Tirupati Smart City Corporation Limited

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Source	1. Government of India E-Governance Standard 2. E-Data Dictionary for Good Governance from Centre for Good Governance
Description	Highlights the principles of Data Standard Definitions
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Draft Policy of Meta Data Management for the Tirupati Smart City

Data Standard Definition METADATA – to use existing Government of Andhra Pradesh guidelines.

Table of Contents

Data Policy of Tirupati Smart City

Executive Summary

The Government of India in Ministry of Housing and Urban Affairs – Smart City Division had published the Data Maturity Framework guidelines for the Smart Cities to adopt. These are set to be uniform across all smart cities with open standards and facilitating inter-operability and exchange of data with open data policy. Accordingly every smart city is required to publish a draft data policy for progressive adoption and inclusion of all citizens and citizen services across sectors for good governance. Data Standard Definition for METADATA, to use the existing Government of Andhra Pradesh guidelines.

Policy

The Tirupati Smart City is dependent on a robust data management principle.

The primary stake holders are:

1. The Municipal Corporation of Tirupati
2. The Tirupati Urban Development Authority
3. The Associated Service Providers from the Government Organizations and Appointed Service Provider Agencies.

Access to the Data shall be role based with due authorizations and trace-log only.

The Meta Data Management (MDM) will be as per the decisions of the TSCCL Board with respective stakeholders as decision makers from the MCT and the TUDA and an ICT (Information and Communication Technology) specialist / Data scientist to map the specific requirements to Data. The Policy is elaborated further in the following sections.

Exit criteria: The Data policy is not time bound and shall continue for ever with suitable changes.

When the SPV ceases to exist, the Heads of the stakeholder Organizations shall meet under the aegis of the City Data Officer designated by the Commissioner, Municipal Corporation of Tirupati from time-to-time, for causing relevant changes to the progressive adoption of the policy.

Approach for Policy

Data Centre, Disaster Recovery and Business as usual:

The data availability for information processing shall be from the above MDM policy.

The Data availability shall be ensured by the City Data Officer, who shall ensure to progressively integrate data into the Tirupati City Dashboard, in the Pan City ICT Project of the TSCCL. The data shall be hosted in the Data Center (DC) and Disaster Recovery(DR) as per scope of the project either on premise or on cloud model basis the MDM decisions of the TSCCL Board, which shall consider the long term Total Cost Of Ownership for DC viz the Cloud outsourced model for an estimated 3-5 Tera-Bytes of online data availability for day-to-day management of a smart city administration.

[Thumb Rule for data size estimation:

1. Tirupati Smart City available Population estimate [Year 2018] : 350,000
2. Daily average Floating Pilgrim population (estimated footfall): + 35,000 (+10%)
3. Calculated at 10 KB base data per citizen this corresponds to (350000+(35000*30*12))*10*1000/1000000/1000 =129.5TB start year (2019). [The Tirupati Urban agglomeration population is estimated to be 4,61,900 as seen in the link https://www.census2011.co.in/census/city/427-tirupati.html]
4. Annual incremental additional data (@+10% on residents (35,000) and @ + 25% on pilgrims (based on long term average annual footfall 43,750*30Days*12months of data for pilgrims=15,750,000) will be (15,785,000*10*1000/1000000/1000)=157.85TB per year for complete profiling of citizens in Tirupati each year]

The TSCCL Board for MDM policy

(A) The TSCCL Board for MDM policy shall have to decide on, either the on premise or cloud data model in view of security surveillance and instant processing requirements for various services to citizens with the availability of time window for decision making purposes for normal and emergent situations. At current price values, due to the progressive decrease in the storage and network bandwidth costs per byte, initial data sets creation can be at an on premise Data Centre (DC) to be set up by the Master Services Integrator (MSI) under the RFP (Request For Proposal) published for the purpose, to start with. Based on the progressive usage, growth of the data, scaling up the DC on premise or migrating the most recent data alone on cloud may be considered at the end of a 2 to 3 year period of operations by the MSI on this policy. The period of usage indicating the linear growth in data size and the number of transactions from different sectors to help in right sizing the cloud based access requirement under a possible hybrid model of DC.

(B) Data Retention and Archival Policy: The TSCCL Board for MDM policy shall also have to decide on data retention and archival policy, in view of the special situation of required surveillance data per citizen in the historic pilgrim city of Tirupati which has no other parallel in the world.

(C) As the data requirements are quite huge for a city of this size, following classification, operation and security management is suggested in this draft policy for discussions, review, changes and suitable adoption:

a. Base alphanumeric data – On premise store (10 KB per Resident)

b. Base unique identification data (pattern / alphanumeric) – On premise store (10 KB per citizen / resident) Use case either as (a) or (b)

c. Base data retention period – City Residents – Lifelong (A long term average of 70 years) – on premise in a secured environment

d. Resident municipal / TUDA services data for Tirupati Smart City residents – shall be on premise for a period of 18 months, from the start of each financial year (for services assessments, services billing, follow up on Demands, Collections and Balances of Arrears. These will be transaction data for current year, updated in the Base data of the citizens for preservation and transaction data shall be backed up and be available online until the end of the financial year as well as till the 18th month from the start of a Financial Year (for arrear tracking and updates on defaulters and/or changes to base data, etc.)

e. Base unique identification data for visitors / pilgrims (10KB per pilgrim / visitor) (VP data)

f. Data retention on premise (for both resident and VP data) : 6 calendar Months; Data older than 6 calendar months, shall be backed up on two sets of Tape media, operated at end of each calendar month (for data preceding the 6 months data backup, while releasing the data-media for re-use, for media containing data older than 3 years from the backup); tape data read once after writing, and one tape data set shall be stored in marked offline disk storage of standard TB removable media available at the time of backup and stored in fire proof chests created for the purpose in the TSCCL / MCT strong room for permanent store for a period of 15 years. After this writing on the disk and at the end of Twelve calendar months from the date of the initial tape back-up, one tape data set shall be released for re-use up to 12 cycles, before being destroyed and discarded from further use of that tape with due certification for data erasure by a competent authority of the Tirupati Smart City Administration identified as the City Data Officer (CDO) or under his supervision hierarchy by an authorized staffer (Gazetted Officer) of the City Administration.

g. Data Security & Role based access: No data shall be leaked or accessed by any unauthorized person / persons, as either individual data or a set of data or in any bulk form without due authorizations even for routine handling. The CDO is also responsible for data security. Every access to the user system in all the sectors, shall be duly controlled with 'IAM' (Identity and Access Management systems that uniquely identifies each user to the

system, including by the use of the dynamic OTP sent to the individual end user, whether internal or external, along with role based access to data.

(D) **Need for Local Data and all weather communication channels on 24x366 basis:** All critical infrastructure, resource data shall be on premise. All public facilities and commercial establishments related data shall be on premise. This will facilitate quick access under any stressed conditions and also during any total communications break down scenario from the user centre to the data centre, when all communication channels fail. Even if the period is low, a significant number of online operations and critical operations shall be hit and hence use of local data from the on premise data is suggested in this policy.

(E) Data on all **City assets** of the MCT and TUDA, work contracts and daily performance data shall be on premise for each calendar month for up to three months and archived on tape and disk media as per back up policy discussed above, thereafter. All contracts related data shall be available online on premise / cloud for the entire duration of the contract, any extension period(s) and to a further period of 5 years after the closure of the commercial contract, until all government review processes are expected to be completed. [Refer RBI norms of retention of payments (banking) data for retention as well as Audit and Accounting requirements of the Government processes]

(F) *Data related Extract from Page 92, ...* ***Detailed Project Report:*** *Tirupati Smart City Project Pan City ICT Solutions*

Key Functional Requirements for Data management

1. The TSCCL Data Centre Facility must be in Tirupati and must be Tier III or above. The Disaster Recovery site shall be within India and should be at least 250 Km away from the TSCCL Data Center and in a different seismic zone.
2. The cloud service provider must have billing model of pay-per-consume where it will charge for amount of computing resources being consumed by application rather than for the allocated resources. MSI shall provide the rate chart of the cloud services to TSCCL, under the hybrid model of adoption by the TSCCL Board.
3. In no circumstances, the data accumulated and processed by Command Control and Communication Centre should be compromised. Hence, provisions will be made to keep all the data stored in this platform highly secured with required multi layered security access control and authorization framework. Further the platform shall provide an open standards based integration Bus with API Management, providing full API lifecycle management with governance and security features.
4. Encryption of all backup files and data and management of encryption keys as a service that can be enabled for Government Departments that require such a service.
5. The proposed solution should be capable of reporting important health parameters like disk space, password changes, file addition/deletion etc. to ensure DR readiness
6. All applications need to have high performance clustering (redundancy) within the Data Centre with automatic fail-over, and redundant data storage in active passive or active-active configuration as per the high availability targets. The data replication should be continuous among all the servers and shared storage should not be used. All mission critical systems must be active-active configurations. Active passive configurations may be permissible for supporting applications.
7. Business as usual: the primary site is functioning as required, procedures for ensuring consistency of data availability at secondary site (DR Site) shall also be in place for an earliest switch over to operations from the DR with a definite time to recover operations from the DC and sync back the data from DR to DC when the business continuity process was functioning from the DR site.
8. Disaster: Declaration of disaster, making the DR site live for production, ensuring availability of users to the secondary site, shall follow the decisions of the TSCCL Board or its Chairman or the MD, based on valid official communication sent through the registered official email-id and/or with a scanned copy of the signed letter declaring the emergency conditions have set in, for initiating operations from the DR site. However, mandatory routine DR site go-live tests

shall be performed periodically and test records for successful performance shall be maintained to ensure business continuity.

9. Access to application systems, Data etc., shall provide a uniform, coherent, user-friendly and standardized interface
10. Should maintain a comprehensive and easy to understand audit trail of read and write actions performed on the system.
11. Audit trails should include detailed information about the user, activity type, date and time of addition/change/removal, and IP address accessed when the action occurred. Audit & logging: Platform should support centralized logging & auditing framework. Physical and logical user access to audit logs restricted to authorized personnel only
12. Should provide ability to extract data in desired formats for publishing, reporting and interfacing purposes. The origin of certain data may both be structured or un-structured, however, shall be integrated for normal defined operations, so as to be outcome specified.
13. Should provide ability to attach data and documents to incidents and other entities.
14. The Data platform is required to issue, log, track, manage and report all activities underway during the various modes of operation.
15. System should support centralized logging & auditing framework.
16. System should have policies and procedures established as Standard Operating Procedure (SOP), supporting business processes and technical measures implemented, for maintaining complete, accurate and relevant agreements (e.g. SLAs).
17. System should maintain complete inventory of critical production assets data. Asset could be defined as source code, documents, binaries, configuration data, scripts, supplier agreements, software licenses etc.
18. System shall provide integrated tool for evidence management of critical events and incidences digitally with provision for long term tamper proof data preservation so as to make it admissible in the court of law.

(G) Data of Sectors (in focus)**:**

1. City Area of Governance jurisdiction (Revenue definition for Tirupati pan city area) – ward data, streets, roads, bridges, canals, causeways, water-pipes(Distribution – all areas – all consumers), water-pipes(Source-cross-section(dia), length, route, reservoir store, reservoir capacity etc.), Drainage Channels / Pipes-carriage capacity, Sewerage –Pipes-consumer number, sewerage pipe cross section dia – carriage capacity, etc.
2. Ward data – coterminous with respective administrative jurisdiction
3. Police Data – as in 2 above
4. Fire and Rescue services Data as in 2 above
5. City Energy resources data – Electricity (power) – Consumption

a. (Daily-hourly demand) from APSPDCL data (Feeder source from each city input feeder line as sum of all inward feeders – as Total Demand for city)
b. Distribution Transformer data based ward-wise / street wise (of all wards) daily-hourly demand data,
c. Street lights (numbers, type, wattage, duration of power on, whether group control / individual control, metered / non-metered, solar backup (Y/N), location, etc.)
d. User wise energy consumption data – from all metered consumers (LT & HT), classified as ward-wise (shall include all users including municipal and all government offices with user type classification)
e. Map of consumption pattern for the entire Tirupati Smart City area with color coding and classified consumption visual map
f. Revenue realization by APSPDCL – ward-wise, LT & HT per billing cycle and DCB with arrears data
g. Power Supply received from Renewable Energy sources (Solar) for City usage, Daily generation and utilization map ward area-wise and Location (building wise)
h. Installed capacity of all solar and daily generation map from all sources
i. Power utilization is schools
j. Additional Fossil fuel based licensed and installed capacity for electricity generation – including own use (residential, commercial) as well as shared public use
k. Power utilization in essential public spaces, street lights, parks, bus stations, railway stations and all Municipal and Government buildings
l. Power utilization in Hospitals
m. Power utilization in water supply reservoirs, pumping stations
n. Power utilization is waste water disposal, treatment and pumping stations
o. Electricity generated from Wind energy and other renewable sources
p. Daily Demand forecasting and supply alignment data from APSPDCL, grid-wise and for total city area

6. City water resources data
    a. Water reservoir data (capacity, daily-availability, daily distribution data, user agency wise data), water source wise data
    b. SCADA operated distribution data (daily – ward wise, area wise quantity and water quality data)
    c. Ward wise water consumption (metered and non-metered, domestic, commercial, industrial, hospital etc.), DCB data on water usage, tax and cess as applicable per consumer basis for all consumers including hospitals, government buildings, schools, domestic, commercial and industrial users

d. Public spaces water consumption (railway station, bus stations, raitu bazars, market yards, parks, public toilets etc.), water ATM data

e. Waste water treatment – canal, length, drain capacity, drain reservoir, treatment capacity, effluent capacity, effluent discharge channel, effluent drain length and public awareness displays, quality of effluent, quality of treated water for industrial and agricultural use etc.)

7. City Environmental Sensor data – Air Quality index, NO2, SO2, PM etc. (Daily-Hourly data from each environmental sensor).
8. City Fossil fuel Daily Supply, Retail Demand and daily consumption of fossil fuel by Municipal services (Petrol, Diesel, CNG, LPG, Coal, Firewood etc., both supply data from retail outlets and daily off-take data by various consumers – sourced at end of day from respective supply outlets and municipal consumption (from municipal purchase bills – budget, supply vouchers, prevention of leakage and fraud, etc.)
9. Shops and Commercial Establishments with labour data – mapped to professional tax
10. Residential, Commercial buildings, type, number of floors, area, facilities like car park, games, telecom towers, advertisement hoardings-size, property taxes, cess, DCB, map onto Electricity supply connection types, artificial intelligence to match – nature of usage with type of billing for services etc. with GIS map
11. Data on Hospitals, ownership Public / Private / Corporate / Municipal / State etc., number of beds, speciality, emergency / intensive care beds, availability of adequate Family physicians, nursing staff, support staff and emergency care professionals, attached labs, pharmacy, incinerator and waste disposal procedure, waste disposal procedure awareness, use of standard protocols
12. Data on Schools, Students, class rooms, teachers, facilities, library, e-enablement, separate toilets for girls & boys – Government, Municipal, public or private, area, water, electricity, labs, agency-elected member adoption, etc.
13. Data on all other educational institutions – coaching classes, colleges, institutes, Universities etc. with facilities, library, e-enablement, separate toilets for girls & boys – area, water, electricity, labs, parking spaces, bike share, agency-elected member adoption, etc.
14. All building types, green certification data, assessment date data, whether structural compliance to safety and security, fire exit and security, Elevator use permits, surveillance data available from premises or from street level etc.
15. Revenue land base data on type of land, ownership data, area, approved and changed use of land, area wise mapping of land use, point, route-vector and area scale mapping of all buildings, survey numbers, details of lease (if Government owned and leased to any individual or group or industry or public facility – pooled or acquired or individually held

etc., City, Town and Country planning permits or approvals for buildings, number of floors, open spaces to be and actual availability of floors, open spaces and area utilized, green cover – forest foliage – garden space availability, rain water harvesting features if any, etc., security of all buildings

16. All points, buildings, roads, canals, pipes, networks (water supply, drainage, sewerage, electricity supply), area coverage for various services, municipal wards, Administrative jurisdictions, etc., shall all be available on respective scale maps with point, vector and area maps of GIS at the proposed ICCC-DC

(H) The detailed data tables for various base data and analytical data shall be prepared by respective stake holder Organization and authority concerned and share to the TSCCL within 3 months from the date of the publication of this data policy on the official district Gazette of Chittoor / Tirupati Smart City related.

(I) The data in respect of all sectors as above are pertaining to Tirupati Smart City and have all the three dimensions of Volume, Velocity and Variety and is thus to grow into a big data base for the primary stake holders to do effective city management going forward.

Conclusion: This policy shall be reviewed once every year after adoption for possible enhancements as well as additional securitization requirements. Individual data structure is not prescribed in this policy, as this is required to follow the guidelines issued from time-to-time by the Government in Andhra Pradesh from the various sectors as they are already using various systems towards the delivery of their services to the citizens.

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