

Request for Proposal (RFP)

PROCUREMENT TAX LABELS AND SUPERVISION SYSTEM



FBR

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1 Introduction

The observation of the Pakistan Tobacco industry shows the following facts:

The estimation of the total cigarette market is about 75 to 80 billion sticks per year.

Most of this market is already in the tax paying sector with two large players: PTC (with 7 brands) and LTC (with 10 brands), and a galaxy of very small other brands and manufacturers which represents about 1% of these market. The total of licensed manufacturers is estimated to 55.

The taxation scheme comprises three level of taxes respectively :

Tax Level A : *est.70% of the total,*

Tax Level B *est. 20%of the total,*

Tax Level C *10% of the total*

The Government of Pakistan has to face revenues losses which are due to counterfeiting, smuggling and difficulties to monitor tax recovering in an universe of more than 400 000 points of sales plus other outlets.

The Government of Pakistan has decided to improve the control of the tax recovery and support the tobacco industry in its fight against counterfeiting and smuggling of their products.

In this respect it has been decided to implement a program dedicated to authenticate, track and trace of the tobacco products. This will be accompanied by a dedicated law enforcement in order make this endeavour successful and perennial.

In order to achieve this goal and after studying the various possible solutions deployed in other countries and the advanced technologies available in the security industries, FBR has decided to implement a system based on high security self-adhesive labels combined with a state of the art Track & Trace system.

2 Purpose of the document

The subject of this RFP is to set the specifications in order to get offers from qualified companies for the high security self-adhesive labels and related Track & Trace system tailored for Pakistani needs, including :

- The design and development of tax stamp self-adhesive high security labels.
- The development, production, and maintenance of mobile authentication and validation devices.
- The design, development, roll-out and maintenance of a tracking system to ensure monitoring:

All labels produced and affixed on cigarette packets and their association to their specific SKU and required production and timestamp.

All activities of Law enforcement officers such as all feedback statistical data's related to the controls and results of the controls, location of the controls, and all relevant related information in order to conduct law enforcement policy.

The scope of this program will concern, the local production of tobacco products in a first stage and the imported cigarettes in an ulterior stage.

3 Scope of the tender

A Track and trace system will be established for tobacco products. It will concern in the first phase: local production and in a second phase importations.

The solution will consist in applying an individually coded label on each cigarette pack during the packaging process on the manufacturing lines. The labels will be associated to a specific brand and manufacturer. The T&T system will allow FBR to monitor the production workflow on a daily basis.

A second layer of T&T will allow, FBR's agents, using mobile control devices to assess the authenticity and the proper allocation of the labels on cigarette packets. The T&T system will provide all the necessary functionalities in order to organize the control workflow, to monitor the activity of the controllers, and then generates the daily, weekly and monthly reports.

A third layer will manage the label workflow from the order from tobacco manufacturer to their dispatch, reception, and at last, application on cigarette packets.

Therefore the track and trace system for tobacco will include:

- 2D barcode serialized self-adhesive labels to be applied on each packet of cigarette
- A system providing at the cigarette production stage the association of the labels with a product defined by its SKU (Stock Keeping Unit); moreover the system will record the association between the label serial number, the level of tax, the production data concerning the tobacco production site. Necessary computers and data capture devices will be provided by the awardee for the packing and filling departments of tobacco facilities.
- In the field, mobile control solution: controllers appointed by FBR or by delegation will be equipped with mobile control devices which will check automatically: the genuineness of the label, capture track and trace secure 2DBarcode in both offline and online modes.
- A specific Track and Trace information datacentre will be developed installed and made ready to use (including the solution requirements such as necessary hardware, software, etc.) under supervisory of FBR.

This system will provide that the information given below will be securely transferred to the data warehouse of FBR, queried and analysed as a whole.

- The unique secure serial numbers (in a 2D bacode format) for each tax stamp printed at awardee premises.

- The serial codes activated with related information connected to manufacturer, line, brand, level of taxation and timestamp.
- Tax stamp production/distribution information and reporting of tax labels activated by the producers.
- The information regarding spoiled, stolen, lost, unused and fake tax labels,
- The results of inspections which will be done by the staff of controllers within the distribution channel.
- The Track and trace system should include control functionalities at several level:
 - Advanced authentication of all the different profiles on the system. (login and password, biometrics or smartcards).
 - Control of activation in packing department of Tobacco plants.
 - Control of controller activity and planning of their inspection tours.

The awardee will provide that the track and trace system will operate as a whole and the production of the tax labels is completed after a maximum of 6 months from the date of commencement of the work. The expected project schedule is detailed in an attached table.

4 Instructions to Bidders

4.1 General Instructions

- a. Proposals must be submitted before or by **11:00 hours 30th April, 2013** and should be hand delivered by an authorized representative of the firm/consortium at the following address:

**Chief (Sales Tax and Federal Excise)
FBR House, Constitution Avenue, G-5
Islamabad, Pakistan.**

- b. Or Proposals can be delivered using the Postal Services to the above address. No soft copies or RFPs sent in by email will be entertained.
- c. Proposals and amendments to proposals received after the date and time specified above will be returned to the Bidders unopened.

- d. A Bid Proposal Opening Exercise will be held at **12:00 hours 30th April, 2013**.. All prospective Bidders/ or their representative are encouraged to attend the bid opening exercise.
- e. Parties interested in obtaining further information regarding this request for proposal may do so by contacting FBR.

Please include the following information:

- Name of Firm:
 - Address and Contact Person
 - Telephone and Facsimile Number
- f. Inquiries received after **12:00 hours 10th April, 2013** will not be accepted.

4.2 Examination of Proposal Documents

By submitting a proposal, Bidder represents that it has thoroughly examined and become familiar with the work required under this RFP and that it is capable of performing quality work to achieve the objectives explained in the document.

4.3 Identification of Proposals

- a. Bidder shall submit **Original plus 05 copies** of its **Technical Proposal**. The original and all copies of the Technical Proposal shall be placed in a sealed envelope clearly marked **“Technical Proposal”** and bearing the **Name of the Bidder and title of the Tender**. Soft copy in **Microsoft Word 2010 format** should also be submitted in Original Technical Proposal Envelope.
- b. **Bid Bond to be submitted by the bidder in original; to be clearly marked and packed in the Original Technical Proposal Package.**
- c. Similarly, the original **Financial Proposal plus 05 copies** shall be placed in a sealed envelope clearly marked **“Financial Proposal”** This envelope shall also bear the **Name of the Bidder** and clearly marked with a warning **“Do Not Open With the Technical Proposal.”** Soft copy in **Microsoft Excel 2010 format** should also be submitted in Original Envelope.

- d. The envelopes containing the Technical and Financial Proposals shall be placed into an outer envelope and sealed. This outer envelope shall bear the **Name of the Bidder, submission address, Title of the Tender and be clearly marked “Do Not Open, Except in the presence of the Official appointed, before 12:00 hours 30th April, 2013.**
- e. FBR shall not be responsible for misplacement, loss or premature opening if the outer envelope is not sealed and/or marked as stipulated. This circumstance may be case for Proposal rejection. If the Financial Proposal is not submitted in a separate sealed envelope duly marked as indicated above, this will constitute grounds for declaring the Proposal non-responsive.

4.4 Bid document Price

Bid Document can be procured for a non-refundable fee of Pak Rs. 1,000 or its equivalent in US\$ in favour of Federal Board of Revenue, Islamabad, on the day of procurement of document.

4.5 Bid Bond

Bid Bond amounting to at least 2% of the financial proposal has to be submitted with the bid. This condition applies to all bidders regardless of the country of origin. *The Bid Security shall be, at the option of the bidder, in the form of Deposit at Call or a Bank Guarantee issued by a Scheduled Bank in Pakistan or an insurance company having at least AA rating from PACRA/JCR in favour of the Employer valid for a period 28 days beyond the bid Validity date.*

4.6 Currency

All bids have to be quoted in US Dollars; any quotes other than the same would be subject to disqualification.

4.7 Language

All bids have to be written in English Language.

4.8 Validity

Bid and Bid Bond have to be valid for **6 months**.

4.9 Bid Document Completion

The bid Document has to be submitted in strict compliance of the following requirements:-

- a. All documents listed in Tender Procurement Document
- b. Complete company detail as per Bidder Information Form - format given in Annex I
- c. Local Partner/ third party subcontractor (if any) Profile mentioned in Annex III
- d. Financial Bid as per the format given in Annex VI
- e. Bid Bond of **at least 2%** of the financial bid. In case of multiple bids, respective Bid Bonds are to be furnished along with EACH bid.

Note : Any document submitted beyond the laid down requirements can subject to disqualification of the bidder.

4.10 Acceptance of Proposals

- a. FBR reserves the right to accept or reject any and all proposals, or any item or part thereof, or to waive any informalities or irregularities in proposals.
- b. FBR reserves the right to withdraw this RFP at any time without prior notice and FBR makes no commitments that any contract will be awarded to any bidder responding to this RFP.
- c. FBR reserves the right to postpone proposal openings for its own convenience.
- d. FBR reserves the right to reject any proposal that fails to respond to all aspect of the scope of work and requirements of the advert.

4.11 Pre-Contractual Expenses

FBR shall not, in any event, be liable for any pre-contractual expenses incurred by Bidder in the preparation of its proposal. Bidder shall not include any such expenses as part of its proposal.

Pre-contractual expenses are defined as expenses incurred by Bidder in:

- a. Preparing its proposal in response to this RFP;
- b. Submitting that proposal to FBR;
- c. Negotiating with FBR any matter related to this proposal; or
- d. Any other expenses incurred by Bidder prior to date of signing of the Agreement.
- e. FBR shall not, in any event, be liable for any pre-contractual expenses incurred by Bidder in the preparation of its proposal. Bidder shall not include any such expenses as part of its proposal.

4.12 Advance Payment Guarantee

- a. Successful bidder can avail the Advance payments, after submitted the Advance Payment Guarantee of the same amount.

5 Prospective Supplier's Profile

FBR expects the potential successful bidder to be full conversant with large tax stamp or brand protection programs and projects, having worked on multimillion quantity labels deliverables. The company should have enough experience in delivering hardware, software, products and services of the similar nature in past; preferably in multiple countries.

The bidders (in the case of consortium at least the Prime contractor) will have to present consolidated yearly revenues above (USD) 50,000,000.

The bidders should demonstrate that their in house of self-adhesive label production equipment's capacity is above 4 billion labels. (*Providing size of the label is about 200 sqmm.*)

The successful bidder must show related official letter of reference showing that he has delivered and deployed at least a similar program outside the boundaries of his country with a minimum importance of 1 000 000 000 (1 billion) over the last 3 years.

The bidder must be certified ISO 9001/2010, ISO 14000, with either CWA High Security Printer or High Security Hologram manufacturer certification or NASPO class1 certification.

For the solution deployment the project team will at least count a PMP certified Project manager, in charge of auditing the schedule of deliverable, and stakeholder's duties.

6 PAKISTAN Tax Stamp Program Monitoring

A central database and monitoring system site will be established at the FBR Headquarters, in Islamabad. A high tech facility will be a dedicated, secure and environmentally controlled area, where servers but also administrators and persons in charge of reporting and accounting will be installed.

FBR will also provide a backup site in another building in Islamabad where disaster recovery equipment's (Backup server and disks) will be installed (part of awardee deliveries).

This facility will be connected to the FBR Headquarter building using an optic fibre link or other equivalent communication link having enough bandwidth to allow the immediate replication of databases.

7 Tax stamp System Technical specifications

The bidder is expected to complete the forms given in Annexure regarding:

- The offered secure label
- Hardware for servers, workstations, 2D barcode reader, fingerprint readers, mobile readers. Network adapters and gateways.
- Software development tools, proposed Database. Implementation and deployment procedures.
- Bidder's own profile.

In broader prospective following are the expectations. :

7.1 Bidder

The bidders will be responsible for :

- I. Delivery of complete the requested quantities of tax stamp labels within the stipulated timeline. (see tables in annex)
- II. Installation of servers at FBR Headquarters Islamabad, installation of workstations and barcode reading equipment in tobacco manufacturers plants according to the roll out schedule (see list of plants and number of lines in annexure)
- III. Rollout, training of FBR's or enforcement forces on the Track and trace mobile devices and also Activation workstations in Tobacco plants.
- IV. Training of FBR's personnel to act as precursor trainers for the rest of the staff
- V. The bidder should propose to FBR a general enforcement policy in order to face the presence of fake labels, proven counterfeits, or non-application of the tax stamp on packets produced legally in Pakistan.
- VI. Availability of critical spares locally 24/7 through own office or local partner.
- VII. Must be able to produce documentary support of the projects executed so far.
- VIII. Must be able to produce required international certifications.
- IX. Must be able to give evidence of usage of the offered similar labels in minimum 1 region/country/state for total 3 years
- X. Must be able to arrange FBR teams' visit to own production unit

- XI. Must be able to supply all brochures, manuals and training material along with the system in hardcopy and softcopy forms in English language.

7.2 Product

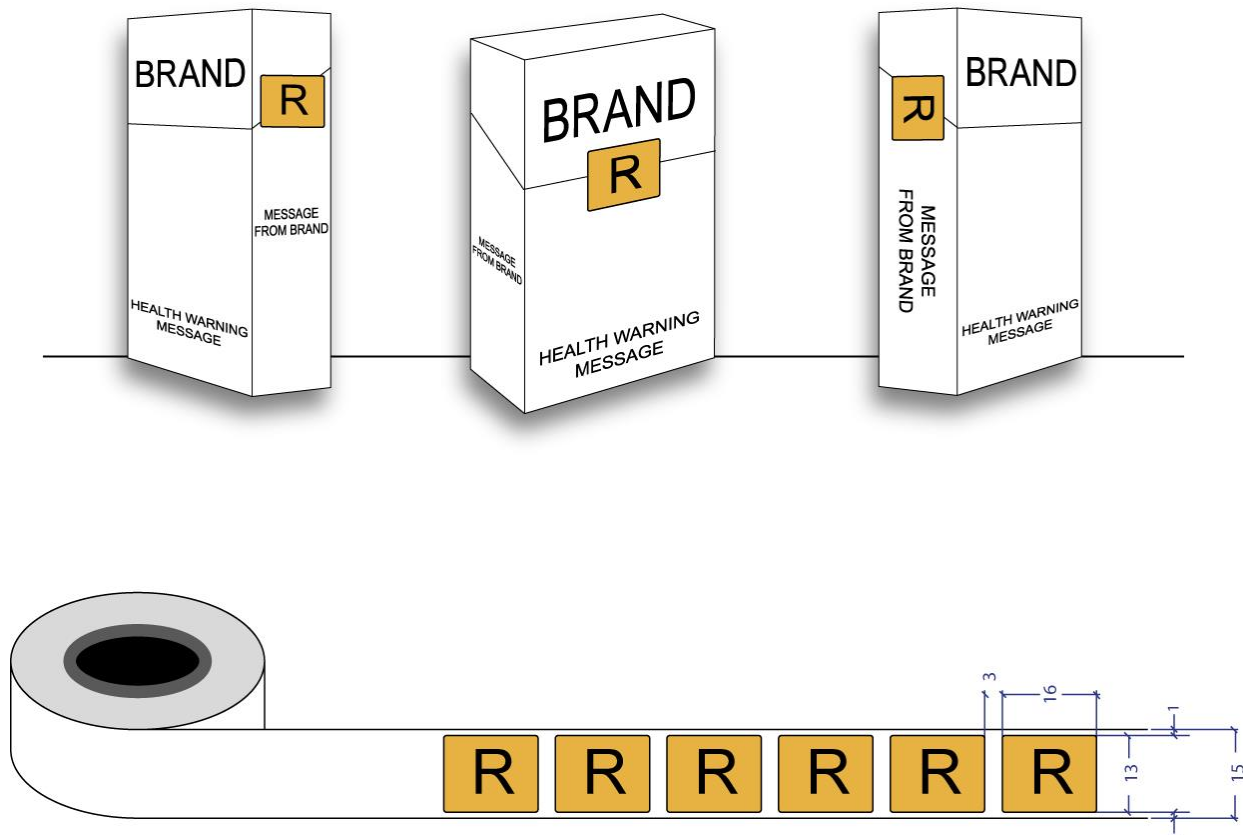
FBR and Pakistani Government wish to implement an innovative and progressive labelling solution based on the latest technologies.

In that frame, the proposed labels must have the following properties **or equivalent**:

- The core material of the label must be in a printable frangible and temperature sensitive polymer :
 - o Fusion temperature below 175°C
 - o Thickness not less than 50 micrometre +/-10%
 - o Tear strength comprised between 30 and 60 MPa
 - o The composition of the label will be such as any attempt of label removal will induce the crumbling of considerable portions of it. The label will be used to seal the cigarette packet (temper evidence).
- Label size : maximum length : 18 mm and minimum surface 200 sqmm
- The label will contain the following security features:
 - o A Gold colour optical variable image. Based on diffractive and/or lenticular techniques
 - o Forensic features like nano-letters only visible using a microscope (size smaller than 25 microns)
 - o Metallic microletters visible with a magnifier (smaller than 150 microns) on the white background of the label.
 - o An optical variable feature which polarizes the light so that visual effect can be easily controlled by the mean of simple polarising filter.
- The label will be overprinted with a unique code such as a data-matrix **or equivalent** readable by the mobile reader.
- At least One (1) special security feature must be embedded in the label and readable by the mobile reader, allowing a high security authentication of the label and acting as a key for authorizing the reading of the identification matrix.

- The labels will be overprinted with a colour mark allowing the differentiation between 3 levels of taxes (the quantity ratio pro tax value is about Tax Level A: 70%, Tax Level B 20%, Tax Level C 10%)
- The label will be delivered in roll of no less than 25 000 labels, the rolls will be delivered with cores compatibles with preconized labelling machines.

The drawing below shows the different labelling position on the cigarette packet which can be applied with a unique type of label roll.



7.3 Track and Trace solution.

The proposed solution should present the following three main functionalities:

- 1) Insure that labels are applied in on all cigarettes packets with labelling machine at the nominal workflow speed of 450 packets/minute. Each label through its 2Dbarcode will be

recorded in the main database with following information: tax level, SKU, line number, plant number.

- 2) Insure that control activities are conducted efficiently on the field: the system should propose the planning of control tours, the recording of controlled serial number, with geolocalisation and time stamp. The solution should automatically and transparently switch from online to offline mode when cellular signal is no more available.
- 3) Provide an exhaustive reporting tool to FBR analysts and auditors. A general dashboard will present online statistics on activation quantities per level of tax, regions, and Manufacturer. A second dashboard will show on a map of Pakistan the places where fake, smuggled... packets and been seized by the enforcement forces.
- 4) Provide an accounting and invoicing system for the labels. Manufacturers, (via the proposed system) will order from FBR provisional quantities of labels of the different tax values according to the produced brands. At activation step, produced quantities will automatically be affected on the account of the manufacturer with the corresponding amount of taxes. The manufacturer will later receive from FBR an official receipt with the amount of tax to be paid. This receipt will be joined at the time of taxes payment.

7.4 Mandatory technologic policy to follow

The following sections describes different requirements of the system mainly divided into functional requirements and the technical requirements. The functional requirements specify the business logic and the software modules and features. The technical requirements focus more on the system architecture, standards to follow and the hardware spectrum.

7.4.1 Functional Requirements

The following sections specify the functional requirements of the system that FBR needs the bidder to design and propose. The functional requirements of the system covers the system functionalities and the way the system should behave with the operators and the administrators, keeping the business requirements intact.

Bidders shall comply with all functional requirements, and the failure of any bidders to comply with any one of the individual functional requirement will be declared non-responsive, and his financial bid will be returned unopened.

7.4.1.1 Order Processing of Manufacturers

The system's first task would be receiving the orders from the manufacturers and processing them so that the system's tax labels production module can prepare accordingly for the production of the required number of labels. This requirement should mainly be carried out by the management system software. There has to be a web interface for the manufacturers and they will have a secure authentication credential for logging into the system and place their orders. The following table details the requirements:

Requirement No.	Requirement/Description	Criticality
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 to 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 manufacturer should be given a secure authentication credential (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 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 manufacturer places an order, the order must be reflected 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 popup message that an order has been issued.	Must
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 packing and shipping phase and also, assign it to particular logistic personnel.	Must
7.4.1.1.6	The system's user interface for carrying out the task of scheduling and assigning the packing and shipping against a particular order should be friendly and fast.	Must

7.4.1.2 Tax labels Production and Tracking

Tax labels are to be bar-coded (i.e. attached to a serial number that will be stored in the serial number generator system database as well). These are basically stickers to put on the cigarette packets, boxes and palettes. This section of the system's functional requirement is producing the security tax labels for attaching that to the generated barcode or secure serial number later for storing into the database for future reference and verification or identification purpose. The following table lists all the requirements for tax labels production module of the system:

Requirement No.	Requirement/Description	Criticality
7.4.1.2.1	Once the secure production of the bar-coded tax labels starts against particular orders received from FBR (or a programmed partial order), the security tax labels should be generated by the system first and then should be printed using the international standards of barcode printing.	Must
7.4.1.2.2	The system software then should generate a secure serial number that should be stored in the origination database so that it can be attached to the tax labels later and can be allocated and then activated once the labels are delivered to the manufacturers.	Must
7.4.1.2.3	The tax labels should be attached to the generated serial numbers once both of them are produced.	Must
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 labels 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 labels into the system database only by changing the status of the tax labels to "produced". (This by entire production or by batches)	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 Tax labels Shipment

The security labels will be shipped to the FBR in Pakistan by air transportation. The authorized system operator will receive the labels and update the records into the origination database so that the system knows which of the initially originated serial numbers are now production complete and shipped successfully to FBR. The central database will also be updated accordingly with the shipment information. The operator will finally accept the shipped labels from the system. After that the labels will be ready for sales and distribution. The following table specifies the requirements:

Requirement No.	Requirement/Description	Criticality
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 labels 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 labels and give the operator a result stating if the synchronization was done perfectly.	Must
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 Tax labels Sales and Distribution

Then the tax labels are ready and at this point they will be sold to the manufacturers.. The system database should update itself after the goods are sold. Once the sales process is completed, it is time for distribution. The tax labels that are allocated to different production points will be distributed accordingly and the system will update the central database with the distribution information so that it can be used later to locate where a roll of label was assigned: to which manufacturer and production point.

Requirement No.	Requirement/Description	Criticality
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 labels to the tobacco manufacturers.	Must
7.4.1.4.2	After the tax labels 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 labels are being sold to. The tax labels 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
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 label and the associated level of tax.	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 Tax labels Activation by Tobacco Manufacturers.

Finally the labels will be pasted on the tobacco packets at that time the labels will be "activated" (it means that all necessary information concerning the brand, plant, level of tax and timestamp of a given cigarette packet are recorded in the central database.).

This activation has to follow a procedure that a minimum impact as possible on the packing workflow of the manufacturing lines. It can be done label by label or by batches of labels:

The reading of the barcode identifier of the label (or of the batch of labels) will allow the association of the label with the type cigarette packet on which it is applied, SKU, Production line, plant, timestamp any information required for traceability purpose.

Requirement No.	Requirement/Description	Criticality
7.4.1.5.1	The system should present a clean and straightforward user interface to the operator to activate a label by the mean of a barcode reader. This module of the system will be used to activate the tax labels on each line of packing cigarette at manufacturer's plant.	Must
7.4.1.5.2	After the tax labels are activated, the status of them should be changed to "Activated" and the central database should be updated accordingly.	Must
7.4.1.5.3	The system must also be able to keep track of the production lines characteristics (based on statistics of past activations) and send warning signal to both monitoring staff at FBR headquarters and also FBR's controllers at manufacturer's site to acknowledge that production line is not producing and inform the system on the technical reason for this non production.	Must
7.4.1.5.4	At given weekly (or monthly) pace, the system will generate on behalf of FBR, official formal activation reports which will be sent to the tobacco manufacturers and serve as basis for their tax declaration.	Must
7.4.1.5.5	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

7.4.1.6 Offline Verification Tools

Once the tobacco packets are out to the market and available for the consumers to purchase from shops, the authorized personnel should be able to check and verify the authenticity the label. They will be given portable devices with preloaded verification application, or they might also be carrying a laptop or tablet PC attached to a specific reader. After reading the tax label using their available verification tools, the system will declare if the cigarette packet is original and valid to be sold in the market or not. The following table specifies the requirements of this module:

Requirement No.	Requirement/Description	Criticality
7.4.1.6.1	The bidder must provide details specifications of the p that it is	Must

Requirement No.	Requirement/Description	Criticality
	offering with the system as a verification tool.	
7.4.1.6.2	When the authorized personnel will be verifying using the portable device, this latter will 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
7.4.1.6.3	<p>The single control device must have three simultaneous and combined functions (in one reading):</p> <ol style="list-style-type: none"> 1) Check and guaranty the authenticity of the label in order to deter any attempt of copy (even with the same 2Dbarcode). 2) Read, and decode the 2Dbarcode in order to check that the barcode as (or not) been generated by the T&T system. 3) Sense and record the geographical position and the time of the control. <p>All the readings will be stored locally in the device: the data will then be transferred to the main database without any human intervention as soon as the device will be connected to Internet (via VPN).</p>	Must
7.4.1.6.4	The user interface should be able to scan the tax label fast and without any issues. The result of the scanning should appear on the screen instantly (less than 2 seconds). The possible results are "Genuine", "Fake", and "Bad reading please try again."	Must
7.4.1.6.5	The verification tool should be able to operate offline without requiring a response from the server or being connected to the internet at all.	Must

7.4.2 Technical Requirements

This section details the technical requirements of the system such as the system architecture, database architecture and scalability, international standards that should be met and the hardware/software specs that the bidder should specify. The following table specifies the technical requirements:

Requirement No.	Requirement/Description	Criticality
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
7.4.2.2	The bidder should have experience in successful deployment of system that are built and developed using the Service Oriented Architecture (SOA).	Must
7.4.2.3	The guiding principles of the architecture should contain – <ul style="list-style-type: none"> • 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
7.4.2.6	The web service security module of the SOA architecture should be using the W3C's XML encryption standards or equivalent .	Must
7.4.2.7	The application server that will be used with the deployment of the system should support DSA-SHA1, HMAC-SHA1, RSA-SHA1, and RSA-MD5 algorithms or equivalent .	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: <ul style="list-style-type: none"> • Server OS <ul style="list-style-type: none"> ○ Windows Server 2008 for HSM installation ○ Linux (CentOS, Debian) • Workstation OS <ul style="list-style-type: none"> ○ Windows XP ○ Windows 7 ○ Windows 8 (when qualified) 	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	Must

Requirement No.	Requirement/Description	Criticality
	security and performance.	
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
7.4.2.13	The database system should come with a compression standard for allowing the managed or unmanaged data to be compressed and a minimum amount of storage resources are used so that the whole system becomes cost effective.	Must
7.4.2.14	The database system should be able to provide enough data mining information so that the application developers can produce actionable predictive information and build integrated business intelligence application.	Must
7.4.2.15	<p>The following or equivalent security evaluation criteria should be met by the proposed database system –</p> <ul style="list-style-type: none"> • US TCSEC, Level B1 • US TCSEC, Level C2 • UK ITSEC. Levels E3/F-C2 • UK ITSEC, Levels E3/F-B1 • ISO Common Criteria, EAL-4 • Russian Criteria, Levels III, IV • US FIPS 140-1, Level 2 	Must
7.4.2.16	<p>The application server security should meet the following criteria –</p> <ul style="list-style-type: none"> • Should include authentication and authorization framework. • The solution should support Built-in LDAP-based data store or equivalent for all profile and entitlement data. • The solution should provide Role-based, dynamic rules driven access authorization engine. • Should support Rule based Role Mapping Policies based on conditions like Timing, User Profiles, etc. • Provide interface for users to create and edit policies. 	Must
7.4.2.17	<p>Application server should meet the following features –</p> <ul style="list-style-type: none"> • A security handler wrapper must be used when any communication (in-bound request or outbound response) 	Must

Requirement No.	Requirement/Description	Criticality
	<p>occurs to / from the service cluster.</p> <ul style="list-style-type: none"> • 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 Datacentre configuration. • Should provide advanced caching, load-balancing, high availability and Web services support. • Support for J2SE across supported operating system platforms, including Linux, UNIX and Microsoft Windows. Support for optimized, tuned and high performance JVM or equivalent. • Must have an advanced authentication and authorization service, comprehensive security mechanism, custom authentication, role-based access control, JAAS delegation and Java cryptology extension (JCE), 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 • Should enable isolation of application servers to avoid single points of failure which reduces and eliminates excess computing capacity through policy-based resource management; metrics-based workload management; and a variety of advanced back-up, disaster recovery, and clustered fail-over solutions to provide maximum availability. • Must have a browser-based administration with graphical presentation capabilities, for remote administration across firewalls providing a single interface for monitoring distributed application servers. • Must have an automated workload distribution across a cluster featuring an auto-discovery and dynamic routing and a comprehensive and application-specific load balancing policies. • Provides manageability with a fully integrated Web server and servlet container. • The solution should support Active-Active Deployment with load balancing, failover, transactions. This will provide end to end High Availability for the applications. 	
7.4.2.18	<p>The system must be Platform Independence and Open Standards Support</p> <ul style="list-style-type: none"> • Solution should be interoperable with other technologies like .Net 	Must

Requirement No.	Requirement/Description	Criticality
	<ul style="list-style-type: none"> Support on multiple hardware platforms and OS . Driving and implement Open Standards like J2EE, JDO, JPA, JAAS, SNMP etc. or equivalent	
7.4.2.19	The following performance criteria should be met by the proposed system – <ul style="list-style-type: none"> Should support High Performance of the App Server and underlying JVM. Solution should provide a predictable performance version of JVM or equivalent 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. Should provide Real-Time JVM or equivalent that gives a deterministic performance and ability to configure Garbage Collection Window for more consistent behavior. 	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 or equivalent	Must
7.4.2.21	The system should have the following management information features or equivalent : <ul style="list-style-type: none"> 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

7.4.3 Hardware Requirements

The minimum configurations of various equipment's **or equivalent** in the middleware tier should be as below:

Requirement No	Specification	Compliance
7.4.3.1	Application Server <ul style="list-style-type: none"> • Intel Xeon 2.4GHz, dual hexacore • 32 GB RAM • 2 x 250GB SAS HDD • 2 x Power supply (Redundant) • 2x Gigabit NIC 	Must
7.4.3.2	Load Balancer <ul style="list-style-type: none"> • Intel Xeon 2.4GHz, dual hexa-core • 32 GB RAM • 2 x 250GB SAS HDD • 2 x Power supply (Redundant) • 2x Gigabit NIC 	Must
7.4.3.3	Download Server <ul style="list-style-type: none"> • Intel Xeon 2.4GHz, quad-core • GB RAM • 2 x 250GB SAS HDD • 2 x Power supply (Redundant) • 2x Gigabit NIC 	Must
7.4.3.4	Desktop <ul style="list-style-type: none"> • Intel Core i3 3.1GHz • 4GB RAM • 250GB HDD • 18.5" Display Monitor 	Must
7.4.3.5	Network Devices <ul style="list-style-type: none"> • Core Router <ul style="list-style-type: none"> ○ with Zone based firewall capacity ○ At least 3x10/100/1000 ports ○ Modular: At least 4 service module slot ○ Embedded hardware-accelerated VPN encryption ○ 512MB DRAM ○ 256MB Compact Flash" • Core Switch (Managed) <ul style="list-style-type: none"> ○ 24 Ethernet 10/100/1000 Ports" 	Must

Requirement No	Specification	Compliance
	<ul style="list-style-type: none"> • Distribution Switch (Managed) <ul style="list-style-type: none"> ○ 24 Ethernet 10/100/1000 Ports ○ 2x Uplink • Access Switch <ul style="list-style-type: none"> ○ 24 Ethernet 10/100 Ports ○ 2x Uplink" • 42U RACK Cabinet for Servers <ul style="list-style-type: none"> ○ With Console Monitor, PDU, KVM Switch, Patch panel, Cable manager and other related accessories. ○ 60 KVA Online UPS ○ 140KVA Power Generator ○ 140 KVA Automatic Voltage Regulator • Precision Air Conditioning System • Fire Detection and Suppression System • Environment Monitoring System • Proper Grounding and Surge protection system • Access Router (Factory/Client End) <ul style="list-style-type: none"> ○ 2 x10/100/1000 Ethernet ports ○ 2x Additional network module card slot ○ Embedded hardware-accelerated VPN encryption 	
7.4.3.6	1D barcode scanners – Class 2 Bluetooth	Must
7.4.3.7	Label printers	Must

7.5. Relational Database Management System RDBMS

7.5.1 RDBMS Functionalities

Requirement No	Specification	Compliance
7.5.1.1	All 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	Offer an industry standard and leading Relational Database Management System (RDBMS) with highest market share globally	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
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

Requirement No	Specification	Compliance
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
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
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

Requirement No	Specification	Compliance
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
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
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

7.5.2 High Availability, Scalability & Disaster Recovery

Requirement No	Specification	Compliance
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
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

Requirement No	Specification	Compliance
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
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
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

7.5.3 Query Performance, Administration & Monitoring

Requirement No	Specification	Compliance
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
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

Requirement No	Specification	Compliance
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
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
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

Requirement No	Specification	Compliance
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
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
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

Requirement No	Specification	Compliance
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 on-going 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
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

7.5.4 Database Security

Requirement No	Specification	Compliance
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
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

7.5.5 Database Platform - DB Servers, Storage & Network Components' Specifications

Requirement No	Specification	Compliance
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
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

Requirement No	Specification	Compliance
7.5.5.11	The platform should support the ability to automatically perform space management.	Must
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
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 No	Specification	Compliance
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
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 No	Specification	Compliance
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
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

Requirement No	Specification	Compliance
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
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
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

Requirement No	Specification	Compliance
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
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 or equivalent.	Must
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

Requirement No	Specification	Compliance
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
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

7.6. Labelling Machines

The labels must be compatible with high speed labelling machines.

The awardee will submit evidence of the compatibility of their labels with at the least 2 (two) reputable qualified labelling machine manufacturers. Test reports issued by labelling manufacturers must be included in the answer to the tender.

The awardee will supply reasonable quantities of blank label rolls to tobacco manufacturers to allow them to select the best suitable labelling machine for their production line and to conduct live test on their lines.

FBR will require the tobacco manufacturers to implement within four (4) months from award date their finishing lines with labelling equipment of their choice whether the equipment is in the list of the tested ones or from any supplier of their choice. In order to enable the tobacco manufacturers to select their labelling equipment and to do the test, the awardee will supply reasonable quantities of blank label rolls.

7.7. Communication link between tobacco plants and FBR data warehouse.

The awardee will provide the dedicated secure VPN infrastructure in order to establish the link the FBR data warehouse.

As a prerequisite, FBR will require from tobacco manufacturers to install for each plant and each cigarette packing line: network and power socket (at the position of every labelling station).

The related networks will either belonging to the production network or preferably a separate one in order to avoid any collision in packets. This network will have an access to the Internet with a minimal ascending and descending bandwidth of 512 kbps.

7.8. Delivery Timelines

Date	Type	Item	Comment	Criticality
T0		Date of Award		
T0+5W		Submission of prototype of label	Fully functional labels to be tested and approved	Must
T0+6W		Acceptance of the label (OK to print)		Should
T0 +4W	LA	Delivery of blank roll for tests	Quantities allocated to each manufacturers to be mutually agreed on reasonable values with FBR.	Should
T0+8W	HW	Delivery of Servers at FBR		Must
T0+10W	SW	F.A.T. for software and interfaces		Must
T0+8W	HW	Delivery of workstations for FBR offices		Should
T0+10W	HW	Delivery of Workstations for Manufacturers.		Must
T0+15W	SW	S.A.T. for software on first pilot line @ plant 1 for manufacturer one.		Must
T0+16W	LA	Delivery of Tax label (Type B and Type C representing 30 % of the global volume)		Must
T0+22W	HW+SW+LA	Complete implement of the complete Tax label system (delivery of the required quantities for full deployment of the T&T system)		Must
T0+18W	HW+SW	Delivery of Mobile devices. (Associated training)		Should

8 Pricing Requirements

8.1 Financial Bid Form

1. Financial Bid would only be acceptable on the prescribed form i.e. Annex VI.

8.2 Base Assumptions for the costing

1. 240 working days at FBR and 365 working days at tobacco manufacturer premises
2. 3 shifts of 8 hours each
3. All quotes strictly to be in US\$
4. All quotes to be CIP Islamabad
5. All equipment has to be insured and the cost has to be borne by the supplier.
6. All quotes to be provided strictly in the format given; any deviation would be disqualified

8.3 Service, Maintenance, Consumables and Spares

The awardee will bear the operational costs in order to maintain the whole functionalities of the system in all the locations (FBR, Tobacco manufacturers... Enforcement forces...)

9 Evaluation Criteria

9.1 Bidder and System Offer Evaluation Grids

Single stage – two envelope procedure will be followed, as described below:-

- (i) The bid shall comprise a single package containing two separate envelopes. Each envelope shall contain separately the financial proposal and the technical proposal; (ii) the envelopes shall be marked as “FINANCIAL PROPOSAL” and “TECHNICAL PROPOSAL” in bold and legible letters to avoid confusion;
- (iii) initially, only the envelope marked “TECHNICAL PROPOSAL” shall be opened;
- (iv) the envelope marked as “FINANCIAL PROPOSAL” shall be retained in the custody of the procuring agency without being opened;
- (v) the procuring agency shall evaluate the technical proposal in a manner prescribed in advance, without reference to the price and reject any proposal which does not conform to the specified requirements;
- (vi) during the technical evaluation no amendments in the technical proposal shall be permitted;
- (vii) The financial proposal of bids found technically nonresponsive shall be returned unopened to the respective bidders;
- (viii) the financial proposals of bids shall be opened publicly at a time, date and venue announced and communicated to the bidders in advance;
- (ix) after the evaluation and approval of the technical proposal the procuring agency, shall at a time within the bid validity period, publicly open the financial proposals of the technically accepted bids only; and
- (ix) the bid found to be the lowest evaluated bid shall be accepted.

The selected bidders will have to make a live fully functional demo of the control devices and present a production specimen of the above described label.

Specifically, the test should demonstrate that the reading device is capable to deter even exact visual copies of a label.

The demo will be done at FBR Headquarter in Islamabad upon formal invitation.

9.2 Evaluation Formula and Award of the Tender

FBR's Evaluation Committee will evaluate the proposals received then award to the proposal considered to be the responsive and lowest evaluate bid.

9.3 Security Clearance

- a. Final selection of the bidder(s) will be dependent upon a possible clearance from relative Pakistani government security agencies.

10 Annexes

10.1 Annex I – Bidder Information Sheet

10.2 Annex II – Tax Label System Information Sheet

10.3 Annex III - Local Partner Information Sheet

10.4 Annex IV - Bidder Profile Assessment Grid

10.5 Annex V - Personalization System Assessment Grid

10.6 Annex VI - Price Schedule