ANNEX 5 : PERSONALIZATION SYSTEM ASSESMENT GRID *This grid will be an assessment subdivision for Annex 4*

Requirement Ref No Functional Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.1.1.1	The system should have a web interface for taking the orders from the manufacturers. If the system is not web based, the bidder must specify how connectivity with the central system database should be maintained with the local user interface (e.g. through web services, Web API etc.)	Must		
7.4.1.1.2	The Tobacco manufacturers and FBR users should be given a secure authentication credentials (i.e. a username and password combination) that should be used properly to use the order placement module of the system.	Must		
7.4.1.1.3	The user interface and the user experience of the order placement module should be friendly and the Tobacco manufacturers should be able to use the system seamlessly without any issues, provided that they are given a minimum length of brief training and introduction to the system.	Must		
7.4.1.1.4	Once the Tobacco manufacturer places an order, the order must be visible in the central system database and should be queued for order processing. The system administrator or the system user of the production module should be notified through email and the system should popup message stating that an order has been issued.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Functional Requirements				
7.4.1.1.5	The authorized system personnel that will be receiving the order from the manufacturer should be able to schedule it for production phase or delivery if on stock..	Must		
7.4.1.1.6	The system's user interface for carrying out the task of scheduling and assigning the production against a particular order should be friendly and fast.	Must		
7.4.1.2.1	Once the secure production of the bar-coded tax stamps starts against particular orders received from different manufacturers, the secure tax stamps should be generated by the system first and then should be printed using the standards of tax stamp production.	Must		
7.4.1.2.2	The system software then should generate secure serial numbers that should be stored in the origination database so that it can be attached to the tax stamps and can be verified or synchronized once the stamps are activated by the manufacturers.	Must		
7.4.1.2.3	The tax stamps should be attached to the generated serial numbers once both of them are produced.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Functional Requirements				
7.4.1.2.4	There has to be an inventory management system that should have a clean and friendly user interface and perform fast and efficient. The purpose of the inventory management system is to track the produced tax stamps and maintain their inventory and supply chain flow.	Must		
7.4.1.2.5	The system operator should be able to add the produced tax stamps into the system database only by changing the status of the tax stamps to "produced".	Must		
7.4.1.2.6	The system should track all the auditing information and store it in the database so that the authorized system administrators be able to generate system audit reports and track down particular actions along with the details information about the system username, date and time, location, PC information, IP address etc.	Must		
7.4.1.3.1	The system operator will be able to login to the system and update the origination database and the central database with the shipped tax stamps information. The operator should be able to do this by changing the status to "Shipped".	Must		
7.4.1.3.2	The system should be able to perform a verification matching against each of the shipped tax stamps and give the operator a result stating if the synchronization was done perfectly.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Functional Requirements				
7.4.1.3.3	Once everything is done successfully, the system operator should be able to change the status to "Accepted". This makes sure that the system and the authority both are synchronized and know what are the finally accepted tax stamp records.	Must		
7.4.1.3.4	The system should track all the auditing information and store it in the database so that the authorized system administrators be able to generate system audit reports and track down particular actions along with the details information about the system username, date and time, location, PC information, IP address etc.	Must		
7.4.1.4.1	The system should present a clean and straightforward user interface to the operator to create a point of sale. This module of the system will be used to sell the tax stamps to the tobacco manufacturers.	Must		
7.4.1.4.2	After the tax stamps are sold, the status of them should be changed to "Sold" and the central database should be updated accordingly.	Must		
7.4.1.4.3	The system must also be able to keep track of the production point or the manufacturer that the tax stamps are being sold to. The tax stamps that are allocated to a production point should be distributed accordingly and the distribution information should also be updated in the system central database.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Functional Requirements				
7.4.1.4.4	The selling process should be done as such that it is possible for the system to identify later which production point got which tax stamps.	Must		
7.4.1.4.5	The system should track all the auditing information and store it in the database so that the authorized system administrators be able to generate system audit reports and track down particular actions along with the details information about the system username, date and time, location, PC information, IP address etc.	Must		
7.4.1.5.1	The bidder must provide details specifications of the control device that it is offering with the system as a verification tool.	Must		
7.4.1.5.2	When the authorized personnel will be verifying using the control device/he has, it should guide them through the authentication procedure. This should be done through a login screen that will require the username and password to be able to use the system.	Must		
7.4.1.5.3	The same reading device must read simultaneously the authentication feature present in the label and the 2D barcode. The same device will also record the geographic position of the control by the means of GPS and timestamp the operation.	Should		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Functional Requirements				
7.4.1.5.4	The user interface should be able to scan the tax stamp fast and without any issues. The result of the scanning should appear on the screen instantly. The possible results are "Genuine", "Fake", and "Not identified."	Must		
7.4.1.5.5	The verification reading device be able to operate offline without requiring a response from the server or being connected to the internet at all.	Must		

Requirement Ref No Technical Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.2.1	The proposed system should be based on the standard Service Oriented Architecture (SOA). The inventory management system, the printing and production module, and the goods tracking modules and everything related to them should be under this architecture.	Must		
7.4.2.3	The guiding principles of the architecture should contain – • Reusability, granularity, modularity, composing ability, componentization, and interoperability • Compliance to standards (both common and industry-specific) • Services identification and categorization, provisioning and delivery, monitoring and tracking	Should		
7.4.2.4	The communication between the different components of the system must be based on XML messages, using SOAP under HTTP/HTTPS protocol to transfer information across the system.	Must		
7.4.2.5	The web service security authentication tokens have to be used to send username, password and X.509 certificates for purposes of authentication within the SOAP message headers.	Must		

Requirement Ref No Technical Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.2.6	The application server that will be used with the deployment of the system should support SHA1/ RSA-MD5 algorithms.	Must		
7.4.2.8	The system should be scalable, performance-first, secure, interoperable, manageable, upgradable, highly available, maintainable, open standards based, and cloud enabled.	Must		

7.4.2.9	The following operating systems should be supported:
	• Server OS
	  ○ Linux (CentOS, Debian)
	• Workstation OS
	  ○ Windows XP
	  ○ Windows 7
		Must		

7.4.2.10	The database system should have a seamless partitioning capability that ensures improved manageability, performance and availability.	Must		
7.4.2.11	The database system should be able to restrict access by unauthorized database users, and also prevent application bypass with multi-factor policies that are enforced in the database for high security and performance.	Must		

Requirement Ref No Technical Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.2.12	For improving the performance and safety of the production database server, there has to be provisioning for one or more synchronized standby databases. The physical standby database should be used for querying, sorting reporting and web based access, while the production server should be handled by the system itself for DML and DDL operations and keep the standby databases synched with it continuously.	Must		

Requirement Ref No Technical Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.2.17	Application server should meet the following features – • A security handler wrapper must be used when any communication (in-bound request or outbound response) occurs to / from the service cluster. • Three-tier architecture is mandatory in service cluster. It will deal with service layer, business layer, and data source layer. • DCS & DRS have to be in active/active Datacenter configuration. • Should provide advanced caching, load-balancing, high availability and Web services support. • Support for J2SE across supported operating system platforms, including Linux/UNIX. • Support for optimized, tuned and high performance JVM. • Must have an advanced authentication and authorization service, comprehensive security mechanism, custom authentication, role-based access control, for enhanced security. • Must offer enhanced workload management and dynamic caching and performance management tools, including network edge components that distribute workload across multiple servers through sophisticated load balancing and clustering capabilities. • Support highly available active server clusters	Must		
	• Should enable isolation of application servers to avoid single points of failure which reduces and eliminates excess			

Requirement Ref No Technical Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.2.18	The system must have **Platform Independence and Open Standards Support** • Solution should be interoperable with other technologies like .Net • Support on multiple hardware platforms and OS. Driving and implement Open Standards like J2EE, , JPA, SNMP etc.	Must		
7.4.2.19	The following performance criteria should be met by the proposed system – • Should support High Performance of the App Server and underlying JVM. • Solution should provide a predictable performance version of JVM ensuring garbage collection pause time thresholds are never exceeded • Should support dynamic garbage collection priority that ensures extremely short pause times and limits the total number of those pauses within a prescribed window.	Must		
7.4.2.20	The system should support Asynchronous HTTP session replication, In-memory replication of EJB(3.0) state , In-memory replication of servlet session state	Must		

Requirement Ref No Technical Requirements	Specification	Compliance	Compliance Level	Description/Comments
7.4.2.21	The system should have the following management information features: • Should provide tools for automating management of applications and servers • The solution should have a consolidated Web-based administration console, providing monitoring and configuration of application server instances, resources, and applications, as well as the database instances. • Graphical Tool for configuration of domain and clusters • Able to stop the access from users to an application without having to un-deploy the application • Should support auto-record repetitive domain configuration	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
RDBMS Functionalities				
7.5.1.1	All RDBMS software licenses must be full use licenses without any restriction and in full compliance with the principle vendor's license policies.	Must		
7.5.1.2	The bidder must provide an industry standard Relational Database Management System (RDBMS).	Must		
7.5.1.3	The RDBMS must provide multi-platform / OS support for the ease of application portability.	Must		
7.5.1.4	32/64 Bit Support for all operating system and hardware (Platform Independent).	Must		
7.5.1.5	The database must include features with which the database can be recovered in minimal time from user errors without restoration of backups; for e.g. user accidentally drops an important Master Table or even the database.	Must		
7.5.1.6	The database must support non-escalating row level locking & support multi-version read consistency and provides concurrency whereby readers don't block writers and writers don't block readers.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
RDBMS Functionalities				
7.5.1.7	The database must have a complete management tool that optimizes database memory structures based upon runtime workload, i.e. to tune memory structures as well as automated storage management of data, storage management, mirroring, and stripping freeing the DBA from manual storage management.	Must		
7.5.1.8	Data redistribution & storage reconfiguration should not involve downtime when resources are added to the storage as part of an expansion	Must		
7.5.1.9	The database shall support referential integrity	Must		
7.5.1.10	The DBMS shall not require the DBA to determine the physical location of each table index partition or simple table space; it shall be managed by the database itself	Must		
7.5.1.11	The system shall allow for queries to be performed on a table concurrently while data is being loaded into it.	Must		
7.5.1.12	The DBMS shall support table level compression, by default	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
RDBMS Functionalities				
7.5.1.13	SQL Regular Expressions, Stored Procedural Code Profiler, Stored Procedure Language Optimizing Compiler, trigger, view, store procedure must be available.	Must		
7.5.1.14	Clustered Tables support must be available.	Must		
7.5.1.15	Index-Organized Tables must be available	Must		
7.5.1.16	Temporary Tables must be available.	Must		
7.5.1.17	Support for all structured, semi-structure and unstructured data must be available into the database.	Must		
7.5.1.18	Parallel Operations like Parallel DML (insert/update/delete), Parallel Query, Parallel Summarization, Parallel index build, Parallel index scans available.	Must		
7.5.1.19	Inbuilt application development capability with XML data support.	Must		
7.5.1.20	Server side data export / import APIs must be available which harness the power of database server.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
RDBMS Functionalities				
7.5.1.21	Automated Point In Time Recovery, Automated, disk-based backup, Automatic Data File Creation, Backup Compression, Backup Throttling block Level Media Recovery, Duplexed Backups, Incrementally Updated backups facility must be available	Must		
7.5.1.22	Capability to overcome downtime caused from human error of dropping or wrongly updating a critical database object must be available.	Must		
7.5.1.23	Online Backup, DDL, Index creation, index reorganization, recovery & restore, table move, segment shrink, table redefinition & reorganization and rebalance from storage removal is available	Must		
7.5.1.24	Ability to view and restore deleted database objects via recycle bin concept	Must		
7.5.1.25	DBMS should be able to quickly recover a table to a point in time in the past	Must		
7.5.1.26	DBMS should be able to quickly revert your database to a prior point in time	Must		
7.5.1.27	DBMS should be able to query data at some point-in-time in the past	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
RDBMS Functionalities				
7.5.1.28	Automated and integrated data protection and disaster recovery with DBMS	Must		
7.5.1.29	DBMS should be able to quickly revert your database to a prior point in time	Must		
7.5.1.30	Asynchronous Client Notification, Client Side Query Cache, Database Connection Pooling, Integrated Message Queuing API must available	Must		
7.5.1.31	Character Set Migration, Extended Globalization character Support with Locale Support like Calendar/alphabet Support & linguistic indexes must be available	Must		
7.5.1.32	Support with Automatic database maintenance	Must		
7.5.1.33	Job Scheduler in Database with monitoring & recovery	Must		
7.5.1.34	Ability to use Operating System Authentication with Kerberos support and Proxy Authentication/Authorization with RADIUS Support.	Must		

Requirement Ref No RDBMS Functionalities	Specification	Compliance	Compliance Level	Description/Comments
7.5.1.35	Security feature like Basic Auditing, Column Access Control, Database Role support, Encrypted Large object data, Encryption APIs, Fine Grained Auditing including DML support, Hardware-Based Master Key Protection, Label Security, Maintain a long term history of data changes, Password Policies, Row level security must be available.	Must		
7.5.1.36	Database must be online during application upgrades	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
High Availability, Scalability & Disaster Recovery				
7.5.2.1	The RDBMS solution must be designed so that hardware and software failures are handled without the entire system going offline.	Must		
7.5.2.2	The RDBMS solution must be able to scale to multiple nodes with a shared everything architecture on storage for a single database using clustering. The database clustering solution must provide Active-Active clustering.	Must		
7.5.2.3	The RDBMS architecture must allow seamless addition to processing power and storage. It must also support server level load balancing at database tier.	Must		
7.5.2.4	The DB platform shall support features of built-in hardware redundancy, fault tolerance and ability to handle any single point of failure.	Must		
7.5.2.5	User connection load balancing must be available.	Must		
7.5.2.6	Dynamic addition/removal capability of Database Nodes to cluster must be available.	Must		
7.5.2.7	Fast, Transparent Connection Fail-over to application is mandatory.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
High Availability, Scalability & Disaster Recovery				
7.5.2.8	The fail over feature shall not require any manual intervention, application restart or recovery operation.	Must		
7.5.2.9	Hot Cluster Failover must be available.	Must		
7.5.2.10	The RDBMS shall be continuously available even in case of failure within the system at unit level or CPU level or other subsystem level.	Must		
7.5.2.11	Clusterware monitoring & management must be Integrated with RDBMS	Must		
7.5.2.12	The RDBMS shall provide linear scalability, without diminishing performance, across growing volumes of data, users, queries, complexity of queries, database administration etc. This linear scalability applies to hardware infrastructure including software (RDBMS & OS).	Must		
7.5.2.13	Future scalability shall be modular in nature and minimum incremental module of DB infrastructure shall be defined in terms of user space, CPU, RAM etc.	Must		
7.5.2.14	Scalability must result in sustained query and load performance despite data size growth in DB.	Must		
7.5.2.15	The DBMS solution architecture must not be compromised through future upgrades.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
High Availability, Scalability & Disaster Recovery				
7.5.2.16	Provision for third Party App support for Cluster Scalability	Must		
7.5.2.17	The RDBMS offered must have features to setup remote disaster recovery systems.	Must		
7.5.2.18	Offload reporting/read-only queries to standby database	Must		
7.5.2.19	Disaster Recovery System site must be 'ON' at all times. In order to avoid idle hardware, the features must allow the DR site to be used for activities such as testing, reporting etc. while it continuously applies changes transmitted by primary database.	Must		
7.5.2.20	Disk Zoning & Dynamic Volume Manager should be available	Must		
7.5.2.21	Open a standby database read-write and then quickly reverse and re-sync with production.	Must		
7.5.2.22	The lag between primary & DR sites must be automatically detected & synchronized in case of network failure between sites.	Must		
7.5.2.23	The disaster recovery site synchronization must support simultaneous copying of changed data to multiple DR site at transaction-level (not at block level) to ensure low network bandwidth consumption	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
High Availability, Scalability & Disaster Recovery				
7.5.2.24	The disaster recovery solution must prevent corrupt block propagation to the DR site	Must		
7.5.2.25	The disaster recovery solution must provide automatic block corruption repair on the primary site from the DR site	Must		
7.5.2.26	DBMS disaster recovery feature should be able to detect lost writes to the DR site	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.1	The optimization of queries in the RDMBS shall be automated.	Must		
7.5.3.2	The optimization of queries in the RDBMS shall automatically parallelize queries & determine the degree of parallelism automatically.	Must		
7.5.3.3	RDBMS shall provide details regarding the query execution path in a graphical manner to aid understanding of the query execution process.	Must		
7.5.3.4	RDBMS shall support query tuning, without any manual intervention.	Must		
7.5.3.5	The RDBMS shall have query optimizer, which supports pipeline parallelism that allows operators to start getting result sets without having to wait for previous operator to finish.	Must		
7.5.3.6	The RDBMS must offer a sophisticated report tool with ability to deliver the full range of analysis and reporting capabilities. Should provide a unified enterprise view of information and unified semantic view of information	Must		
7.5.3.7	The database should have support for partitioning of heavy table data transparently to the application	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.8	Table Partitioning like hash, list, range, function & virtual column, reference column & interval partitioning features must available for performance enhancement & manageability of large tables	Must		
7.5.3.9	Reference partitioning must be supported	Must		
7.5.3.10	Partitioning advisor & Partition Wise Joins must be available	Must		
7.5.3.11	Global Partitioned Indexes available with maintenance capability	Must		
7.5.3.12	Online partition create, drop, modify, merge & split capability must be available	Must		
7.5.3.13	The RDBMS solution must provide integrated, production-ready management tools	Must		
7.5.3.14	The database shall have the capability of comprehensive online schema reorganization/redefinition	Must		
7.5.3.15	The RDBMS solution must provide index organized table capability to increase performance and must support reverse key index implementation along with support for built in advanced queuing capability without additional costs.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.16	The RDBMS solution must support the capabilities to do diagnostic on both database activities and hardware capabilities to provide correlation between database usage and hardware performance and capability to tune database structure, database instance and also SQL statement for improved performance.	Must		
7.5.3.17	The RDBMS solution must keep a record of structural changes to the database and provide the ability to create and draw comparisons from base line metrics.	Must		
7.5.3.18	The RDBMS solution must allow secure change propagation for database	Must		
7.5.3.19	The RDBMS solution shall support a single interface for management console and other tools to provide easy management of the system including clusters.	Must		
7.5.3.20	The RDBMS solution must provide single interface for simplified management and administration.	Must		
7.5.3.21	The RDBMS solution shall support simple user-friendly GUI tools for database administration and management.	Must		
7.5.3.22	The RDBMS solution shall support performance and workload dashboards.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.23	The RDBMS solution shall support query metrics repository for tuning analysis, resource accounting and capacity planning.	Must		
7.5.3.24	The management tools shall not be dependent on availability of any particular node in the system and management / administration shall continue in the event of failures.	Must		
7.5.3.25	RDBMS shall have self-managing subsystems: self-configuring, self-optimizing, self-diagnosing, self-healing, and self-protecting in most of the situations.	Must		
7.5.3.26	RDBMS shall track its workload & support the ability to automatically perform workload management through proactive diagnostics.	Must		
7.5.3.27	The DB platform shall support mixed workload capability, simultaneous support for load (real time/near real-time & bulk) as well as query (simple & complex) operations in addition to maintenance work.	Must		
7.5.3.28	The RDBMS shall support query prioritization feature.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.29	The RDBMS solution shall support dynamic resource allocation at runtime for query operations is present based on resources needed, without any manual intervention.	Must		
7.5.3.30	RDBMS shall allow for limiting resource usage at user level like IO, CPU etc. by the administrator.	Must		
7.5.3.31	Automatic performance diagnosis capabilities must be available.	Must		
7.5.3.32	Automatically maintain workload history facilities and history performance analysis.	Must		
7.5.3.33	Comprehensive system monitoring and advanced event notification.	Must		
7.5.3.34	Provide automatic tuning for SQL statements without changing the application.	Must		
7.5.3.35	Automatic Memory Tuning must be available	Must		
7.5.3.36	Real time monitoring capability of SQL execution should be available to keep a check on long running SQL statements	Must		
7.5.3.37	Server-Generated Alerts & Threshold-Based Alerts must be available	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.38	Capability of comparing Database objects, or baselines & update database object definitions automatically across databases	Must		
7.5.3.39	Propagate database objects with data, with a subset of the data, or without data.	Must		
7.5.3.40	Reverse Engineer Databases and Schema object Definitions	Must		
7.5.3.41	Out of box deployment procedures to provision or de provision additional cluster nodes	Must		
7.5.3.42	Update database object definitions automatically	Must		
7.5.3.43	RDBMS must provide feature to support ongoing Change Management, End-to-end management of patches, upgrades, and schema and data changes	Must		
7.5.3.44	Clone Databases & software with management solution without human intervention	Must		
7.5.3.45	The database should provide out-of-box Deployment Procedures to provision and patch the Database (both Single Instance Database and active-active clustering setup) including the underlying infrastructure	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Query Performance, Administration & Monitoring				
7.5.3.46	The offered system supports the entire Patch Management Lifecycle including, patch advisories, pre-deployment analysis, rollout and reporting.	Must		
7.5.3.47	RDBMS must come with built-in functionality to support Impact analysis of application upgrades on customizations can also be performed by automatically identifying schema changes specific to each customization	Must		
7.5.3.48	The offered RDBMS must be able to perform Configuration Management, track inventory, configuration drift and detailed configuration search	Must		
7.5.3.49	The offered RDBMS should be able to provision a new database from a reference system or from a gold image. The gold image along with configuration details can be captured in Provisioning Profiles.	Must		
7.5.3.50	System must help in Compliance Management, reporting and management of industry and regulatory compliance standards	Must		

Requirement Ref No Database Security	Specification	Compliance	Compliance Level	Description/Comments
7.5.4.1	The solution must prevent database privileged users (DBA) from using their special privileges to access application data	Must		
7.5.4.2	The solution must be able to enforce separation of duty for database access & other real time preventive access controls	Must		
7.5.4.3	The solution must be able to restrict access to business information on a need-to-know basis	Must		
7.5.4.4	Must offer complete protection from accidental or malicious update: No one – not even administrators - can update historical data directly, and only authorized users can view the historical data.	Must		
7.5.4.5	The solution must be flexible enough to restrict access to an entire application schema or a subset of tables	Must		
7.5.4.6	Restrict access by unauthorized database users—even privileged users—by using powerful access controls built into the database.	Must		

Requirement Ref No Database Security	Specification	Compliance	Compliance Level	Description/Comments
7.5.4.7	Restrict ad-hoc access to application data—Prevent application-bypass with multi-factor policies that are enforced in the database for high security and performance.	Must		
7.5.4.8	The solution must be able to control the execution of database commands including DDL and DML access	Must		
7.5.4.9	The solution must not require Agent installation at the database server	Must		
7.5.4.10	The solution must be able to use environmental parameters like IP Address or Time as authentication mechanisms	Must		
7.5.4.11	The solution must ensure security policies to be enforced even if the system is accessed from the console; i.e. firewalls are bypassed	Must		
7.5.4.12	The solution must provide out-of-the-box security reports	Must		
7.5.4.13	The solution must be easily integrated (installed and configured) with the organization's existing database infrastructure	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
Architecture				
7.5.5.1	The database platform should provide the redundancy in both hardware and software and avoid single point of failure.	Must		
7.5.5.2	The platform shall be able to support multi-generation hardware to coexist to avoid hardware redeployment keeping in mind future upgrades or expansions to ensure investment protection.	Must		
7.5.5.3	There should not be a need to re-partition the data in case of storage disk failure.	Must		
7.5.5.4	The DB platform shall support features of built-in hardware redundancy, fault tolerance and ability to handle any single point of failure.	Must		
7.5.5.5	Effective storage strategic to maximize technology to achieve fast access and processing; while utilize lower cost components for less critical area to drive down costs.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.6	The platform should be a unified solution of Database server, operating system, network and storage and associated management tools.	Must		
7.5.5.7	The platform should come pre-configured with Servers, Storage, O/S & RDBMS in a rack type setup	Must		
7.5.5.8	Hardware and Software (DB) must be fully integrated wherein the components complement each other for DSS, OLTP & mixed workloads.	Must		
7.5.5.9	Data redistribution within the storage should not involve downtime when additional resources are added to the platform as a part of expansion.	Must		
7.5.5.10	The platform must be capable of supporting system expansion to cater to the increasing growth of data volumes without unloading/re-loading of data.	Must		
7.5.5.11	The platform should support the ability to automatically perform space management.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.12	The platform must be capable for support system expansion automatically to cater to the increasing growth of data volumes without making changes into load utilities, production jobs and packages.	Must		
7.5.5.13	Addition of new storage should increase storage capacity and also increase IO bandwidth between database server and storage servers.	Must		
7.5.5.14	System should allow for online addition of either CPU resources or storage capacity without any downtime.	Must		
7.5.5.15	The platform should support compression - both table level and partition level. A single table should support multiple partitions with different compression types.	Must		
7.5.5.16	The compression in the platform should be managed automatically without the manual intervention.	Must		
7.5.5.17	The compression in the platform should support for both structure and unstructured data in the RDBMS.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.18	The system shall have the ability to process parts of the SQL query at the storage layer & offloading database servers. Effectively, system must be capable of offloading query processing from database servers to the storage.	Must		
7.5.5.19	The system should support horizontal scaling by connecting more racks of similar system to provide higher processing capacity.	Must		
7.5.5.20	Storage must support an advanced columnar compression technology for optimizing cost of retaining data online for longer periods of time.	Must		
7.5.5.21	The storage system should be database aware and have the ability to offload database SQL processing such as Row filtering, column filtering, join filtering and offloaded scans on encrypted data. The system shall have the ability to process parts of the query at the storage layer.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.22	To improve I/O performance, the system should have capability to store frequently accessed data in the form of built-in cache storage. The database system should be aware of presence of cache and be able to use it transparently.	Must		
7.5.5.23	The system shall allow for queries to be performed on a table concurrently while data is being loaded into it.	Must		
Performance and Scalability				
7.5.5.24	The platform must be able to scale to multiple nodes with a shared storage for a single database using clustering.	Must		
7.5.5.25	The platform architecture must allow seamless addition to processing power and storage. It must also support server level load balancing at database tier.	Must		
7.5.5.26	Hardware (capacity) upgrade should be accomplished with minimal effort (e.g. not require reconfiguration, not require data migration, etc.)	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.27	The system should scale to accommodate the number of users agreed upon and maintain the defined response time levels.	Must		
7.5.5.28	The system shall support the concurrent users, without degradation of system performance and/or functionality, regardless the number of users.	Must		
7.5.5.29	The system shall be available with no degradation in performance during the scheduled load process	Must		
7.5.5.30	The system shall accommodate on-going increases in data volume, without any significant incremental degradation in the performance and/or functionality of the system. Degradation is defined as a decline to a lower condition, quality, or system response level so that limited system functionality is maintained, even when part of the system is rendered inoperative. The system provides a reduced level of service rather than failing completely.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.31	The system shall support all types of ad-hoc, complex queries with multiple table joins & star query transformations without performance degradation caused by data shipping across multiple nodes.	Must		
7.5.5.32	The platform should provide linear scalability across growing volumes of – data, users, queries, complexity of queries, database administration, etc. This linear scalability applies to hardware infrastructure including software.	Must		
7.5.5.33	Future scalability shall be modular in nature and minimum incremental module of DB infrastructure shall be defined in terms of user space, CPU, RAM etc.	Must		
7.5.5.34	The solution architecture must not be compromised through future upgrades.	Must		
7.5.5.35	Scalability should result in sustained query and load performance despite data size growth.	Must		
7.5.5.36	Scalability should be achievable by adding more CPU or nodes without the need to rebalance existing data.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
Availability				
7.5.5.37	The platform should support features of built-in hardware redundancy, fault tolerance and ability to handle any single point of failure.	Must		
7.5.5.38	The solution must be designed so that hardware and software failures are handled without the entire system going offline.	Must		
7.5.5.39	The platform should be based on active-active database clusters technology.	Must		
7.5.5.40	The platform should support seamless integration of failed units that have been repaired.	Must		
7.5.5.41	The platform should support minimal downtime required during future expansion.	Must		
7.5.5.42	The failover feature should not require any manual intervention, application restart or recovery operation.	Must		
7.5.5.43	The database should be continuously available even in case of failure within the system at unit level or CPU level or other subsystem level.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.44	The system should provide the option to have more than one mirror copy of the data.	Must		
7.5.5.45	The platform should support dynamic load balancing of workload requests across multiple available compute nodes	Must		
7.5.5.46	All interconnects within the system should be protected with fault tolerant redundancy	Must		
Management				
7.5.5.47	The platform must support single interface for simplified management and administration for single database and multiple databases.	Must		
7.5.5.48	All platform components including hardware (database nodes, storage disks, network components, PDUs & other hardware peripherals) and software must be monitored & managed via a single interface & user-friendly management console	Must		
7.5.5.49	The platform should support performance and workload dashboards	Must		
7.5.5.50	The platform should support query metrics repository for tuning analysis and resource accounting.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.51	Management of platform should not be dependent on availability of any particular node in the system and management / administration should continue in the event of failures.	Must		
7.5.5.52	Provide toolset for quality system management e.g. system resource management and capacity management.	Must		
7.5.5.53	Provide alerts upon process failures through various channels, e.g. e-mail, IPMI, SNMP	Must		
7.5.5.54	The solution must support the capabilities to do automatic diagnostics on both database activities and hardware capabilities to provide correlation between database usage and hardware performance and capability to tune database structure, database instance and also SQL statement for improved performance	Must		
7.5.5.55	Error handling - ensures that processing modules can handle unusual or abnormal events in a recoverable fashion.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.56	The platform should have high performance parallel data loading capabilities with the ability to load simultaneously across all cluster nodes to facilitate extremely high load rates	Must		
7.5.5.57	The platform should support dynamic resource allocation at runtime for query operations is present based on resources needed, without any manual intervention.	Must		
7.5.5.58	The platform should allow parallelism for all operations like loading, query, database administration/management operations like backup, restore, creation & updates of index, creation & refresh of materialized views etc.	Must		
7.5.5.59	The platform must provide integrated & built-in functionality for I/O Resource Management	Must		
Hardware & Storage Specifications & Capabilities (Primary Site)				
7.5.5.60	4 x Database servers shall have sufficient processing power, i.e. Two Eight-Core Intel Xeon E5-2690 Processors (2.9 GHz or more) with 256 GB memory.	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.61	Database Servers must contain 4 x 300 GB 10,000 RPM SAS Disks	Must		
7.5.5.62	Database Platform should provide sufficient processing power (CPUs) & memory (RAM) at storage tier.	Must		
7.5.5.63	To improve I/O performance, storage should have flash disks / cards of approximately 11TB (expandable) attached to it.	Must		
7.5.5.64	Shared Storage should provide 22.5 TB of usable capacity with 3-way mirroring/striping of data. Redundancy at storage level is required so that in case of disk or disks group failure data can be recovered.	Must		
7.5.5.65	Shared Storage for database must comprise of 84 x 600GB 15,000 RPM SAS Disks	Must		
7.5.5.66	The network communication between various components shall be efficient i.e. disk controller HBA with 512 MB Battery Backed Write Cache.	Must		
7.5.5.67	System must have ability to perform 750K of Read IOPS & 500K of Write IOPS or more (inclusive of flash)	Must		

Requirement Ref No	Specification	Compliance	Compliance Level	Description/Comments
Database Platform - DB Servers, Storage & Network Components' Specifications				
7.5.5.68	System must have ability of uncompressed I/O bandwidth up to 12.5 GB/Sec or more and capability to scale up whenever required.	Must		
7.5.5.69	The system should be capable to achieve data load rate of up to 8 TB per hour	Must		
7.5.5.70	Network fabric between database & storage servers must comprise of 3 x 36 port QDR InfiniBand Switches	Must		
7.5.5.71	The network communication between various components shall be efficient up to 40 Gb /sec network speed with 4 embedded Gigabit Ethernet.	Must		
Hardware & Storage Specifications & Capabilities (Disaster Recovery Site)				
7.5.5.72	Database platform for the disaster recovery site should be identical to the primary site (aforementioned section) for 100% business continuity capability.	Must		
7.5.5.73	The Production and DR sites should be connected with real time replication technology – between database to database - with zero data loss scenario. There should not be any need for a SAN to SAN replication in order to save bandwidth costs.	Must		