



# Architecture-Driven e-Government Development

- Royal Government of Bhutan

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**3<sup>rd</sup> Asia-Pacific Regional Forum on  
Smart Cities and e-Government**

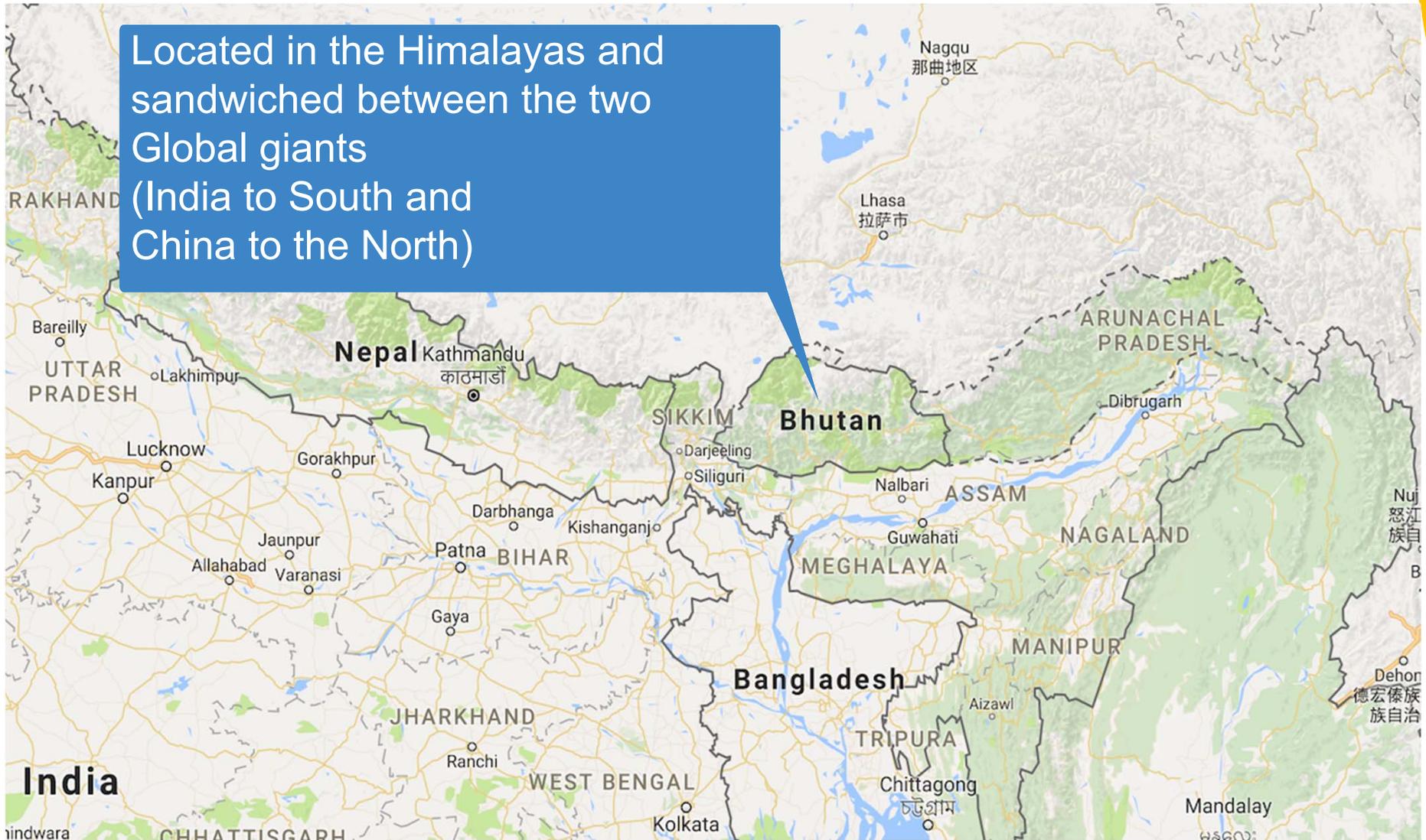
21-22 September 2017

Bangkok, Thailand



# Bhutan on Map

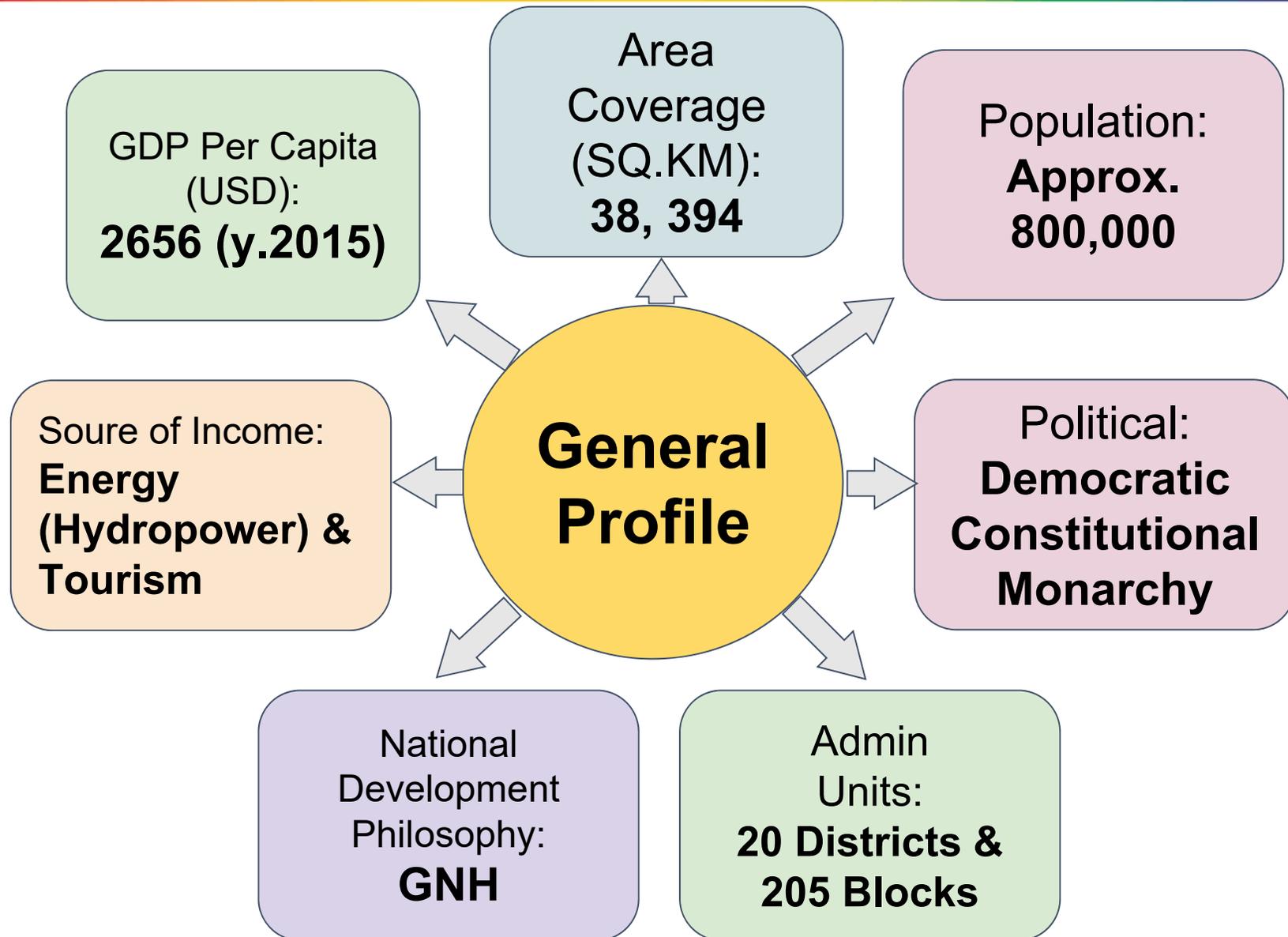
Located in the Himalayas and sandwiched between the two Global giants (India to South and China to the North)



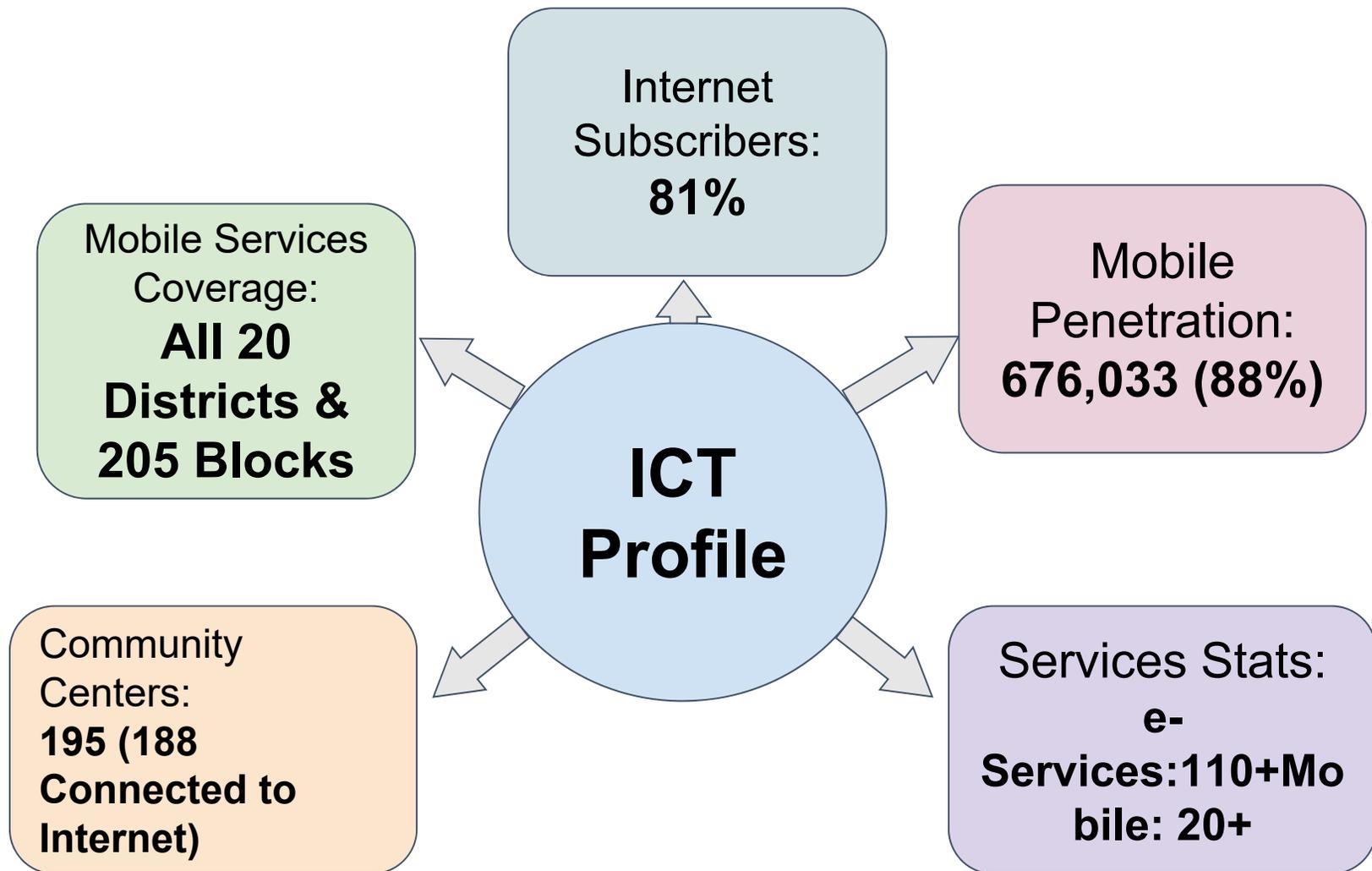
# Bhutan in Picture



# Country Profile - General



# Country Profile - ICT



# ICT Development Progress



**Image Courtesy:** ITU Information Society Measurement Report Video 2016



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# ICT Development Progress

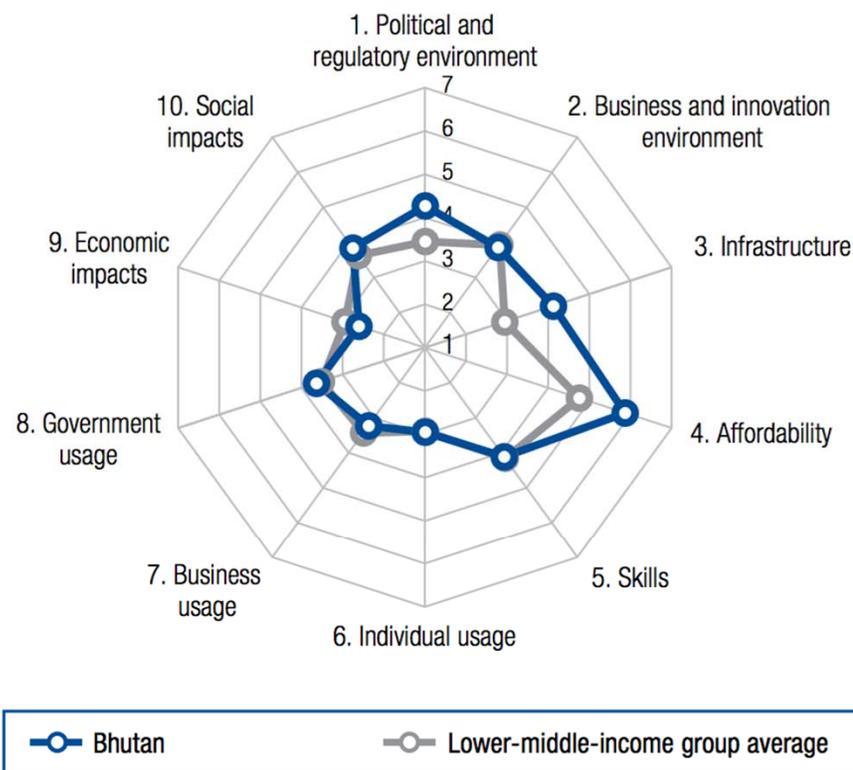


RGoB's Government Enterprise Architecture - Electronic Government Interoperability Framework (e-GIF) was awarded the Open Group Award on Excellence in Enterprise Architecture in improving Government Services in February 2017



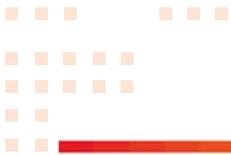
# Network Readiness Index 2016

	Rank (out of 139)	Value (1–7)
<b>Networked Readiness Index</b> .....	<b>87</b>	<b>3.8</b>
Networked Readiness Index 2015 (out of 143).....	88	3.7
Networked Readiness Index 2014 (out of 148).....	94	3.7
Networked Readiness Index 2013 (out of 144).....	n/a	n/a
<b>A. Environment subindex</b> .....	<b>63</b>	<b>4.1</b>
1st pillar: Political and regulatory environment.....	37	4.3
2nd pillar: Business and innovation environment.....	102	3.9
<b>B. Readiness subindex</b> .....	<b>80</b>	<b>4.7</b>
3rd pillar: Infrastructure.....	73	4.1
4th pillar: Affordability.....	45	5.9
5th pillar: Skills.....	103	4.1
<b>C. Usage subindex</b> .....	<b>101</b>	<b>3.3</b>
6th pillar: Individual usage.....	99	2.9
7th pillar: Business usage.....	111	3.2
8th pillar: Government usage.....	83	3.6
<b>D. Impact subindex</b> .....	<b>98</b>	<b>3.2</b>
9th pillar: Economic impacts.....	119	2.6
10th pillar: Social impacts.....	85	3.8



**Source:** The Global Information Technology Report 2016 ([www.weforum.org](http://www.weforum.org))





# Enterprise Architecture



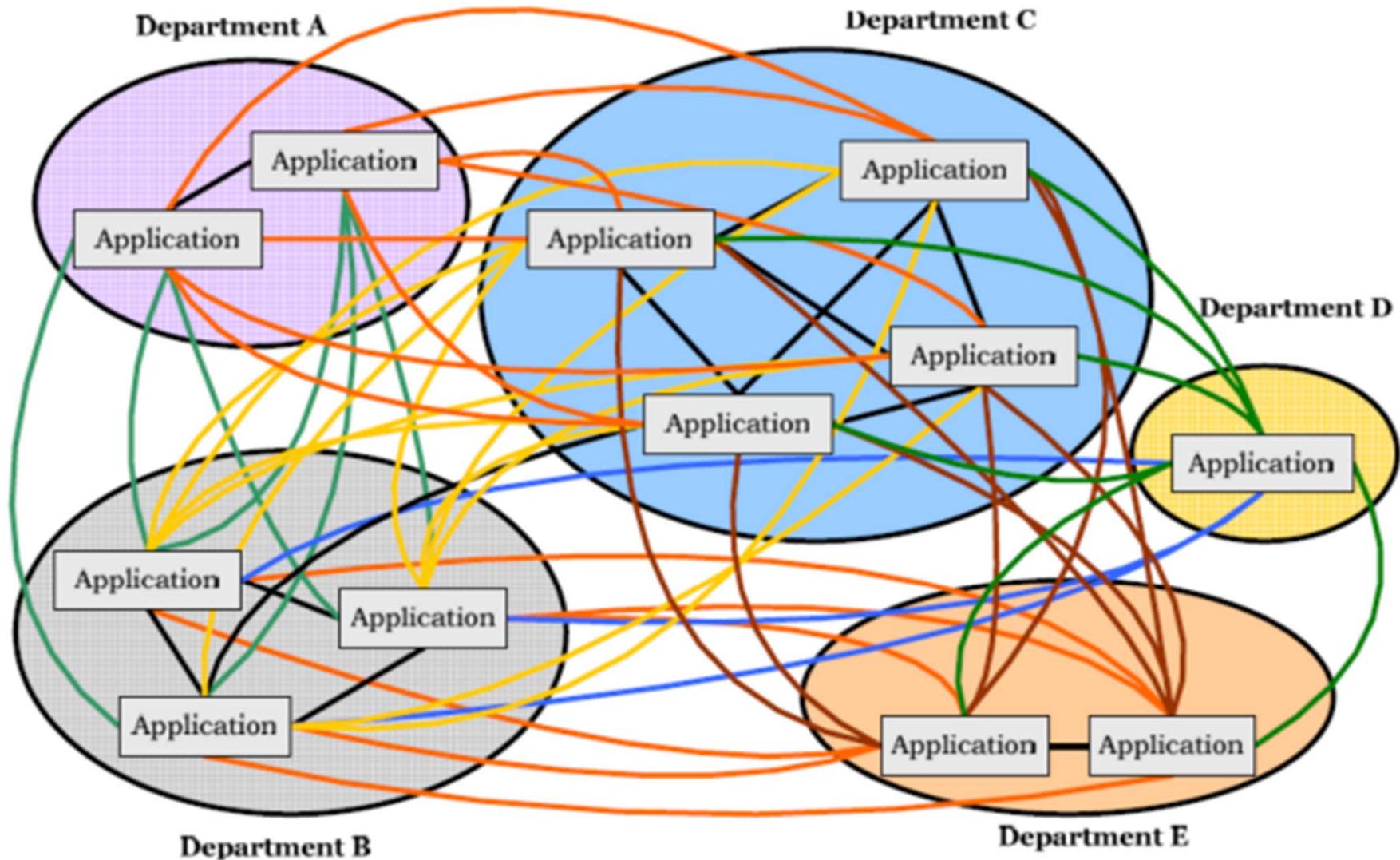
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“At the highest level, EA is about organising an enterprise’s resources – its services, processes, information, applications, and technology infrastructure – and establishing technical choices and a supporting set of policies which help achieve desired business outcomes, technical standardisation and integration” [\*]

[\*] Queensland Government Enterprise Architecture 2.0, Australia



# “Spaghetti” Architecture



# e-GIF - Government Enterprise Architecture

## Electronic Government Interoperability Framework (e-GIF):

- Tool, Framework, and Best Practices for shaping Government ICT for Government Business Outcomes

1

Alignment of ICT initiatives to business goals and objectives

2

Improve coordination, reuse and sharing of assets among agencies and systems

3

Avoid duplications and maximise savings

4

Reduce departmental silos and realise integrated service delivery

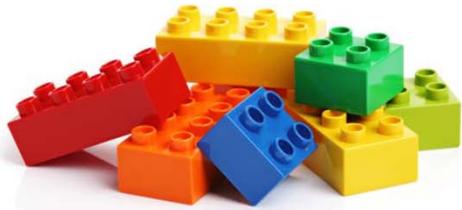
5

Identification & prioritisation of ICT programmes and projects

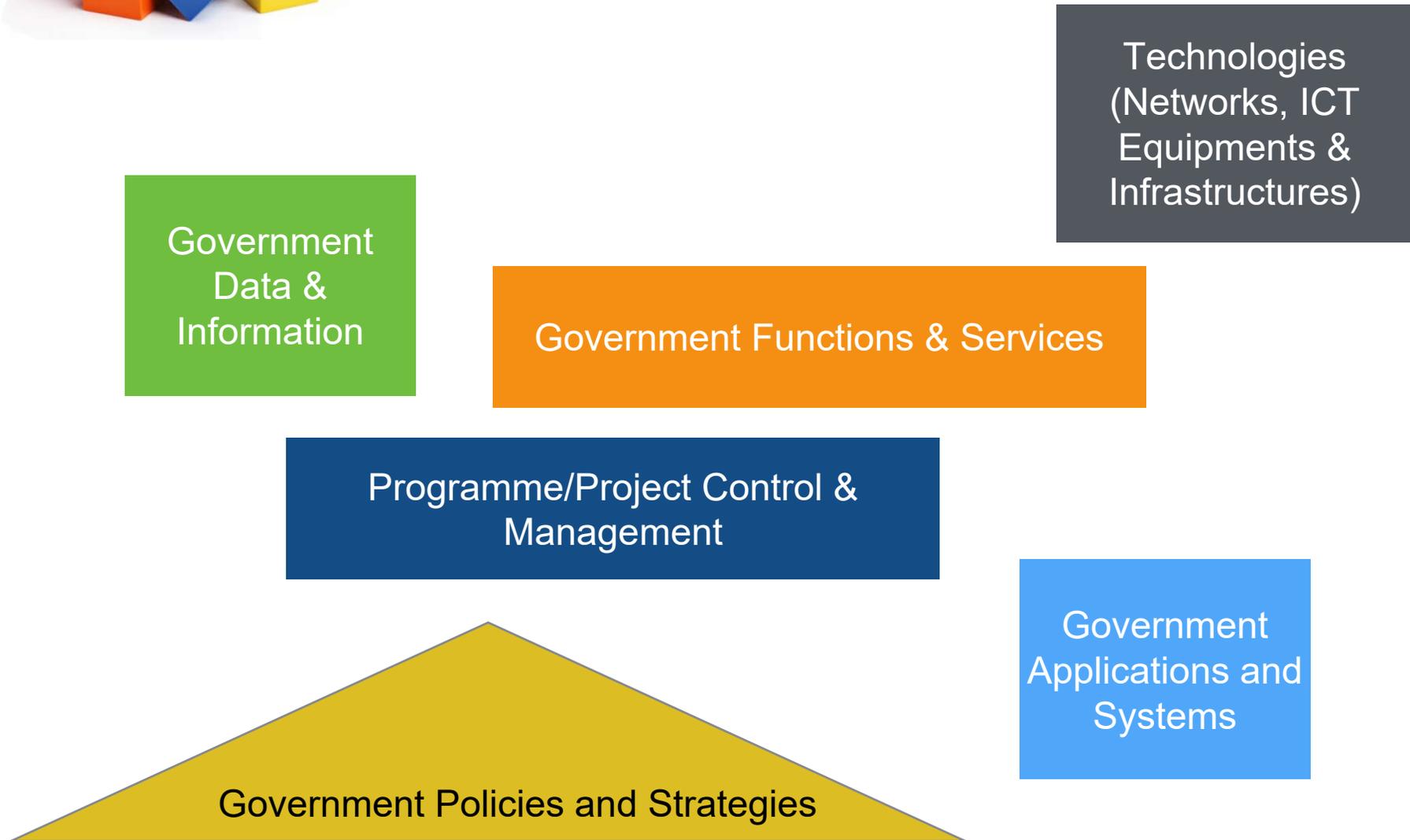
6

Standardisation & integration of ICT systems and infrastructures





# Without e-GIF





# With e-GIF

## Policy & Strategy Architecture

(GNH Pillars & Visions, Policies, FYP Docs, MPs, NKRAAs, SKRAAs)

## Business Architecture

(Business Areas, Functions, Services, Processes, Catalogs, & Taxonomies)

### Data Architecture

(Dictionaries, Metadata, Common Data - People, Vehicle, Business, Land, GIS)

### Application Architecture

(Application Building Blocks, Application Portfolio, Common Systems, Capabilities)

### Technology Architecture

(Networks, Equipments/Infrastructures, Standards, Specifications)

## Architecture Governance & Management

(Dashboards, KPIs, Governance Structures)





# Policy & Strategy Architecture

## Architecture Work:

→ **Review of Bhutan Vision 2020 Document** (Peace, Prosperity, & Happiness) + UN MDG + UN SDG (Now - 12FYP)

### → **GNH Pillars**

- Sustainable and Equitable Socio-economic Development.
- Preservation and Promotion of Culture
- Conservation and Sustainable Utilisation of Environment
- Promotion of Good Governance

### → **Architecture Principles**

- Citizen centric approach
- Digital by Default
- Whole-of-Government and Sectoral Perspective
- Effective Collaboration and Coordination
- Architecture domain specific principles





# Policy & Strategy Architecture

## Programmes/Projects/Activities:

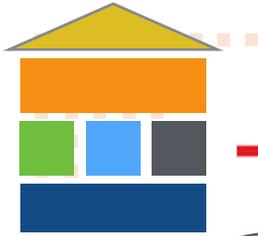
### → Whole of Government Plan (11th Five Year Plan Document)

- ◆ National Key Result Areas (NKRAs) - 16
- ◆ Sector Key Result Areas (SKRAs) - 250

### → ICT Sector Acts, Plans and Strategies

- ◆ BICMA Act and its revision
- ◆ e-Gov Masterplan
- ◆ Sector Specific ICT MP (Education, Health, Tourism, ICT Private Sector Development, Procurement)
- ◆ ICT Road Map
- ◆ WOG **e-Government Policy** encompassing all the principles from the e-GIF





# Business Architecture

## Architecture Work:

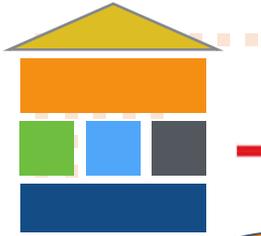
→ **Identification of Business Areas (BA), Line of Business (LOB), Government Functions (GF), & Services:**

- BA (2)
- LOB (23)
- GF (58)
- Services (850+)

→ **Government Services**

- Catalog (Profile & Description)
- Categorisation & Prioritisation
- Rationalisation
- Organisation (Service Patterns)
- Classification





# Business Architecture

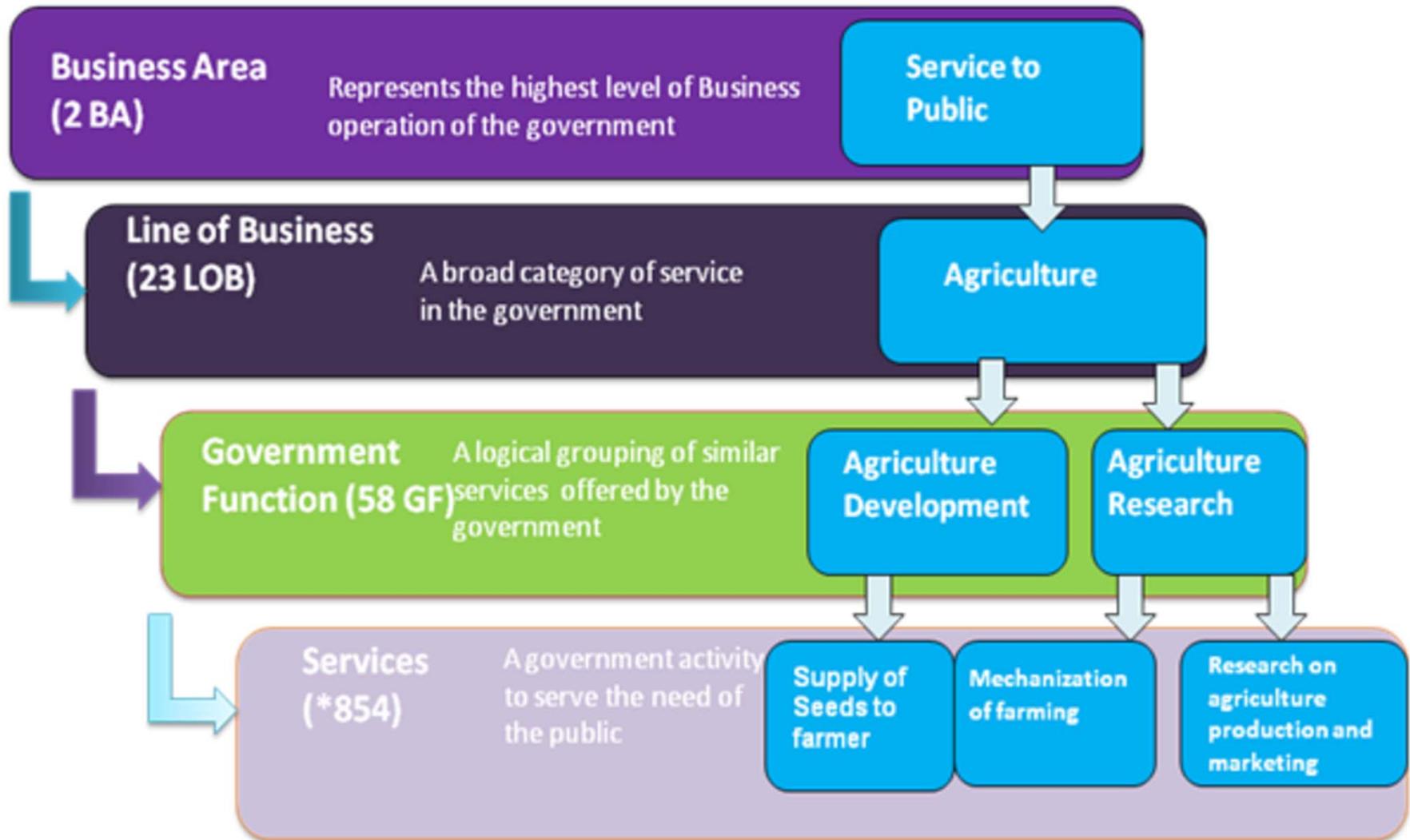
## Programmes/Projects/Activities:

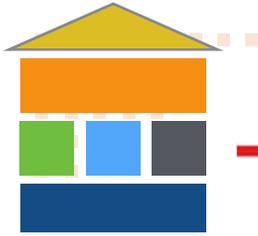
- Whole of Government Agency Service Catalog Preparation along with SDS, SOP, and SLA
- Public Service Charter development initiated by G2C Office, PMO





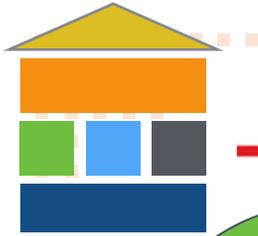
# LoB, BF, Service Example





# LoB, BF, Service Example





# Data Architecture

## Architecture Work:

### → **Conceptual Data Model**

- Data Entities & Relationships
- Data Elements (Service I/O)

### → **Data Dictionary**

- Data Naming Conventions & Design Best Practices

### → **Data Ownership**

- Data Access Model
- Agency Data Owners, Roles, and Governing policy

### → **Data Security Classification**

- Classification (Public, Internal Use Only, Confidential)
- Security Model (Control Types - ISO 27005)

### → **Meta Data**

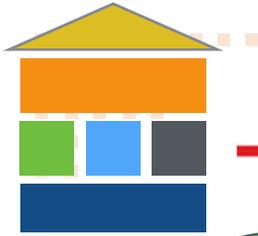
- Dublin Core Standard

### → **Common (Core) Data**

- People, Vehicle, Business, Land, GIS

### → **Master Data**





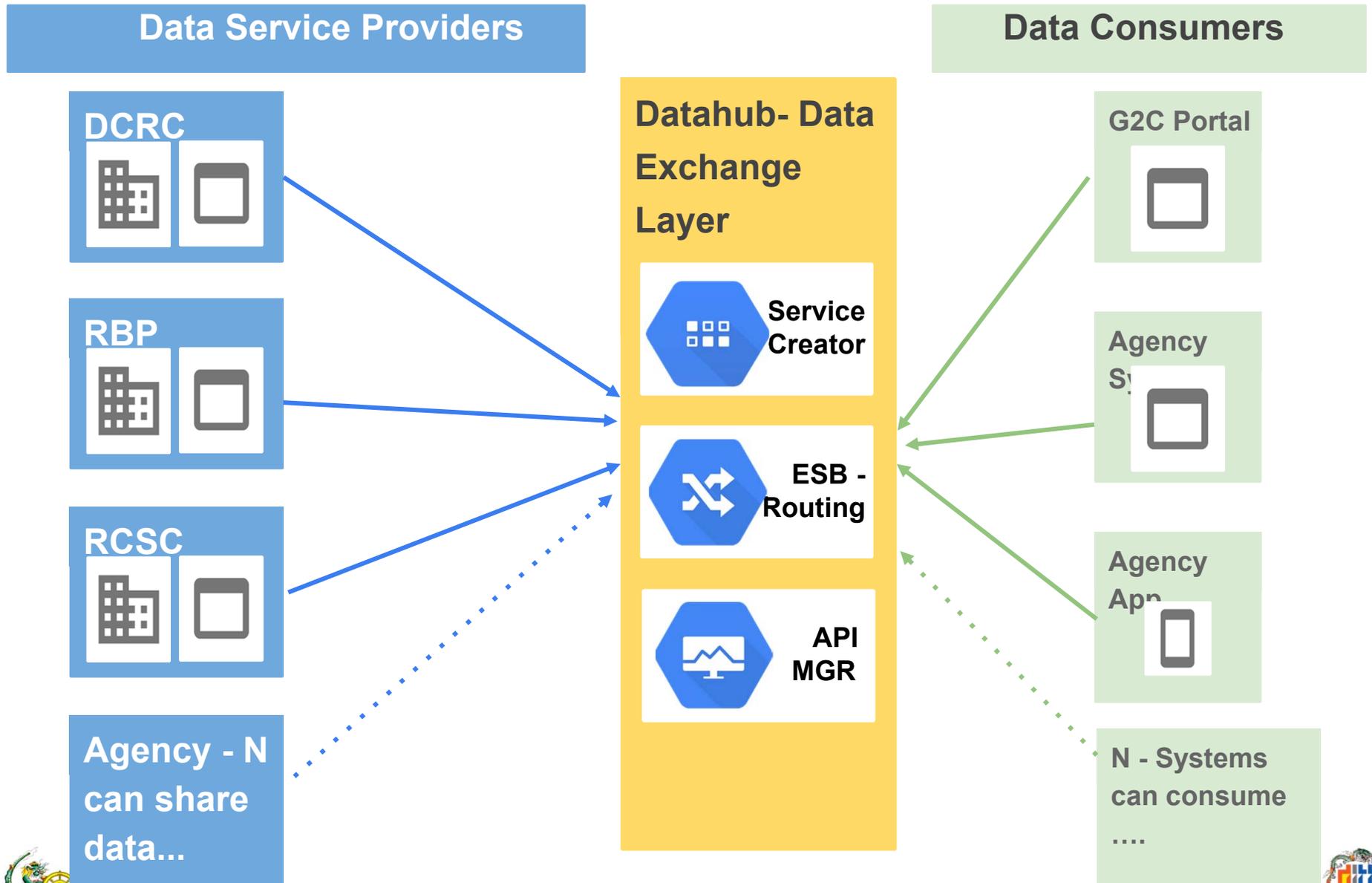
# Data Architecture

## Programmes/Projects/Activities:

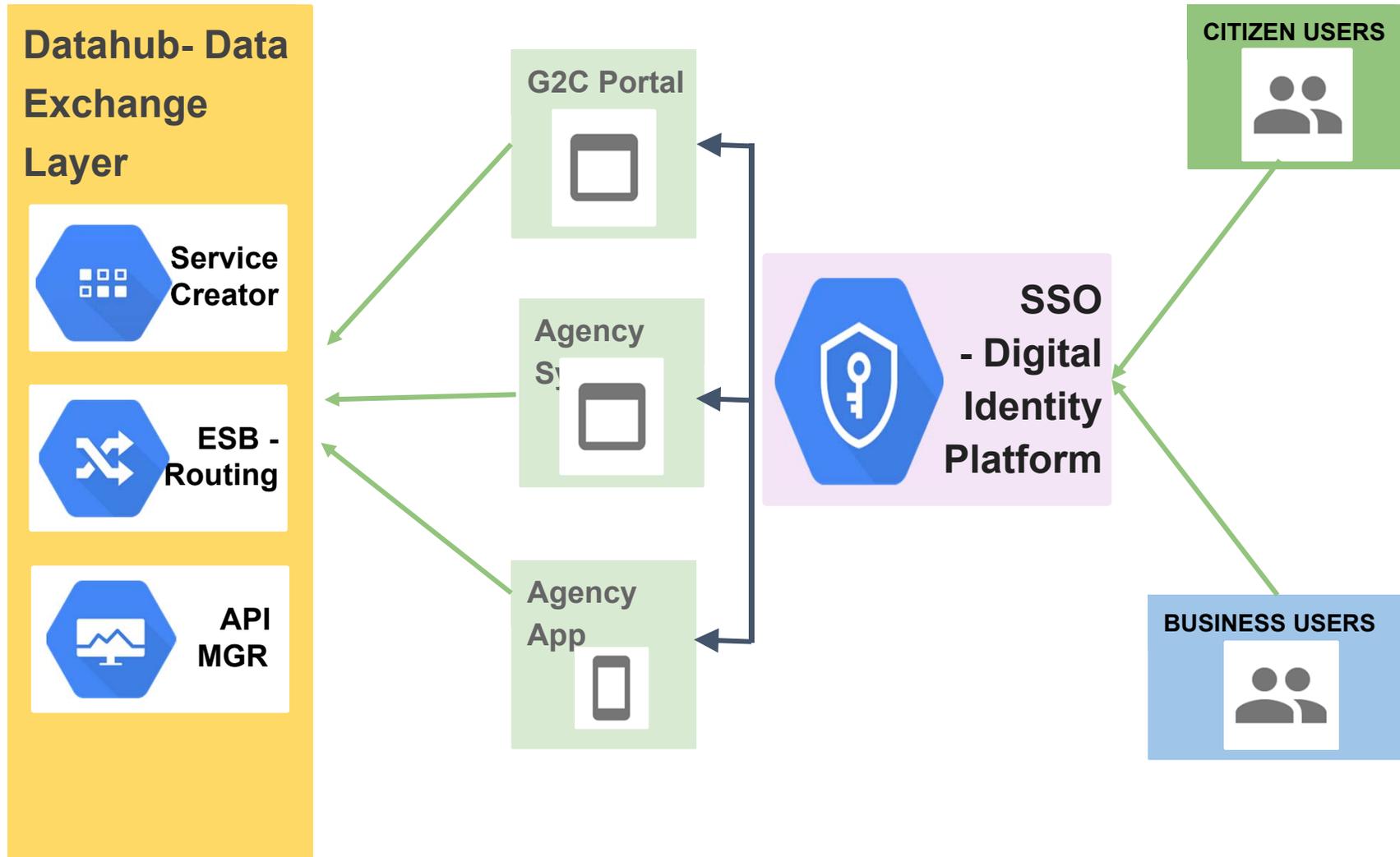
- Development of WoG Data Entity/Element Owner/Source and Consumer Matrix
- **Data Hub Project**
  - ◆ Middleware for Shared Data/Information Service
  - ◆ SOA infrastructure (WS Creation, ESB, API, Analytics, SSO)
- **Center for GIS Coordination (CGISC)**
  - ◆ GIS Portal

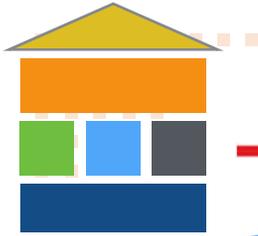


# Datahub - Information Exchange Platform



# Datahub Security - SSO





# Application Architecture

## Architecture Work:

### → **Government Application/Information Systems Portfolio**

- Applications: **166+**
- Classification (Departmental, Cluster, Common, Crosscutting/Orchestrated)
- Alignment to BFs/Services

### → **Application Architecture Principles and Building Blocks**

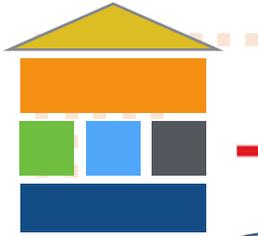
- Principles - Fit for use, Interoperability, Usability, etc.
- ABBs (Functional and Technical)

### → **Critical WoG Common Systems**

### → **Common Application Capabilities**

- Reusability





# Application Architecture

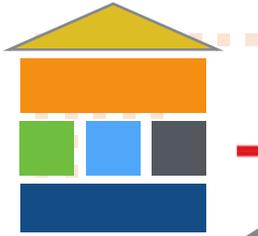
## Programmes/Projects/Activities:

→ **Whole of Government Application Portfolio Management**

### → **Common Systems**

- ◆ Civil Service IS
- ◆ Govt Email & Collaborative Suite
- ◆ Asset and Inventory Management System
- ◆ Electronic Government Procurement (e-GP)
- ◆ GPMS, PEMS, MYRB
- ◆ G2C Portal (Transactional, e-Services)
- ◆ National Portal (Information)
- ◆ **GovCMS (Ongoing)**
- ◆ e-Payment Gateway





# Technology Architecture

## Architecture Work:

### → Technology Architecture Domains

- Access
- Integration
- Platform
- Network
- Data Center and DR
- Security
- Monitoring and Management

### → Technology Standards & Specifications

- Access, Integration, Platform, Network, Protocol, Security

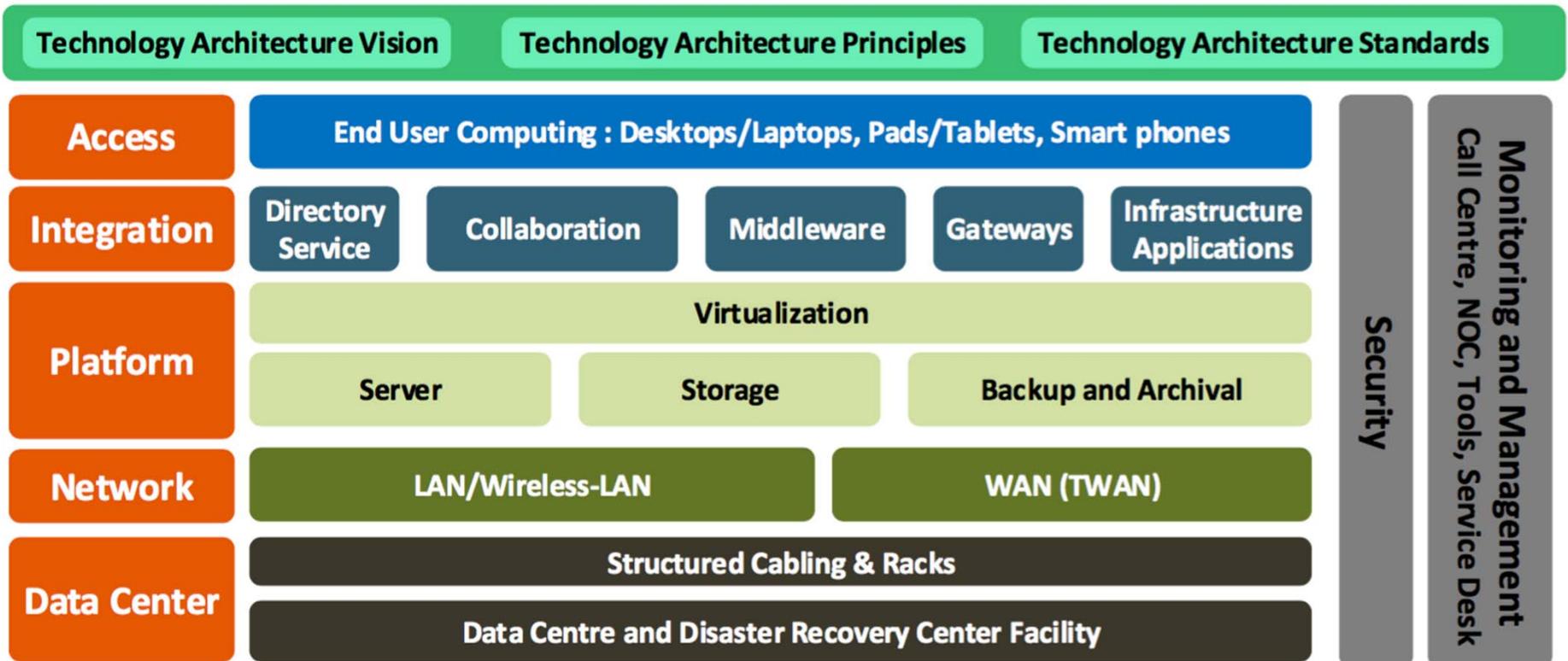
### → Security Architecture

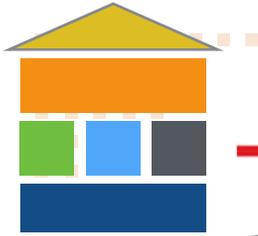
- Domains
- Access & Identity Management





# Target Technology Architecture





# Technology Architecture

## Programmes/Projects/Activities:

- Government Hardware/Infrastructure Clearance through e-GIF Standard & Specs
- Government Data Center
- Government WAN
- Nation-Wide Fiber N/W - National Connectivity
- International Connectivity - 2 gateways from India
- DR Site (Coming soon)
- BtCIRT





# Architecture Governance & Management

## Architecture Work:

- Decision taking body for implementation of EA Programmes and Projects
- e-Gov PMO & Governance Structure
- Dashboards - KPIs related to NKRA & SKRA
- Cross Domain Views and Analysis through Domain Matrices
  - Service to Data, Service to Application, Data to Application, Application to Technology.
- e-GIF Portal (EA Repository System)





# Architecture Governance & Management

## Programmes/Projects/Activities:

- WoG Review of all ICT projects by e-Gov PMO & Governance Structure
- ICT Project proposal (Compliance Check)
- Government Performance Management System (GPMS) through measurement of Ministry/Department/Division APA's KPIs (Baseline -> Target)



**Thank you for your attention**

