



Designing an Intelligent Enterprise Resource Planning (ERP) Halal Authentication

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Enterprise Resource Planning (ERP)

An ERP system is a combination of a series of **integrated** software modules and works in **a single database**, which enables an organization to manage its resources **efficiently and effectively**, through (1) **re-engineering and automating** its business processes, (2) **data sharing** procedures, and (3) data access within the environment in a **real-time work**





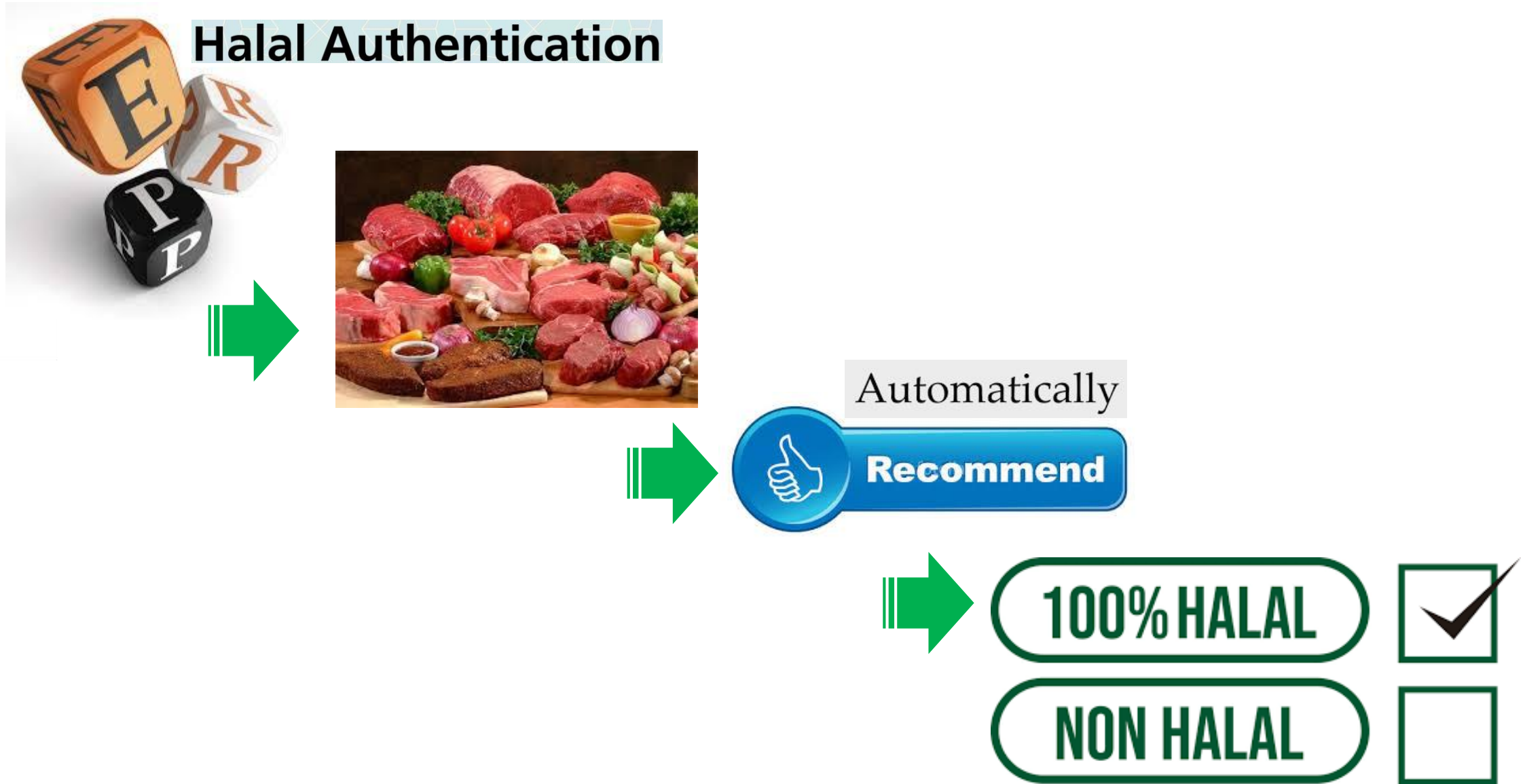
Halal Authentication

The process to **verify and certify** a product or service, in terms of **compliance with the requirements of Islamic Law (Shariah)**, to be permitted or “halal” for consumption or use by Muslims

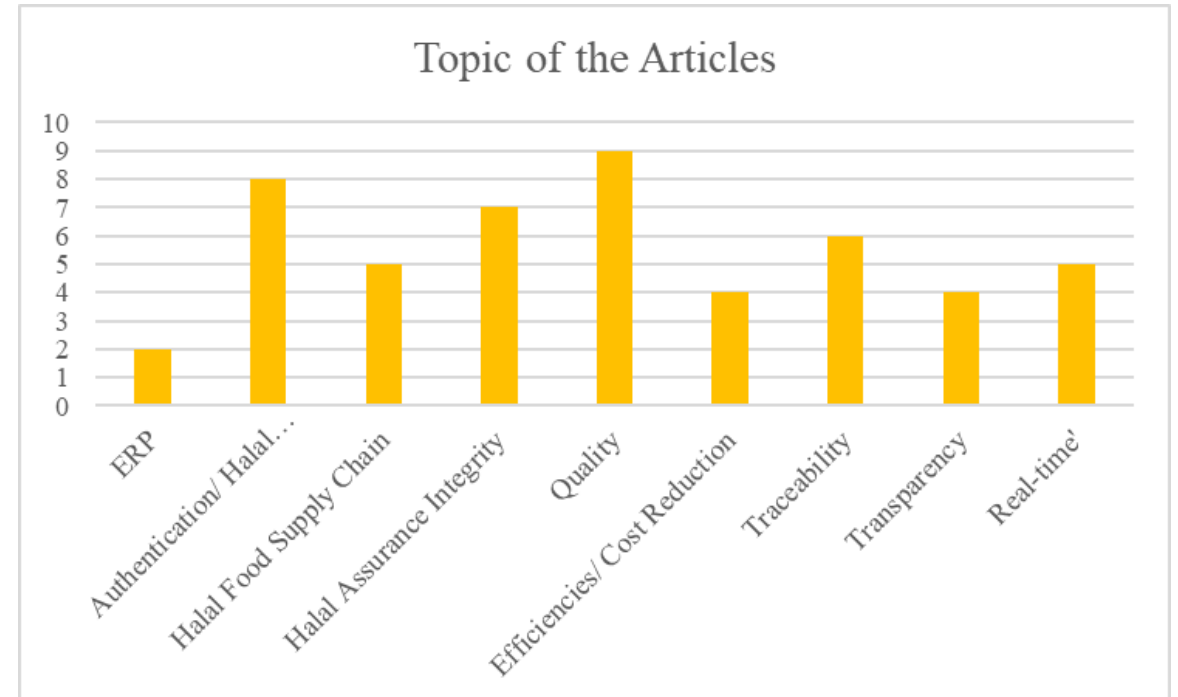
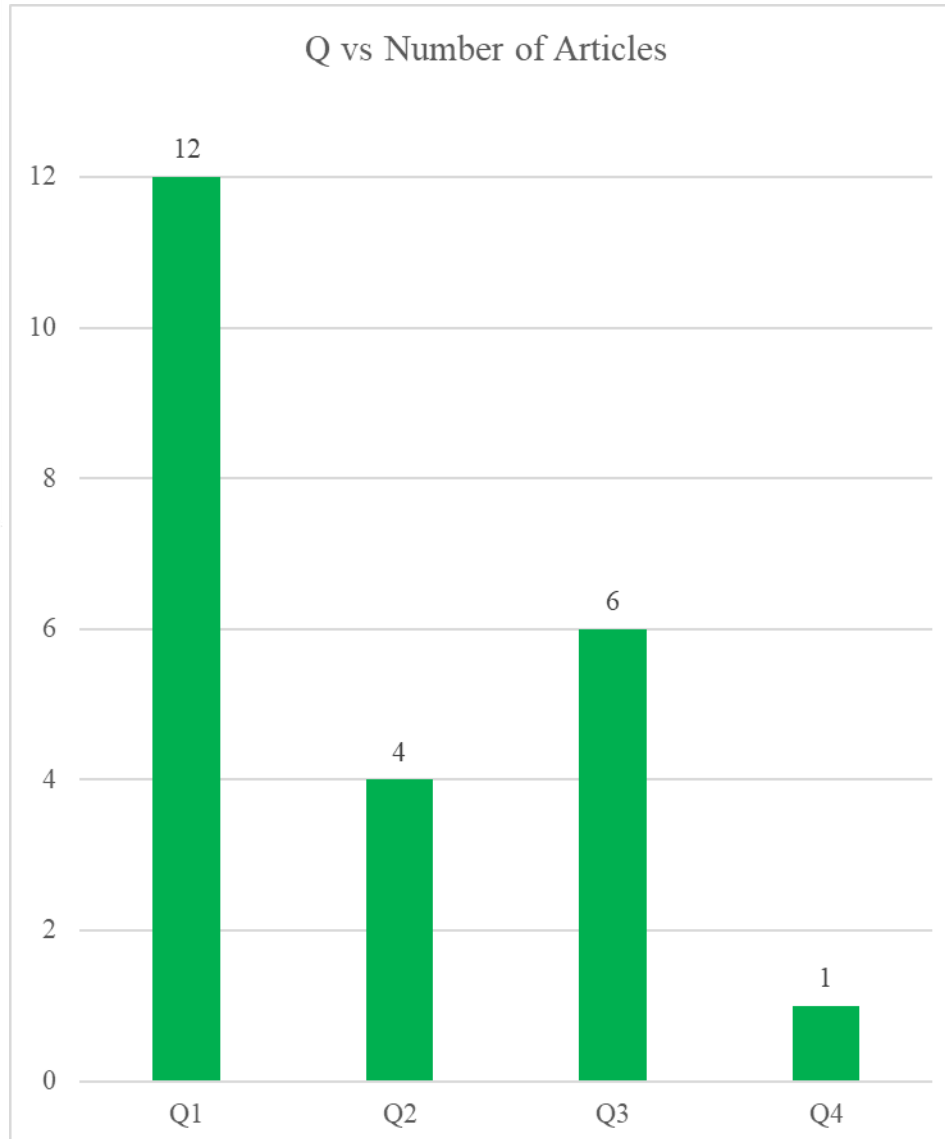
The Authentication process ensures that **the product or service** has been **produced, processed, or presented** in accordance with Islamic Law (Shariah)---including: **composition, properties, varietal purity, origin/geography, and technology/production method**

A series of appropriate methods are needed to obtain **accurate and reliable results**, in the process of **monitoring and controlling the halal authenticity** of ingredients/products (food).

ERP Halal Authentication: How does it work?



Halal Authentication: SLR

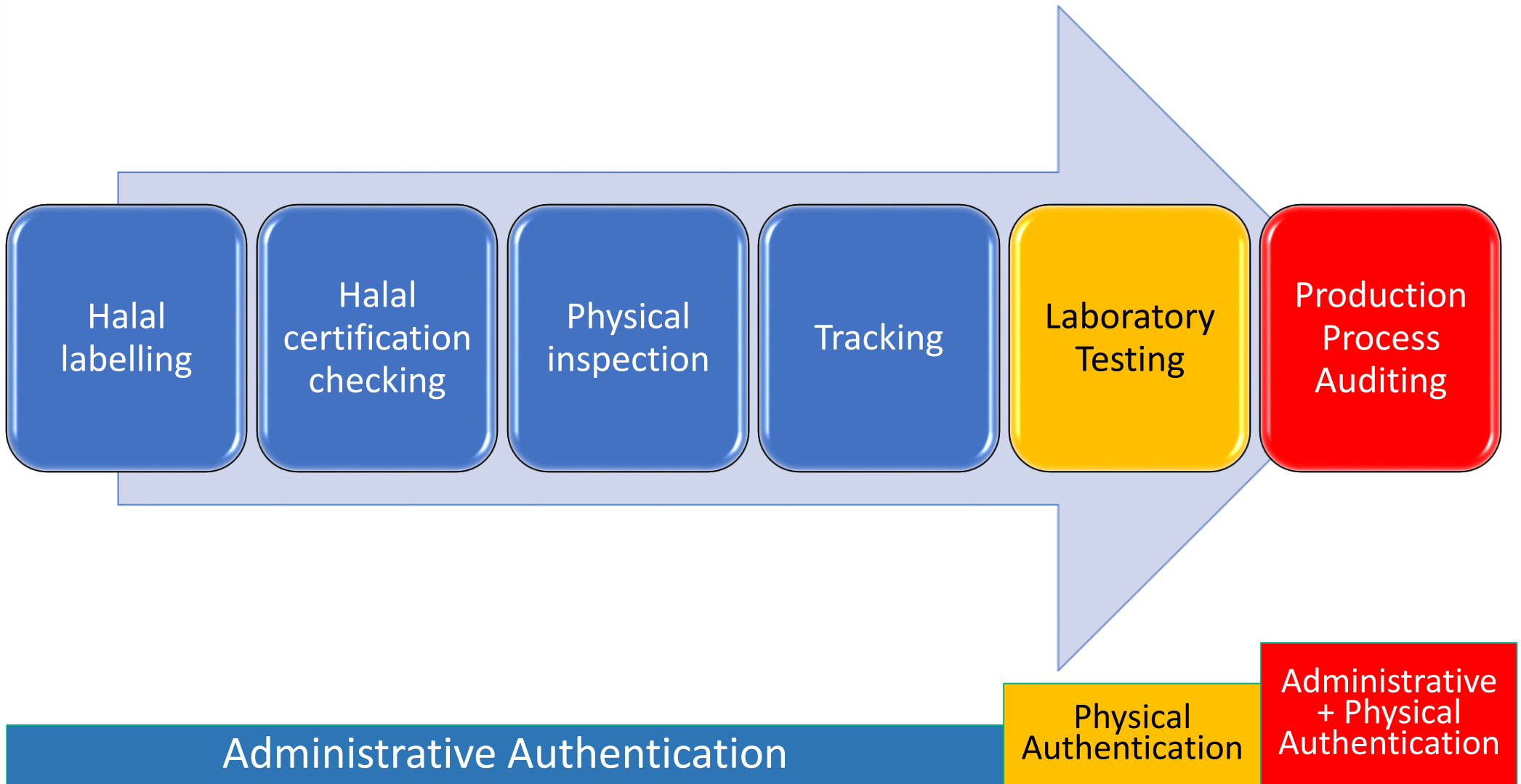


2019 – 2024

Keywords: ERP, Halal Authentication, Halal Food Supply Chain, Halal Integrity: **193**

Q1, Q2, Q3, Q4: **23**

Halal Authentication: SLR, six steps of authentication

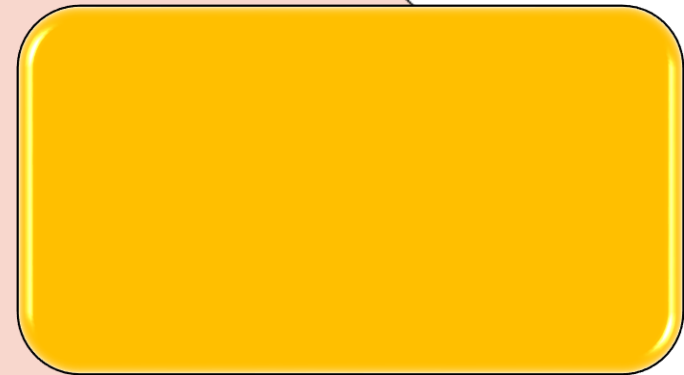




ERP Halal Authentication: Goals

Conducts the six halal authentication steps **automatically**, and...

Records the process and outcome into the ERP System for the 3T (trust-transparent-traceable) operation, and...





Intelligent ERP Halal Authentication: Goals

Conducts the six halal authentication steps **automatically**, and...

Records the process and outcome into the ERP System for the 3T (trust-transparent-traceable) operation, and...

Capable in executing the decision making processes based on the **data analytics**

ERP (existing)



ERP Halal Authentication

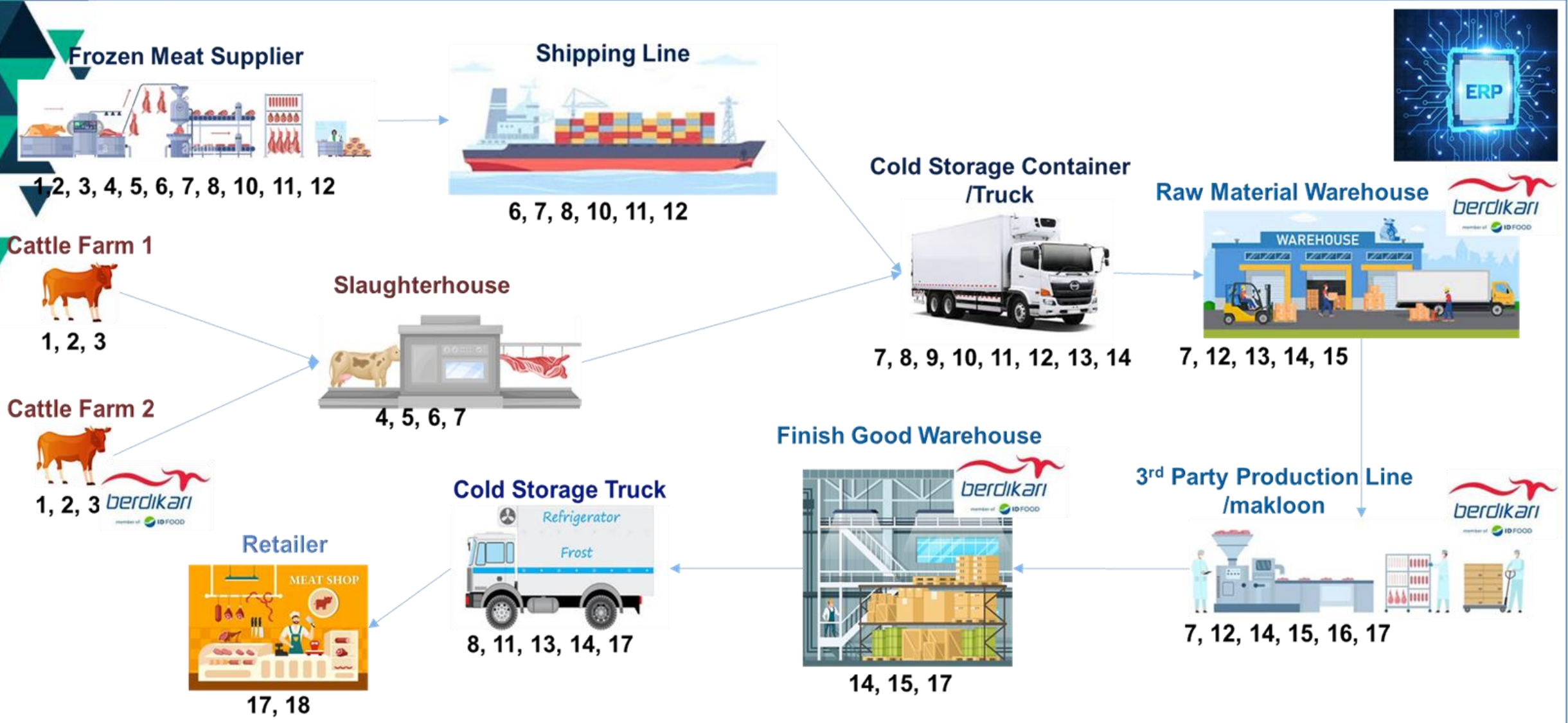
**2Q only
QUALITY
QUANTITY**

CONVENTIONAL

**ERP HALAL
AUTHENTICATION
+ HALAL INTEGRITY**

**HALAL
INDONESIA**

Meat products: Logistic, Critical Processes



Existing Halal Authentication

Purchase Order, Health Certificate, Cargo Description, Inspection Certificate, Halal Certificate, Country of Origin, Packing List, Commercial Invoice

 SHIPPER: JBS S/A CNPJ: 02.916.265/0037-70 Address: ROD BR 364, KM 18, SN DISTRITO INDUSTRIAL VILHENA - RO - BRASIL CEP: 76.988-899		Phone: +55 (69) 3316 - 1300 Fax:
PACKING LIST NR 48674053-1		
CONSIGNEE: PT BERDIKARI Address: JL. MEDAN MERDEKA BARAT NO. 1 GAMBIR, JAKARTA PUSAT INDONESIA TAX ID: 01.000.057.8-051.000 City: Country:		
Port of Loading: PARANAGUA PORT Port of Discharge: JAKARTA Vessel: MAERSK LINS		
CONTRACT	YOUR ORDER	CONTAINER
48674053-1	65/BDK/JKT/11/2022	SUDU8120383

FAMBRAS HALAL CERTIFICAÇÃO
 FAMBRAS HALAL CERTIFICATION
 فامبراس حلال لاصدار الشهادات



CERTIFICADO DE ABATE HALAL
 HALAL SLAUGHTERING CERTIFICATE
 شهادة ذبح حلال

FM 7.7.3 - Rev 04

CNPJ: 27.637.554/0001-50 - RUA TEJUPÁ, 192 - JABAQUARA - SÃO PAULO - SP - BRAZIL - CEP 04350-020 - PHONE/FAX: +55 11 5035.0820 - CERTIFICATE@FAMBRASHALAL.COM.BR

A FAMBRAS HALAL Certificação Ltda. Certifica que a carne bovina/ovina/de aves ou seus derivados contidos no submencionado embarque foi abatida de acordo com os ritos islâmicos, na presença de seus representantes autorizados e sob coordenação direta de seus supervisores gerais. Todas as precauções adequadas foram tomadas para prevenir sua contaminação com produtos não-Halal e alcoólicos. Por conseguinte, Esta carne é Halal e apropriada para o consumo por muçulmanos de qualquer parte do mundo.


تشهد فامبراس حلال لإصدار الشهادات بأن شحنة لحوم الإبل/الأغنام / الدواجن أو مشتقاتها المذكورة اذناه بأنه قد تم ذبحها طبقاً لأحكام الشريعة الإسلامية وذلك تحت مراقبة المشرف العام للشركة. كما أنه تأكد عبر إتخاذ جميع الإجراءات اللازمة بخلوها وعدم إختلاطها بأي مواد خزيرييه أو كحولية وهي صالحة لإستهلاك المسلمين في سائر بقاع العالم.

FAMBRAS HALAL Certificação Ltda. Certifies that the meat of beef/muttons/poultry or their derivatives contained in the undermentioned shipment have been slaughtered according to Islamic rites, in the presence of its authorized representatives and direct coordination of its general supervisors. All adequate precautions were taken to prevent its contamination with non-Halal and alcoholic products. Accordingly, this meat is Halal and suitable for consumption by Muslims in any part of the world.

Nº Certificado | رقم الشهادة | Certificate Nº
 2212322714

Data de Emissão | تاريخ الإصدار | Issue Date
 02/01/2023

Administrative Authentication

 SHIPPER: JBS S/A CNPJ: 02.916.265/0037-70 Address: ROD BR 364, KM 18, SN DISTRITO INDUSTRIAL VILHENA - RO - BRASIL CEP: 76.988-899		Phone: +55 (69) 3316 - 1300 Fax:
COMMERCIAL INVOICE NR 48674053-1		
BUYER: PT BERDIKARI Address: JL. MEDAN MERDEKA BARAT NO. 1 GAMBIR, JAKARTA PUSAT INDONESIA TAX ID: 01.000.057.8-051.000 City: Country:		
CONSIGNEE: PT BERDIKARI Address: JL. MEDAN MERDEKA BARAT NO. 1 GAMBIR, JAKARTA PUSAT INDONESIA TAX ID: 01.000.057.8-051.000 City: Country:		
Country of Origin: BRASIL Port of loading: PARANAGUA PORT Port of destination: JAKARTA	Vessel: MAERSK LINS	
PAYMENT T.T		TOTAL CIF USD 156.645,20
CONTRACT	YOUR ORDER	CONTAINER
48674053-1	65/BDK/JKT/11/2022	SUDU8120383



Existing Halal Authentication: research gap

Manual: health certificate, cargo document, inspection certificate, halal certificate, country of origin, packing list, and commercial invoice

NOT Integrated: not recorded in ERP, no traceability, data tampering/ falsification, and human error, security and inefficient

NO data analytic: data driven-
decision making process



Method: MBSE (Model Based System Engineering)

- Functional Architecture: **Business Process-Functional & NON-Functional Engineering, BPMN**
- Conceptual Architecture: **Class Diagram**
- Logical Architecture: **Internal Block Diagram**
- Physical Architecture

Business Process (Existing)

Business Process ID	Actor	Task	Description
BP.I-01	Vendor	Register as a Supplier	Registers as a supplier by providing their personal and contact information, such as name, address, email, and phone number, etc to the system. This also includes the administrative functions, such as: payment method, bank ID, bank name & address, currency etc.
BP.I-02	Vendor	Login to the system	Logs into the system using their registered username and password.
BP.I-03	Vendor	Receive the RFQ	Review the opportunity to satisfy the RFQ, which covers: products, ordered quantity, quality standard, time scheduling, shipment arrangement etc.
BP.I-04	Vendor	Response to RFQ	Submit the confirmation via email, whether to receive/ proceed or to reject
BP.I-05	Vendor	Receive the PO	Review the data matching between the original RFQ vs PO and to deliver a PO confirmation
BP.I-06	Vendor	Prepare the Health Certificate	To submit all necessary terms & conditions, and to get the document from the Ministry of Health
BP.I-07	Vendor	Prepare the Halal Certificate	To submit all necessary terms & conditions, and to get the document from the approved Halal Certification Body
BP.I-08	Vendor	Prepare the Inspection Certificate	To request for an inspection to the approved/ appointed Inspection Body, in order to get this document
BP.I-09	Vendor	Prepare the Cargo Description	To request for an inspection to the approved/ appointed Inspection Body, in order to get this document
BP.I-10	Vendor	Prepare the Packing List	To request the document from the 3rd Party Logistic (3PL)
BP.I-11	Vendor	Prepare the COO	To request the document from the 3rd Party Logistic (3PL)
BP.I-12	Vendor	Prepare the Commercial Invoice	Prepare the document in accordance to the approved PO
BP.I-13	Purchasing	To prepare the RFQ, based on the MRP	To prepare the RFQ, based on the MRP Result
BP.I-14	Purchasing	To prepare the PO based on the RFQ	PO Preparation, based on the RFQ and confirmation from the Vendor
BP.I-15	Purchasing	To prepare the PO for the 3rd party Laboratorium	Generate a PO for the halal laboratory testing, as well as to deliver the meat sample for the laboratory's need
BP.I-16	Custom Clearance	Receive all 8 (eight) associated documents	Arrange the receipt documents accordingly and schedule for the Administrative Halal Authentication
BP.I-17	Custom Clearance	Conduct the Administrative Halal Authentication	Administrative Halal Authentication for: (1) Halal Labelling, (2) Halal Certification Checking, (3) Physical Inspection, and (4) Product Tracking
BP.I-18	Custom Clearance	Record the Result of the Administrative Halal Authentication	Record the actual result of those 4 (four) administrative authentication steps accordingly and to report it to Purchasing
BP.I-19	Custom Clearance	Send the result of Administrative Halal Authentication to Purchasing	In order to either document re-submission by vendor, or to get the 3rd Party Laboratorium to conduct the Halal Laboratory Testing for the incoming frozen meat
BP.I-20	Inventory/ Warehouse	Inventory/ PO Receipt	Conduct the receiving of the halal imported frozen meat in Warehouse
BP.I-21	Inventory/ Warehouse	Inventory management	Physically segregate the halal and non-halal products

Business Process (Designed)

Business Process ID	Actor	Task	Description
BP.I-01	Vendor	Register as a Supplier	Registers as a supplier by providing their personal and contact information, such as name, address, email, and phone number, etc to the system. This also includes the administrative functions, such as: payment method, bank ID, bank name & address, currency etc.
BP.I-02	Vendor	Login to the system	Logs into the system using their registered username and password.
BP.I-03	Vendor	Receive the RFQ	Review the opportunity to satisfy the RFQ, which covers: products, ordered quantity, quality standard, time scheduling, shipment arrangement etc.
BP.I-04	Vendor	Response to RFQ	Submit the confirmation via email, whether to receive/ proceed or to reject
BP.I-05	Vendor	Receive the PO	Review the data matching between the original RFQ vs PO and to deliver a PO confirmation
BP.I-06	Vendor	Prepare the Health Certificate	To submit all necessary terms & conditions, and to get the document from the Ministry of Health
BP.I-07	Vendor	Prepare the Halal Certificate	To submit all necessary terms & conditions, and to get the document from the approved Halal Certification Body
BP.I-08	Vendor	Prepare the Inspection Certificate	To request for an inspection to the approved/ appointed Inspection Body, in order to get this document
BP.I-09	Vendor	Prepare the Cargo Description	To request for an inspection to the approved/ appointed Inspection Body, in order to get this document
BP.I-10	Vendor	Prepare the Packing List	To request the document from the 3rd Party Logistic (3PL)
BP.I-11	Vendor	Prepare the COO	To request the document from the 3rd Party Logistic (3PL)
BP.I-12	Vendor	Prepare the Commercial Invoice	Prepare the document in accordance to the approved PO
BP.I-13	Vendor	Data Encoding for Barcode	Submit the data of the 8 (eight) inbound logistic paperworks in accordance to the actual document and product, including the 3 (three) keys information: PO#, HC#, and Container#
BP.I-14	Purchasing	To prepare the RFQ, based on the MRP	To prepare the RFQ, based on the MRP Result
BP.I-15	Purchasing	To prepare the PO based on the RFQ	PO Preparation, based on the RFQ and confirmation from the Vendor
BP.I-16	Purchasing	To prepare the PO for the 3rd party Laboratorium	Generate a PO for the halal laboratory testing, as well as to deliver the meat sample for the laboratory's need
BP.I-17	Purchasing	To coordinate with Vendor for any document re-submission	Manage for the data updating, based on the Administrative Halal Authentication
BP.I-18	Custom Clearance	Receive all 8 (eight) associated documents	Arrange the receipt documents accordingly and schedule for the Administrative Halal Authentication
BP.I-19	Custom Clearance	Conduct the Administrative Halal Authentication	Administrative Halal Authentication for: (1) Halal Labelling, (2) Halal Certification Checking, (3) Physical Inspection, and (4) Product Tracking
BP.I-20	Custom Clearance	Record the Result of the Administrative Halal Authentication	Record the actual result of those 4 (four) administrative authentication steps accordingly and to report it to Purchasing
BP.I-21	Custom Clearance	Send the result of Administrative Halal Authentication to Purchasing	In order to either document re-submission by vendor, or to get the 3rd Party Laboratorium to conduct the Halal Laboratory Testing for the incoming frozen meat
BP.I-22	Inventory/ Warehouse	Inventory/ PO Receipt	Conduct the receiving of the halal imported frozen meat in Warehouse
BP.I-23	Inventory/ Warehouse	Inventory management	Physically segregate the halal and non-halal products
BP.I-24	System Administrator	To set the Vendor-Products arrangement	Halal products are able to be purchased only to the assigned/ particular Vendor
BP.I-25	System Administrator	To set the Location/ Warehouse-Vendor arrangement	Halal products are able to be stored in the assigned/ particular location or warehouse

Business Process: Existing vs Designed

ERP Halal Authentication: Functional & Non-Functional Requirement (existing vs designed)

Functional Requirement (existing)

Req ID	Requirement Description	Input	Process	Output	Mathematical Model	BP.I ID (Parent)
FR-01	The system must allow users to create an account	User registration information	User registration process	User account created successfully	createAccount(userInfo) = userAccount	All
FR-02	The system must allow users to log in to their account	User login information	User login process	User logged in successfully	login(loginInfo) = userSession	All
FR-03	The system must allow users to create a location	Location registration information	Location registration process	Location created successfully	createLocation(locationInfo) = locationAccount	All
FR-04	The system must allow users to transfer and issue inventory from the location created	Inventory movement and Outstanding PO information	PO Receipt, WO Receipt, Inventory Transfer process	Inventory transacted in successfully	transactInventory(inventoryTransactionInfo) = InventoryTransactionSession	BP.I-05, BP.I-06
FR-05	The system must allow users to inquire the MRP Result: Planned Purchase Order (PPO)	List of PPO	Planned Purchase Order Inquiry	List of outstanding PPO	InquiryPPO() = PPOList	BP.I-03, BP.I-04
FR-06	The system must allow users to inquire the outstanding PO in particular Vendors	Open PO Status and Vendor Details	Outstanding PO Inquiry	List of outstanding PO vs Vendor	InquiryPO() = POList	BP.I-05, BP.I-06

Functional Requirement (designed)

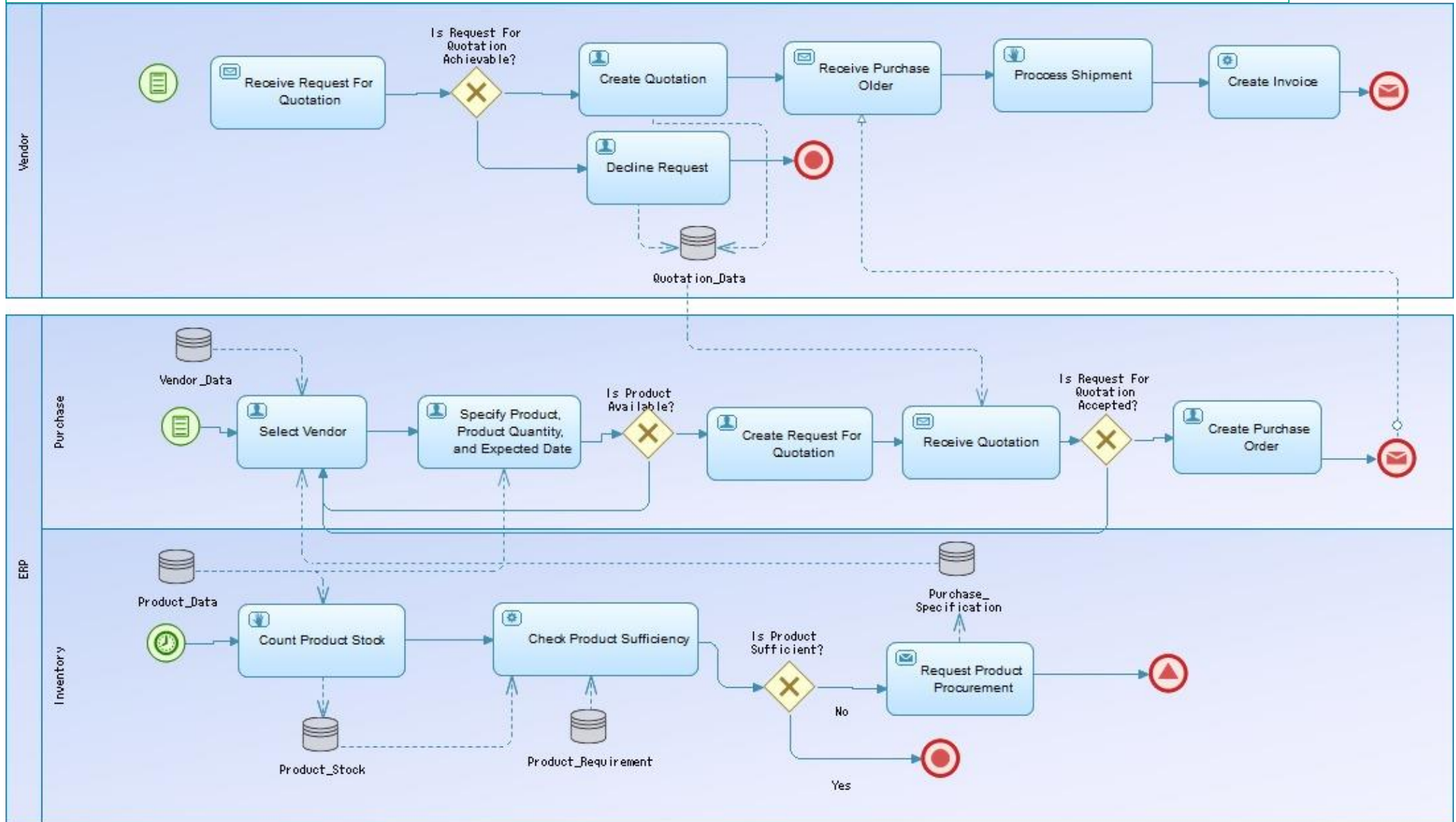
Req ID	Requirement Description	Input	Process	Output	Mathematical Model	BP.I ID (Parent)
FR-01	The system must allow users to create an account	User registration information	User registration process	User account created successfully	createAccount(userInfo) = userAccount	All
FR-02	The system must allow users to log in to their account	User login information	User login process	User logged in successfully	login(loginInfo) = userSession	All
FR-03	The system must allow users to create a Vendor account who has halal certification	User: Halal Vendor registration information	User: Halal Vendor registration process	User: Halal Vendor account created successfully	createHalalVendorAccount(userInfo) = userHalalVendorAccount	All
FR-04	The system must allow users to create a location	Location registration information	Location registration process	Location created successfully	createLocation(locationInfo) = locationAccount	All
FR-05	The system must allow users to create a Halal Location	Halal Location registration information	Halal Location registration process	Halal Location created successfully	createHalalLocation(locationInfo) = halallocationAccount	All
FR-06	The system must allow users to transfer and issue inventory from the location created	Inventory movement and Outstanding PO information	PO Receipt, WO Receipt, Inventory Transfer process	Inventory transacted in successfully	transactInventory(inventoryTransactionInfo) = InventoryTransactionSession	BP.I-05, BP.I-06

ERP Halal Authentication: Non-Functional Requirement

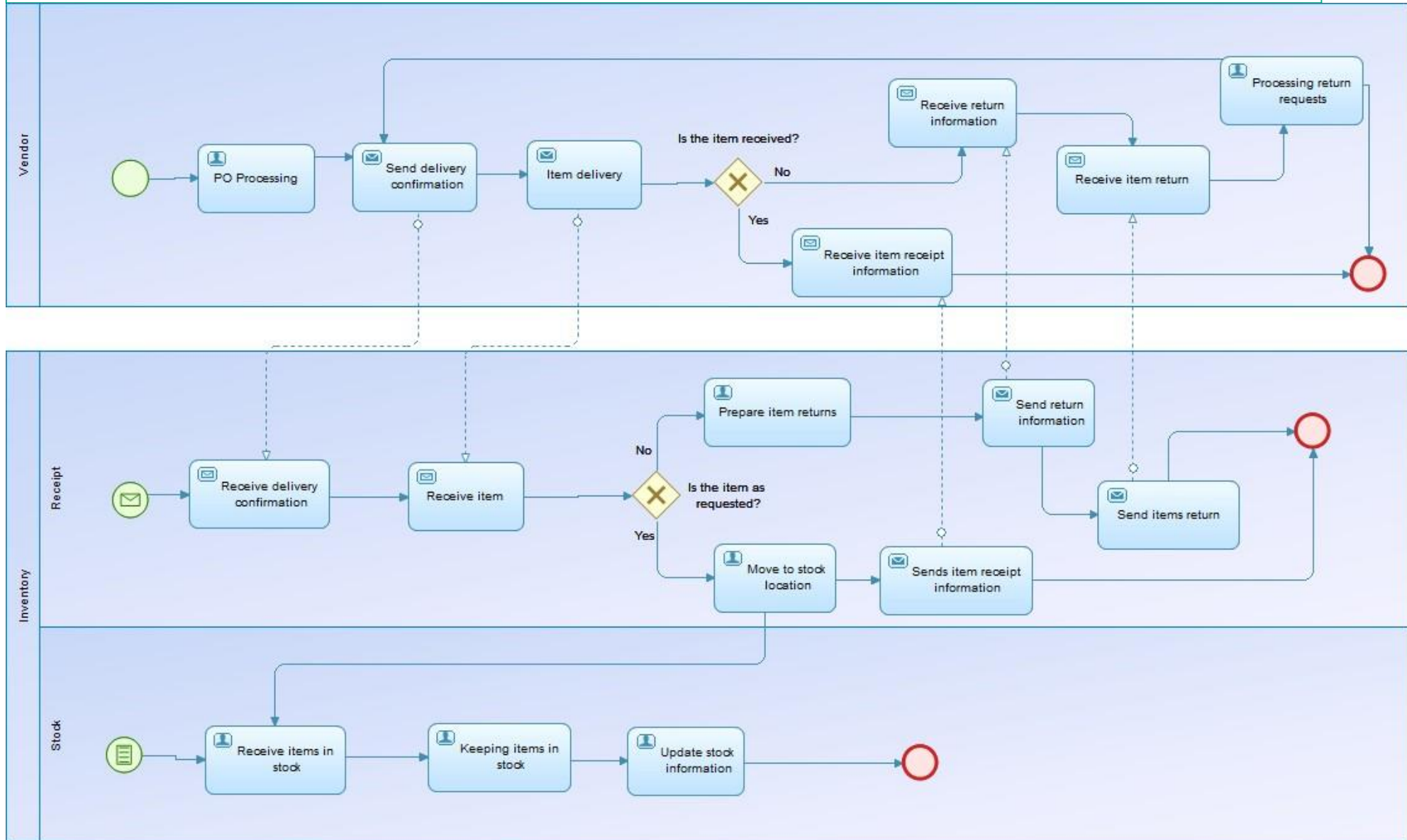
Non Functional Requirement

Requirement ID	Requirement Description	Type	Input	Process	Output	Mathematical Model
NFR-001	The system must have a response time of less than 5 seconds	Performance Requirements	User requests	System response time monitoring process	System responds within 5 seconds or less	$t_{\text{response}} \leq 5$
NFR-002	The system must be able to handle 100 concurrent users	Performance Requirements	Concurrent user requests	System capacity monitoring process	System can handle 100 concurrent users	$n_{\text{users}} \leq 100$
NFR-003	The system must have 99% availability	Reliability Requirements	System uptime monitoring	System uptime monitoring process	System is available 99.99% of the time	$\text{availability} \geq 99\%$
NFR-004	The system must be secure and prevent fraudulent activity	Security Requirements	Security threats and user activities	Security monitoring and prevention process	Security threats and fraudulent activities prevented	$p_{\text{fraudulent_activity}} = 0$
NFR-005	The system must be able to manage the Halal Authentication Steps	Performance Requirements	Halal Authentication for each PO for Halal Products	Barcode Scanning process	Halal Authentication Process	$\text{halal_authentication_activity} = \text{True}$
NFR-006	The system must send notifications within 5 seconds of the event	Performance Requirements	Event information	Notification sending process	Notifications sent within 5 seconds of the event	$t_{\text{notification}} \leq 5$
NFR-007	The network infrastructure must provide high availability and uptime to ensure the auction system is accessible to users	Availability Requirements	Network infrastructure	System uptime and accessibility	System available to users with uptime of at least 99.9%	$\text{availability} \geq 99.9\%$
NFR-008	The system must have sufficient storage capacity to store blockchain data	Capacity Requirements	Amount of blockchain data	Storage capacity	Sufficient storage capacity to store blockchain data	$\text{storage_capacity} \geq \text{required_storage_capacity}$

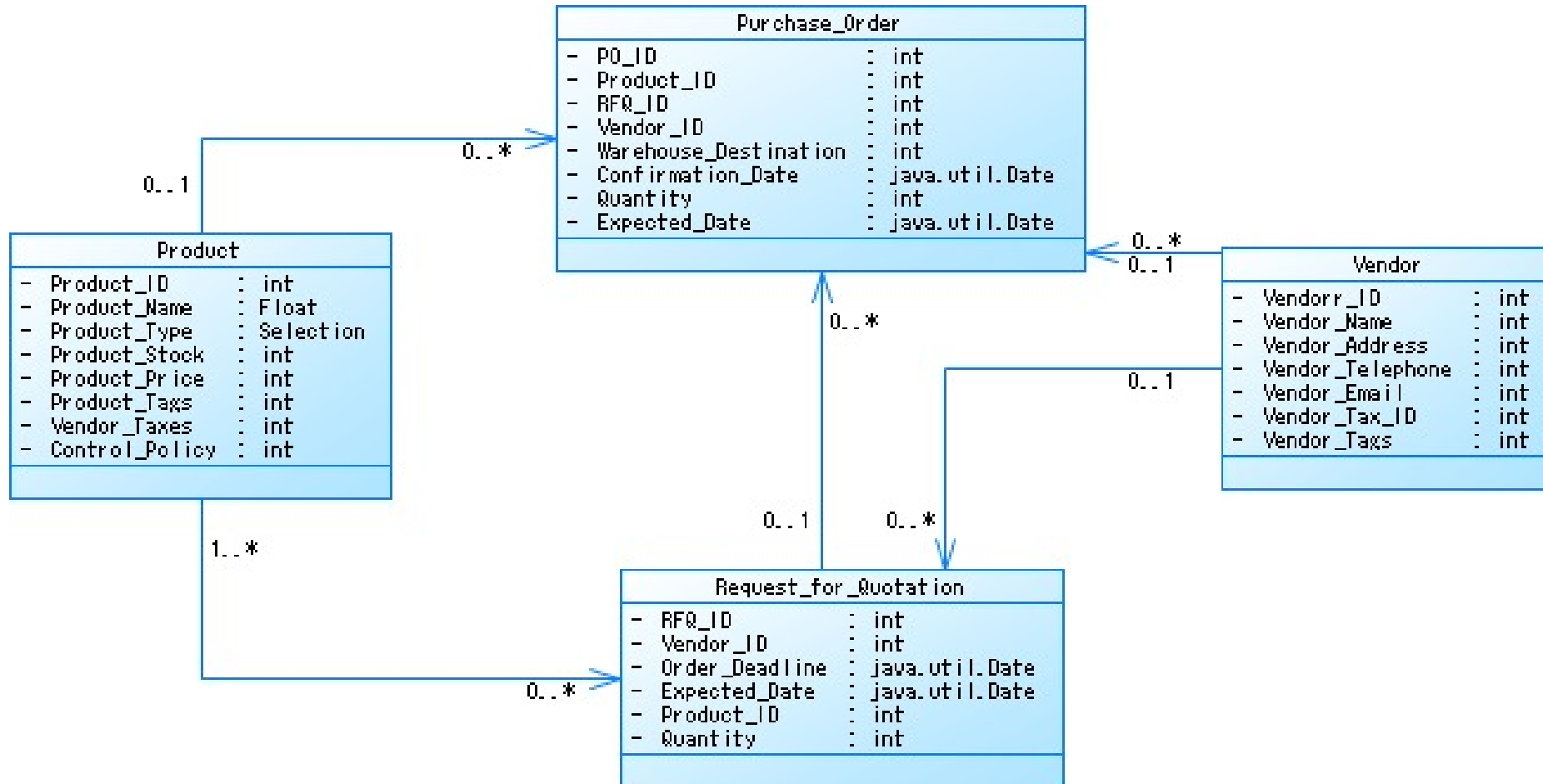
ERP Halal Authentication: Functional Architecture for Purchase



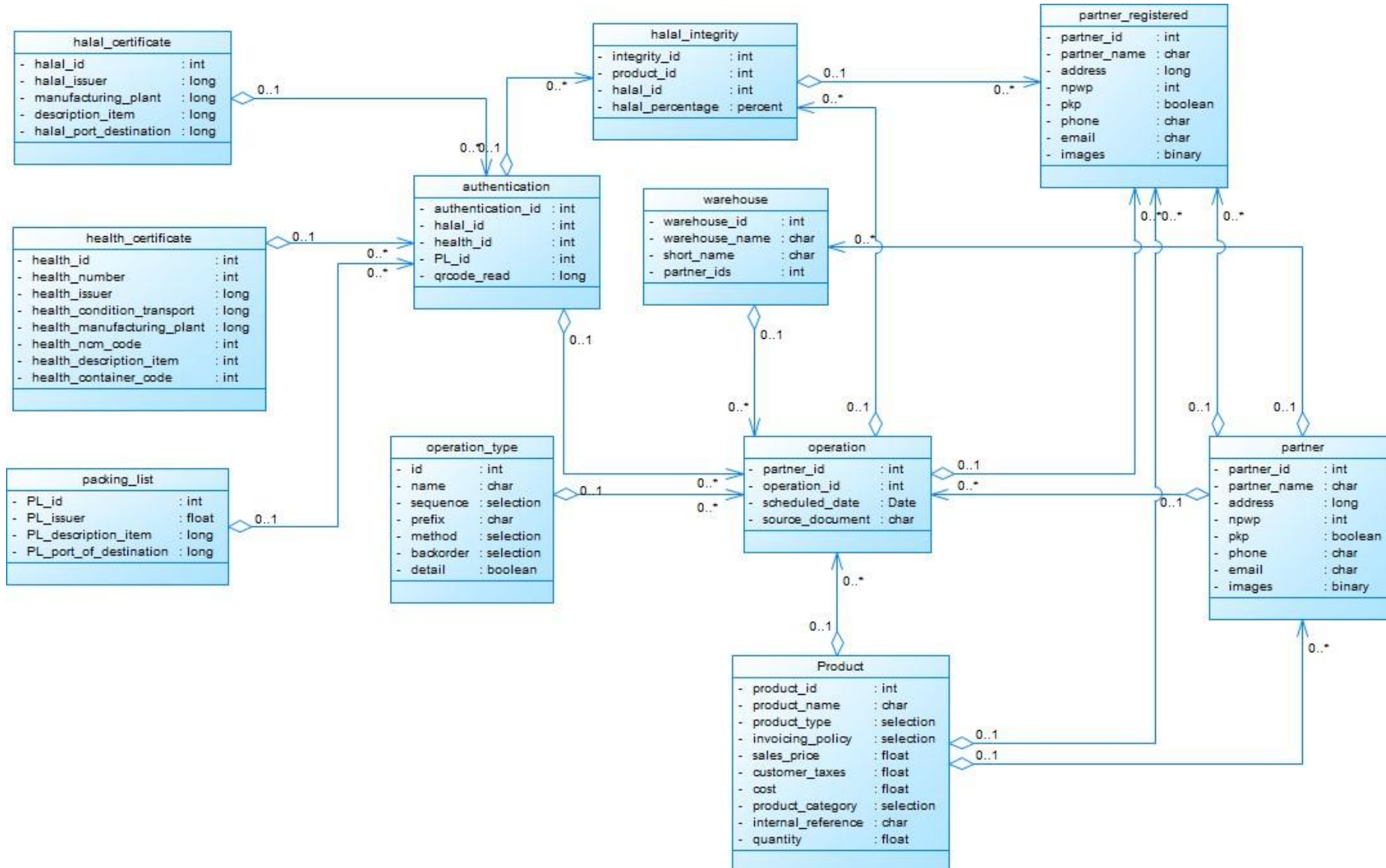
ERP Halal Authentication: Functional Architecture for Inventory



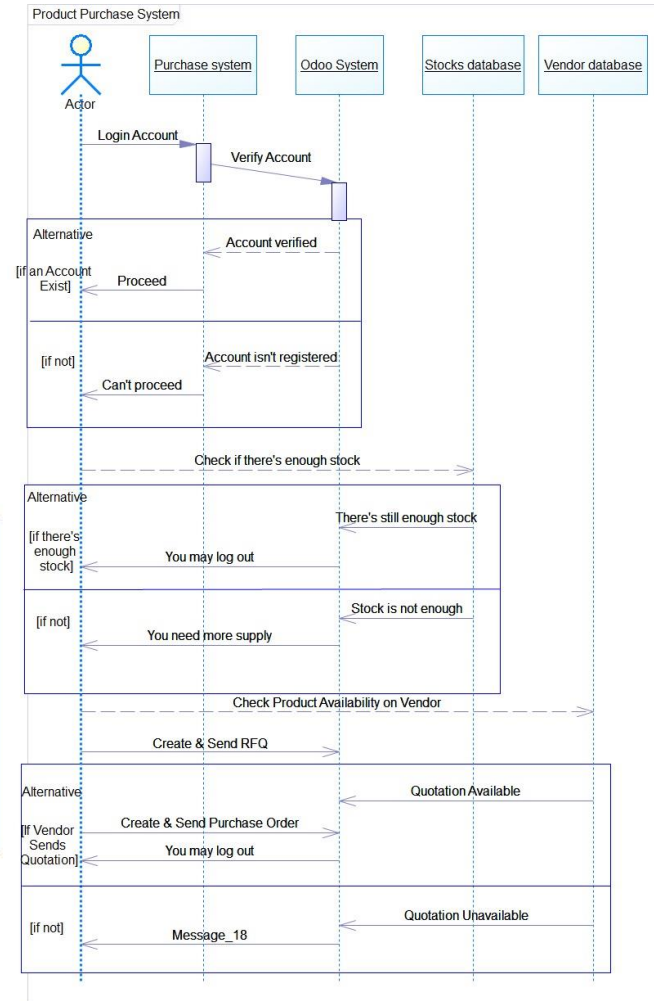
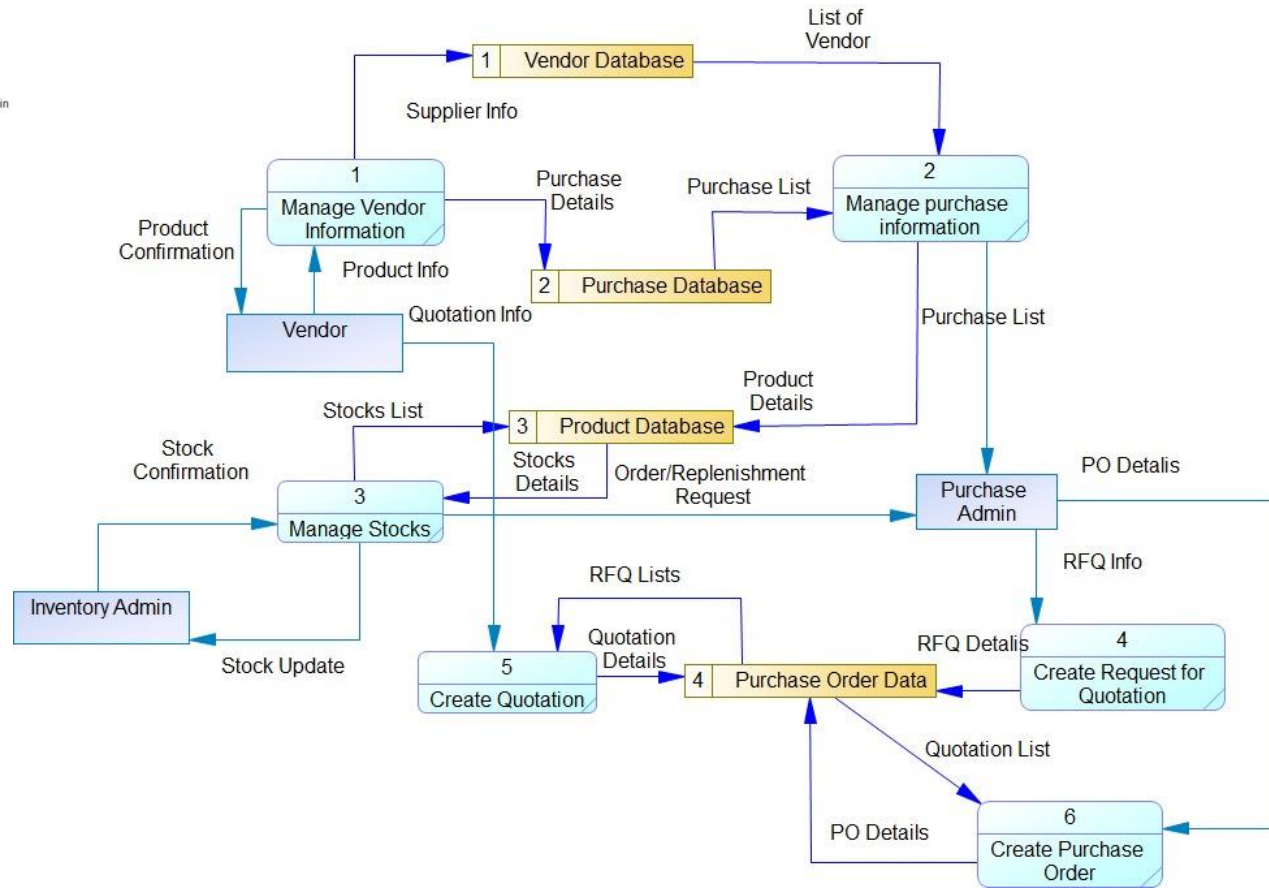
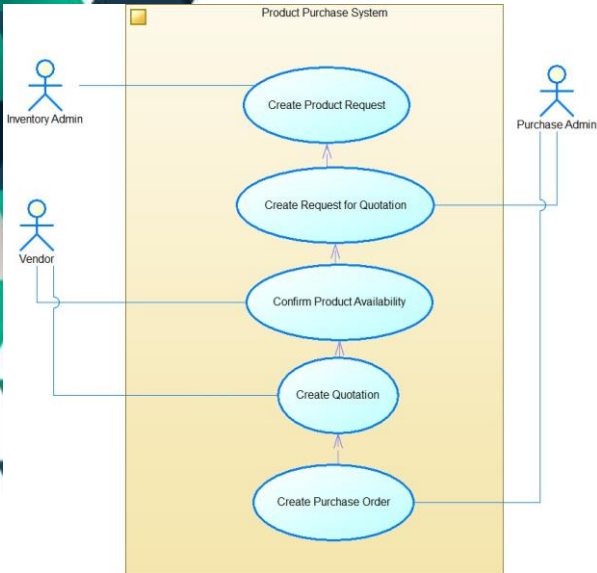
ERP Halal Authentication: Conceptual Architecture for Purchase



ERP Halal Authentication: Conceptual Architecture for Inventory



ERP Halal Authentication: Logical Architecture for Purchase



ERP Halal Authentication: Physical Architecture

Purchase Orders Products Reporting Configuration

New Products [19379371BXABC] Knuckle Documents 0 In: 1 Out: 0 Bill of Materials 0 Putaway Rules Purchased 1,010.00 Units 23 / 47

Replenish Print Labels

Product Name? ☆ Knuckle


Can be Sold? Can be Purchased?

General Information Attributes & Variants **Purchase** Inventory Accounting

Vendor	Company	Price	Currency	Delivery Lead Time
Joe	Minerva S/A (BR)	4.90	USD	25
Cindy	JBS S/A (BR)	4.90	USD	31

[19379371BXABC] Knuckle

19379371BXABC



PO111 HC222 CN333

\$ 735.00

Dashboards Dashboards Configuration

Last 90 Days Country Vendor Buyer Share

SALES

78,682 Purchased

25 Orders

4,280 Quantity ordered

8 days Days to receive

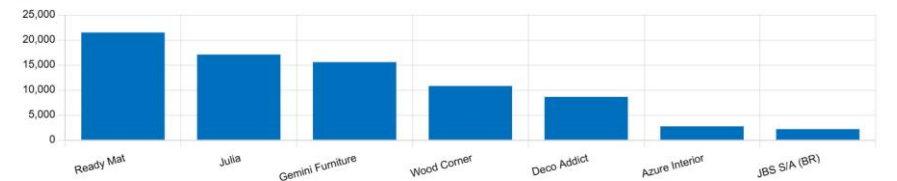
99 % Halal Integrity

99 out of 100

FINANCE

LOGISTICS

Top Vendors by Amount



Inventory Overview Operations Products Reporting Configuration

New Products [19379371BXABC] Knuckle Documents 0 In: 1 Out: 0 Bill of Materials 0 Putaway Rules Purchased 1,010.00 Units 21 / 42

Replenish Print Labels

Product Name? ☆ Knuckle

Can be Sold? Can be Purchased?

General Information Attributes & Variants **Purchase** Inventory Accounting

Attribute	Values
Halal	Halal

Configure

Intelligent ERP Halal Authentication: Data Analytics

No	Document Contents	1	2	3	4	5	6	7	8	9
		PR	Sales & Purchase Contract	Health Certificate	Cargo Description	Inspection Certificate	Halal Certificate	COO	PL	Commercial Invoice

Document Number	Contract #	Health Certificate #	Inspection Certificate #	Halal Certificate #
Document Date				
Document Issuer, Address, Country				

1 Requested Date				
Purchase Order Number				

2 Halal Declaration				
Price				Total CIF
Penalty				
Inspector/ Surveyor				
Payment				

3 Competent Authority				
Local Competent Authority				
Country of Origin				
Country of Dispatch				
Country of Destination				
Declared point of Entry	Jakarta			
Condition for transport/ storage	Frozen (-18 C)			
Lot or Production Date				
Manufacturing Plant		Production Plant	Processing & Packing Plant	
Type of Packaging				

4 Inspection Summary				
Average Net Weight				
Average Gross Weight				
Average Temperature				
Container Temperature Set				
Stuffing Container commenced at				
Stuffing Container completed at				

Data Classifying

5 Cargo Description				
Container Seal Number				

6 Bill of Lading Data				
Slaughterhouse				
Brand				
Slaughter Date				
Processing & Packing Date				

Intelligent ERP Halal Authentication: Data Analytics

Purchase Orders Products Reporting Configuration

Mitchell Admin VerrySuryaHendraw

New Purchase Orders

☆ New

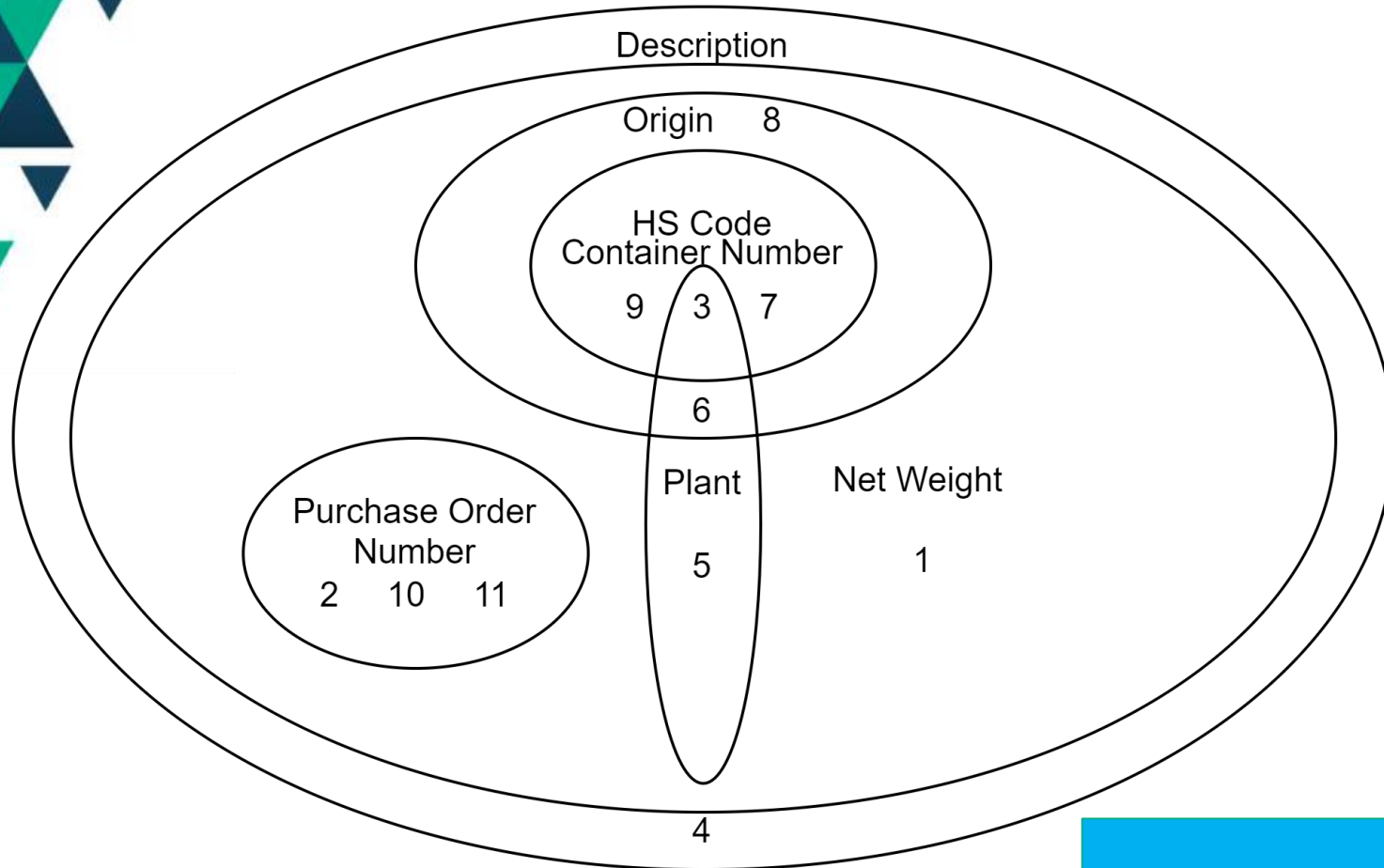
Vendor ?	JBS S/A (BR)	Order Deadline ?	05/25/2024 16:50:37
Vendor Reference ?		Expected Arrival ?	06/23/2024 16:00:00
Currency ?	USD	<input type="checkbox"/> Ask confirmation	No On-time Delivery Data
		Deliver To ?	YourCompany: Receipts

Products Other Information Halal Certificate Health Certificate Cargo Description Inspection Certificate COO Packing List Commercial Invoice

Halal Certificate Number ?	Net Weight ?
Product ?	Gross Weight ?
Production Plant ?	Expire Date ?
Slaughterhouse ?	Document Date ?
Slaughter Date ?	
Processing & Packing Date ?	

Data Classifying

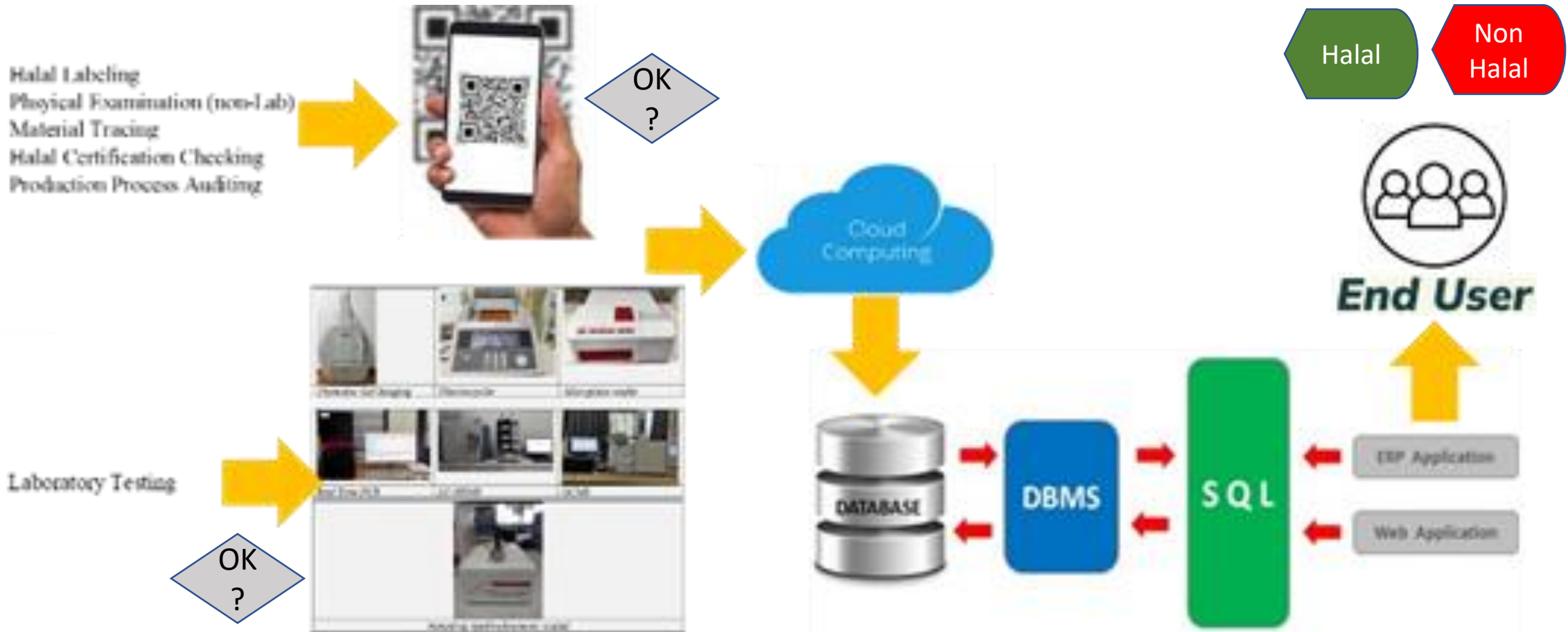
Intelligent ERP Halal Authentication: Data Analytics



Algorithm to ensure the data matching between 9 documents + 2 reports involved

Data Classifying

Intelligent ERP Halal Authentication: Data Analytics



Data Anomaly

Intelligent ERP Halal Authentication: Conclusion

Manual vs
Automatic

NOT Integrated vs
Integrated

NO Data Analytic vs
Business Analytic





Thank you