नौविमानन प्रबंधन प्रणाली केंद्र
CENTRE FOR NAVAL AVIATION MANAGEMENT SYSTEMS
नौसेना बेस/ NAVAL BASE, कोच्ची/ KOCHI - 682 004
दूरभाष/ TEL: 0484 - 287 3702 फ़ैक्स/ FAX: 0484 - 287 3707

137/NAMS/1 13 Feb 24

M/s_____
_____

REQUEST FOR INFORMATION (RFI) FOR
OFFLOADING TASK OF MIGRATING ILMS (AIR) APPLICATION
DATABASE FROM ORACLE TO SUITABLE OPEN-SOURCE DATABASE

1. Centre for Naval Aviation Management System (CNAMS) based at Kochi intends to migrate its material and maintenance management ERP application from Oracle to an open source database e.g. PostgreSQL, My SQL, SQLite etc. Towards the same, CNAMS intends to hire specialists which could facilitate in the specific task for migration of database.

2. The Request for Information (RFI) consists of three parts as indicated below:-

(a) **Part I**. This part of RFI includes following:-

(i) Detailed information pertaining to Network, Software and Database related aspects of the ILMS (Air) application.

(ii) Requirement of migration to open-source database.

(iii) Aim/ Deliverables/ test parameters of database migration.

(b) **Part II**. This part of the RFI states the methodology of seeking response from vendor.

(c) **Part III**. This part of the RFI states guidelines for framing criteria for vendor selection/ pre-qualification.

PART-I

3. **Background**. ILMS (Air) is a web-based application developed through in-house efforts by CNAMS. The application comprises of more than 3000 functionalities related to air logistics and maintenance. The ILMS(Air) application has been deployed through Main Data Center (MDC) at CNAMS, Kochi and two Disaster Recovery (DR) sites at separate locations. This deployment architecture based on near-real time data sync feature makes ILMS(Air) a robust and reliable application with round the clock availability. The application is accessed by users across Naval aviation based on various pre-defined roles and the access of data by any user is defined by the role assigned to that particular individual. The application is provided with intuitive MIS pages for each role type to cater specific requirements and thus aiding the user to take appropriate decisions based on their hierarchical roles. Additionally, to digitised and synergize naval aviation operations, maintenance and logistics, development of Naval Aircraft Management System (NAMS) is under progress thorugh in-house efforts.

4. **Application Architecture**. ILMS(Air) is based on the classic 'Client-Server' architecture. The system comprises of database servers hosting Oracle 12c database on AIX 7.2 platform, application servers (Load Balancer, Web Server) running Apache HTTP server and Tomcat web server are also on AIX 7.2. The application deployment architecture of MDC is placed at **Appendix 'A'**. The Hardware/ Software specifications of production environment are as tabulated below: -

Component	Resource	Type	Description
Web/ App server	Servers	H/W	IBM P9
	Server OS	S/W	AIX 7.2
	Web Server	S/W	Apache HTTPD
	Application Server	S/W	Apache Tomcat 8.5.45
Database	Servers	H/W	IBM P9
	Server OS	S/W	AIX 7.2
	Database	S/W	Oracle 12c

5. **Database Design**. At any given time, users connect to database at MDC. To provide robust disaster recovery and prevent data loss the ILMS (Air) system has two DR sites. All the transactions taking place at a site (normally MDC) are replicated to the databases held at other sites in real time. Therefore, each site hosts latest copy of databases. Additionally, two standby databases for primary database at MDC has also been created using Oracle data guard as another safety measure. Databases at each site along with other important resources are also backed up on RDX drives and NAS. The concurrency and robustness of disaster recovery sites is regularly checked by regular conduct of DR exercise when the users are directed to any of the other sites.

6. **Development Environment**. A separate and completely isolated development environment has been in existence since the beginning of development of ILMS (Air) application. Developers connect to a near latest copy of the production database dump hosted in development database server. They are completely isolated from the production network, the access to which is provided only to authorized personnel of DBA team. A test environment has been created employing the web server and the merged database for

development of ILMS(Air)**.** Web application is developed in Grails application framework powered by Groovy Programming language using Intellij Idea IDE running on PCs installed with Ubuntu. The Hardware/ Software specifications of the development environment are as follows: -

Component	Resource	Type	Description
Personal Computers	Development PCs	H/W	Acer Veriton S2680G
	Operating System	S/W	Ubuntu 20.04
Application	Development Tools	S/W	IntelliJ IDEA 2019.3
			Grails 4.0.6
			JRebel 2023.1.2
			Git 2.25.1
			Java 11
			Esapi 2.1.0
			Groovy 3.0.7
Database	Database	S/W	Oracle 12c
			SQL Developer 18.2.0.183

7. **Problem Statement**. As brought out above ILMS (Air) application runs on oracle database which is proprietary paid software. However, to optimize use of open source technology and to reduce dependence on paid subscriptions there is a need to migrate the app database onto an open source database.

8. **Aim/ Deliverables**. Aim of the project is to identify and migrate to suitable open-source database for ILMS (Air) application. Following will be the key deliverables of the project: -

(a) Identify suitable open-source database for ILMS(Air) application.

(b) Migrate existing database schema and data from Oracle to the open-source database.

(c) Integration of new database with existing application and necessary changes in application towards integration.

(d) Testing of application functionalities and associated database interactions.

(e) Setting up and testing database replication among primary and standby databases.

(f) Role change over between primary and standby databases.

(g) Assist in VA of the new setup.

(h) Migration to new database in production environment

9. **Requisites of Database/ Migration**. Certain key points to be considered during important evolution of migration from Oracle to open source database are as follows:-

(a) **Compatibility**. The compatibility of current database schema, SQL queries, and stored procedures with the identified open-source database is essential. The features used in oracle must have equivalent or compatible features in the identified open-source database i.e. PostgreSQL, MySQL etc.

(b) **Migration Tools**. Appropriate migration tools that support both oracle and the open-source database is required to identified. Tools like AWS Database Migration Service, ora2pg, etc. can assist in data transfer.

(c) **Schema and Data Mapping**. Oracle database schemas, data types, constraints, trigger etc are to be migrated into the open-source database. Any difference in data types, indexing, and constraints during migration process are required to be addressed.

(d) **Application Changes**. Evaluation and updation of application code that interacts with the database to ensure interface with open-source database will be required. This includes SQL queries, stored procedures, and database-specific functions.

(e) **Testing Environment**. Testing environment will be required to be setup to thoroughly test the migration process, validate data integrity, application functionality and performance in the new environment.

(f) **Backup and Recovery Plan**. Creation of a comprehensive backup of oracle database before initiating the migration. Establishing a recovery plan to address any unforeseen issues during or after the migration process.

(g) **Performance Consideration**. Assessment and optimization of the performance of the open-source database to meet the requirements of the ILMS (Air) application adjustment of configurations, indexes, and other parameters as required.

(h) **User Access and Security**. Replication of user accounts, roles and permissions from oracle to open-source database ensuring that the security measures are implemented.

(j) **Documentation and Training**. Preparation of documentation of entire migration process including configurations, settings and any changes made to the database and application code. Training of CNAMS personal in migration process, new open-source database and subsequent database administration.

(m) **Post Migration Monitoring**. Implementation of monitoring tools to track the performance and health of the open-source database after the migration. Address any issues promptly to ensure a smooth transition.

10. **Testing/ Trials**. The firms/vendors are to indicate their willingness for the conduct of the evaluation trials post completion of the migration of the database to the open source on the following points: -

(a) **Data Integrity and Consistency**. Verify that data migrated from oracle to the open-source database is accurate, with no loss or corruption of data.

(b) **Query Performance**. Assessment of the performance of SQL queries and database operations to ensure they meet acceptable response times and performance benchmarks.

(c) **Scalability Testing**. Evaluate the database's scalability by simulating increased loads, transactions, and data volume to ensure it can handle future growth.

(d) **Concurrency and Transaction Handling**. Testing of the database's ability to handle concurrent transaction.

(e) **Compatibility with Application**. Verify that the migrated database is fully compatible with existing application and that there are no issues with application functionalities.

(f) **Backup and Recovery Testing**. Conduct of backup and recovery tests to verify that data can be successfully backed up and restored in case of unexpected issues.

(g) **Security Testing**. Perform security audits to validate access controls, authentication mechanisms and data encryption features of the open-source database.

(j) **Failover and Redundancy Testing**. Testing of failover mechanism and redundancy configurations to ensure high availability and minimal downtime in case of server failures.

(p) **Data Migration and Rollback Plan**. Development and testing a rollback plan to revert to the previous state in case any issues arise during the trials.

(q) **Monitoring and Alerting**. Setting up of monitoring tools and alerting mechanism to proactively identify and address performance and security issues.

11. **Vendor Response**. Vendor is required to provide/ confirm acceptability of following: -

(a) The vendor is to indicate its capability to execute the project and provide support.

(b) The vendor is to provide tentative technical proposal of the proposed project and timelines of undertaking the same.

(c) The vendor is to provide the indicative cost including taxes and this should take into account all aspects of the project, integration, training etc.

(d) Vendor is to indicate acceptability of going through Two Bid System and payment as per Naval procedures/ guidelines.

PART-II

12. **Procedure for Response**.

(a) Vendors must fill the form of response as given in **Appendix 'B'**. Apart from filling details about the company, details about the exact knowledge base, expertise available and major projects undertaken by the company can also be included.

(b) The response to the RFI must be made in a sealed envelope to the following address: -

The Director
Centre for Naval Aviation Management Systems
Naval Base
Kochi 682004
Kerala
Email ID: directorilmsair@navy.gov.in
Phone: 0484-2873712,
Mob: 9404894363

(c) The last date of acceptance of filled form is **10 Mar 24**. The vendor shortlisted for issue of RFP would be intimated.

13. Prior submission of responses, firm/ vendor may visit the CNAMS at Kochi for clarification after obtaining necessary clearances from the Office of CNAMS, Kochi. The vendor, if desirous of visiting the CNAMS, Kochi are to seek prior permission at least 02 days in advance of the visit.

14. Proposal for a presentation may be included in the response of to the RFI.

15. This information is being issued with no financial commitment and the Director, CNAMS reserves the right to change or vary any part thereof at any stage.

PART-III

GUIDELINES FOR FRAMING CRITERIA FOR VENDOR SELECTION

16. Relevant extant guidelines prescribed for short-listing/ pre-qualification of Indian vendor are laid down vide Chatter IX of DAP-2020. Salient features which are unique and considered essential for short listing towards the above said project are as follows: -

(a) Applicant Entity should be an Indian Vendor as defined at Paragraph 20 of Chapter I of DAP 2020.

(b) Business dealing with applicant Entity or any of its allied entities should not have been suspended or banned by any Government Department or organization

(c) The entity should not be under insolvency resolution as per Indian Bankruptcy Code at any stage of procurement process from the issuing of RFP to the signing of contract.

(d) Vendor shall be a working entity or a system integrator in the field relevant to the above said project. The vendor should have minimum three year experience in same.

(e) Minimum average annual turnover for last three financial years, ending 31st March of the previous financial year should not be less than 30% of estimated cost of the project.

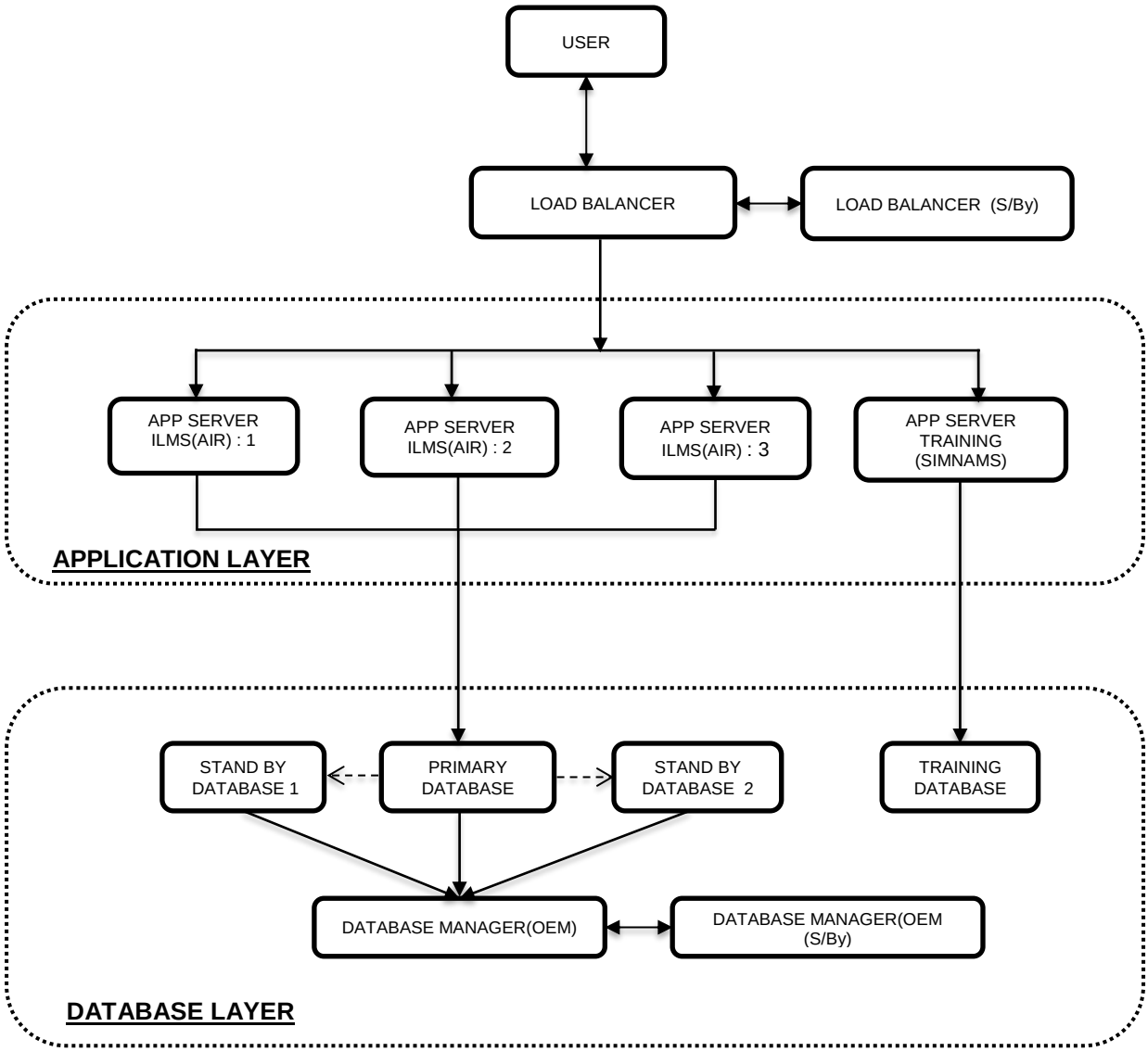
(f) Net worth of entities, ending 31st March of the previous financial year, should not be less than 5% of the estimated cost

-SDXX-

(Deepak Sarhoch)
Commander
Joint Director Systems and DBA
for Director

Appendix 'A'
(Para 4 refers)

APPLICATION DEPLOYMENT ARCHITECTURE OF MDC: ILMS(AIR)



Appendix 'B'
{Para 12 (a) refers}

VENDOR INFORMATION PROFORMA

1. **Name of the Vendor/Company/Firm**.
(Company profile including Share Holding pattern, in brief, to be attached)

2. **Contact Details**.
(Address, email, website, local address if any)

3. **Financial Details**.
(Category of Industry: Large/Medium/Small Scale)

4. **Details of Registration (with validity date)**.
(GeM, DGQA/DGAQA/DGNAI, OFB, DRDO, Any other Government Agency)

5. **Technical Expertise of the firm wrt to the project indicated in RFI**.

6. **Past Experience in similar projects alongwith copy of work orders**.

7. **Declaration**. It is certified that the above information is true and any changes will be intimated at the earliest.

(Authorised Signatory)