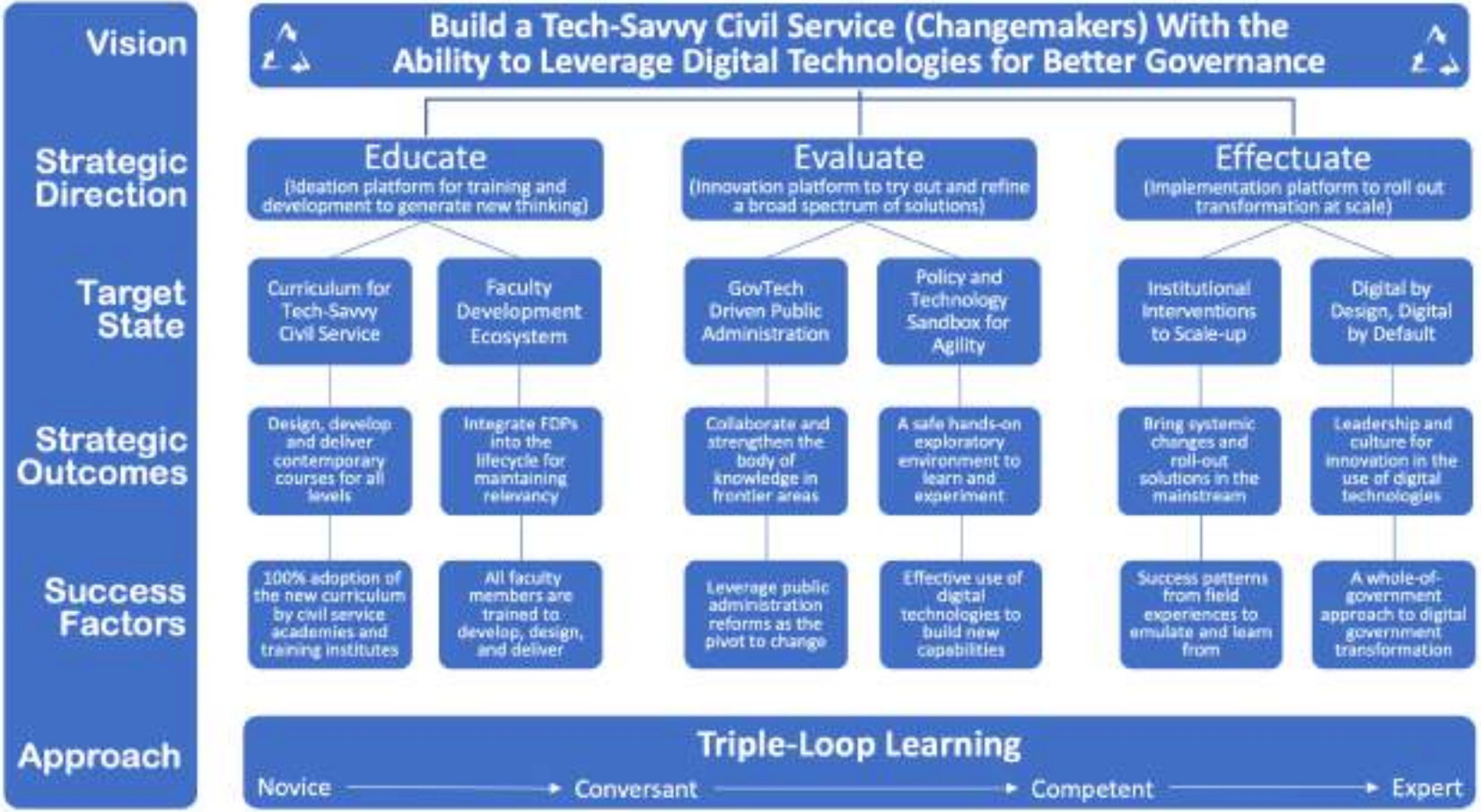


IndEA Framework Pertinence Model

1. Setting a top-down strategic whole-of-government orientation in digital transformation.
2. Building a robust institutional and governance framework.
3. Securing high-level political and senior civil servant leadership.
4. Establishing a conducive policy and legal framework.
5. Leveraging adoption mechanisms to drive change across the public sector.
6. Adopting an outcomes orientation that puts users first.



Public Sector Capacity Development for Digital
[Vision, Strategy & Target State]



Benefits of Digital Transformation in Government

How Is India Faring?

- **BCG Digital Service User Satisfaction Survey 2020**
  - Of the 26 service groups covered and the 36 countries surveyed, India is within the Top 3 in all but three categories.
  - In 'Drivers License' India is Ranked 4, in 'Vehicle Registration' India is Ranked 6, and in 'Real-Time Information' India is Ranked 11th.
  - India is Ranked 1 in 12 service groups; highest among all the countries surveyed.
  - With our size, complexity, diversity, and continent-sized population, we are doing well.
- **World Bank GovTech Maturity Index 2021**
  - India has been placed in Group A among the GovTech leaders demonstrating advanced/innovative solutions and good practices reflected in a composite score of 48 indicators. In total there are 43 countries in Group A (from a total of 198 countries).
  - A small group of countries uses GEA effectively. India, Bhutan, Brazil, and South Korea find special mention in this regard.
  - It is well known that moving from agency-level architecture to government-wide architecture is a big step change - the larger the country, the complex and difficult it gets (e.g. India).

Thank You!!

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