Toolkit on Digital Transformation for People-Oriented Cities and Communities

3

Module 3:
Data Processing and Management

Jointly developed by: ITU, UNDP

Module 3 – Data Processing and Management

- This Module of the ITU Toolkit on Digital Transformation of People-Oriented Cities and Communities focuses on setting up and optimizing the management of data generated by city applications and services.

- Cities that are starting on their smart cities and communities journey will find the resources highlighted within this Module useful toward developing and then managing their data processing and management capability.

- This Module is also useful for cities that have already made some headway into their smart cities and communities process but would like to gauge how up-to-date and effective their Data Processing and Management measures are.

Module 3 – Data Processing and Management

This Module will cover the following topics:

1. Data background: Open Data and Data Governance
2. Data Processing and Management: Challenges
3. Data Processing and Management: Solutions
4. Key tools for Data Processing and Management
    1. Tool #1: IoT and data
    2. Tool #2: Open data
    3. Tool #3: AI and smart sustainable city data
    4. Tool #4: Blockchain and smart sustainable city data

1. Open Data and Data Governance

What is Open Data

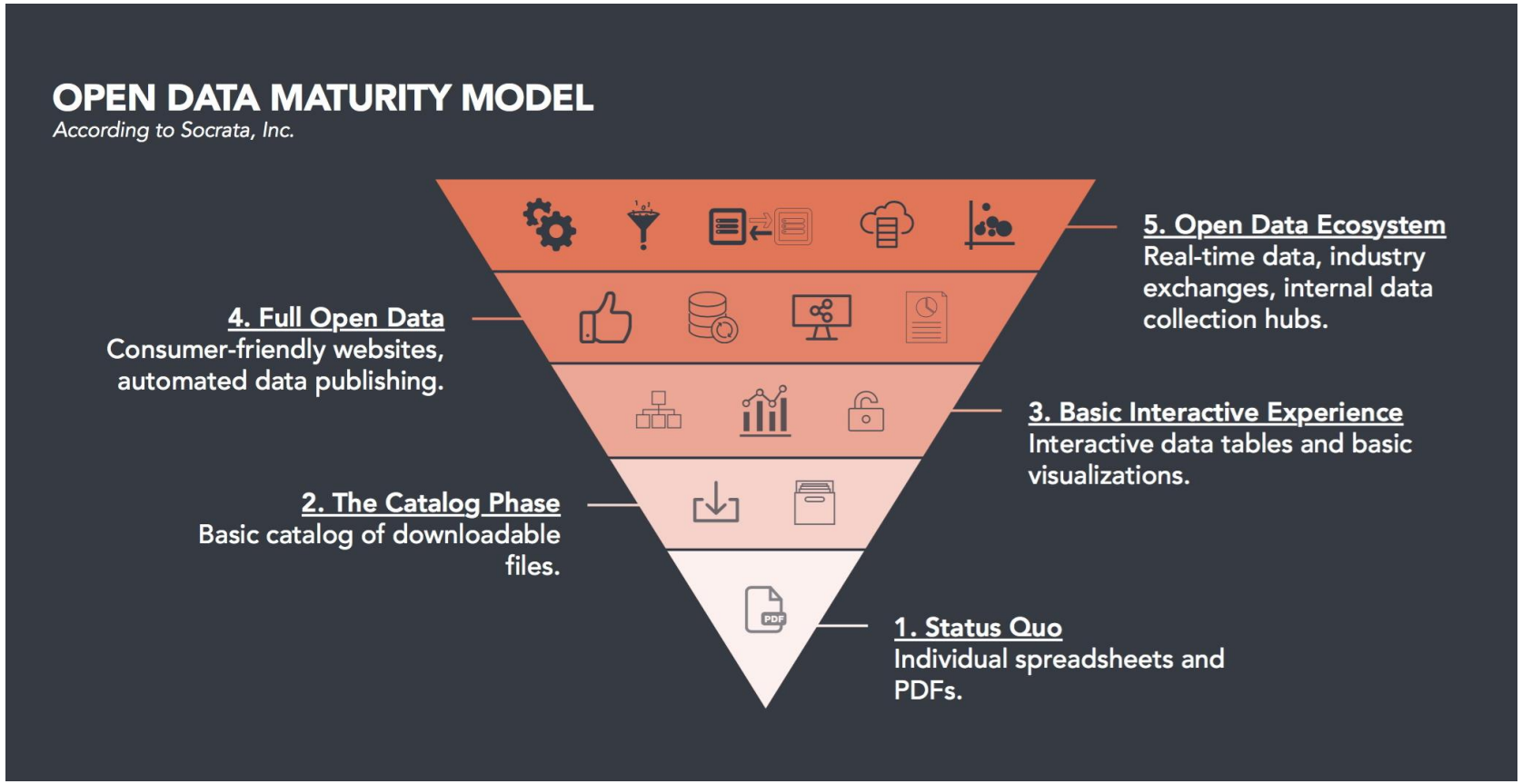


Image source

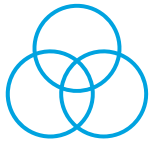
Opportunities for Open Data

Open Data Should be

Open by Default

Timely and Comprehensive

Accessible and Usable

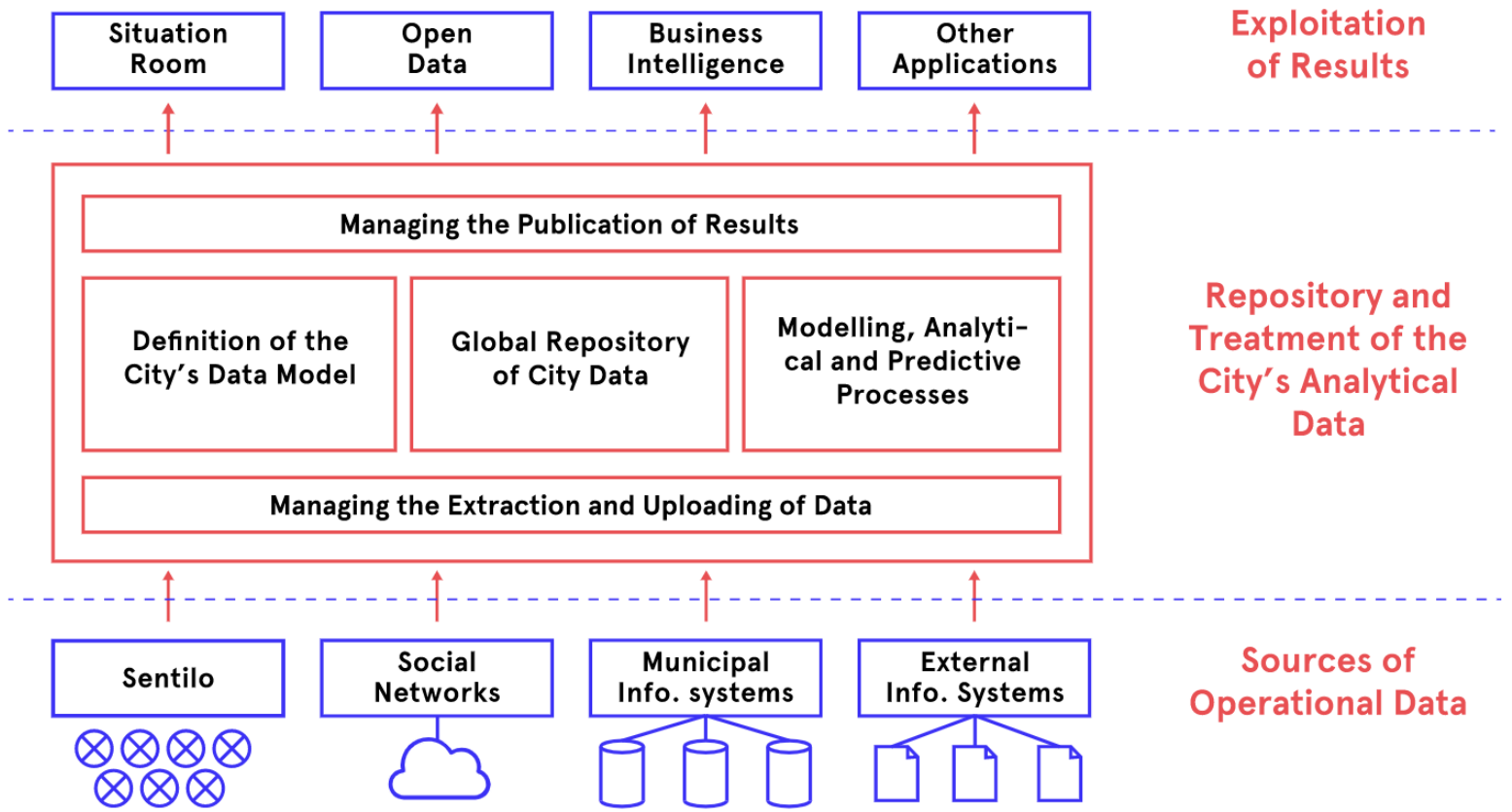


Comparable and Interoperable

For Improved Governance & Citizen Engagement

For Inclusive Development and Innovation

Data Governance



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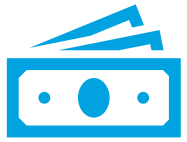
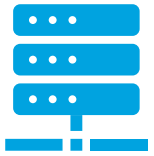
2. Smart Sustainable City Data Challenges

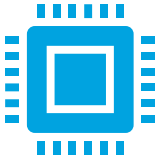
Smart Sustainable City Data Challenges



Cost



Physical resources



Processing power

Carbon emissions

Network coverage

Privacy

Security

Biased analysis

Regulations & Governance

Technical Capacity

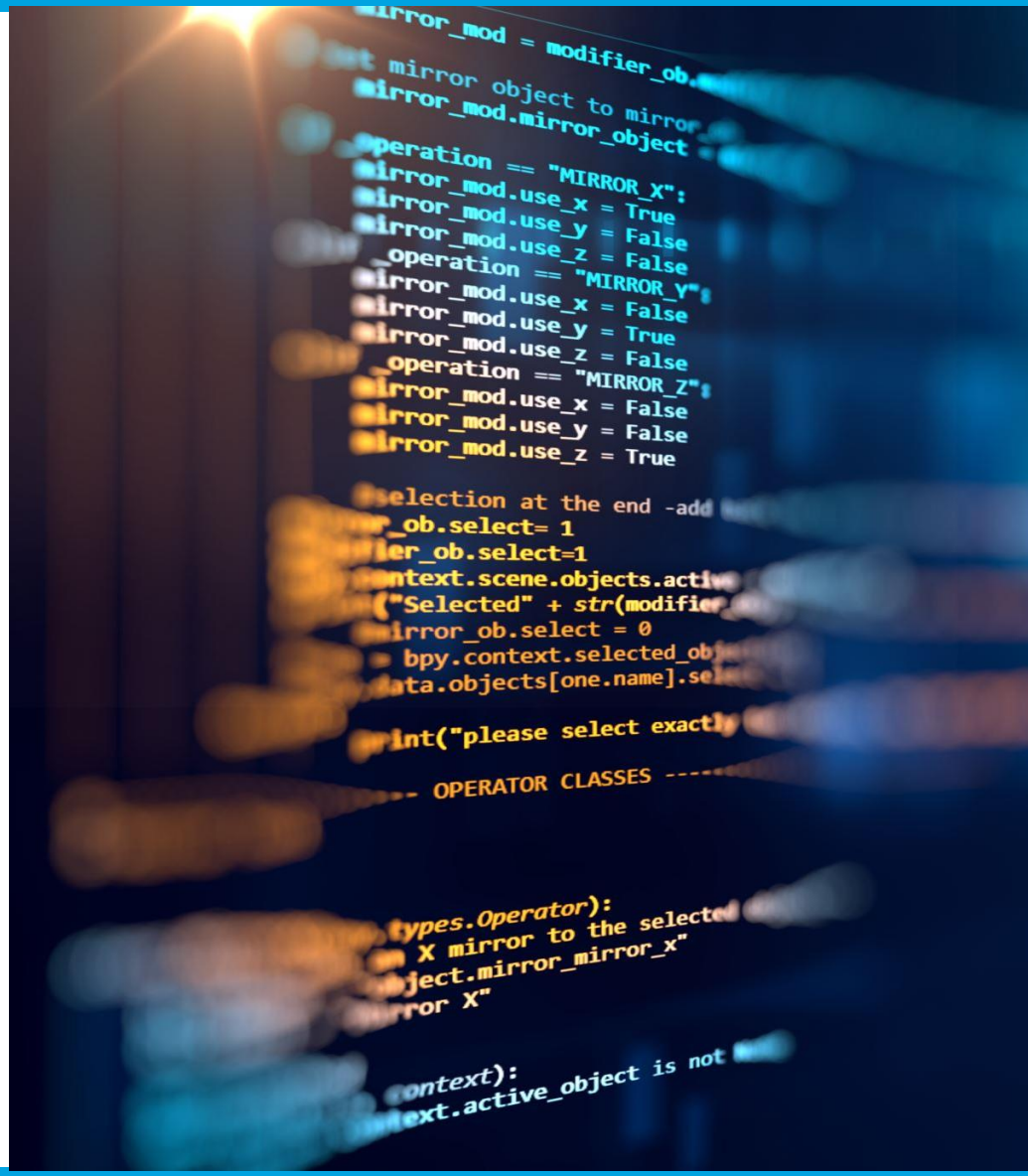
2. Smart Sustainable City Data Solutions

Smart Sustainable City Data Solutions

Polices

Standards

New technologies



3. Key Tools for Data Processing and Management

Introduction to Tools for Data Processing and Management

Tool #1:
IoT and data

Tool #2:
Open data

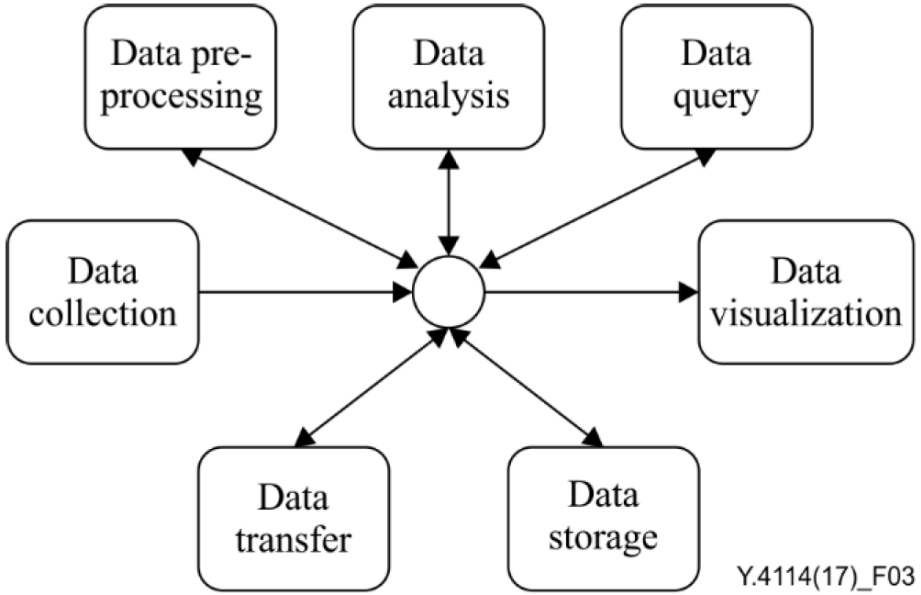
Tool #3:
AI and smart sustainable city data

Tools #4:
Blockchain and smart sustainable city data

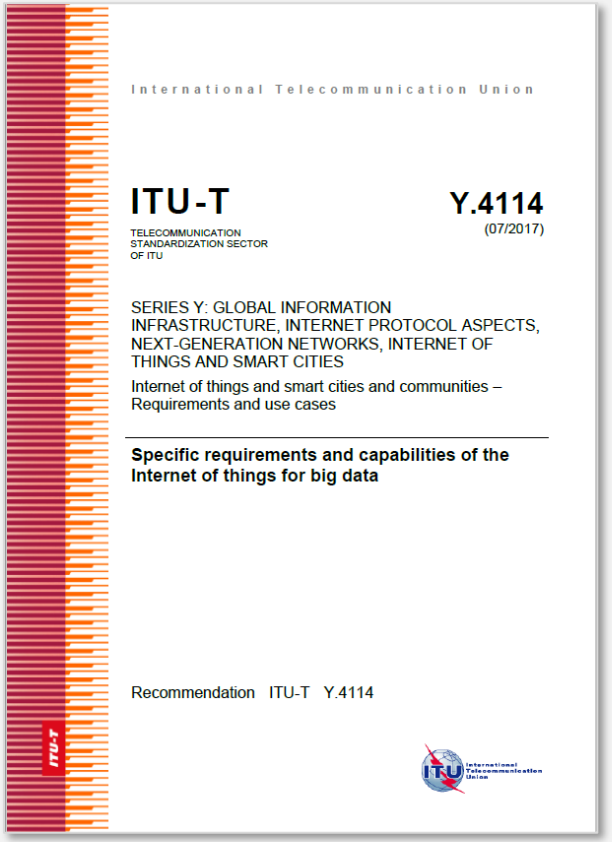
Tool #1

IoT and Data

IoT and Data Requirements and Capabilities



IoT Data Operations


International Telecommunication Union

ITU-T Y.4114
(07/2017)

TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS, NEXT-GENERATION NETWORKS, INTERNET OF THINGS AND SMART CITIES

Internet of things and smart cities and communities – Requirements and use cases

Specific requirements and capabilities of the Internet of things for big data

Recommendation ITU-T Y.4114

Case Example
Ur-Scape Planning Support Tool — Makassar, Indonesia

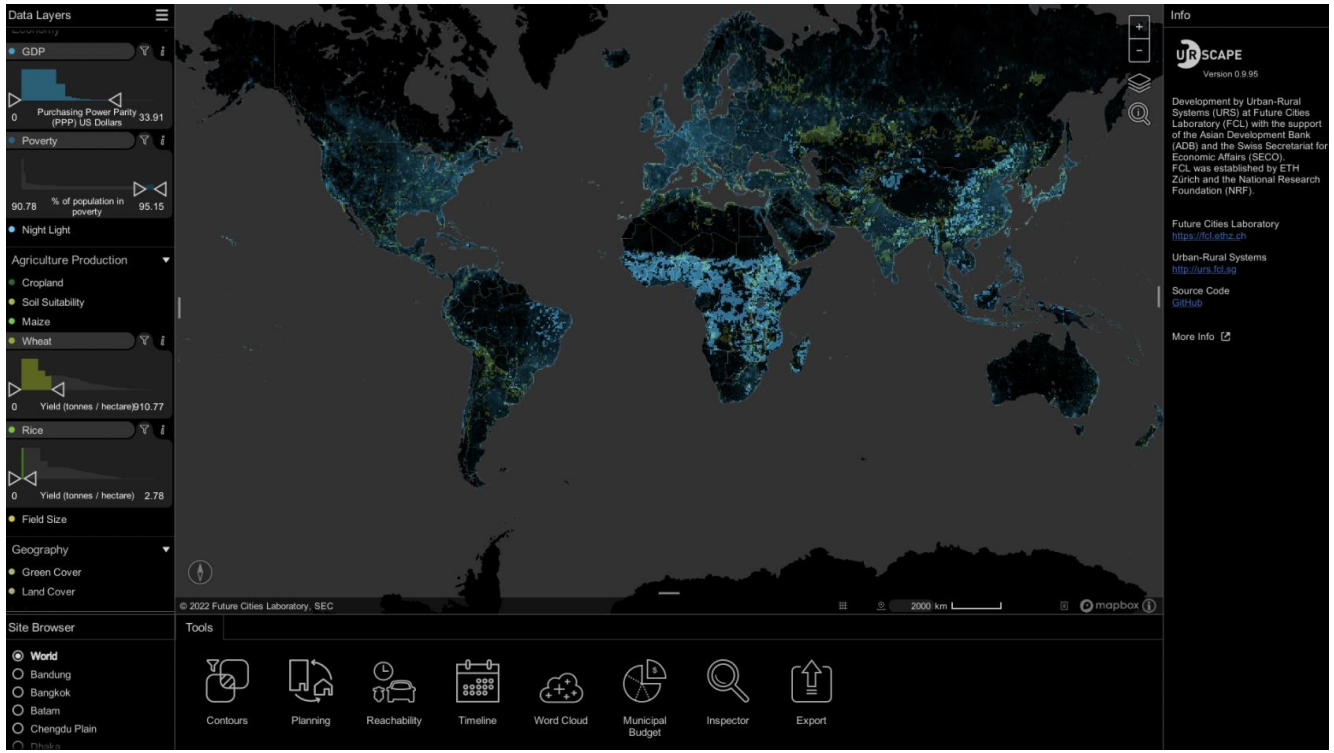
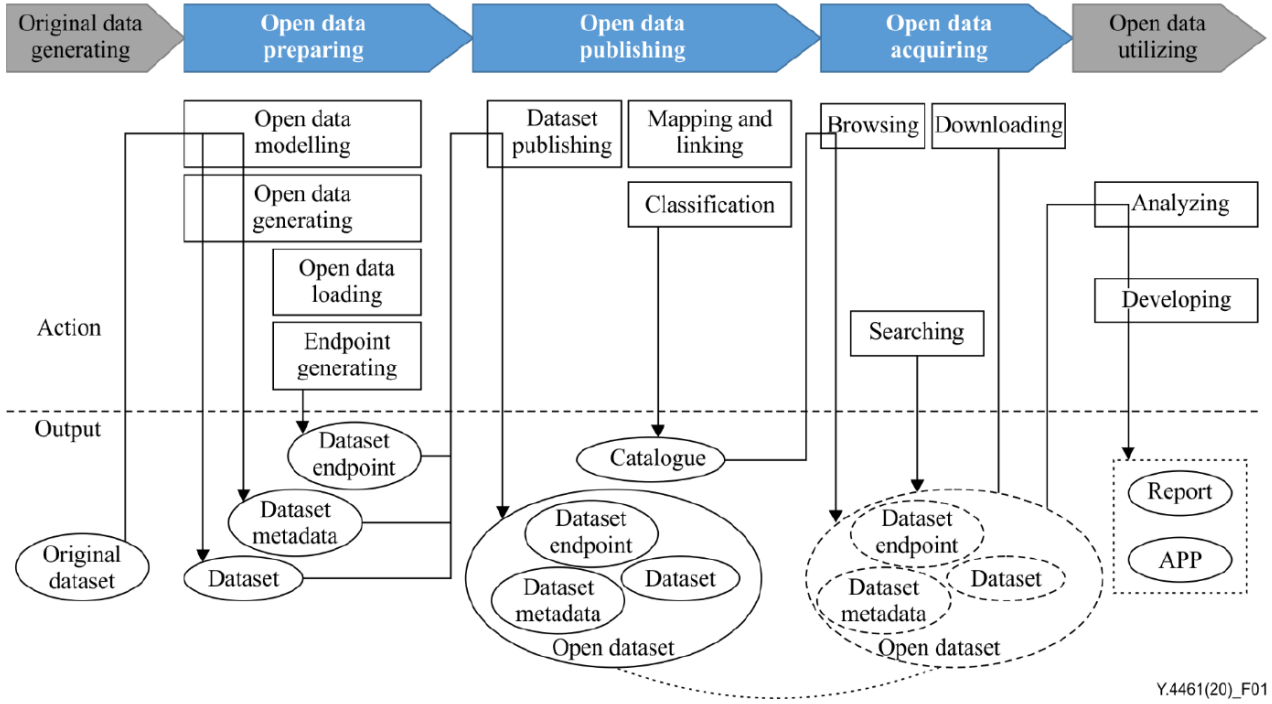


Image credit: Future Cities Laboratory (FCL)
UR-Scape wiki: https://urs.sec.sg/ur-scape/

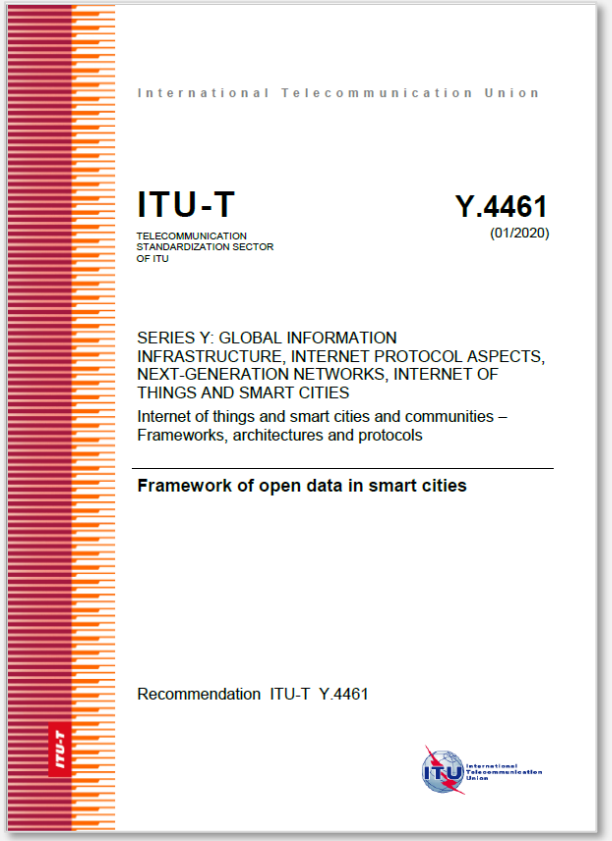
Tool #2

Open data

Open Data Framework



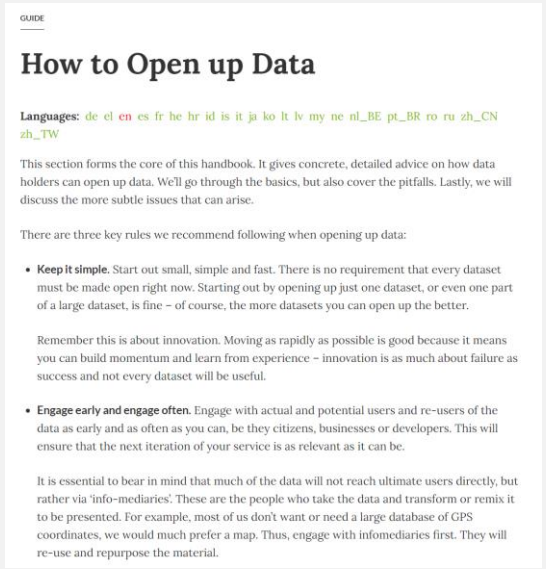
Key phases of open data in smart sustainable cities



Open Data Handbook

Choose your dataset(s) → Apply an open license → Make the data available → Make it discoverable

Open Knowledge Foundation



GUIDE

How to Open up Data

Languages: de el en es fr he hr id is it ja ko lt lv my ne nl_BE pt_BR ro ru zh_CN zh_TW

This section forms the core of this handbook. It gives concrete, detailed advice on how data holders can open up data. We'll go through the basics, but also cover the pitfalls. Lastly, we will discuss the more subtle issues that can arise.

There are three key rules we recommend following when opening up data:

- **Keep it simple.** Start out small, simple and fast. There is no requirement that every dataset must be made open right now. Starting out by opening up just one dataset, or even one part of a large dataset, is fine – of course, the more datasets you can open up the better.

  Remember this is about innovation. Moving as rapidly as possible is good because it means you can build momentum and learn from experience – innovation is as much about failure as success and not every dataset will be useful.

- **Engage early and engage often.** Engage with actual and potential users and re-users of the data as early and as often as you can, be they citizens, businesses or developers. This will ensure that the next iteration of your service is as relevant as it can be.

  It is essential to bear in mind that much of the data will not reach ultimate users directly, but rather via 'info-mediaries'. These are the people who take the data and transform or remix it to be presented. For example, most of us don't want or need a large database of GPS coordinates, we would much prefer a map. Thus, engage with infomediaries first. They will re-use and repurpose the material.

Do-it-Yourself Open Data Toolkit

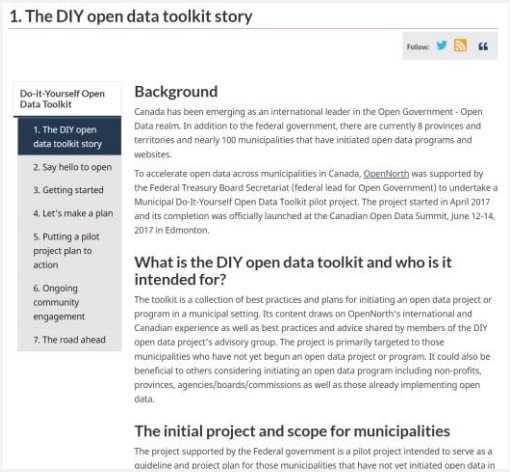
Key Components

- Governance
- Open Data Portal
- Community Engagement
- Standards
- Operations

Supporting Infrastructure

- Open Data/IM Policy
- Technology Infrastructure and Tools
- Data
- Human and Financial Resources

Government of Canada / Gouvernement du Canada



1. The DIY open data toolkit story

Follow:

Do-it-Yourself Open Data Toolkit

1. The DIY open data toolkit story
2. Say hello to open
3. Getting started
4. Let's make a plan
5. Putting a pilot project plan to action
6. Ongoing community engagement
7. The road ahead

Background

Canada has been emerging as an international leader in the Open Government - Open Data realm. In addition to the federal government, there are currently 8 provinces and territories and nearly 100 municipalities that have initiated open data programs and websites.

To accelerate open data across municipalities in Canada, OpenNorth was supported by the Federal Treasury Board Secretariat (federal lead for Open Government) to undertake a Municipal Do-It-Yourself Open Data Toolkit pilot project. The project started in April 2017 and its completion was officially launched at the Canadian Open Data Summit, June 12-14, 2017 in Edmonton.

What is the DIY open data toolkit and who is it intended for?

The toolkit is a collection of best practices and plans for initiating an open data project or program in a municipal setting. Its content draws on OpenNorth's international and Canadian experience as well as best practices and advice shared by members of the DIY open data project's advisory group. The project is primarily targeted to those municipalities who have not yet begun an open data project or program. It could also be beneficial to others considering initiating an open data program including non-profits, provinces, agencies/boards/commissions as well as those already implementing open data.

The initial project and scope for municipalities

The project supported by the Federal government is a pilot project intended to serve as a guideline and project plan for those municipalities that have not yet initiated open data in

Case Example
Open Data Platform — Pune, India

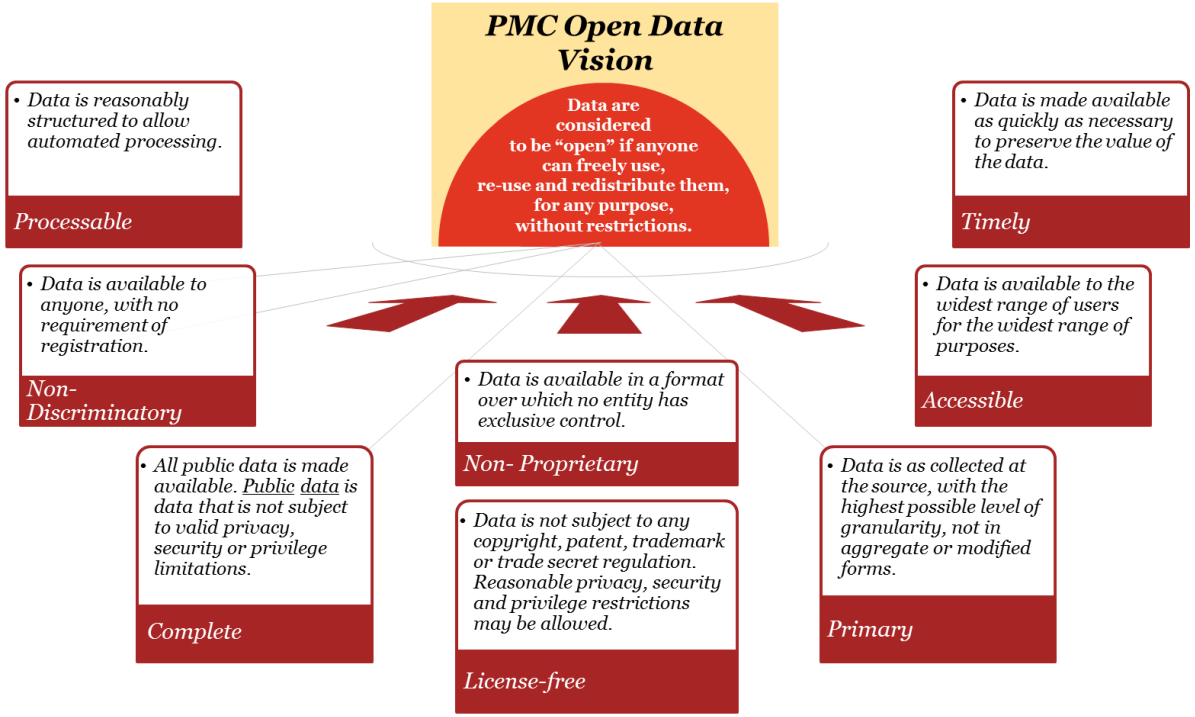
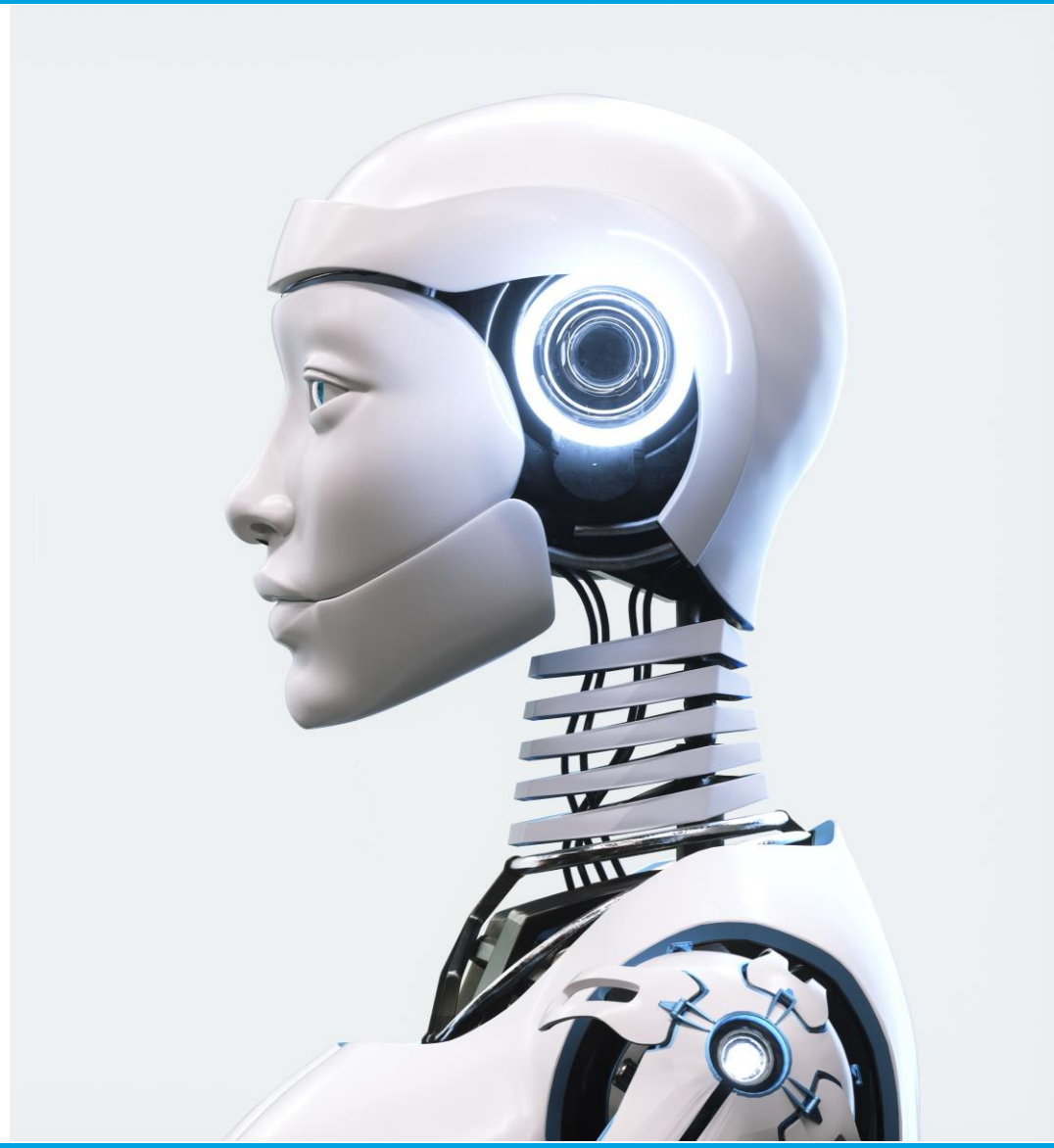


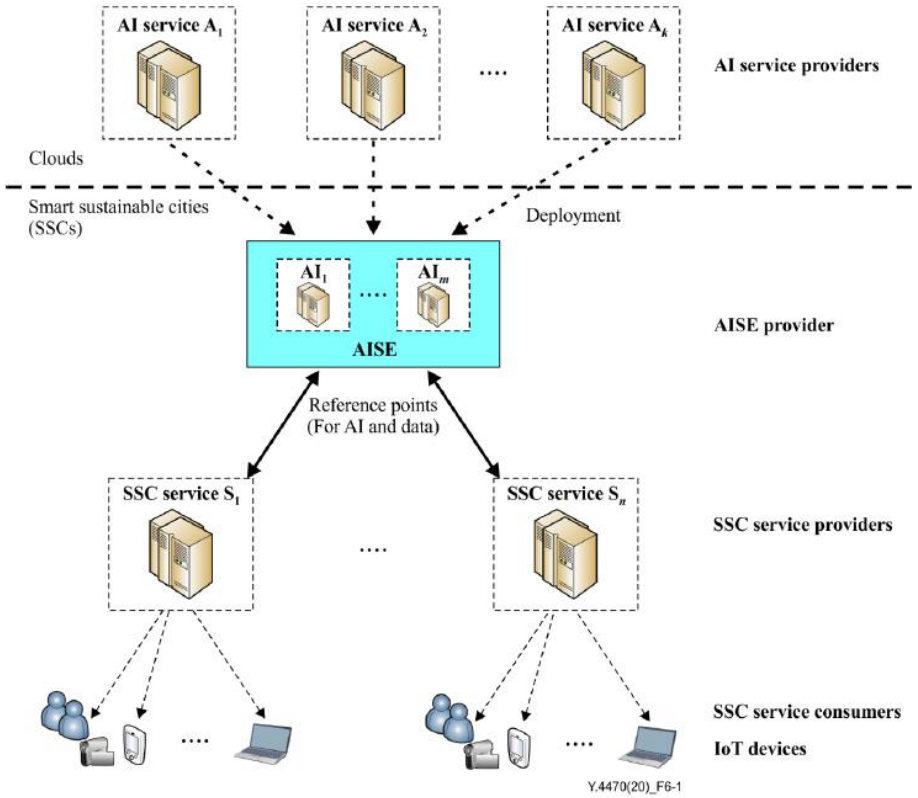
Image credit: Pune Municipal Corporation, https://www.pmc.gov.in/en/open-data

Tool #3

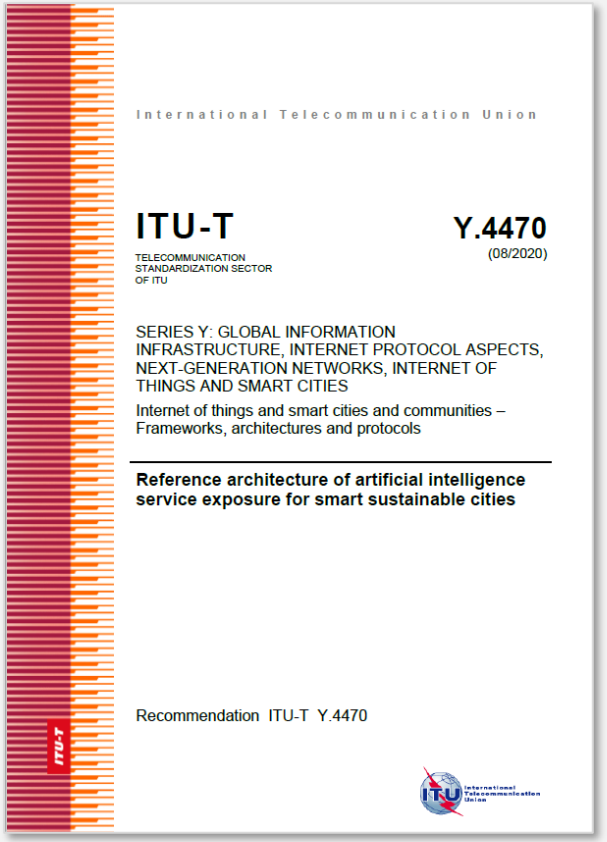
AI and Smart Sustainable City Data



Artificial Intelligence Service Exposure



Overview of AISE

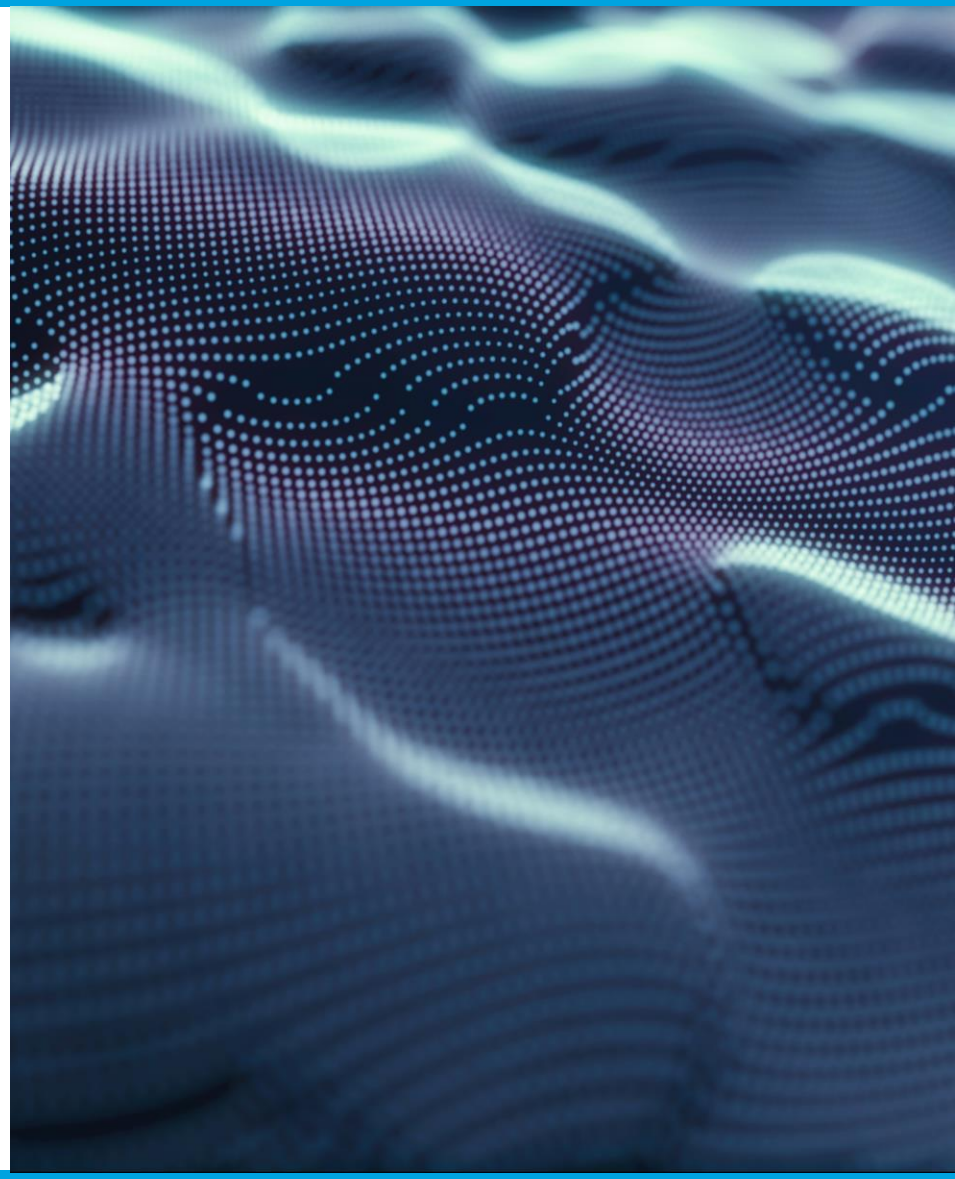


Artificial Intelligence Case Example

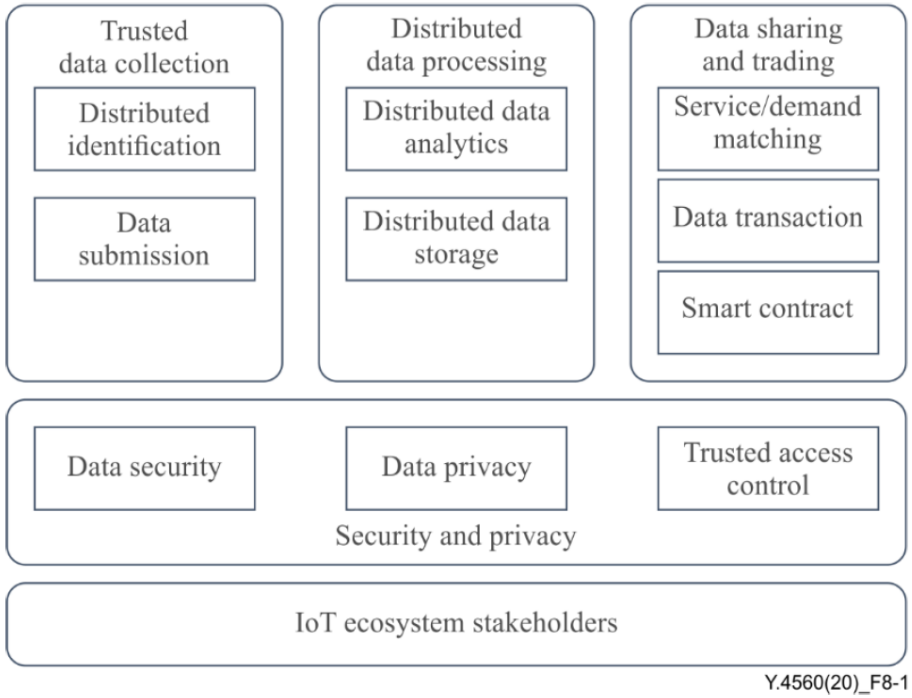
Moscow was recently the subject of a comprehensive case study, in which the rapid evolution and success of its smart and sustainable city journey were mapped in detail. Its increasing use of AI-powered intelligent traffic control systems is an important element in its response to the challenge of traffic congestion

Tool #4

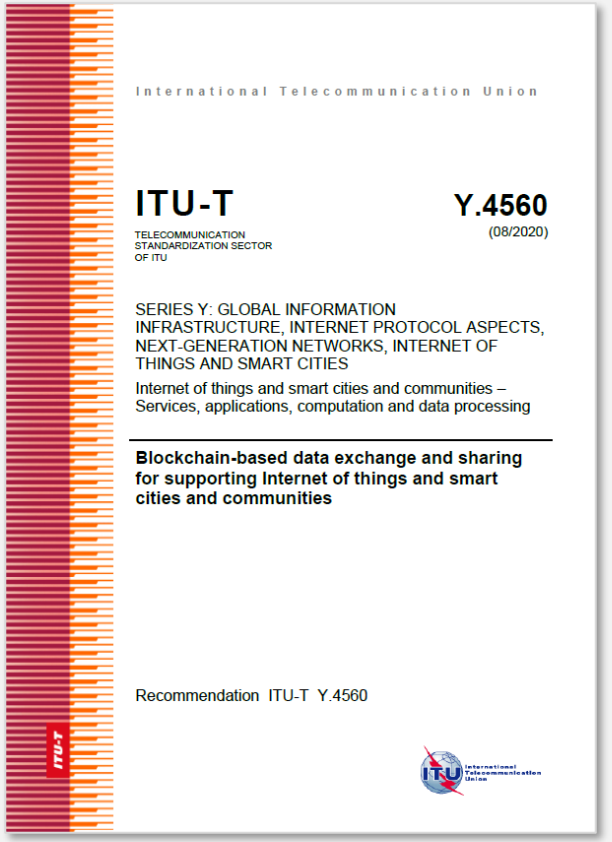
Blockchain and Smart Sustainable City Data



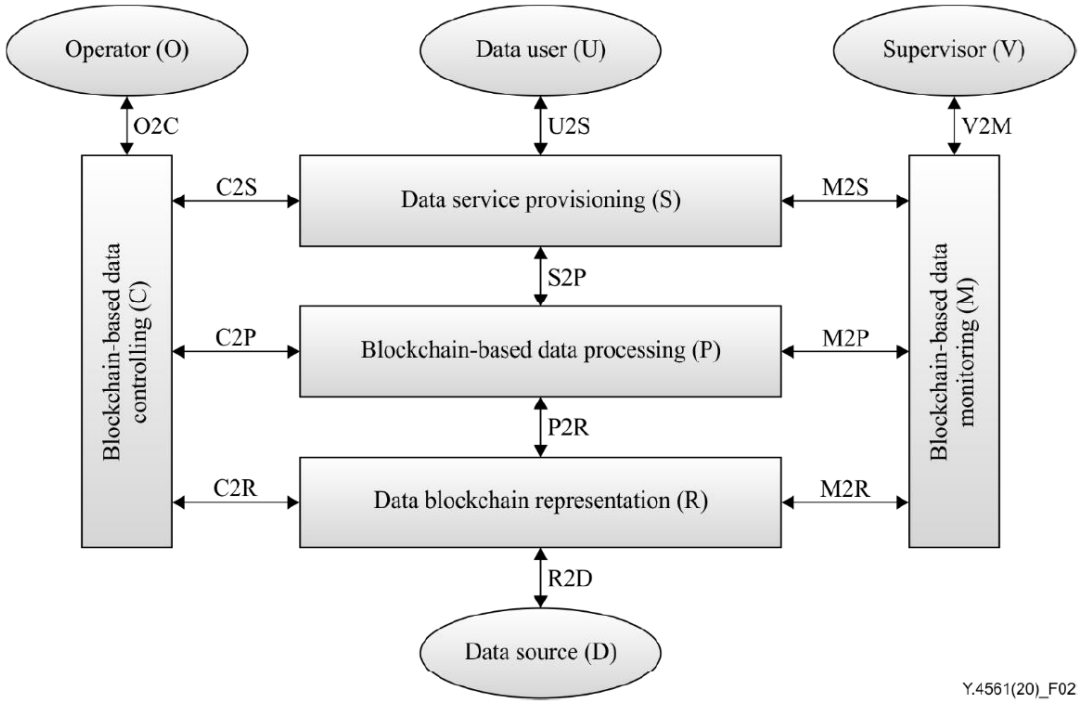
Blockchain-Based Data Exchange and Sharing



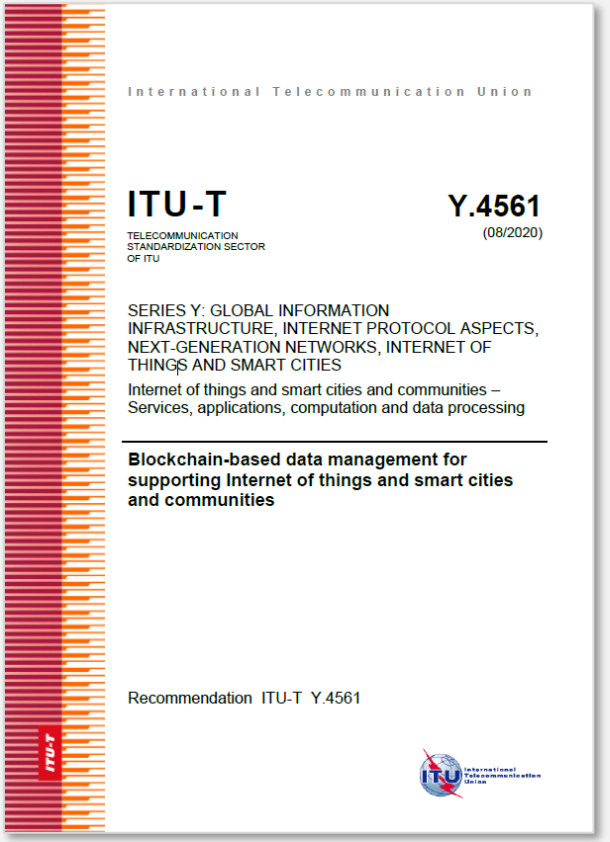
A functional model of blockchain-based data exchange and sharing



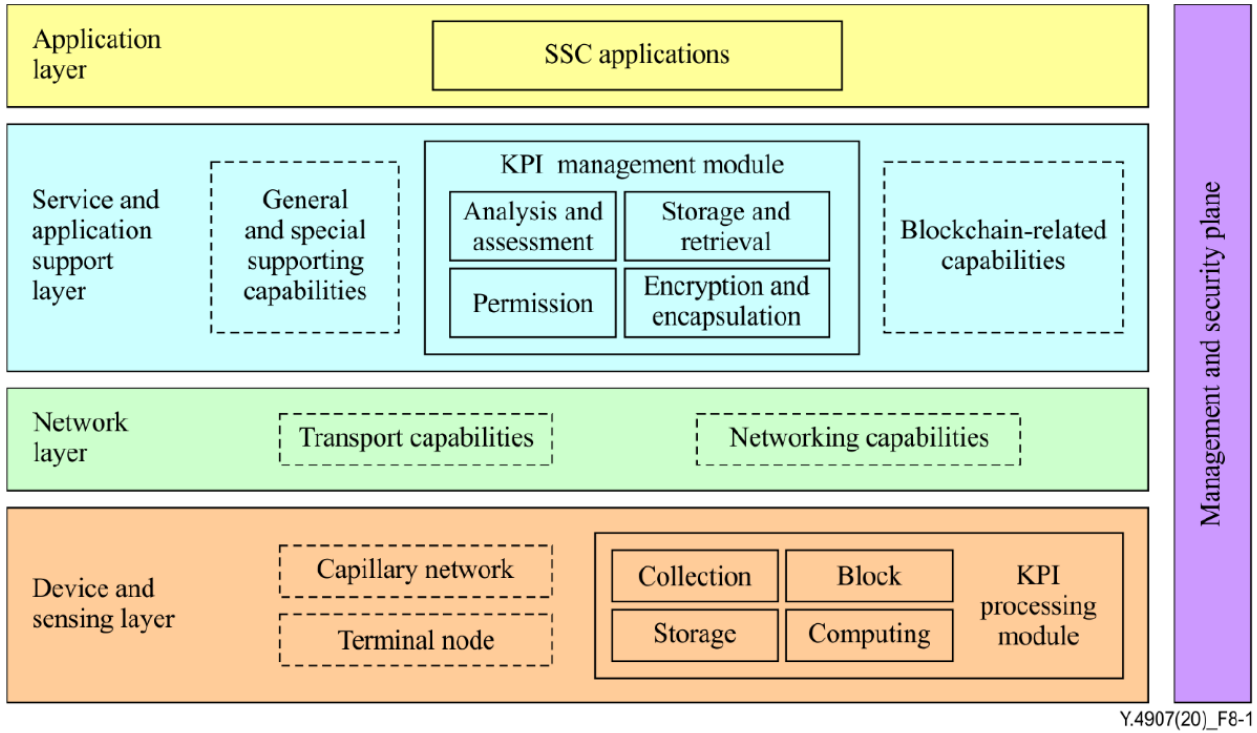
Blockchain-Based Data Management



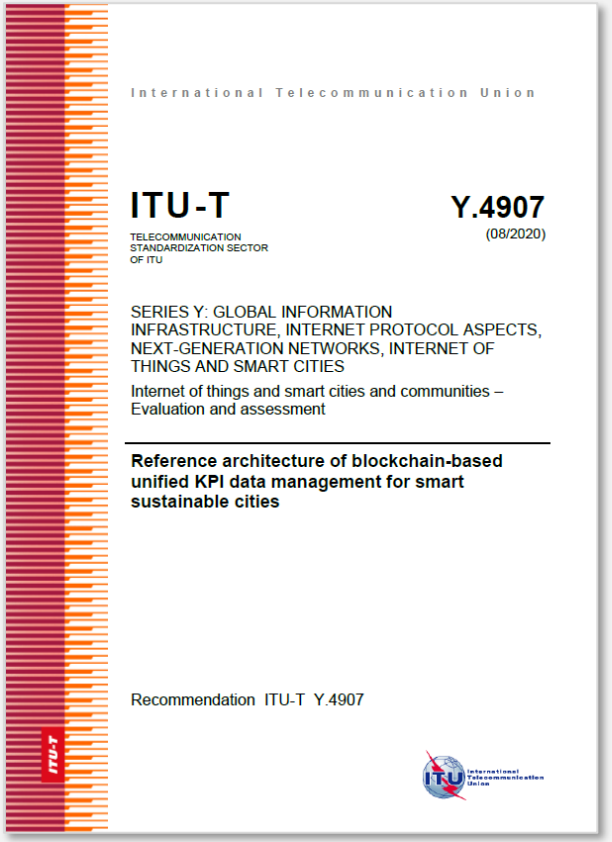
A generic reference model of blockchain-based data management



Blockchain-Based Unified KPI Data Management

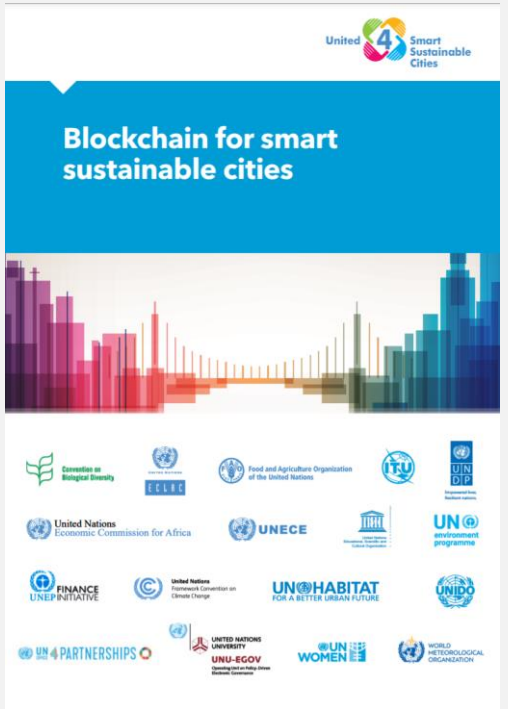


Reference architecture diagram of a BKDMS



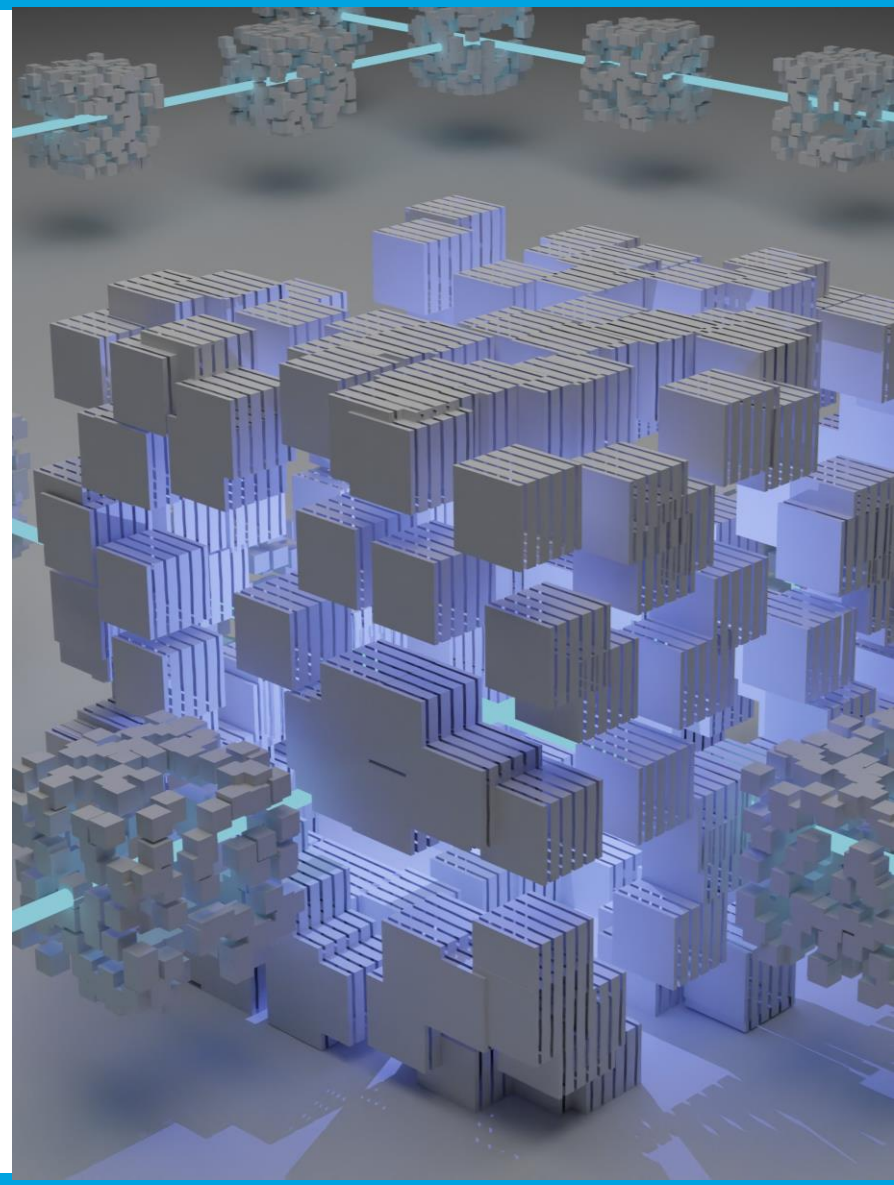
Blockchain Use Case Example

Active Citizen – Moscow City



Case Example
Blockchain Land Registry — Panchkula, India

Image Source



Module 3 –
Data Processing and Management

Thank you for completing this Module of the ITU Toolkit on Digital Transformation for People-Oriented Cities and Communities.

We hope that you found the information in this Module useful toward planning and initiating your city or community's digital transformation process.

Please review the resources highlighted within for further details, including valuable real-world use cases, on how to get started on – and optimize from the onset – your city or community's digital transformation journey.

Toolkit
on Digital Transformation
for People-Oriented
Cities and Communities

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