MCX Emergency Communications Solution.

- Driving 5G private network ecosystem and value growth

Solution Introduction

MCX Business Analysis & Industry Applications

MCX Business Analysis

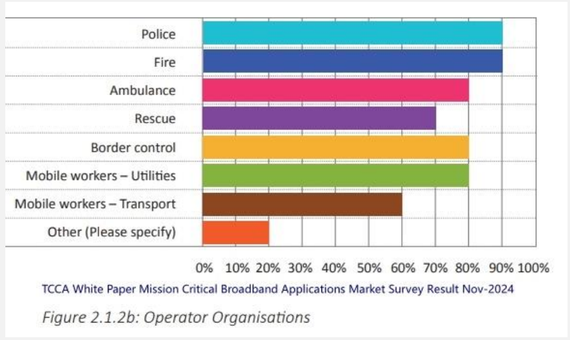


Figure 2.1.2b: Operator Organisations

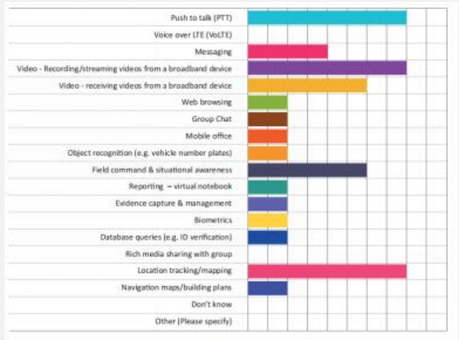


Figure 3.1.2b: Administrator Mission Critical Application Capabilities

MCX Industry Applications

Public Safety & Security

- Real time command and coordination of actions for police/fire/medical emergencies, etc
- Real time video image transmission

Emergency

- Dispatching and cooperation in natural disaster and accident rescue operations
- Real time monitoring of disaster situation, on-site data transmission

Military

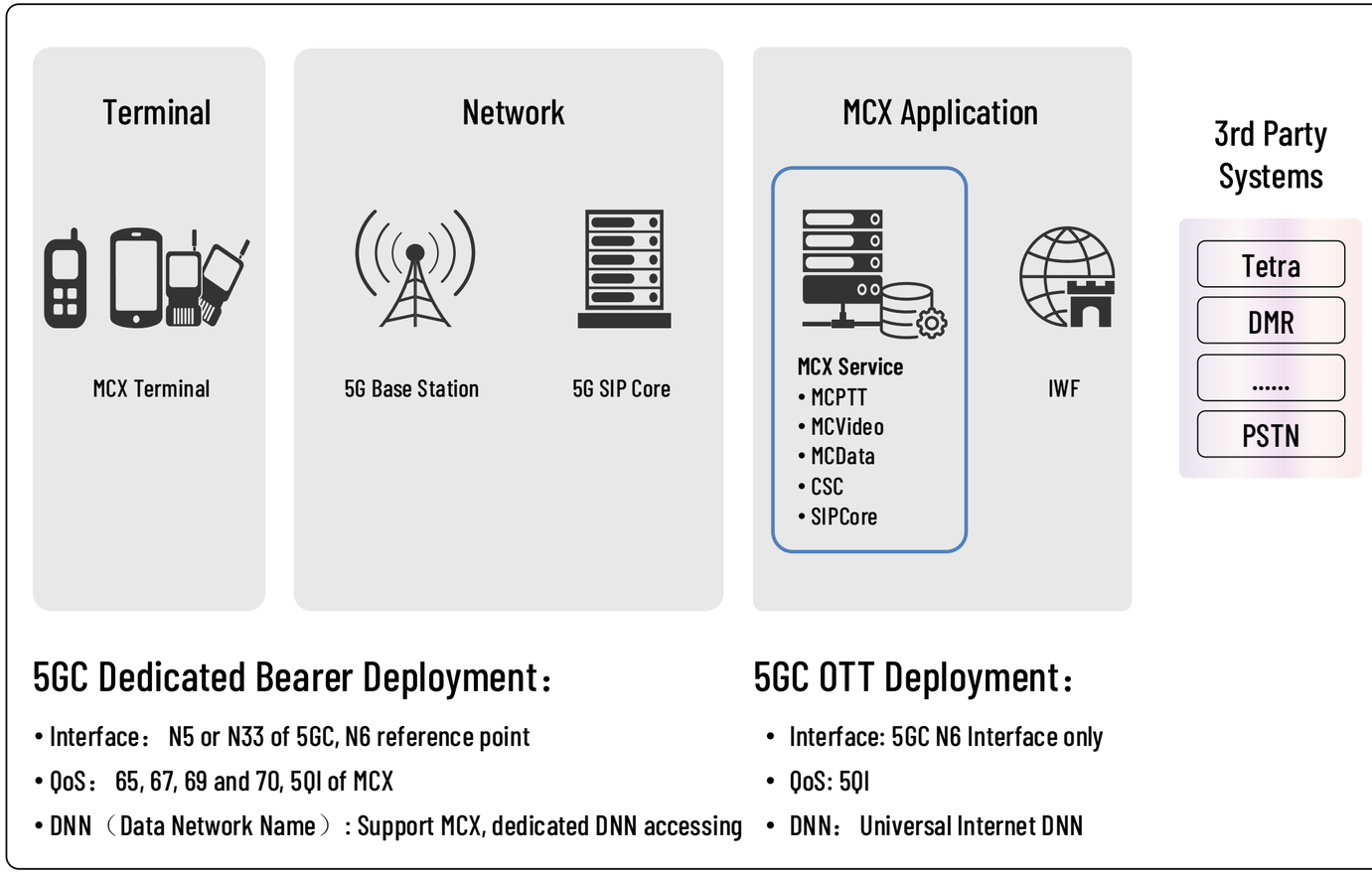
- Key communication supports real-time communication between combat units
- Quickly issue commands, transmit battlefield intelligence, and adjust tactical layouts

Rail Transit

- Voice communication between different positions
- Location and management of video surveillance, alarms, and unexpected events

Solution Introduction

Relationship between 5G Private Network and MCX



5GC Dedicated Bearer Deployment：

- Interface： N5 or N33 of 5GC, N6 reference point
- QoS： 65, 67, 69 and 70, 5QI of MCX
- DNN（Data Network Name）: Support MCX, dedicated DNN accessing

5GC OTT Deployment：

- Interface: 5GC N6 Interface only
- QoS: 5QI
- DNN： Universal Internet DNN

5G Private Network Core Capability

Big Bandwidth eMMB: DL Peak: 10Gbps, UL Peak:1Gbps
Low Latency uRLLC： End-to-End Delay less than 10ms
Multi Connection mMTC： 1 million devices connection per Squ. KM
Advanced QoS: Logical isolation, differentiated QoS guarantee

MCX Priority under 5G Private Network

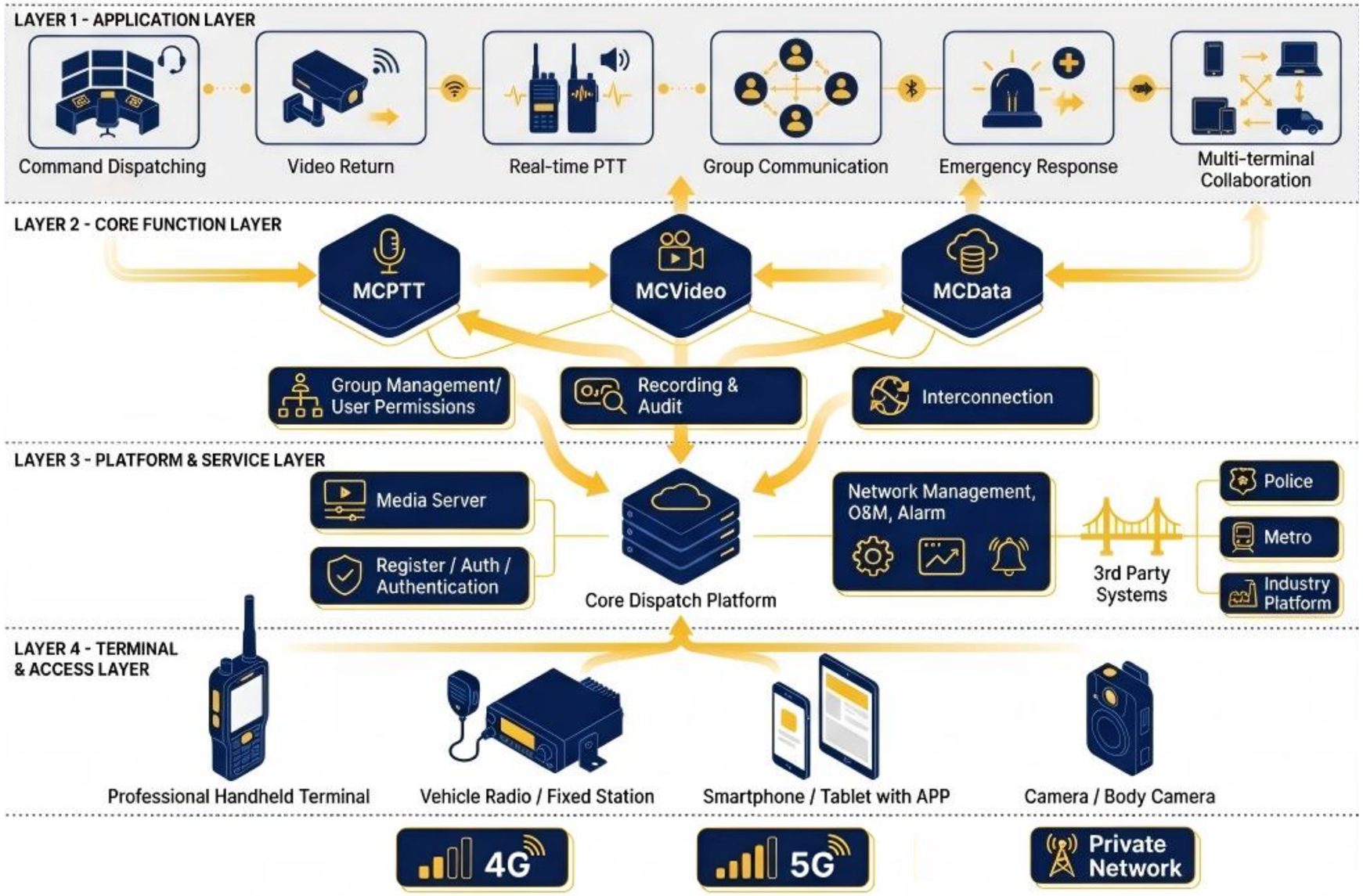
- The highest business priority in the network
- Support preempt public channel resource
- Dedicated bearer, network resource guarantee
- Internet interface integration, native broadband tunking

MCX Business Type

MCPTT | MCVideo | MCData

Solution Introduction

MCX solution whole picture



Solution Introduction

Abundant of Trunking Functionalities

CRAI-MC provides abundant of multimedia trunking functionalities.

MC PTT (Voice)

- Full-duplex Private Call
- Half-duplex Private Call
- Voice Group Call
- Emergency Private Call
- Emergency Group Call
- Emergency Alarm
- Ad-hoc Group Call Management
- Floor Control
- Priority
- Group Chat
- Group Broadcasting
- First Call Response
- Position Location
- Call Queueing /Forwarding /Hold

MC Video (Video)

- Full-duplex Video Private Call
- Video Group Call
- Video Broadcast Call
- Video Group Chat
- Emergency Private Call
- Emergency Group Call
- Ad-hoc Group Call Management
- Transmission Control
- Video Pushing/Live Streaming
- Ambient Monitorring

MC Data (Data)

- Point-to-point SDS
- Group SDS
- Emergency Point-to-point SDS
- Emergency Group SDS
- File Distribution
- File Storage
- Emergency Alarm
- Ad-hoc Group Management
- Dialogue Management
- Enhance SDS Management
- Data Transmission Control

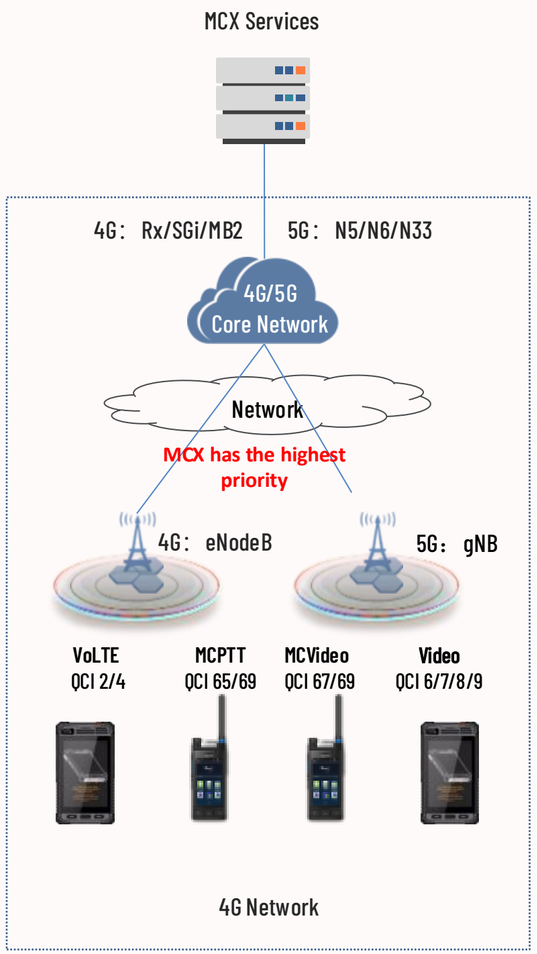
Dispatcher (Dispatching)

- Black and White List
- Remote Private Call
- Remote Group Call
- Ambient Listening & Monitoring
- Group Broadcasting
- Group Switching
- Video Pushing & Live Streaming
- Override/Interrupt
- Audio and Video Recording
- Video Callback & Forwarding
- Message Pushing
- GIS Management

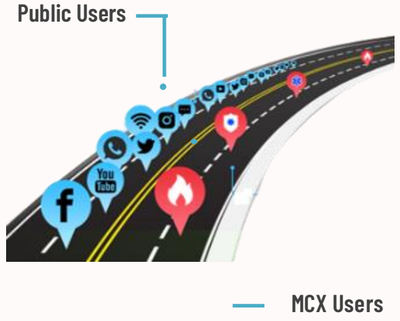
Solution Introduction

MCX Reliability

MCX Business and 4G/5G Network QoS Guarantee



MCX services are coupled with 4G and 5G networks through standard 3GPP interfaces to ensure transmission indicators such as priority, delay, and packet loss during the network transmission process of MCX services, thereby ensuring the QoS.



4G/5G QCI/5QI QoS Business Mapping Table

Table 5.7.4-1: Standardized 5QI to QoS characteristics mapping

5QI Value	Resource Type	Default Priority Level	Packet Delay Budget	Packet Error Rate	Default Maximum Data Burst Volume (NOTE 2)	Default Averaging Window	Example Services
1	GBR NOTE 1	20	100 ms	10^{-2}	N/A	2000 ms	Conversational Voice
2		40	150 ms	10^{-3}	N/A	2000 ms	Conversational Video (Live Streaming)
3		30	50 ms	10^{-3}	N/A	2000 ms	Real Time Gaming, V2X messages Electricity distribution – medium voltage, Process automation - monitoring
4		50	300 ms	10^{-6}	N/A	2000 ms	Non-Conversational Video (Buffered Streaming)
65		7	75 ms	10^{-2}	N/A	2000 ms	Mission Critical user plane Push To Talk voice (e.g., MCPTT)
66		20	100 ms	10^{-2}	N/A	2000 ms	Non-Mission-Critical user plane Push To Talk voice
67		15	100 ms	10^{-3}	N/A	2000 ms	Mission Critical Video user plane
75		25	50 ms	10^{-2}	N/A	2000 ms	V2X messages

MCX KPI

- KPI definition of 3GPP standard.

MCPTT KPIs	Threshold	Likelihood	LTE Packet Delay Budget
MCPTT KPI 1 – Access Time	< 300 ms	95% of all MCPTT requests	< 60 ms
MCPTT KPI 1 – Access Time (Emergency)	< 300 ms	99% of all MCPTT requests	< 60 ms
MCPTT KPI 2 – End-to-End Access Time	< 1000 ms	N/A	< 60 ms
MCPTT KPI 3 – Mouth-to-Ear Latency	< 300 ms	95% of all voice bursts	< 75 ms
MCPTT KPI 4 – Late Call Entry Time (encrypted calls)	< 350 ms	95% of all Late Call entries	< 60 ms
MCPTT PESQ	MOS-LQO ≥ 3.0	N/A	N/A
MCPTT POLQA	MOS-LQO ≥ 3.0	N/A	N/A

Market Analysis & Applicable Scenario

Smart Park 5G Private Network & MCX Application Scenarios

MCPTT | **MCVideo** | **MCData** | ✓ Critical voice communication | ✓ Critical video transmission | ✓ Critical data monitoring

Security department

- Inefficient Traditional Patrols
- Monitoring Blind Spots
- Delayed Incident Response
- Untimely Patrol Team Communication

- 5G Private Network: High-Rate, Real-Time HD Patrol Video Transmission
- Fast Group Setup, High-Priority Instant Communication
- MCX Key Command Delivery

Operation and maintenance department

- Wide Distribution
- Time-Consuming Patrols
- Delayed Fault Detection
- Low Maintenance Communication Efficiency

- MCData + 5G Private Network: Access Key Operational Data of Park Devices
- Fast Staff-Expert Communication
- Remote guidance via video call

Enterprise sector

- Low communication efficiency, slow file transfer, and affect work progress

- Flexible Communication Group Setup, One-Click Group Call
- Fast broadcasts, emergency calls
- File transfer is fast and efficient, leaving traces throughout

Management department

- Non-Real-Time Resource Info
- Delayed Env Anomaly Detection
- Slow Data Aggregation
- Lagging Decision-Making

- Real-time intercom
- Group chats
- File sharing
- MCData combines 5G private networks to collect park resources and environmental data in real time and quickly distribute data

Logistics sector

- Unclear Vehicle Positions
- Irrational Routes
- Untrackable Cargo Status
- Low Scheduling Efficiency

- Optimize transport routes based on traffic and cargo conditions, real-time feedback on cargo status
- High-precision positioning and real-time monitoring of vehicles
- The dispatch center communicates with drivers in real time

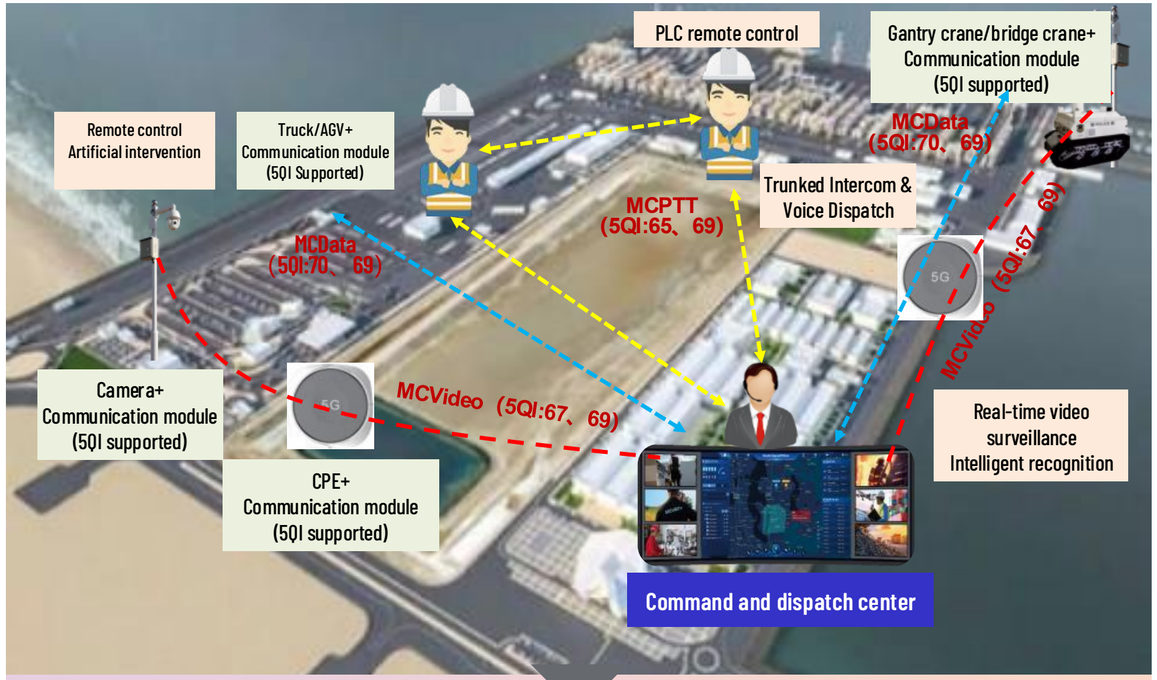
Emergency department

- Poor Emergency Info Transmission
- Difficult Rescue Coordination
- Delayed Evacuation Commands

- Voice communication between emergency command center and rescuers, fast command transmission, coordinated operation of rescue forces
- Real-Time HD Video & Data Transmission (Emergency Scenes)

Market Analysis & Applicable Scenario

Smart Port 5G Private Network & MC Application Scenarios



Seamless coverage of 5G private network

5G private network

- Low Latency (ms) , Large Bandwidth , Massive Connections
- On-Demand Resource Adjustment (Bandwidth/ Priority)
- Unmanned Device Collaboration & Precise Control
- Data-Driven Operation & Management

MCPTT

- Priority Real-Time Voice, Full-Duplex/Half-Duplex/Emergency Call, Talk Right Control, Group Chat, Broadcast, Transfer, Hold, etc.
- Cargo Scheduling, Transportation Collaboration, Emergency Command, On-Site Monitoring, Equipment O&M

MCVideo

- Video calls, live video, push & pull, video group chat
- Real-Time HD Video Transmission, Unmanned Driving Monitoring, On-Site Operation Monitoring, Emergency Command, Video Recognition

MCData

- Messaging, positioning, customized data
- Remote Device Control, Intelligent Transportation, Production Data Analysis, Equipment Condition Monitoring, Intelligent Tallying

Command and dispatch

Integrate voice, video, and data to provide map-based multimedia comprehensive command and scheduling functions.

Market Analysis & Applicable Scenario

Industrial Manufacturing 5G Private Network & MCX Application Scenarios

- MCPTT （5QI:65、 69）
- MCVideo （5QI:67、 69）
- MCData （5QI:70、 69）
- 5G&MCX deep docking provides high-priority communication and ensures service quality
- Supported by international standards, technology evolves continuously
- Multi-network convergence, eliminating communication barriers
- High reliability, ensuring uninterrupted production
- Multimedia services, adapting to diverse scenarios
- Flexible deployment, matching enterprise development

5G private network

- Network Connection, Computing Power Sinking, Service Integration
- Low Latency (ms) , Large Bandwidth , Massive Connections, High Reliability
- Private/Public Network Full Isolation(Service Flows, Operation and Maintenance)
- Supports the Transformation and Upgrade Towards Informatization, Digitization, Automation and Intelligence

MCPTT

- Priority Real-Time Voice, One-Click Group Call, Full-Duplex/Half-Duplex/Emergency Call, Talk Right Control, Group Chat, Broadcast, Transfer, Hold, etc.
- Equipment Patrol Communication, Production Scheduling Command, Equipment Maintenance & Emergency Repair, Logistics Transportation Coordination, Cross-Plant Collaborative Operation

MCVideo

- Video calls, live video, push & pull, video group chat
- Remote video diagnosis and guidance of production line faults, remote production monitoring, and emergency on-site command

MCData

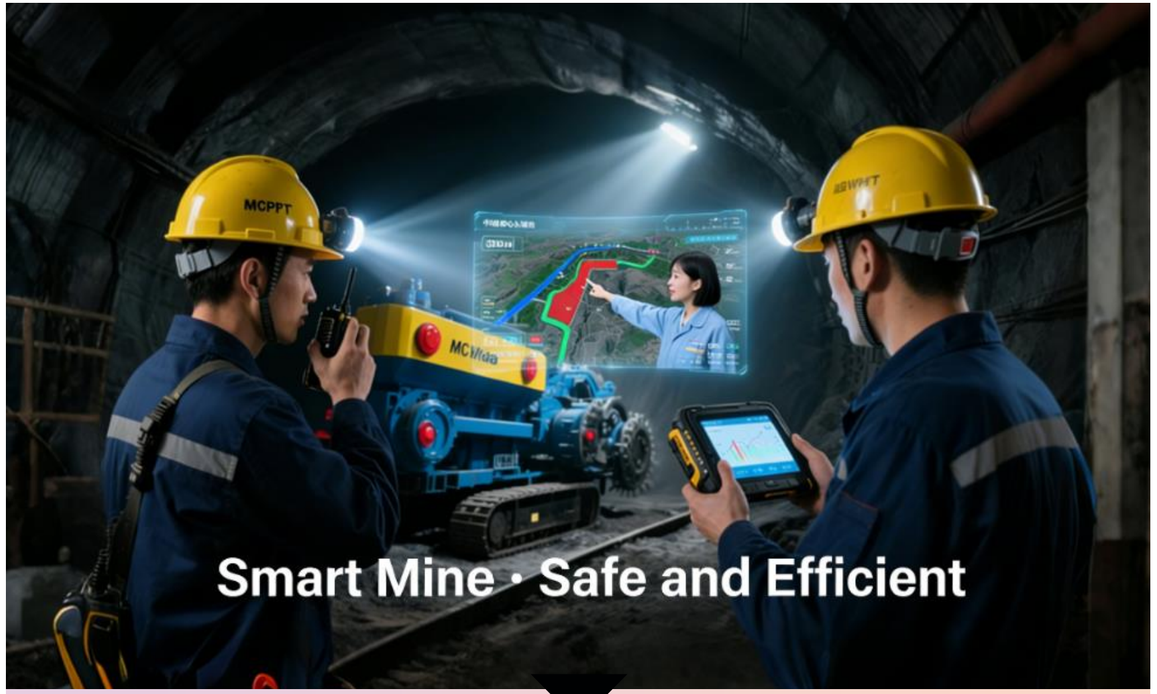
- Messaging, positioning, customized data
- Rotational speed, temperature and other equipment operating parameters, status information monitoring, sensor data monitoring, file and drawing transmission

Command and dispatch

MCX command and dispatch integrates audio, video and data, and realizes high-priority multimedia integrated dispatch for production, equipment and logistics in industrial manufacturing based on maps.

Market Analysis & Applicable Scenario

5G Private Network & MCX Application Scenarios in the Mining Field



Priority transmission, eliminating congestion

Real-time data transmission

Remote real-time monitoring

Efficient and stable transmission

5G private network

- Low Latency (ms) , Large Bandwidth , Massive Connections, High Reliability
- Supports diverse industrial applications, enabling intelligent perception, ubiquitous connection and precise control for all mining production links

MCPTT

- Priority Real-Time Voice, One-Click Group Call, Full-Duplex/Half-Duplex/ Emergency Call, Talk Right Control, Group Chat, Broadcast, Transfer, Hold, etc.
- Enables flexible grouping, real-time communication and command delivery across teams, with one-click emergency calling for rapid notifications

MCVideo

- Video calls, live video, push & pull, video group chat
- High-definition video surveillance of key operation areas, unmanned vehicle video, video footage return of the work surface, emergency on-site command

MCData

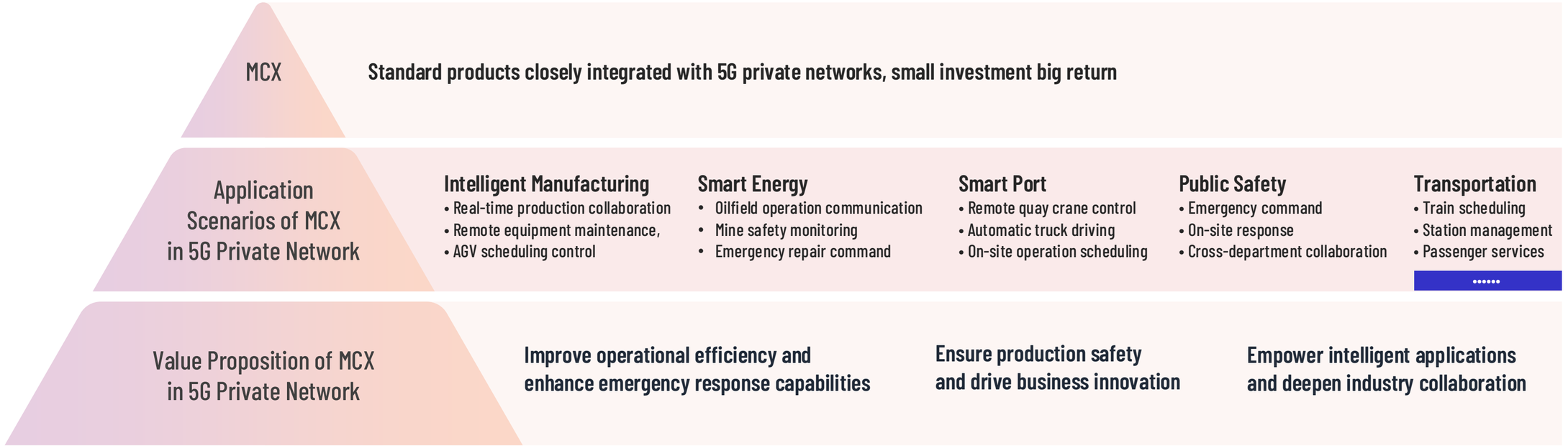
- Messaging, positioning, customized data
- High-speed, reliable and priority transmission for unmanned vehicle sensing, equipment working condition, geological and environmental monitoring data

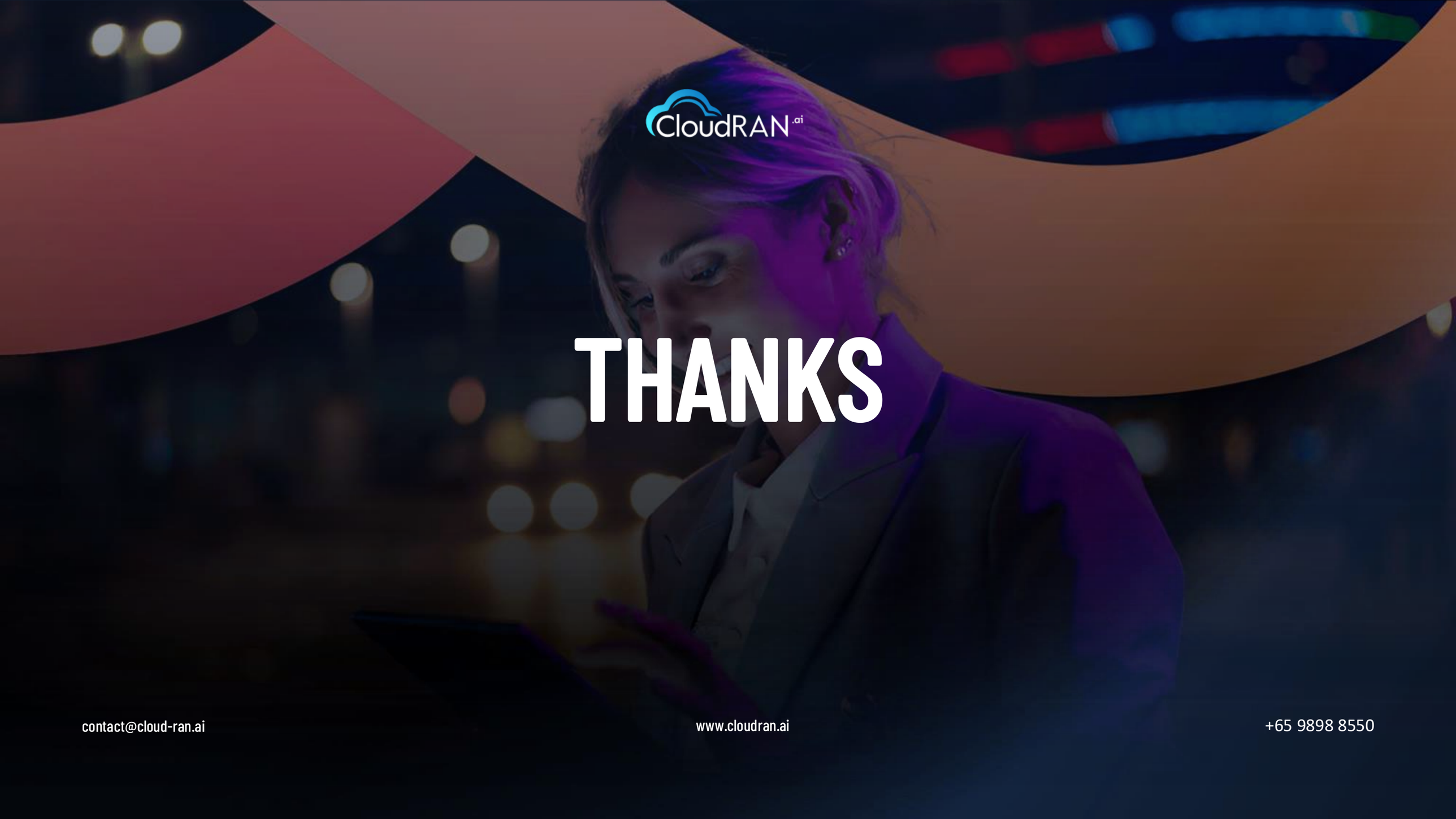
Command and dispatch

Integrates voice, video and critical data to enable high-priority communication and integrated command scheduling across mining processes, providing real-time visibility into underground personnel, equipment status and operational progress

Market Analysis & Applicable Scenario

MCX drives the 5G Private Network Ecosystem and Value Growth





THANKS

contact@cloud-ran.ai

www.cloudran.ai

+65 9898 8550