PRASAR BHARTI
(India's Public Service Broadcaster)
Directorate general of Doordarshan
Doordarshan Bhawan, Copernicus Marg
New Delhi -110001.

File No. 19(2)2020-21E1 (P) TV Date: 28/08/2020

M/s ---**Prospective Bidders**-----

Subject: Draft Technical Specifications for SITC of File Based Workflow facility at DDK Hyderabad.

The Draft specification of the upcoming tenders is enclosed herewith to offer comments if any by prospective bidders. Please also submit budgetary quote of the item by due date at e-mail ddpurchase401@yahoo.co.in or on following Address:

Assistant Engineer
Room No. 403,
Directorate General: Doordarshan,
Doordarshan Bhawan, Copernicus Marg,
New Delhi -110001 (India)
Telephone: 011- **2311 4401**

Specification For: Draft Technical Specifications for SITC of File Based Workflow facility at DDK Hyderabad
Specification No.: SD 05/2020 Dated: 25.08.2020

Due Date to offer Comments: 10.09.2020

Encl.: As above (41 Pages)

Signature Not Verified
Digitally signed by PRABHAT KUMAR SINGH
Date: 2020.08.28 10:35:49 IST

Prabhat Kumar Singh
Assistant Engineer
For DG: DD

PRASAR BHARATI
India's Public Service Broadcaster
DIRECTORATE GENERAL: DOORDARSHAN

SPECIFICATIONS FOR SITC OF END TO END FILE BASED WORKFLOW FACILITY AT DDK HYDERABAD

Specifications No.: SD 05/2020
Dated: 25.08.2020

1. SCOPE:

The specifications aim at Supply, Installation, Testing and Commissioning (SITC) of End to End File Based Workflow facility to create high technology production environment that connects all the operations departments and built a fully digital tapeless video production and playout at Doordarshan Kendra, Hyderabad. The solution includes Ingest Server, Production Automation, Media Asset Management, Metadata creation, Integration of Non Linear Editing systems for Programs & News stories (Both Low-res and High-Res), Central Storage system, Video Playout Server, Play-out Automation and Archiving in an integrated environment on turnkey basis.

The broad scope of the project is as under:-

i) Creating an Equipment Area for housing the electronics of the equipment etc. in 19" standard rack(s),

ii) Creating Ingest Desk with monitoring facility through Video Monitor & Multi-viewer.

iii) Creating Transmission Desk with monitoring facility through Video Monitor & Multi-viewer.

iv) Miscellaneous works like-necessary partitioning, painting and minor repair, if required, within the facility. Provision of Power supply distribution for the system being installed and augmentation of Air-conditioning system within the equipment area.

v) In the SITC of End to End File based Workflow system, the bidder is required to integrate the following existing systems presently functioning at Doordarshan Kendra, Hyderabad.

   a. In-house developed Newsroom Playout system. The bidder should provide the hardware & software API required for integration.

   b. Existing Media Nucleus BATS system.

   c. Existing Non-Linear Editing systems from Adobe Premier Pro, FCP, Avid Media Composer etc.

2. ENVISAGED SYSTEM OVERVIEW:

(a) The offered end to end file based workflow system should have the following areas & functions namely:

1. **Content Creation**
   i. Acquisition of Baseband & File based signals through Ingest Server & Import of content through FTP.
   ii. Integration of existing Non Linear Editing systems for Post production.
2. **Content Management**
   i. Media Asset Management
   ii. Proxy Generation
   iii. Centralized Online Storage
   iv. Archiving
3. **Content Delivery**
   i. Playout Automation
   ii. Graphics & Logo Generation
   iii. Off-air Logger
   iv. Transcoding & Delivery to Social Media Platforms

(b) The baseband content generated from Studios & received from feed room and the file based content received from ENG Camcorders & received from stringers through FTP will be ingested through the Ingest Video Server into the central storage system.

(c) A powerful, comprehensive and enterprise class Media Asset Management system with built-in transcoding features should keep track of the flow of the media.

(d) The MAM should create low resolution copy of the high resolution content through proxy generator. The low resolution copy of the content will remain in the on-line central storage till the end of the content life.

(e) Automatic Metadata generation & manual Metadata addition should be possible during ingest. The system in addition to creation, should also allow for viewing & modifying the metadata of ingested materials. Metadata should include at least title, ID, source, media number, date, Time Code etc. Indexing of clips should be systematic for easy searches. Metadata fields should be customizable.

(f) Low resolution & High resolution content pertaining to News and the Graphics content should be made accessible for the In-house developed Newsroom Playout system. The bidder has to cooperate in developing the required API for the Newsroom Playout system in coordination with the Doordarshan's team.

(g) The low resolution program content will be available for browsing in the Client systems and will be accessed by the existing Non Linear Editing systems for proxy editing and later on confirmation in respective high resolution for playout purpose. Similarly, the system should also facilitate on storage (in place) editing for the existing Non-Linear editing systems.

(h) Contents scheduled for transmission should be played by Play-out Automation solution by controlling the devices such as Playout Video Servers, VCRs/Decks, Graphics system, Router, Logo Generators etc.

(i) Enhancing the richness of on-air looks of the content should be contributed by the multilayer graphics system.

(j) Capable of Dynamic AD insertion through SCTE-104/SCTE35 protocol.

(k) Preparation of scheduling & reconciliation of As Run Log with the Media Nucleus BATS (Broadcast Air Time Scheduler) system which is presently being used in Doordarshan Kendra, Hyderabad.

(l) Facility for transcoding the content for publishing through Social Media platforms should be provided. The Social Media publishing system should facilitate creating (locally as well as remotely) & running the exclusive playlist for catering to social media platform.

(m) The off-air logging facility for retaining the copy of the telecasted content for a selected period should be included in the workflow.

(n) The high resolution contents will be moved after scheduled time frame to LTO tape library for deep Archival purposes.

(o) The entire file based workflow facilities should be capable of operating from remotely also. Accordingly, necessary software & remote client licenses should be provided.

3. GENERAL REQUIREMENTS:

a) The General specifications of the System applicable to all the equipment are given in **Appendix - I**.

b) **The offered system should be from an internationally reputed manufacturer and each quoted item should be field proven and in use by leading broadcasters. The bidder should essentially submit the list of the broadcasters to whom the quoted model of equipment have been supplied. The tenders without the proper user list shall liable to be rejected.**

c) Supply, Installation, Testing and Commissioning of End to End File based Workflow Facility should be implemented on turnkey basis.

d) Before submitting the bid, the bidder can visit the proposed site to assess the site requirements on any working days with prior permission from Deputy Director General (Engg.), Doordarshan Kendra, Hyderabad.

e) A pre bid conference will be held at an appropriate time before the last date of the submission of the bid to bring clarity to all the prospective bidders in respect of the requirement of tender specifications. The date and venue will be intimated to all the prospective bidders. **The prospective bidders are required to submit their queries (if any) in writing so as to reach Doordarshan at least three working days before the pre-bid conference.**

f) It will be the responsibility of the bidder to ensure after-sale service and guarantee for all equipment from respective manufacturers.

g) Any substandard equipment included in the offer may cause rejection of the complete offer with the sole responsibility of bidder.

h) The offered system should be capable of working in SDTV (4:3 and 16:9 aspect ratio) and HDTV (16:9 aspect ratio). The SDTV standard is 625 lines conforming to SMPTE 259M and ITU-R BT 601(amended upto date) (SD-SDI 270Mbps). The HDTV standard is 1920x1080/50/I conforming to SMPTE 292M and ITU-R BT. 709 (CIF) (amended up to date) (HD-SDI: 1.485 Gb/s).

i) The bidder is required to submit the system design including layout drawing, rack layout, technical furniture design along with the bid.

j) The successful bidder will be required to prepare and submit the final system design in consultation with Doordarshan immediately after award of the contract/work order and get it approved by DG: Doordarshan before implementation/execution at the designated site.

k) The bidder shall submit only one solution (Single BOM) for the offered system. BOM shall not contain any alternate item/items for the item mentioned in the BOM. Bid with alternate item(s) is liable to be rejected.

l) The bill of material (BOM) required is given in **Appendix - II**. The bidder is required to provide the complete list of items & accessories etc. offered to meet the specifications requirement in the following proforma:

Sr. No.	Description / Name of the item	Make	Model	Part No., if any	Qty.
1.	2.	3.	4.	5.	6.

m) An indicative workflow diagram is as per the **Appendix - III**.

4. ESSENTIAL REQUIREMENTS OF THE SYSTEM:

a) The offered end to end File based Workflow solution should be based on Open standard Architecture using COTS hardware for the various components of the system.

b) The system should strictly be on a client-server architecture.

c) The components of the offered solution should be based on widely accepted and field proven operating system with quick boot up for reliable operation. The operating system for the Servers should be either Linux based operating system or run on Windows Server 2016 or above.

d) The system should be based on industry-standard protocols like FTP for file transfer and should provide an API for integration with third-party devices.

e) The offered system should be designed for easy-to-use, flexible, reliable, scalable, efficient playout and high quality delivery.

f) The bidder will be required to integrate the HD/SD VTR/VDRs that will be provided by Doordarshan for Ingesting purpose as well as for direct live transmission in case of exigency.

g) The system should be capable of ingesting any source (Like VTR, Live feed etc.) Monitoring facility for input sources, program output, preview output including associated audio channels should be provided.

h) The content should be ingested in open file structure without using any proprietary wrapper and the content should be assessable to by third party system without any transcoding or rewrapping.

i) Graphic User Interface of the system should be customizable and operator friendly.

j) Necessary Audio/Video router controllable by the Automation system should be included.

k) The bidder has to include a Digital Intercom system as specified in this document.

l) The networking of the overall system should be designed carefully to support peak load conditions and taking into account 50% increased system load. Server and network bandwidth should not be the performance bottleneck. The bidder should submit the calculation undertaken & explanation along with the bid.

m) The network is an integral part of the design. The complete network system should be designed for high quality service.

n) The network component should have adequate buffering on channels and should meet integrated highest quality & performance benchmark.

o) The Network switches used should be rack mountable, suitable for 24 x 7 operation and should be from a reputed manufacturer.

p) The Core Network switches should be Layer 3 switches and the distribution Network switches should be Layer 2 switches.

q) All network accessories such as transceivers, SFP+ Modules and cables required for the efficient functioning of the entire system is the responsibility of the bidder and should be part of the bid.

r) The security of the overall network system should be ensured by implementing a hardware based Firewall system with adequate Firewall Throughput.

5. ACCOMADATION, POWER SUPPLY, AIR CONDITIONING & SYSTEM INTEGRATION:

a) The system is required to be installed at Doordarshan Kendra, Ramanthpur, Hyderabad - 500013, Telangana state. An indicative layout of Doordarshan Kendra, Hyderabad is enclosed in **Appendix-IV**.

b) A suitable space (Telecine room) will be provided by Doordarshan Kendra, Hyderabad to install the desired system. Necessary false flooring and partitioning within the facility for equipment area is required to be included in the offer. The firm is required to use metallic frame with glass, MDF board & Aluminium

composite panels for the partitioning works. The interior of the accommodation should match with the existing installation. Further, painting and minor repair, if any, within the facility will also be part of the offer. The bidder should workout the area required for installation of the proposed facility as per their system design. A layout plan should also be submitted along with the bid.

c) The accommodation for dedicated Ingest room (VTR room) will be provided by Doordarshan which is already equipped with house lights. However, Ingest Desk accommodating the separate Ingest Client systems for base band & file based ingest with monitoring facility and Client workstation for receiving media clips from the Stringers & other kendras through FTP. Provision of adequate quantity of special LED lights for proper illumination of operation desk should be provided by the bidder.

d) Doordarshan will provide three-phase power supply (phase to neutral 230 volt ±5%, @50 Hz) at single point in the facility.

e) A compact Power Distribution Panel with the required switchgears like MCBs, digital Volt & Ampere Meters, digital frequency meters etc. should be provided. The entire Switch Gears should be of high quality and should be of reputed brands.

f) The Kendra will provide the un-interrupted Power Supply required for the system. Further distribution of power supply to the equipment, working desks etc. have to be planned and executed by the bidder.

g) The bidder should also provide the electrical load calculation of the offered system. Mains and UPS Power Supply availability status indication (Aural & Visual) should be made available in the Operational Area. It should be clearly visible and audible.

h) The power cables to be used for internal wiring for various purposes should be fire retardant and of the best quality having adequate rating with sufficient headroom.

i) The successful bidder will be required to submit the power supply distribution schematic to Doordarshan for approval prior to execution of the work. The provision of all electrical items required for the facility should be included in the bid.

j) The accommodation for equipment room being provided is already Air Conditioned. However, the bidder should install one number of commercial/ industrial grade precision air conditioner of approx. 3 ton capacity. The precision air-conditioner will supplement the existing air-conditioning system and will run on essential power supply with Diesel Generator backup.

k) The bidder has to use high grade cables & connectors for video, audio, data and power interconnection of all the equipment. The video cable should be similar to Belden make for rack wiring and other applications. The BNC connectors of high quality similar to Neutrik make should be used.

l) Technical Block diagram and Line diagrams of the Signal, Control and Power chain etc. should be properly displayed in the facility.

m) Essential input and output signals will be made through HD patch panel for flexibility in the facility for emergency operation. Only high quality patch panels with suitable numbers of the patch cords are also required to be included in the offer.

6. MAIN FUNCTIONAL AREAS:

The installation will comprise of mainly following functional areas:-

6.1 Equipment Area:

The equipment area is required to be partitioned within the provided facility which will house all the electronics of equipment in standard 19" rack(s). The equipment rack will be equipped with one no. of 17" Video Monitor with audio monitoring facility and one no. of XY control panel of Router.

A System Administrator workstation with Monitor, keyboard and mouse for purging, diagnostics etc. should be installed in the Equipment room.

6.2 Ingest Desk with Monitoring Facility:

The Ingest Desk area (Video Disk Recorder room) will have a desk on which two number of Ingest Client Systems for ingesting baseband signals received from feed room/CAR and ingesting file base content received from field based ENG coverages & received via FTP. Client workstation for receiving media clips from the Stringers & other kendras through FTP.

This desk will also accommodate two nos. of audio-monitoring station and one no. of XY control panel of router with each Ingest Client System. The associated monitoring facility for required Input & Output sources will be provided in front of the desk through large size Video Monitor and multi-viewer.

In addition, one remote client Ingest system should be provided at Playout Desk also for ingesting purpose in exigency. The necessary technical furniture for the Ingest Desk in the Ingest room will be part of the offer.

6.3 Playout Desk with Monitoring Facility:

The Main Playout room will have a desk on which remote client system of playout server will be installed. This desk will also accommodate two nos. of audio-monitoring station for each channel and one no. of single bus control panel of router. The associated monitoring facility for required Input & Output sources will be provided in front of the desk through large size Video Monitor and multi-viewer. The monitoring facility will also be equipped with one pair of Ampli-speaker system for ON AIR program monitoring.

The remote client systems for Playout Server & for Graphics facility should be made available at the Production desk of Production Control Room of both Studios i.e. PCR-1 & PCR-2.

The necessary technical furniture to accommodate the equipment for Playout Desk will be part of the offer.

7. MAIN COMPONENTS OF THE SYSTEM:

7.1 VIDEO SERVER:

a) The offered Video Server should strictly be on a client-server architecture using generic IT hardware and should be designed specifically adhering to Broadcast Quality Standards for a 24 x 7 use environment with a guaranteed uptime of 99.99 %.for television broadcasting.

b) The offered system should consist of main and back-up Video Server in redundant (1 + 1) configuration for Two (Dual) channel Playout Automation operations and multiple Servers for Ingest/Production operation.

c) Out of the total 24 bi-directional I/O ports envisaged, 12 Nos. of bi-directional configurable I/O ports should be distributed in two or more Ingest/Production Video Servers and each Playout video server should be equipped with 6 bi-directional configurable I/O ports. The bidirectional ports should be able to switch between ingest, preview and playout dynamically without the requirement of system reboot.

d) Each Playout Server should have 2 (two) ports for Ingest/record/live purpose and 4 (four) ports for Playout purpose i.e. Channel-1 PGM, Channel-1 PVW, Channel-2 PGM, Channel-2 PVW.

e) The operating system of Video servers should run on a RAID 1 based SSD for redundancy & fast boot up.

f) The Playout Video servers should be offered with an internal storage of at least 200 Hours content at 50Mbps for each channels enabling seamless playout even in case of networking error.

g) The server should support edit while ingest on the storage functionality and should also support play while ingest functionality.

h) The internal storage should be RAID 5 or RAID 6 based and should come with enterprise class 10K/15K SAS HDD or SSD for high file transfer throughput.

i) The video servers should be equipped with dual 10G SFP+ or 10G Base T networking interface.

j) Each video server should provide at least 200MBps of file transfer throughput for fast file transfer.

k) The video servers should be based on industry-standard protocols like FTP for file transfer and should provide an API for integration with third-party devices

l) The offered Video Server System shall have the following functionalities:-

(I) INGEST:

a) The Ingest system should have intuitive user interface for easy ingest operation with easy controls available in the hand of operators for resolving any eventuality.

b) The content either from live feeds or VCRs/Decks will be mix of SD and HD sources. The content should be ingested in native format i.e. SD in SD and HD in HD. Similarly, the live input content (s) will also be mix of SD and HD.

c) Ingest operation for baseband signal (live feed and VTR etc.) and file based content should be user selectable between auto & manual mode.

d) The ingest system should support VTR control for batch capture, the ingest system should also support Scheduled Ingest. It should also provide VTR control interface for remote operation.

e) It should be able to ingest SD SDI baseband signal in to DVC PRO 50 format and HD SDI baseband signal in XDCAM HD 422 format. It should also support embedded AES/EBU audio.

f) It should also have file based Ingest of Sony XDCAM HD422 {MPEG-2 long GOP (12 frames) 4:2:2@HL} 50Mbps with 8 bit quantization data files in MXF file format. The system should offer complete compatibility with broadcast industry *.mxf file formats for content exchange. Necessary interfaces along with required hardware should be included in the offer.

g) The system should create, edit/ modify metadata for all the media files ingested or being ingested.

h) It should be possible for operator to define source and destination for ingest. Edit while ingest and play while Ingest should be possible with a delay of as less as 10 seconds from the start of recording.

i) Simultaneous ingest of the sources should be possible even when the play out continues from the Servers.

j) The content should be ingested in open file structure without using any proprietary wrapper.

k) System should provide current status of ingest process to operator in time domain with an option to abort the process any time.

l) It should be possible for operator to define source and destination for ingest through X-Y control panel of routing switcher.

m) Necessary monitoring facility for monitoring the sources being ingested including respective audio channels & its level should be provided.

(II) SCHEDULING:

a) The application for scheduling should facilitate creating of play lists for multiple channels. It should be possible to append play list without interruption. It should also be able to import schedule from third party traffic systems like Media Nucleus, to convert it into a playlist (s). Schedules include primary and secondary events.

b) It should be possible to link various events with graphic templates, as well as adding, deleting, and replacing graphic templates to schedule. It should provide visibility of all secondary events, and the timing of all secondary events

c) It should be possible to import & export the playlist.

d) The operator should have all standard and configurable tools set for auto time line calculation etc. with alarms for any missing event or scheduling conflict etc. It should allow fill up of specific time gap with video, still clip etc.

e) It should allow non-restrictive editing of playlist even during the transmission, especially when a live program from non-controllable external source is on air whose duration is not known in advance.

f) Playlist should allow files of different resolutions and bit rates to co-exist.

g) Multiple Playlist repetition should also be possible.

h) System should provide adequate protection for accidental changes in the play list.

i) It should be possible to generate independent 'ARL' (As RUN Log) for all play back events containing separately details of clips, ticker, crawl & graphics which were played and it should be possible to take the print outs of these 'ARL' for the purpose of commercial billing.

j) It should be possible to export the 'As Run Log' to the traffic department, if required.

(III) PLAYOUT:

a) The playlist for both the channels should be in 1+1 mode for redundancy. Both the playlists should work in sync. Each playlist for each channel should be dynamic and should have primary, secondary and tertiary events for video, logo, graphics and audio clips.

b) The system should allow frame accurate playout by using station black burst reference and time code.

c) The playout will carry both, live events such as National/Regional News, Panel discussions, Interviews, Talk show etc. and pre-recorded/ingested content.

d) The system should be able to play SD and HD contents back-to-back and provide program output in SD or HD. It should, therefore, have Up/down/cross conversion of both live inputs and recorded media files in desired aspect ratio at the time of playout.

e) The playout application must be able to pull the required content and metadata and transfer them as files over the network to the playout port it is managing.

f) It should have user-friendly menu for preparation of play list. Last minute (5 sec or less) changes in the play list should be possible.

g) It should have live input recording with or without graphics for deferred/repeat telecast as and when required.

h) It should also be possible to preview sequences for marking IN and OUT points.

i) It should resume the playout from the last known position in case of interruption and it should also allow the user to jump from one line in a playlist to another during broadcast, regardless of whether or not the current event has finished. In that case, remaining playlist should be automatically modified accordingly.

j) The system should also have facility to pause and play the playlist manually.

k) It should be able to schedule and play the growing file being ingested in the system.

l) The playback of scheduled clips from the play list should be instantaneous without any delay.

m) It should support a wide range of native file formats with mixed format for back-to-back playout.

n) The system should manage available devices as per the playlist automatically and manually for each event.

o) It should be possible to create several in & out points on the same clip to be able to play as segments.

p) It should be possible to preview clip sequences.

q) System should also support voice over/recorded audio as "secondary event" as per the Playlist.

(IV) REDUNDANCY:

a) All additions and modifications with respect to playlists, content and associated metadata should also be affected automatically in back-up server. Back-up server should always be in-sync with main

server for the smooth transition in case of changeover due to system failure or to allow maintenance work.

b) In case of online server port failures, automatic switching of program from backup server should be provided so that the program on-air is not interrupted.

c) The switchover to redundant system may be possible manually or automatically.

d) Facility to monitor the status of redundant hardware/ software should be provided to operator so that appropriate decision may be taken by him in case of exigencies.

e) The bidder must ensure redundancy of the system by offering redundant power supplies, fans, network ports. It should also have hot swappable components.

f) Any changes made in the master playlists should also be automatically made in the slave (redundant) system.

g) In exigencies, it should be possible to take live feed or predefined source with single button operation.

7.2 ONLINE SHARED STORAGE SYSTEM:

(a) The offered Central storage system should be of enterprise class and high performance unified storage for online editing. The storage array in (1 + 1) mirrored configuration and should be offered in separate boxes.

(b) Each offered Central storage system should be highly reliable, robust and scalable for the required application.

(c) The Storage system should be in separate chassis should be 19" rack mountable. The system should be modular for easy servicing and hot swappable components in case of failures. It should be possible to easily configure and manage the system.

(d) The shared storage will be used for various applications such as ingest, play-out, archive, collaborative editing etc. simultaneously.

(e) The unified storage system should have approx. **100 TB** of usable storage capacity in RAID-5/6 configuration for storing Audio-Video & ancillary data.

(f) Each Storage box should give a sustained throughput of 900 MegaBytes/sec or higher.

(g) The storage should support edit on storage (In place editing).

(a) Each Storage system should have a dual intelligent RAID controller or similar technology meeting the required BW in active-active mode with fail over functionality with at least 8GB of memory per controller. The disk array should be configured in RAID 5/6. Even in case of failure of two disk, the system should offer the required performance.

(h) Every captured clip will be stored in the shared storage and should be available to multiple users simultaneously for editing and play-out all the time without any restriction.

(i) The contents stored in the main storage box should be automatically mirrored in the back-up storage box.

(j) The storage should support on storage editing from both Mac and Windows operating systems.

(k) The storage should support all major NLE systems like Adobe Premiere Pro CC, FCP, and Avid Media composer.

(b) The storage should not have a single point of failure and redundancy should be built in in all levels. It should have redundant network ports, Raid controllers and Power supplies. The HDDs, power supplies and fans should be hot swappable.

(l) The storage system should have proven installations with Automation, MAM & Archive OEM.

(m) Each Storage Controllers/ Storage node should have minimum 2 ports of 10GbE SFP+

(n) The offered Storage system has 12Gbps SAS or higher backend connectivity.

(o) The Storage system should be populated with SAS hard disk.

(p) The Storage system should have dual redundant hot plug power supplies. Storage should come with SSD read cache for better performance. The storage should be scalable up to 1 PB with additional JBOD.

(q) The storage should support the following file transfer protocols: CIFS, NFS, FTP, SMB3.0, FC & iSCSI. License should be provided for all the protocol and it should be perpetual.

(r) Support the management, administration and configuration of the whole storage platform through a single web managed interface along with CLI

(s) It should provide highest levels of digital asset protection. The system design should ensure that in case of any fault, there should not be loss of ingested content. It should give suitable aural-visual alarm in case of any failure.

(t) The offered storage system should offer bandwidth for real-time play back of four video streams of compressed High Definition video (XDCAM HD422 @ 50Mb/s)) for each of the 12 NLEs working simultaneously along with 20 port server. Required throughput should be assured in all situations to avoid frame drops during high speed editing. Necessary calculation sheets to substantiate the claimed throughput should be submitted along with the Tender.

(u) The storage should use FC/10 gigabit Ethernet or similar connectivity with multiple ports aggression in a transparent manner. Necessary hardware

and software for the same should be offered. The storage solution, NLEs and video server should be fully integrated to provide adequate dedicated bandwidth to each node with dedicated port buffering for the envisaged application. Detailed Network design should be submitted to elucidate the required workflow and performance.

(v) It should be possible to operate directly on shared storage. It should also be possible to import graphics, animations, video and audio directly to the Storage.

(w) The offered system should have powerful storage management software tools for monitoring its performance including diagnostic functions.

(x) The network cable and switches including connectors etc. are part of the offered system.

7.3 MEDIA ASSET MANAGEMENT SYSTEM:

(a) Media Asset Management software should streamline content workflow. The MAM should streamline the content life-cycle right from acquisition to delivery.

(b) The MAM software should also support with web based client application that supports all platforms and device types.

(c) It should take care of ingest operations, metadata creation, browsing, search, tracking, transcoding, frame accurate proxy generation, movement of the content and end to end content management functionalities in the envisaged workflow including Content Storage Management (CSM)/ Hierarchical Storage Management (HSM) .

(d) It should carry out the functions like copy, move, delete, rename, check IDs and retrieve metadata from video file servers and other storage. It should instantly inform what new assets have been ingested into the system. It should provide information about location; format and status of content. It should take care archive, restore and transcode. It should have customizable content workflows, automate delivery and carry out assignments.

(e) The MAM should be able to link the metadata, low resolution copy, full resolution copy and full resolution file copy stored offline on a data tape media.

(f) It should facilitate content browsing and media transfer functionality across entire operation. It should create proxy copies of the ingested material irrespective of baseband or file based or final high res copy of the edited footage. It should retrieve embedded MXF metadata, provide real-time information about new assets and move content between archive and online storage.

(g) It should provide powerful metadata management capability for effective cataloguing, search and retrieval. The system in addition to manual metadata creation, should allow embedded MXF metadata. The metadata

insertion should be possible for entire video or for any portion of a clip. The metadata field should be scalable and should be customised according to the end user's requirement. It should be able to create & modify metadata fields as per user requirement.

(h) It should provide comprehensive toolset to transparently manage media movement requirements automatically including ingest, QC, production, playout and archiving file-based material.

(i) It should be suitable for live news environment. It should manage live feeds and log content as information is captured. It should quickly find the content needed to tell the complete breaking story.

(j) It should manage the key workflows such as acquisition/ ingest, cataloguing, editing and distribution of digital content.

(k) It should automate file-based operations including digital media ingest, transcoding, media duplication, and search, locate, preview, transfers and deliver content.

(l) It should relate metadata to content and integrate devices to deliver the right content to the right person at the right time. It should be designed to integrate with playout automation systems, video servers, NRCS, storage, LTO tape library and other of third-party products.

(m) It should have comprehensive search tools including thesaurus to find content across the operation based upon metadata. The search engine should deliver unified search results from all relevant metadata across all storage devices in all configured domains. Search results should allow previewing proxy media and moving the corresponding high-resolution content in full or part as desired from an archive to a production or playout destination.

(n) It should provide facility to browse, view and edit low-resolution proxy media from any of the client workstations. The low resolution copy should be frame accurate and time code synchronized with the high resolution content.

(o) The MAM system shall update its database as soon as the notification for metadata updating is received from the ingest system.

(p) It should have an integrated industry standard open database application similar to SQL, Oracle, DB2 as core module. The database should be scalable and user configurable. It should offer standard data management tool sets.

(q) The browser should invoke the proxy media player to view the low res. content. The browsing software should provide all the standard operational features of the media player like play, pause, stop, fast forward, skip to begin/end, skip to time code, skip configurable (number of frames forward/backward), jog and shuttle.

(r) The browsing software loaded in the workstations should be an integral part of the MAM software and facilitate browsing, cataloguing, search &

retrieval applications. The offered system should support up to 30 concurrent browse users.

(s) This software should facilitate creating & editing the metadata for the ingested low resolution content. The metadata can be quite comprehensive and hence the software should permit the expansion of the data structure of the database. It should have the flexibility for the end users to define their own metadata fields in addition to the MAM's standard metadata database.

(t) It should also be possible to import metadata and store in the offered MAM's database after adding newly created metadata to the imported metadata.

(u) The MAM software should facilitate the browser to make mark in, mark out and capable of sequencing various clips from the ingested contents.

(v) The bidder should furnish content retrieval time from archive, along with the bid.

(w) The MAM should ensure that the Transcoding Engines delivers the desired resolution high quality media across different Industry formats.

(x) The transcoders should be highly efficient so that the time taken for transcoding should be less than real-time of the Clip duration.

7.4 ARCHIVE SYSTEM:

A. CONTENT/ HIERARCHICAL STORAGE MANAGEMENT SYSTEM

(a) The content storage management system should provide frame accurate movement of content throughout the workflow

(b) It should manage multi-format content across all the storage devices such as online storage, near line storage, LTO tape library and tape on the shelf.

(c) It should be integrated seamlessly with MAM, Automation, NRCS software and Video server, NLEs, online storage, near line storage and LTO tape.

(d) It should allow time code based partial file restore of the needed video.

(e) Web-based MAM application allowing even remote users to simply search, locate, preview and deliver archived content from any desktop/Internet Browser.

(f) The proposed content management system should be capable to interface with different reputed tape library vendors like HP/IBM/Oracle/Quantum etc.

(g) The system should support offline Tape Cartridge Management/ externalization of tapes for unlimited number of tapes on the shelf.

(h) The content management should give performance history of all drives and media, as well as forecast of their performance. It should be possible to set triggers, to generate a variety of alerts when various performance thresholds have been exceeded.

(i) The content management should be controlled by Automation system.

B. LTO TAPE LIBRARY & DATA CARTRIDGE:

(a) The offered LTO Tape Library should have at least 3 Nos. of LTO - 8 tape drives with minimum 40 cartridge slots. The sustained uncompressed data transfer rate should be 300 MB/s or more in case of LTO - 8. The native uncompressed cartridge capacity should be 12 TB in case of LTO - 8.

(b) 60 Nos. of LTO - 8 RW Custom Labelled Data cartridges should also be included in the offer.

(c) LTO drives should have 8Gbps Fiber Channel and 6Gbps SAS interface.

(d) The library should be 19" rack mountable, robust construction, excellent performance and outstanding reliability required for broadcast archival purposes.

(e) Necessary tape management software and licenses for the same should be offered.

(f) Cleaning cartridges and other accessories essentially required for smooth functioning of the library should also be offered.

7.5 GRAPHICS SYSTEM:

(a) The offered system should also include a broadcast Graphics system.

(b) It should be able to import 2D static and animated graphic elements from industry-standard graphics authoring applications. It should also support insertion of animated logos.

(c) The Designer module should provide design, animation and page-based CG creation.

(d) The offered Graphics system should have dual channel support. It should have at least dual render engine to cater to both the Playout channels.

(e) The inbuilt graphics engine should be able to play the following graphic elements without any need of additional hardware or software

- L-BAND
- Animated Logo and Clock
- Ticker with dynamic content
- Coming back in Bug with dynamic timer
- Current program name Bug

(a) Bidder should provide necessary software and interfaces for simple import of logo graphic files and other commonly used graphic file formats through industry standard interfaces/ports.

(b) The system should be able to design broadcast quality graphic templates and application should enable arranging graphic elements into templates for play out channel.

(c) It should also be possible to key-in, roll, ticker and crawl graphics. System should also allow RSS feed to display on screen with suitable editing for display.

(d) The system application should permit creation and saving of repeatable templates. The templates with all the associated data will be populated at the moment of going to air. These templates should collect the data from multiple sources. In case of playlist changes, the associated XML metadata should maintain the correct associations so that the proper content should be played out.

(e) The system should have inbuilt multilingual character generation facility with Unicode fonts as per requirement of Doordarshen Kendra, Hyderabad. It should have full Unicode support with multiple text entry orientations including right to left and top to bottom. The Unicode fonts for Telugu, Hindi & English should be provided.

(f) System should support at least four layers of graphics simultaneously and each layer should be individually controllable.

(g) The system should support all standard image formats (PNG, JPG, TIFF, GIF) and sequences (Targa etc.).

(h) Even it should be possible to fire animation/graphics, L-band squeeze etc. easily that are not scheduled in the playlist but situation warrant them to fire as and when required during the transmission.

(i) Operator should have facility to position graphics within the safe area for insertion.

(j) It should have the capability for switching between logos as per the requirement during transmission.

(k) Application should also allow displaying the real time clock as graphics.

(l) Basic DVE effects for standard graphics should also be provided.

(m) Preview facility for graphics should be provided.

(n) Necessary hardware along with required storage for smooth functioning of the graphics facilities should also be offered.

(o) In addition, one number of graphics client machine for offline graphic creation/ text & data entry should also be offered.

7.6 SOCIAL MEDIA PUBLISHING SOLUTION:

(a) The bidder should offer enterprise scale Social media publishing solution to publish, monitor and analyze social media content.

(b) The system should integrate with leading social media platforms: YouTube, Twitter and Facebook and website.

(c) The system should strictly be on a client-server architecture and all administration tasks of the proposed system should be supported on a web-based client.

(d) The system should automatically transcode the contents to the format required by social media platforms and capable of publishing simultaneously in these platforms with operational ease.

(e) The system should support creation of playlist exclusively for the Playout for the Social media platform. It should also support creation of playlist remotely.

(f) The system should facilitate playing the playlist for publishing on social media platform and websites only after obtaining approval from the competent authority.

(g) The system should support standard Streaming protocols like RTSP, RTMP, HLS, etc.

(h) The system should also be capable of streaming baseband input content to social media platforms or a website.

(i) The system should be capable of assigning privileges to the users, provide password protected login, logging of publishing activities and generation of reports.

(j) The bidder should offer necessary hardware required for the Social Media Publishing along with required Software & User license on perpetual basis.

7.7 INTEGRATION OF EXISTING SYSTEMS WORKING AT THE KENDRA:

Doordarshan Kendra, Hyderabad is presently having Broadstream's Oasys based Playout Automation facility for Single channel operation and an in-house developed Newsroom Automation system. The Kendra is also using Media Nucleus's BATS system. The details of the existing Automation systems, BATS system, Non Linear Editing system and the requirements expected from the bidder are as mentioned below:

A. NON LINEAR EDITING SYSTEM:

(a) The Kendra is presently having 12 Nos. of HD Non Linear Editing systems of reputed make working on Windows and Mac OS like

Grassvalley EDIUS, Adobe Premium Pro, Apple FCP, Avid Media Composer etc.

(b) The bidder should integrate the above mentioned NLEs with the file based workflow facility and allow the Editing systems to edit the media available in the Central storage. Necessary interfaces along with required hardware should also be offered.

(c) Both in place editing and push-pull editing on the central storage should be feasible in the offered solution. The bandwidth calculation has to be made accordingly.

B. NEWS ROOM AUTOMATION SYSTEM:

(a) The Kendra is presently using In-house developed Newsroom Playout system. The Video Server, Character Generator, Teleprompter and Database Server of the News Automation system are indigenously developed in-house and integrated. The existing Newsroom Playout system is not MOS compatible.

(b) The bidder has to facilitate accessing of the MAM system by the Newsroom Playout system for fetching the ingested & edited media clips & Graphics clips required for the News rundowns.

(c) The bidder has to essentially quote for the hardware & software API required for accessing of MAM & Storage and the integration charges.

(d) The base band signal played by the Newsroom Playout system will be scheduled as a live event in the multi-channel Playout system of the offered File based Workflow facility.

C. PLAYOUT AUTOMATION SYSTEM

(a) The Kendra is presently using Broadstream's Oasys Playout Automation solution for delivering through Satellite transmission. The Playout system consists of two Ingest servers and Playout Servers in 1+1 configuration and a Graphics system. The Automation system is having storage distributed to both Ingest & Playout servers in mirrored mode.

(b) The playout automation system does not have a full-fledged Media Asset Management system.

(c) The existing Automation system does not have the provision for Transcoding and facilities for delivery on Social Media platform.

(d) The bidder has to **optionally** quote for the hardware & software API required for integration of the existing Playout Automation system.

D. BROADCAST MANAGEMENT SYSTEM

(a) Media Nucleus's BATS system is being used in Doordarshan network.

(b) The bidder has to **essentially** ensure smooth integration of the existing Media Nucleus's BATS system with their offered system for scheduling, reconciliation of As Run Log and Invoice generation.

8. TECHNICAL SPECIFICATIONS OF MAJOR EQUIPMENT:

i. All the equipment in the offer should be from internationally reputed and leading manufacturers of their respective industry, who have proven records of offering high class, high MTBF equipment.

ii. All Servers, Workstations, Storage system & Desktop Computers should be from internationally reputed manufacturers such as HP, Dell or equivalent only will be accepted.

iii. The hardware configuration mentioned in the Technical specification are as per the minimum requirement and however the bidder can offer a superior hardware configuration as recommended by the OEM for ensuring full performance of the offered system & application software.

iv. Any substandard equipment included in the offer may cause the rejection of complete offer with the sole responsibility of bidder.

8.1 Technical Specifications for various Servers & Workstations:

A. Video Playout Servers:

Sr. Nos.	Description		Parameter Values
1.	Inputs/Outputs	:	HD-SDI: 1.485 Gb/s and SD-SDI 270Mbps with embedded audio (16, 20, 24 bits PCM@48KHz)
2.	Reference	:	Analog Black Burst/Tri level sync
3.	Time Code	:	LTC/NTP/VITC on black
4.	Channel / I/O Ports	:	Each Playout Server should have at least Six base band bi-directional ports configurable as 2 In 4 Out
5.	Format Supported	:	**SD**: Encoding/ decoding DVCPRO, DVC PRO50, MPEG-2 @ ML 4:2:2, I-Frame & Long GOP, 4-50 Mb/s **HD**: Encoding/ decoding XDCAM HD 4:2:2 (50 Mb/s), MPEG-2@HL 4:2:2, I-Frame & Long GOP, 20-100 Mb/s **File based support**: XDCAM HD 4:2:2 (50 Mb/s) with MXF OP1a wrapper, DVC PRO & DVCPRO 50 with MXF OP Atom or MXF OP1a wrapper.
6.	I/O Interface	:	(i) HD/SD SDI on BNC (ii) RS422 ports for control (VTR control

			interface through appropriate protocol) wherever is required (iii) Ethernet (RJ45) (iv) I/Os for connecting other standard devices
7.	Network	:	Dual 10G SFP+ or 10G Base T interface
8.	Throughput	:	at least 200MBps
9.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
10.	Processor	:	Dual Intel Xeon Gold 6250 Scalable series or better with minimum eight (8) cores per processor
11.	RAM	:	32GB or more DDR4
12.	Graphics RAM	:	2 GB or more
13.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
14.	Media Storage	:	16TB or more Enterprise class SAS 10K or 15K HDD or SSD in RAID 5/6 to store at least 400 hours content at 50Mbps data rate. (200 hours of content for each channel)
15.	Enclosure	:	19" rack mount
16.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply
17.	Operating Temperature	:	10°C to 35°C ambient with free air flow

B. Video Ingest/Production Servers:

Sr. Nos.	Description		Parameter Values
1.	Inputs/Outputs	:	HD-SDI: 1.485 Gb/s and SD-SDI 270Mbps with embedded audio (16, 20, 24 bits PCM@48KHz)
2.	Reference	:	Analog Black Burst/Tri level sync
3.	Time Code	:	LTC/NTP/VITC on black
4.	Channel / I/O Ports	:	12 Nos. of I/O Ports distributed in Two or more Ingest/Production Servers.
5.	Format Supported	:	**SD**: Encoding/ decoding DVCPRO, DVC PRO50, MPEG-2 @ ML 4:2:2, I-Frame & Long GOP, 4-50 Mb/s **HD**: Encoding/ decoding XDCAM HD 4:2:2 (50 Mb/s), MPEG-2@HL 4:2:2, I-Frame & Long GOP, 20-100 Mb/s **File based support**: XDCAM HD 4:2:2 (50 Mb/s) with MXF OP1a wrapper, DVC

			PRO & DVCPRO 50 with MXF OP Atom or MXF OP1a wrapper.
6.	I/O Interface	:	(i) HD/SD SDI on BNC (ii) RS422 ports for control (VTR control interface through appropriate protocol) wherever is required (iii) Ethernet (RJ45) (iv) I/Os for connecting other standard devices
7.	Network	:	Dual 10G SFP+ or 10G Base T interface
8.	Throughput	:	at least 200MBps
9.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
10.	Processor	:	Dual Intel Xeon Gold 6250 Scalable series or better with minimum eight (8) cores per processor
11.	RAM	:	32GB or more DDR4
12.	Graphics RAM	:	2 GB or more
13.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
14.	Media Storage (in case required)	:	2TB or more Enterprise class SAS 10K or 15K HDD or SSD
15.	Enclosure	:	19" rack mount
16.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply
17.	Operating Temperature	:	10^{o}C to 35^{o}C ambient with free air flow

C. Unified Storage System:

Sr. Nos.	Description		Parameter Values
1.	Usable Storage Capacity	:	100TB per Storage Box
2.	Sustained Throughput	:	900 MegaBytes/sec or higher per Storage Box
3.	Controller	:	Dual Controller
4.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
5.	Processor	:	Intel Processor 2 cores 2.2GHz or higher
6.	System Memory	:	8GB per Controller
7.	Read Cache	:	Storage should come with 1 TB SSD read cache for better performance
8.	Storage Media	:	SAS 10K/15K HDD or SSD or better
9.	RAID Support	:	RAID 0, 1, 5, 6, 10, 50
10.	Redundancy	:	Storage: Minimum 2 disk failure protection Power Supply: Dual redundant hot plug

			power supplies
11.	Storage Scalability	:	The storage should be scalable up to 1 PB with additional JBOD
12.	File transfer protocols	:	CIFS, NFS, FTP, SMB3.0, FC & iSCSI License should be provided for all the protocol and it should be perpetual.
13.	Backend connectivity	:	12Gbps SAS or higher
14.	Network	:	Each Storage Controllers/ Storage node should have minimum 2 ports of 10GbE SFP+
15.	Enclosure	:	19" rack mount
16.	Chassis Form factor	:	5U or more
17.	Power Supply	:	200 to 240 Volts, 50 Hz Dual hot swappable redundant power supply
18.	Operating Temperature	:	10ºC to 35ºC ambient with free air flow

D. Media Asset Management Server:

Sr. Nos.	Description		Parameter Values
1.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
2.	Processor	:	Intel Xeon Silver 4208 2.1G, 8C/16T, 9.6GT/s, 11M Cache, Turbo, HT (85W) DDR4-2400 or higher
3.	RAM	:	16GB or more DDR4
4.	Network	:	Dual 1Gbps or better
5.	Throughput	:	at least 200MBps
6.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
7.	Video formats	:	Video-Codecs: XD CAM HD, DV Family, AVC Intra, MPEG2, H264 Video Wrappers: MXF, MOV, DV, Mp4
8.	Audio Formats	:	PCM / LPCM, MPEG Layer 1/2 Audio, AAC, HE-AAC, WMA, AMR, Raw, DV, Dolby Digital Plus Pro (AC-3 & E-AC-3)
9.	Image Formats	:	Png, Jpg, tiff, Jpeg, bmp
10.	Enclosure	:	19" rack mount
11.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply
12.	Operating Temperature	:	10ºC to 35ºC ambient with free air flow

E. HSM / Archive Server:

Sr. Nos.	Description		Parameter Values
1.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
2.	Processor	:	Intel Xeon Silver 4208 2.1G, 8C/16T, 9.6GT/s, 11M Cache, Turbo, HT (85W) DDR4-2400 or higher
3.	RAM	:	16GB or more DDR4
4.	Network	:	Dual 1Gbps or better
5.	Throughput	:	at least 200MBps
6.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
7.	Video formats	:	Video-Codecs: XD CAM HD, DV Family, AVC Intra, MPEG2, H264 Video Wrappers: MXF, MOV, DV, Mp4
8.	Audio Formats	:	PCM / LPCM, MPEG Layer 1/2 Audio, AAC, HE-AAC, WMA, AMR, Raw, DV, Dolby Digital Plus Pro (AC-3 & E-AC-3)
9.	Image Formats	:	Png, Jpg, tiff, Jpeg, bmp
10.	Enclosure	:	19" rack mount
11.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply
12.	Operating Temperature	:	10^{o}C to 35^{o}C ambient with free air flow

F. LTO Library & Cartridges

Sr. Nos.	Description		Parameter Values
1.	Drive Type	:	LTO-8 Ultrium
2.	No. of Drives	:	2 or more
3.	No. of Tape Slots	:	40 or more
4.	Drive Interface	:	FC (8Gbps), SAS (6Gbps)
5.	Native Data Transfer rate for LTO-8	:	300MBps or more
6.	Native Storage Backup Capacity for LTO-8	:	Up to 480 MB
7.	Enclosure	:	19" rack mount
8.	Form Factor	:	3U
9.	Power Supply	:	Dual Redundant Power supply
10.	Native Cartridge Capacity for LTO-8	:	12TB

G. Social Media Publishing Server:

Sr. Nos.	Description		Parameter Values
11.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
12.	Processor	:	Intel Xeon Silver 4208 2.1G, 8C/16T, 9.6GT/s, 11M Cache, Turbo, HT (85W) DDR4-2400 or higher
13.	RAM	:	16GB or more DDR4
14.	Network	:	Dual 1Gbps or better
15.	Throughput	:	at least 200MBps
16.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
17.	Enclosure	:	19" rack mount
18.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply
19.	Operating Temperature	:	10°C to 35°C ambient with free air flow

H. Transcoder System:

Sr. Nos.	Description		Parameter Values
1.	Operating System	:	Linux or Microsoft Windows Server 2016 and above
2.	Processor	:	Intel Xeon Silver 4208 2.1G, 8C/16T, 9.6GT/s, 11M Cache, Turbo, HT (85W) DDR4-2400 or higher
3.	RAM	:	16GB or more DDR4
4.	Network	:	Dual 1Gbps or better
5.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
6.	Enclosure	:	19" rack mount
7.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply
8.	Operating Temperature	:	10°C to 35°C ambient with free air flow

I. Graphics System

Sr. Nos.	Description		Parameter Values
1.	Operating System	:	Microsoft Windows 10 Pro or similar
2.	Processor	:	Intel Xeon Silver 4208 2.1G, 8C/16T, 9.6GT/s, 11M Cache, Turbo, HT (85W) DDR4-2400 or higher

3.	RAM	:	16GB or more DDR4
4.	Network	:	Dual 1Gbps or better
5.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
6.	Graphics Processing Unit		NVIDIA Quadro P4000 (8 GB GDDR5 dedicated) or better
7.	Power Supply	:	230 Volts ±5%, 50 Hz Dual hot swappable redundant power supply

J.Ingest, Playout, Graphics, MAM, Off-Air Logger & Administrator Client Work Stations:

The bidder should offer required nos. of Client, Graphics & Administrative Workstations. These workstations should be equipped with necessary software and hardware. The hardware should have the following minimum configuration:-

Sr. Nos.	Description		Parameter Values
1.	Operating System	:	Windows 10 Pro 64 or similar
2.	Processor	:	Intel Core i5 9600 3.1G, 6C, 9MB Cache, DDR4-2666 or higher
3.	RAM	:	8GB or more DDR4
4.	Network	:	Dual 1Gbps or better
5.	Graphics	:	On board Intel® HD Graphics 630 or similar
6.	OS Drives	:	2 X 200GB 6Gbps SSD on Raid 1, hot-plug drive bays or higher
7.	Display	:	24-inch IPS LED Backlit Monitor.
8.	Accessories	:	Optical 3-Button Mouse, Key Board etc.
9.	Power Supply	:	230 Volts ±5%, 50 Hz

8.2 32x32 HD/SD SDI ROUTING SWITCHER:

a) The bidder should offer internationally reputed 32 X 32 routing switcher. It should be capable of routing HD/SD-SDI signal with embedded audio.

b) The routing switcher facilitates effective utilization of various resources by assigning any of the sources to required destination.

c) The bidder should provide 3 nos. of XY remote control panel and 2 nos. of single bus remote control panel.

d) The router should have dual redundant power supply and system controller. It should be genlockable with local reference sync.

e) The offered router should facilitate relay bypass feature to bypass the router in the event of power failure.

f) The offered router should be transparent to embedded audio.

g) The router should be configurable for Transmission playback, ingest and monitoring of various sources through RCPs.

h) The brief Technical Parameters of Routing Switcher are as under:

Sr. Nos.	Description		Parameter Values
1.	Input & Output	:	3G/HD/SD-SD with embedded audio
2.	Connector	:	BNC
3.	Reference Input	:	PAL Black & Burst or HD Tri-Level on BNC
4.	Impedance	:	75 ohm
5.	Return Loss	:	≥15dB 1MHz to 1.5GHz; ≥10dB, 1.5GHz to 3GHz
6.	Signal Level	:	800 mV±10%
7.	Equalization	:	Automatic up to 75 m or more (at 1.5Gb/s) for Belden 1694A or equivalent cable

8.3 SYNC PULSE GENERATOR (SPG):

a) Genlockable dual SPG with Auto Change-over facility should be offered along with the system.

b) The offered SPG should be able to work as Master/Slave mode, as per the requirement.

c) Both the Main & back-up units should have HD Tri-level sync, Analog Black Burst (PAL) (at least 5 user configurable HD Tri-level sync/Analog Black Burst (PAL) outputs, digital black, Digital Audio Reference Signal (DARS), word clock output, VITC and LTC & NTP Time code outputs.

d) It should have GPS receiver and should be supplied with GPS antenna and cable.

e) The Automatic changeover unit should have at least 9 channels of changeovers for the signals mentioned in para (c) above.

f) The changeover unit should have redundant power supply unit.

8.4 MULTI–IMAGE DISPLAY PROCESSOR:

a) The offered system should have 16 nos. of auto sensing HD/SD SDI inputs and dual display with HD/SD-SDI or HDMI outputs.

b) The offered system should support 1920x1080 resolutions.

c) The offered system should also display embedded audio.

d) The offered system should allow for full screen viewing of any input on both outputs.

e) The offered system should have dynamic under monitor displays and tallies via several supported protocols.

f) The offered system should be modular and 19" rack mountable with redundant power supplies.

g) The offered system should have control and configuration capabilities via Simple Network Management Protocol (SNMP) or any other similar protocol.

h) The offered system should have on-screen digital/analog clocks.

i) The offered system should have general purpose interface I/O.

j) It should be possible for the user to configure the layout of image display.

8.5 55" VIDEO MONITOR:

a) The offered monitor should incorporate high intensity & high contrast wide screen of size 55" (diagonal) and wide viewing angle LCD Panel to view stable images from various angles - both horizontally and vertically, with no reduction in picture contrast, brightness and colour saturation.

b) The incorporated LCD panel should employ LED backlight technology to make offered monitor thinner and lighter with lower power consumption. It should have faithful colour reproduction.

c) The LCD panel of the offered monitor should be of 16:9 aspect ratio with resolution of 1920X1080 or better pixels. The offered monitor should support 16:9 and 4:3 aspect ratio format of the video signal.

d) The offered monitor should have a minimum response time and high refresh rate of 50Hz for viewing fast moving picture like sports events without motion artifacts such as blur, judder etc. It should therefore reproduce smooth, sharp and clear fast moving images.

e) The monitor should have HD/SD-SDI or HDMI input compatible with the offered multi-viewer.

f) The product should have high reliability for continuous operation.

g) The monitor should be offered with mounting unit complete in all respect.

h) The brief Technical Parameters of 55" Video Monitor are as under:

Sr. No.	Specifications Parameters		Parameter Values
1	Active Screen Size	:	55" diagonal
2	Aspect Ratio	:	16:9
3	Resolutions	:	1920 x 1080
4	Viewing angle	:	178^{o} or more

	(H & V)		
5	Brightness	:	500 Cd/m2 or better
6	Contrast		1400:1 (Typical) or better
7	Colour Resolutions	:	1.06 billion colours
8	INPUTS		
(a)	HD/SD-SDI or HDMI (1.3 or better) input	:	1 or more compatible with the offered multi-viewer

8.6 16.5"/17" HD-SDI VIDEO MONITOR:

a) The offered monitor should incorporate high intensity, high contrast wide screen 16.5"/17" (approx.), wide viewing angle LED backlit, 10 bit LCD panel to view stable images from various angles: both horizontally and vertically, with no reduction in picture contrast, brightness and colour saturation.

b) The offered monitor should support 16:9 and 4:3 aspect ratios of the video signal. The monitor should also support 1920X1080/50I (HD) and 720X576/50I (SD) video formats.

c) The offered monitor should support embedded audio. It should also have analogue audio input and built in speaker for audio monitoring.

d) The monitors should display various area markers, including a center marker, aspect markers, and safe zone marker.

e) It should have various I/P (Interlace to Progressive) conversion modes with minimum delay suitable to display fast moving images with no blur and jagged noise/effect.

f) The LCD panel should be coated with Anti-Reflection protection layer to provide high transmission rate of the internal light source and to keep the reflection from ambient light to a minimum.

g) The offered monitor should have tally light with necessary interface.

h) It should have front panel controls to control the display parameters like brightness, contrast, colour saturation etc.

i) The brief Technical Parameters of Video Monitor are as under:

Sr. No.	Parameter		Specification
1)	Display size	:	16.5"/17" approx. diagonally
2)	Drive system	:	a-Si TFT active matrix
3)	Resolution	:	1920 x 1080 pixels or better
4)	Colour reproduction	:	1.073 billion or better
5)	Contrast ratio	:	800:1 or better
6)	Viewing Angle	:	178 degrees in Horizontal & 170 degrees in

			Vertical or better
7)	Brightness	:	300 cd/sq.m or better
8)	Video Inputs	:	**HD/ SD SDI:** 2 or more HD SDI SMPTE 292 in BNC, 1.485Gb/s, 0.8V pp across 75 ohms (1080/50I) and SD SDI SMPTE 259 in BNC, 270Mb/s, 0.8V pp across 75 ohms, auto detection.
9)	Audio Inputs	:	Mini jack/RCA
10)	Audio Outputs	:	Mini jack/RCA and built-in speaker

8.7 INTERCOMMUNICATION SYSTEM

a) The bidder should offer a Digital Intercommunication System. The offered digital matrix should be of 32 ports with redundant power supply unit.

b) Remote control panels should be provided in the following technical area within the Kendra like Producer (Studio-1), CCU (Studio-1), Audio Engineer (Studio-1), Producer (Studio-2), CCU (Studio-2), Ingest Desk, Playout Desk, MCR, CG Room, Equipment Room, News Room, Earth Station.

c) The Producer Station and other remote control panels should have alphanumeric electronic displays for various keys. All the panels should be with gooseneck microphones.

d) Each Studios of the kendras (Studio-1 & Studio-2) should be provided with One number of Camera Mix & Distribution units to interconnect with Cameramen via the base stations of the Studio Cameras.

e) Each Studios of the kendras (Studio-1 & Studio-2) should be provided with Two numbers of wired belt packs with dual muff headsets for Floor Managers.

f) Each Studios of the kendras (Studio-1 & Studio-2) should be provided with Two numbers of wired IFB belt packs with earplug for anchors/talents.

8.8 Off-Air Logger (Broadcast Compliance)

a) The offered Broadcast compliance system must ensure automatic logging of the aired content of both channels of Doordarshan Kendra, Hyderabad on 24 x 7 basis in order to comply with regulatory requirements.

b) The offered system should facilitate simultaneous users to remotely monitor the live or archived contents of the logger system

c) The Broadcast compliance logger should have a simple user interface that allows the users to monitor the content, search, create and share clips quickly and effectively.

d) The system should allow mark-in and mark-out of the ingested segmen and facilitate exporting of the content at the desired resolution, bitrate and file format.

e) The logger system should accept multiple HD-SDI signals of the off-Air content.

f) The recorded content should be preserved for a minimum period of 90 days and facilitate auto/scheduled purging of the recorded contents. Accordingly, the offered off-Air logger system should have the required capacity of media storage disk in addition to the OS disk.

g) The logger should record the content in blocks/files of fixed duration and the duration of each file can be pre-configured. When the recording file reaches specified duration, it will automatically roll over to a new file for recording.

8.9 AUDIO MONITORING STATION:

a) The Audio Monitoring Stations should be 19" rack mountable and standalone unit.

b) The offered system should have two nos. of HD/SD-SDI inputs.

c) It should have level metering of 16 de-embedded audio channels from selected HD/SD-SDI inputs.

d) It should have audio bar graph, High quality internal speakers, headphone out.

e) One no. of good quality headphone should also be supplied along with each audio monitoring station.

f) It should provide balanced stereo analog outputs on XLR connector for connection to external loudspeakers.

8.10 PERIPHERAL EQUIPMENT WITH FRAME:

a) The bidder should offer card type DVDA, VDA, ADA and other required peripherals as per the system design.

b) The offered peripherals should be housed in 19" rack mount frame along with auto switchable redundant power supply and fan units.

8.11 TECHNICAL FURNITURE & INSTALLATION MATERIALS:

a) Suitable technical furniture/desk including operators chairs etc. required for the facility will be part of the offer.

b) The offered technical furniture should be designed for ergonomics and high end aesthetics.

c) All furniture should be made of high quality material. The Ingest & Playout Desks should be aesthetically designed to accommodate the technical equipment.

d) The power supply distribution panels should also be integrated with these desks.

e) All sorts of Power, Audio and Video installation materials including Equipment rack to house storage, server etc., all sorts of connectors & cables etc., LAN switch(es), LAN I/Os etc. are required to be offered along with the bid.

9. COMPLETENESS OF THE OFFERED SYSTEM:

a) Completeness of the offered system is the responsibility of the bidder.

b) The successful bidder will be solely responsible for operationalization of the system to the satisfaction of Doordarshan.

c) In order to ensure the completeness of the system, any additional software/equipment/accessories which bidder feels necessary to complete the configuration should also be quoted. However, in such case they should provide proper justification for the additional equipment required. These items, if any, must be listed in the offered BOM.

d) If the bidder feels that the system requires additional items for better functionality, the bidder may quote such items as an optional item and provide full justification to decide its utility.

10. SOFTWARE:

a) The licensed version of all software including Operating System, all application software etc. are required to be supplied in original media. **These software should be licensed in the name of Doordarshan with perpetual validity**. In case of hardware failure, it should be able to re-install all the software in the system with new hardware. Required recovery disc, if any for this purpose, should also be provided.

b) The bidder will provide up-gradation of all the offered software free of charge during the guarantee period. **The bidder will be required to give an undertaking to this effect along with the bid.**

11. COMPLIANCE:

a) **A point by point full compliance statement in respect to all the parameters related to the concerned equipment/item(s) laid down in the specifications from the respective principal manufacturers is to be enclosed along with the offer in the format given below. Mere signature on the copy of DD specifications shall not be accepted as a compliance statement.**

The figures so mentioned should be supported by record of these in the technical literature enclosed with the tender and reference to the page number of enclosed literature for all features and technical specifications should be mentioned in the relevant column. Offers without the compliance statement or with incomplete compliance statement will liable to be rejected with the sole responsibility of the bidder. **Any deviation from the specification detailed in the compliance statement is to be highlighted separately.**

Sr. No of DD specs.	DD specs.	Compliance (Yes/No)	Performance Fig. of equipment Offered	Reference to the Page Number of enclosed literature	Deviations, in case of non-compliance	Optional items if any reqd. to make the sys. Compliant to DD specs.	Features in the offered Product which exceeds DD specs.
1	2	3	4	5	6	7	8

b) **In addition to above, a separate point by point compliance statement duly signed by the bidder in respect of all the points laid down in the specifications for all the equipment/item(s) should also be submitted along with the bid by the bidder in the above mentioned proforma.**

c) In addition to the above, authorization from respective principal manufacturers in respect of the equipment listed below should necessarily be submitted along with the bid:-

1) Servers,
2) Workstations,
3) Storage System,
4) Routing Switcher,
5) Graphics System
6) Synch Pulse Generator,
7) Multi-image Processor,
8) Intercom System
9) Off-Air Logger system
10) Audio Monitoring Station

12. TECHNICAL LITERATURE:

One set of technical manuals/brochures for all the equipment are required to be provided along with the tender to facilitate the technical evaluation, otherwise the tender is liable to be ignored. The successful bidder will have to supply a set of technical, user and installation manuals with respect to each of the equipment.

13. DEMONSTRATION:

If necessary, the bidder may be asked for demonstration of the offered system as part of the technical evaluation. In such case the bidder will have to make suitable arrangement for the demonstration of the offered system at Doordarshan Bhawan, New Delhi, on notice of 15 days. Accordingly the bidder should be in readiness for demonstration.

14. GUARANTEE:

a) With reference to the clause no.8.2 of the "General Terms and Conditions (GTC)" under ANNEXURE-II of tender document, the complete system including all items/equipment should be guaranteed for **three years** of trouble free operation from the date of commissioning. In case of any item or equipment failure including software and hardware within this period.

b) The guarantee should cover all hardware, software and modules of the complete system.

15. DELIVERY PERIOD:

The delivery period will be 04 months. **The delivery period does not include on-site training and support.**

16. ON-SITE TRAINING AND SUPPORT:

The bidder has to offer trainings & support as given below:

a) *Operation & System Administration Training:* The bidder should offer Operation and System Administration Training to Engineers, Programmers for 5 working days at the installation site immediately after completion of installation.

b) *On Site Support:* The bidder should offer on- site support for 5 working days immediately after commissioning and completion of training.

Accordingly, necessary resource persons are required to be deputed for imparting the trainings. The bidder has to provide the comprehensive training material in the form of hard copies, as well as soft copies to the trainees, during the training session. The complete cost towards these training and operational support, if any, should be quoted separately.

17. INSPECTION:

The equipment shall be subjected to inspection by Doordarshan officials at the Project site.

18. ENCLOSURES:

The bidder must necessarily upload the following documents along with the technical bid:

a) An undertaking as required vide clause no. 10(b).

b) Compliance statement with respect to all the points of the specifications duly signed by the OEM should be submitted for all the equipment/item(s) in the proforma mentioned in clause no. 11(a).

   The reference to the page number of enclosed literature for all features and technical specifications should be essentially mentioned in the relevant column of the compliance statement.

c) A separate point by point compliance statement duly signed by the bidder in respect of all the points laid down in the specifications for all the equipment/item(s) in the proforma mentioned in clause no. 11(b).

d) Authorizations from respective principal manufacturers as required vide clause no. 11(c).

e) Technical manuals/detailed technical literature/catalogues for all the offered products for substantiating the model no. and technical specifications.

f) Model specific user list of the offered product(s).

g) Any other document mentioned elsewhere in the tender document.

The tender is liable to be rejected in the absence of the above enclosures with the sole responsibility of the bidder.

Appendix-I

GENERAL TECHNICAL SPECIFICATIONS APPLICABLE TO THE SYSTEM

1.	**System**	:	**HDTV:-** 1920x1080/50/I conforming to SMPTE 292M and ITU-R BT. 709 (CIF) (amended upto date) (HD-SDI: 1.485 Gb/s) and **SDTV:-** 625/50i (4:3 aspect ratio) conforming to SMPTE 259M and ITU-R BT. 601(amended upto date) (SDI: 270 Mb/s, PAL, 2:1 Interlace, 25 frames/s, 50 fields/s). The video in both the systems is associated with embedded audio.
2.	**Digital processing**	:	**HDTV**: 4:2:2, Y: 74.25 MHz, P_r: 37.125 MHz, P_b: 37.125 MHz Sampling rate, 10 bit quantization. **SDTV**: 4:2:2, Y: 13.5 MHz, P_r: 6.75 MHz, P_b: 6.75 MHz Sampling rate, 10 bit quantization.
3.	**Power supply**	:	230 ±5% Volts AC, 50 Hz
4.	**Operating temperature**	:	5 to 40 Deg. Celsius
5.	**Relative humidity**	:	30% to 85%
6.	**Mounting/Dimensions**	:	Standard 19" Rack mount in case of Standalone units. Otherwise 19" Rack mounting frame housing the units with auto switchable Redundant power supply unit.
7.	**Connectors**	:	
(a)	Video	:	75 Ω BNC
(b)	Audio	:	3 Pin XLR/75 Ω BNC
(c)	Control	:	BNC, Mini XLR, RS-422, GPI, Ethernet etc. as applicable
8.	**Video Signal**		
(a)	Digital Video	:	0.8 Vp-p ± 10%, across 75 ohms
(b)	Reference signal	:	1080/50/I HDTV Tri-level sync and PAL black burst
9.	**Audio**	:	(a) Embedded audio unless specified otherwise (b) AES/ EBU
10.	**Time code**	:	VITC on black and LTC

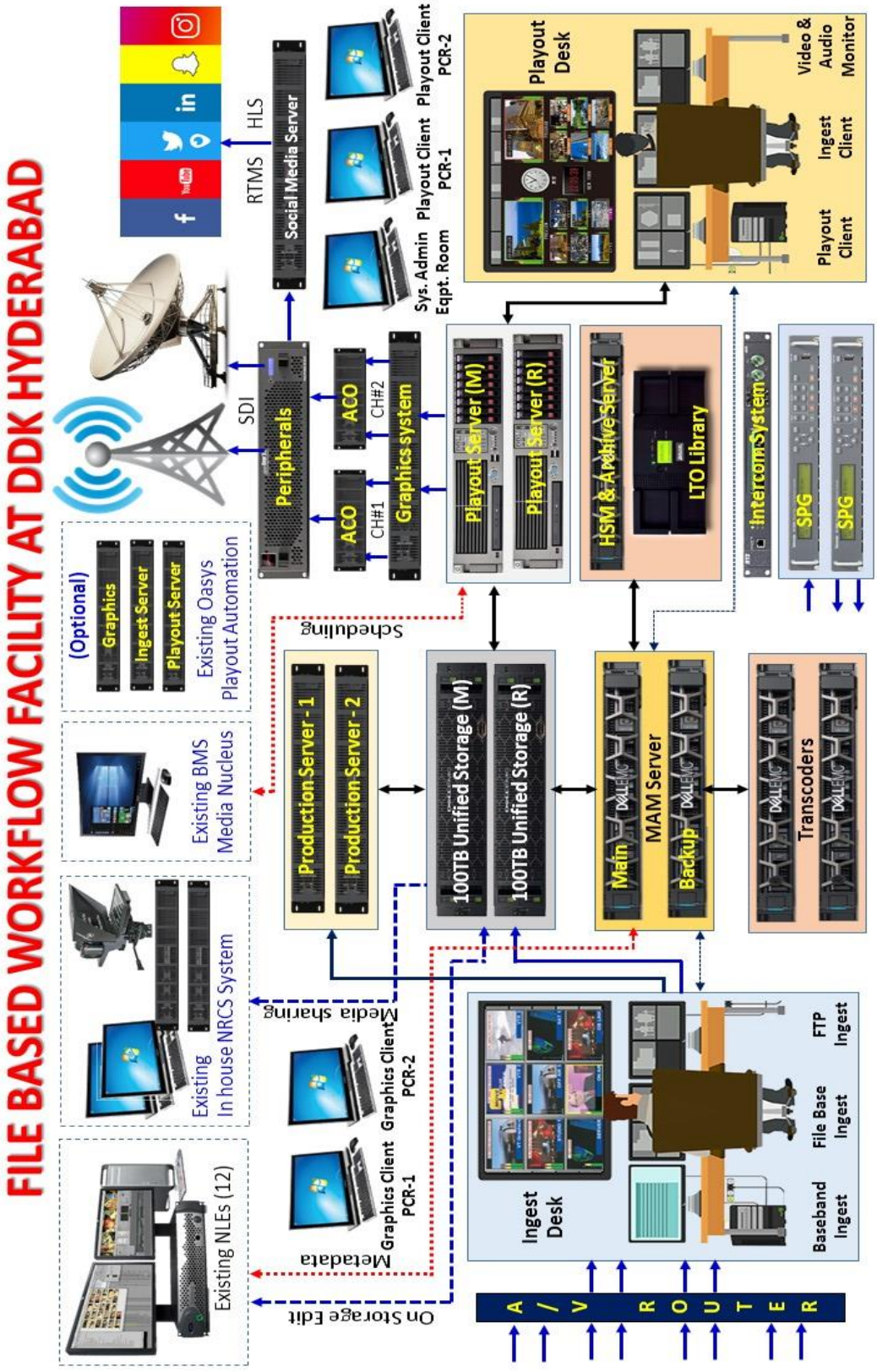
Appendix-II

INDICATIVE BILL OF MATERIAL (BOM) REQUIRED PER LOCATION

Sl. No.	Components	Quantity
A	**Necessary hardware for File based Workflow facility:**	
1.	**Ingest Servers** consisting of Twelve configurable bi-directional ports.	2 Nos. or more
2.	**Playout Servers** in (1 + 1) configuration with internal storage of 16TB or more Enterprise class SAS 10K or 15K HDD or SSD in RAID 5/6. Six base band bi-directional ports configurable as 2 In 4 Out.	2 Nos.
3.	**Media Asset Management Server** (Main & Backup) with Linux or Microsoft Windows Server 2016 OS, having Intel Xeon Silver 4208 2.1G, 8C or higher Processor, 16 GB or higher DDR4 RAM	1 Lot.
4.	**Transcoders** with Linux or Microsoft Windows Server 2016 OS, having Intel Xeon Silver 4208 2.1G, 8C or higher Processor, 16 GB or higher DDR4 RAM	2 Nos.
5.	**Social Media Publishing Server** with Linux or Microsoft Windows Server 2016 OS, having Intel Xeon Silver 4208 2.1G, 8C or higher Processor, 16 GB or higher DDR4 RAM	1 No.
6.	**HSM/Archive Server** with Linux or Microsoft Windows Server 2016 OS, having Intel Xeon Silver 4208 2.1G, 8C or higher Processor, 16 GB or higher DDR4 RAM	1 No.
7. (a)	**LTO-8 Tape Library** with 3 (Three) Tape drives and 40 slots with all network accessories such as SAS/FC cards and cables required for the efficient functioning of the entire system	1 Set.
(b)	LTO-8 (12 TB) RW Tape Cartridges	60 Nos.
(c)	LTO Ultrium Cleaning Cartridge	2 Nos.
8.	2 Nos. of 100 TB usable **Unified Storage system** (1 + 1) in mirrored configuration each storage chassis with Dual Network controller, Dual RAID Controller, Dual hot swappable Power Supply unit including required Management Software and necessary housing etc.	1 Lot
9.	**Client Workstation terminals** for Ingest (3), Playout (4), BMS (1), Graphics (2), MAM (5), Off-Air Logger system (1) and System Administration (1)	17 Nos.
10.	**Necessary Software for File based Workflow facility:**	
(a)	Media Asset Management, Ingest, Browse, Scheduling, Playout Automation, Transcoder, Recording, Social Media Publishing & Remote Access Web-Client License for 10 users and 20 Nos. of MAM licenses etc. (on perpetual license basis)	1 Lot
11.	**Graphics System** with Microsoft Windows 10 Pro OS, having Intel Xeon Silver 4208 2.1G, 8C or higher Processor, 16 GB or higher DDR4 RAM, NVidia P4000 Graphics card and AJA Kona or BMD I/O card or similar with Dual channel support	1 No.

	Aston or Wasp 3D software or similar	
12.	32X 32 HD/SD-SDI Router (AV) with redundant power supply & Controller along with 3 nos. of XY Control panel and 2 nos. of single bus remote control panels.	1 Set
13.	Dual Sync Pulse Generator (SPG) with Change Over Unit	1 Set
14.	Digital Intercom System	
A	32-port Matrix with dual redundant power supply unit	1 No.
B	16 button/switch Remote Control Panel with gooseneck microphone and built in speaker and power supply unit	12 Nos.
C	Headset with connectors for using with remote panels	4 Nos.
D	Camera mix and distribution boards/units for minimum 8 cameras	2 Nos.
E	Wired Belt pack with dual muff Headset for Floor Manager/Floor Assistant	4 Nos.
F	Wired Belt pack (IFB) with earpiece for Anchors	4 Nos.
15.	Dual Display 16 Channel Multi-viewer	1 Set
16.	55" LED Monitor with mounting for Ingest & Playout Desk	2 Nos.
17.	16.5"/17" LED Video Monitor	2 Nos.
18.	Audio Monitoring Station with Headphone	5 Nos.
19.	Unicode complaint fonts for Hindi, English, Urdu and regional language Telugu	1 Set
20.	IT and Networking Components as per the specified system requirement such as Firewall system, Enterprise class Fiber & Ethernet Switches, Network Interface cards, Host Bus adapters, KVM Switches etc. as required	1 Lot
21.	Automatic Change Over Switch for Dual channel	1 No.
22.	Dual Ampli-speakers for Ingest & Playout Desk	2 Set.
23.	LTC enabled Digital clock (six digits, 2.3" height red LEDs)	1 No.
24.	19" rack mountable card type peripherals like DVDA, VDA, ADA, Multi-format converters etc. along with frame having redundant power supply & fan unit *(Qty. as per system design requirement)*	1 Lot
25.	Installation materials i/c associated cable, connectors, HD patch panel, patch cords, racks, power cords etc. as required for installation and to make the system completely functional as per the specifications.	1 Lot
26.	Site preparation works – as specified	1 Job
27.	Technical Furniture for Playout Desk & Ingest Desk	1 Lot
28.	Operator chair	6 Nos.
29.	Power Distribution Panel i/c MCBs, Digital Volt & Ampere Meters, Digital frequency meters, power cables etc.	1 Lot
30.	Commercial/ industrial grade Precision Air conditioner of approx. 3 ton capacity	1 Set
31.	Installation, testing and commissioning works	1 Job
32.	Training and On Site Support	1 Job
33.	Operation, Maintenance and service manuals for all the offered items.	1 Set

APPENDIX- III



APPENDIX-IV