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“Applications Development and Deployment Project”





صفحة ٢ من ٤٩١



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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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IBM CSP

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(Hardware Configuration)

No.	Hardware Description	Quantity	Comments
١.	IBM ٩٦٧٢ Model R٢١ Parallel Enterprise Server ٥١٢ MB Processor Storage Rated Speed – ٢٦ MIPS (Million Instructions Per Second)	١	
٢.	IBM ESCON Director ١٨ Channels	١	
٣.	IBM ٩٣٩٤ Disk Array Controller	٢	
٣.	IBM ٩٣٩٥ DASD Capacity	١	
٤.	IBM ٣٩٩٠ Disk Controller	١	
٥.	IBM ٣٣٨٠ DASD Capacity	١	
٦.	IBM ٣٥٩٠ Tape Controller	١	
٧.	٣٤٨٠ Tape Cartridge Drives	١	
٨.	٣٤٢٢ Open Reel tape Drives	١	
٩.	IBM ٣٧٤٥-١٧٠ Remote Comm. Controller	١	
١٠.	IBM ٣١٧٤—٠١L Local Comm. Controller	٥	
١١.	IBM ٣١٧٤—١١L Local Comm. Controller	٢	
١٢.	IBM ٦٢٦٢-٠١٤ High Speed Line Printers	٢	Speed ١٤٠٠ Lines Per Minute
١٣.	IBM ٣٨٢٠-٠٠١ Laser Printers	١	Speed ٢٠ Pages Per Minute
١٤.	IBM ٣٩٣٥ Laser Printers	٣	
١٥.	IBM ٤٠٢٨ Laser Printers	٤	
١٦.	HP Laser Printer	١	
١٧.	Xerox Printers	٣	
١٨.	Dot Matrix Printers	?	

Table ٢,١,١ IBM Hardware Configuration

(Software Configuration)

No.	Software Description	Version	Comments
١.	VM/ESA Service Level ٩٩٠١	٢,٣,٠	OS
٢.	CMS١١	١,٢,٢	OS
٣.	٣٨٠٠ Image Library		AFP
٣.	DCF	١,٤,٠	AFP
٤.	PSF	٢,١,١	AFP
٥.	AFP Font Collection	١,٠,٠	AFP
٦.	CSP/AD	٣,٣,٠	Appl. Dev
٧.	CSP/AE	٣,٣,٠	Appl. Dev

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No.	Software Description	Version	Comments
٨.	VMBACKUP (Al-Falak)	٣,٢.A	Backup
٩.	TCP/IP	٣,١,٠	Comm.
١٠.	RSCS	٣,٢,٠	Comm.
١١.	ACF/NCP	٧,٧,٠	Comm.
١٢.	PC File Transfer	١,١,٠	Comm.
١٣.	ACF/SSP	٤,٧,٠	Comm.
١٤.	ACF/VTAM	٤,٢,٠	Comm.
١٥.	COBOL II	١,٢,٠	Compiler
١٦.	HLASM	١,٣,٠	Compiler
١٧.	Language Environment	١,٨,٠	Compiler
١٨.	DFSORT/SMS	٢,١,٠	Sort
١٩.	RXSQL	٣,٤,٠	SQL (Database)
٢٠.	SQL/DS VMDSS	٣,٥,٠	SQL (Database)
٢١.	CMS Utility Feature	١,١,٠	Util.
٢٢.	VSE/VSAM	٢,٢,٠	Util.
٢٣.	DIRMAINT	١,٥,٠	Util.
٢٤.	ICKDSF	١,٦,٠	Util.
٢٥.	Real-time Monitor (SMART)	١,٥,٢	Util.
٢٦.	DMS/CMS	٢,١,٠	Util.
٢٧.	DW/٣٧٠	٢,٢,٠	WP
٢٨.	PSAF	١,١,٠	AFP
٢٩.	FLSF	١,١,٠	AFP
٣٠.	APPC	١,١,٠	Comm.
٣١.	Open System Adapter		Comm.
٣٢.	LAN File Services/ESA	١,١,٢	Comm.
٣٣.	LAN Resource and Extensions	١,٣,٠	Comm.
٣٤.	REXX/٣٧٠ Compiler	١,٣,٠	Compiler
٣٥.	REXX/٣٧٠ Library	١,٣,٠	Compiler
٣٦.	C/٣٧٠	١,٢,٠	Compiler
٣٧.	GDMM/VM	٣,٢,٠	Graphic
٣٨.	EREP	٣,٥,٠	Monitor
٣٩.	VMPRF	١,٢,١	Monitor
٤٠.	Resource Access Control Facility (RACF)	١,١٠,٠	Security
٤١.	SQL Master	١,٢,٠	SQL (Database)
٤٢.	QMF	٣,٣,٠	SQL (Database)
٤٣.	Open Edition Shell		Unix
٤٤.	DFSMS/VM	٢,٢,١	Util.
٤٥.	DITTO/ESA	١,٢,٠	Util.
٤٦.	ISPF	٣,٢,٠	Util.

Table ٢,١,٢ IBM Software Configuration

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Windows O/S
SQL Server
Byte Quest

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Visual Basic

Access DB

DOS

DataFlex ()

(Network Configuration)

- Budget LAN
 - Microsoft SNA Server acting as SNA-to-IP Gateway
 - IBM Personnel Communication
 - IBM ٨٢٥٠ Token Ring
 - Microsoft Exchange Server
- Data Center LAN
 - Microsoft SNA Server acting as SNA-to-IP Gateway
 - IBM Personnel Communication
 - IBM ٨٢٥٠ Token Ring
- LAN Administered by Computer Unit
 - Novell
 - Communication Gateway Server
 - IBM Personnel Communication
 - More than ٢٥٠ Workstations
 - Windows Server
 - Branch Network
- NCFEI LAN
 - Novell
 - File Server
 - Horizon Server
 - Microsoft Exchange Server
 - Horizon Application System
 - SAS Application System
- Office and Branches (٣٤ Location)
 - Ethernet /TCP/IP
 - ٣٤ Servers and ١٣٦ Workstations

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IBM 9672-R21 VM/ESA – O/S, CSP, COBOL, REXX, and SQL/DS (DB/2) Developed In-house	Position System —	1
Windows O/S, Package System Vendor - BuildSoft	BuildSoft	2
Windows O/S, Visual Basic, Access DB Developed In-house		3
Windows O/S, Visual Basic , Access DB Developed In-house		4
DOS, DataFlex (Language and DBMS), Package System Vendor – Hi-Tech Company		5
Windows O/S, Visual Basic Access DB Developed In-house		6
Windows O/S, Visual Basic , Access DB Developed In-house		7
VAX 4000-200/VMS, COBOL, SQL Developed In-house	()	8
Windows O/S, Visual Basic , SQL Server Developed In-house	()	9
DOS, DataFlex (Language and DBMS) Package System Vendor – Hi-Tech Company		10
Windows O/S, Visual Basic , Access DB Developed In-house		11
Windows O/S, Visual Basic , Access DB Developed In-house		12
Windows OS, SQL Server Package System Vendor – Hi-Tech Company		13

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Windows O/S, Visual Basic , Access DB Developed In-house		١٤
Windows O/S, Visual Basic , Access DB Developed In-house		١٥
Windows O/S, Visual Basic , Access DB Developed In-house		١٦
Windows O/S, Visual Basic , Access DB Developed In-house		١٧
Windows O/S, Visual Basic , Access DB Developed In-house		١٨
Windows O/S, Visual Basic , Access DB Developed In-house		١٩
Windows O/S, Visual Basic , Access DB Developed In-house		٢٠
Windows NT, Sybase DB Package System Vendor – Arabian Advanced System		٢١
Windows NT and Novell SAS DB Package System Vendor – SAS	SAS	٢٢
Windows O/S, Visual Basic , Access DB Developed In-house		٢٣
Windows O/S, Visual Basic , Access DB Developed In-house		٢٤
Windows O/S, Visual Basic , SQL server, Developed In-house		٢٥
DOS, dBase IV/Sybase Developed In-house		٢٦
Windows O/S, PowerBuilder, Sybase DB Developed In-house		٢٧
Windows O/S, Visual Basic , Access DB Developed In-house		٢٨
Windows O/S, Visual Basic , Access DB Developed In-house		٢٩
Windows O/S, Visual Basic , Access DB Developed In-house		٣٠
Windows server OS, Visual Basic, SQL Server Developed In-house		٣١
Windows server OS, Visual Basic, SQL Server Developed In-house		٣٢
Windows server OS, Visual Basic, SQL Server Developed In-house		٣٣
Windows server OS, SQL Server, Byte Quest Package System Vendor – Al-Fanar		٣٤

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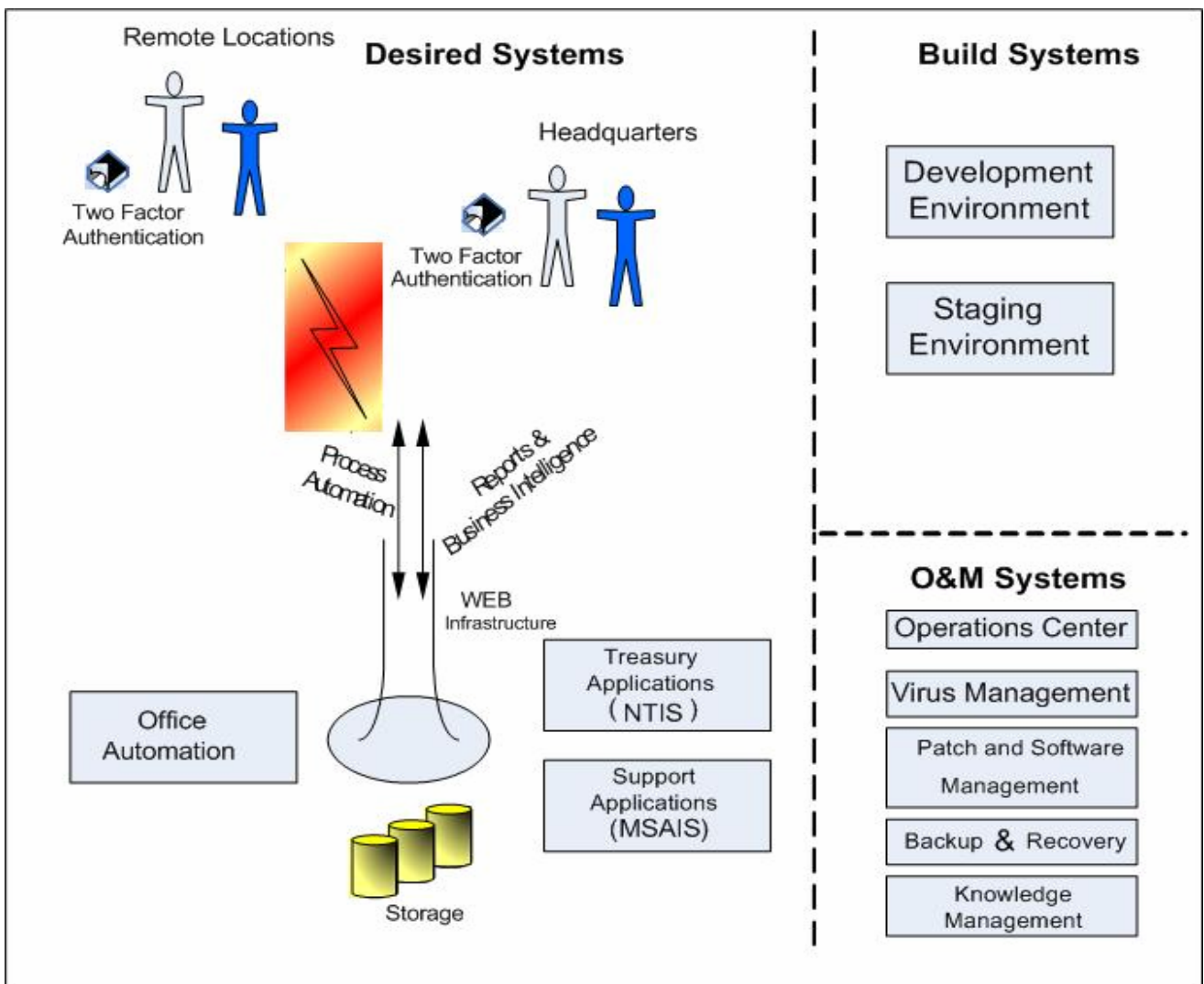
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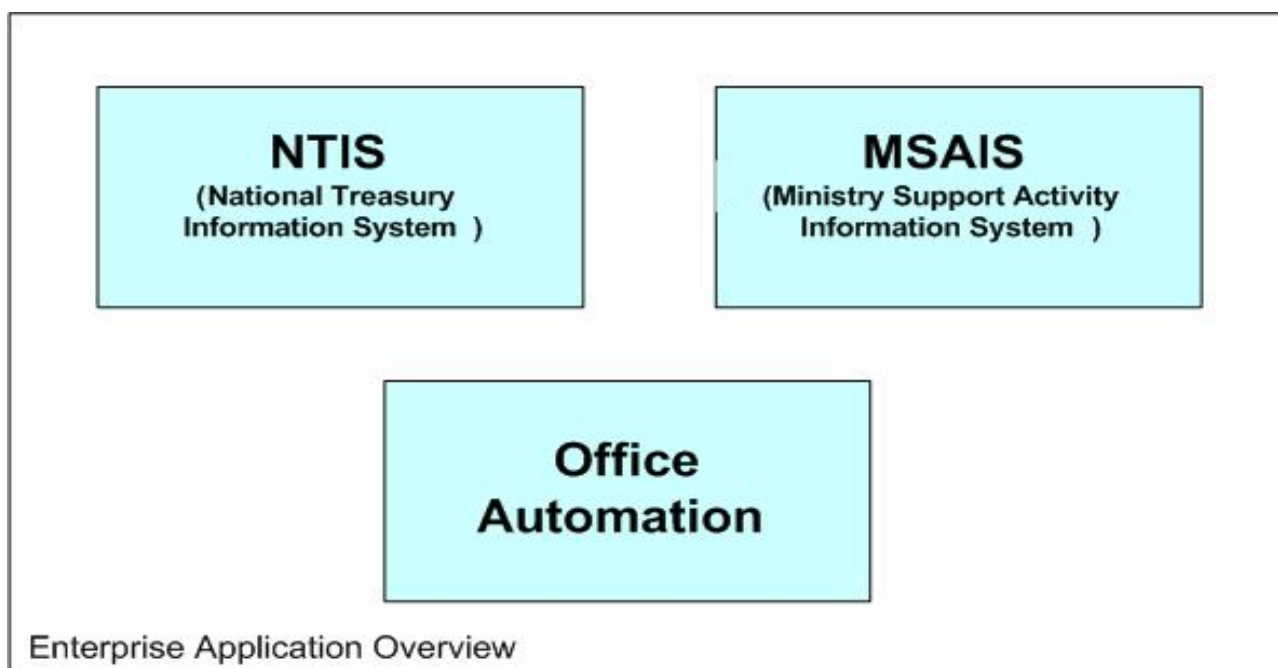
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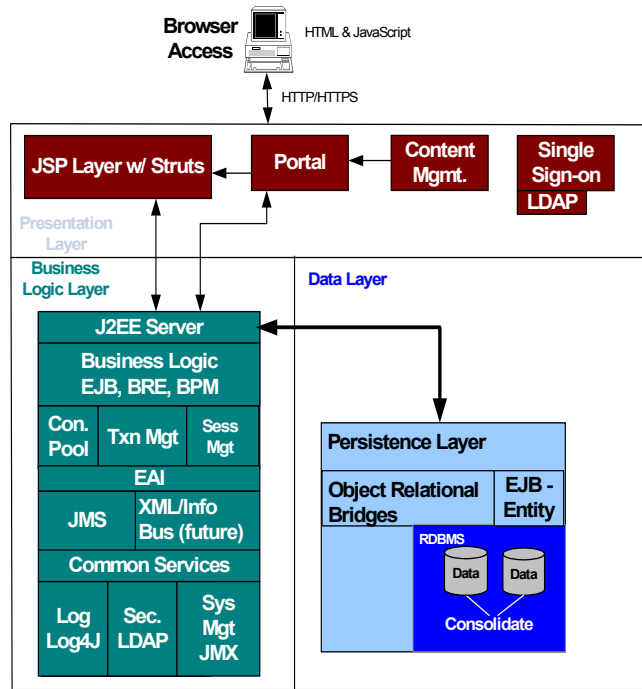


Figure ٤,٧,٢,١ Logical Architecture Model (J²EE)

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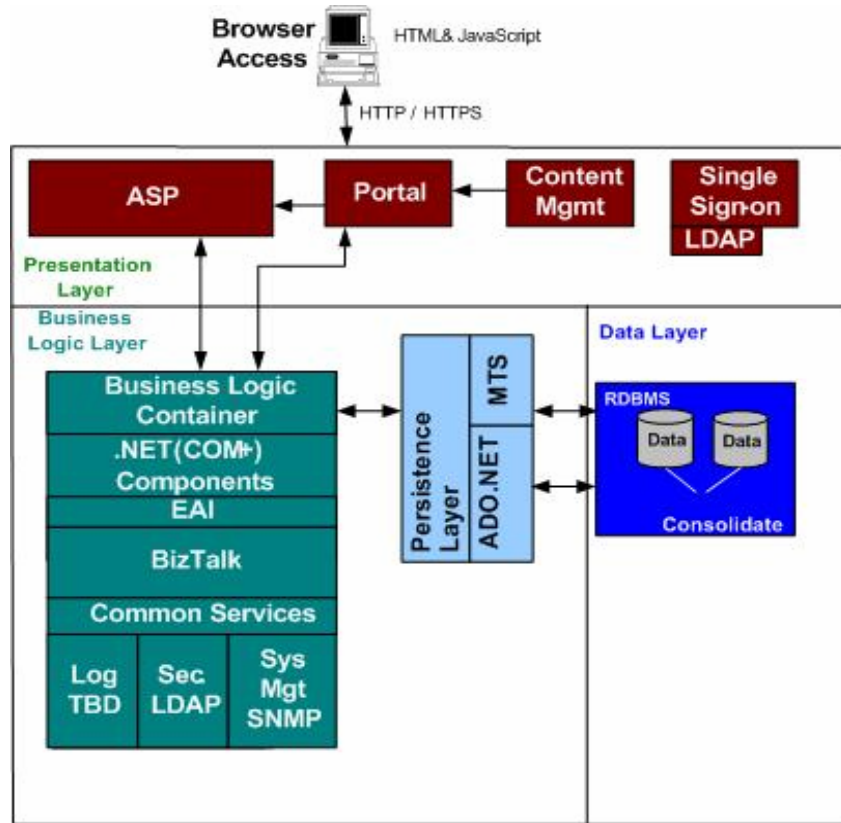


Figure ٤,٧,٢,٢ Logical Architecture Model (.NET)

Requirement No.	Conceptual Architecture Model Requirement
AAC-٠١	All user access shall be provided via the portal
AAC-٠٢	Web applications shall be secured using a common security layer that provides authentication and authorization services.
AAC-٠٣	Applications shall be clearly separable into three distinct layers: ١) presentation layer, ٢) business logic layer, and ٣) data layer.
AAC-٠٣	A common systems management, logging, and security facility shall be provided to service all three layers.
AAC-٠٤	A common persistence layer shall provide persistence to nonvolatile storage (e.g. hard disk).
AAC-٠٥	JSP (J٢EE) or ASP (.NET) shall be used for developing the presentation layer.
AAC-٠٦	Content management capabilities shall be limited to customizations to portal content.
AAC-٠٧	If required to maintain data integrity between systems, the future state architecture must send and retrieve data between the systems (manually or automatically).

Table ٤,٧,٢-١ Conceptual Architecture Model Requirements

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J EE

Requirement No.	J EE Logical Architecture Model Requirement
AAL-٠١	Solution shall support HTTP and HTTPS. HTTPS will be relied on heavily, as IPSEC will not be providing encryption. Client side certificates must also be supported, however, it is not required to be implemented immediately.
AAL-٠٢	The single sign on solution shall be based on LDAP
AAL-٠٣	LDAP shall also be used to provide a common authorization scheme (Sec. LDAP in diagram)
AAL-٠٤	The Business Logic layer shall support EJB, provide a business rules engine (BRE), and provide business process management (BPM).
AAL-٠٥	Enterprise Application Integration shall be accomplished through the JMS API. In the future an XML-based information bus will be used.
AAL-٠٦	The J EE application server shall support connection pooling, transaction management, and session management.
AAL-٠٧	Application Response Time shall be measured at different points in the architecture using ARM.
AAL-٠٧	Log4J shall be used as a common logging approach.
AAL-٠٨	Systems management, at the application level, shall be implemented using JMX.
AAL-٠٩	The persistence layer shall support object to relational bridging and entity beans.

Table ٤,٧,٢-١ Logical Architecture Model Requirements (J EE)

.NET

Requirement No.	.NET Logical Architecture Model Requirement
AAL-٠١	Solution shall support HTTP and HTTPS. HTTPS will be relied on heavily, as IPSEC will not be providing encryption. Client side certificates must also be supported, however, it is not required to be implemented immediately.
AAL-٠٢	The single sign on solution shall be based on LDAP
AAL-٠٣	LDAP shall also be used to provide a common authorization scheme (Sec. LDAP in diagram)
AAL-٠٤	The Business Logic layer shall support custom business logic, a business rules engine (BRE), and provide business process management (BPM).
AAL-٠٥	Enterprise Application Integration shall be accomplished through the BizTalk framework.
AAL-٠٧	Application Response Time shall be measured at different points in the architecture using ARM.
AAL-٠٧	Bidders are encouraged to specify their approach to logging.
AAL-٠٨	Systems management, at the application level, shall be implemented using SNMP.
AAL-٠٩	The persistence layer shall use ADO.NET and MTS for managing persistence.

Table ٤,٧,٢-٢ Logical Architecture Requirements (.NET)



(J EE .NET)

Requirement No.	J EE and .NET Logical Architecture Model Requirement
AAL-١٠	All RDBMS servers shall be clustered (paired) at the operating system and database level. The fact that servers are clustered shall be transparent to remote applications.
AAL-١١	All RDBMS servers shall be configured such that a "roll forward" procedure can be accomplished after a tape backup has been used to restore to the database from the last tape backup.
AAL-١٢	Disk storage for user data on all RDBMS servers shall be external.
AAL-١٣	Disk storage for user data on the RDBMS servers shall provide the ability to add and remove hard disks without interrupting the disk array.
AAL-١٤	Disk storage for user data on the RDBMS servers shall be supported by a hardware RAID controller that supports RAID ٠, ١, ١٠, ١٠٠, ١٠٠٠, and ١٠٠٠٠. RAID ٠ should be used to minimize the number of hard disks required in the array.
AAL-١٥	All RDBMS and application servers shall use parallel processors.
AAL-١٦	Collectively, the web/application/RDBMS servers shall, at a minimum, support the following transaction loads: ٠٠ OLTP transactions per second and be vertically scalable to support ١٠٠ OLTP transactions per second with the addition of memory, CPU's, and modifications to the disk array. ١٠٠٠ OLAP queries per hour and be vertically scalable to support ٢٠٠٠ OLAP transactions per hour with the addition of memory, CPU's, and modifications to the disk array. OLAP queries should be assumed to be against ٢٠٠ GB of data.
AAL-١٧	All ad hoc queries against an RDBMS server shall not be executed against an RDBMS server that serves OLTP purposes.
AAL-١٨	The presentation layer shall be physically separated from the data layer so that the presentation tier can be placed on a separate network segment. The business logic layer can be hosted on separate server, the presentation tier servers, or the RDBMS servers, at the bidder's discretion.
AAL-١٩	The servers used in the presentation layer shall scale horizontally and vertically.
AAL-٢٠	All LDAP services shall be hosted on separate physical hardware. The LDAP repository within this environment should be synchronized with the office automation environment to eliminate the need for users to remember and maintain two passwords.
AAL-٢١	All network interface cards for servers that are not scaling horizontally shall be Gigabit Ethernet.

Table ٤,٧,٢-٣ Logical Technical Architecture Requirements (for J EE and .NET Architecture)

Data Service	Description	Detailed and Summary Data	Data History	Data Freshness
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Data Service	Description	Detailed and Summary Data	Data History	Data Freshness
OLTP	Data Storage that facilitates creating, reading, updating, and deleting granular data elements.	Detailed	N/A	Real-time
Class I ODS	Class I ODS will be used in favor of ad hoc queries against the OLTP data stores. The ODS and corresponding data source will be synchronized almost immediately, therefore there will be little if any data transformation. Because of this limitation, the ODS will usually serve a single application.	Detailed	١-٢ Months to support tactical decisions	Near-Real-Time (Seconds)
Class II ODS	Class II ODS will be used to aggregate and transform data from multiple applications.	Detailed, little summary	Same as Above	٣-٤ Hours
Class III ODS	Same as Class II ODS	Detailed, little summary	Same as Above	End of Day
Class IV ODS	Class IV ODS will be small static data that is produced from the Enterprise Data Warehouse.	N/A	N/A	End of Month
Data mart	Data marts are subsets of the enterprise data warehouse that are specifically prepared for a particular department.	Detailed and Summary	Five Years or more	End of Month
Enterprise Data Warehouse	The enterprise data warehouse consolidates all data into a single model that is tuned for querying. Users have limited, if any, access to this data store.	Detailed and Summary	Same as Above	End of Month

Table ٤,٧,٣-١ Data Services and Data Approach

Requirement No.	Data Services and Data Approach Requirements
DSA-٠١	Rather than hard coding strings into application logic, lookup tables will be used within the database schemas.
DSA-٠٢	Nulls shall be prevented from being used unless absolutely necessary (use the NOT NULL column constraint by default).
DSA-٠٣	All databases shall support a level of abstraction such that the actual names of tables are hidden from applications. For example, end of year processing routines need to quickly create the tables for the new year, yet keep the last year in tact for transactions which must be back dated.
DSA-٠٤	Tables, other than lookup tables, shall contain a timestamp attribute.



Requirement No.	Data Services and Data Approach Requirements
DSA-٠٥	Use of stored procedures shall be avoided unless absolutely necessary.
DSA-٠٦	Referential integrity mechanisms shall be used in favor of triggers wherever possible.

Table ٤,٧,٣-٢ Data Services and Data Approach Requirements

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	Windows O/S Visual Basic SQL Server Developed In-house	) (	٩
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	Windows O/S Visual Basic Access DB Developed In-house		١١
	Windows O/S Visual Basic Access DB Developed In-house		١٢
	Windows SQL Server Package System Vendor – Hi-Tech Company		١٣
	Windows O/S Visual Basic Access DB Developed In-house		١٤

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	Windows O/S Visual Basic Access DB Developed In-house		١٥
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	Windows O/S Visual Basic Access DB Developed In-house		١٩
	Windows O/S Visual Basic Access DB Developed In-house		٢٠
	Windows NT Sybase DB Package System Vendor – Arabian Advanced System		٢١
	Windows NT and Novell SAS DB Package System Vendor – SAS	SAS	٢٢
	Windows O/S Access DB Developed In-house		٢٣
	Windows O/S Access DB Developed In-house		٢٤

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	Windows O/S Visual Basic SQL Server Developed In-house		٢٥
	DOS dBase IV/Sybase Developed In-house		٢٦
	Windows O/S PowerBuilder Sybase DB Developed In-house		٢٧
	Windows O/S Access DB Developed In-house		٢٨
	Windows O/S Access DB Developed In-house		٢٩
	Windows O/S Access DB Developed In-house		٣٠
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	Windows server OS, Visual Basic, SQL Server Developed In-house		٣٢
	Windows server OS, Visual Basic, SQL Server Developed In-house		٣٣
	Windows server OS, SQL Server, Byte Quest Package System Vendor – Al-Fanar		٣٤

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Enterprise Server IBM -R

Requirement No.	System (Hardware and System Software) Requirements
HW-001	Central Processing Unit (CPU) Capacity Requirements MOF will operate at least five system images that include the following: • Production • Pre-Production • Integration and Quality Assurance • Application Development • Systems Programming, and Maintenance When executing four or five system images, we should assume that 5-10% of available processor power would be used to manage the complex and will therefore not be available to the end user for application use. However, this should be confirmed in the vendor's response. MOF workload estimates are as follows: Peak Hour Transactions per Second for the Internal OLTP Systems: 50 Peak Hour Transactions per Hour for the Internal OLAP Systems: 1000
HW-	Central Server Storage Requirements MOF assumes that 4GB will provide adequate storage for the operating system images and also enable the new applications to take advantage of data in memory technologies and thus provide a faster internal host transaction processing time. However, storage upgrade increments should be clearly indicated as MOF application system will be implemented in different phases/releases.
HW-	Central Server I/O Sub-System Requirements The I/O Sub-system components proposed by the vendor will have to take into account the existing peripherals installed, and suggest ways in which the I/O may be improved in the most cost-effective manner. Consideration will need to be given to supporting the Data Warehouse, Document Archiving, etc.
HW-	Central Server DASD (Direct Access Storage Device) Requirements MOF has performed a rough estimate of its DASD requirements for the Central Server MOF applications and operating system. MOF DASD storage estimates are as follows: Data Storage (non document archiving): 100 GB (OLTP) + 250 GB OLAP

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Requirement No.	System (Hardware and System Software) Requirements
	Document Archiving Storage: ٢٥٠ GB with additional expandability. Vendors are requested to review these numbers, provide their own estimates and reflect them in their proposed DASD configuration.
HW-٠٠٥	Additional Central Server Requirements Vendors shall state the maximum number of signed on and of active users that can be supported by the offered CPU configuration, in on-line, interactive and batch processing mode. The CPU shall be in fully compatibility with the offered Operating System, the RDBMS, the MOF application software and any other software offered.
HW-٠٠٥-٠١	Configuration Structure Vendors shall explain how the constituent parts of the Central Processing Unit as processors, internal channels, integral main memory, etc. are configured in the architecture of the offered CPU. Vendors shall indicate whether integral I/O controllers or attachable controllers are used for connecting peripherals, LANs, workstations, etc. to the CPU. Vendors shall also indicate whether dedicated I/O processors are used to meet the servicing requirements of the peripherals. Vendors shall give the following information about the CPU offered: • Number and types of central processors and maximum number of each type that can be accommodated in the CPU. • Processor cycle time. • Maximal internal main memory. • Number and width of internal I/O data paths between processor components and memory. • Maximum number and type(s) of integral I/O controllers. • Maximum number and type(s) of attachable I/O controllers.
HW-٠٠٥-٠٢	CPU sizing Vendors shall indicate the actual quantity of each constituent part of the CPU offered for the initial configurations and the additional quantities required for possible upgrades. MOF application systems will be implemented in different phases/releases.
HW-٠٠٥-٠٣	Single System Image The CPU shall fully support the offered operating system. The offered operating system and software sub-systems shall provide a single system image to the configuration. Vendors shall state and elaborate on the design characteristics of the offered system that make it to provide a single system image. Vendors shall explain how the operating system takes into account the hardware architecture, in terms of allocation of jobs to processors, load balancing, handling of processor(s) failures, disk utilization, configurability, maintainability, availability, etc. Vendors shall indicate whether or not offered configuration supports symmetric multiprocessing (SMP) and he shall explain how SMP is supported at the hardware and software level.

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Requirement No.	System (Hardware and System Software) Requirements
HW-٠٠٥-٠٤	Hardware Enhancements The hardware enhancements available shall be listed and described in the tender. If applicable and part of the submitted tender, these shall be described in the response and be included in the tender as optional offerings.
HW-٠٠٥-٠٥	CPU connection All connectors required to attach peripheral equipment and other devices to the offered CPU shall be included as part of the offered configuration.
HW-٠٠٥-٠٦	Scalability Vendors shall propose an upward growth path for the processor power to meet future upgrade requirements. Vendors shall indicate the ratio of throughput capability between adjacent processors on the growth path for an on-line transaction load and for a batch-processing load. Vendors shall state whether the CPU can be upgraded into the upgraded configurations within the limits of the offered enclosures. If not, the stages on the growth path in which the enclosure(s) need to be extended shall be indicated.
HW-٠٠٦	Main Memory Vendors shall supply the following information about the main memory (RAM and Cache) in the offered configuration: - Type and capacity of the memory chip(s) used. - Memory cycles and access times in nanoseconds. - Memory sizes and units of increment available in megabytes for each processor in the offered range. - Maximum memory capacity, each processor can handle. - Memory data path speed in megabits per second and width in bits. Vendors shall state the type and capacity of memory offered for the initial installation and the proposed increase in memory size for upgrade configurations. Vendors shall discuss the efficiency in the operation of each product in relation to the number of concurrent users, and the main memory requirements.
HW-٠٠٧	I/O Data Buses I/O data buses include external I/O channels, peripherals data buses, etc. directly connecting external resources and peripherals (disks, tapes, LANs, printers, etc.) to the central processing unit(s). Type of Connections Vendors shall indicate the different types of I/O buses that are available, explain the purpose of use for each one and state the maximum number of each type that can be supported by the offered configuration or possible upgrades. Vendors shall also indicate whether I/O buses are internal with or external to the main processor. The actual number of I/O buses in the offered configuration and the offered devices connected by each one shall be indicated. Vendors must indicate the width of each I/O data bus. Data Transfer The maximum and average data transfer rate for each individual I/O data bus shall be specified.

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Requirement No.	System (Hardware and System Software) Requirements
	The maximum concurrent data transfer rate for all I/O data buses for the maximum configuration of peripherals that can be attached shall be specified.
HW-٠٠٨	Disk Controllers Vendors shall identify the disk controllers that are included in the offered configuration, explain the role and functionality of each one and explain how these are integrated within the whole system. In case the disk controllers offered also control other devices, such as tape drives, (e.g. in the case of SCSI controllers) a description of the limits applying to the control of each device and the overall limits of the combined controllers shall be provided. Disk Controllers Characteristics Vendors shall specify and describe the characteristics of the disk controllers offered. Disk Controller Connection The maximum number of disk controllers attachable to the CPU, the maximum number of connectors from each controller towards the CPU and the maximum number of disk drive units that can be attached on a single controller shall be stated in the tender. Vendors shall explain fully the connectivity of the offered controllers to the pre-processor interconnects and to the disk drives in the offered configuration. All connectors required to attach disk controllers on the CPU and disks on the controller shall be included as part of the offered configuration, Vendors shall give the type and characteristics of the connectors offered. Data Transfer Vendors shall provide the following information about the data transfer and I/O operations capability at each level of control in the proposed configuration: • Maximum and average concurrent data rate provided by each separate disk controller. • Amount of memory buffer provided by each disk controller. • Maximum number of I/O operations per second that can be supported. If simultaneous data transfer through a single disk controller to and from multiple attached devices shall be possible, Vendors shall explain how this is achieved. Vendors are required to show diagrammatically the path connecting the CPU up to the disk unit, identify the intermediate devices, buses, channels, etc. used in the patch and indicate the data throughput of each unit shown in the diagram. Vendors shall explain how the concurrent operation of units using common devices (i.e. disks on same controller, controllers on same bus, etc.) is supported.
HW-٠٠٩	Disk Drives Vendors shall state whether disk drives can be re-configured on the controller without bringing processor configuration down. Vendors shall indicate the type and number of the disk drives offered and explains how they are configured within the whole system. Disk configuration, providing the storage requirements for the data volumes specified

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Requirement No.	System (Hardware and System Software) Requirements
	and storage overheads shall be included in the tender. Disk Drives Characteristics Vendors shall describe the disk drives offered. The following information shall be supplied: • Type of disk drives offered and formatted capacity of each one. • Number of read/write heads available in each disk drive. • Minimum, average and maximum seek time in milliseconds for each type of disk. • Average latency in milliseconds for each type of disk. Disk Drive Connection Vendors shall state the maximum number of disk drives that can be supported by the offered configurations and their formatted capacity and the maximum formatted capacity that can be ultimately supported when all possible expansion are employed. The maximum number of disk drives that can be attached on a single disk controller and the total formatted capacity available to each disk controller shall also be stated. Vendors shall explain whether there are any limitations on the way in which different disk drives may be attached to different disk controllers. Data Transfer Vendors shall specify the maximum concurrent data transfer rate supported by any single disk drive unit.
HW-٠١٠	Tape (Cartridge) Controllers Tape controllers shall be included in the offered configuration. In case the tape controllers offered also control other devices, such as disks, cartridges, etc. (e.g. in the case of SCSI controllers) a description of the limits applying to the control of each device and the overall limits of the combined controller shall be provided. Tape Controllers Characteristics Vendors shall specify and describe the characteristics of the tape controllers offered. Tape Controller Connection The maximum number of tape drives that can be attached on a single controller shall be stated in the tender. Vendors shall explain fully the connectivity of the offered controllers to the processor-peripheral interconnections and to the tape drives in the offered configuration. All connectors required to attach tape controllers on the CPU and tapes on the controller shall be included as part of the offered configuration. Vendors shall give the type and characteristics of the connectors offered. Data Transfer Vendors shall provide the following information about the data transfer capability: • Maximum and average concurrent data rate provided by each separate tape

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Requirement No.	System (Hardware and System Software) Requirements
	controller. - Amount of memory buffer provided by each tape controller. - Maximum number of I/O operations per second that can be supported. Simultaneous data transfer through a single tape controller to and from multiple attached devices shall be possible. Vendors shall explain how this is achieved.
HW-٠١١	Tape Drives Tape drives that will be used mainly for archival and backup and recovery requirements shall be included in the offer, as part of tape drive subsystems for each server. The drives will be used also for importing data to the system collected on tapes on external systems. The actual number of the tape drive units to be offered shall depend on the capabilities of the tape drive sub-systems for each server and shall be such as to ensure that back up and recovery procedures can be performed within the specified time limits. Vendors shall state the actual number of tape drive units offered per tape drive subsystem and explain how they are configured within the whole system Tape Drive Characteristics Vendors shall state the type of tape drives offered and describe in detail their features and characteristics. Error correction capabilities shall be available for each type of tape drives. Vendors shall describe the method used. Standard type tapes shall be used by the offered tape drives. Data shall be written in a format that complies with international standards for data interchange. Vendors shall state the standards supported. Tape Drive Connection Vendors shall state the maximum number of tape drives supported by each tape controller and the maximum number supported by the proposed CPU configuration for each type of server offered. All connectors required to connect tape drives with controllers shall be included as part of the offered configuration. Vendors shall give the type and characteristics of the connectors offered. Data Transfer Vendors shall state the maximum data transfer rate for each separate logical data path.
HW-٠١٢	I/O Controllers I/O controllers in adequate numbers to support the specified functionality and workload of the server shall be included in the offered configuration. Vendors shall identify the controllers that are included in the offered configuration, explain the role and functionality of each one and explain how these are integrated within the whole system.

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Requirement No.	System (Hardware and System Software) Requirements
	In any case, Vendors shall include the following types of I/O controllers: • Ethernet (٨٠٢,٣) LAN-controllers • Asynchronous (RS-٢٣٢) controller I/O Controller Characteristics Vendors shall describe and specify the characteristics of the I/O controllers offered. I/O Controller Connection The maximum number of I/O controllers attachable to the CPU and the maximum number of connectors from each controller towards the CPU shall be stated in the tender. Vendors shall explain fully the connectivity of the offered controllers to the processor-peripheral interconnections in the offered configuration. All connectors required to attach I/O controllers on the CPU shall be included as part of the offered configuration, Vendors shall give the type and characteristics of the connectors offered. Data Transfer Vendors shall provide information about the data transfer and I/O operations capability at each level of control in the proposed configuration: Vendors are required to show diagrammatically the path connecting the CPU up to the controller, identify the intermediate devices, buses, channels, etc. used in the path and indicate the data throughput of each unit shown in the diagram.
HW-٠١٣	Printer Controllers Vendors shall indicate the type and the number of printer controllers offered and explain how these are integrated within the whole system. In case the printer controller offered can also control other devices, a description of the limits applying to the control of each device and the overall limits of the combined controller shall be provided. Vendors shall clearly indicate whether the controller is an integral part of either the CPU or the printers. Printer Controller Characteristics Vendors shall describe and specify the characteristics of the printer controllers offered. Printer Controller Connection The maximum number of printers that can be attached on a single controller shall be stated in the tender. Vendors shall explain fully the connectivity of the offered controllers to the processor-peripheral interconnections in the offered configuration. All connectors required to attach the printer controllers on the CPU and the printers on the controller shall be included as part of the offered configuration. Vendors shall give the type and characteristics of the connectors offered.

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Requirement No.	System (Hardware and System Software) Requirements
	Data Transfer Vendors shall provide the information about the data transfer capability
HW-٠١٤	Laser Printers Laser Printer Characteristics Vendor shall provide full technical details for the laser printer offered. Vendors shall state the type of printers offered and explain how they are configured within the whole system. The laser printers offered shall be able to print A^٤ size sheets at a speed of at least ٤٠ pages per minute (ppm). Vendors shall state the speed of the offered printers as well as the time-to-first-page for both documents with text only and documents with text and graphics. The offered laser printers shall be able to accept A^٤ paper size both automatically (from a paper input tray) and manually. Vendors shall state all the different standard paper sizes accepted by the offered laser printers. Vendors shall state also the A^٤ paper input tray capacity, and the paper output tray capacity both for face-up and for facedown printouts. The capability for attaching an optional sorter on the offered standard or optional printers shall be indicated and unit prices shall be quoted in the financial tender. For graphics the laser printers must achieve a resolution of ٦٠٠ dpi. Tenders shall state printer memory offered and the maximum memory size supported by each of the offered laser printers and include in the Bill of Quantities all the available memory increment units. Vendors shall state the number of English fonts, Saudi Arabian fonts and mathematics/science fonts available for each type of the offered printers. Vendors shall clearly indicate which of the above fonts are optional items that can be purchased separately and include unit prices in the corresponding financial tender. Vendors shall also state the maximum number of fonts that can be supported concurrently. Vendors shall provide full details of required controllers. Laser Printer Connection The offered laser printers shall have at least one parallel and one serial RS-٢٣٢ printer interface. Vendors shall state clearly the type of interfaces offered with the laser printers. All connectors required for connection of printer shall be included as part of the offered configuration. Vendors shall give the type and characteristics of the connectors offered.

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Requirement No.	System (Hardware and System Software) Requirements
	Support by the operating systems has to be given without the need for special hardware, reliant on software device drivers only.
HW-٠١٥	System Printers System Printer Characteristics Vendor shall provide full technical details for the system printer offered. Vendors shall state the type of printers offered and explain how they are configured within the whole system. Vendors shall indicate the maximum print speed supported and the actual print speed for ١٣٢ and ٨٠ character lines. A print speed of ١٤٠٠ lines per minute for ١٣٢ character lines is the minimum requirement for the offered system printers. The offered printers shall support industry standard horizontal character and vertical line spacing. Vendors shall specify the line and character spacing supported. The printer must support the bilingual (Arabic/Latin) printing capability. The printers offered shall support tractor paper feed with adjustable paper width. Printed forms handling facilities shall be provided for each printer type offered, including at least automatic paper stacking. Other printed forms handling facilities will be advantageous and Vendors shall explain the facilities offered. Vendors shall supply the following additional information about each system printer type offered: • Type of technology used to form characters. • Character sets available (including the alphanumeric and symbols supported concurrently together with their corresponding code). • Print fonts available and how many can be used concurrently. • Print fonts included in the offer. • Maximum print width and speeds for each character set. • Maximum number of form plies the printer can accept. • Bilingual (Arabic/Latin) printing Vendors shall state the paper sizes that can be fed in the offered printers and the quality of paper that can be used. System Printer Connection Vendors shall indicate whether there are any limitations in the way that different printers may be attached to the offered printer controllers of the servers. All connectors required for the connection of printers shall be included as part of the offered configuration. Vendors shall give the type and characteristics of the connectors offered. The maximum data transfer rate towards each individual printer shall be also specified.
SW-٠٠١	Operating System

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Requirement No.	System (Hardware and System Software) Requirements
	Requirements Vendors are required to offer a multi-user, multitasking operating system (latest available version). Also an MIB-II compliant SNMP agent will be provided to support network management. The operating system will provide integration, connectivity and services with TCP/IP networks. Vendors shall provide an appropriate graphical user interface (GUI) for server administration. Vendors shall describe the configuration of the operating system offered on the basis of the software products included in the offer in order to support the specified system (Using Web Enabled Architecture). In each case all the prerequisite hardware and software required to support the function concerned shall be indicated. Vendors shall make clear that all prerequisite hardware and software are included in the offer. The operating system shall support all intended users and all central computer hardware and software offered in the initial installation and all hardware and software indicated as being on the upgrade paths as well. Vendors shall list the operating system software products and utilities offered and state the main memory requirements for each product in order to meet the specified performance loads. The software that needs to be co-resident in the main memory shall be indicated. Vendors shall clearly indicate whether operating system upgrades and/or enhancements are required to support possible upgrades and in a positive case include them appropriately in the bill of quantities (BOQ) as optional items. Any system extensions and/or different products required to support the introduction in the future of additional local area networks (LAN) and wide area networks (WAN) shall be also indicated, described and justified. Vendors shall assure free of charge all the updates of the operating system version (new drivers available, bugs-solved programs, etc.). Features of the Operating System Vendors are required to indicate whether each of the following features is provided by the base operating system, operating system extension(s) or separate sub-system software. The different products offered shall be clearly indicated in the technical description and quoted appropriately in the bill of quantities (BOQ). Operating System Version Vendors shall indicate the exact version of the operating system offered,

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Requirement No.	System (Hardware and System Software) Requirements
	along with detailed information about the version history and features. • Licenses Vendors shall indicate the maximum number of concurrent users of the system, as well as the kind of users supported (run-time, development, etc.) • Standards Vendors shall indicate which operating system standards are followed by the offered operating system. • Security Features Security and access control facilities shall be provided by the operating system. Vendors shall indicate which levels of international security standards are supported by the offered operating system version, as well as which are the extensions needed to support higher security levels. Benchmarks The transaction processing performance must be proved with benchmark evaluations conducted by independent institutions, the result of which must be attached as annex to the tender. It is desirable that these results are based on the standards tests TCP-A, B and C for the offered platforms

Table ٤,١٢,١ Central Server

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Requirement No.	Security and Mail Server (Hardware and Security Software) Requirements
SS-٠٠١	Security Servers Vendors shall bid for the following Security Servers: • Intrusion and Detection Server • Proxy/VPN/Content Inspection Server • Authentication and Authorization Server • Mail Server • PKI Server • Firewall • Switches • Access Router (with VPN capability to ISP) Vendor shall include the following software in the bid: • Access Control • Audit Control • Single Sign-on • Intrusion and Detection • Contents Inspection • Firewall • Directory Services • PKI • Virtual Private Network (VPN) • Web Access • Anti Virus Vendors shall state the nature of support the product can offer to standard mail interface such as: • SMTP • SNMP • POP٣ • LDAP • Messaging Application Programming Interface All products offered shall be clearly indicated in the technical description and quoted appropriately in the bill of quantities (BoQ).

Table ٤,١٢,٢ Security and Mail Server

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Requirement No.	Middleware (Software) Requirements
MD-٠٠١	Web Server (HTTP and HTTPS) Vendors shall propose software that accepts request from the Web Browser and forward request to the Application Server for processing. Vendors shall indicate supporting the proposed operating system and provide detailed technical description.
MD-٠٠٢	Application Server Vendors shall propose software that processes the application business logic. Business Rules should be developed separately. Vendors shall indicate supporting the proposed operating system and provide detailed technical description.
MD-٠٠٣	Data Server (RDBMS) Vendors shall propose a RDBMS, which will support all hardware and software platform (including Operating System) offered. Vendors shall design, configure and offer RDBMS for the MOF target Application System. Vendors shall state how the RDBMS can scale from single workstation: - to a symmetric multiprocessor platform - to a massive parallel processor platform and - to a mainframe The RDBMS must support the following features: - Data Replication - On-line Data Reorganization - ODBC Connectivity - JDBC Connectivity - Data Query and Reporting Vendors shall also include the cost of Business Intelligence Software to include Data Warehousing, Data Marting and Data Mining. The tool support must support bilingual (Arabic/Latin) reporting facilities.
MD-٠٠٤	Backup and Recovery Tool Vendors shall quote for the Backup and Recovery Tool. Vendors shall indicate supporting the proposed hardware and software and provide detailed technical description.
MD-٠٠٥	Performance and Capacity Planning Software Vendors shall quote for the performance monitoring tool to measure transaction response time (Application and Network), CPU and DASD Usage, I/O utilization, Memory utilization etc.
MD-٠٠٦	Operation Management Vendors shall quote for the following software: Help Desk

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Requirement No.	Middleware (Software) Requirements
	• Problem/Change Management • Configuration Management
MD-٠٠٦	System Utilities (Optional) Vendors may propose additional software that may require supporting the MOF Application Systems.

Table ٤,١٢,٣ Middleware

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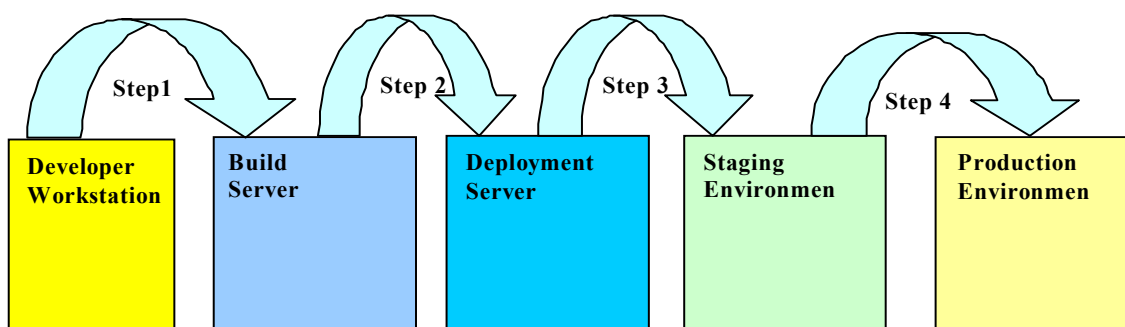


Figure ٤,١٣,٥ Development and Release Process

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طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
 ١٠ أغسطس، ٢٠٠٤
 سري - أنظر الغلاف للإطلاع على القيود
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طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للاطلاع على القيود
صفحة ١٩٠ من ٤٩١



طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
 ١٠ أغسطس، ٢٠٠٤
 سري - أنظر الغلاف للاطلاع على القيود
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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة ١٠ أغسطس، ٢٠٠٤
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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
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سري - أنظر الغلاف للإطلاع على القيود
صفحة ١٩٨ من ٤٩١



طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للاطلاع على القيود
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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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صفحة ٣٠٨ من ٤٩١

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود



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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود
صفحة ٣١٦ من ٤٩١

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة



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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود
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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة



طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
 ١٠ أغسطس، ٢٠٠٤
 سري - أنظر الغلاف للاطلاع على القيود
 صفحة ٣٥٢ من ٤٩١



طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
٢٠٠٤، أغسطس،
سري - أنظر الغلاف للمإطلاع على القيود
صفحة ٣٥٣ من ٤٩١

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Application Standards	
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Online Help	
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<u>Archiving and Purging</u>	WH- -
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صفحة ٣٧٦ من ٤٩١

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صفحة ٣٨٨ من ٤٩١



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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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Reliability	
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١٠ أغسطس، ٢٠٠٤ سري - أنظر الغلاف للإطلاع على القيود	١٠ أغسطس، ٢٠٠٤ سري - أنظر الغلاف للإطلاع على القيود



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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للاطلاع على القيود
صفحة ٤٠٣ من ٤٩١



صفحة ٤٠٤ من ٤٩١

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ONLINE FINANCIAL TRANSACTIONS	PI- -
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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة



طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة



طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود
صفحة ٤١٩ من ٤٩١

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طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للمإطلاع على القيود

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١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للاطلاع على القيود

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online archive () offline archive	
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طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للاطلاع على القيود
صفحة ٤٣١ من ٤٩١

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود
صفحة ٤٤١ من ٤٩١

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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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طلب تقديم العروض للأظمة التطبيقية، الطبعة الثالثة
١٠ أغسطس، ٢٠٠٤
سري - أنظر الغلاف للإطلاع على القيود
صفحة ٤٥٧ من ٤٩١



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طلب تقديم العروض للأنظمة التطبيقية، الطبعة الثالثة

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