Annexure-1: Revised Qualification Criteria

Pre-	Pre-qualification/ Eligibility Criteria				
SI. No	Eligibility Criteria	Document Proof			
	Bidders Competency				
	The Bidder/All members of consortium shall	Copy of certificate of Incorporation, MOA & AOA for Companies Certificate of Incorporation & LLP agreement for LLPs			
1	be a registered company/Partnership	partnership beed with credential of partners for partnership firm			
	In case of Consortium MoU to be signed by both the parties.	For global players, equivalent certificate in the country of incorporation (GFR Rule for Make In India should be fulfilled)			
		In case of consortium, MoU signed by both the parties Power of Attorney to the authorised person of the lead bidder (as per the format provided)			
2	The Bidder/All members of consortium should have or shall be ready to set up a project office in Bhubaneswar with 30 days of issuance of LOA/I.	Undertaking by Bidder/All consortium members			
3	The Bidder should not have been blacklisted by any Central/State Government Organization or Department in India at the time of submission of the bid.	Declaration by the Bidder and all consortium members as per format given in the bid document			
	Financial Stability				
4	The Bidder must have an Average Annual Turnover of at least INR 20(Twenty) Crore from Last 3 financial years (2018-19, 2019-20, 2020-21) In case of consortium, the lead Bidder must have an Average Annual Turnover of at least INR 20(Twenty) Crore from Last 3 financial years (2018-19, 2019-20, 2020-21) And The Consortium Partner must have an Average Annual Turnover of at least INR 3(Three) Crore from Last 3 financial years (2018-19, 2019-20, 2020-21) The Bidder/Lead Bidder (in case of consortium) must have Positive Average Net Worth of Rs.3 (Three) Crore from Last 3 financial years (2018-19, 2019-20, 2020-21) Other consortium member must have positive average net worth From Last 3 financial years (2018-19, 2019-20, 2020-21)	 Financial Statement for Financial years 2018-19(audited), 2019-20(audited) and 2020-2021 (provisional/audited) by statutory auditor Turn over Certificate and Net worth Certificate from Chartered Accountant clearly specifying the Average Annual Turnover & Average Net Worth of the Bidder for the specified years. GST return/Annual GST Return Copy for the specified years, GST certificate, certified copies of valid PAN documents shall be furnished 			

5	As on last date of submission of the proposal, the Bidder/all members of consortium shall have not been blacklisted by Central/State Government/PSU entity in India or similar agencies globally for unsatisfactory past performance, corrupt, fraudulent or any other unethical business practices, in past three (3) years. Bidders/Any consortium member shall not have any proceedings pending before DRT and/or BIFR	Undertaking by the authorized signatory as per the Form in the Annexure to be mandatorily submitted
	Technical Stability	
6	The Bidder/The Lead Bidder (in case of consortium) should have experience of implementing at least 1 project related to Integrated/Intelligent Transport Management System of value not less than INR 15 Cr. for bus operations of any Indian/Foreign cities or states in last five years as on last date of submission of this RFP. AND The Bidder/The Lead Bidder (in case of consortium) should have experience of implementing at least 1 project related to alike ICT/IoT based services of value not less than INR 15 Cr, provided in any Indian/Foreign cities or states in last five years as on last date of submission of this RFP. AND Other member of Consortium must have at least 1 similar project experience related to Integrated/Intelligent Transport Management System for bus operations or alike ICT/IoT based services of value not less than INR 1 Cr provided in any Indian/Foreign cities or states in last five years as on last five years as on last five services of value not less than INR 1 Cr provided in any Indian/Foreign cities or states in last five years as on last five years as on last five years as on last five services of value not less than INR 1 Cr provided in any Indian/Foreign cities or states in last five years as on last five years as on last five years as on last date	Copy of Work Order & Work Completion certificate of the project from respective client clearly stating the scope, current status (percentage completion), System Stability Status and the contact details of the authority. Project cost should be mentioned clearly. For Ongoing project experience, Copy of Work Order & Go-Live certificate of the project from respective client clearly stating the scope, current status (percentage completion), System Stability Status and the contact details of the authority. Project cost should be mentioned clearly.
	of submission of this RFP.	
	possess any of the below two certifications:	
7	ISO 9001:2015	Copy of the Valid Certificate signed and stamped by
	ISO 27001	the Authorized Signatory
	CMMI Level 3	

Technical Evaluation Criteria

Table 1: Technical Evaluation criteria

Technical Marking Criteria				
Sr.No.	Criteria	Break-up of Marks (Sole Bidder)	Document Proof to be submitted	Maximum Marks
TQ1	Average Annual Turnover of the Bidder/ (lead bidder & Consortium Member in case of consortium) during last three Financial Years- 2018- 19, 2019-20 and 2020- 21	Rs.20 crores (INR): 7 marks For every additional turnover of Rs.2 crores-1 mark subject to maximum of 3 marks.	1-Certificate from the Statutory Auditor clearly specifying the annual turnover for the specified years. 2-Audited and Certified copies of Balance Sheet and Profit/Loss Account of last 3 Financial Years last three (03) financial years 3- Provisional Financial Statement by CA for Year 2020-21 will be considered.	10
	Average Positive Net worth of the Bidder/ the lead Bidder (in case of consortium) during last three Financial Years- 2018-19, 2019-20 and 2020-21	Rs.3 crore :3 marks For every additional Net worth of Rs.1 crore-1 mark subject to maximum of 2 marks.	Certificate from the Statutory Auditor clearly specifying the Average Net Worth during last three Financial Years-2018-19, 2019-20 and 2020- 21	5
TQ2	The bidders/any member of consortium should have experience in deploying ITMS or ITMS for public/govt. entities/SPV/STU (India or Abroad) bus operation in last five years from the last date of submission.	200 to 300 Buses/Vehicles: 7 marks 301 to 500 Buses/Vehicles: 10 marks 501 or more Buses/Vehicles: 15 marks	 1- Work Order issued & signed by the competent authority of the client entity. 2- Completion Certificate issued & signed by the competent authority of the client entity on letterhead 	15

TQ3	The bidders/any member of consortium should have experience in AFCS along with Smart Card and mobile app-based ticketing solution for public/govt. entities/SPVs/STUs (India or Abroad) for public bus system in last five years from the last date of submission.	5 marks for each project (Maximum 15 Marks)	 Work Order issued & signed by the competent authority of the client entity. Completion Certificate issued & signed by the competent authority of the client entity on letterhead 	15
	The bidders/any member of consortium	For Go Live/Project Completion • 5 Marks for 1 Project • Additional 2.5 mark for each project completed subject to Maximum 5Marks	1. Work Order issued & signed by the competent authority of the client entity 2. Go-live or Project completion Certificate from Client	10
TQ4	should have project completion (go live) with complete system integration with the ETM, AFCS, Smart card, mobile ticketing, AVLS and live tracking, etc. of buses across any Public/Govt. Transport agency in last five years from the last date of submission	For Satisfactory Completion• 3Marks-1• 3Marks-1SatisfactoryProjectcompletion1• Additional1markforeachsatisfactoryprojectcompletionsubjecttoMaximum2MarksNote:TheBidder/TheLeadBidderneedtospecifytheproject/sfor	1. Work Order issued & signed by the competent authority of the client entity 2- Satisfactory Completion Certificate issued & signed by the competent authority of the client entity on letterhead	5

		evaluation as per given format.		
		given format.		
	System functionality			
TQ5	The bidder/The Lead Member in case of consortium (Combined experience) will be marked on the basis of number of features present as a part of COTS (Cost-off-the shelf) ITMS/ITMS solution. Note: In case of consortium second member must have any two mandatory System Functionality Module. 1. GIS/Open-Source MAP based Vehicle Tracking System (Mandatory) 2. Integration with IoT devices with central monitoring Centre (Mandatory) 3. Role Based Mobile/Web Application across any Public Payment and Public Ticketing (Additional) 4. Fleet Management system including driver's app, route planning, re-routing, alerts, destination information, ETA, etc. (Mandatory) 5. Billing system or any alike Transport related ERP services for vendors	10 Marks for availability of 5 sub- modules/systems including 4 Mandatory Modules Additional 1 mark for each additional module up-to a maximum of maximum 5 marks	An undertaking by the bidder to confirm the presence of following modules as a part of COTS. CRUT at any time, before awarding the project, reserves the right to ask the bidder to demonstrate the features declared by them. In case of discrepancy between no. of modules in declaration and actual number of modules present as COTS, CRUT reserves the right to remove the bidder from the process.	15
	ERP services for vendors			

	of Municipal			
	Corporation/ULBs/Govt.			
	SPVs (Mandatory)			
	6. Grievance Redressal			
	System/Incident			
	Management System			
	(Additional)			
	7. Dashboards and MIS			
	for transport system			
	with Role Based Access			
	Control and ranking			
	module for different			
	divisions, departments			
	etc. (Auditional)			
	6. Cloud Dased DC & DR			
	System (Additional)			
	9 The system should be			
	fault tolerant with the			
	system capability to			
	handle 3000 vehicles.			
	(Additional)			
		The solution to be		
		demonstrated to		
		CRUT and CRUT		
		would rate the		
		bidder to their		
		satisfaction on the		
		ability of the bidder		
		to execute the end-		
		to-end solutions as	Live Demonstration	
		per the Scope of	of the proposed	
	Project Implementation	Work	solution.	
TQ6	Approach	Understanding of	Presentation (soft	20
- • •	(Presentation)	Scope- 5 Marks	copy & hard copy),	-
		Project Team- 5	Resume of Project	
		Marks (1.25 mark	Team, Project Plan	
		for each resource		
		to be engaged for		
		project		
		Droject Diam (Uliah		
		Lovel) & Delivery 5		
		Level) & Delivery- 5		
		Over all colution		
		design & approach		
		acaign a approach		

		methodology- 5		
		Marks		
	The Bidder/Any			
	member of the			
TQ7	consortium			
	certification:	1 mark for each		
	ISO 9001:2015	certificate	Copies of the valid	5
	ISO/IEC/20000	Maximum 5 Marks	certificate	
	ISO 27001			
	CMMI Level 3			
	CMMI Level 5			
	Total			100

Annexure-2: Unpriced Bill of Quantity

A – Ha	A – Hardware Components		
Sr. No.	Component	Qty	UOM
1	IN-BUS ITMS Solution Components	L	
1.1	OBITMS Hardware (GPS/VTS Device only) for Buses with SIM card	50	Nos.
1.2	Integration for OBITMS Hardware for E-Rickshaws	500	Nos.
1.3	ETM/POS hardware for E-ticketing with SIM card	715	Nos.
1.4	ETM Charging Ports inside buses	225	Nos.
2	BUS STATION & TERMINALS – ITMS Solution Components	L	
2.1	Station PIS Solution board with Inbuilt controller & GPRS Module for communication with command centre	20	Nos.
2.2	Terminal PIS Display with controller (LED TV) & GPRS Module for communication with command centre with IP-65 casing & mounting structure for outdoor mounting	2	Nos.
2.3	ETM/ POS hardware for E-ticketing at terminals	8	Nos.
2.4	Smartcard Issuance Unit	8	Nos.
2.5	ETM/ POS Pigeon Case Charging Unit	8	Nos.
2.6	IP Public Address System for Terminals	4	Set
2.7	Emergency Call Button	16	Nos.
2.8	GSM Router with 2 SIM cards	4	Set
2.9	8 Port Industrial Grade Switch	4	Set
3	Depot – ITMS Solution Components		
3.1	AFCS Workstation	20	Nos.
3.2	Depot Manager Workstation	7	Nos.
3.3	L2 Access Switch (24 Port)	6	Nos.
3.4	CCTV with local 16 Channel NVR, 10 nos. 2MP IP CCTV Bullet Camera and 32" Monitor complete with keyboard and mouse	6	Set
3.5	IP Public Address System for Depots & Terminals	6	Set

3.6	Biometric Attendance System	6	Set
3.7	Digital Clock	6	Nos.
3.8	12U Racks	6	Nos.
3.9	100 MBPS Broadband connection with routers from two different service providers	2	Set
3.10	ETM/ POS Pigeon Case Charging Unit	6	Nos.
3.11	Electrical work including all power points and accessories for ITMS equipment	6	Lot
3.12	Local Networking Work including all equipment & accessories for ITMS equipment	6	Lot
4	Central Control Centre (CCC) Infrastructure	L	
4.1	3 x 3 (55") LED Video Wall & software with all accessories for ITMS	1	Set
4.2	Work Stations with two monitors	6	Nos.
4.3	Firewall (UTM)	2	Nos.
4.4	Internet Router	2	Nos.
4.5	L3 Switch/Edge Router	2	Nos.
4.6	L2 Access Switch (24 Port)	4	Nos.
4.7	Master Clock System	1	Nos.
4.8	Digital Clock	2	Nos.
4.9	Access Control System	1	Lot
4.10	UPS with 1 Hour of Backup	1	Lot
4.11	42U Racks	1	Lot
4.12	Internet Line (MPLS) - 10 Mbps	1	Nos.
5	Any other Consumables as per solution requirement	1	Lot
B - Software Solution Components			
Sr. No.	Solution Software Component	Qty	
1	Automated Vehicle Tracking Software (AVLS)	1	Nos.
2	Incident Management Software along with Helpdesk solution	1	Nos.
3	PIS Management Software solution	1	Nos.

4	BI / MIS Reporting	1	Nos.	
5	Mobile Application (IOS and Android Platform)	1	Nos.	
6	GIS Map Platform	1	Nos.	
7	Web Portal	1	Nos.	
8	Vehicle Planning and Scheduling System	1	Nos.	
9	Depot Management Solution	1	Nos.	
10	AFCS Solution S/W including AFCS centralised S/W and HHT/ETM & POS Solution	1	Nos.	
11	Integration with Existing ITMS & Other Third Party Hardware & Software		Nos.	
C # O & M - Software Hosting/Server Management & Connectivity for 5 Years				
Sr. No.	Solution Component	Units		
1	DC & DR on Managed Cloud Services for 5 Years	1	Nos.	
2	Manpower for CCC operations & support	1	Lump sum	
3	AMC Charges for Hardware for a period of 5 years 1		Nos.	
4	AMC Charges for Software for a period of 5 years (including all perpetual licenses)	1	Nos.	
_				
5	Standard Business Licenses of Office 365 services	20	Nos.	

Annexure-3: Product Technical Specification

Minimum Technical Specification for Access Control System

Indicator	Technical Specification Requirement
Finger Print Sensor	Superior Optical sensor with min 500 dpi approx. 18x22 mm
Туре	Sensor make: IAFIS certification
	Finger print sensor shall be Non Stretchable using human nail,
	effective for Dry and Wet finger
	Shall be able to distinguish between real human finger and
	other fake finger printed on paper, film, rubber, silicon, and
	Prosthetic hand/finger
Card reader	Card reading distance= 10-12 cm
Finger rotation and	The reader should ensure automatic finger rotation and
Deviation	correction with allowed finger displacement of +/- 5 mm
Recognition Timing	< 2 sec, Typically 1 Sec
Processor	shall be 32 Bit RISC
Data Encryption	Data transfer in Encrypted mode
Finger print template	ISO 19794-2 Compatible
Network Interface	TCP/IP both Ipv4 and IPv6 Compatible
Local Storage	Either 16 MB on Boar Flash memory or Should able to Support
	50000 transaction in offline mode and 1000 card holder and
	finger print information
Non Volatile RTC	Required
Upgrades	Should able to remotely upgrade the software over Ethernet

Minimum Technical Specification for Firewall

Indicator	Technical Specification Requirement
Configuration	GE electrical ports \geq 16, GE combo ports \geq 8; 10GE optical ports \geq 2;
requirements	GE WAN ports \geq 2; concurrent SSL VPN users \geq 460; IPSec VPN
	tunnels \geq 3900; virtual firewalls \geq 50; one power supply configured
	and expansion to dual power supplies supported, and URL filtering
	signature database update (optional)
Hardware	1 U high; multi-core architecture; dual AC power supplies; pluggable
architecture	fan module; front-to- rear ventilation channel
Interface	GE electrical ports \geq 16; GE combo ports \geq 8; 10GE optical ports \geq 2;
requirements	GE WAN ports ≥
	2;USB ports ≥ 2; USB 2.0 and USB 3.0 supported
Performance	Throughput ≥ 2Gbps; maximum number of concurrent connections
requirements	\geq 2,800,000; number of new connections per second \geq 70,000;
	IPSec throughput ≥ 1.5 Gbps; SSL_VPN throughput ≥ 280 Mbps; IPS
	throughput ≥ 1.3 Gbps; SSL proxy throughput ≥ 270 Mbps

Policy control	Allows users to configure security policies based on time, user/user
	group/security group, application-layer protocol, geographical
	location, IP address, port, domain name group, URL category,
	access type, terminal type, device group, vlan ID and content
	security.
Routing	Supports static routes, policy-based routing, and routing protocols
	such as RIP, OSPF, BGP.
Routing	Policy-based routing supports the following matching conditions:
	source IP address, destination IP address, service type, application
	type, user/user group/security group, inbound interface, and DSCP
	priority.
IPv6	Supports the IPv6 protocol stack, IPv6 traversal technology, and
	IPv6 routing protocols.
IPv6	Supports IPv6 over IPv4 GRE tunnels
Protocol	Identifies over 5000 application-layer protocols, including SIP and
identification	proprietary protocols of mainstream security vendors.
Policy management	Supports the translation of port-based security policies to
	application-based security policies, supports the analysis of policy
	risks and redundancy, and provides security policy tuning
	suggestions.
Data security	Supports data leak prevention to identify and filter files and content
	in transit.
Data security	Supports DNS filtering to improve web page filtering performance.
Data security	Supports Safe Search to filter out unhealthy content.
DDoS defence	Supports application-layer flood attacks such as HTTP, HTTPS, DNS,
	and SIP, supports traffic auto-learning, the setting of the auto-
	learning time, and automatic generation of anti-DDoS policies.
DDoS defence	Supports IP reputation.
NAT	Supports full NAT functions and for multiple application-layer
	protocols.
NAT	Supports Source NAT automatic detection and exclusion of invalid
	addresses in NAT address pools.
NAT	Supports the generation of an alarm if the usage of the Source NAT
	address pool exceeds the threshold.
Intrusion	Supports attack detection and prevention based on over 8000
prevention and	signatures.
antivirus	
Intrusion	Supports the customization of intrusion prevention policy templates
prevention and	based on scenarios.
antivirus	
Network access	Supports AD SSO, MAC authentication and SMS authentication.
user authentication	
Network access	Supports dynamic security groups to dynamically authorize
user authentication	horizontal organizations.

Network access user authentication	Supports multiple authentication domains to meet the requirements of independent management and authentication of multiple branches.
Reliability	Supports BFD link detection and association of BFD and VRRP/OSPF to implement rapid active/standby switchover.
Reliability	Supports the smooth upgrade of HRP. In the upgrade window, the software of different versions can be used for hot standby.
Intelligent uplink selection	Intelligently selects carrier links based on destination IP addresses, supports active/standby interface configuration and load balancing by percentage.
VPN	Supports IP Sec intelligent uplink selection or equivalent to select the best link based on link quality detection.
VPN	Supports DSVPN or equivalent. VPN tunnels can be established between enterprise branches for encrypted communication.

Minimum Technical Specification for Master Clock & Digital Clock

SL.N O.	TECHNICAL SPECIFICATIONS	
	MASTER CLOCK	
1	Self-contained subsystem should include Lithium, Quartz and support circuitry	
2	The RTC should designed to ensure real time accuracy	
3	GPS based PRC shall be designed in accordance with ITUT recommendation G 811	
4	Central Master clock synchronized to GPS shall be better than 10^11 with reference to UTC	
5	Clock accuracy on loss of GPS synchronization shall be better than 10^9	
6	The availability of the time distribution system shall be better than 99.99%	
7	The built in clock of individual system shall provide the time reference to all	
/	interfaces	
8	System shall provide Interface ports to other Sub Systems	
DIGITAL CLOCK		
1	Housing: Black MS or SS Cabinet	
2	Legibility:40 Meters	
3	Digit Height: ~100mm	
4	Time format:12/24 format	
5	Protection Class: IP54	
6	Temperature Range:0-50°C	

Minimum Technical Specification for Emergency Call Button

SI. No.	Functional Specification	
	A high quality digital transceiver, to be placed at certain key locations	
1	determined by Department	
	Key is to make it easily accessible by public	
2	The unit shall preferably have a single button which when pressed, shall connect	
	to the Integrated Command and Control Centre.	
3	The system shall be integrated to the CCC to provide status of Call of the ECB	
	At some locations, this can be also used for Public Address	
4	These shall be installed at select locations within the vicinity of constant	
	supervision to avoid misuse and vandalism of the call button.	
SI. NO.	I ecnnical Specification	
1	Construction: Cast Iron/Steel Foundation, Sturdy Body for equipment	
	Call Button: Watertight Large backlit Rectangular Push Button, Visual Feedback	
2	for button press and call indication	
3	Connectivity: Ethernet	
4	Sensors: For tempering/ vandalism	
5	Operating Temporature 0 to 70 C	
6	Speaking Distance minimum 5 ft	
/	Inhuilt Class D Amplifier 99dh SPI	
8	Inbuilt Class D Amplifier, 990b SPL	
9	Minimum 3 inputs and 2 Output relay contacts	
10	ECB Should be able to make calls to the PA system	
11	Iransmission Bandwidth 16000 HZ	
12	Front panel: stamess steel of minimum 3 mm	
12	Central Software based server application capable of working on virtual	
13	Software based on Linux (Debian 0, 64 bit) for virtualized IT platforms	
14	Software based on Linux (Debian 9, 64 bit) for virtualised if platforms	
15	component if required	
15	ECB Master Controller to have facility for multiple mic inputs, direct dialling	
16	buttons. LCD screen	
17	Software Client for making/receiving Calls to ECB	
18	Automatic Volume Control. Call recording	
19	Transmission handwidth16000 KHz for master control desk	
20	Operating temperature for control desk 0 to +60C	
21	Webbook commands via HTTP/HTTPS	
22	ISO 27001:2013 Information security management system certification	

Minimum Technical Specification for Router

SI. No.	Description		
1	The router should have minimum 3 numbers of 10/100/1000 BASE-T/BASE-X based WAN/LAN interfaces. The hardware of all these ports should be complete in all respect.		
2	Router shall support an overall throughput of at least 100 Mbps from Day 1 which can be scalable to 200 mbps for future expansion		
3	The router should have a multicore processor (minimum 4 cores) and should have minimum 4GB of active memory and 4 GB of flash memory from Day 1. Further, the router should be able to support expandability of the memory and flash by 100% for future requirement		
4	The router shall have Power supply unit capable of operating between 100-240 Volts AC		
5	The router should support at least 10K multicast routes		
	Router should have capability to enable SD-WAN features on the same device without any hardware upgrade, if needed in the future		
6	The router should support at least 4K ACL system wide with at least 10K ACL entries per ACL rule		
7	The router should have support for 100K routes		
8	The router must support IKEv1, L2TP, IKEv2, GRE and IPSEC from day 1. The proposed solution should serve the GRE encryption for traffic from any location to other location on demand and also should able to create GRE tunnel.		
9	Router should have capability to enable SD-WAN features without hardware upgrade		
10	The router should be able to support all the existing routing protocols in the network including the Voice services and should be able to work as an EPABX for registering at least 10 IP Phones. In case, the device does not have support for native voice support, an external device can also be provided along with the router to meet the functional requirement		
11	5 years comprehensive OEM warranty		

Minimum Technical Specification for L3 Switch/Edge Router

SI. No.	Description		
1	Switch should be 1U and rack mountable in standard 19" rack.		
2	Switch should support internal field replaceable unit redundant power supply from day 1.		
3	Switch should have minimum 2 GB RAM and 2 GB Flash.		
4	Switch should have dedicated slot for modular stacking, in addition to asked uplink ports. Should support for minimum 48 Gbps of stacking throughput with 8 switch in single stack.		
SI. No.	Performance		
1	Switch shall have minimum 128 Gbps of switching fabric and 95.23 Mpps of forwarding rate.		
2	Switch shall have minimum 16K MAC Addresses and 250 active VLAN.		
3	Should support minimum 11K IPv4 routes or more		
4	Switch shall have 1K or more multicast routes.		
5	Switch should support at least 16K flow entries		
6	Switch should support 128 or more STP Instances.		
7	Switch should have 6MB or more packet buffer.		
SI. No.	Functionality		
1	Switch must have functionality like static routing, RIP, PIM, OSPF, VRRP, PBR and QoS (Quality-of-Service) features from Day 1		
2	Switch should support network segmentation that overcomes the limitation of VLANs using VXLAN and VRFs.		
3	Switch should support IPv6 Binding Integrity Guard, IPv6 Snooping, IPv6 RA Guard, IPv6 DHCP Guard, IPv6 Neighbour Discovery Inspection and IPv6 Source Guard.		
4	Switch should support 802.1x authentication and accounting, IPv4 and IPv6 ACLs and Dynamic VLAN assignment and MACSec-128 on hardware for all ports.		
SI. No.	Interfaces		
1	Switch shall have 24 nos. 10/100/1000 Base-T ports and additional 4 nos. SFP uplinks ports.		
SI. No.	Certification		
1	Switch shall conform to UL 60950 or IEC 60950 or CSA 60950 or EN 60950 Standards for Safety requirements of Information Technology Equipment.		
2	Switch shall conform to EN 55022 Class A/B or CISPR22 Class A/B or CE Class A/B or FCC Class A/B Standards for EMC (Electro Magnetic Compatibility) requirements.		
3	Switch / Switch's Operating System should be tested for EAL 2/NDPP or above under Common Criteria Certification.		
4	OEM should be listed in Gartner Leader Quadrant for Wired and Wireless LAN Infrastructure from last 3 years before releasing this RFP.		

Minimum Technical Specification for L2 Access Switch

1Switch must be enterprise grade in 1 RU form-factor with internal power supply and fanless model.2Switch Should have minimum 512 MB RAM3Switch Should have minimum 256 MB Flash4Switch shall have minimum 56 Gbps of switching fabric and 41Mpps of forwarding rate.5Shall have minimum 15 K MAC Addresses and 256 Active VLANs.6Shall have minimum 1Pv4 and IPv6 multicast routes and 1024 IGMP groups7Should have minimum 64 STP instances8Shall have 512 IPv4 and 512 IPv6 security access list entries9Switch should support 1024 IPv4 multicast routes, IGMP groups and IPv6 multicast groups10Switch Need to support 600 IPv4/MAC security ACEs and IPv6 security ACEs11Switch need to support 9198 bytes MTU-L3 packet13Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3az.14Switch must have features like static routing 16 for IPv4 and 16 for IPv615Shall have 802.1p class of service, marking and classification & eight egress queues.16Switch should support management features like SNMPv3, NTP, RADIUS and TACACS+.17improving convergence time in ring topologies with industry standard like Resilient Protocol or equivalent.	SI. No.	Description		
1and fanless model.2Switch Should have minimum 512 MB RAM3Switch Should have minimum 256 MB Flash4Switch shall have minimum 56 Gbps of switching fabric and 41Mpps of forwarding rate.5Shall have minimum 15 K MAC Addresses and 256 Active VLANs.6Shall have minimum IPv4 and IPv6 multicast routes and 1024 IGMP groups7Should have minimum 64 STP instances8Shall have 512 IPv4 and 512 IPv6 security access list entries9Switch should support 1024 IPv4 multicast routes, IGMP groups and IPv6 multicast groups10Switch Need to support 600 IPv4/MAC security ACEs and IPv6 security ACEs11Switch need to support 9198 bytes MTU-L3 packet13Should support IEEE Standards of Ethernet: IEEE 802.1D, 802.1s, 802.1w, 802.1x, 802.3ad, 802.3x, 802.1p, 802.1Q, 802.3, 802.3u, 802.3ab, 802.3az.14Switch must have features like static routing 16 for IPv4 and 16 for IPv615Shall have 802.1p class of service, marking and classification & eight egress queues.16Switch should support advance mechanism to handling link failures and improving convergence time in ring topologies with industry standard like Resilient Protocol or equivalent.	1	Switch must be enterprise grade in 1 RU form-factor with internal power supply		
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17 Switch should support advance mechanism to handling link failures and 17 improving convergence time in ring topologies with industry standard like Resilient Protocol or equivalent.		TACACS+		
 improving convergence time in ring topologies with industry standard like Resilient Protocol or equivalent. 		Switch should support advance mechanism to handling link failures and		
Resilient Protocol or equivalent.	17	improving convergence time in ring topologies with industry standard like		
	17	Resilient Protocol or equivalent.		
Switch should support DHCP. Auto Negotiation, DTP, LACP, UDLD, MDIX, VTP.		Switch should support DHCP. Auto Negotiation, DTP. LACP. UDLD. MDIX. VTP.		
18 TFTP, NTP, Per-port broadcast, multicast, Static routing, Layer 2 trace route and	18	TFTP, NTP, Per-port broadcast, multicast, Static routing, Layer 2 trace route and		
unicast storm control.	10	unicast storm control.		
Security with 802.1X support for connected devices, Switched Port Analyzer	10	Security with 802.1X support for connected devices, Switched Port Analyzer		
19 (SPAN), and Bridge Protocol Data Unit (BPDU) Guard	19	(SPAN), and Bridge Protocol Data Unit (BPDU) Guard		
Industry Standard : 60950-1, CISPR22 Class A, EN55024, RoHS and IPv6 Ready		Industry Standard : 60950-1, CISPR22 Class A, EN55024, RoHS and IPv6 Ready		
Logo	20	Logo		
Switch should support enhanced QoS like, egress queues, Ingress policing to,	21	Switch should support enhanced QoS like, egress queues, Ingress policing to,		
QoS through Differentiated Services Code Point (DSCP) mapping and filtering,		QoS through Differentiated Services Code Point (DSCP) mapping and filtering,		
21 QoS through traffic classification, Trust boundary, AutoQoS, Shaped Round		QoS through traffic classification, Trust boundary, AutoQoS, Shaped Round		
Robin (SRR) scheduling and Weighted Tail Drop (WTD) congestion avoidance,		Robin (SRR) scheduling and Weighted Tail Drop (WTD) congestion avoidance,		
Switch should have intelligent nower management allows flexible newer		Switch should have intelligent nower management allows floxible newer		
allocation across all norts. With Pernetual PoF, the PoF+ nower is maintained	22	allocation across all norts. With Pernetual PoF the PoF+ nower is maintained		
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	during a switch reload. So that there is no power disruption during a switch reboot.	
23	Operating Temperature range : -5 to +50 deg. C	
24	Minimum 24 x 10/100/1000 Base-T ports and additional 4 nos. SFP uplinks ports loaded with required SFP modules as per design requirement. All the SFP modules should be from the same OEM as the switch	
25	OEM should be listed in Gartner Leader Quadrant for Wired and Wireless LAN Infrastructure from last 5 years.	
26	Safety certification UL 60950-1 Second Edition, CAN/CSA-C22.2 No. 60950-1 Second Edition, EN 60950-1 Second Edition, IEC 60950-1 Second Edition, AS/NZS 60950-1	
27	EMC: Emissions certification 47CFR Part 15 (CFR 47) Class A, AS/NZS CISPR22 Class A, CISPR22 Class A, EN55022 Class A, ICES003 Class A, VCCI Class A, EN61000-3-2, EN61000-3-3, KN22 Class A, CNS13438 Class A	
28	EMC: Immunity, certification EN55024 (including EN 61000-4-5), CISPR24, EN300386, KN24	
29	Switch should support 802.1X features to control access to the network, including flexible authentication, 802.1X monitor mode, and RADIUS change of authorization	
30	Switch should support Multidomain authentication to allow an IP phone and a PC to authenticate on the same switch port while being placed on the appropriate voice and data VLANs.	
31	Switch need to support Access Control Lists (ACLS) for IPv6 and IPv4 security and Quality-of-Service (QoS) ACL elements (ACEs).	
32	Switch should have features like Port-based ACLs, SSH, Kerberos, and SNMP v3, TACACS+ and RADIUS authentication, Web authentication redirection, Multilevel security on console access, Spanning Tree Root Guard (STRG), Internet Group Management Protocol (IGMP) filtering,	
33	Switch should support SPAN, with bidirectional data support, to allow the OEM Intrusion Detection System (IDS) to take action when an intruder is detected.	
34	OEM should be listed in Gartner Leader Quadrant for Wired and Wireless LAN Infrastructure from last 3 years before releasing this RFP.	

## Minimum Technical Specification for Industrial Grade Switch

SI. No.	Parameter	Specification	
1	Туре	Industrial grade Din-rail Ethernet Switch	
2	No. of Ports	Minimum 8 port 10/100mbps half/full duplex ports and Minimum 2 * 1000 Base Fx Single mode SFP ports	
3	PoE / POE+	All access ports shall deliver PoE (IEEE 802.af) / PoE+ (802.3at) with overall power budget of 180W per switch	
4	Protocols support	Switch should support at least STP/MSTP as link management protocol	
5	Type of VLANs	IEEE 802.1Q, VLAN aware, Internet Group Management Protocol (IGMP) and DHCP snooping	
6	Software features	LLDP, MSTP, STP Portfast, ICMP Vlans, static IP, Trust Ingress DSCP, COS, Priority Port, port - security, IGMP querier, DHCP server SNMP v2/v3, SNMP traps, syslog, IGMP snooping, DHCP snooping, BPDU guard, Etherchannel, Alarms, Smartport Macro, SPAN/Port Mirroring, Strom Control, EtherNet/IP	
7	Security	802.1x, secure access, port-security;, TACACS+ and RADIUS, AAA Client , Single host mode with MAC authentication bypass	
8	Management	WebUI, MIB, SNMP, syslog	
9	Power supply	48 to 54VDC	
10	Operating Temperature:	-20 to 60°C or better	
11	Operating Humidity	5% to 95% (non-condensing)	
12	Housing	IP30 protection	
13	MTBF	3,50,000 hrs or better	
14	Shock & Vibration	IEC 60068-2-27 & IEC 60068-2-6	
15	Safety Certifications	UL/CSA 60950-1, CE Marking, RoHS compliant, NEMA TS- 2	
16	EMC Emissions compliance	EN 55022/CISPR 22 Class A, EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4- 8, EN 61000-4-9, EN 61000-4-29	

## Technical Specification - Video wall

Sr. No.	Particular	Minimum Specification
1	Configuration	Backlight LED Video wall of 3 x 3 of Super narrow Bezel LCD panels of 55"
2	Resolution	1920 x 1080
3	Pixel Pitch	<mark>0.63 mm</mark>
4	Light Source	LED
5	Contrast Ratio	4000:1
6	Color Capability	1.07 Billion
7	Response Time	8 ms
8	Viewing Angle	H : 178°, V : 178°
9	Scan Rate	H: 30~75kHz, V: 50~85Hz
10	Video	NTSC,         PAL,         SECAM           480i, 480p, 720p, 1080i, 1080p,
11	Standard Inputs	Standard Inputs 1x Digital DVI-I/
		1x Digital DVI-D/
		1 X HDMI or Component/
		other industry standard compatible input ports,
12	Standard Outputs	1x Digital DVI-D ; 1x CVBS BNC or HDMI
13	Control	RS-232/RS-422/IR
14	Input Voltage	AC 90~240V@50/60 Hz
15	Power Consumption	< 160W
16	Standby Mode	< 2W at 110V
17	Temperature	0°C -35°C (32°F -95°F)
18	Humidity	10% -90%, non-condensing
19	Operating Life	> 50,000 hours
20	Maintenance Feature	Quick Swap Modules
21	Combined Bezel (Typical)	5.7 mm or lesser
22	Video Wall Tiling	20 X 15

Sr. No.	Particular	Minimum Specification
23	Display controller	Controller to control Display module in a matrix of 2 ( C) x 2 ( R) with 4 outputs, DUAL LAN input & 8 DVI inputs along with necessary software
24	Processor	Single Quad Core Intel [®] Xeon 64-bit 2.0 GHz CPU or latest
25	Ram	8 GB minimum
26	HDD	Min 500 GB Hard Disk
27		Hard disk Capacity should be upgradable
28	Networking	Dual-port Gigabit Ethernet Controller inbuilt
29		Support for Add on Network adapters
30		Support for Optical Fiber interface Adapters
31	Accessories	DVD-R,DVD+RW, Keyboard, mouse
32	OS	Support 64-bit Operating Systems Windows / Linux
33	Power Supply	(1 + 1) Redundant AC-DC high-efficiency power supply w/ PFC AC Voltage 100 -240V, 50-60Hz
34	Chassis	19" industrial Rack mount movable Front Panel should have lockable Door to Protect Drives
35	Wall configuration	4 DVI-D Outputs
36	Resolution output support	1920x1200 per output minimum
37	Universal Inputs	2 DVI Inputs
38	Redundancy Support	System Should have the redundancy support for following: Fans Power Supply LAN
39	Manufacturing	OEM should have a manufacturing facility in India with its own service centre manned by its own engineers for providing support

# Technical Specification - 55" Digital Display

Item	Specification
Panel size	55 inch
Dimensions	1910 x 840 x 70mm
Brightness	500cd/m2
Display area	1210mm×682mm 16:9
Maximum resolution	1920X1080
Display color	16.7
Visual angle	178°/178°
Response time	5ms
Life(hrs)	>60,000(hrs)
Input and output	
USB	1
SD	1
CF	1
Speaker	2×5W(9Ω)
Video	
Color system	PAL/NTSC
Remote controller	IR Remote Controller
Support Media Play Format	All format Video, all format music, Image (JPG, GIF, BMP, PNG)
Display (screen menu display)	
Menu language	English
Power	
Power supply	AC100~240V 50 /60 HZ
Maximum power consumption	<=280W
Standby power consumption	<5W

Item	Specification
Temperature	
Working temperature	0°C~50°C
Storage temperature	-20°C~60°C
Working humidity	85%
Storage humidity	85%
Appearance	
Case	Metal casing
Installation	Floor-standing

#### Annexure-4: Existing ITS

SI. No.	Item Description	Quantity	Make	Model
1	Automatic Vehicle Location			
	System:			
	Smart Tracking App & Server	1	Infinium	Locomade
	Type-I Workstations	10	Dell	Precision tower 3620xcto base
	Additional Workstation Monitor- 17"	10	Dell	
2	OBITS Hardware			
	OBU-1 for BPTS Buses	200	Infinium	Albatrus
	3G/GPRS enabled SIM Cards	200		
3	Passenger Information System (PIS)			
	PIS Application with API	1	Infinium	Locomade
	19" size of Passenger Information Display at Bus Stations	30	LG	19M38A
	55" size of Passenger Information Display at Terminal/ Interchange	5	LG	55SE3KB/D
	UPS for PIS	35	APC	SRC1KI-IN
4	Electronic Ticketing Machines			
	ETM app server + DB	1	Infinium	Locomade
	HH TM+GPRS SIM	440+99=539	Verifone	C680
	Workstation Type-I ICOMC	3	Dell	Precision tower 3620xcto base
	Workstation Type-III ETM Cashup	2	Dell	Precision tower 3620xcto base
	Printer Cashup	2	Possiflex	PP8800
5	Transit Management System			
	DMS+ERP	1	Infinium	Locomade
	Mobile Apps (Admin Application)	1	Infinium	Locomade
6	"Mo Bus" Mobile Application for Citizen	1		

## Annexure-5: Project Timeline

Stage	Description	Timeline			
Phase 1: Implementation					
1	Acceptance of Order and Signing of	T1			
2	Project Plan	T1 + 3 weeks			
3	System study and documentation	T1 + 6 weeks			
4	Deployment of Package-1 Modules	T1 + 16 weeks			
	Automatic Vehicle Locating System				
	Automatic Fare Collection System				
	Mobile Application				
5	Deployment of Package-1 Modules	T1 + 24 weeks			
	Passenger Information System				
	Command & Control Centre				
	Depot Management System				
6	Deployment of Package-2 Modules	T1 + 28 weeks			
	Sureveillance System (Depot & In				
	Bus CCTV Surveillance)				
	Incident Management System				
	Web Portal				
	Management Information System				
	Finance Management System				
	Business Intelligence & Reporting				
	System				
7	Control Room Setup	T1 + 20 weeks			
8	Integration with existing ITMS & Other	T1 + 32 weeks			
	third-party solutions				
Phase 2: Implement	ation				
Full roll-out / Go	Go-live of entire application including	T1 + 36 weeks			
Live	planning, scheduling, transit, depot and				
	workshop management, etc. as per RFP				
Stabilization	6 months of stabilization	3 months from full			
		roll-out			
Phase 3: Operations & Maintenance for a period of 5 years after completion of Phase 2					
Kick-off of exit	Kick-off exit management plan	1 year before end of			
management		contract period			
End of	Contract closure	End of 5 years from			
contract		Operations and			
period		maintenance			
Note: The SI/Bidder need to develop & design project plan intact with the defined timeline with					
appropriate project management tool. Route wise bus details will be provided to bidder after					
issuance of LOA. Bidder need to prepare and submit the all requirements desired from CRUT at the					
time of project plan submission. Bidder need to ensure that there should not be any delay for					
Information gathering of data collection.					
which can be renewed or further extended to 2 years based on mutual agreement.					
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