|  |
| --- |
| ICS 35.240CCS L73      |

Community standard

SQL/SCIE XX-XXXX, T/SZIOT XXXXX-XXXX

|  |
| --- |
|       |

Smart city - Urban multi-level collaborative command platform construction requirements

|  |
| --- |
|  |
| (Exposure draft) |

Issued date: XXXX-XX-XX

Implementation date: XXXX-XX-XX implementation

Smart City Industry Ecosystem

Released by Shenzhen Internet of Things Industry Association

Contents

Foreword II

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Abbreviations 1

5 Overall structure 2

6 Functional requirements 3

6.1 Infrastructure layer 3

6.2 Platform layer 4

6.3 Support layer 8

6.4 Application layer 10

6.5 Interaction layer 15

6.6 Security management 15

6.7 O&M management 15

7. Multi-level linkage requirements 15

7.1 Physical association 16

7.2 Communication linkage 16

7.3 Data linkage 16

7.4 Application association 16

8 Interface requirements 16

Foreword

This standard is drafted in accordance with the rules given in the GB/T 1.1-2020.

This standard was proposed by the smart city industry ecosystem.

This standard was prepared by Smart City Industry Ecosphere and Shenzhen IoT Industry Association.

This standard is drafted by Huawei Technologies Co., Ltd., Shenzhen Institute of Standards and Technology, Chengdu Smart City Information Technology Co., Ltd., China Institute of Electronic Technology Standardization, Hangzhou Xujian Technology Co., Ltd., Guangzhou Xinwei Smart Security Technology Co., Ltd., and Shenzhen Starnet ICT Co., Ltd.

Drafters of this standard: XXX and XXXX.

Smart city - Urban multi-Level collaborative command platform construction requirements

1. Scope

This document describes the overall architecture of the Smart City multi-level linkage command platform, and specifies the platform function requirements, multi-level linkage requirements, and interface requirements.

This document is applicable to the planning, design, construction, and O&M of the multi-level command platform for smart cities.

1. Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including all amendments) applies.

GB 35114 Technical requirements for information security of video surveillance network system for public security

GB/T 22080 Information technology - Security techniques - Information security management systems—Requirements

GB/T 22239 Information security technology - Baseline for classified protection of cybersecurity

GB/T 28181 Technical requirements for information transmission, switch and control in video surveillance networking system for public security

GB/T 34960.5 Information technology service－Governance－Part 5: Specification of data governance

GB/T 43208.1 Information technology services - Intelligent operation and maintenance - Part 1: General requirements

YD/T 3839 Technical requirement for LTE based Broadband Trunking Communication (B-TrunC) system (Phase 2)

1. Terms and definitions

For the purpose of this document, the following terms and definitions apply.

* 1.

collaborative command platform

a complex system that provides functions such as command and dispatch, video consultation, data collection and application, and information transmission. It can learn the city running status in a timely manner and conduct collaborative command for major urban events and emergencies

* 1.

southbound data

data sent from the cloud platform to the gateway or from the cloud to the device through the gateway

* 1.

northbound data

data sent from terminals to the cloud platform through the gateway

1. Abbreviations

The following acronyms and abbreviations apply to this document.

AES: Advanced Encryption Standard

AI: Artificial Intelligence

API: Application Programming Interface

APP: Application

B-TrunC: Broadband Trunking Communication

DMR: Digital Mobile Radio

eLTE: enterprise LTEF5G: The Fifth-Generation Fixed Network

GIS: Geographic Information System HDD: Hard Disk Drive

IPC: Inter-Process Communication

IPv6: Internet Protocol Version 6

NB-IoT: Narrowband Internet of Things

NLP: Natural Language Processing

OCR: Optical Character Recognition

PDF:Portable Document Format

PDT: Police Digital Trunking

PoC: Push-to-Talk Over Cellular

PSIP: Program and System Information Protocol

QoS: Quality of ServiceONVIF: Open Network Video Interface Forum

SDK: Software Development Kit

SIP: Session Initialization Protocol

SSD: Solid-State DriveUHF: Ultra High Frequency

VHF: Very High Frequency

VoLTE: Voice over Long-Term Evolution

VoNR: Voice over New Radio

1. Overall structure

Figure 1 shows the overall architecture of the city multi-level linkage command platform.



1. Overall structure

The city multi-level command platform consists of the infrastructure layer, platform layer, support layer, application layer, and interaction layer. The components are described as follows:

1. Infrastructure layer: provides terminals, network communication, computing, and storage infrastructure for multi-level city linkage command. It is the basic capability of the platform;
2. Platform layer: provides multi-level city command platform capabilities, including converged communications, videoconferencing, video aggregation, and geographic information platforms;
3. Support layer: constructs a city multi-level linkage command service center, aggregates southbound data in the linkage command scenario, forms standard interfaces, and provides northbound data support for upper-layer applications;
4. Application layer: integrates the situational awareness, monitoring and warning, linkage command, and decision-making assistance capabilities to provide application capabilities for various linkage command terminals;
5. Interaction layer: provides platform users with three interaction modes - large screen, medium screen, and small screen, which can be adapted based on different scenarios.
6. Functional requirements
	1. Infrastructure layer
		1. Terminal equipment

Terminal requirements are as follows:

1. Shall support unified device communication protocols and data formats, protocol conversion through the platform, and real-time access to terminal information;
2. Shall support distributed communication between devices, intelligent interconnection between devices and service association, quick discovery and connection of devices, task distribution, and data transmission;
3. Shall support information access from multiple terminals, including but not limited to SMS, APP, social media, mobile phone/fax, alarm column, camera, recorder, PDT, Tetra/DMR/P25/VHF/UHF, eLTE, PoC, videoconferencing terminal, splicing screen/decoder, UAV, thin and light terminal, and dual system Terminals, dedicated trunking terminals, IP phones, and PTZ dome cameras;
4. Support selecting the appropriate processor model and clock speed based on the device's usage scenario and expected tasks to ensure that the device can run various applications smoothly.
	* 1. Network communication

The network communication requirements are as follows:

1. Shall support the convergence of multiple networks, such as 4G/5G/F5G/cellular-based NB-IoT, to ensure data transmission diversity and redundancy;
2. Shall support IPv6 and subsequent extensions, including but not limited to IPv6 address allocation, routing protocols (such as BGP4+ and OSPFv3), and security protocols (such as IPsec);
3. Shall support the provision of independent network slicing based on joint command requirements to ensure isolation and security between different services;
4. Shall support dynamic elastic contraction and adjust network resource allocation in real time according to business load;
5. Shall support automatic bandwidth load balancing to ensure network performance stability and reliability in high-concurrency scenarios;
6. Shall support the E2E bearing of multiple services and achieve efficient collaboration of different services in a unified network architecture;
7. Shall support automatic identification of access-side applications and terminal devices, and collects and sorts device information;
8. Shall support intelligent path optimisation, automatically selecting the optimal transmission path based on network status and business requirements to reduce transmission latency and packet loss rates.;
9. Shall support different QoS priorities for different services to ensure priority transmission for important services;.
10. Shall have features like flow control and congestion management to stop network congestion from messing with business performance;
11. Shall provide a unified network management platform to support centralized management and monitoring of network devices;
12. Shall provide real-time network performance monitoring and alarm reporting functions.
	* 1. Calculation and storage
			1. Calculation requirements are as follows:
13. Shall support cloud computing architecture, dynamically allocate and adjust computing resources according to actual needs, respond quickly during peak periods or emergencies, and reduce resource consumption during off-peak periods;.
14. Shall provide parallel processing and real-time analysis functions, support full-time video image query, and support one-time analysis and comparison of multiple elements, such as target recognition and behavior recognition;
15. Shall support multi-directional intelligent correlation analysis. For example, data from different sources shall be associated through spatiotemporal analysis for event prediction and pattern recognition;
16. Shall support computing on edge nodes and provides preliminary data processing and filtering functions, such as data cleaning and object detection.
	* + 1. The storage requirements are as follows:
17. Shall support distributed storage architecture withseamless storage capacity expansion;
18. Shall support automatic tiered storage of hot and cold data and the combination of SSDs and HDDs;
19. Shall support data lifecycle management, including data collection, sorting, analysis, archiving, and destruction.
	1. Platform layer
		1. Converged communication platform
			1. Voice service convergence requirements are as follows:
20. Voice services shall support voice interoperability with various communication systems through E1/IMS, PSIP, B-TrunC, or air interface methods, connect to communication terminals such as internal network telephones, public network telephones, conventional walkie-talkies, broadband clusters, and satellite communications, and provide P2P voice calls and other trunking dispatching functions;
21. Voice coding shall support the G.711, G.723, and PCM coding formats.
	* + 1. Video conference convergence requirements are as follows:
22. Shall provide the video conference function, and audio and video transmission should meet the requirements of ITU-T H.323 and IETF RFC 3261;.
23. Shall support video protocols such as H.265, H.264 SVC, H.264 HP, and H.264, and supports 4K, 1080p, 720p, and 4CIF video sources to join conferences;
24. Shall control the image and sound of any video dispatching terminal and dispatch the video source of the video capture device during video consultation;
25. Shall support converged video surveillance and unified management, support access to security surveillance images, and implement converged management of the existing videoconferencing platform and security surveillance platform;
26. Shall support mobile terminal management and enable users to organise or join video conferences through mobile terminals;
27. Shall support one-click switching between meeting scenarios, allowing administrators to set meeting scenario modes according to business needs and switch between them with a single click;
28. Shall support voice terminals such as telephones, narrowband terminals, and broadband terminals to join video conferences;
29. Shall support conference control functions such as creating, adding, recalling, hanging up, ending, joining, muting, unmuting, viewing, and broadcasting.
	* + 1. The location information convergence requirements are as follows:
30. Terminals with the location capability, such as narrowband trunking, broadband trunking, public network trunking, and video surveillance, shall be connected through PSIP, B-TrunC, and SDK interfaces.
31. Shall support for obtaining longitude, latitude, and speed information, with location reporting, track tracking, and playback functions;
32. Shall support formats such as WGS84 and CGCS2000.
	* + 1. The requirements for trunking scheduling convergence are as follows:
33. Shall support audio and video interworking with PDT trunking, Tetra trunking, LTE broadband trunking, 700 Mbit/s 5G private network trunking, public network POC, or other trunking systems;
34. The PSIP protocol shall support the P2P call, group call, location, and SMS functions;
35. The B-TrunC protocol shall support the P2P call, group call, video, location, and group multimedia functions;
36. Public network POC or other trunking communication systems shall support group calls;
37. Allow users to add phones, broadband, and narrowband to the same trunking group to make group calls.
	* + 1. Multimedia service convergence

Multimedia service convergence shall support data services such as short messages of different systems to implement point-to-point and group-based sending and sharing of short messages, voice messages, and pictures between different systems and terminals, meeting the requirements for command command delivery and information sharing.

* + - 1. 5G professional trunking convergence

5G professional trunking convergence shall support 5G professional trunking based on operators' 5G networks and adopt the B-TrunC standard, to achieve trunking communication capabilities, such as P2P calls, group calls, late joining, video intercom, video upload, video viewing, video conference, location reporting, location sharing, and group multimedia.

* + - 1. User management

The converged communications system shall provide the functions of user registration management, user service control, and terminal device management, while also providing software push service and login service for terminals. Other systems may obtain the registration information through the interface.

* + - 1. Audio and video recording

Recording requirements are as follows:

1. Shall have audio and video recording functions, and support the recording, playing, and management of media;
2. Shall support video codec protocols such as H.264 HP and H.264 BP;
3. Shall support 1080p60, 1080p30, 720p, and 4CIF video formats;
4. Shall support AES encryption storage for recorded files to prevent malicious tampering and information leakage;
5. Shall support viewing on PCs and mobile phones.
	* + 1. Disaster recovery and backup

Primary/secondary devices shall be deployed in different physical locations. When the master device is faulty and cannot run, services may be automatically switched to the slave device within several minutes to ensure the normal running of services.

* + - 1. Multi-network deployment

Shall support separate deployment in multiple network environments, such as the e-Government extranet and Internet, connect to various communication systems on different networks, and enable interconnection across the e-Government extranet and Internet.

* + - 1. Multi-level interconnection

The interconnection and interworking of voice, video surveillance, video conference, and location functions shall comply with the SIP and YD/T 3839-2021 requirements.

* + 1. Video conference platform
			1. Video convergence

Video convergence requirements are as follows:

1. The converged communication system shall have the video surveillance convergence function and support unified scheduling of various video surveillance resources;
2. Shall support video surveillance, 4G/5G mobile terminals, broadband trunking, UAV video, individual soldiers, PTZ dome cameras, video calls, video preview, and video recording;
3. Shall supports real-time video viewing, PTZ control, historical video viewing, and directory synchronization;
4. Video access, switching, and control comply with GB/T 28181-2022 and ONVIF requirements;
5. RTSP shall be supported for transmission over IP-based networks;
6. Shall support video surveillance images accessed via IP cameras based on the RTSP protocol;
7. The maximum video definition should be 4K 30 fps;
8. Shall support audio and video interworking with the public network operator's IMS dedicated line through SIP;
9. Shall support VoLTE mobile phone video conferencing;
10. Shall support communication between the audio, video, and management plane through SIP and RESTful interfaces, and enables eLTE handheld and vehicle-mounted terminals to access video conferences;
	* + 1. Video dispatching

The requirements for video dispatching are as follows:

1. Shall support the conference convening function, obtain the multi-level participant list through the cascading service, and support conference cascading;
2. Shall supports site control, such as setting the chair, muting and unmute the microphone, broadcasting, and one-click call disconnection;
3. Shall support meeting administrator control operations, such as polling, customized multi-screen views, and roll call speaking;
4. Shall support the initiation of command and dispatch meetings during key incident assurance, emergency drills, and emergency handling;
5. During the meeting, all participants shall be allowed to learn about the onsite situation through customized continuous presence;
6. Shall support the interconnection between large-screen controls and decoders to uniformly schedule conference, surveillance, trunking, and local video resources;
7. Shall support previewing video sources in the preview area and displaying content on a large screen;
8. Shall support the setting of multiple contingency plans based on business processes, which can be quickly invoked when switching.
	* 1. Video aggregation platform
			1. Video analysis

Video analysis requirements are as follows:

1. Shall support video analysis services, such as license plate recognition and video synopsis;
2. Shall support target, target overall, vehicle depth feature extraction, and the video and image analysis modes;
3. Shall support feature extraction, full data structuring, video, and image analysis.
	* + 1. Recording and forwarding

Recording and forwarding requirements are as follows:

1. Shall have IPC access management, video recording and image storage, video forwarding, and historical video query and download, and other business functions;
2. Shall support IPC access, storage, recording download and playback, media forwarding, and image storage;
3. Shall support IPC migration between trunking services;
4. Shall support pure forwarding of media streams;
5. Shall support image storage service.
	* + 1. Data retrieval

Data retrieval requirements are as follows:

1. Shall support feature data retrieval services, enabling the retrieval of feature data from analysis results for targets, target assemblies, vehicles, etc., to achieve image search by image;;
2. Structured data of analysis results shall be obtained from message queues and sent to services such as structured database search engines for storage;
3. Shall support structured database services and storage and retrieval of structured data from analysis results;
4. Shall support the intelligent video parsing service and fuzzy search of structured data in analysis results.
	* + 1. Video transcoding

Video transcoding requirements are as follows:

1. Shall support real-time transcoding of video streams, including conversion from high bit rates to low bit rates;
2. Shall support conversion between different resolutions, including but not limited to 4K, 2K, 1080p, 720p, and D1.
3. Shall support conversion between different video codecs, including but not limited to H.265, H.264, and H.263.
4. Shall support conversion between different bit rates, with a bit rate range of 64 kbit/s to 8 Mbit/s.
	* 1. Geographic information platform
			1. Data conversion

Data conversion requirements are as follows:

1. Shall should have data format conversion and coordinate conversion functions, and support batch conversion;
2. Shall support multiple data formats, including but not limited to AutoCAD DXF, LandXML, KML/KMZ, ESRI GeoDatabase XML Exporter, ESRI Shape;
3. Shall have the data sorting function, including but not limited to data check and repair, data combination, duplicate data processing, logical relationship check, data tailoring, and other data processing.
	* + 1. Geographic information management

Requirements for geographical information management are as follows:

1. Shall have features like map data storage and maintenance updates, map data browsing, 2D and 3D model display, and data output;
2. Shall have the functions of spatial data conversion and analysis of original data, and processing of map and image file applications;
3. Shall have the ability to integrate and process diverse geographic information, supporting the fusion and processing of basic geographic data (imagery, line maps), thematic data, and dynamic data from facilities and equipment (real-time location data from positioning devices, aircraft, vehicles, etc.) at different scales, resolutions, coordinate systems, and time phases within a unified spatio-temporal framework.
	* + 1. Spatial analysis

The spatial analysis requirements are as follows:

1. Shall support multiple spatial analysis, including but not limited to route planning topology, spatial analysis and query, attribute query, optimal route query, and important facilities and locations query;
2. Shall have the ability to view and browse 2D electronic maps and 3D models, and output 2D and 3D scenes in multiple formats, such as pictures, PDF, and videos;
3. Shall have 2D and 3D map linkage functions, support switching between 2D and 3D map models, have an eagle-eye function for 2D maps, and support switching between different areas;
4. Shall support the spatial data of the physical objects (such as drill equipment and facilities, drill vehicles and personnel, etc.) related to the drill of the associated command plan;
5. Shall support contingency plan process setting and dynamic display, intuitively completes contingency plan drills, and assists in the design and improvement of the contingency plan process;
6. The rescue management system shall support the function of dragging and placing various models on the two-dimensional visual interface. Users may manually place fire/medical rescue vehicles, plan vehicle walking routes and assembly points, and define the storage location of key emergency materials;
7. Shall support the established system equipment model library, such as rescue assembly points, material storage points, road signs, vehicles, and personnel;
8. Shall support route design and roaming functions, allowing routes to be designed as needed. By setting the start and end points and key passing points of the route, the system will automatically generate a complete route and support roaming modes such as walking and flying.
	* + 1. Geographic information service interface

The platform shall have interfaces such as data collection interface, map service interface, function service interface, data synchronization interface, and geographical information management interface.

* 1. Support layer
		1. Service support
			1. Incident handling

Incident handling includes daily incident management, notification and announcement, and incident information and situation in command state. The function requirements are as follows:

1. Requirements for the daily event management function:
2. Shall supportthe display of the status of completed incidents, disposal records, and follow-up reports;
3. Shall support viewing telephone records and text message records related to the handling of the incident in reverse chronological order, and allow viewing of details;.
4. Shall support viewing summary reports generated during the incident handling process and exporting reports.
5. Requirements for the daily notification and bulletin function:
6. Shall support for displaying anotification list, including but not limited to the title, type, group, release status, release time, number of read users, number of unread users, and operations;
7. Shall support the release of notice bulletins, edit rich text notice bulletin information, and send different types of notice bulletins to specified organizations; shallsupport the withdrawal, re-editing, and resending of a published bulletin;.
8. Shall support for modifying and deleting currently published notices and bulletins.
9. Requirements for the function of the commanding state event information:
10. Shall support displaying whether a contingency plan response has been initiated since the current incident was reported; whether the response notice has been released based on the special command structure of the current incident contingency plan; whether the response task has been released based on the response process preset in the current incident contingency plan; and whether the on-site command has been set up for the incident;
11. Shall support showcasing the current impact factors of the event, such as the number of deaths, the number of injuries, economic losses, and other indicators;
12. Shall support displaying the latest follow-up information received on the incident;
13. The basic information about the incident shall be displayed, including but not limited to the incident occurrence time, location, incident receiving event, and incident overview.
14. Requirements for the situation function of the commanding state event:
15. Incident handling personnel shall be able to perform live broadcast on site through mobile devices and synchronize the live broadcast to the command center; which may view the live broadcast of the current event;
16. Event task handling tasks shall be synchronized to the visualized large screen of the command terminal in real time through the task dynamics reported by the mobile terminal, and reminders shall be displayed on the map;
17. The event information reported by the mobile device shall be viewed in real time and the event location information shall be viewed on the map.
	* + 1. Integrated command

Comprehensive command includes emergency response, task scheduling, communication scheduling, video patrol, real-time dynamics, event intelligence, situation summary, and summary report. The function requirements are as follows:

1. Emergency response function requirements:
2. Shall support matching contingency plans based on the current incident types, allowing to view contingency plan information and organizational structure, dynamically adjust response levels and task assignment, and manage organizational structure and sign-in;
3. Initiate emergency response at the corresponding level based on the current incident situation. Shall support automatic distribution of response responsibility information to the owner based on the responsibilities and owners of the member units structured in the current contingency plan. May summarize the responsibility response;
4. After the emergency plan is started, the corresponding emergency response plan tasks shall be sent to the responsible person of the relevant unit. The execution status of contingency plan tasks may be tracked in real time;
5. Shall support adjustment to emergency plan and response level based on the incident development. After the contingency plan is adjusted, the system will resend the response responsibility and contingency plan task to the relevant company owner. Records of adjustments to plan response levels may be viewed;.
6. After the contingency plan is initiated, the organization structure shall be dynamically adjusted based on the on-site situation;
7. Shall support on-site personnel check-in, join the corresponding onsite work team, and summarize the check-in information.
8. Requirements for the task scheduling function:
9. User-defined tasks shall be created and sent to the owner, participant, and copy-to person for execution. Task information shall be set, including the task label, task name, task location, execution time, task time limit, task description, and task attachment;
10. After receiving a task, the task execution personnel shall view the task details and share the task information and execution status through pictures, texts, and videos;
11. Shall support real-time viewing of the completion status of various tasks in real time and learn about the task status through statistics and summary.
12. Requirements for communication scheduling functions:
13. Shall support viewing contact information in the address book, organization structure of the current incident plan, and relevant units and personnel information in the onsite incident command structure; make calls, send individual or group SMS messages, and initiate or join meetings for related contacts within the organization structure;
14. Shall support viewing historical communication records of the current event, including call records, SMS records, and conference records Also support viewing the phone recordings, SMS details, and meeting minutes;
15. Shall support viewing list and details of surveillance videos, conference terminals, and trunking terminals. Support functions such as monitoring preview and quick conference.
16. Requirements for the video inspection function:
17. Based on the surrounding range of the center point, the surveillance resources on the map shall be retrieved by drawing the surrounding range of the line and polygon. The search results may be displayed by video tags;
18. Video images shall be previewed and polled in batches for search results. Different polling rules may be switched;
19. Shall support customized grouping and saving of retrieved video combinations. Video surveillance and video surveillance may be associated to form a video chain. Associated video resources may be previewed in batches based on the video chain.
20. Real-time dynamic function requirements:
21. Shall support viewing online status of the current address book (emergency communication must be activated or bound to terminals), emergency teams, trunking terminals, and real-time location on the GIS map. Also support viewing the locations of related personnel, teams, and devices based on the current event;
22. During task execution, the task personnel shall report intelligence, which will automatically generate trajectory nodes. Through these trajectory nodes, one may view the historical task reporting details of the personnel;
23. Shall support playback of the movement trajectories of personnel, teams, and equipment, and dynamic playback of movement paths within any time period.
24. Event intelligence function requirements:
25. Shall support viewing of various multimedia information reported based on the whole process of emergency handling of the current incident;
26. Shall support real-time broadcast of current meteorological data, including temperature, humidity, and precipitation, shall be supported.
27. The situation summary shall cover the whole process from receiving the report to the end of the response, and support the panoramic review of each key node of the incident in the timeline;
28. The summary report shall support the creation of a template-specific report file for the incident disposition process.
	* + 1. Video application

Video applications include video inspection and tag management. The following table lists the function requirements.

1. Video inspection shall support quick sequencing of real-time surveillance images in batches by grouping established surveillance devices. Users may specify the image sequencing interval and the number of videos that can be played in rotation at the same time.
2. Label management requirements are as follows:
3. Support shall be provided for defining tags for common scenarios in joint command and control, such as traffic black spots and waterlogging spots. Related monitoring information may be labeled so that specific tags can be used in unified query;
4. Shall support labeling of surveillance resources in batches. Video resources in the same scenario may be aggregated and displayed by group by video note during peripheral search.
	* 1. Data support
			1. Data governance

Shall comply with GB/T 34960.5-2018 and provides the capability of convergent processing of structured, semi-structured, and unstructured data, implementing unified storage, computing, management, and scheduling of government data, city data (perception, spatiotemporal, and video), and public data.

* + - 1. Data resource

Data resource requirements are as follows:

1. Shall have basic resource libraries such as population, legal person, natural resources, economy, and electronic certificates to support interconnection with the government big data platform;
2. Shall have on-duty data, emergency command, special prevention, and three-prevention data;
3. Shall have a library of topics such as natural events, accidents, health and epidemic prevention, public security, urban lifeline, key areas, and major activities.
	* + 1. Data management

Data management requirements are as follows:

1. Shall support the collection, sorting, summary, production, and release of shared open data;
2. Shall have the functions of filling, modifying, deleting, submitting, importing, exporting, and printing for government data sharing and opening;
3. Data collection shall adapt to the system environment of each department and level;
4. Shall have the functions of real-time data collection, flow processing, and on-demand sharing;
5. Shall support proactive data collection and reads service system database logs of data source departments.
	* + 1. Data service

Data service requirements are as follows:

1. Shall have the functions of defining, executing, managing, monitoring and collecting statistics on database table exchange tasks;
2. Shall provide the functions of defining, registering, subscribing, approving, consuming, monitoring, and collecting statistics on message queues;
3. Shall support the transfer of any type of files, such as video files, image files, binary files, text files, and database files.
	* 1. AI support
			1. Platform tools

The platform tools must meet the following requirements:

1. Shall have the ability of one-stop training, reasoning and management integrating computing power;
2. Shall provide full-stack AI model unified development, reasoning, and operation functions.
	* + 1. Knowledge engine

The requirements for the knowledge engine are as follows:

1. Support shall be provided for the management and services for algorithm models based on scenarios;
2. Shall support coexistence and convergence of multiple algorithms and one-click deployment and loading of algorithms;.
3. Shall support the function of adjusting the parsing algorithm as required, upgrading the algorithm version, and testing the algorithm model;
4. Shall be able to synchronise algorithm tasks and schedule them based on priority;
5. Shall support intelligent scheduling, detection, and monitoring of algorithm tasks.
	* + 1. Atomic ability

Shall provide atomic capabilities such as OCR, CV, NLP, and multi-modal capabilities to support on-demand assembly and support AI service scenarios.

* 1. Application layer
		1. Situational awareness
			1. On duty

The requirements for the on-duty function are as follows:

1. Shall have a telephone reporting function, automatically popping up a screen to identify caller information when the call is connected, and creating an event entry interface;
2. Shall have video reporting functionality, automatically assign on-duty personnel to answer calls, establish video calls between on-duty personnel and reporters, and automatically obtain the location of reporters. When reporting via video, it shall support capturing or recording video images;
3. Shall support receiving the information recorded by frontline personnel or filled in by frontline personnel, and support contacting the reporting personnel through voice and video;
4. Shall support incident reports, automatically generate report content according to templates, automatically generate PDF files, and promptly report to relevant personnel;
5. Shall support event circulation, select recipients through the address book, and transfer event information;
6. Shall support the query of event summary information, collect statistics on event information by event status, and collect statistics on damage;
7. Shall provide daily, weekly, and monthly statistics on emergencies, collect statistics by incident level, response level, and damage, collect statistics on the number of received reports, and print functions; should also allow for the selection of contacts from a directory for event statistics reporting;
8. The function requirements of the duty arrangement are as follows:
9. On-duty management shall be provided, and on-duty rules shall be set for the affiliated organizations and lower-level organizations that need to be on-duty, including whether roll call is required and on-duty roles;
10. The automatic shift scheduling function and automatic shift scheduling rule setting shall be supported;
11. Shall be capable of setting up duty schedules for special circumstances such as holidays and major events;
12. Shall have the function of a duty schedule, and can display the duty schedule information in a way that follows the calendar format such as weekly or monthly;.
13. Shall have the function of duty roll call and can view the roll call records;
14. Shall be capable of swapping shifts and can view the shift swapping records;
15. Shall have the function of shift handover, and can view the shift handover records.
	* + 1. Visualized development

The requirements for the visualized development function are as follows:

1. Shall support the visualized 2D and 3D development capability. The 2D visualization supports development based on the low-code development platform;
2. Shall support the reference of customized 3D libraries, GIS rendering components, environment rendering components, and 3D model rendering components;
3. Shall support graphical, drag-and-drop, and WYSIWYG editing functions for visualized applications; provide an integrated drag-and-drop interface that allows users to add components to the page and adjust the position and layout;
4. Shall support visualized application configuration; support card style, data, and interaction configuration; support application preview, publishing, importing, exporting, and other functions;
5. Shall support the development of customized components, including creating and configuring various components, customizing visual elements, and setting data sources to implement visualized data display.
	* + 1. Asset management

Requirements for asset management functions:

1. Integration and use of the visualized low-code platform and 3D visualization engine shall be supported, and a unified asset management interface shall be provided;
2. Shall provide the multi-tenant asset management capability on the visualized platform, support asset isolation and sharing among different tenants, and provide the tenant permission management function to ensure that tenants can access and operate only their own assets;
3. A low-code development environment shall be provided, allowing users to create and manage assets by dragging and configuring, and providing templates and component libraries.
	* 1. Monitoring and warning
			1. Event warning

The requirements for the event warning function are as follows:

1. Standard interfaces shall be provided for relevant parties to report warning information;
2. Customized warning policies shall be provided;
3. Pre-warning processing and task delivery shall be available;
4. Shall support surveillance video browsing;
5. Special operation monitoring shall be supported, including but not limited to economic development, public security, urban governance, administrative services, people's livelihood and happiness, transportation operation, ecological environment, urban planning, global tourism, and party building guidance;
6. Thresholds shall be set based on service requirements. When the thresholds are exceeded, multi-level warnings shall be provided.
	* + 1. Collaborative plotting

The collaborative plotting function requirements are as follows:

1. Shall support customizing the point, line, and surface attributes of the map plotting tool;
2. Files, pictures, video conferences or video surveillance images, and application systems shall be supported;
3. Data import templates shall be generated based on classification attributes;
4. Shall support the statistics template and style of customized classification fields;
5. Shall support custom template types to classify common points, lines, and surfaces for template management;
6. Shall support quick map plotting by selecting template categories;
7. Supports free plotting points and map retrieval points to plot the data information on the map;
8. Allows users to select the line (surface) drawing tool to draw free lines (surfaces), circular lines (surfaces), and rectangular lines (surfaces);
9. The direction of action on the single arrow and double arrow shall be supported.
10. Pictures, videos, and documents shall be uploaded for plotting information.
11. The drawing layer information shall support customized group management.
12. Support shall be given to inviting other organisations to participate in map marking;
13. After receiving the invitation, the collaborative organization shall support plotting based on the assigned layer permission and plotting data classification;
14. Batch import Excel templates shall be generated based on the fields defined by different classification points, and batch import is supported;
15. Data imported in batches shall be categorized by template;
16. Shall support adaptive screen resolution;
17. Plot sharing and playback shall be supported;
18. Multi-dimensional statistics shall be generated based on the data plotted on the map based on the classification statistics template.
	* + 1. Moving track

The requirements for the moving track function are as follows:

1. Shall support subscription to the track information of specified terminal devices;
2. Shall support viewing the online status of the current address book personnel (mobile apps must be installed or terminals must be bound), rescue teams, trunking terminals, and real-time location on the GIS map;
3. When task personnel report intelligence during task execution, track nodes shall be automatically generated;
4. Shall support the playback of moving tracks of personnel, teams, and devices.
	* 1. Command and dispatch
			1. Resource scheduling

The resource scheduling function shall meet the following requirements:

1. Support should be provided for locating the positions of teams, material and equipment depots, rescue teams, shelters, and protected targets via maps, and for categorising and displaying them on maps;
2. Shall support the search of geographical information, materials, shelters, protection targets, and rescue expert data by keyword, and view geographical location information in search results on maps;
3. Shall support the search of multiple data resources within the coverage area by using the map polygon search tool (including points, lines, and surfaces, including but not limited to geographical information, materials, shelters, protection targets, and rescue expert data);
4. Risk hazard information shall be displayed on the map. Based on the scope of the incident or a customised scope, risk hazard information surrounding the incident may be viewed..
	* + 1. Command and dispatch

Command and dispatch functions include response initiation, personnel dispatch, vehicle dispatch, material dispatch, and incident notification. The requirements are as follows:

1. Startup response function requirements:
2. Emergency organization members shall be automatically notified by phone, SMS, or system message when the response is started;
3. Plan tasks shall be automatically delivered to the emergency organization team, and members can receive the plan tasks and provide feedback;
4. The command center shall be able to view the progress of contingency plan tasks, view the overall incident command process, and mark the completion status of process nodes.
5. Requirements for personnel assignment functions:
6. Shall be able to set dispatch destinations and support destination adjustments on the map;
7. The transportation mode for the transferred personnel, including driving, cycling, and walking, shall be available. The system can automatically estimate the time to reach the destination;
8. Automatic sign-in shall be provided. When the transferred personnel arrive at the area near the specified location, the sign-in can be automatically completed;
9. Shall allow users to view the movement track of the transferred personnel and the execution feedback of the transferred personnel.
10. Vehicle dispatching function requirements:
11. Real-time vehicle location information shall be displayed on the map. The dispatch destination can be set;
12. Shall be capable of selecting the required vehicles on the map and delivering the dispatching task;
13. The dispatch route shall be set up and the route can be delivered to the dispatched vehicle;
14. It shall have the automatic navigation function to view the movement track of the dispatched vehicle.
15. Requirements for material dispatching functions:
16. The required material types and quantities shall be available, and the system can match the nearby warehouse;
17. Shall have voice or video contact for the warehouse contact, or add the warehouse contact to the meeting;
18. The material transfer status shall be able to be viewed. After the material transfer is complete, the warehouse inventory data can be automatically deducted.
19. The requirements for the event notification function are as follows:
20. Shall notify designated personnel by batch SMS, system message, or phone;
21. Shall automatically synthesize text into voice, and support the setting of confirmation feedback during voice notification;
22. The notification template for setting different modes shall be available. The template can define macro fields and reference the template when an event notification is initiated;
23. An event group shall be automatically created for each incident, and notifications can be sent to the event group.
24. Requirements for the video dispatch function:
25. A video surveillance device directory tree shall be provided and support keyword-based search for video surveillance devices;
26. Shall be capable of viewing the distribution of video surveillance devices on the map, and automatically avoid, aggregate, and thin out surveillance devices based on the map scale;
27. The video surveillance status shall be detected and marked, including online and offline(No code stream, white screen, or response timeout)
28. ; Multiple monitoring windows shall be integrated into one window for unified control;
29. Shall allow users to browse real-time video images or historical video images, and captures and records surveillance video images;
30. Watermarks shall be superimposed during surveillance video viewing to enhance security.
31. Requirements for the GIS dispatching function:
32. An event layer shall be provided. When an incident occurs, the location of the crime scene shall be located and the occurrence point shall be marked on the map;
33. The personnel layer shall be provided. The personnel layer shall be displayed through the location reported by the mobile device;
34. A device layer shall be provided to display the distribution of video surveillance devices;
35. Material layer shall be provided to display the distribution of material warehouses;
36. A site layer shall be provided to display the site distribution layer defined by the system;
37. Map search, circle selection, box selection, and multi-point selection shall be provided;
38. Should be capable of switching between map display modes, such as 2D mode, 3D mode, and satellite map mode;
39. Map collection shall be available, and search may be performed after the location is found;
40. Map plotting shall be provided, and combat plotting through circles, squares, arbitrary polygons, single arrows, double arrows, etc. shall be supported on the map.
41. Shall support displaying incident handling records in a timeline, updating and obtaining images, videos, voice, and texts reported by mobile devices in real time, and displaying all onsite information;
42. One-click coordination shall be supported for incident handling by related personnel, and an IM communication group is automatically created for all personnel involved in incident handling. All members may view the incident handling information provided by onsite personnel in the form of text, voice, image, and video.
	* + 1. Task scheduling

The requirements for the task scheduling function are as follows:

1. Shall support the creation of tasks, send them to other users, and follow up the task execution status;
2. Shall support presetting command solutions, security solutions, and rescue solutions in advance based on different incident types to provide data sources for intelligent task matching. Shall support modification, deletion, and query the configured task scheme;
3. Intelligent matching of relevant task solutions, including command solutions, support solutions, and rescue solutions, shall be supported based on the event type. The task template content shall be confirmed or edited and sent to designated personnel;
4. After the responsibilities of member units and tasks of action teams are distributed, the SMS response status shall be automatically tracked, and the relevant response time shall be obtained, and the tracking response status shall be displayed in a list;
5. Shall suppport receiving contingency plan tasks through mobile devices, providing feedback on the execution status of the contingency plan tasks, and sending pictures, videos, and texts for feedback;
6. Shall allow users to view all sent and received task records and may view the total number and status of various published tasks, including being executed, completed, and completion rate;
7. The event information shall be displayed on the upper chart, including all to-be-scheduled events. The event title, time, and location shall be displayed in the list in descending order of time. In addition, the disaster indicators that need to be concerned about different types of events shall be displayed differently and the disaster indicator data shall be updated in real time based on the onsite reporting situation.
	* 1. Assisting decision-making
			1. Situation study and judgment

Situation analysis includes surrounding situation, monitoring analysis, and consultation analysis. The function requirements are as follows:

1. Requirements for the surrounding situation functions:
2. Shall automatically locate the incident location on the map and automatically adjust the location to the center of the map;
3. The real-time distribution of surrounding rescue personnel, fire brigades, rescue teams, rescue vehicles, video surveillance, hospitals, shelters, material warehouses, civil air defense projects, and protection targets shall be viewed on the map;
4. The distribution of risk sources, hidden trouble points, and waterlogging-prone points around the incident location shall be viewed on the map;
5. The system shall support the selection of points on the map, the adjustment of the radius size for filtering, and the points within the circled range should be listed by category;
6. Quick reset to the incident location on the map shall be supported.
7. Requirements for the monitoring analysis function:
8. Shall automatically filter the video surveillance devices around the incident location by distance and list the video surveillance devices within the range;
9. Multiple monitoring images shall be opened at the same time, and the selected monitoring devices are automatically arranged in the matrix.
10. The video matrix layout shall be set. The number of images may be selected. Each image has multiple layout options.
11. Video surveillance devices shall be selected from templates and video surveillance templates shall be customized.
12. Requirements for the consultation and analysis functions:
13. Shall support the selection of consultation objects from the address book, such as personnel, devices, groups, external organizations, and experts;
14. Shall suppport the addition of name and phone number of the person to the consultation;
15. Shall support the initiation of consultations by selecting on-site personnel, video surveillance, etc. on the map;.
16. Shall support the establishment of a radius-based screening system centred on the incident site to screen on-site personnel and video surveillance, and for initiating consultations..
	* + 1. Indicator collection

The requirements for metric collection are as follows:

1. A unified index system management platform shall be supported, and unified management of application index system shall be supported;
2. Shall support the operation capabilities of indicators such as subscription, circle reading, red light, and precise push;
3. A unified indicator data service shall be supported to ensure that multiple indicator data are sourced from the same source. In addition, multiple indicator calculation methods, such as rules, tags, APIs, and customized modeling, shall be supported;
4. Online preview of indicator data and manual calibration and version iterative viewing shall be supported to ensure the consistency, accuracy, and vividness of indicators on the upper screen.
	* + 1. Collaboration and consultation

The requirements for collaboration and consultation are as follows:

1. Shall support multiple ways to select members to initiate meetings, such as selecting from the address book, meeting plans, and maps. The built-in video software client may join the conference and has the conference scheduling permission.
2. Conference control functions shall include member status monitoring, re-call upon disconnection, adding and removing participants, muting all participants, enabling and disabling video, and setting continuous presence. (supports layouts such as 1, 2, 3, 4, 6, 9, 16, and 24), polling, broadcasting, giving the floor, voice activation, conference snapshot, conference recording, conference timing, conference exit, and conference end;
3. Shall provide the consultation and collaboration functions, including desktop sharing, electronic whiteboard, conference material sharing, graphic and text assistance, and collaborative annotation.
	* + 1. Intelligent interaction

The requirements for the intelligent interaction function are as follows:

1. Real-time interaction of content on the screen through digital people shall be supported, and the configuration of various art resources and knowledge bases such as digital people's image, voice, background, speech, and skills shall be supported;
2. Intelligent interaction through voice interaction shall be supported, and the functions of digital human explanation, digital human screen control, and digital human questioning and numbering shall be implemented.
	1. Interaction layer

The requirements for the interaction layer are as follows:

1. Shall support visual display and interaction on multiple terminals of different sizes, such as large screens, computers, command terminals, and mobile phones;
2. Shall provide the capability of setting up and interacting visualized scenarios on multiple terminals, and support operations on the man-machine interface on multiple terminals;
3. The interactive display information shall be synchronized with the actual status to reflect the typical characteristics of the actual status;
4. Switching and visualized interaction between different perspectives shall be supported. For example, global/local perspective monitoring, tracking perspective monitoring, and surround view monitoring shall be supported by using the mouse, virtual button, and shortcut keys;
5. Shall support real-time scheduling of terminal resources based on services, such as displaying video images captured by cameras on the screen within seconds.
	1. Security management

Security management shall comply with the requirements specified in GB/T 22239-2019, GB/T 22080-2016, and GB 35114-2017.

* 1. O&M management

The O&M management shall comply with the requirements specified in GB/T 43208.1-2023.

1. Multi-level linkage requirements

All industry departments in cities may rely on the multi-level linkage command system to coordinate the joint management and integrated action of all district command centers and departments, and realize cross-level, cross-department, and cross-regional business collaboration and command and dispatch of cities, districts, and streets. Figure 2 shows the architecture of the multi-level linkage command design.



Figure 2 Multi-level linkage command design architecture

* 1. Physical association

The requirements for physical association are as follows:

1. The command center at the municipal and district levels shall build a dedicated 10G optical fiber network as the basis for the physical linkage of the site. At the same time, the municipal and district command centers shall build an integrated and interconnected centralized control system to implement unified management and control of large-screen display and control, intelligent agents, conference sound, and environmental control systems, and support multi-point command functions;
2. The district-level command center shall connect to the centralized control access system in series to realize resource sharing and multi-level joint control between the municipal and district command centers.
	1. Communication linkage

The communication linkage requirements are as follows:

1. Converged communication platforms are built at the municipal and district levels to implement unified access management and converged audio and video dispatching for terminal devices such as analog phones, digital phones, mobile phones, trunking intercom, surveillance videos, video conferences, mobile apps, and small mobile emergency platforms;
2. Various communication terminals in streets and communities are connected to the district-level converged communication platform, and the district-level converged communication platform is connected to the municipal converged communication platform, implementing emergency command and integrated communication scheduling for major activities.
	1. Data association

Data linkage requirements are as follows:

1. Build a unified data front-end node for command and dispatch data services at the municipal and district levels to support the "one map" command and dispatch of the whole city. The event information, resource information, contingency plan information, address book information, image information, video information, and monitoring information of the municipal and district command and dispatch platforms are aggregated to the front-end node at the current level. The street-level emergency service data is aggregated to the front-end node at the district level;
2. The front-end data nodes in each district aggregate data to the municipal platform through the big data service, forming a "one map" of the city's command and dispatch resources;
3. The city and district data front-end node permissions are managed by level, implementing integrated sharing services throughout the city and meeting the data requirements of command and dispatch services.
	1. Application association

Application association requirements are as follows:

1. Command and dispatch application systems shall be built at the municipal and district levels, including on-duty, command and dispatch, comprehensive support, and real-life command systems;
2. If the command and dispatch application system has been built in each district, the system shall connect to the municipal system through interfaces to realize integrated command and dispatch function control.
3. Interface requirements

The interface requirements are as follows:

1. The implementation of the platform interface shall be irrelevant to the implementation technology. The change of the internal implementation technology of the interface shall not cause the change of the service interface;
2. Platform interfaces shall have unified data formats and interaction parameters, and provide mechanisms such as error prevention, fault tolerance, and validity check;
3. The platform interface server shall authenticate the client identity and encrypts sensitive data;
4. The platform shall not support interfaces that can bypass the system security mechanism to access the platform or data;
5. Logs shall be recorded for platform interface access operations, and the log content shall meet the audit requirements.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_