GOVERNMENT OF YEMEN

HIGH AUTHORITY FOR TENDER CONTROL

PROCUREMENT MANAGEMENT INFORMATION SYSTEM(PMIS)PROJECT

PMIS DATA CENTER

COMPUTER EQUIPMENTS

SOULTION OVREVIEW

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1.   Introduction

The Government of Yemen (GoY) is seeking to implement a Procurement Management Information System to improve government efficiencies.

This document presents a recommended solution design and server specification to support such an implementation.

The recommendation is based on Oracle's E-Business Suite Release 12, a modular and comprehensive suite of business applications for the enterprise, built on state-of-the-art technology, and installed at 37,500 customer sites globally.

Oracle E-Business Suite enables organizations to streamline Procurement Management, to improve efficiencies, to respond rapidly to changing organizational needs, and to comply with legislative and auditing requirements.

Intracom Jordan is confident that the recommended solution will meet the present and future Procurements Management requirements of GoY.

2.   E-Business Suite Architecture

Oracle E-Business Suite is a feature-rich application that includes a number of Procurements management modules, including Accounts Payable (AP), Accounts Receivable (AR) and General Ledger (GL).

Oracle E-Business Suite is built on the industry-leading Oracle Relational Database Management System, and utilizes the latest technology to deliver a fully web-enabled user-friendly application.

Oracle E-Business Suite conforms to the n-tier architecture of all leading ERP systems, as illustrated in Figure 1.
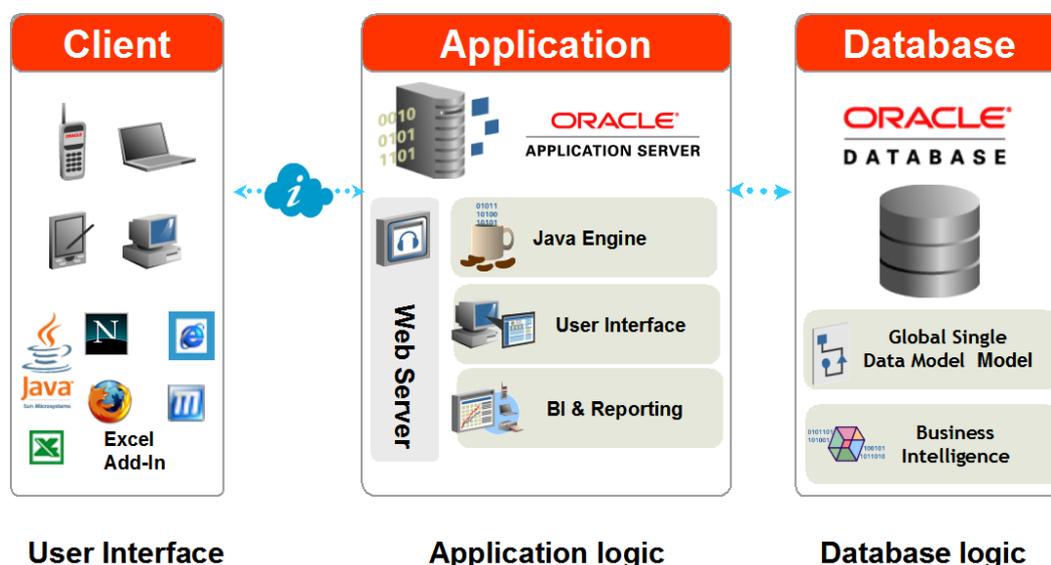
Figure 1 – Oracle E-Business Suite Architecture
This *n*-tier architecture allows for a great deal of flexibility in deployment; E-Business Suite can be deployed on a single physical server, or on multiple Application and Database servers,

depending on the number of users, server specification, high availability requirements, and future scalability.

Oracle E-Business Suite can be easily reconfigured to meet changing business requirements (e.g. by adding additional servers to handle additional users), especially if deployed on low-cost blade servers.

Details of the different components of Oracle E-Business Suite are presented in the following table:

Tier	Components
Client	*Browser-based interface* Oracle E-Business Suite is accessed from the client via a web-browser interface (e.g. using Internet Explorer, Firefox or Safari). This allows for easy deployment to client machines, either on a LAN or across WAN links.
Application	*Oracle Application Server 10g* Acts as the middle tier server for running the web server (Apache based), and business logic using its powerful J2EE engine. Oracle Application Server is closely integrated with the Oracle Database, providing best performance, scalability, end-to-end high availability, integrated security and unified systems and application management.
Database	*Oracle Database 11g* The Oracle Database is the core of Oracle E-Business, storing all data in a secure, robust and scalable database. The Oracle Database is the market leader for enterprise applications.

3.   Solution Requirements

For the purposes of specifying the hardware and architecture for the Procurements Management solution, PMIS has the following requirements:

- A total of 100 named users distributed between 8 sites.

- No requirement for High Availability nor Disaster Recovery.

- Simple, flexible and cost-effective design.

- Scope for future growth

4.   Solution Assumptions

In making this recommendation, the following assumptions have been made:

- Typically, only 10-20% of the total users will be accessing the system concurrently at any one time (i.e. between 5 and 10 users in the Pilot Phase).
- Business requirements are valid.

- Oracle E-Business Suite R12 running on Oracle RDBMS 11gR2.

- Hardware lifecycle of 1-3years.

- Minimum network bandwidth of at least 100 Kbps per user, and a maximum network latency of 50ms.

- The system is tuned, continuously monitored and regularly updated in order to optimize system performance.

5. Solution Architecture

5.1   Overview

For the implementation of Oracle E-Business Suite, the following environments are proposed:

- Production environment Test Training & Development environment

Further details of these environments are discussed below.

5.2   Production Environment

5.2.1   Architecture

The proposed Oracle Procurement's Production Environment consists of the following components:

- 1 x Database Server.
- 1 x Application Server.
- 1 x SAN storage.

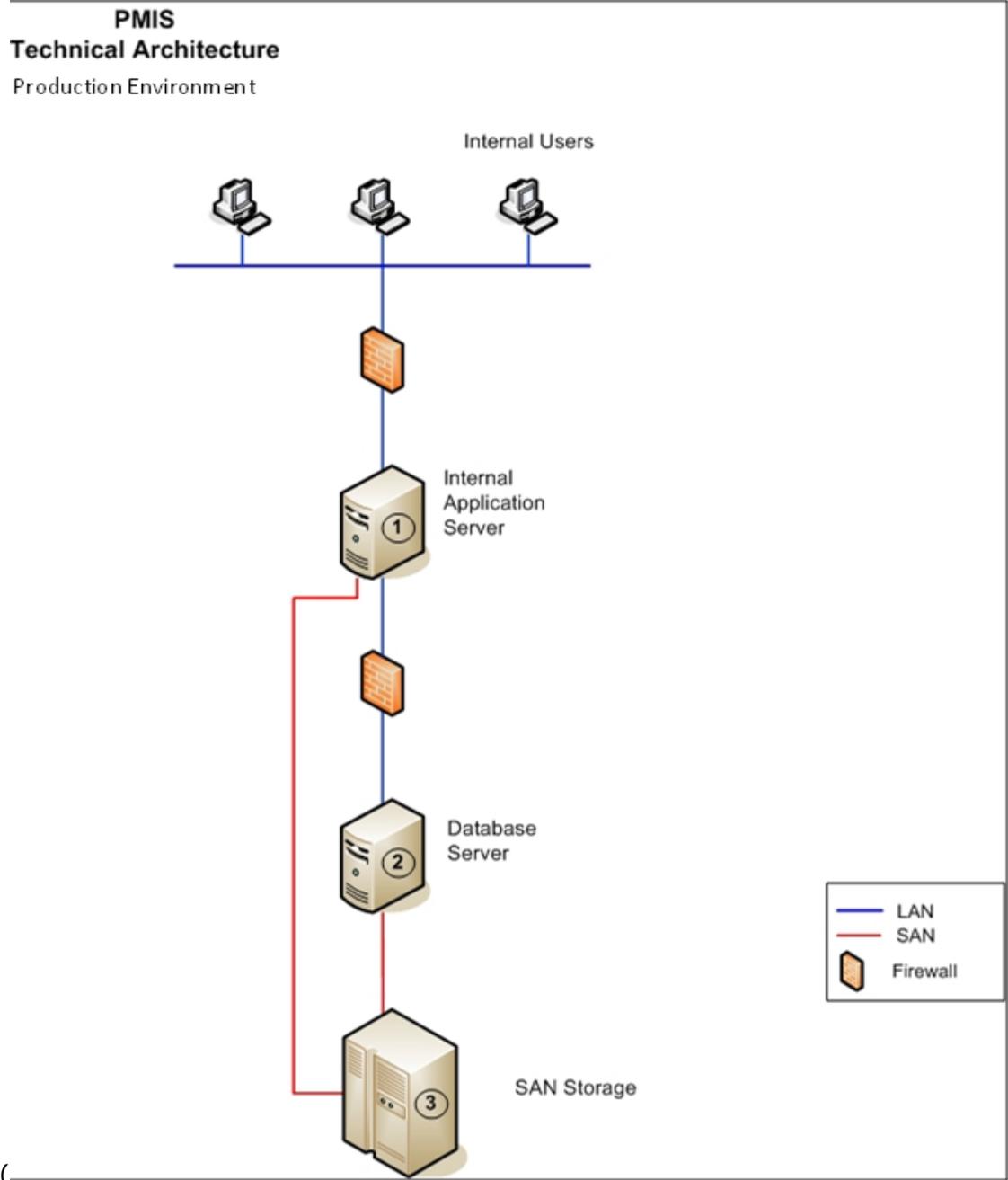Figure1 (below) illustrates the design of the Production Environment

PMIS
Technical Architecture
Production Environment

Internal Users

Internal
Application
Server (1)

Database
Server (2)

SAN Storage (3)

—— LAN
—— SAN
Firewall

(

Figure 1 – Production environment

The following table describes the function the servers illustrated in Figure 1:

Node	Role	Components
1	Internal Application Server	Oracle Web/Application Server 10g Oracle E-Business Suite 12.1.x components
2	Database Server	Oracle Database 11g Enterprise Edition
3	SAN Storage	SAN disk storage

5.2.2   Solution Features

The proposed design of the Production Environment demonstrates the following features:

- Ability to handle up to 100 concurrent users.

- Separate Application Servers and Database Server for optimal performance, network security and best-practice compliance.

- SAN disk storage for optimal performance, scalability and ease of maintenance.

- Ability to scale to accommodate more users by adding additional servers as required.

- Storage and processing capacity of 1-3 years.

- No High Availability.

5.3 Test Training & Development Environment

5.3.1 Architecture

In order to test out upgrades, patches and application changes, it is important to have a Test and Development environment that is separate from the Production environment.

The proposed Test and Development environment consists of the following servers:

- 1 x Application Server
- 1 x Database Server

Figure 2 (below) illustrates the design of the Training, Test and Development Environment.
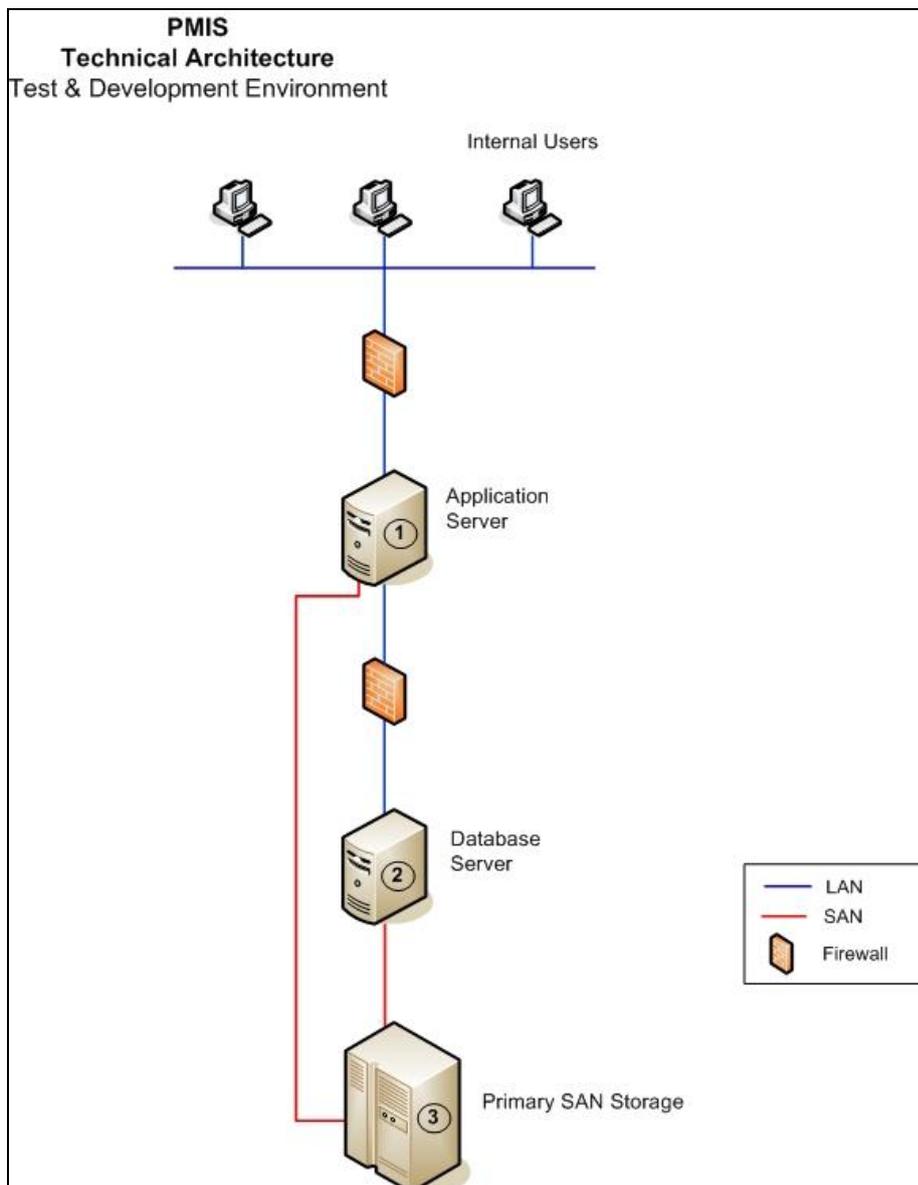
Figure 6 – Test and Development environment.
The following table describes the function the server illustrated in Figure 6:

Node	Role	Components
1	Application Server	Oracle Web/Application Server 10g Oracle E-Business Suite 12.1.x components
2	Database Server	Oracle Database 11g Enterprise Edition
3	SAN Storage	SAN disk storage

5.3.2   Solution Design Features

The architecture of the Development Environment has the following features:

- Ability to host up to 3 database instances
- Ability to handle around 10 concurrent users per instance.
- Mirrored (RAID 1) OS disks for redundancy.
- Shared storage on the Production SAN for optimal performance.
- Capacity for 1-3 year's growth.
- No Disaster Recovery or High Availability.

6.   Solution Notes

6.1   Application Server

The Application Server runs the web server components, as well as the Forms and Reports servers. Users connect to the Application Server using HTTP, and the Application Server connects to the Database on the Database Server using a TCP connection.

By default, the HTTP connection from the client to the Application Server is not secured, that is the connection is over HTTP. If required, the connection can be encrypted using an SSL certificate.

Similarly, the connection from the Application Server to the Database Server is via unsecured TCP – this can also be encrypted if required.

6.2   Database Server

The Database Server hosts the database itself, the core of the Application, and stores all the database data files. This server is where all the data processing occurs, and depending on the number of concurrent users and the type of work being performed, this server can experience substantial loading.

6.3   Backup and Recovery

For database backups, Oracle's Recovery Manager (RMAN) is recommended. This enables online ("hot") backups of the database, ensuring zero downtime and full 24/7 processing.

Backups of the Application Server can be carried out using backup tools such as vdump or tar.

RMAN can be easily integrated with all the leading tape backup solutions (e.g. Networker, Legato, Tivoli Storage Manager).

6.4   Operating Systems

A 64-bit Linux or Linux Operating System is recommended for all servers. Linux offers the most stable, secure and high-performance platform for Oracle E-Business Suite.

As part of the implementation, best-practice security guidelines will be followed to ensure the Operating System on all nodes is configured correctly.

6.5   Network

Although not essential, a firewall is recommended between the Application Server(s) and the Database Server(s). A firewall ensures that only users, protocols and servers listed in the firewall will be allowed through. For example, a firewall is typically configured to only allow through database connections from the Application Servers to the Database Server.

When connecting to E-Business Suite, users will need to authenticate to the firewall before being granted access. Only if the user is listed in the firewall Access Control List with the appropriate authorization (e.g. authorization to connect on port HTTPS 443) will that user be allowed through the firewall.

7. Hardware Specifications

This section details the hardware specifications of the servers for the different environments

These hardware specifications are generic in that they do not assume a particular hardware platform or Operating System. Once the hardware vendor has been decided on, a proper sizing exercise should be carried out with the vendor to ensure an accurate hardware specification.

7.1   Production Environment

The following table summarizes the basic characteristics of the recommended servers for the Production Environment at the Primary Site:

Node	Server	CPUs	RAM	Internal Storage	OS
1	Application Server	2 x Quad Core	16 GB	2 x 146 GB (OS, RAID 1)	Linux 64-bit
2	Database Server	2 x Quad Core	24 GB	2 x 146 GB (OS, RAID 1)	Linux 64-bit
3	SAN Storage	Nodes 1 & 2 to be connected to SAN storage of 1-3 TB			

7.2   Test   Training   &   Development Environment

The following table summarizes the basic characteristics of the recommended servers for the Test & Development Environment:

Node	Server	CPUs	RAM	Internal Storage	OS
1	Application Server	1 x Quad Core	12 GB	2 x 146 GB (OS, RAID 1)	Linux 64-bit
2	Database Server	1 x Quad Core	12 GB	2 x 146 GB (OS, RAID 1)	Linux 64-bit
3	SAN Storage	Nodes 1 & 2 to be connected to the Production SAN			

8. Software Versions

The table below summarizes the recommended software and versions of the Oracle software and supported Operating System:

Component	Description
Oracle E-Business Suite 12.1.3	The latest stable release of E-Business Suite.
Oracle Database 11g Enterprise Edition	The latest version of the Oracle database that is fully certified with Oracle E-Business Suite. Oracle Database 11gR2 Enterprise Edition is included with Oracle E-Business Suite 12.1.3.
Linux Operating System	A Linux Operating System is strongly recommended as the optimal platform for Oracle. Ideally a 64-bit Operating System is recommended in order to take full advantage of the maximum available physical memory.

NOTE : Oracle software packages not included in this tender , bidders are not required to quote price for oracle software .

9. Data Center Site Preparation

PMIS Project have a server room with dimensions of 5.75 x 4.50 miter (~26 m2). A Provider should outfit this room to correspond with the following requirements :

9.1.1   Entrance system

- Two doors of Servers room and PMIS Project main entrance need should provided by security entrance system support ID-Card and/or PW.

9.1.2   Air conditions (AC)

- Data center room should Provided with two air-conditions to offer a proper environment for the devices :
    - AC cooling capacity not less than 3 Ton (36000 BTU) for each AC.
    - Refrigerant-based cooling system.
    - have automatic controller for automatic interchange suggest that two AC automatically swaps every 6 hour

9.1.3   Fire prevention

- Room should have an adequate fire prevention system contain of :
    - Emergency Power Off function.
    - Fire detector (sensors).
    - Smoke detector.
    - Light and ringing (Fire / Smoke) alarm.
    - Auto foam Fire sprinkler.

- Room should provided by two hand held fire extinguisher (inside / outside server room)

9.1.4   UPS

- The UPSs required supplying power to Server room equipments and CCTV only.
- The estimated no of UPS's are three with 10 KVA, and batteries for 4 hours extended run time at full loads.
- UPS should have SNMP network card supports TCP/IP connection for management.

9.1.5   CCVT System

- Supplier should install CCTV system with at least 4 cameras (dome, day/night,) , DVR for monitoring and continuous recording facility.
- CCTV should be support to operate, manage through LAN.
- Suppliers are requested for site visit to identify the right proposal for the system.

9.1.6   Server rack

- The estimated no of rack to host the servers, SAN, UPS, network devices be 2 X42 U.
- Rack will include TFT screen, keyboard, KVM, and any other required accessories.
- Servers rack(s) should have adequate clearance per manufacturer specifications (but no less than 48" front and 36" rear clearance).
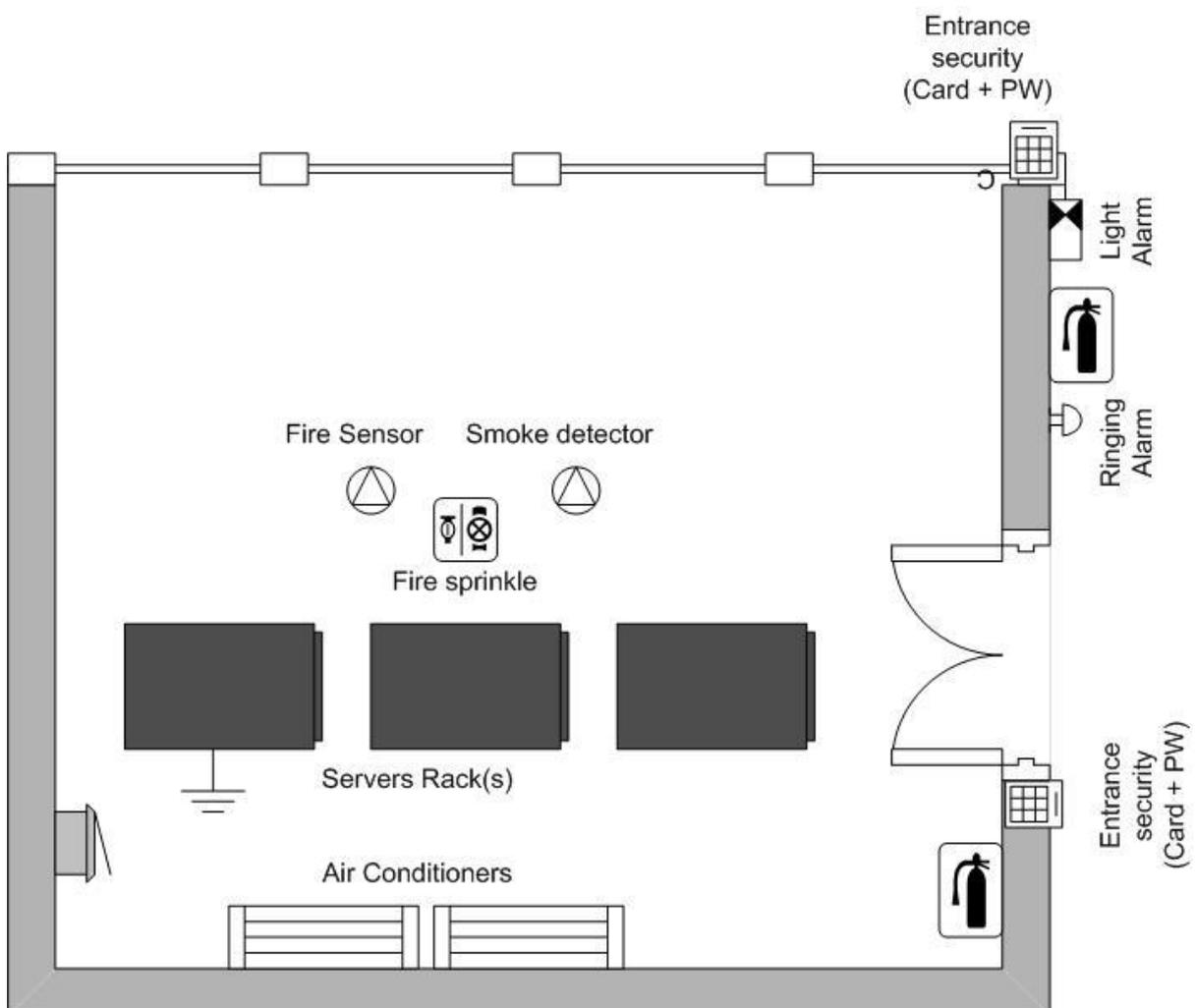
9.2   Diagram of Server Room:

Figure 5

➢ 2 x 3 ton split-wall Air conditioners with automatic controller for automatic interchange

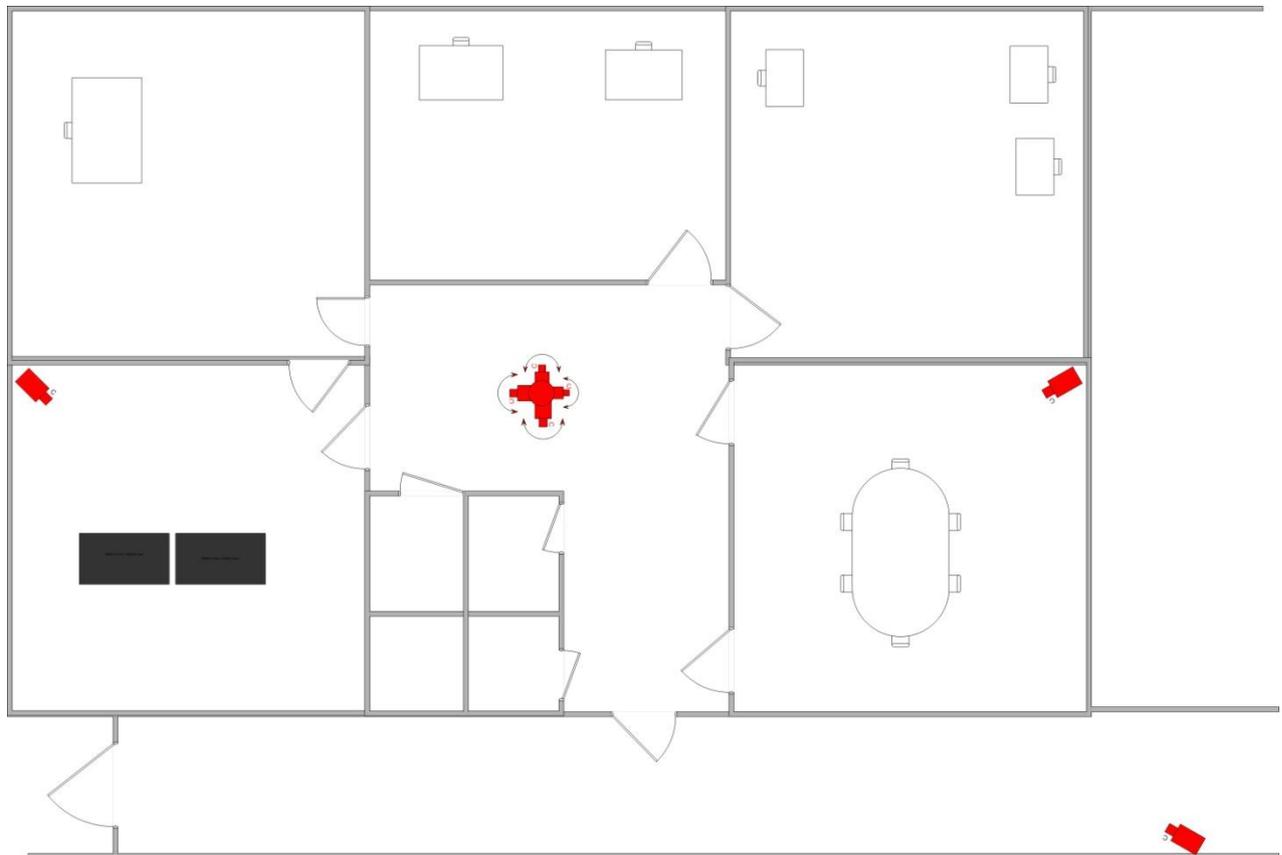> Fire prevention

> Entrance Security

9.3   CCTV System

Figure 7

> 3 x Bullet Infrared Cameras

> 1 x doom Infrared Camera

> 1 x 8 channels DVR

9.4   Features Supported:

The supplier should include in his offer optional proposal for the following:

- ➢ Raised floor
- ➢ Power distribution
- ➢ Power tray
- ➢ Power industrial sockets
- ➢ Power cable