

**S.I.R.I.A**

**Food traceability systems**

traceability

and

backward  
traceability



Pork meat

---

---

---

---

---

## index

### 1. introduction to the system

### 2. basic modules

- 2.1. basic data sets
- 2.2. incoming stocks of pigs
- 2.3. slaughter plan
- 2.4. slaughter
  - 2.4.1. fresh meat purchase
- 2.5. manufacture
  - 2.5.1. sectioning
- 2.6. further manufacture
  - 2.6.1. bone removal/trimming
  - 2.6.2. dough
  - 2.6.3. use of animal guts for sausages
- 2.7. freeze
- 2.8. seasoning
  - 2.8.1. packaging and shipment
  - 2.8.2. shipment of fresh (not freezed) products

### 3. traceability and backward traceability

- 3.1. traceability
- 3.2. backward traceability

### 4. operational flow-chart

### 5. some of our customers

- 5.1. industria macellazione **GHINZELLI MARINO** spa
- 5.2. consorzio latterie **VIRGILIO**
- 5.3. industria carni del Sud **I.C.S.**

## 1. introduction to the system

### **S.I.R.I.A.**, *application software for the backward traceability of Pork Meat*

*industries* is a specific and complete software application that can be integrated with EGGs web management software and it has been developed to solve specific problems of industries dealing with pork meat slaughtering, processing and trading.

The single and coherent system structure avoids data duplications and all functions in the system have been designed to perfectly match corporate operational needs (for ex. operators have at their disposal functions keys to move across the whole system).

Integrated tools have been designed to be user-friendly and help functions (like searches without codes, guided and customized insertions,..) have been provided in the whole system as well.

System administrators can define the level of control they want to have on the system in order to create a software environment which is in line with habits, working methods and responsibilities of the corporate staff.

## 2. basic modules

### 2.1. basic data sets

The “Basic data sets” module manages data about customers, suppliers and items that are shared by (and so common to) the whole information system.

Operators can search information using “windows” and different search filters (for code, corporate name, item description) or they can be directly suggested where compulsory.

The structure for each database has been created so that it can be exported to standard software packages like Word, Excel, Access and so on.

### 2.2. incoming pig stocks

The system allows operators to manage incoming stocks of pigs starting from the scheduling of their collection. At this time the system collects the first information needed for backward traceability like

- cattleman
- supplier
- agent
- carrier
- loading time
- arrival time
- essential data of the document
- type of pig
- quantity arrived (N°)
- net weight at departure (Kg)
- net weight at arrival
- evaluation at departure (discards, underweight, boars, sows, .....)
- evaluation at arrival (discards, underweight, boars, sows, .....)
- stock homogeneity
- % irregularity in stocks
- confinement
- veterinary block
- veterinary analysis
- number of dead animals
- incoming lot

according to the following screenshots :

Arrival Date/Time	Supplier	Breeding	Lot	Open	Closed
03/03/2009 15.18	BREEDING/SLAUGHTERHOUSE 001085	001085	09062491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07/03/2009 16.14	BREEDING/SLAUGHTERHOUSE 000511	000511	09066411	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07/03/2009 16.20	BREEDING/SLAUGHTERHOUSE 001085	001085	09066491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07/03/2009 16.23	BREEDING/SLAUGHTERHOUSE 001045		09066451	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10/03/2009 13.41	BREEDING/SLAUGHTERHOUSE 001085	001085	09069491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14/03/2009 10.20	BREEDING/SLAUGHTERHOUSE 001085	001085	09073491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14/03/2009 12.17	BREEDING/SLAUGHTERHOUSE 001085	001085	09073492	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14/03/2009 15.38	BREEDING/SLAUGHTERHOUSE 001045	001045	09073451	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17/03/2009 12.52	BREEDING/SLAUGHTERHOUSE 001085	001085	09076491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
21/03/2009 17.26	BREEDING/SLAUGHTERHOUSE 0456		09080241	<input type="checkbox"/>	<input checked="" type="checkbox"/>
21/03/2009 17.28	BREEDING/SLAUGHTERHOUSE 001045	001045	09080451	<input type="checkbox"/>	<input checked="" type="checkbox"/>
21/03/2009 17.30	BREEDING/SLAUGHTERHOUSE 001045	001045	09080452	<input type="checkbox"/>	<input checked="" type="checkbox"/>
24/03/2009 12.06	BREEDING/SLAUGHTERHOUSE 001085	001085	09083491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
28/03/2009 16.27	BREEDING/SLAUGHTERHOUSE 001045		09087452	<input type="checkbox"/>	<input checked="" type="checkbox"/>
28/03/2009 16.29	BREEDING/SLAUGHTERHOUSE 001085		09087492	<input type="checkbox"/>	<input checked="" type="checkbox"/>
29/03/2009 16.23	BREEDING/SLAUGHTERHOUSE 000523		09089241	<input type="checkbox"/>	<input checked="" type="checkbox"/>
31/03/2009 10.47	BREEDING/SLAUGHTERHOUSE 001085		09090491	<input type="checkbox"/>	<input checked="" type="checkbox"/>
31/03/2009 11.51	BREEDING/SLAUGHTERHOUSE 000045		09090321	<input type="checkbox"/>	<input checked="" type="checkbox"/>
31/03/2009 13.36	BREEDING/SLAUGHTERHOUSE 000511	000511	09090411	<input type="checkbox"/>	<input checked="" type="checkbox"/>
04/04/2009 12.44	BREEDING/SLAUGHTERHOUSE 0006688		09094321	<input type="checkbox"/>	<input checked="" type="checkbox"/>
04/04/2009 12.47	BREEDING/SLAUGHTERHOUSE 0006688		09094401	<input type="checkbox"/>	<input checked="" type="checkbox"/>
05/04/2009 12.41	BREEDING/SLAUGHTERHOUSE 0006688		09095241	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07/04/2009 09.02	BREEDING/SLAUGHTERHOUSE 001102	001102	09097511	<input type="checkbox"/>	<input checked="" type="checkbox"/>
07/04/2009 13.32	BREEDING/SLAUGHTERHOUSE 0006688		09097251	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11/04/2009 10.30	BREEDING/SLAUGHTERHOUSE 0006688		09101241	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11/04/2009 15.17	BREEDING/SLAUGHTERHOUSE 0006688		09101401	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11/04/2009 15.51	BREEDING/SLAUGHTERHOUSE 0006688		09101511	<input type="checkbox"/>	<input checked="" type="checkbox"/>
23/04/2009 12.05	BREEDING/SLAUGHTERHOUSE 0006688		09113251	<input type="checkbox"/>	<input checked="" type="checkbox"/>

*List of incoming pigs*



<b>General</b>   <b>Stables</b>		<b>Supplier</b> BREEDING/SLAUGHTERHOUSE 003300		<b>Order Nr</b> 0		<b>Delivery Note</b> N° 1234		<b>Arrival</b> Date 24/04/2009	
<b>Breeding</b> Breeding 003300		<b>date</b>		<b>Date</b> 24/04/2009		<b>Starting time</b> 14.08		<b>Ending time</b> 14.08	
<b>Pig Nr</b> 0									
<b>Transport Information</b>		<b>Declared information in the delivery note</b>							
<b>Animal type</b> PIGS TO SLAUGHTER		<b>Weight</b> 31000		<b>Trailer car</b> 0		<b>Total</b> 31.000,00			
<b>Weight class</b> FROM 160 TO 170		<b>Animal Nr</b> 180							
<b>Agent</b>		<b>Registered information at arrival</b>							
<b>Driver</b>		<b>Gross</b>		<b>Tare</b>		<b>Net</b>			
<b>Matriculation Nr</b> AA 000 BB		<b>Truck weight</b> 45.000,00		<b>Weight</b> 14.500,00		<b>Weight</b> 30.500,00			
<b>Average weight for animal (kg)</b> 169,44		<b>Animal Nr</b> 180							
<b>Average loss in weight for anim (kg)</b> -2,78		<b>Quality check</b>							
<b>Comments</b>		<b>Homogeneity:</b> Homogenous <input checked="" type="radio"/> Heterogeneous <input type="radio"/> % 0							
				<b>Evaluation at arrival</b>					
		<b>Discarded animals</b> n° 0							
		<b>Animals under weight</b> n° 0							
		<b>Male pigs</b> n° 0							
		<b>Sows</b> n° 0							
		<b>Isolated animals</b> n° 0							
		<b>Dead animals</b> n° 0							
		<b>Halted animals</b> n° 0							
		<b>Other</b> n° 0							
<input checked="" type="checkbox"/> <b>CONFIRM</b>		<input type="checkbox"/> <b>EXIT</b>							

*Incoming pig stock detail*

### 2.3. slaughter plan

In function of what the veterinary says, the system allows operators to define the slaughter plan that can be:

- *daily*: the plan must be defined every day: operators list the stocks of pigs to slaughter in that day and the order to follow
- *weekly*: it simply indicates the number of pigs that are supposed to be slaughtered day by day in the week. This function is not compulsory but it can be useful to schedule pig collections in order to optimize the daily production of the slaughterhouse.

The slaughter of all different stocks is scheduled as shown in the following screenshot

Week 18 / 2009  
From 27/04/2009 To 03/05/2009

27/04/2009	28/04/2009	29/04/2009	30/04/2009	01/05/2009	02/05/2009	03/05/2009
Scheduled	Scheduled	Scheduled	Scheduled	Scheduled	Scheduled	Scheduled
N° 0	N° 0	N° 0	N° 0	N° 0	N° 0	N° 0

Arrived stocks and undispached supplier orders with deliveries in the selected week

Supplier (breeder)	Lot	Sublot	Item	Animals Nr	Pig status	Pickup date

Daily slaughter plan for 27/04/2009

Order	Supplier/breeder	Prod.lot	Stock lot	Sublot	Item	Pig Nr
1	ALLEVAMENTO / MACELLO 000334	2009180001	09117071	2	SUINI VIVI DA MACELLO	50
2	ALLEVAMENTO / MACELLO 000330(Allevamento 000330)	2009180002	09114371		SUINI VIVI DA MACELLO	180
3	ALLEVAMENTO / MACELLO 000334	2009180003	09117071	3	SUINI VIVI DA MACELLO	70
4	ALLEVAMENTO / MACELLO 000523	2009180004	09101241	3	SUINI VIVI DA MACELLO	94
5	ALLEVAMENTO / MACELLO 000334	2009180005	09117071	1	SUINI VIVI DA MACELLO	60

Callout: Slaughtered (Red), Slaughtering (Yellow)

PRINT ESTIMATED ARRIVALS PRINT PLAN DISPLAY STABLES EXIT

## 2.4. slaughter

For every lot (incoming animals) the system monitors in real-time the slaughter plan. This can be done thanks to specific functions that record the weight of half parts as well as fat levels and all "wrong" information given about pigs in shipping documents (for ex. wrong age of pigs).

These data are useful to record weight loss, check the number of animals for range, different fat values and wrong information given in shipping papers since companies may decide to apply fines to their suppliers.

At the end of every "cut-line", half-parts are labeled with a unique tag that identifies the production lot and provides information for health bulletins. Inserted information are stored in a proper register that contains information like

- date
- from number ..... to number
- collected from .....
- their use and/or remarks

In manufacture lines the system manages stock changes: on the basis of information about incoming animals, the system advises operators if a stock has to be changed (an alarm "wakes up" the operator). This reduces errors in changing stocks and if something goes wrong operators can always cancel possible "wrong" changes or indicate if a stock has not been changed at all.

Stock	Corporate name	Full stock	Half stock	Half weight	% Completion	Closed
0001	ALLEVAMENTO / MACELLO 000334	50	100	100	100,00%	<input checked="" type="checkbox"/>
0002	ALLEVAMENTO / MACELLO 000330	180	360	102	28,33%	<input type="checkbox"/>
0003	ALLEVAMENTO / MACELLO 000334	70	140	0	0,00%	<input type="checkbox"/>
0004	ALLEVAMENTO / MACELLO 000523	94	188	0	0,00%	<input type="checkbox"/>
0005	ALLEVAMENTO / MACELLO 000334	60	120	0	0,00%	<input type="checkbox"/>

Weight  Kg      N. of half sides in the stock 102      Total Nr of half sides 202

Callout  
 In process  
 Completely slaughtered

CHARGE OFF WEIGHTS    MANUAL WEIGHT    RECORD WEIGHT    ADD PIGS    END OF STOCK    UPDATE    EXIT



Every half-part is labeled with a tag that contains important information for backward traceability: its barcode identifies that specific half part and its stock. From this barcode tag operators can always get important information about slaughtered meat like supplier, breed of origin, number and date of the delivery note and so on.

### 2.4.1. Fresh and slaughtered meat purchase

Slaughterhouses can also buy fresh and slaughtered meat from other suppliers: this represents a further problem connected to traceability issues.

This software application manages incoming meat, creating special stocks of meat (that has already been slaughtered), that are going to be saved in a new database composed by the following information:

- supplier code (in this case it is not a breeding but another slaughterhouse)
- essential data of the incoming document (number and date of the delivery note)
- arrival date and time
- internal lot code assigned at delivery in “yydddxy” format
- details about meat cuts, like:
  - item code
  - total net weight
  - possible supplier's code for the lot (if it is the same for every item)
  - detail of boxes for that item, composed by:
    - ✓ barcode stitched to the box
    - ✓ net weight of the box (if it is weighted for unit)
    - ✓ possible supplier's lot code (if different for different boxes)

Collected data are going to be manually inserted by operators while the system is going to record automatically weights thanks to its connection to balances and it is going to assign automatically boxes to the current stock thanks to the reading of barcodes stitched on the boxes. Used codes can include letters or other types of information/signs so that every meat cut can always be recognized (and operators can always know which cuts are fresh or purchased from different slaughterhouses).

At this point the system loads the stocks of pigs and sends them to processing plants, issuing the related reports.

## 2.5. manufactures

### 2.5.1. sectioning

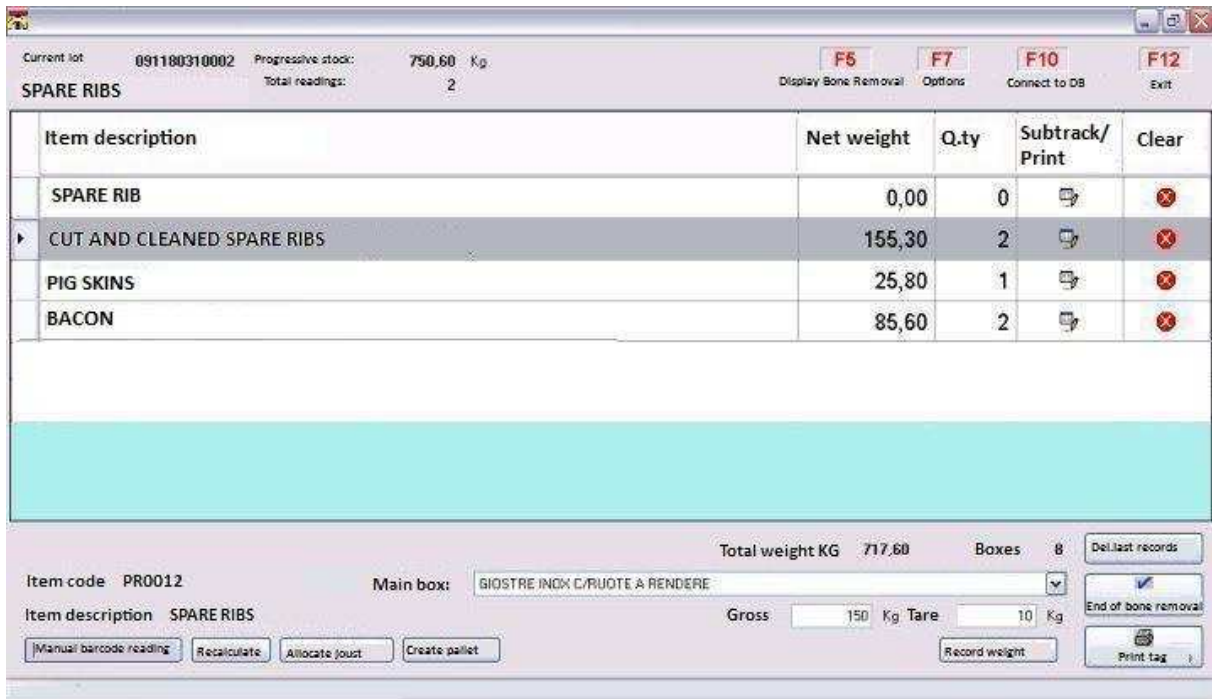
Half parts are now sent to the sectioning area to be cut (hams, lombs and so on). Every single half part or the whole stock is packed into boxes and each one of them has a specific and progressive barcode that cannot be deleted. In this way every code is unique and it contains information about the sectioning date and its stock/stocks. Every load is traced in time so it must contain (unique or different) stocks of pigs that were manufactured on cut lines when boxes have been filled.

## 2.6. manufactures

### 2.6.1. bone removal/trimming

Bone removals and trimming can be monitored, as well. This software application guarantees a complete and precise traceability of hams, picked up from all different runners.

If after trimming hams are hung in different runners, the system allows operators to manage different loads, assigning a new runner and issuing new barcodes for every new load that is going to be stored in cold stores.



## 2.6.2. further manufactures: dough

For all manufactured meat cuts, operators can manage:

- *dough basic note*: management of the different types of hams, their doughs and salt-works.
- *production launches in the ham factory*: this software application allows the management of all different production launches to perform with the indication of the date, number of production launch, item, standard lot, quantity to produce, time and so on.
- *summary of production*: the system allows operators to summarize ingredients used in production and to specify all different purchase lots.
- *print of production launch data*

Lot	Description	Variant	Date/Time	Dough Nr	Done	Delete
0006809	SPIANATA	DOLCE STAMPO 4 + GOLE A CUBETTI	02/04/2009 8.59	1	1	Delete
0006909	DOUGH FOR FRESH SAUSAGES	NAPOLI NORMALE STAMPO 8	02/04/2009 11.48	2	2	Delete
0007009	DOUGH FOR FRESH SAUSAGES	PROMOZIONE STAMPO 7	02/04/2009 14.06	1	1	Delete
0006209	DOUGH FOR FRESH SAUSAGES	PUNTA DI COLTELLO STAMPO 14	02/04/2009 16.40	3	3	Delete
0006309	DOUGH FOR FRESH SAUSAGES	PROSCIUTTO RM STAMPO 4	02/04/2009 16.40	1	1	Delete
0006409	DOUGH FOR FRESH SAUSAGES	MISTA BOVINA STAMPO 4	02/04/2009 16.40	2	2	Delete
0006509	DOUGH FOR FRESH SAUSAGES	LUGANEGA/MACINATA STAMPO 4	02/04/2009 16.41	3	3	Delete
0006609	DOUGH FOR FRESH SAUSAGES	NAPOLI NORMALE STAMPO 8	02/04/2009 16.41	2	2	Delete
0006709	DOUGH FOR FRESH SAUSAGES	PROMOZIONE STAMPO 7	02/04/2009 16.42	2	2	Delete

### 2.6.3. further manufactures: use of animal guts for sausages

The system displays the list of dough lots with their quantities and lists prepared lots up to the previous day. As soon as dough lots are selected, operators can display the list of final products (level 1) that you can get from them: operators can select the one they really want to produce and the requested quantities.

As soon as the final product to get has been selected, the system sends a request to the warehouse keepers so that they can prepare ingredients needed to get the final product. The warehouse keeper can display requests as well as components and ingredients needed to dispatch the request. When everything is ready, operators have to indicate picked-up quantities and their related lots.

Once everything has been dispatched, the request status moves to "accomplished": the list of picked-up components and their related quantities is linked to that production lot.

The system allows then operators to manage in real time the whole process.

The screenshot shows a software window titled 'Animal guts' with a date dropdown set to 'April 23rd 2009'. The main area contains a table with the following data:

Code	Item description	Code	Variant description	Estimated Qty
PR00102	SALAME NAPOLI BOLLO ROSSO 350gr	ST	STANDARD	2.550,00
PR00104	SALAME NAPOLI BOLLO BLU 700gr	ST	STANDARD	250,00
PR00113	SALAME NAPOLI BOLLO ROSSO 800gr	ST	STANDARD	1.500,00
PR00201	SALAME SALSICCIA NAPOLI DOLCE 400gr	ST	STANDARD	500,00
PR00901	MORTADELLA BOLLO BLU	15CP	15 kg C/PSTACCHI	1.500,00
PR30011	SALSICCIA AL FINOCCHIETTO	ST	STANDARD	145,00

At the bottom of the window, there are four buttons: 'Exit', 'Add', 'Change', and 'Delete'.

## 2.7. freeze

After their slaughter, some “cuts” (for example discards, fat-trimming, pigskins and so on) are packed and sent to freezing “tunnels” in order to be quickly frozen, stored in a warehouse and then packed and shipped.

ID Trasfer.:  Box Id F00169576 F00169563  
 Weight date/Time:     
 Family LARD  
 Item LARD  
 Pallet   
 Boxes  N°   
 Stocks  
  
 Lots:

N°	Lot barcode	Box Nr	Net weight	Freeze date	Expiring date
1	LS 200816 000026	6	119,5	14/04/2008	14/10/2009
2	LS 200817 000014	14	176,5	21/04/2008	21/10/2009

Print expiring date  
 Exp.Date   
 Gross W.KG  +  
 Pallet tare  -  
 Box tare  -  
 Net weight Kg

The system assigns a freezing lot which is then linked to barcode tags and so to the stocks in the box. These information are going to be printed by the system on a tag, stitched on the box before it comes into the freezing area.

## 2.8. seasoning

Some cuts, coming out from the sectioning (bacon,..) as well as the salami coming out from processing plants, are then sent to the seasoning area. The system allows operators to identify products and all the different cells with barcodes: reading the barcode tags, the system traces all movements of salami and any type of sausage in the warehouse and information are then stored in real time in the central system.

Using reports and different graphic display options, operators can display the status of the seasoning warehouse whenever they want.

## 2.9. packaging and shipment

Considering information collected during the previous steps, operators can check all picked-up boxes from waiting cells and they can also check that those products match the ones requested by customers as well as shipping papers that have been issued (delivery notes and requested certifications).

In this phase the system collects all information about the destination of finished products

- customer
- agent
- carrier
- departure time
- essential data of the document
- type of meat
- weight at departure
- weight at arrival
- shipping lot

### 2.9.1. shipment of fresh and frozen meat (not packed)

Some of the half parts produced may not be manufactured again but they can be shipped right after slaughter. In this case the system allows operators to manage their shipment using special equipments placed near the different shipping points.

A specific software interface allows operators to select customers and destinations, add weights and lots to get information needed by the management software interface to issue bills and possible certification to include in the shipment.

### 3. traceability and backward traceability

The traceability and backward traceability modules allow the company to follow slaughtered meat from the entrance of animals (and the related supplier) up to their final destination (the customer) and backwards.

#### 3.1. traceability

Traceability is given by all information related to the poultry stock (“lot”) that goes through the slaughterhouse: from the supplier’s document to the customer’s one, considering stalling, slaughter, selection, store and shipment as well.

Every new issued barcode tag is linked to the previous one in order to keep all information previously collected.

a new barcode tag is issued for every manufacture done (sectioning and packaging) and it is linked to the previous one to save original information .

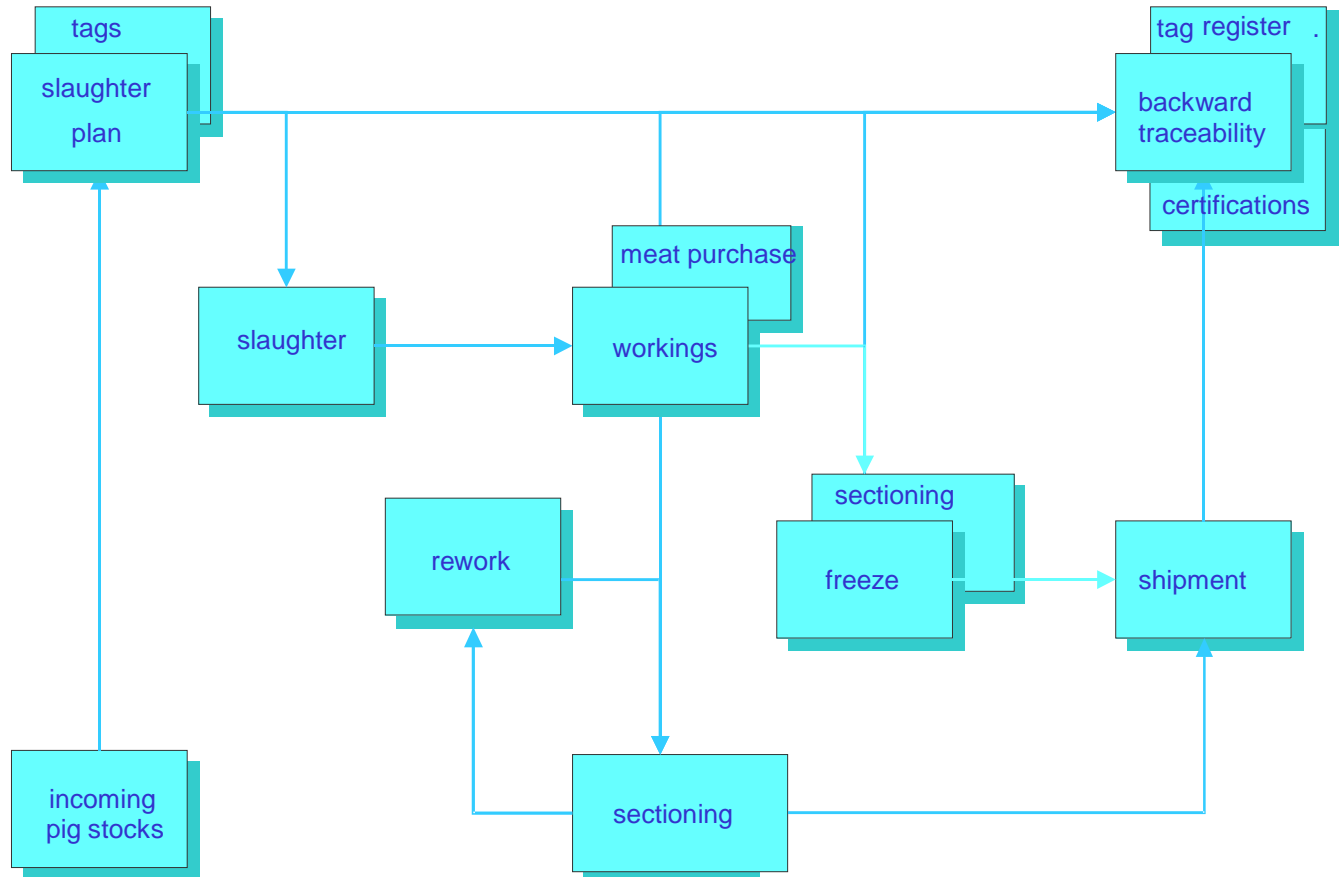
#### 3.2. backward traceability

After the shipment the system allows operators to get information about the animals' Origin (their country of origin, breed, sex, company that owned them for the last time, slaughter lot, sectioning lot, packaging lot and so on) up to the final customer for every single meat cut as well as for every lot/box.

- origin of pigs (supplier, country of origin, race, sex, company that owned the animal for the last time, slaughter lot, sectioning lot, packaging lot and so on)
- essential data of the stock of pigs (number and date)
- essential data of the slaughter and/or of manufactures (number, date, starting time, ending time)

## 4. operational flow-chart

The operational flow-chart is the following



## 5. some of our customers

### 5.1 industria macellazione **GHINZELLI MARINO** spa

via I° maggio, 28 Viadana (MN) - Italy

### 5.2 consorzio latterie **VIRGILIO**

viale della favorita, 19 Mantova - Italy

### 5.3 industria carni del Sud **I.C.S.**

AREA ASI - LOC. PASCAROLA Caivano (NA) - Italy