Electronic Health Solutions

REQUEST FOR PROPOSAL

Enterprise Imaging Solution

RFP Reference Number: RFP-EHS-PROC-15-2024

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1. Introduction

Under the patronage of His Majesty King Abdullah II bin Al Hussein, Electronic Health Solutions (EHS) was founded in 2008 to transform the healthcare sector in Jordan. EHS is an innovative technology-driven, non-profit company that effectively provides automated solutions to enhance the quality and efficiency of Jordanian healthcare services.

In collaboration with strategic healthcare and technology partners, EHS is driving the future of electronic health in Jordan. These key stakeholders (owners) include:

Figure 1: EHS key stakeholders (owners)

In 2009, Electronic Health Solutions (EHS) launched its flagship program, Hakeem, the first national digital transformation initiative of its kind, in Jordan's healthcare sector. Hakeem program aims to facilitate efficient, high-quality healthcare in the Kingdom through the nationwide implementation of an Electronic Health Record solution (EHR). Leveraging electronic systems developed according to the best international medical practices in the field of healthcare. In effect, physicians, pharmacists, medical technologists, and other clinicians can electronically access medical records of patients within participating healthcare facilities around the country simply by entering the patient's national ID number.

The types of electronic medical information clinicians may access include digital radiological exams, electrocardiograms (ECGs), endoscopic biopsies, eye exams, and videos of echocardiograms and angiograms. An integral component of the Hakeem program, VistA Imaging PACS, facilitates the efficient storage, retrieval, and dissemination of medical images among Hakeem professionals, facilitating precise diagnoses and informed treatment decisions.

The rapid progression of medical imaging technology dictates the periodic assessment, update, and upgrade of Picture Archiving and Communication Systems (PACS) within healthcare institutions. The comprehensive approach detailed in this Request For Proposal (RFP) ensures that the selected Bidder's solution not only addresses the immediate needs of the Hakeem program but also forecasts future growth and technological advancements, promoting long-term flexibility and adaptability in a rapidly changing healthcare environment.

The fundamental objectives of this project is to partner with a reputed top KLAS ranked Bidder/ Vendor with experience in a large scale solution for an enterprise imaging system and/or a regional VNA to acquire a complete enterprise imaging solution, with the following core functions; capture, storage, viewing, interoperability/image exchange and analytics. The solution is expected to include deploying a Vendor Neutral Archiving (VNA) Solution, along with Teleradiology functionalities and to supply RIS/PACS functionalities to Hakeem sites whether they have an existing solution or not as part of the VNA, in order to achieve sharing of diagnostic and non-diagnostic imaging information for all patients and service providers across Jordan regardless of location or size, in a timely and cost effective manner, across the public healthcare sector in Jordan under the flagship Hakeem program of EHS.

1.1 Intended Approach / Scope of Work

- EHS intends to create a patient-centric imaging record that would provide the ability to view any image from a single web viewer enabling better image sharing across the Hakeem program in all its instances, in which all imaging services would share a centralized image archive (one per instance), with no limit to number of exams performed annually (currently MoH performs around 3 million studies annually and RMS performs around 0.9 million studies annually).
- EHS intends to partner with a reputable imaging solution provider directly through the designated regional representative, and not through the local agents. Level 1 and level 2 (and if applicable level 3) support is expected to be performed by EHS's Imaging Team after being professionally trained by Bidder. Moving forward, and if the Bidder finds value in collaborating with EHS's team, regional installations, implementations, and support could be handled by the EHS team upon mutual agreement between parties.
- It is expected that two selected sites, one from each instance, will be implemented by Bidder/ Vendor's team shadowed by EHS's team. The rest will be implemented by the trained EHS imaging team.
- The VNA would feed both the specific departmental imaging applications (radiology PACS, cardiology PACS, etc.) and the rest of the Hakeem users through a universal web viewer, primarily used by the clinicians but capable of consuming any image in the VNA.
- The clinical specialist will no longer need to open separate viewers, but can view all the images of interest from the patient's Hakeem EHR or directly from the integrated PACS. Clinical specialists range from radiologists to technologists, cardiologist, orthopedic surgeons, surgeons, dermatologist, ophthalmologists, pathologist, referring physicians, dentist, to mention a few.
- The supplier must use the current Hakeem hardware and infrastructure for both MoH and RMS instances, to create the backend and frontend digital platform including all required licenses to support the imaging system and migrate all required data, when applicable, including installation, configuration and commissioning.

- A document that describes the current infrastructure setup for both MoH and RMS, including servers' specifications and bandwidth will be shared with Bidder as Annex 1.
- A Proof of Concept (PoC) approach will be a major part of the evaluation. Specific sites will be selected by EHS for the PoC to demonstrate solution application functionality and overall performance. A conditional awarding process will be followed. Bidder will only be formally awarded if PoC passes EHS requirements.
- Bidder to advice on how the solution network performance will be assessed during various clinical application DICOM study image retrieval runs. Network performance assessment should indicate the network bandwidth utilized.
- It is highly recommended that the Bidder validates any of the RFP provided current site data and/or technical specification, inclusive of network infrastructure.
- It is highly recommended that Bidder performs a site survey and collects all required information of existing infrastructure including current solution setup and DR solution locations. This should be conveyed to EHS ahead of time to gain required approvals.
- Bidder shall advise if there is any compatibility issue from current setup with proposed solution.
- Changes to infrastructure are to be reported by Bidder if it yields better proposed solution performance.
- Bidders must comply with all items mentioned in this specifications document. Non-compliance to any of the points by Bidders will render them disqualified.
- Bidders are to expand on the required specifications on how they intend to achieve them, in the last column titled '**Reference doc./ Comment**'
- Data Ownership: EHS retains the Exclusive right to data ownership. The ownership includes all copies of data available, including backup media copies if any.
- Bidder to agree with EHS imaging administrators on method of prior image retrieval into new solution, since data migration is out of scope.
- The Bidder shall fully describe the various infrastructure components, their functionality and their interconnectivity in the proposed solution for production, disaster recovery and test environments.

1.2 Proof of Concept Demonstration

- During the POC period, Bidder shall demonstrate to EHS imaging administrators the below functionality at a minimum.
  1. A complete workflow cycle inside the radiology department, that includes, but not limited to, receiving orders and submitting final radiology report to Hakeem EHR.
  2. Merge and/or split two study examinations.
  3. Identify and resolve unverified study images.
  4. Perform customized client application searches (e.g. AET, station name, etc.).
  5. Use admin tools to resolve studies that failed to appear on modality DICOM worklist.
  6. Change image presentation states (actual size, true size, fit to screen, etc.) on PACS workstation.
  7. Customize the hanging protocols.
  8. Add a new DICOM export node.
  9. Create new end-user accounts.
  10. Create and/or edit end-user account profiles.
  11. Manage key images and image annotations.
  12. BI module functionality.
  13. How the system mitigates external media study image import/uploads when we have a study UID clash.
- During the POC period, Bidder shall demonstrate to selected Radiologists, but not limited to, the below functionality;
  1. Screening and diagnostic mammography hanging protocol.
  2. Diagnostic hanging protocols.
  3. Breast imaging visualization module.
  4. Managing key images.
  5. Managing a user profile.
  6. 2D and 3D post-processing capabilities.

2. Confidentiality Statement

This Request for Proposal (RFP) contains information proprietary to Electronic Health Solutions, hereafter referred to as “EHS”. Each recipient is entrusted to maintain its confidentiality. The information contained in this RFP is provided for the sole purpose of permitting the Bidder to respond to the RFP. This information may not be reproduced in whole or in part without the expressed written permission of EHS.

The recipient shall hereby agree to keep all the information in this RFP confidential and shall not, without prior written permission of EHS, disclose this information to any person other than the employees, agents, subcontractors, and advisors who are required in the course of their duties to execute proposal preparation activities. The recipient shall undertake the responsibility that all such persons are informed of the confidential nature of the information.

No recipient of this RFP shall, without the prior consent of EHS, make any public statements to any third parties in relation to this RFP or the subsequent short-listing of any prospective implementer or the subsequent awarding of any order. Unauthorized release of information or public statements will result in immediate disqualification.

Information provided by each Bidder will be held in confidence and will be used for the sole purpose of evaluating a potential business relationship with the respective Bidder’s company.

There will be no obligation to maintain the confidentiality of any information that was known to EHS, prior to the receipt of a proposal from the Bidder, or due to becoming publicly known through no fault of EHS, or if received without obligation of confidentiality from a third party owing no obligation of confidentiality to the Bidders.

3. Contact Information

Any questions regarding this RFP shall be directed to the following email address in writing:

Name:	Procurement Department
Company:	Electronic Health Solutions
Address:	King Hussein Business Park, King Abdullah the second street. 4408 Amman 11952
Telephone / Fax:	Telephone +962 (6) 5800461 EXT: 3050, 3071Fax +962 (6) 5800466
Email:	Procurement@ehs.com.jo

The bidder should receive a response from the procurement department, if not please call the following number

+962 79 668 1595 Or Tel: +962 6 5800461 | Ext: 3050, 3071.

4. General Conditions

Upon participation, the Bidder agrees to the following:

1. All costs incurred by Bidder in the preparation of this proposal shall be borne by the Bidder.
2. "EHS" will assume that all statements in writing, made by persons submitting Proposals are true, accurate, complete and, not misleading.
3. "EHS" reserves the right to cancel, at any time, this RFP partially or in its entirety. No legal liability on the part of "EHS" for payment of any kind shall arise and in no event will a cause of action lies with any Bidder for the recovery of any cost incurred in connection with preparing or submitting a proposal, in response hereto all efforts initiated or undertaken by the Bidder shall be done considering and accepting this fact.
4. Bidder's proposals shall be based on full compliance with the terms, conditions and, requirements of this RFP and its future clarifications and/or amendments.
5. "EHS" shall not be under any obligation to return or save either the original or any copies of any Bidder's Proposals (technical and/or financial), and all documents submitted to "EHS", whether originals or copies, shall be kept or disposed of by "EHS".
6. This Request for Proposal doesn't constitute an offer. "EHS" shall not be under obligation to enter into any agreement with any Bidder in connection with this RFP and responses received.
7. The Bidder's proposals (technical and financial) shall comply with the laws and regulations of the Hashemite Kingdome of Jordan.
8. The Bidder's proposals (technical and financial) shall be compatible with international standards and best practices.
9. Bidders are to expand on the required specifications on how they intend to achieve them, in the last column titled '**Reference doc./ Comment**'.

5. Bidder Qualifications

1. The Bidder must be a legally registered company in its home country with at least three years of operational history. The Bidder must provide proof of financial capacity in the form of audited financial statements or bank statements.
2. The Bidder should have a minimum of three completed projects similar to the proposed project, preferably in the healthcare sector. Detailed project references, including project size, duration, scope and references contacts must be provided.
3. The Bidder must have at least two live installations of the proposed or similar solution with ongoing support at the time of bid submission.
4. The Bidder must have at least two engineers with relevant technical certifications to support the implementation and maintenance of the proposed solution.
5. The Bidder must provide up-to-date official registration documents from its home country.
6. The Bidder must be an authorized partner of the manufacturer or have a formal business relationship allowing them to sell and support the proposed solution. Proof of authorization, such as a partnership agreement, reseller certificate, or joint venture agreement, must be provided.
7. The Bidder must have at least two engineers certified by the manufacturer for the implementation and technical support of the proposed solution. Refer to point '9.3' of this document for further requirements.
8. All proposed equipment, solutions, items, and services must be:
    - Original and brand new (not refurbished).
    - Licensed by the manufacturer for supply and installation.
    - Covered by a manufacturer's warranty and support for a minimum of ten years from the date of delivery.
    - Not obsolete, phased out of production, or discontinued.
9. The Bidder must be classified as a tier-one partner by the manufacturer and provide the necessary certificates or letters to verify this status.

6. RFP Guidelines

6.1 RFP Issuance & Submission

Event	Date
1. RFP distribution to Bidders	29-AUG-2024
2. Questionnaire Session	N/A
3. Proposal due date Closure Date	26-SEP-2024*

*Submission before (1500 HR) of business day dated (Sept, 26th, 2024)

6.2 Queries and Responses

All inquiries during the questions and answers session (Bidder Conference) if conducted must be documented. Verbal clarifications, inquiries or communication are not permitted, and only written communication is accepted.

6.3 RFP Acknowledgement

1. Award of the contract resulting from this RFP will be based upon the most responsive Bidder whose offer will be the most advantageous to "EHS" in terms of cost, functionality, and other factors as specified elsewhere in this RFP.
2. Bidder has a period of (5) days to acknowledge and accept the awarding letter with its terms and conditions. Delay of acceptance will yield into consideration of rejection.
3. EHS reserves the right to:
   a) Accept other than the lowest-priced offer.

b) Award a contract on the basis of initial offers received, without discussions or requests for best and final offers.
c) Not declare the name of the winning Bidder, and awarding details.

6.4 Proposal Format Requirements

1. The financial and technical proposals must be submitted separately. Each proposal must be sent in a separate (PDF) electronic file (PDF). (**If the proposal file document size is bigger than 9 Megabyte (MB), you may send the document through a secured file hosting service and an internet-based computer file transfer service company such as Dropbox, WeTransfer, etc.**)
2. The proposals must be sent to the Procurement Department email namely; (Procurement@ehs.com.jo). A password divided into (3) portions and not to be less than (9) nine digits must be set on the financial offer.
3. The passwords must be sent through a text message (SMS) to relevant mobile numbers which will be cellular mobile numbers that will be provided to the Bidders at a later stage.
4. The Financial Proposal must specify clearly the compliance with the (10) ten years' warranty duration required in the Technical Specification section.
5. The Bidder shall submit only one financial proposal file. The financial proposal must include all of the products or solution options proposed in the Technical Proposal. The financial proposal must be in a format that is easy to read and understand and in compliance and consistent with the pricing and terms and conditions mentioned in this RFP document. The financial proposal must be in English.
6. The Bidder must provide a detailed pricing structure for all proposed solution components.
7. The financial proposal must be signed by an authorized representative of the Bidder.
8. If the Bidder submits more than one financial proposal file, or if the financial proposal does not include all of the products or solution options proposed in the Technical Proposal, the Bidder's proposal may not be considered.
9. The Bidder must submit a cover letter in a PDF format as a separate document from the Technical and the Financial Proposal. The cover letter must include the following information:
    - The tender reference number.
    - The name of the Bidder.
    - The contact information for the Bidder.
    - A list of the product(s) and/or solution(s) names that are being proposed, along with the corresponding product and/or solution code.
    - A listing of the proposed product(s)/ solution(s)/service(s) along with their relevant brief description.

The aforementioned information must be filled in the following “Table Template” and must be consistent and in a total match with the relative names and descriptions included in the financial and technical proposals.
The list of product and/or solution names must match those included in the Technical and Financial Proposal. If the Bidder does not submit a cover letter, or if the list of product and/or solution names do not match those included in the Technical and Financial Proposal, the Bidder's proposal may not be considered.

Table Template

The following table template can be used to list the product and/or solution names that are being proposed:

Option	Product/Solution/Services Name	Product/Solution/Services Description
Option (1)	**Product 1**	
Option (2)	**Solution 1**	
Option (3)	**Solution 2 & Product 2**	

7. RFP Terms & Conditions

7.1 Evaluation Criteria

1. "EHS" will evaluate each response. Responses will be evaluated on many criteria deemed to be in EHS's best interest, including but not limited to, technical offering, price, warranty, delivery duration, Bidder certification, accreditation, schedule, Bidder's capabilities, compliance with bonding, and any other factors that "EHS" determine. The order of these factors does not denote relative importance.
2. "EHS" reserves the right to consider other relevant factors as it deems appropriate in order to obtain the best value.
3. This RFP does not commit "EHS" to select any firm, enter into any agreement, pay any costs incurred in preparing a response or procure or contract for any services or supplies. "EHS" reserves the right to request additional information from the Bidders whose response meets "EHS" needs and business objectives without requesting such information from all respondents.

7.2 Rejection of Proposals

"EHS" reserves the right to reject any or all offers and discontinue this RFP process without obligation or liability to any potential Bidder.

7.3 Proposal Costs and Expenses

No legal liability on the part of "EHS" for payment of any kind shall arise and in no event will a cause of action lies with any Bidder for the recovery of any cost incurred in connection with preparing or submitting a proposal. In response hereto all efforts initiated or undertaken by the Bidder shall be done considering and accepting this fact.

7.4 Bid, Performance, Advance payment, and Warranty Bonds

1. The Bidder shall submit a bid bond amount of (15,000.00 $) Fifteen Thousand US Dollars. The bond must be issued by a reputable international bank or financial institution and be in the form of a bank guarantee, letter of credit, or certified check. The bid bond shall be valid for (120) days from the bid submission deadline. Failure to comply with the bid terms and conditions may result in the forfeiture of the bid bond.
2. If an advance payment is required, the Bidder shall provide an advance payment guarantee equal to the amount of the advance payment for a maximum amount of (20%) of the total Contract value. The guarantee must be issued by a reputable international bank or financial institution and be in the form of a bank guarantee, or letter of credit. The guarantee shall remain valid until the successful completion of the installation or implementation of designated two sites as per project plan.
3. The successful Bidder shall submit a performance bond amounting to (10%) of the contract value, in US Dollars. The bond must be issued by a reputable international bank or financial institution and be in the form of a bank guarantee or letter of credit. The performance bond shall remain valid until the successful completion of the project and final acceptance of the deliverables by EHS. Besides, this performance bond must remain valid for the 10 years' duration of the contract.

7.5 Penalties

In the event, the Bidder fails to deliver according to the agreed time (for either the initial agreed delivery date or any of the subsequent delivery dates). The Bidder must pay EHS a delay penalty of (1%) of the total contract amount for each calendar week of delay. The maximum penalty for delays shall not exceed (15%) of the total contract value. The payment or deduction of such penalty shall not relieve the winning Bidder from its obligations to complete the services or from any other obligations and liabilities under this bid.

7.6 Payment Terms

1- Payment terms: (for the first year of the contract)

20% of the fixed annual payment (Annual Solution Cost) Advance Payment against "Advance Payment LG"

20% of the fixed annual payment (Annual Solution Cost) upon installation or implementation of designated two sites as per project plan.
20% of the fixed annual payment (Annual Solution Cost) upon accomplishing set and agreed-to milestones as per project plan.
40% of the fixed annual payment (Annual Solution Cost) On final EHS acceptance. Refer to section 11 'Solution Acceptance Testing'.

In case the winning Bidder fails to comply with the "Advance Payment LG" term set for the first payment, hence, the winning Bidders will be entitled to receive (40%) of the total contract value after the fulfillment of the delivery and initial receiving conditions set forth in this RFP.

2- Payment terms: (for the subsequent years of the contract)
25% of the fixed annual payment (Annual Solution Cost) at start of first quarter.
25% of the fixed annual payment (Annual Solution Cost) at start of second quarter.
25% of the fixed annual payment (Annual Solution Cost) at start of third quarter.
25% of the fixed annual payment (Annual Solution Cost) at start of fourth quarter.

3- Payment currency shall be in US Dollars

7.7 Terms of Delivery

The specific timeline for delivery, installation, and implementation shall be mutually agreed upon between EHS and the Successful Bidder.

7.8 Offer Expiry Date

The validity of the Proposal shall be no less than (120) days unless clearly mentioned differently.

The prices must remain fixed and valid for (120) days from the date of the invitation for bid closing date and shall be clearly stated in the technical and commercial bids.

8. Financial Compliance Sheet

#	Description	Comply (Yes/No)	Reference in the proposal
1	The Bidder shall comply with all points included in the General Conditions section		
2	The Bidder shall comply with all points included in the Bidder Qualifications section		
3	The Bidder shall comply with all points included in the RFP Guideline section		
4	The Bidder shall comply with all points included in the RFP Terms and Conditions section		

9. Technical Specifications/ General Requirements:

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.1	The Bidder shall provide the latest available, proven technology and version at time of deployment of the solution. This includes, but not limited to, supporting 64 bit architecture.			
9.2	Bidder /Vendor to be ranked at least once by KLAS for PACS (Global) Middle East/Africa with an overall score of not less than 75 between the years 2020 to 2024, and/or KLAS ranked at least once for VNA with an overall score of not less than 75 between the years 2020 to 2024			
9.3	Bidder to provide the below information: ○ Service center location(s) ○ Research and development center (R&D) location(s) ○ Region's number of Engineers ○ Region's number of Application Specialists			
9.4	Bidder to explain in detail how they are to achieve each of the specifications listed in following sections. Failing to do so might render Bidder disqualified.			
9.5	Leveraging Existing infrastructure: The Bidder should present a detailed plan on how they will leverage any existing infrastructure to be incorporated into the new system. This strategy aims to reduce costs and minimize disruptions to current workflows.			
9.6	Bidder must report if change in the infrastructure is required to get better solution performance.			

9.7	The offered solution must be fully web-based (Diagnostic and Image viewer). For diagnostic viewer only, hybrid solutions will also be considered (e.g. Smart client setup) provided they migrate to web based in the near future (Please specify time required for web based version if applicable)			
9.8	Solution offered must be from same provider/ manufacturer and owned by them. If third party applications or subcontracting is required, relationship between Bidder/ Vendor and the latter has to be clearly and officially identified. Final solution must be provided by Bidder, and EHS will only interact with Vendor directly.			
9.9	The offered solution must be FDA approved for medical imaging and diagnosis.			
9.10	Offered solution must integrate fully with Hakeem database for full patient and study data. Hakeem is the source of truth for patient data.			
9.11	Solution must be configured and designed to be fully independent from Hakeem. All features of offered solution must be available, even when there is no connectivity to Hakeem. Users can process requests, orders and complete the imaging cycle independently, and synchronize with Hakeem once connection is restored.			
9.12	Solution must have an automatic and manual Hakeem synchronization.			
9.13	Solution to include a staging/ training instance and a testing instance.			
9.14	Bidder must provide a list of at least three reference institutions for which Bidder successfully implemented a multi-site setup with cross-reading and cross-reporting in the region. The reference site must have at least 3 million studies performed annually. Contact person from each reference site is to be identified for EHS to reach out to if needed.			
9.15	Bidder to provide EHS with documentation from manufacturer of proof that proposed solution has passed stress testing for high volume reading installations similar to Hakeem setup.			

9.16	It is preferred that Bidder has previous experience in integrating solution at a USA Veteran's Affairs hospital using the VistA platform, which Hakeem is built on. Reference sites to be indicated.			

- All line items are to be considered as requirements of this request. Failure to treat these statements as requirements may result in Bidder disqualification.
- **It should be taken into consideration that the below specifications are the minimum required to be considered for the bid, but must not be limited to them.**

9.1 Data Storage and Management

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.1.1	Supported Data Formats: DICOM, including enhanced DICOM objects, other relevant medical Non-DICOM image formats (e.g., JPEG, PNG, scanned documents for non-diagnostic purposes), video files and all electronic image reports and documents, as well as associated metadata and text documents. Such as, but not limited to; ○ Images produced by any DICOM compatible imaging modality including multi-frame ○ All current digital image formats including, but not limited to, tiff, jpg and raw images produced by digital cameras and scanners ○ All current movie clips formats including, but not limited to, (mpeg, mpeg2, mpeg4, avi) ○ Electronic document formats including pdf			

9.1.2	Support for data storage from various modalities in multiple subspecialties including, but not limited to, Radiology (XR, CT, MR, PET, NM, US, fluoroscopy), Orthopedics (radiographs, arthroscopy, US, photographs), Ophthalmology (visible light imaging, fundoscopic images, optical coherence tomography), OB/GYN (endoscopy and ultrasound), Digital Pathology, Cardiology (ECG, CT, MR, US/echo, fluoroscopy), GI (endoscopy), Neurology (EEG, EMG), family medicine/internal medicine (photography)			
9.1.3	Support of uploading/importing relevant documents through custom-defined forms, including multi documents importing, maintaining patient historical record.			
9.1.4	Support of importing images (JPG, BMP, TIFF), documents (PDF) and video (MPEG-2, MPEG-4, AVI) from file to an existing order or by creating a new order from a variety of devices (e.g. mobile devices, digital cameras, scanner, etc.) or any web-browser enabled device to patient documentation archive related to patient file.			
9.1.5	Data storage: utilizes industry-standard storage technologies, to ensure scalability, reliability, and cost-effectiveness			
9.1.6	Data Retention: Compliance with local healthcare regulations regarding data retention periods.			
9.1.7	Data Integrity: Mechanisms to ensure data integrity throughout the archive lifecycle			
9.1.8	Advanced data management features: including, but not limited to, data deduplication, compression, and encryption to optimize storage efficiency and protect patient privacy.			
9.1.9	Compression: Allow studies to be stored using various levels of compression, both lossless, and lossy, configurable by Imaging administrators. Non-reversible compression is not permitted.			
9.1.10	Long-term Archiving: Support for long-term archiving of medical images with appropriate data integrity checks.			

9.1.11	Provide a locking mechanism that prevents studies from simultaneously being modified throughout the solution			
9.1.12	Able to store images and their supporting information from different sources, such as PACS or modalities, and non- DICOM sources such as mobile devices, cameras, scanners, using non-proprietary, standards-based transactions.			
9.1.13	Support DICOM WADO standard, to enable retrieving DICOM objects from a PACS or other medical imaging repositories using standard web technologies.			
9.1.14	Ability to segregate specialties to enable sorting and viewing studies per specific specialty.			
9.1.15	Access to historical images and related data.			
9.1.16	Ability to modify or transform DICOM metadata tags within a DICOM file.			
9.1.17	Data storage is compliant with industry standards for security, privacy, and interoperability, such as HIPAA and DICOM.			

9.2 Integration

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.2.1	The solution seamlessly integrates with existing Hakeem EHR, PACS, RIS, and other healthcare IT infrastructure. Integration capabilities include HL7 messaging (FHIR, HL7 2.x, etc.), DICOM interface standards, and RESTful APIs.			

9.2.2	Bidirectional data exchange ensures real-time access to patient data, orders, results, and imaging studies across the Hakeem healthcare enterprise.			
9.2.3	Third-Party Integration: Offers APIs, SDKs, web services, and integration toolkits for integration with third-party applications and medical devices, allowing customization and extensibility.			
9.2.4	Integration with various medical imaging modalities (e.g., X-ray, CT, MRI) to facilitate direct transfer of studies to the VNA.			
9.2.5	Integration with diagnostic viewing applications, reporting systems, and collaboration tools to enable efficient image review and decision-making.			
9.2.6	Integrate with Hakeem's current and future Billing and Revenue Cycle Management Module. To handle medical billing, claims processing, insurance verification, and revenue cycle management tasks.			
9.2.7	Ability to integrate with third party advanced imaging applications. Such applications are usually part of the modalities' features available at sites, and can vary per supplier of modality.			
9.2.8	Artificial/Augmented Intelligence: system to include AI integration. This enables system to integrate with AI FDA approved solutions.			
9.2.9	Computer-Aided Detection (CAD): Capability of integration with AI/ CAD powered algorithms to assist in identifying suspicious lesions or abnormalities within images, improving reading efficiency and accuracy. View the CAD Markers generated by third party software.			
9.2.10	Voice Recognition Integration: Integration with voice recognition (Nuance PowerScribe) software to facilitate faster report generation and data entry for radiologists. Report entry to be preferably within the RIS system (without opening a PowerScribe window).			
9.2.11	Zero-footprint web image viewer must be integrated with Hakeem system, and must be integrated with Hakeem patient portal and patient mobile application 'My Hakeemy'.			

9.3 Interoperability and Standards Compliance

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.3.1	Complies with industry standards, including DICOM, HL7, and IHE, to facilitate interoperability with existing and future healthcare IT systems.			
9.3.2	Ability to conform to Health Information Exchange (HIE) standards and protocols. To ensure interoperability between different healthcare information systems and facilitate the secure and efficient exchange of patient data in Jordan.			
9.3.3	Supports DICOM web and RESTful APIs for seamless integration with PACS, RIS, Hakeem (EHR), and other clinical applications.			
9.3.4	FHIR interfaces to enable interoperability with modern healthcare systems and facilitate data exchange across the healthcare systems.			
9.3.5	Supports IHE profiles to ensure seamless integration and exchange of data with other IHE-compliant systems, enabling sharing of medical images and documents efficiently.			
9.3.6	Supports Diagnostic Coding and Terminology Management, such as, but not limited to, SNOMED CT, ICD-9, ICD-10, LOINC, CPT, RxNorm, HCPCS.			
9.3.7	Bidders should state IHE profiles supported and tested at an IHE Connectathon to ensure the VNA conforms to published integration specifications.			
9.3.8	Bidders should state IHE profiles implemented in the region with references.			
9.3.9	Solution must have, but not limited to, the following IHE profiles, to meet intended interoperability:			
9.3.10	○ Scheduled Workflow			
9.3.11	○ Patient Information Reconciliation			
9.3.12	○ Access to Radiology Information			
9.3.13	○ Simple Image and Numeric Report			

9.3.14	o	Consistent Time			
9.3.15	o	Teaching File and Clinical Trial Export			
9.3.16	o	Consistent Presentation of Images			
9.3.17	o	Key Image Note			
9.3.18	o	Mammography Image			
9.3.19	o	Nuclear Medicine Image			
9.3.20	o	Digital Breast Tomosynthesis			
9.3.21	o	Portable Data for Imaging			
9.3.22	o	Cross-Enterprise Document Sharing (XDS.b)			
9.3.23	o	Cross-Enterprise Document Sharing for Imaging (XDS-I.b)			
9.3.24	o	Cross-enterprise Scanned Document Sharing (XDS-SD)			
9.3.25	o	Audit Trail and Node Authentication			
9.3.26	o	Patient Identifier Cross-referencing			
9.3.27	o	Patient Demographics Query			
9.3.28	o	Basic Patient Privacy Consents			
9.3.29	o	Imaging Object Change Management (IOCM)			
9.3.30	o	Scanned Documents			
9.3.31	o	Evidence Documents			

9.4 Security and Access Control

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.4.1	Compliance with stringent security measures to protect patient data and ensure compliance with regulatory requirements, such as HIPAA (Health Insurance Portability and Accountability Act), GDPR (General Data Protection Regulation), FDA requirements for medical device			

	software, and other relevant data privacy regulations, to safeguard patient privacy and protect against unauthorized access, data breaches, and cyber threats.			
9.4.2	Granular access control mechanisms to limit access to sensitive patient data/ VIP patient data based on user roles and permissions.			
9.4.3	Audit Trails: Maintains detailed audit trails of user activities, system events, and data access to support compliance with regulatory standards such as HIPAA and GDPR, and detect and mitigate security threats.			
9.4.4	Data Encryption: Utilizes encryption techniques to protect sensitive data both at rest and in transit, safeguarding patient confidentiality and integrity.			
9.4.5	Role-based access control (RBAC), encryption, audit trails, and data encryption mechanisms to safeguard against unauthorized access, data breaches, and tampering, ensuring granular access control and data integrity, thus protecting patient privacy and confidentiality.			
9.4.6	Authentication and Authorization: Requires strong authentication mechanisms (e.g., multi-factor authentication) to verify user identities and authorize system access.			
9.4.7	Regular Audits and Assessments: Conducts periodic security audits and risk assessments to identify vulnerabilities and mitigate security threats proactively.			
9.4.8	Auto-Lock: Locks an inactive session after an administrator specified time.			
9.4.9	Auto-Logout: Auto log out and terminate inactive sessions after an administrator specified time.			
9.4.10	Security certificate for the proposed solution must be provided.			

9.5 Administration and Management

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.5.1	User Management: Tools for creating, managing, and deactivating user accounts, assigning roles and permissions.			
9.5.2	Alerting and Notification: Ability to configure alerts for potential issues (e.g., low storage space, failed backups).			
9.5.3	Reporting and Analytics: Reporting tools for tracking system usage, identifying trends, and generating reports for audits or performance optimization.			
9.5.4	System Monitoring: web based real time dashboards, to monitor system performance, storage utilization, and network health. Providing comprehensive performance monitoring and analytics tools to track system utilization, throughput, and latency.			
9.5.5	Historical analytics data facilitate capacity planning, resource allocation, and optimization of storage infrastructure.			
9.5.6	Tools for anonymizing or de-identifying patient data for research purposes while maintaining data integrity.			
9.5.7	Advanced Workflow Management: Configurable workflows for managing complex imaging studies and reporting requirements.			
9.5.8	Ability to merge, split, delete, and move studies and/or images by authorized users.			
9.5.9	Quality Control: Allows the user to create Quality Control tasks, order review, escalation rules, etc.			
9.5.10	Resource Monitoring: Monitors system resources, including CPU, memory, and storage utilization, to proactively identify and address performance bottlenecks.			

9.6 Performance and Scalability

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.6.1	Scalable Architecture: Ability to scale storage capacity and processing power to accommodate growing data volumes and user base.			
9.6.2	The solution must be designed to scale horizontally and vertically to accommodate increasing data volumes and user loads over time.			
9.6.3	Scalability features, such as load balancing, clustering, and distributed storage, allow the system to scale seamlessly to meet growing demands.			
9.6.4	The solution must support high throughput to handle concurrent read and write operations efficiently and consistently, especially during peak usage periods.			
9.6.5	Low latency is essential for quick access to archived data. Minimizing retrieval times enhances user experience and productivity. Quick retrieval of archived data, with real-time access to historical information.			
9.6.6	The ability to ingest data rapidly into the archive			
9.6.7	Fast Image Retrieval: Efficient retrieval of medical images based on various search criteria (e.g., patient demographics, date, study type) with minimal latency.			
9.6.8	The solution is to handle large volumes of medical imaging data and concurrent user access without compromising performance.			
9.6.9	Implementing efficient data compression and deduplication techniques to optimize storage utilization and reduce bandwidth requirements, enhancing overall performance.			
9.6.10	Ensure data integrity and reliability through features such as, but not limited to, checksums, replication, and redundancy to prevent data corruption or loss.			

9.6.11	Compatibility with various storage systems, protocols, and data formats to enable seamless integration with existing infrastructure and to facilitate data exchange between different systems and applications.			
9.6.12	Efficient metadata management capabilities to organize and index archived data effectively, enabling fast and accurate searches and retrieval.			
9.6.13	Performance Optimization: Implements caching mechanisms, load balancing, query optimization and resource optimization techniques to ensure optimal system performance and responsiveness.			
9.6.14	Content on-demand: Users can start reading and processing the images before the entire study is loaded, with full functionalities.			

9.7 Disaster Recovery and High Availability

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
9.7.1	Incorporates robust disaster recovery and high availability features to ensure data resilience and business continuity.			
9.7.2	Data replication, snapshotting, and backup mechanisms safeguard against data loss and enable rapid recovery in the event of hardware failures or natural disasters.			
9.7.3	Provide a reliable and secure backup solution, ensuring patient care continuity and regulatory compliance in the event of data loss or system failure.			
9.7.4	High Availability: Minimized downtime and high availability (99.99 % uptime) to ensure continuous access to archived data.			

9.7.5	A documented disaster recovery plan ensuring data availability and system functionality in the event of emergencies or outages.			
9.7.6	Business continuity plan to minimize disruptions to imaging workflows and patient care in unforeseen circumstances.			

10. Technical Specifications/ Vendor Neutral Archive (VNA)

The Medical Imaging Vendor Neutral Archive (VNA) is a centralized, standards-based repository designed to store, manage, and distribute medical and non-medical images and associated data across healthcare enterprises.

It provides a scalable, vendor-agnostic solution to consolidate imaging data from multiple sources, including Picture Archiving and Communication Systems (PACS), modalities, and departments.

10.1 Archiving and Retrieval

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
10.1.1	Automated Workflows: Ability to automate archiving processes based on pre-defined rules (e.g., by modality, patient ID, specialty).			
10.1.2	Fast Retrieval: Efficient retrieval of archived images based on various search criteria (e.g., patient demographics, date, study type, specialty).			
10.1.3	Versioning: Ability to track and manage different versions of studies.			

10.2 Image Lifecycle Management

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
10.2.1	Provide comprehensive lifecycle management capabilities to automate image ingestion, retention, migration, and disposition processes.			

10.2.2	Rule-based policies to enable automatic data lifecycle management based on configurable criteria, such as retention periods, access frequency, and storage capacity.			
10.2.3	Automated data migration tools to facilitate seamless data movement between storage tiers, optimizing performance and cost-efficiency.			
10.2.4	Automate image routing, study reconciliation, prefetching, and result distribution, enhancing operational efficiency and clinical productivity.			

10.3 Vendor Neutrality

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
10.3.1	Open Standards: Utilize open standards for data storage and communication to ensure vendor independence.			
10.3.2	Ability to easily export archived data in a standard format for use with other systems.			
10.3.3	Zero-Footprint Viewing: Ability to view archived studies on any device with a web browser without installing additional software.			
10.3.4	The system has to support neutrality DICOM query and retrieval from any PACS or imaging system.			
10.3.5	True independence: Independence from any single, underlying infrastructure, Hardware independence, vendor independence.			

11. Technical Specifications/ Enterprise Diagnostic Imaging Solution

The enterprise diagnostic imaging solution is designed to manage and streamline medical imaging data, workflows, and operations, across the entire healthcare enterprise. It enables seamless integration, storage, viewing, and sharing of medical images and associated data, ensuring efficient workflows and improved patient care.

It must integrate seamlessly with Hakeem, Picture Archiving and Communication Systems (PACS), and Radiology Information Systems (RIS).

11.1 Imaging Solution

11.1.1 Key Features/ System Architecture

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.1.1	Patient Information Management Module: Stores and manages patient demographics, medical history, insurance information, and contact details.			
11.1.1.2	Appointment Scheduling Module: Facilitates the scheduling of patient appointments, including availability management, appointment reminders, and calendar integration.			
11.1.1.3	Reporting and Analytics Module: Provides tools for generating standard and custom reports, analyzing healthcare data, and gaining insights into performance.			
11.1.1.4	The system can be deployed on-premises or optionally hosted in a cloud environment, ensuring accessibility and data security. Currently cloud hosting is not allowed for MoH and RMS instances.			

11.1.1.5	Image Acquisition Module: Interfaces with various medical imaging devices (e.g., MRI, CT, X-ray) to capture images. Provides Modality Worklist (MWL).			
11.1.1.6	Image Viewing and Analysis: Provides healthcare professionals with intuitive tools to view, analyze, and annotate medical images.			
11.1.1.7	Viewer and Interpretation Tools: Advanced tools for physicians to efficiently view, analyze, manipulate, and interpret medical images, including, but not limited to, zoom, pan, windowing/leveling, annotation, and measurement capabilities.			
11.1.1.8	Reporting and Workflow Management: Tools for generating reports with embedded images, integrating results with Hakeem EHR, and managing image-related workflows for different clinical specialties.			
11.1.1.9	System should provide functionality for Prefetching (triggered by reception of order/DICOM file).			
11.1.1.10	Solution must support auto-routing studies and its related priors based on pre-defined rules and logic.			
11.1.1.11	Workflow Automation: Automates repetitive tasks such as image routing, study prioritization, and report generation, reducing manual effort and improving efficiency.			
11.1.1.12	Rule-based routing and prioritization mechanisms optimize workflow efficiency and ensure timely delivery of imaging studies to the appropriate stakeholders.			
11.1.1.13	Image acquisition workflows, including image routing, auto-routing based on study attributes, and support for manual routing.			
11.1.1.14	Critical results notifications: Provides a notification to ordering physician of results with high abnormality, thus ensuring efficient communication between the radiology department and the ordering physician.			
11.1.1.15	Image Export: Provide ability to export study or images to;			
11.1.1.16	○ Folder in JPEG, BMP, PNG format			
11.1.1.17	○ Folder as a DICOM file in native full resolution format			

11.1.1.18	○ CD/DVD drive with or without encryption ▪ With or without a DICOM viewer ▪ With or without report			
11.1.1.19	○ Ability to print on compatible printable surface media; ▪ With customer-designed graphics ▪ With patient demographic and study information (configurable)			

11.1.2 Image Viewing and Analysis

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.2.1	The solution provides web-based image viewing application with intuitive user interface for healthcare professionals, which supports all major web browsers. Hybrid solutions will also be considered (e.g. Smart client setup) provided they migrate to web based in the near future (Please specify time required for web based version if applicable)			
11.1.2.2	Viewing applications support multi-modality image fusion, comparison, annotation, measurement, and manipulation functionalities.			
11.1.2.3	Solution must support multi-monitors setup.			
11.1.2.4	Provide access to radiology reports.			
11.1.2.5	Image Sharing and Collaboration: Secure platform for sharing and discussing medical images with colleagues within the organization or for remote consultations with specialists.			

11.1.3 Diagnostic Viewer

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.3.1	The solution provides web-based FDA approved diagnostic image viewing application with intuitive user interface for healthcare professionals, that ensures cross browser compatibility. Hybrid solutions will also be considered (e.g. Smart client setup) provided they migrate to web based in the near future (Please specify time required for web based version if applicable)			
11.1.3.2	General Functionality (not limited to): - Interactive zoom & pan - Rotate and flip - Cine display mode with adjustable rate - Edge enhancement - Magnifying glass - Interactive windowing - Automatic windowing by region of interest - Inverse windowing - Single image or workgroup windowing - Textual annotations and arrows can be placed on images - Annotations can be saved with images and are available globally - Measurement tools include pixel values, distances, angles, and ROI analysis - Hiding of DICOM information for clear image display - Toolbar can be hidden for maximum use of display area - Orthopedic measurements (cobb angle, HKA angle, horizontal/vertical/parallel and perpendicular measurements, pelvis Schmid - Coxometry).			

	-Ability to compensate for differing slice thickness when comparing images across series -Ability to mark key images -Annotation, key image and measurement data can be shared with all client workstations -Ability to export images in various formats (GIF, JPEG, TIFF) -Ability to export selected images -Spine labeling -Ribs labeling -Measurements can be included in reports with a simple user interaction			
11.1.3.3	Customizable search fields			
11.1.3.4	Support for hanging protocols per imaging type configured per user or group and can be shared between users.			
11.1.3.5	Add worklist filters and mark preferred filters			
11.1.3.6	User preferences Viewing Protocols			
11.1.3.7	Radiologists' settings are loaded per logged-on workstation (roaming user profiles)			
11.1.3.8	Ability to send key images to report			
11.1.3.9	System should have built in Peer review workflow and Statistical Peer review reports			
11.1.3.10	Peer Review control groups and permissions			
11.1.3.11	Ability to search for different status of the Peer Review			
11.1.3.12	Ability for users to 'chat' within system			
11.1.3.13	Intelligent assistant tool to significantly enhance precision during the diagnoses			
11.1.3.14	Critical Results Module to communicate directly between the ordering Physician and the Performing Physician/Radiologist			
11.1.3.15	Provide access to radiology reports.			

11.1.4 Advanced Imaging/ Post Processing

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.4.1	3D Visualization (Advanced Imaging/ Post Processing): Tools for creating and manipulating 3D/ 2D reconstructions from medical images for improved diagnostic capabilities and surgical planning, with unlimited number of users and workstations.			
11.1.4.2	System shall have the following, but not limited to, advanced imaging features:			
11.1.4.3	Advanced visualization (not limited to): - Angle measurement - Volume rendering - Multiplanar reconstruction - MIP, MinIP, AVG - Progressive display of images			
11.1.4.4	MIP/MPR (not limited to): - Simultaneous display of axial, coronal and sagittal reconstructions, with 3D triangulation - Adjustable reconstructed slice thickness (slabs) - Multiple projection modes for slab MPR (maximum, minimum, average intensity projection) - Oblique and double-oblique reconstructions - Part of the default display protocol - Configurable screen layouts			
11.1.4.5	CPR (not limited to): - Manual placement of curve points on native or MPR images - Cross-curve reconstructions (perpendicular to the curve) - Multiple projection methods (straightened, stretched) - Rotation around the CPR View			

11.1.4.6	3D volume rendering (not limited to): - MPRs Synchronization - 3D volume rendering techniques - 3D MIP - Comprehensive set of transfer functions (3D color presets)			
11.1.4.7	3D Segmentation (not limited to): - CT table and CT bone automatic segmentation - Clipping planes - Manual segmentation tools including lasso tool, point and click segmentation, add or remove capabilities, dilatation and erosion - Segmentation mask volume measurement			
11.1.4.8	Registration (not limited to): - Automated Registration of studies and series (e.g. current and prior) - Rigid registration (no image distortion) - Synchronized 3D navigation across studies (extended to MPRs) - Manual adjustment (through translation and/or rotation) of the registered series			
11.1.4.9	Fusion (not limited to): - Blending percentage adjustment between datasets - Color map to one of the datasets (including a comprehensive set of default color maps such as hot iron, rainbow, etc.) - Automated fusion of particular series/studies (e.g. PET/CT or SPECT/CT)			
11.1.4.10	Mammography (not limited to): - Chest wall alignment - Automated nipple pectoralis alignment - Paired pan, paired zoom - Fit largest breast - Implants shutter			

	- Unlimited editable workflows by the user
	- Multi modality hanging protocols
	- Embedded Intelligence:
	  - Automatic pectoralis alignment
	  - Automatic showing of retakes first
	  - Automatic detection of implants triggers dedicated views
	  - Same size automatically applied
	- Background air suppression
	- Magnifying glass
	- Toggle internal VOI LUT with a keyboard shortcut
	- Non IHE smart inverse
	- Quadrant viewing
	- 1:1 navigation
	- Tomosynthesis support			

11.1.4.11	PET/CT, SPECT/CT, and PET/MR (not limited to):
	- Volume Viewing (triangulation)
	- Fusion display
	- SUV display and assessment of PET lesions (SUV methods: weight, BSA, LBM)
	- Linking
	- Multiple study comparison
	- Automatic study-to-study registration (e.g. active to comparison)
	- Dedicated and customizable hanging protocols including comparison hanging protocols
	- Registration and linking between SPECT, PET, CT and MR series as follows;
	  - Automatic study-to-study registration (e.g. active to comparison)
	  - Series-to-series registration (e.g. PET/CT with MR or diagnostic CT)			

	- Ad hoc automatic registration and linking - Manual registration and linking			
11.1.4.12	Volume Viewing 3D (not limited to): - Saving of reconstructed MPR series as new series - Restoring previously segmented 3D volumes - Saving a 3D animation as a (cine) series of DICOM images			
11.1.4.13	Volume Viewing (not limited to): - Marker-based registration: aligning two datasets, based on at least 3 sets of anatomical markers which are placed in both datasets - CT/CT subtraction views (colored or grayscale) - Stereoscopic (anaglyph) rendering of 3D volumes			
11.1.4.14	Vessel Viewing (not limited to): - Automated vessel centerline tracking, based on one or more markers placed on the contrast-filled vessel - Automatic contouring of the vessel lumen, and extraction of minimum, average and maximum vessel diameter at any cross-section. The cross-sectional area is computed as well. Tools are available to manually adjust the lumen contour, when required. - A vessel diameter chart plots the vessel diameter as a function of distance along the centerline. - Stenosis quantification, based on the average vessel diameter or cross-sectional area. - 3D endoscopic flythrough for contrast-filled structures (e.g. vessels) and air-filled structures (e.g. trachea).			
11.1.4.15	Virtual Colonoscopy (not limited to): - Automated segmentation and centerline extraction of the colon, for both prone and supine acquisitions - 3D endoluminal and cross-curve colon flythrough - Structured reporting with labelling, classification, measurement and documentation of findings			

	- Cube view and double-contrast views to improve navigation
	- AVI movie output (3D endoluminal view)
	- Vessel suppressed CT data series, that aids both machine and humans in the detection and characterization of nodules
	- Targeting of all primary nodule types, including solid, sub-solid, and ground-glass nodules
	- Precise characterization of detected nodules through vessel suppression
	- Sort and/or triage task lists
	- Workflow Orchestration:
	  - Rule-based DICOM routing.
	  - Automated task prioritization.
	  - Automated task re-assignment
	- Advanced visualizations:
	  - Vessel suppression: automatically removes vascular structures to make the lung nodules more visible. It goes beyond MIP's and Min-IP's.
	  - Detection: automatically detects, measures and segments lung nodules
	  - Compare: automatically provides difference measurements for changes in detected nodules between two exams
	- Smart Hanging Protocols			

11.1.5 Zero Footprint (ZFP) Viewer

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.5.1	Zero foot print web based requiring no download, which can be easily used on any platform, and any device regardless of OS.			
11.1.5.2	Original file type is maintained, enabling export of the DICOM and non-DICOM data.			
11.1.5.3	Able to display any image and report stored in the PACS/VNA.			
11.1.5.4	Can be deployed as a stand-alone viewer with smart search capabilities or embedded directly inside Hakeem system without reentering the user login data.			
11.1.5.5	Allows display of diagnostic DICOM or non-DICOM clinical data from either PACS/VNA, archive or other vendors' PACS or from multiple DICOM archives.			
11.1.5.6	Access and view non-DICOM clinical data types such as AVI, JPEG, PDF, Scanned documents etc.			
11.1.5.7	Provides access to comprehensive patient imaging reports, orders, and key images.			
11.1.5.8	Simple viewing tools include zoom, pan, windowing, basic measurements and cine loops in a single layout.			
11.1.5.9	Users are able to locally save and print images to their desktop.			
11.1.5.10	Search capabilities based on patient name, patient ID or accession number, etc.			
11.1.5.11	Wild-card search, sorting rules, configurable filters.			
11.1.5.12	Search results display comprehensive information including birth date, body parts, study status and referring physician name.			
11.1.5.13	Implements robust security measures to protect patient data and ensures compliance with healthcare regulations (e.g., HIPAA).			

11.1.5.14	Full access controls that ensures restricting 'referring physicians' to only view data belonging to their patients. These access control restrictions are also available through URL integrations.			
11.1.5.15	Built-in auditing for HIPAA compliance.			
11.1.5.16	Web services are available for direct access to the data through EHS developed applications.			
11.1.5.17	Easy access to complete patient imaging portfolio with possibility to easily filter to show historical studies of a certain period of time.			
11.1.5.18	Supports multiple layout of the screen to display different groups of images simultaneously.			
11.1.5.19	Ability to compare current with prior studies, and sync series to automatically match anatomical locations of two different studies.			
11.1.5.20	Supports manual linking of studies.			
11.1.5.21	3D rendition support (MPR, MipPR, MinPR and MP Volume Rendering), with the ability to switch between planes (Axial, Sagittal, Coronal and Oblique).			
11.1.5.22	Support bookmarking, and automatically display the corresponding images that contain the findings.			
11.1.5.23	Fast access on low bandwidth/slow connections.			
11.1.5.24	Includes the following graphics and tools at a minimum:			
11.1.5.25	○ Line measurement			
11.1.5.26	○ ROI/Ellipse			
11.1.5.27	○ Angle/Cobb Angle			
11.1.5.28	○ Shapes			
11.1.5.29	○ Windowing, predefined window presets			
11.1.5.30	○ Rotate clockwise/anticlockwise			
11.1.5.31	○ Invert windowing			
11.1.5.32	○ Zoom			
11.1.5.33	○ Pan			
11.1.5.34	○ Supports VOI LUT			

11.1.6 Collaboration and Teleradiology

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.6.1	The solution supports remote image access and teleradiology consultations, enabling collaboration among healthcare professionals across geographical locations.			
11.1.6.2	Secure communication channels and encryption protocols ensure the confidentiality and integrity of patient data during teleradiology sessions.			
11.1.6.3	Integration with real-time video conferencing, screen sharing, and remote diagnostic tools to enhance collaboration and decision-making capabilities.			

11.1.7 Teaching File 'Favorites'

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.7.1	Studies of interest can be labeled as "favorite/teaching" study.			
11.1.7.2	Provide detailed annotations for each image, including patient demographics (age, gender), clinical history, relevant findings, and any pertinent observations or diagnoses.			
11.1.7.3	Organize the teaching file in a structured manner, such as by anatomical region, pathology type, or clinical specialty. Making it easier for users to navigate and locate specific cases of interest.			

11.1.7.4	Robust search functionality to allow users to search for specific cases based on keywords, diagnoses, or other criteria.			
11.1.7.5	Anonymized patient studies. Patients cannot be identified.			
11.1.7.6	Ensure that the images included in the teaching file are of high quality and resolution. They should be suitable for detailed analysis and interpretation by students or other healthcare professionals.			

11.1.8 Diagram Annotation

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.1.8.1	Intuitive and user-friendly interface designed for healthcare professionals with varying levels of technical expertise.			
11.1.8.2	Customizable toolbar and workspace to accommodate different workflow preferences.			
11.1.8.3	Support for touch-enabled devices for easy annotation on tablets or touchscreen monitors.			
11.1.8.4	Comprehensive set of annotation tools such as drawing tools (lines, shapes, arrows), text annotations, measurement tools (distance, angle, area), and highlighting tools.			
11.1.8.5	Ability to overlay annotations on medical images (e.g., X-rays, CT scans, MRIs) and other healthcare diagrams (e.g., anatomical diagrams, flowcharts).			
11.1.8.6	Undo/redo functionality to correct mistakes or revise annotations.			
11.1.8.7	Seamless integration with offered imaging solution and VNA.			
11.1.8.8	Compatibility with industry standards such as DICOM and HL7 for interoperability with medical imaging systems and electronic health data exchange.			

11.1.8.9	Role-based access control to restrict annotation privileges based on user roles and permissions.			
11.1.8.10	Encryption of data both in transit and at rest to ensure patient data security and compliance with healthcare regulations (e.g., HIPAA).			
11.1.8.11	Audit trail functionality to track annotation activities and maintain a record of changes made to medical images or diagrams.			
11.1.8.12	Ability to customize annotation templates or presets for common annotation tasks (e.g., pre-defined anatomical landmarks or measurement tools).			
11.1.8.13	Configuration options for adjusting annotation settings, preferences, and default behavior based on user preferences or organizational requirements.			
11.1.8.14	Support for multiple image formats and modalities (e.g., X-ray, MRI, ultrasound) to accommodate diverse clinical imaging needs.			
11.1.8.15	Integration with reporting tools to generate annotated images or diagrams along with accompanying clinical notes or reports.			
11.1.8.16	Export functionality to save annotated images in standard formats (e.g., JPEG, PNG, PDF) for sharing or inclusion in patient records.			

11.2 RIS

The Radiology Information System (RIS) is designed to manage and streamline the workflow and operations of radiology departments within healthcare organizations. The following outlines the technical specifications for a RIS to ensure efficient data management, integration with Hakeem healthcare systems, and compliance with regulatory standards.

11.2.1 Key Features

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
11.2.1.1	Patient Registration and Management: Allows for efficient capture and maintenance of patient demographic information, medical history, and insurance details. Ensuring accurate patient identification and record-keeping.			
11.2.1.2	Appointment Scheduling: Facilitates the scheduling of radiology exams, managing appointment slots, resources, and patient preferences, including resource allocation and appointment reminders.			
11.2.1.3	Order Entry and Management: Supports electronic order entry, verification, and tracking of radiology orders, ensuring completeness and accuracy.			
11.2.1.4	Advanced Search: Allows creation of non-standard searches. Permitting users the possibility selecting a combination of multiple search parameters.			
11.2.1.5	Task Assignment: Permits users to assign certain tasks to designated users of group of users, such as reporting on sub specialty imaging.			
11.2.1.6	Automatic Refresh: Task and orders list automatically refreshes. It also allows users to manually refresh lists.			

11.2.1.7	Exam Workflow Management: Coordinates the workflow of radiology exams, from order creation, patient check-in, to image acquisition, interpretation, and reporting, optimizing departmental efficiency.			
11.2.1.8	Reporting and Results Distribution: Streamlines the process of radiology reporting by radiologists, allowing users to generate, review, and distribute reports electronically to referring physicians.			
11.2.1.9	Report Entry: Reports can be created by the radiologists by typing directly in the system, digital dictation (with transcriptionist workflow), or by using online voice recognition.			
11.2.1.10	Support of signature levels: Draft, Preliminary and Final (signed/verified) Reports subject to radiologist configurable privileges.			
11.2.1.11	Web-based Interface: web-based without any integrated 3rd party applications.			
11.2.1.12	Patient should be searched and retrieved by means of several criteria, such as, but not limited to: last name, first name, date of birth, patient ID, modality, admission number, National ID and Military ID.			
11.2.1.13	System should be able to view patient histories.			
11.2.1.14	Radiology Reports Printing: Provides ability to print radiology study reports to a windows based paper printer, in a customizable format, including, but not limited to, adding the user's logo to the heading.			
11.2.1.15	Radiology Examination Room Management: Examination Room Management, Manage exam order by each exam room, Radiology Scheduling Slot Management.			

11.3 Solution Performance

Bidder to provide results in the below tables reflecting performance of system. Not applicable or not supported fields must be indicated accordingly.

11.3.1 Diagnostic image viewing performance

1st Image MR

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study MR (average of 250 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

1st Image CT

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study CT (average of 2000 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

1st Image CR

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study CR (average of 3 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

1st Image Mammo

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study Mammo (average of 200 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

11.3.2 Non-Diagnostic image viewing performance

1st Image MR

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study MR (average of 250 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

1st Image CT

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study CT (average of 2000 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

1st Image CR

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study CR (average of 3 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

1st Image Mammo

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

Full Study Mammo (average of 200 images)

Bandwidth/Latency	0ms	5ms	15ms	30ms	60ms	120ms
1 gbps						
100 mbps						
56 mbps						
25 mbps						
10 mbps						
2 mbps						

12. Technical Specifications/ Patient Portal

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
12.1	System must include a web based patient portal accessed through any web browser enabled device (desktop and mobile).			
12.2	Allow an authorized user to provide a secure login to the patient.			
12.3	Provide a mechanism for sharing patient access credentials.			
12.4	Capable of being embedded into EHS's 'My Hakeemy' patient portal for both desktop and mobile app versions without the need to install extra software.			
12.5	Allow the administrator to add site's logo on the patient portal login page.			
12.6	Provide release controls on patient's medical records within portal solutions.			
12.7	Allow the patients to view their radiological images, reports and all other non-DICOM files through portal, with access to VNA.			
12.8	Built-in security features that protect data access and transfer, including encryption.			
12.9	Full access controls to control viewable studies. As an example, physicians can only view their patient's study/images, and patients can only view their exams.			
12.10	Ability to audit access, including logins and tracking of data accessed.			
12.11	Capability of rescheduling or canceling existing future appointments by patients.			
12.12	Allow patients to save a copy of their images to their local device, along with a DICOM viewer.			

13. Technical Specifications/ Business Intelligence

By implementing a BI module, EHS/ Hakeem can leverage data-driven insights to improve patient care, optimize resource allocation, and enhance operational efficiency.

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
13.1	Data Integration: Compatibility with various data sources including PACS, RIS, Hakeem, and other relevant systems. Ability to extract, transform, and load (ETL) data from disparate sources into a unified data warehouse or data lake.			
13.2	Data Modeling and Warehousing: Design and implementation of a comprehensive data model tailored to the needs of medical imaging, including, but not limited to, patient demographics, imaging procedures, diagnoses, and outcomes. Creation of a scalable and secure data warehouse infrastructure to store and manage large volumes of imaging data.			
13.3	Reporting and Analytics: Development of interactive dashboards and reports for monitoring key performance indicators (KPIs) such as patient wait times, equipment utilization, report turnaround times, and adherence to quality standards. Advanced analytics capabilities including trend analysis, predictive modeling, and anomaly detection to identify patterns and outliers in imaging data.			
13.4	Data Visualization: Integration with data visualization tools to present complex imaging data in intuitive and actionable formats, such as heat-maps, scatter plots, dashboards, and geographic maps. Support for interactive features like drill-downs, filters, and annotations to facilitate exploration and interpretation of imaging data. The data can be exported in standard formats (such as csv, xls, etc)			

13.5	Alerting and Notifications: Implementation of customizable alerting mechanisms to notify stakeholders of critical events or deviations from expected norms, such as abnormal imaging findings or equipment malfunctions.			
13.6	Security and Compliance: Implementation of robust security measures to protect sensitive patient data and ensure compliance with healthcare regulations (e.g., HIPAA).			
13.7	Role-based access control (RBAC) mechanisms to restrict access to imaging data based on user roles and privileges.			
13.8	Integration with Clinical Workflows: Seamless integration with clinical workflows to provide BI insights within the context of routine tasks performed by radiologists, technologists, and other healthcare professionals. APIs (Application Programming Interfaces) and interoperability standards (e.g., DICOM) for interoperability with existing medical imaging systems and applications.			
13.9	Scalability and Performance: Scalable architecture capable of handling increasing data volumes and user loads as the medical imaging system expands. Optimization techniques such as parallel processing and in-memory computing to ensure fast query performance and responsiveness.			
13.10	User Training and Support: Provision of training materials, documentation, and user support services to help stakeholders effectively utilize the BI module and interpret the insights generated, requiring no database knowledge. Ongoing maintenance and updates to address evolving requirements and technology advancements in medical imaging and BI.			

14. Training

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
14.1	Since the intended business model is based on partnership between Bidder and EHS, training for at least 8 members of EHS imaging team at the manufacturer's site, or mutually agreed to facility, must be provided. This shall include, but not be limited to: ○ Enterprise imaging application user training. ○ Basic and advanced PACS administrator training. ○ Training on all installed clinical applications. ○ High-level review of system architecture, integration and backend functionality. ○ VNA technology review and management. ○ Supporting integration and HL7 interfaces.			
14.2	Duration of training is to be recommended by the Bidder to guarantee successful implementation and support by the EHS imaging team, and in no case shall it be less than 5 working days.			
14.3	Expenses for such associated costs (travel, room & board, fees, etc.) is to be borne by the Bidder.			
14.4	Training and Documentation: Offer to include training programs, user manuals, and documentation to assist in utilizing the system effectively.			
14.5	Bidder shall formulate a comprehensive training program for all staff during the implementation, in cooperation with EHS's Imaging Team.			
14.6	The training program shall include training prior to installation, during the system installation and after the system has been installed, including required upgrade performance.			
14.7	Instruction and demonstrations shall be provided by a qualified fully trained application specialist.			

14.8	Bidder shall provide all on-site user training (for two major hospitals picked by EHS)for technologists, radiologists, clinicians, orthopedic surgeons, referring physicians, nurses, dentist, IT staff shadowed by EHS Imaging Team, for the installed system applications, including all installed clinical and/or extended applications.			
14.9	Bidder shall provide minimum of three (3) days of Business Intelligence (BI) onsite application training for EHS imaging team.			

15. Documentation

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
15.1	Bidder shall provide, but not limited to, the following documentation in English (see also section 10: Solution Acceptance Testing): ○ Complete operational manuals ○ Service manuals ○ System architecture and/or infrastructure diagrams. ○ Security baseline document that specify the security controls that will be applied to increase the system security. ○ Integration documentation specifying system HL7 and DICOM integration. ○ Business Intelligence end user documentation. ○ Disaster Recovery plan.			

16. Software Licenses, Updates and/or Upgrades

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
16.1	Licensing/Subscription: All the required licenses for the functioning of the system must be provided by Bidder for the benefit of EHS.			
16.2	The Bidder shall guarantee software/hardware upgradeability of all equipment supplied and must state the period of guarantee.			
16.3	The Bidder provided software applications, operating systems and third-party software must be original legal copies and licensed for EHS, and must be provided on original installation disks/media including any associated serial numbers and registration keys required for full re-installation of such software in case of system or hard disk drives failure.			
16.4	Software patches: software, and firmware changes to the solution which are corrective in nature and are initiated by the manufacturer due to errors, recalls, regulatory requirements or safety reasons, shall be delivered and installed by the Bidder at no charge for the life of the solution.			
16.5	Software updates and/or upgrades: software and firmware changes that enhance existing features or add new features shall be provided and installed at no charge during the 10 year contract period. These no-charge updates and upgrades shall include all solution components.			
16.6	Software licenses: the Bidder shall clearly indicate all details relating to solution software licenses, clearly indicating that it is unlimited in nature (including type, site, user, entitlements, etc.). No internet validation of licenses will be accepted/ allowed, nor use of Dongles for activation (one time activation could be managed with EHS pre approval).			
16.7	Any future changes of any software name, EHS will be entitled to receive the new software including updates on the license.			

16.8	Bidder shall not implement any new software patches, updates or upgrades until it confirms the compatibility with current hardware and software			
16.9	The Bidder shall notify EHS in writing of any such software patches, updates or upgrades within sixty (60) days of their release by the manufacturer. Additional training, if required, shall be provided by the Bidder to all EHS's Imaging Team on all system changes as a result of software patches, updates or upgrades			
16.10	All software changes to the system shall be performed offline or during off-peak hours aimed at minimizing system downtime and interference with regular operations, in coordination with EHS concerned team(s).			
16.11	The Bidder shall utilize the test environment system to validate any software upgrades prior to production environment activation.			
16.12	All system settings, including, but not limited to, connectivity, shall be maintained and not require any manual changes.			

17. Artificial / Augmented Intelligence (*Optional*)

AI for diagnostic imaging is revolutionizing the field of medicine by enhancing the accuracy, speed, and efficiency of interpreting medical images such as X-rays, CT scans, MRIs, and ultrasound scans.

AI algorithms can analyze medical images and detect abnormalities, such as tumors, with high accuracy. This can assist radiologists by providing automated preliminary readings or highlighting areas of concern.

Bidder must provide as an optional item, the below requirements;
Please provide itemized pricing.

Ref.	Description	Compliant	Not-compliant	Reference doc./ Comment
17.1	Details and cost of the AI infrastructure engine and/or orchestrator.			
17.2	Details and cost of the AI development module/server.			
17.3	Details and cost of the development tool boxes available.			
17.4	Cost of the chest x-ray visualization/analysis package.			
17.5	Cost of the CT head stroke visualization/analysis package.			
17.6	Cost of the breast imaging visualization/analysis package.			
17.7	Cost of the prostate imaging visualization/analysis package (MRI).			
17.8	Specify for which geographical population their database was developed for, and confirm it can be applied to the population of Jordan.			
17.9	Determine AI's high accuracy in detecting abnormalities and lesions within medical images. Sensitivity (true positive rate) and specificity (true negative rate) are to be provided.			
17.10	The AI system should be robust against variations in image quality, patient demographics (e.g., age, gender), and equipment differences			

	(e.g., different types of scanners). It should perform consistently across different settings and conditions.			
17.11	Real-time or near-real-time processing is for timely diagnosis and patient management without significant delay in workflows.			
17.12	Seamless integration with proposed Enterprise Imaging System. The AI should be able to retrieve and process images directly from the system.			
17.13	Adhere to regulatory requirements, such as FDA approval and/or CE marking.			
17.14	Comply with data protection regulations (e.g., HIPAA, GDPR).			
17.15	AI solution shall be scalable to handle large volumes of imaging data, ensuring effectiveness and responsiveness as the workload in Hakeem sites increases.			
17.16	Incorporate continual learning capabilities, improving results over time with new data and feedback from radiologists, thus refining algorithms and maintaining accuracy.			

18. Solution Acceptance Testing

- Upon completion of installation and prior to utilization of the solution by end users, the entire system shall undergo acceptance testing by Bidder's appointed engineer and EHS's team.
- Bidder shall identify and provide all required materials, applications, and supplies for the acceptance testing process.
- Bidder shall submit a complete acceptance-testing plan including time lines and milestone tolerances. Plan to be signed off by both parties.
- The purpose of acceptance testing is to verify that the performance of the installed solution is within the parameters of the tender specifications and within the parameters provided by the manufacturer in the form of:
    - Sales Literature.
    - Technical Brochures.
    - Product Data Sheets or system manuals.
- EHS's Team shall collaborate with Bidder during acceptance testing.
- Any deficiencies identified during acceptance testing shall be rectified by the Bidder to EHS's satisfaction, prior to commencing clinical acceptance and application training.
- System acceptance shall be deemed successfully completed when Bidder final acceptance documentation has been mutually signed off by both Bidder and EHS's assigned committee and not on first end user use.
- After the system has been handed over to EHS for normal service. At no less than one month after system acceptance, Bidder must provide all of the following documentation (as well as documents mentioned in section 8: Documentation):
    - System 'as built' documentation.
    - Hardware/software/licenses delivery documentation, showing clearly that EHS has ownership of such.
    - System 'network implementation' diagram.
    - System component diagram.
    - Final acceptance documentation.

19. Maintenance and Support

Maintenance and support are the backbone of lasting customer satisfaction and operational reliability, ensuring that the solution continues to function optimally beyond their initial deployment. It embodies the commitment to customer care and operational excellence. It is significant in maintaining seamless operations, enhancing product longevity, and ultimately, achieving customer satisfaction.

The Maintenance and Support service is to include, but not limited to;

- Responsive technical support to address any issues or answer user questions.
- The solution includes comprehensive maintenance and support services, including software updates, patches, and technical assistance.
- 24/7 customer support and remote monitoring capabilities (in coordination with EHS for approvals per policy) ensure rapid response to issues and minimize system downtime.
- Clear and precise downtime policy and procedure, in line with EHS's internal policies.
- Regular system health checks and performance tuning activities to optimize system performance and reliability.
- Regular performance evaluations and proactive system monitoring to help identify and address potential issues before they impact operations.
- The Bidder shall confirm to provide the following software support:
    - Installation of the latest Bidder/ Vendor release at the time of installation.
    - Installation of the latest Bidder/ Vendor service updates.
    - Installation of OS service packs, security patches and anti-virus definitions, where applicable.

19.1 Support Process

The expected support process for the solution in collaboration between EHS Imaging Team and the Bidder's support is described in the following sections. Any deviations from this process is to be suggested by Bidder and approved by EHS before mutually agreeing to them.

The process describes the needed action to resolve concerns and ensure escalation of issues if initial resolutions are unsatisfactory.

The Bidder will be subjected to a penalty, if the target resolution time(s) were breached due to reasons attributable to the Bidder at any time during the support and maintenance term and such breach has not been cured within (3) working days of receiving written notice from EHS as 1% of the Annual Solution Cost value per day per breach. The total summed penalty should not exceed 10% of the total amount of the Annual Solution Cost.

19.2 Severity Definitions

- Severity 1 (Critical): Issues that cause complete system outage or major malfunctions impacting 50% of users. Requires immediate attention.
- Severity 2 (High): Issues that degrade the performance of the system or significantly impact multiple users.
- Severity 3 (Medium): Issues that affect some but not all functionalities or users, with moderate impact.
- Severity 4 (Low): Minor issues affecting non-critical functionalities or a small number of users.

19.3 Support Levels

Expected support levels are as follows;

Level 1 – EHS Help Desk

- Initial customer contact and ticket creation as per EHS policy and procedure.
- Resolution of common issues using predefined procedural steps provided by EHS Imaging Team, which are based on troubleshooting skills acquired by EHS Imaging Team from Bidder/ Vendor, and utilizing Bidder/ Vendor's knowledge base.

Level 2 – EHS Imaging Team:

- In-depth technical analysis and troubleshooting.
- Utilization of advanced diagnostic tools.
- Collaboration with Bidder/ Vendor's product development and EHS ITI teams.

Level 3 – Bidder/ Vendor's system experts: ***(Can be performed by EHS Imaging Team upon reaching approved competency by Bidder/ Vendor)***

- Deep investigation and troubleshooting
- Using a predefined tools by the Development and engineering team
- Implement changes into some levels of DB
- Collaboration with Level 2 support for issue resolution.

Level 4 – Bidder/ Vendor's Product Development/Engineering/ R&D:

- Investigation of product defects and bugs.
- Implementation of patches or hotfixes.
- Collaboration with Level 2 and Level 3 support for issue resolution.

Level 5 – Bidder/ Vendor's Management/Leadership:

- Oversight of escalated issues.
- Communication with EHS regarding escalated matters.
- Coordination of resources for resolution.

These can be amended with mutual agreement between EHS and Bidder. If the issue is not resolved by any support Level, the respective support personnel of that level escalates issue to next level and cooperates to reach full resolution.

Remote access to solution is only allowed through approved methods and policies of EHS's Cyber Security requirements.

19.4 Response and Resolution Times

Severity Level	Impact	Response Time	Resolution Time (Expected)
Severity 1	Critical	15-30 minutes	1 hour
Severity 2	High	45-90 minutes	12 hours
Severity 3	Medium	6-8 hours	24 hours
Severity 4	Low	8-12 hours	72 hours

- These times can be adjusted by mutual agreement between EHS and Bidder/ Vendor's support. They have to meet the required uptime of 99.99%.

20. Implementation

- The supplier must present a clear, unambiguous strategy, and commitment to a successful implementation.
- Well-defined Implementation Plan: A detailed plan outlining the steps for complete proposed solution installation, configuration, prior images retrieval (where applicable), user training, and go-live procedures.
- It is expected that two selected sites, one from each instance, will be implemented by Bidder/ Vendor's team shadowed by EHS's team. The rest will be implemented by the trained EHS imaging team.
- Bidder shall incorporate strategy in their project plan to:
    - Incorporate hardware.
    - Perform the required integrations.
    - Perform the required interfaces.
    - Perform the required data prior images retrievals.
    - Initiate data import of required prior studies.
    - Incorporate 'ology' Imaging Services in parallel with Radiology Imaging Services.

21. Financial model

Bidder is required to submit a 10-year fixed payment model matching the below;

- Model has to have a fixed annual payment. Referred to as 'Annual Solution Cost'
- Fixed annual payment to include software, license, and maintenance/ support.
- License to be perpetual with no concurrent use limitations, such as, but not limited to;
  - Unlimited number of Performed exams/ studies
  - Unlimited number of Connected hospitals/ clinics (current and future)
  - Unlimited number of System end users
  - Unlimited number of Modality connections
  - Unlimited number of Application features, such as post-processing
- Offer to be inclusive for all public sector EHS/Hakeem program current and future sites/ instances, including but not limited to, Royal Medical Services, Ministry of Health, and any additional EHS/Hakeem program beneficiaries.
- Price to be inclusive of, but not limited to; (No hidden costs or extras are accepted.)
  1. Product/solution price
  2. Implementation
  3. Training
  4. On-site support, if needed
  5. Interface and integration
  6. Recommended infrastructure configuration and specifications
  7. Data Conversion from existing system (if any)
  8. All required Licenses
  9. Maintenance /support
- Non-Resident Withholding Tax (WHT) under the Jordanian income tax law, with respect to services performed by a non-resident juristic or natural person, and the national contribution deduction on payments to non-residents totaling 11% are to be borne by the Bidder.
- **Optional Artificial Intelligence/Augmentation to be quoted separately.**