Ministry of Housing and Urban Affairs
Government of India

Compliance Assessment and Performance Evaluation Framework (CAPE)

For Standards- Guidelines and Specifications

National Institute of Urban Affairs
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Compliance Assessment and Performance Evaluation Framework (CAPE) Report

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ABBREVIATIONS

AI	Artificial Intelligence
BIS	Bureau of Indian Standards
CAA	Constitution Amendment Act
CDG	Centre for Digital Governance
FRS	Functional Requirement Specification
GDP	Gross Domestic Product
IoT	Internet of Things
KPI	Key Performance Indicators
MoHUA	Ministry of Housing and Urban Affairs
NIUA	National Institute of Urban Affairs
NOC	No Objection Certificate
NUDM	National Urban Digital Mission
NUIS	National Urban Innovation Stack
RFP	Request for Proposal
CAPE	Compliance Assessment and Performance Evaluation Framework
SRS	Software Requirement Specification
ULB	Urban Local Body
UT	Union Territories

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Executive Summary

The rapid urbanisation in India has made urban governance a critical aspect of the country's growth, with urban areas expected to contribute 70% of the national GDP by 2030. However, urban local bodies (ULBs) face numerous challenges in fulfilling their responsibilities due to infrastructure gaps, resource shortages, and financial constraints. To address these issues and promote innovation in the urban sector, the Ministry of Housing and Urban Affairs (MoHUA) introduced the National Urban Innovation Stack (NUIS) strategy and approach in 2019.

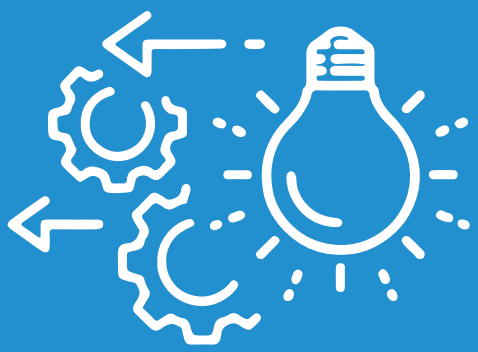
NUIS aims to act as a digital public good by providing a set of application programming interface (APIs) or building blocks that enable collaborative design, implementation, and refinement of innovative solutions to local urban problems. It adopts a stack approach, offering adaptability and ease of adoption, with reusable and modular building blocks arranged in various configurations. The Centre for Digital Governance (CDG) at the National Institute of Urban Affairs (NIUA) has been established to anchor and operationalise the NUIS strategy.

While India is experiencing rapid growth in digital transformation, there are challenges in the digitalisation of urban governance systems. These challenges include the lack of uniformity and standardisation in data collection and management, inadequate technological infrastructure and expertise, data privacy and security concerns, and ensuring equitable access to digital services.

To overcome these challenges, the government has launched National Urban Digital Mission, focusing on digitalisation and standardisation in urban governance. Standards play a crucial role in promoting interoperability, efficiency, and effectiveness in urban governance systems. They help improve service quality, promote innovation, facilitate data sharing and integration, and ensure transparency and inclusivity in governance processes.

Compliance Assessment and Performance Evaluation Framework (CAPE) has been developed to evaluate the compliance of service modules with the respective standards published by MoHUA. CAPE aims to assess the maturity and effectiveness of standards compliance in civic services management, knowledge exchange, benchmarking, gap assessment, and catalysing scalable models. It provides cities with a self-assessment toolkit to identify gaps, promote peer learning, and facilitate the adoption of standardised digital municipal services solutions.

In conclusion, digitalisation has the potential to transform urban governance in India by enhancing service delivery, efficiency, and transparency. The CAPE provides a comprehensive framework for promoting digital innovation, standardisation, and capacity building in urban local bodies. By leveraging technology and adhering to standards, India can achieve its vision of inclusive and efficient urban governance, contributing to the country's overall development.



01
INTRODUCTION

1. Introduction

By 2030, the urban population in India is projected to reach 600 million, accounting for 40% of the total population. Urban areas in India have become the driving force behind the country's growth, with 70% of the national gross domestic product (GDP) expected to originate from these regions due to their concentration of trade, commerce, knowledge-based industries, and a significant informal sector. Urban governance involves managing various social, economic, and governance priorities that interact through a diverse range of institutions at different levels of government, as well as industries, citizens' groups, and civil society organisations. The responsibility for coordinating these stakeholders and ensuring the development, management, and maintenance of cities lies with the Urban Local Bodies (ULBs), as mandated by the 74th Constitution Amendment Act (CAA), 1992.

However, most ULBs face several constraints in fulfilling their responsibilities due to existing infrastructure gaps, shortages in human resources, and financial limitations. The urban sector in India requires innovative solutions that address systemic bottlenecks and inefficiencies across the entire system. ULBs are spread across a vast geographic area, encompassing 4,800+ statutory cities with diverse geographical and cultural contexts within India's states and union territories. This diversity implies that a single solution cannot be universally applied or scaled across the country. Instead, there is a need to rapidly enhance the intrinsic capacity of ULBs to address local problems, meet local needs, and deliver services to residents effectively, efficiently, and equitably.

Urban governance refers to the management and administration of urban areas, including the delivery of basic services such as sanitation, housing, and transportation. Digitalisation, which involves the use of digital technology to transform traditional systems and processes, has emerged as a powerful tool to improve urban governance in India. However, the process of digitalising urban governance systems in India has been beset with several challenges.

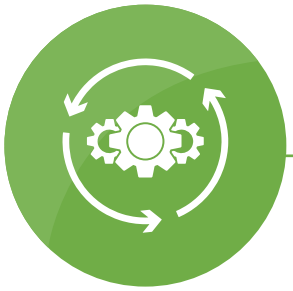
One of the major challenges is the lack of uniformity and standardisation in data collection and management. Many cities have their systems for data collection and management, resulting in a lack of interoperability and difficulty in aggregating data at the national level. This has led to difficulties in tracking progress and identifying best practices across cities, lack of technological infrastructure and expertise at the local level and shortage of trained professionals who are capable of designing and implementing digital systems. Also, many cities lack the necessary infrastructure to support digital systems, such as reliable internet connectivity and robust IT systems. The most pertaining issue is of data privacy and security as more data is collected and shared digitally, there is a risk of data breaches and misuse. Ensuring the privacy and security of citizens' data is critical to building trust in digital systems. Moreover, there is a challenge of ensuring equitable access to digital services. While digital systems have the potential to improve access to services, there is a risk of leaving behind those who do not have access to digital technology or lack the skills to use it effectively. This creates a digital divide that must be addressed to ensure that all citizens can benefit from digital systems.

India is rapidly emerging as one of the largest and fastest-growing markets for digital transformation, with over half a billion internet subscribers and increasing connectivity. However, the adoption of technology varies across sectors and population segments. To fulfil the vision of the Honourable Prime Minister in making "***India a trillion-dollar economy and fostering inclusive growth***", the government is emphasising the use of technology to provide all government services to citizens digitally and develop a secure and robust digital infrastructure. To achieve the required scale and speed, leveraging the transformative power of digitisation is essential in all aspects of the urban sector.

In February 2019, the Ministry of Housing and Urban Affairs (MoHUA) acknowledged this need and introduced the National Urban Digital Mission (NUDM) to streamline and coordinate efforts of the urban ecosystem and to improve the ease of living for citizens by creating & strengthening a national urban digital ecosystem that delivers accessible, inclusive, efficient and citizen-centric governance in India. The approach to NUDM (National Urban Digital Mission) involves rolling it out across three key pillars: People, Processes, and Platforms. Each pillar focuses on specific aspects of urban development and aims to drive positive change in the urban ecosystem.

NUDM is predicated on the belief that urban India's opportunities can only be unlocked by a deep partnership between the actors of the quadruple helix, namely governments, civil society, industry, and academia. A key enabler of such collaboration is the creation of standards (Processes) that will allow diverse stakeholders and their corresponding systems to interoperate seamlessly. In keeping with the three pillars, NUDM will facilitate the creation of standards for people, processes, and platforms, as also for APIs and data. In the context of the NUDM, a standard is a collection of minimal requirements and definitions which helps solutions to: coexist and inter-operate correctly with each other, speed up time to market, meet the necessary regulations/policies, help compare the applicability of competing solutions, and allow solution providers the choice of technology.

People: This pillar aims to mobilize, enable, and empower stakeholders across the urban ecosystem. It recognizes that the active involvement and participation of people are crucial for the success of any urban development initiative. NUDM seeks to engage various stakeholders such as government officials, citizens, community groups, and industry players. By fostering collaboration and participation, NUDM aims to harness the collective intelligence, resources, and expertise of individuals and organisations to address urban challenges effectively.



Processes: The second pillar of NUDM focuses on improving governance through the establishment of standards and frameworks for collaboration and impact. This pillar aims to streamline processes and decision-making mechanisms related to urban development. By defining standards and best practices, NUDM intends to enhance coordination, transparency, and accountability among different government agencies, departments, and stakeholders. The goal is to create a more efficient and effective governance structure that can drive sustainable urban development

Platforms: The third pillar of NUDM emphasises leveraging technology to enhance the quality of life for every citizen. This involves adopting digital platforms and solutions to address urban challenges and deliver public services more effectively. By harnessing the power of technology, NUDM aims to improve various aspects of urban life, such as transportation, infrastructure, healthcare, education, and public safety. This pillar encourages the development and deployment of innovative technologies, including IoT (Internet of Things), data analytics, artificial intelligence, and smart city solutions, to create smarter, more livable cities.

Standards - Guidelines and Specifications

Governments across the world aim to make all government services accessible to the common citizen in their locality and ensure the efficiency, transparency & reliability of such services at affordable costs. To meet this vision, there is a need to cooperate, collaborate and integrate information across different departments and organisations. Government systems across the world are however characterised as islands of systems. Interoperability (interlinking of information, systems, applications and ways of working) remains a challenge not only within governmental departments but also in their interaction with the administration, enterprises and the public.

India specifically has a federal government structure. Additionally, there is uneven adoption of various municipal governance platforms and solutions by various states and ULBs at different levels of maturity. This necessitates integration of technologies and data to transform public administrations and also to facilitate information flow and encourage data use among different governmental departments, agencies, citizens and businesses.

One of the key initiative under NUDM is the creation/ adoption of Standards - Guidelines and Specifications for Municipal Digital Governance, to promote data usage, and data-driven governance and to enable interoperability (foundational, structural & semantic) of data, processes & systems in ULBs, securely.

The Standards will also enable improved information consistency, better analytics, secure data access & transfer, and smarter business processes, while also enabling diverse stakeholders to collaborate and their corresponding platforms and processes to interoperate seamlessly.

The following Standards - Guidelines and Specifications (in various stages of development/ adoption) apply to NUDM:

a. **Municipal Governance Reference Architecture** as a reference blueprint for platforms

b. **Domain Knowledge Standards - Guidelines and Specifications** with key data elements and their standardised data interpretation

c. **API definitions** for standardised integration with the National Dashboard

d. **Security Assurance Standards** for enabling data privacy controls

e. **National meta-data standards** for data quality enablement for state & national dashboards

Out of these a. Municipal Governance Reference Architecture and b. Domain Knowledge Standards on Property Tax Taxonomy, Municipal Grievance Redressal, Water and Sewerage, Trade Licenses, Fire NOCs have been released by BIS and MoHUA in 2021 and 2022 respectively. These domain knowledge standards are aimed to encourage data culture in ULBs as well as solve the pressing issue of semantic interoperability. The standards can further help by

- identifying and categorising important data elements for a domain;
- resolving differences in terminology for urban governance;
- analyse current city domain models, processes, reports & KPIs, thus, retrofitting existing data models and methods with missing data

These Standards are prepared in consultation with various urban stakeholders comprising government agencies, academia, industry, citizen community, practitioners etc. and provide a holistic approach to solving the pressing issue of data inconsistency. It will help the ULBs to collect, collate and systematically analyse the data.

Standards play a crucial role in urban governance by providing a common language and framework for the various stakeholders involved in the planning, development, and management of cities. They help to ensure that the different systems, processes, and technologies used in urban governance are interoperable, efficient, and effective.

One of the key benefits of standards is that they help to improve the quality and reliability of urban services. By establishing common norms and benchmarks for things like infrastructure design, construction, and maintenance, standards can help to ensure that cities are built and managed sustainably and equitably.

Standards can also help to promote innovation and encourage the adoption of new technologies in urban governance. By establishing best practices and guidelines for the use of emerging technologies like the Internet of Things (IoT), artificial intelligence (AI), and blockchain, standards can help to ensure that these technologies are implemented in a way that is safe, secure, and transparent.

Another important role of standards in urban governance is to facilitate data sharing and integration. By establishing common data formats, protocols, and interfaces, standards can help to ensure that data can be easily exchanged between different systems and stakeholders, enabling better decision-making and more effective service delivery.

In addition, standards can help to ensure that urban governance is transparent, accountable, and inclusive. By establishing clear guidelines for public participation, open data, and ethical use of technologies, standards can help to ensure that urban governance is responsive to the needs and aspirations of all citizens.

Design Principles

Design Principles are the foundation on which good products are built. While implementing technology solutions in our cities, it is important to lay down the considerations on which such products or solutions are built. In light of this, the Ministry of Housing and Urban Affairs (MoHUA) conceptualised the National Urban Innovation Stack (NUIS)- a digital infrastructure with a deep understanding of the urban ecosystem and its needs. The NUIS is being envisaged as a shared digital infrastructure that will be available for use by all citizens, entrepreneurs, academics, administrators, governments, NGOs and other urban actors across the country. The NUIS, a set of building blocks, would be "built as a common in Cities". Technology is to be treated as the means to achieve the end outcomes i.e., quality of life, economic ability and sustainability. We must also ensure public participation during the design and implementation of technology projects in Smart Cities. Thus, there is a greater need today to discuss, debate and deliberate on how cities should conceptualise, design and implement technology projects.

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COMPLIANCE ASSESSMENT AND PERFORMANCE EVALUATION FRAMEWORK (CAPE)

2. Compliance Assessment and Performance Evaluation Framework (CAPE)

Overview

The objective of the framework is to provide a roadmap to Indian cities in combating the challenge of data inconsistencies and interoperability. Compliance Assessment and Performance Evaluation Framework (CAPE) consists of module-specific indicators defined in Standards under two parameters namely **Terminology Assessment** and **Process Assessment** across 5 sections (i) Data Entities, (ii) Channels, (iii) Stakeholders, (iv) Process and (v) Reports and KPIs. The framework provides an assessment of both terminology and process (functionality) compliance. The indicators are progressive in nature to support cities in assessing where they stand and encourage them to adopt appropriate actions enabling them to improve their score in the future and consequently enable data-driven governance.

The purpose of this exercise is to evaluate the compliance of service modules wrt the respective Standards published by MoHUA in partnership with BIS. The key objective of CAPE is to provide government service providers with a self-assessment toolkit to assess the maturity and effectiveness of Standards compliance in civic services management, planning, monitoring and policy making. CAPE has been broadly conceptualised to achieve following objectives,

Compliance Assessment of Services

To periodically assess the maturity of service functionality on a digital platform and its process harmonisation.

Knowledge Exchange

To enable peer-to-peer learning and allow cities to replicate success, use the learnings of others.

The standard frame of reference through Benchmarking

To help in developing common understanding and standardisation on Digital municipal services solutions, architecture, and components among various stakeholders viz. equipment manufacturers, system integrators, startups, domain experts, consultants, and city administration

Gap Assessment

To help Cities identify gaps in capabilities across municipal services dimensions.

Catalyse Scalable Model

To help in replicating the successes and avoiding redundancy in data, reduce the burden on administrators, harmonise terminology and processes and increase syntactic and semantic interoperability. It will also act as a launch pad for the cities which are yet to commence their digital platforms solution design, and system integration, monitor city operations, and prepare SRS, FRS and Model RFPs for implementation.

This document has been designed to help States/UTs or Cities find answers to the following questions through assessment activities:

Terminology Assessment

Asses the difference in terminologies and their definitions for urban governance services

- Is the city will be able to use the same data across services?
- Are the data entities captured in services being used in the processes?
- Asses the redundancy in data collection?

Process Assessment

Asses the process flow in urban governance services

- Ensuring convergence of applications/ systems/databases
- Leveraging all available data entities in the process flow/analysis/monitoring?
- Asses the functionality of establishing interlinkages with various related departments
- Asses the capability of automating the reports and use of KPIs

Key Parameters of Assesment

The various components and key parameters under the two dimensions are explained below in detail:

Terminology Assessment

Process Assessment

Accuracy

The taxonomy should accurately reflect the meaning of the concept it represents. It should be free from ambiguity and provide precise and unambiguous definitions.

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Completenes

The taxonomy should accurately reflect the meaning of the concept it represents. It should be free from ambiguity and provide precise and unambiguous definitions.

The taxonomy should cover all relevant concepts related to the domain it represents. It should include all necessary terms and definitions required to describe the domain.

Consistency

The taxonomy used should be consistent in its use of terms and definitions across different parts of the domain it represents and various services. It should avoid using different terms or definitions to describe the same concept in various services or processes.

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Clarity

The taxonomy should be easy to understand and use. It should be accessible to a wide range of users

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Relevance

The taxonomy should be relevant to the context in which it is used.

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Key Parameters

- **Data Entities Compliance-** verification of the data entities captured in a module
- **Channels Compliance-** mapping the various channels to provide service to enhance the accessibility among citizens
- **Stakeholder Engagement Compliance-** mapping the stakeholders involved in the service and assessing the ease of communication
- **The process to Data Entities Compliance-** mapping input and output in the process flow and assessing any redundancy during the process
- **Reports and KPIs Compliance-** mapping basic minimum reports and KPIs required for analysis and monitoring

Key Parameters

- **Process Flow Compliance-** mapping the existing processes and gap identification
- **Interoperability Between Departments -** mapping the use of various related data entities in services between different departments
- **Functionality Interlinkage-** mapping integration with Aadhaar/ Digi locker-like initiatives of other ministries and departments
- **Platform Compliance -** mapping the availability of the functionalities available on the platform such as auto fetch, generate reports, escalation etc.

Methodology

The Compliance Assessment and Performance Evaluation Framework (CAPE) assess the readiness of the municipal digital service on data across Terminology and Process

Compliance. The State/UT or Cities modules are scored on a scale of 0 to 1.

CAPE Scoring

The final score is a combination of the following assessment based on the respective Standard Module.

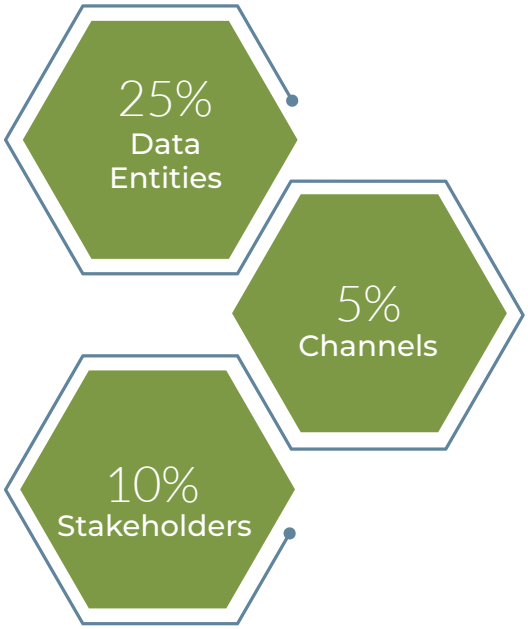
The following weights will be applicable for assessment scoring

CAPE Score = (0.4* terminology assessment score) + (0.6* process assessment score)

Terminology

40% Weightage

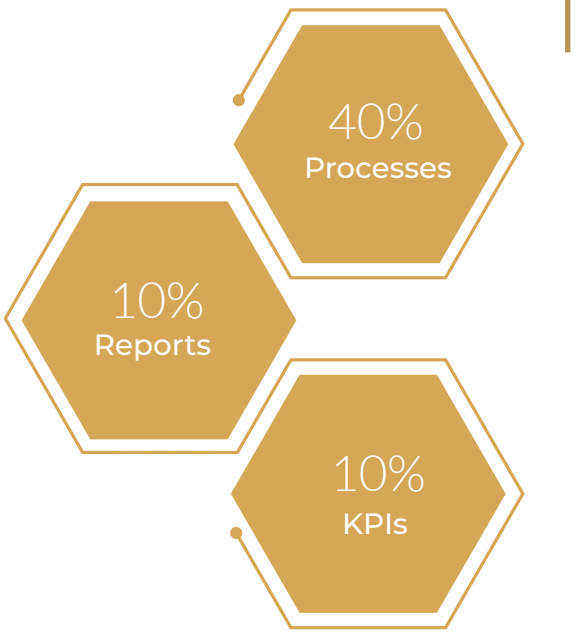
To assess the difference in terminologies and their definitions for urban governance services



Process Assessment

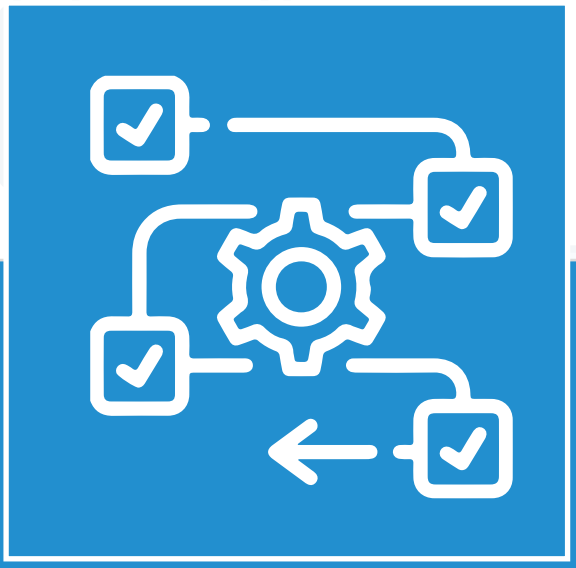
60% Weightage

To assess the process flow harmonisation in urban governance services



Terminology Assessment Score = (0.25 * Data Entities Assessment Score) + (0.05 * Channels Assessment Score) + (0.10* Stakeholders Assessment Score)

Process Assessment Score = (0.40* Process Assessment Score)+(0.10* Reports Assessment Score)+ (0.10* KPI Assessment Score)



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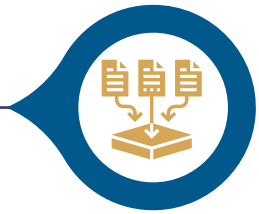
COMPLIANCE ASSESSMENT PROCESS

3. Compliance Assessment Process

STAGE 1



Data Collection

- Cities undertake CAPE self-assessment

Duration: 20 days

STAGE 2

Data Verification and State-Level Validation

- Set up Evaluation Committee at the city level
- Validate and generate the score and CAPE level

Duration: 30 days from completing the self-assessment

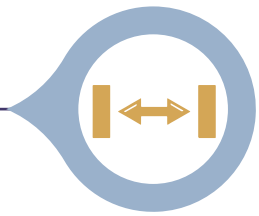
STAGE 3

Gap Assessment

- Identify gaps under Terminology and Process Assessment
- Formulate an action plan to rectify gaps in time bound manner
- Identify stakeholders responsibilities

Duration: 40 days from data verification and validation

STAGE 4



Gap Closure and Documentation

- Validate the status of identified gaps as per the action plan
- Evaluation committee to review and validate the status of gaps
- Mark closure of iteration and document the best practices use cases and outcomes with evidence
- Preparation for the next self-assessment and undertaking the next iteration to improve the score.

Duration: 30 days from completion of action plan submission

04

SELF-ASSESSMENT TOOLKIT

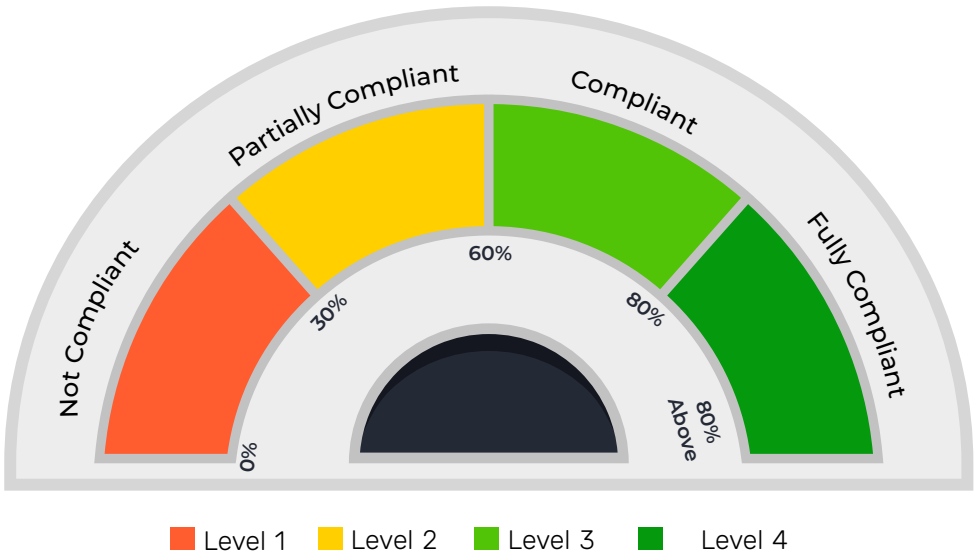
4. Self-Assessment Toolkit

For Terminology Assessment, each indicator needs to be mapped with the following response viz.: Yes/No. For each "Yes " response, 1 (One) mark should be allotted and for each "No "= response, 0 (zero) mark should be allotted. "Yes" means exact terminology available.

For Process Assessments, each indicator shall be mapped with the following responses -Yes, No, or NA (Not Applicable). For each "Yes " response, 1 (One) mark should be allotted and for each "No " response, 0 (Zero) mark should be allotted. For NA response, mappedindicator should not be considered for assessment. If 30% or more of responses are NA, thenthe State/UTs or city should assess low compliance for the respective component. Thecumulative of each process shall be marked further with the following responses – Fully Available, Partially Available and NA (Not Available). For Fully Available (100%), 1 (One) Compliance Assessment and Performance Evaluation Framework (CAPE) mark should be allotted, for Partially Available (≥50%), 0.5 mark should be allotted and for NA 0 (Zero) mark should be allotted.d.

CAPE Compliance Classification

State/UTs or ULBs will be ranked by cumulating the marks obtained in 2 parameters against the total marks. Ranking will be allocated as per below mentioned criteria (marks will be converted into percentages).



Annexure

Annexure 1: Illustrative Compliance Scoring Matrix

Dimension	Section	Total Indicators	Total Marks	Marks Obtained	Percentage Compliance	Total Compliance Level
Property Tax	Terminology	89	89	30	13% ((30/89*100) *0.4))	43% Level 1 (Partially Compliant)
	Process	60	60	30	30% ((30/60*100) *0.6))	
Trade License	Terminology	121	121	50	17% ((30/89*100) *0.4))	36% Level 1 (Partially Compliant)
	Process	79	79	25	19% ((30/60*100) *0.6))	

Illustrative Calculation: Under the assessment, the city's overall score should be calculated based on the average of all components score. For a city service under assessment compliance is equal to ((13%) terminology compliance + (30%) process compliance) = 44% total compliance. The level of compliance is 1 i.e. Partially Compliant.

Annexure 2: Details of Released Standards

S.No.	Standards	Access on
1	Property Tax Taxonomy	https://standardsbis.bsbedge.com/BIS_SearchStandard.aspx?Standard_Number=18006&id=0
2	Trade License Knowledge Standard	https://niua.in/intranet/sites/default/files/2452.pdf
3	Fire NOC Knowledge Standard	https://niua.in/intranet/sites/default/files/2451.pdf
4	Water and Sewerage Knowledge Standard	https://niua.in/intranet/sites/default/files/2454.pdf
5	Municipal Grievance Redressal Knowledge Standard	https://niua.in/intranet/sites/default/files/2453.pdf

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