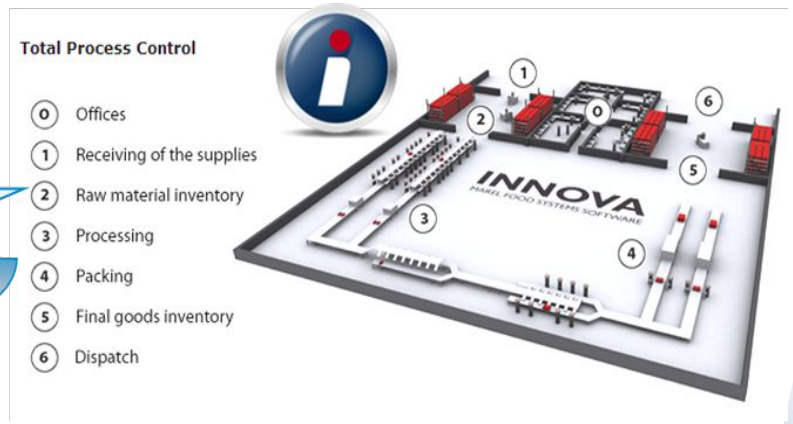
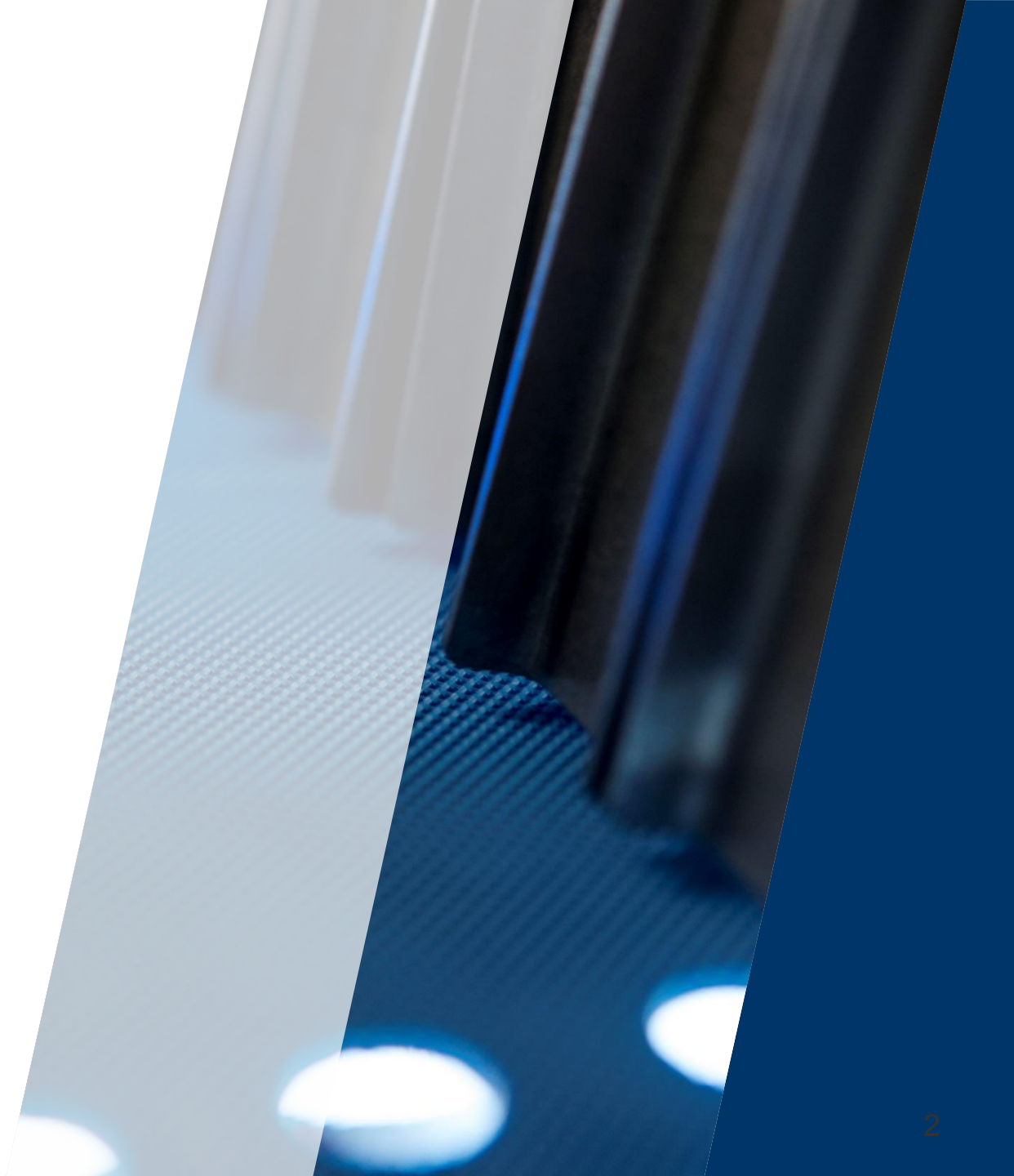
Innova & PDS-NT Overview



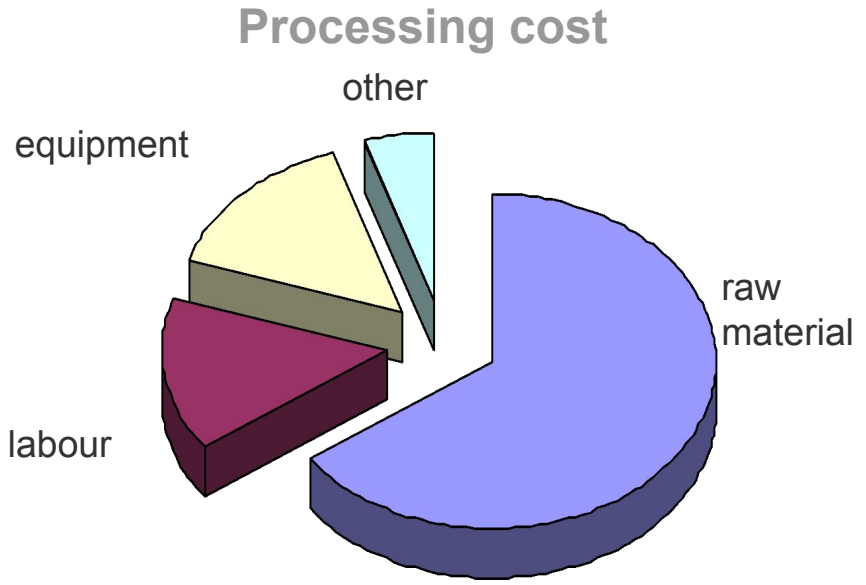
ADVANCING
FOOD PROCESSING

Tabel of content



Innova and PDS-NT: Why?

- Maximize added value and reduce cost
- Process each bird into its most profitable form
- Provide the required data for efficient production management
- Obtain information of each individual bird throughout the complete process
- Data collection and product allocation
- Traceability



YOUR DAILY CHALLENGES

YIELD

UPTIME

EFFICIENCY

QUALITY

TRACEABILITY

INVENTORY LEVELS

INVENTORY LOSSES

GIVEAWAY

DELIVERY ACCURACY

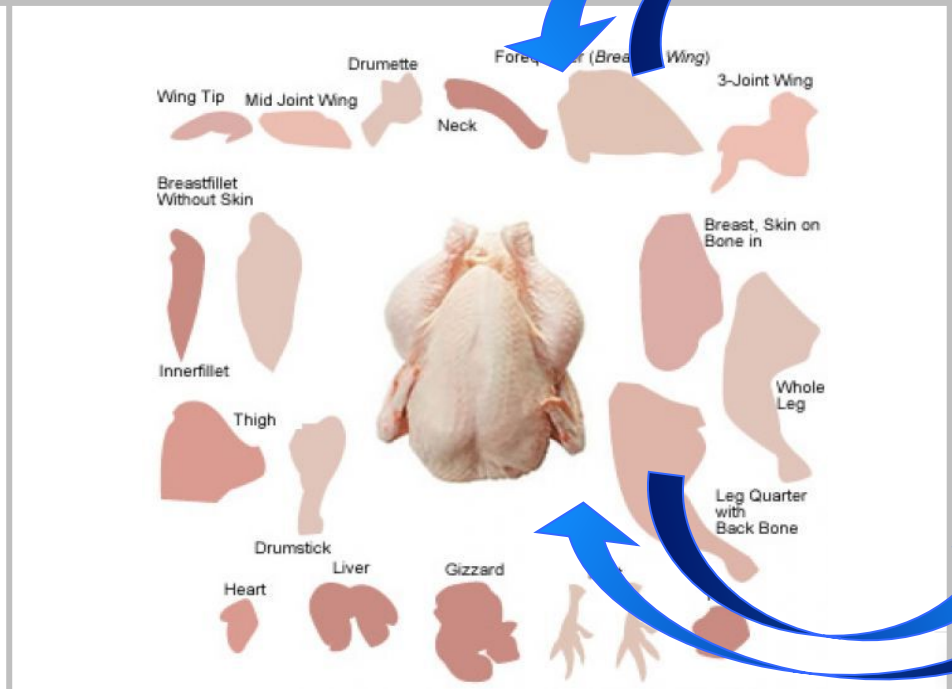

THE FUTURE OFFICE OF PRODUCTION MANAGEMENT
Production Performance
MONITOR
CONTROL
INNOVA
Processing Software

Effective and efficient product allocation

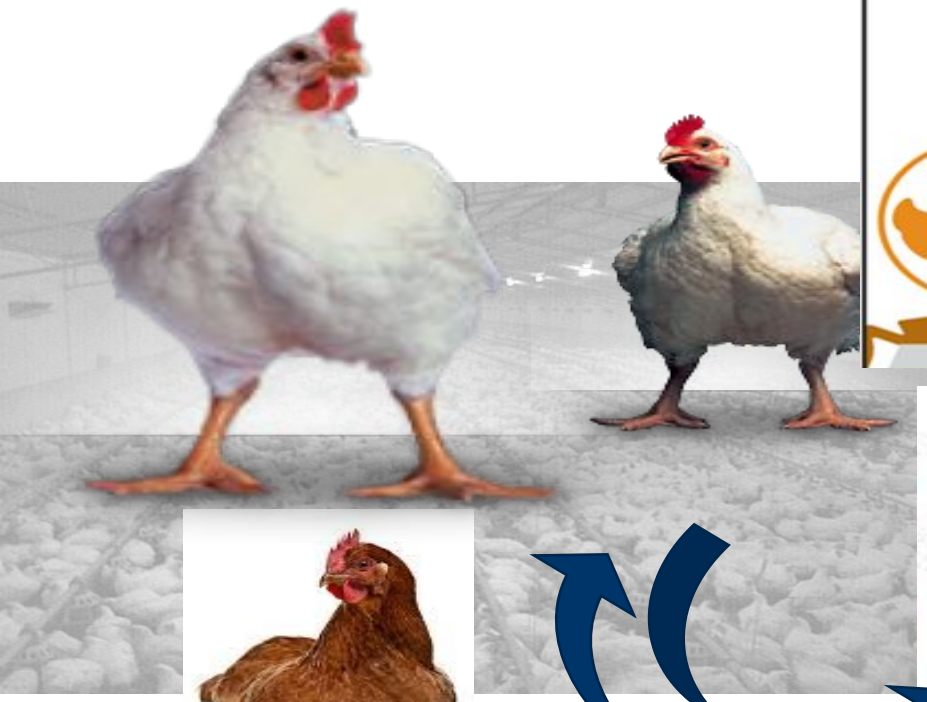
- Deliver your customers
  - Right products
  - Right time
  - Right volume
- In an efficient way
  - Max added value out of your raw material
  - Optimal processes and equipment utilization

Supply versus Demand

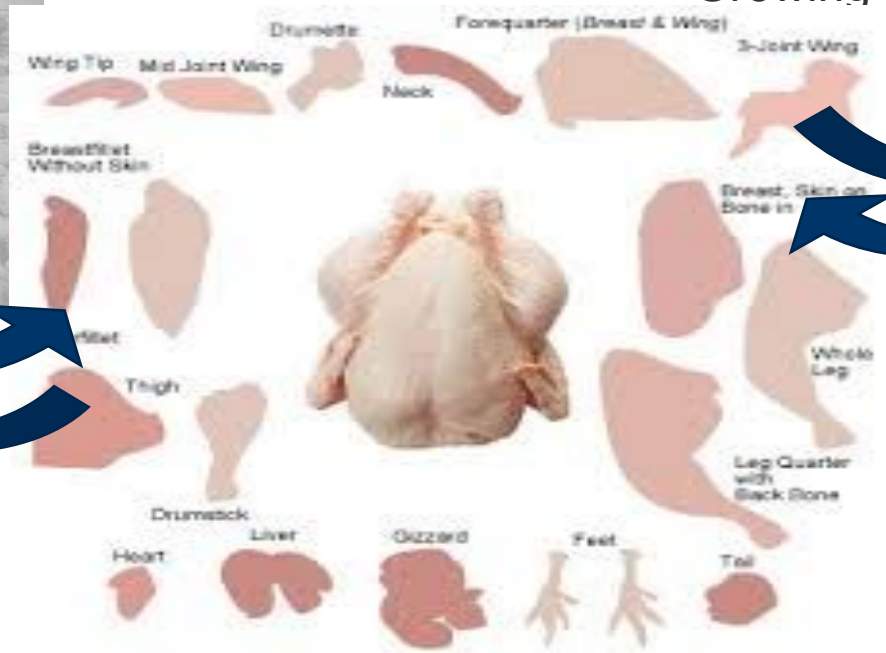
- Growing product assortment
- Flock types, weight ranges, free range, GMO free, …



Supply □□ Demand

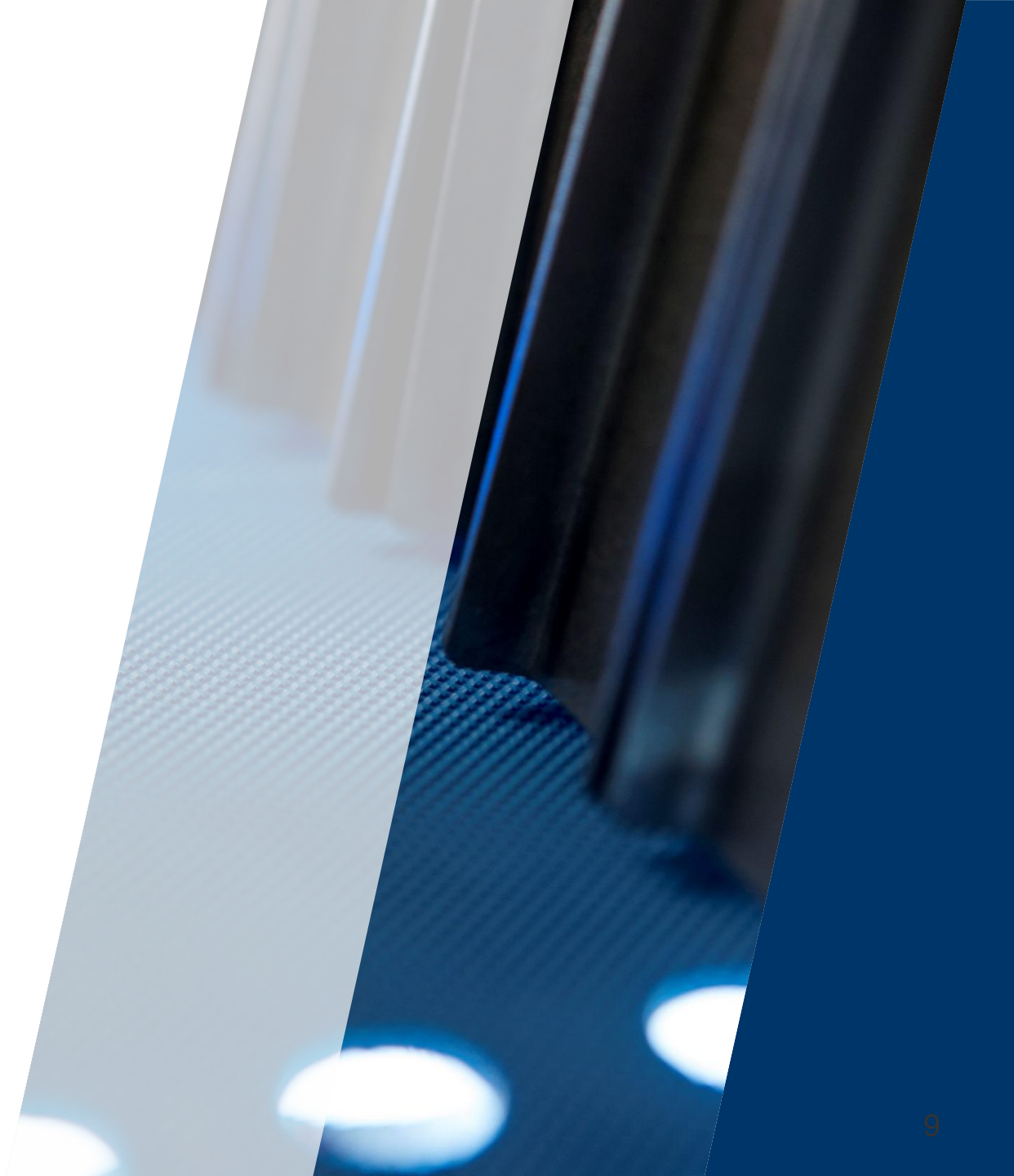


Growing product assortment



Flock types, weight ranges, free range, GMO free,…..

Tabel of content



INNOVA

Empowers food processors

- ✓ Control production
- ✓ Monitor in real time
- ✓ Improve performance

- Device & Process Control
- Weighing & Labeling
- Order Processing & Planning
- Logistics
- Quality Control
- Traceability
- Performance Monitoring
- Integration Services

ACCOUNTING SYSTEMS / ERP

Purchase orders | KPIs | Inventory status | Sales orders

DEVICE AND PROCESS CONTROL

WEIGHING AND LABELING

QUALITY CONTROL

PERFORMANCE MONITORING

INNOVA

Empowers food processors

ORDER PROCESSING AND PLANNING

LOGISTICS

TRACEABILITY

INTEGRATION SERVICES

Receiving | Inventory | Processing | Packing | Inventory | Dispatch

CONTROL PRODUCTION - MONITOR IN REAL TIME - IMPROVE PERFORMANCE

GET EMPOWERED WITH INNOVA

CONTROL PRODUCTION

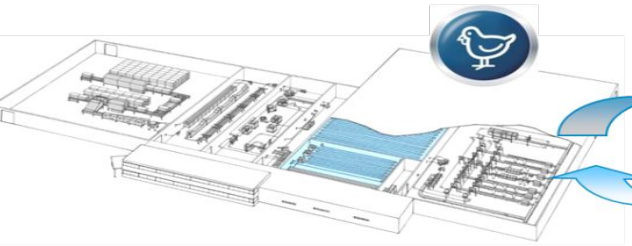
- Overview of complete value chain
- Integration between equipment
- Integration with other systems

MONITOR IN REAL TIME

- Reliable data collection
- Direct response to deviations
- Dashboards & status reports

IMPROVE PERFORMANCE

- Accurate delivery
- High level of quality
- Traceability & food safety
- Maximum yield & throughput



Control production

- Overview of complete value chain
- Integration between equipment
- Integration with other systems

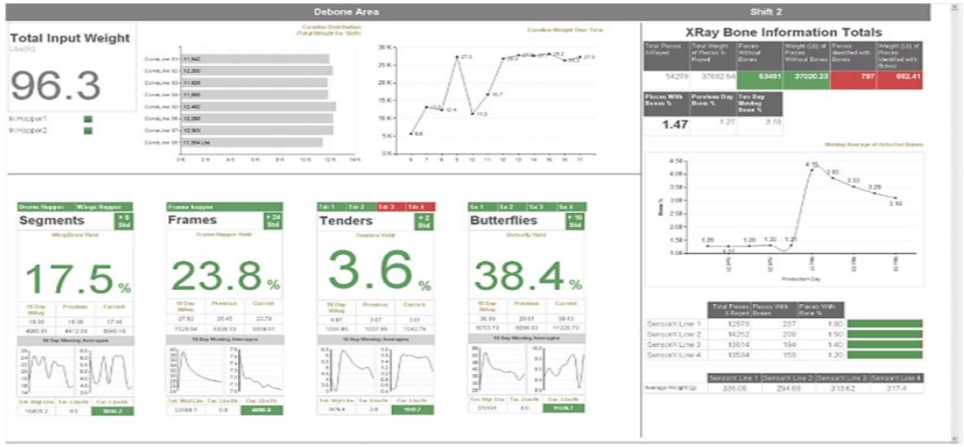
Monitor in real time

- Reliable data collection
- From receiving to dispatch
- Dashboards and status reports

Improve performance

- Maximize yield and increase throughput
- Maintain high level of quality
- Traceability and food safety

Dashboarding – Examples



Why Implement MES ?

- Specifically designed for
  - Manufacturing Execution and Device Support
  - Handling and processing hugh amounts of registrations
  - Quick response times to high speed equipment (i.e. Cut-Up Lines)
  - Holding data/registration on detailed level (Items & Packs)

Smaller, less complex and semi-fixed data models compared to ERP systems

Uses simplified user interfaces on shop-floor for fast and easy operations

Should be seen as a complementary system to ERP

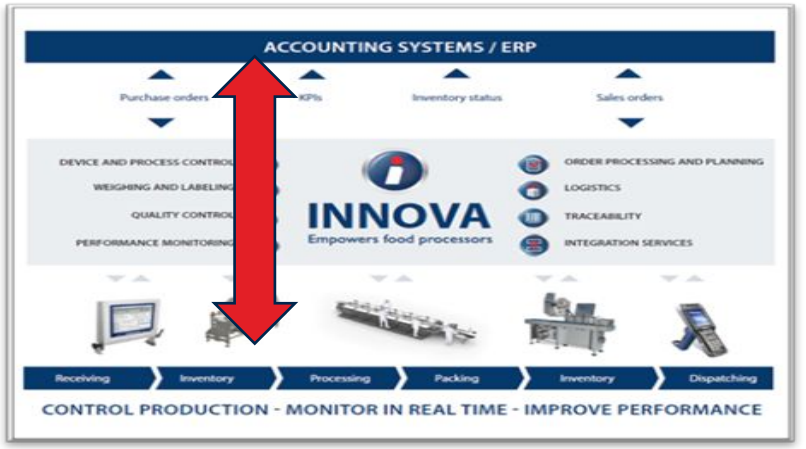
Serves a the technical and integration layer to the shop-floor equipment and PLC’s

Integrated solutions – horizontal integration

- Linking processing steps together
- Prevent sub optimization
- Example fillets

  - Change flock: different weight
  - Change order: different batches/packs
    - Change SensorX program
    - Change batching program grader
    - Change settings checkweigher
    - Change settings WPL
    - All changes can be done centrally from Innova

Integrated solutions – vertical integration



Link with equipment:

Collecting data from equipment for monitoring and reporting

Centralized control of equipment

Innova as part of our customers complete IT systems infrastructure:

Enter all data only once:

- Sales orders from ERP to Innova
- Order progress from Innova to ERP
- Master data from ERP to Innova
- Stock levels from Innova to ERP

Innova – Modules & Processes

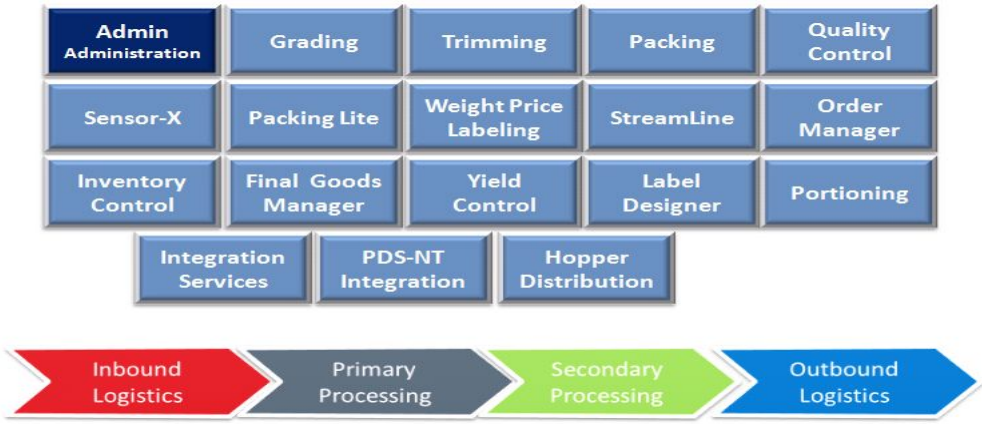
Grading	Trimming	Portioning	Packing	Quality Control
Sensor-X	Packing Lite	Weight Price Labeling	StreamLine	Order Manager
Inventory Control	Final Goods Manager	Yield Control	Label Designer	Integration Services
	PDS-NT Integration	Hopper Distribution	OEE	

WORKING IN PARTNERSHIP WITH OUR CUSTOMERS WORLDWIDE

STORTEBOOM · Emsland Frischgeflügel · PLUKON food group · ABALIOĞLU · PERDUE · Indolina · Tegel · Danpo · HAZELDENE'S · FACCENDA · ProView Foods · Sun chef · Tyson · Koch Foods · Moy park · erpiliç · Real Fresh 참프레 · Foster Farms · Pilgrim's Pride · Boscher · brf · CEDROB

Innova base

Innova Administration



- Kernel of the Innova system
- Latest technology from Microsoft & SQL Server database

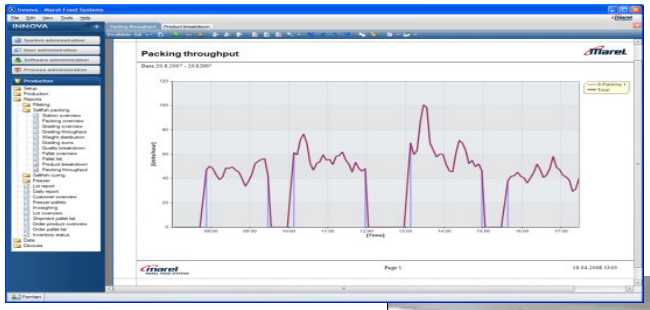
- Development platform:
  - Microsoft.net using C#
- Database:
  - Microsoft SQL
- Reporting:
  - Dev Express as standard
  - Support for Crystal Report for customer reports and plug-in in Innova User Interface
- PC Client OS:
  - Windows

Innova Packing

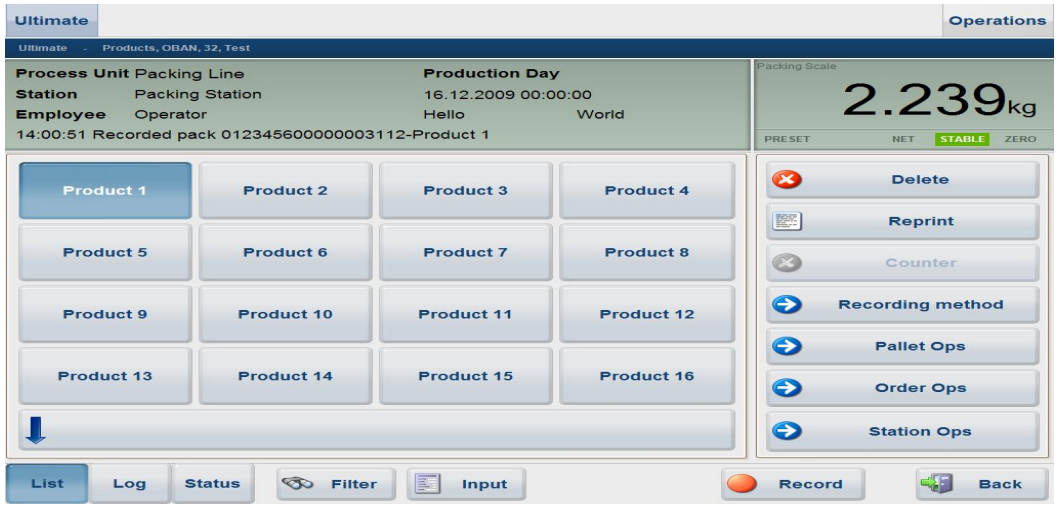
ADVANCING
FOOD PROCESSING

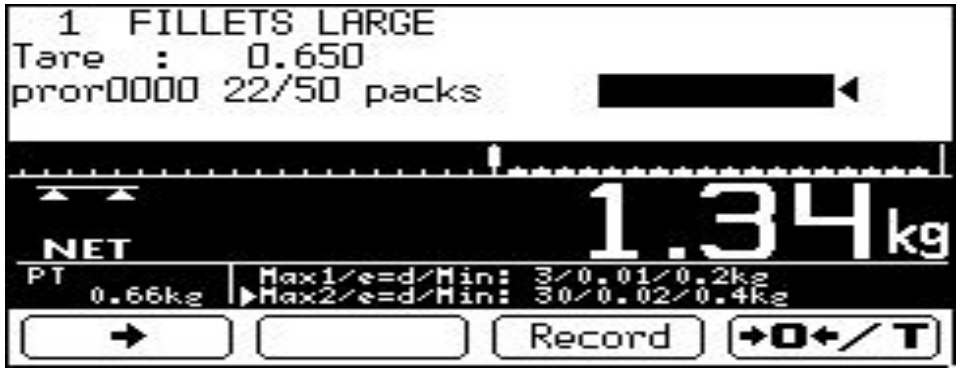
Innova Packing

- Innova offers simple as well as advanced packing and labeling solutions with full inventory, palletizing and order processing capabilities
- The system provides full support for
  - “work in process weighing”
  - inventory control
  - packing
  - giveaway monitoring
  - finished goods outer case marking
- Orders can be processed online, pallets can be built automatically and all labels printed are based on time data
- Data transferred to ERP system as production an stock transfers



Packing stations





Employee Login/Logout

- Logging in and out per station or department/line

Personal id-tags

Yield and throughput Report

Yield and throughput

Date:24.4.2006 - 19.4.2008
Purchase order: =Ajax #21

Process unit	Input (kg)	Output (kg)	Input time	Output time	Input kg/min	Output kg/min	Input vs. average	Output vs. average	Yield %
Filleting 1	49.756,7	19.214,2	09:17	18:07	89,2	17,7	102,6%	73,8%	38,62%
Filleting 2	55.738,0	34.540,5	11:02	21:07	84,1	27,2	96,8%	113,3%	61,97%
Filleting 3	60.465,2	33.827,8	11:01	20:20	91,4	27,7	105,2%	115,4%	55,95%
Filleting 4	54.124,5	27.834,1	10:11	19:54	88,5	23,3	101,8%	97,1%	51,43%
Filleting 5	47.060,8	27.615,8	09:42	19:54	80,8	23,1	93,0%	96,3%	58,68%
	267.145,2	**143.032,2**	**51:15**	**99:25**	**86,9**	**24,0**			**53,54%**

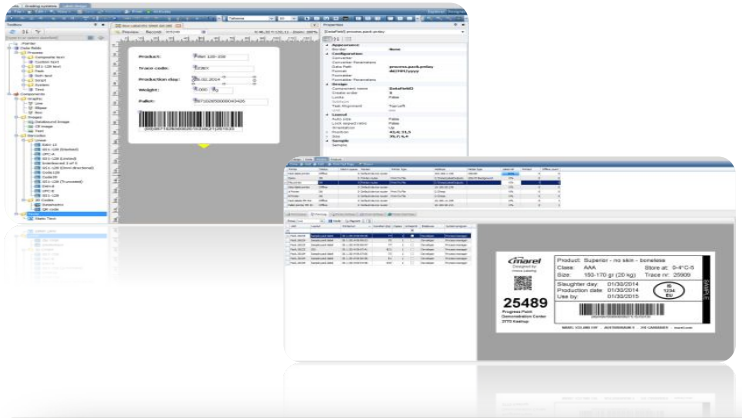
Innova Label management

ADVANCING
FOOD PROCESSING

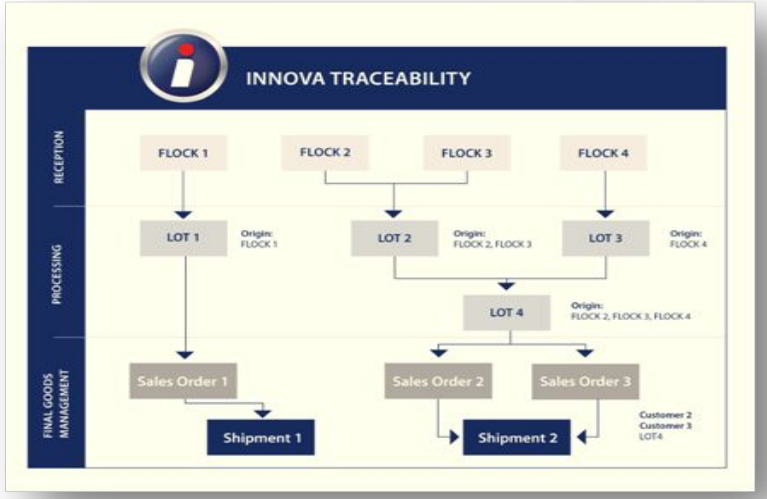
Move away from preprinted labels

Main features Labeling

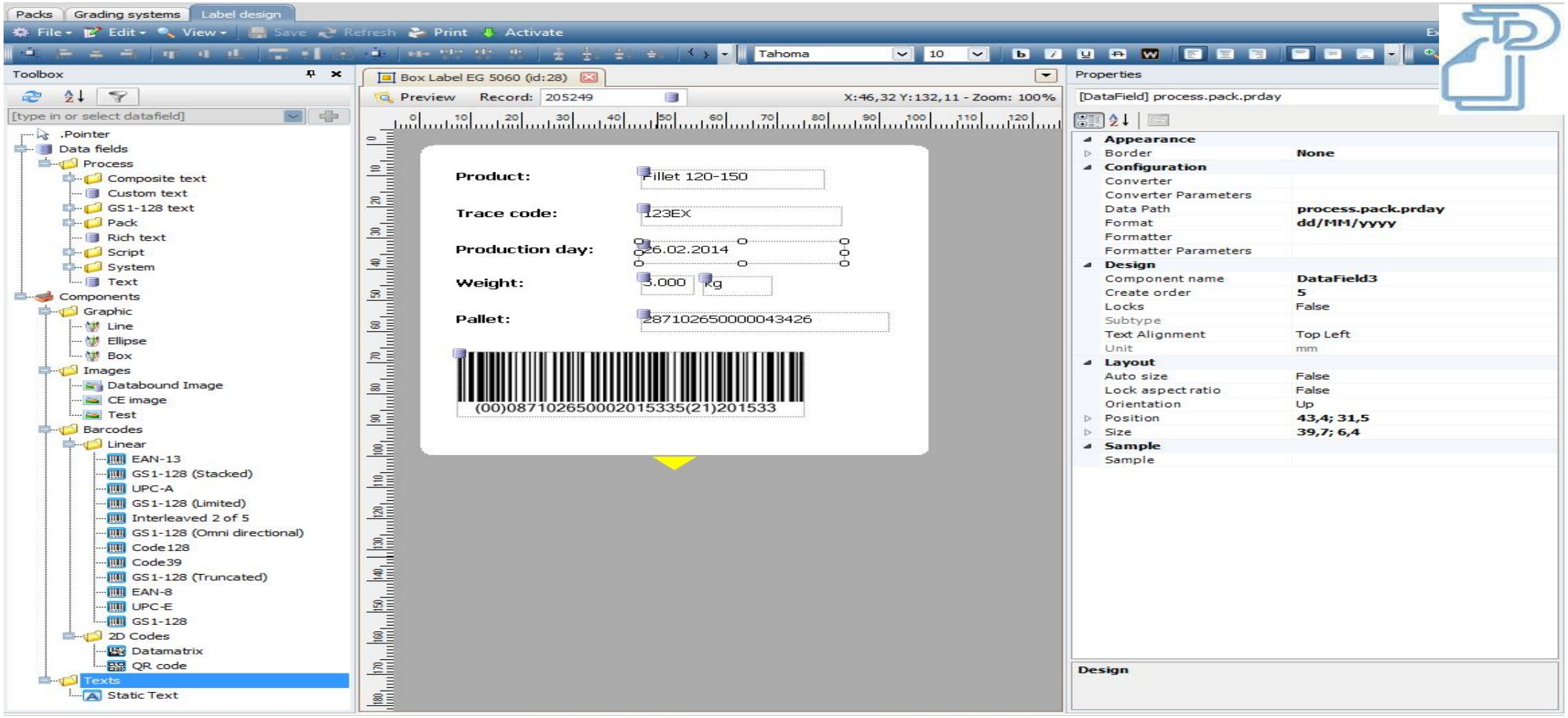
- Easy to design labels with visual designer
- Full integration with the Innova production system for product informations and settings suchs as:
  - Product codes and names
  - Date off-sets
- Languages, customer specific descriptions, barcode
- Label management
- Fast print speeds secures increased throughputs
- Printer management to allow for increased up-time with early warnings
- A labeling solution specifically designed for the food industry



- Plays an important role in traceability



Label designer – WYSIWYG and „drag & drop“



Printer support

- Intermec, Sato, Datamax & Zebra printers
  - Native support, does not use Windows drivers
- Any printer with a Windows driver
- Delford WPL‘s and OCM‘s
  - Label designs can also be used for other printers
- Support for 2D barcodes

Innova Grading & Batching

Innova Grading

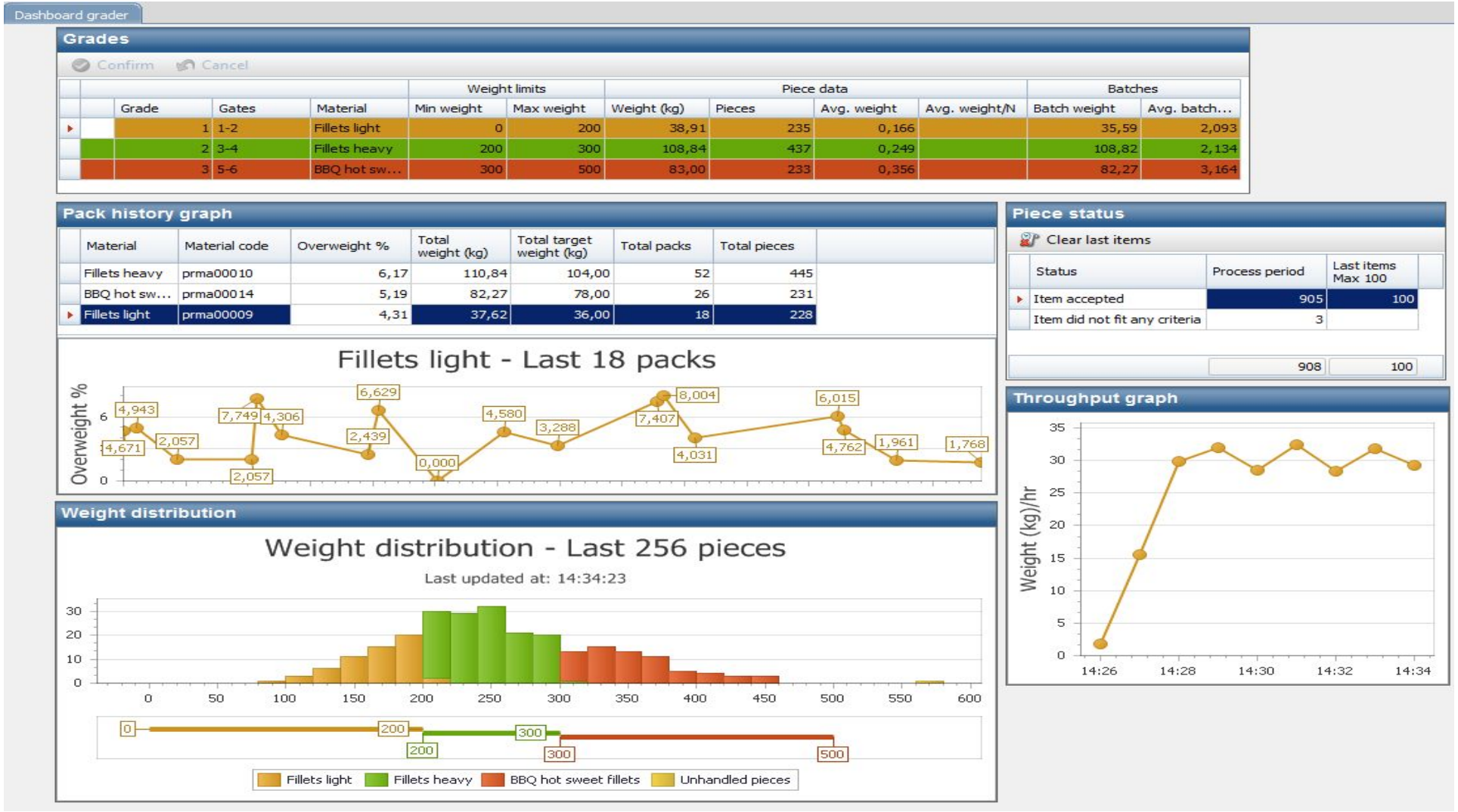
Main Purpose

Controls and monitors grading operation

key benefits:

- Manages all types of graders in one system
- Records information about a graded product
- Real-time grader control and moni
  g, or

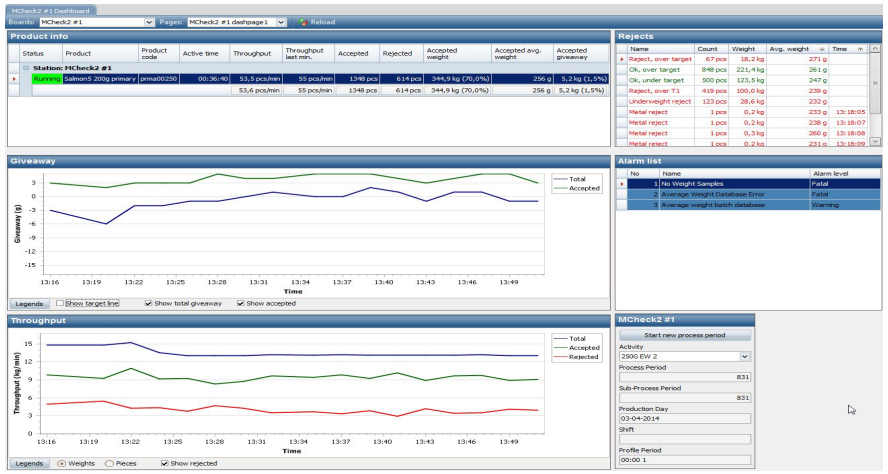
Innnova Grading - Real time monitoring



Innova Checkweighing

Key benefits

- Real-time monitoring allows for intervention if performance deviates from expectations.
- Centralized remote configuration of check weighing devices.
- Centralized remote control and monitoring of check weighing devices.
- Supports sharing of check weighing programs between multiple devices.
- Reports allow historical analysis of give-away results.



E-weighing overview

E-weighing overview

Date:15-06-2009 - 19-06-2009
Break on process period

Process Unit: CW1 RF5 sim 2 **Process Period:** 3872 2009-06-18 11:02 - 11:04

Batch	Product	Units	Accepts	Rejects	Avg wgt (kg)	Avg wgt acc (kg)	Tot wgt (kg)	Tot wgt acc (kg)	Accept Over	Accept Under	Accept <T1	Reject Over	Reject >T1	Reject >T2	Reject Under
1	100g	10	0	10	0,105	0,000	1,0	0,0	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%

Process Unit: CW1 RF5 sim 2 **Process Period:** 3873 2009-06-18 11:04 - 11:06

Batch	Product	Units	Accepts	Rejects	Avg wgt (kg)	Avg wgt acc (kg)	Tot wgt (kg)	Tot wgt acc (kg)	Accept Over	Accept Under	Accept <T1	Reject Over	Reject >T1	Reject >T2	Reject Under
1	100g	190	0	190	0,098	0,000	18,6	0,0	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	100,0%

Process Unit: CW1 RF5 sim 2 **Process Period:** 3874 2009-06-18 11:06 - 11:15

Batch	Product	Units	Accepts	Rejects	Avg wgt (kg)	Avg wgt acc (kg)	Tot wgt (kg)	Tot wgt acc (kg)	Accept Over	Accept Under	Accept <T1	Reject Over	Reject >T1	Reject >T2	Reject Under
1	100g	297	242	55	0,100	0,101	29,7	24,4	49,2%	31,6%	1,3%	3,5%	0,3%	10,7%	3,5%
2	100g	294	252	42	0,100	0,101	29,3	25,4	52,0%	33,0%	1,6%	0,4%	0,3%	11,5%	1,2%
3	100g	260	226	34	0,100	0,101	26,0	22,8	54,6%	31,6%	1,4%	0,8%	0,0%	11,2%	0,3%

Process Unit: CW1 RF5 sim 2 **Process Period:** 3875 2009-06-18 11:15 - 13:19

Batch	Product	Units	Accepts	Rejects	Avg wgt (kg)	Avg wgt acc (kg)	Tot wgt (kg)	Tot wgt acc (kg)	Accept Over	Accept Under	Accept <T1	Reject Over	Reject >T1	Reject >T2	Reject Under
1	100g	292	249	43	0,100	0,101	29,3	25,1	58,6%	26,0%	1,3%	2,6%	0,0%	11,2%	0,3%
2	100g	294	258	36	0,100	0,101	29,4	26,0	56,4%	30,5%	1,6%	0,4%	0,0%	10,5%	0,6%
3	100g	298	263	35	0,100	0,101	29,8	26,5	54,2%	33,1%	1,6%	1,5%	0,0%	9,1%	0,6%

Weight distribution chart, E-weighing job

Weight distributions, chart mk2

Date:01-03-2009 - 11-03-2009

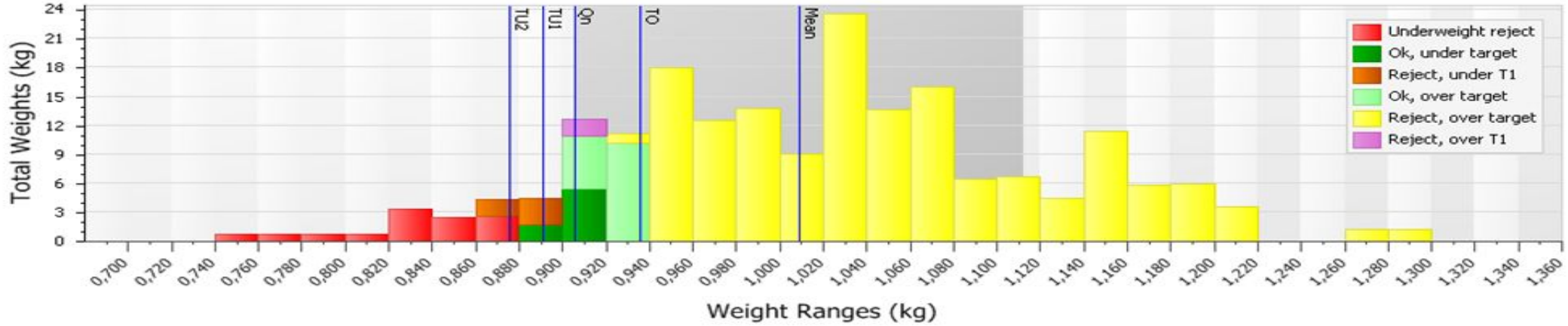
Process period: = (All), Process unit: = (All), Production lot: = (All), Lot: = (All), Device: = (All)

Process Unit:	CW1 RF5 tgcly	**Weight:**	197,813 kg	**Avg Wgt Accepted:**	916,0 kg
Process Period:	2940 - 09-03-2009 (09:44-08:12)	**Units:**	196	**Std.Dev Accepted:**	13,4 g
Device:	CW RF5 tgcly				

Run Info:		**Batch Info:**	
Prod Name	CW prod 906	Batch	
Prod Code	prma00034	Lot	106
CW List	CW list 1 2min p906	Size	10000 pcs
Serial no	tgclyCW	Time	2 min

Product Setup:	
Nominal	906,00 g
TU1	891,00 g
TU2	876,00 g
TO	936,00 g
Tare	10,00 g

Code:	Product	Range (kg)		Time		Units	Weight (kg)	Status
prma00034	CW prod 906	0,900	0,940	12:02	08:12	17	15,696	Ok, over target
prma00034	CW prod 906	0,880	0,920	12:02	08:12	8	7,204	Ok, under target
prma00034	CW prod 906	0,920	1,340	12:02	08:12	149	156,382	Reject, over target
prma00034	CW prod 906	0,900	0,920	12:02	08:12	2	1,803	Reject, over T1
prma00034	CW prod 906	0,860	0,900	12:02	08:12	5	4,399	Reject, under T1
prma00034	CW prod 906	0,720	0,880	12:02	08:12	15	12,329	Underweight reject

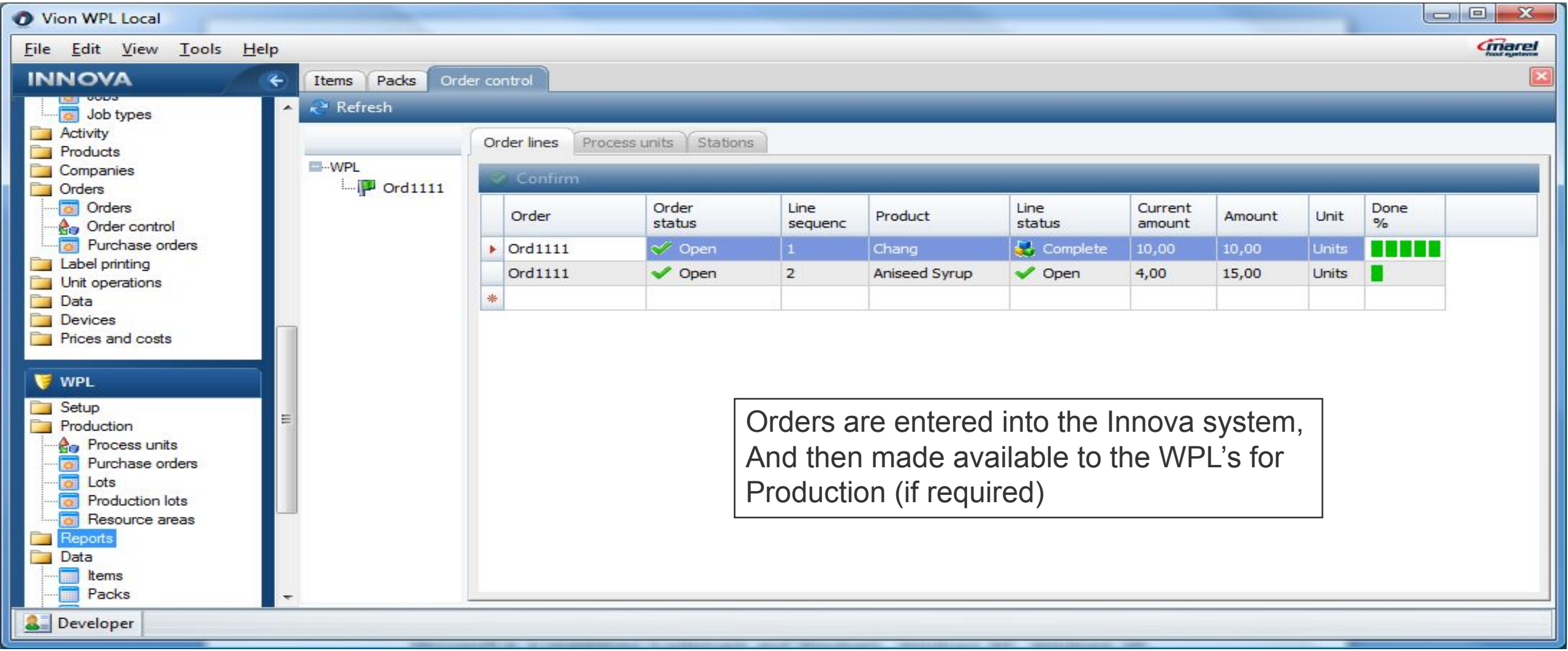


Innova
Weight Price Labeler

ADVANCING
FOOD PROCESSING

WPL Selection Screen

WPL - Order Entry

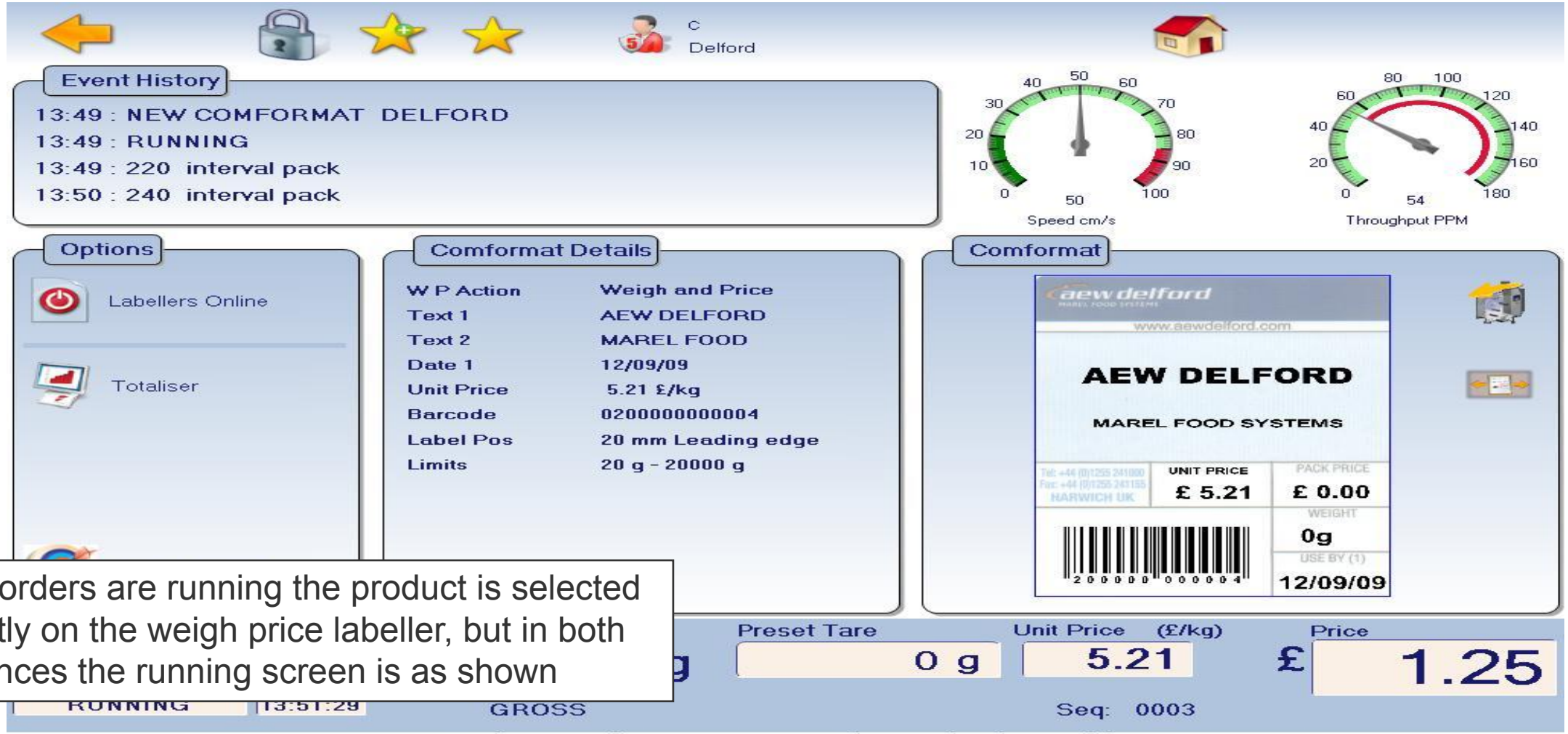


Orders are entered into the Innova system, And then made available to the WPL's for Production (if required)

Order Entry


C
Delford
Operations
WPL
Product : Beef Batch Pack size : 4.0 kg
Order : Beef 4/100 packs
Produced: 3.6 kg Rem. packs: 96 Items: 383
System log
Lamb Batch
Beef Batch
The production order is then selected through Innova on the Weigh Price Labeller (if required)
Setup
Ops
Pause
Resume
Previous page
Next page
Comformat
IO000001
RUNNING
11:02:07
Weight
658 g
GROSS
Preset Tare
0 g
Unit Price (£/kg)
6.21
Seq: 0002
Price
£ 4.09
Not To be Used For Direct Trade With The Public

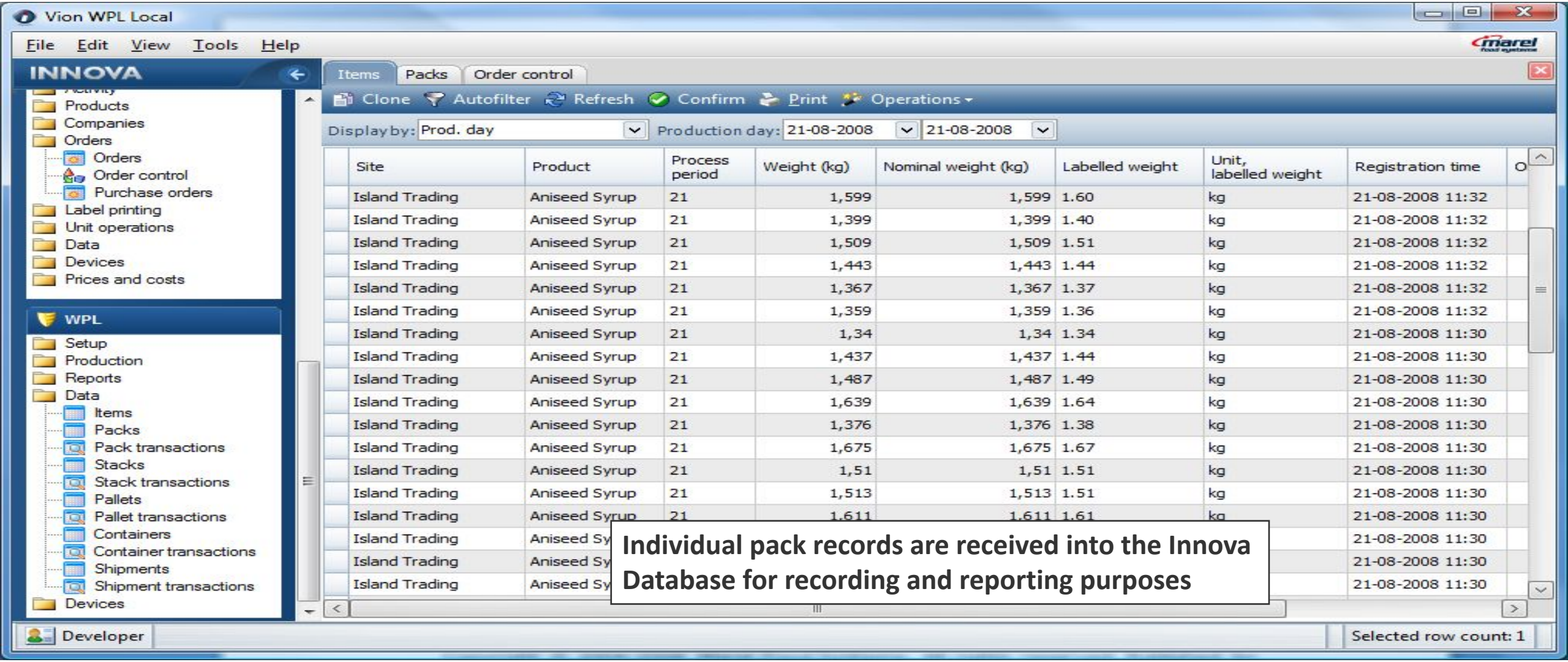
In Production Screen on WPL



If no orders are running the product is selected directly on the weigh price labeller, but in both instances the running screen is as shown

Not To be Used For Direct Trade With The Public

Individual Pack Records



Innova Portioning

ADVANCING
FOOD PROCESSING

Main purpose

Controls and monitors your portioning operation in real-time

- Enables easy-to-use remote programming, control, real-time monitoring and reporting on actual performance.
- Provides report on portion sizes and weights, product yields, throughput and product value based on actual cuts.
- Allows cutting programs to be shared among two or more portion cutters.

Portioning control panel overview

Portioning Machines

Lane: Portioning 2 - Sim | Refresh | Clear | Connect | Settings

Status

Active program:	Process period:	Process started:	Lane status:	Grader status:
Tyson Sim	60	1/15/2008 3:22:55 PM	Idle	Idle

Details | History | Portion weights | Portion piece size

Input

Total	267.9	kg
Throughput	14614.6	kg/hour
Active time	00:01:06	
Average weight	4541	g
Average length	435	mm
Weigth from inweigher	0	%

Output

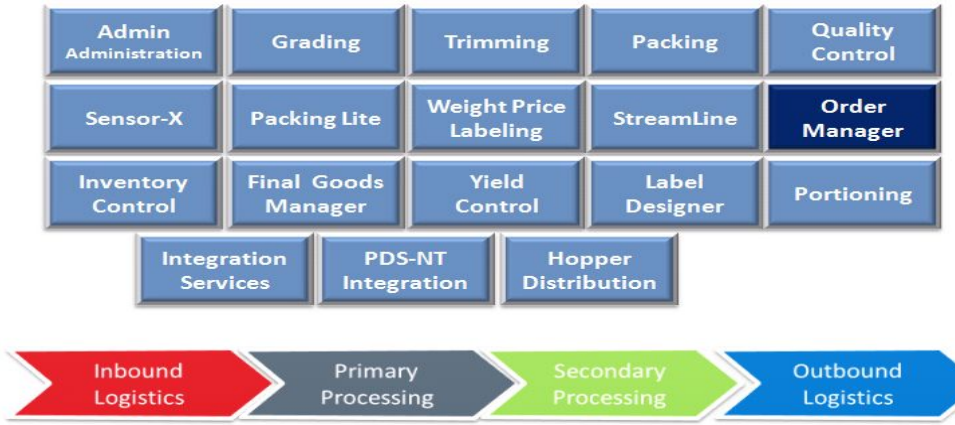
Primary	37.0	%
Secondary	55.2	%
Tertiary	7.8	%
Other/Uncut	0.0	%
Average value	3.62	$/kg
Errors	0	

	Material	Count	%	Weight (kg)	%	Avg.weight (g)	Avg.value ($/kg)
Primary							
	14oz	124	25.8	99.1	37.0	799	5.00
Primary total		124	25.8	99.1	37.0		5.00
Secondary							
	8oz	295	61.5	148.0	55.2	502	3.00
Secondary total		295	61.5	148.0	55.2		3.00
Tertiary							
	Club Face	59	12.3	20.7	7.7	352	1.50
	Face cut	2	0.4	0.1	0.0	49	0.00
Tertiary total		61	12.7	20.8	7.8		1.49
Total		480		267.9			3.62
Grand total		480		267.9			3.62

Innova
Order Management

ADVANCING
FOOD PROCESSING

Innova Orders & shipment



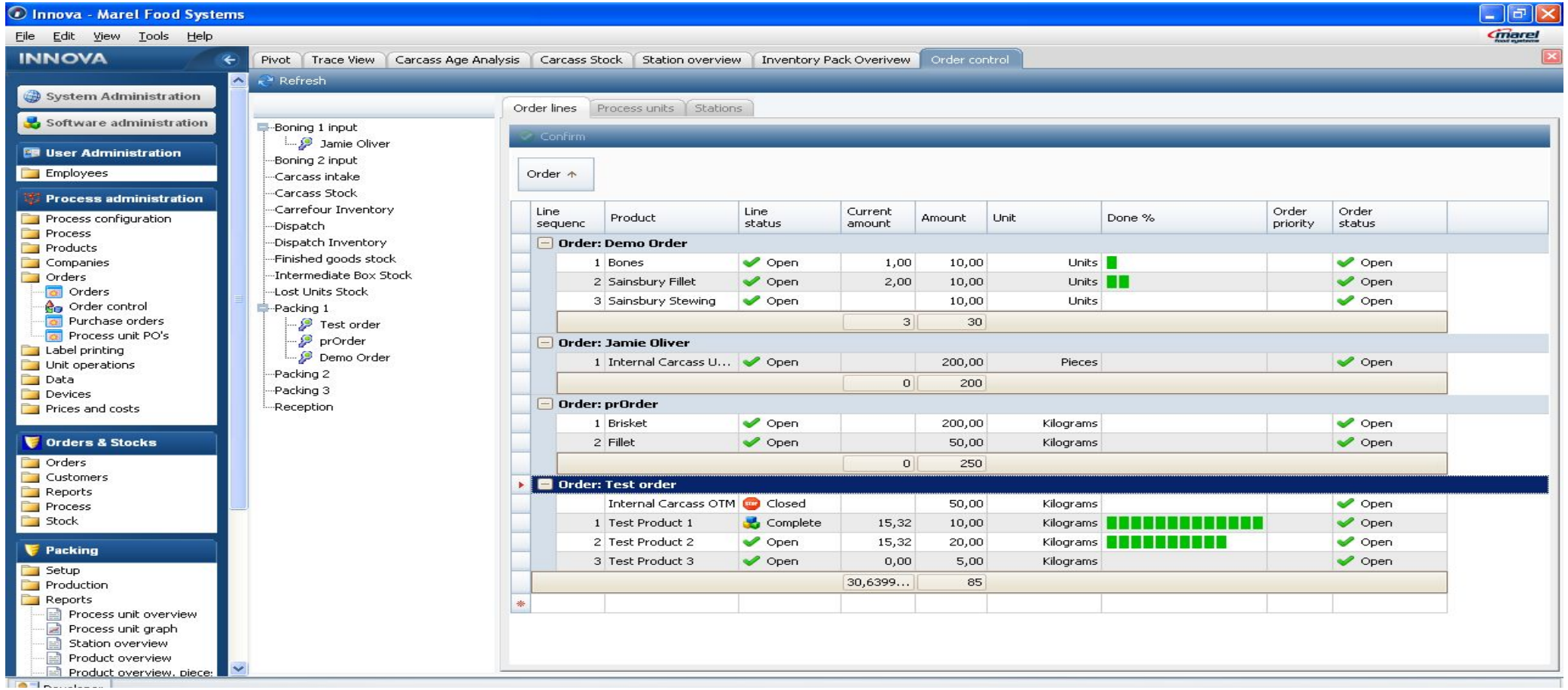
Order management:

- Purchase orders to receive goods against PO's
- Production orders for planning and production line control
- Sales orders to pack directly to customer orders
- Transfer orders to manage transfers between sites or warehouses
- Inventory orders to control how items are packed directly into inventory

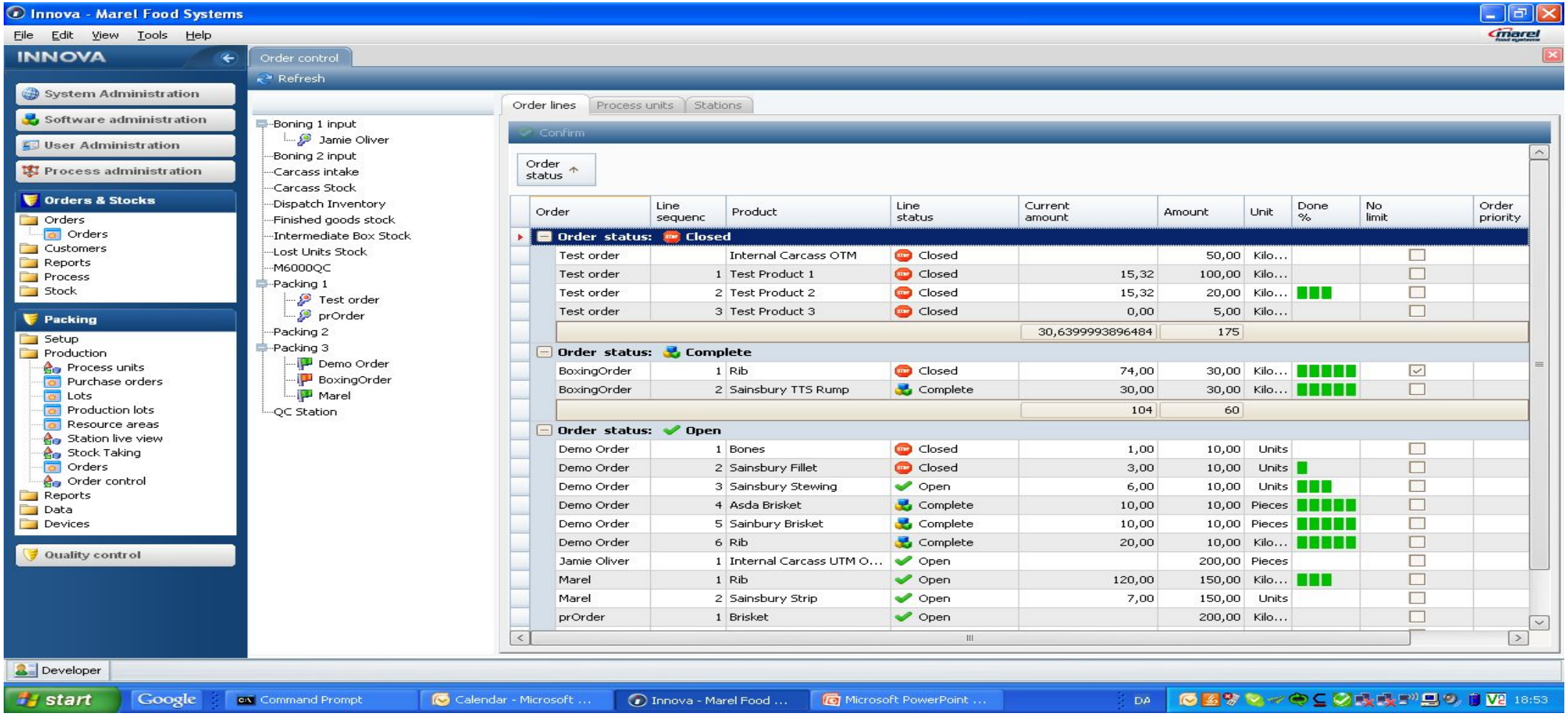
Innova orders & shipment

- Packing to orders - gives real-time status of orders and reliable order fulfilments.
- Order picking with hand-held devices and barcodes
- Order specific packing rules and labelling
- On-line order monitoring
- Different order types
- Order controlled trimming lir
- Real time on-floor managen -held devices or wall mounted ter M6215

Order Control – By Orders



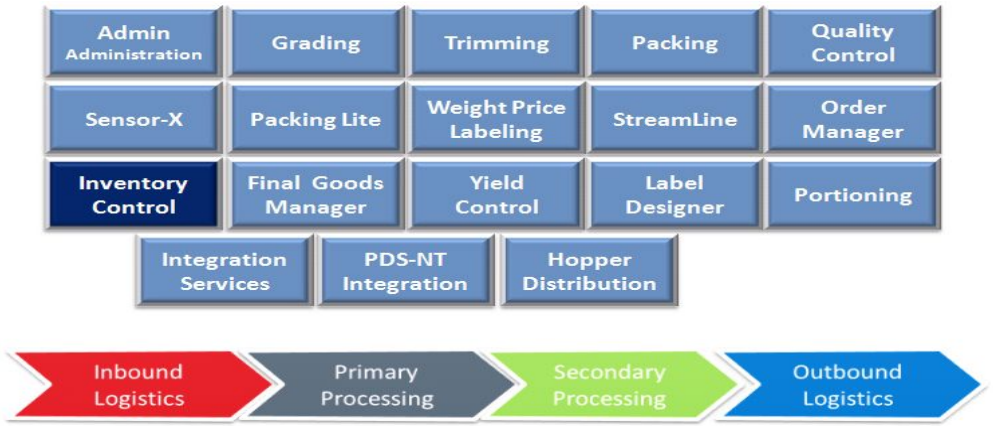
Order Control – By Status



Innova Inventory Control

- Raw material
- Intermediate stocks
- End-products

- Locations
- Stock takings/countings



Innova Final Goods Management

ADVANCING
FOOD PROCESSING

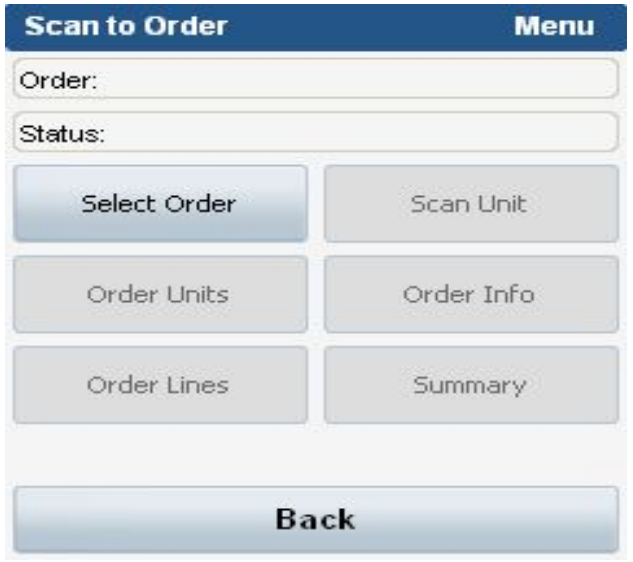
Palletizing/Order Picking/Dispatch

- Innova makes the delivery of the final goods, with all the necessary information
- Goods can be delivered with full traceability all the way through processing and back to the supplier
- Real time order and picking control
- Create pallets, both mono and mixed pallets
- Box or pallet picking
- Multiple shipments per order
- PDA or fixed dispatch stations
- **Highly configurable to specific screen designs and business rules**

Order Picking/Assign to Order & Assign to Shipment

PDA Overview

PDA - Order Tasks



PDA - Order Assigment

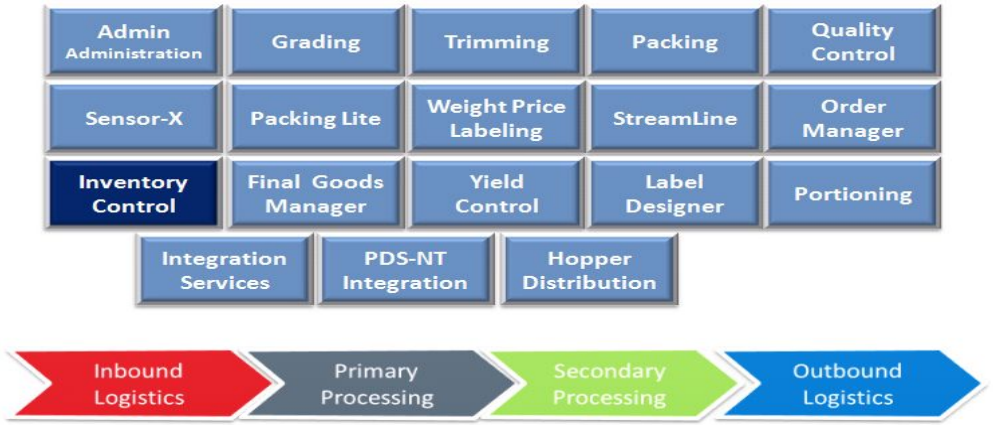
Innova
Inventory Control

ADVANCING
FOOD PROCESSING

Innova Inventory Control

- Raw material
- Intermediate stocks
- End-products

- Locations
- Stock takings/countings



Raw material inventory

- Raw material stock levels are known at all times
- Items can be assigned to stock location as they enter the inventory
- For each item on stock, information like quantities, age, expiry dates, location and supplier is important for production planning, scheduling and traceability
- When items are used for production they are removed from stock and assigned to different production lines, giving accurate information about raw material usage, cost and origin of raw material per production line
- Transactions sent to ERP system as stock transfers
- Stock Take functionalities (“on the fly”)

Finished Goods Inventory

- Finished goods are moved into inventory or produced directly to stock during the packing process
- Products can be palletized and located within the stock
- Stock levels are known at each point in time with all relevant data available, such as age, expiry dates and time on stock
- With online mobile scanners the inventory transactions are performed scan-by-scan, providing up-to-date information
- Transactions sent to ERP system as stock transfers

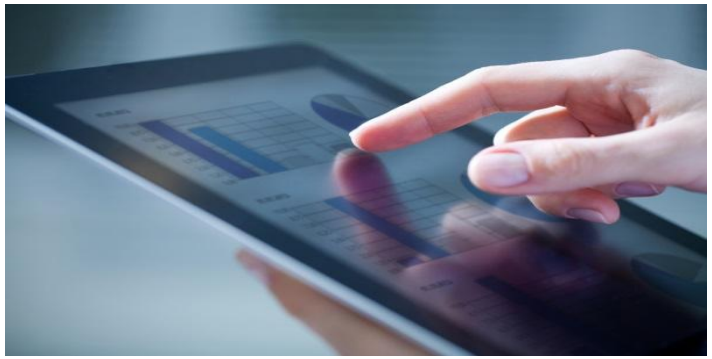
Innova
Quality Control

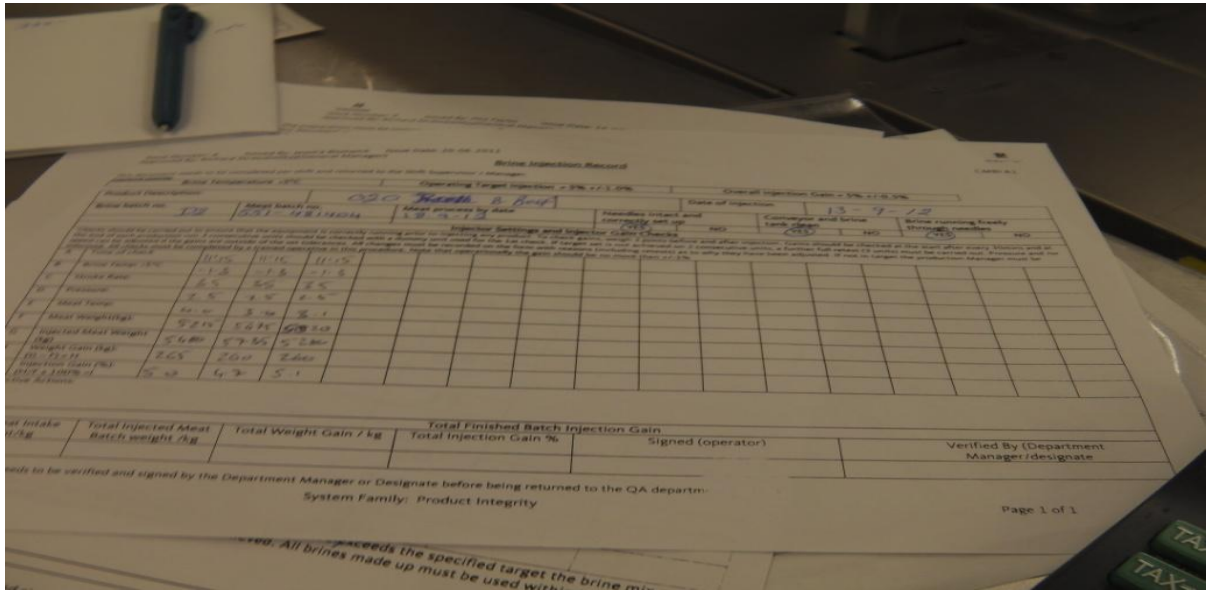
ADVANCING
FOOD PROCESSING

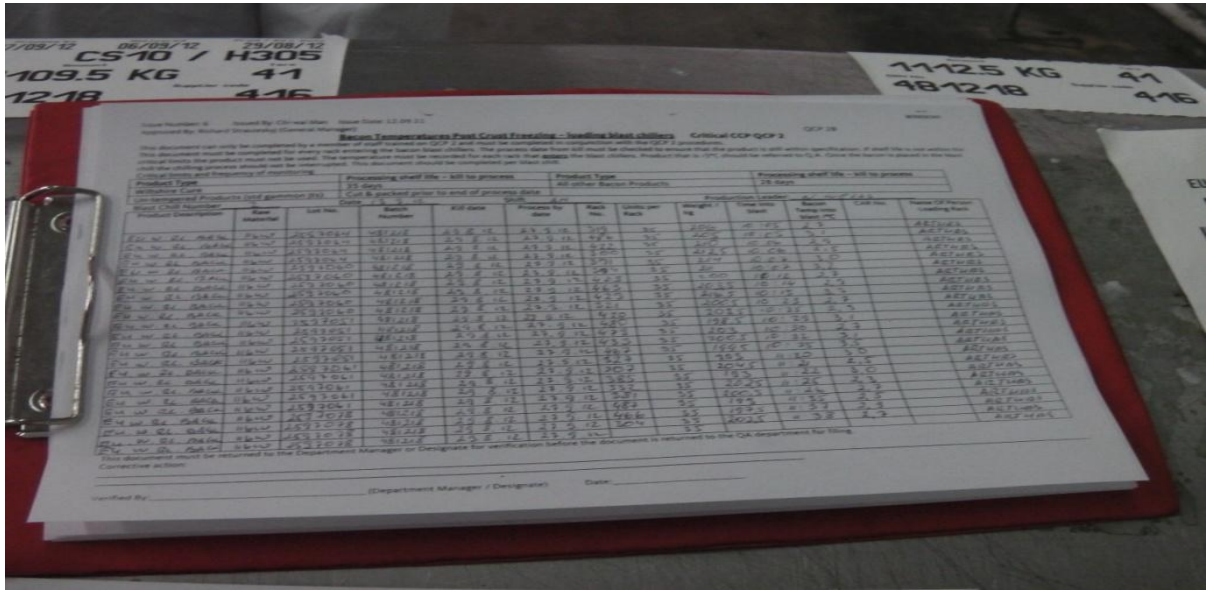
Innova Quality Control

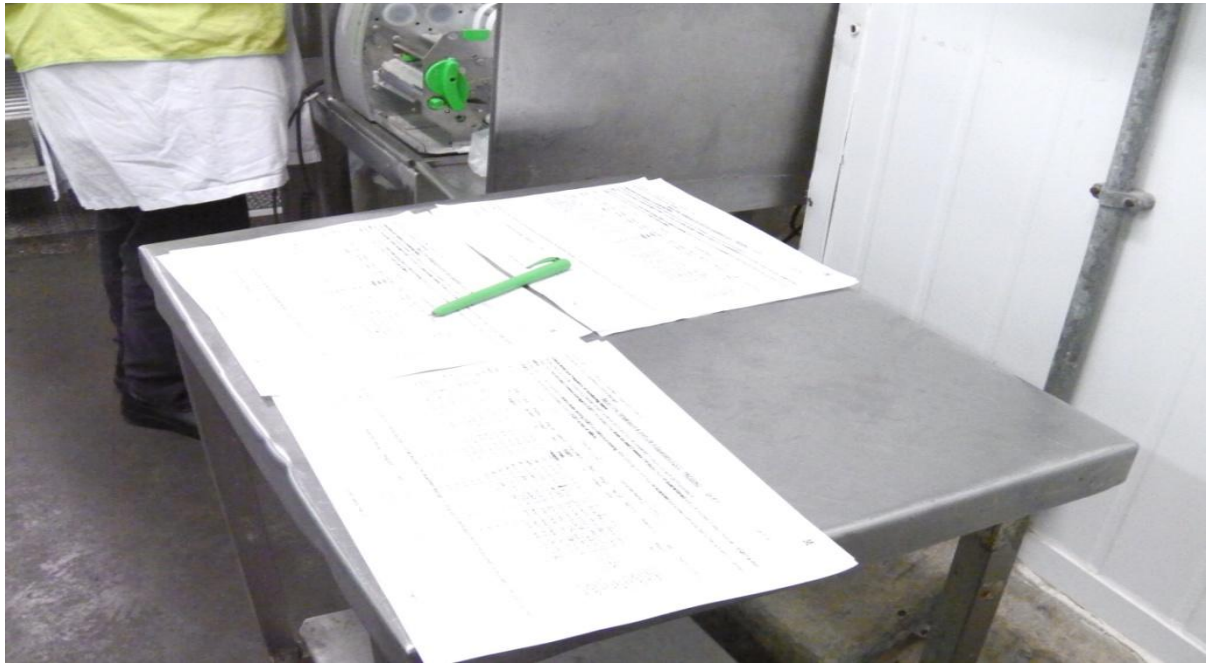
INNOVA

Gain paperless control and automation of your quality control from receiving to dispatch.




Brine Injection Record
Total Finished Batch Injection Gain
Total Weight Gain / kg
Total Injection Gain %
Signed (operator)
Verified By (Department Manager/designate
System Family: Product Integrity
Page 1 of 1


CS10 / H305
1112.5 KG
1109.5 KG
41
4812.18
416




LINE 3-4
LINE 5-6
LINE 7-8

Control production

INNOVA

Gain quality control at all levels.

- Receiving live birds
- Slaughtering
- Processing
- Packaging
- Dispatch

Also …..

- Packing material control
- Ingredients control
- Laboratory
- Training guidelines
- Suppliers audits
- Internal audits

QUALITY CONTROL

Innova QC – the benefits

- Paperless inspections

  All inspections can be done without paper using fixed screens or mobile devises

- Real time data

  Inspections out of range are immediately notice and response can be in real time decreasing possible damage

  Items (production lot, pallets, box, etc…)

- Dashboards

  Real time information from the quality monitoring

  Valuable information communication in real time

Innova QC – the benefits

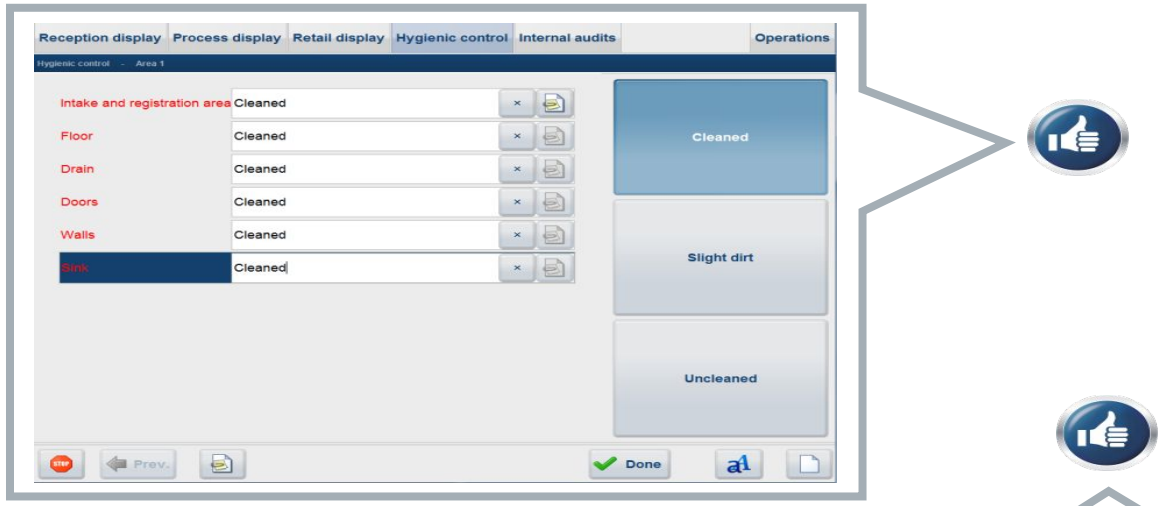
- Easy access and analyses of data
  - All records are available in real time for further analysis and information
  - Trend analysis on data providing valuable information that can be used for further improvements
- Inspection scheduling
  - For „not every day“ inspections.
  - Scheduling linked with inspection lists
  - Valuable in making special inspections, for example cleaning inspection, vehicles inspection, building inspections
- Non-confirmative
  - Record and control of non confirmative
  - Innova generation 2 provides the possibility to record non-conformities both from a stand-alone registration form and as a result of a failed inspection.
  - Pre-configured non-conformity reasons and resolutions with the possibility of adding text and graphical detail.

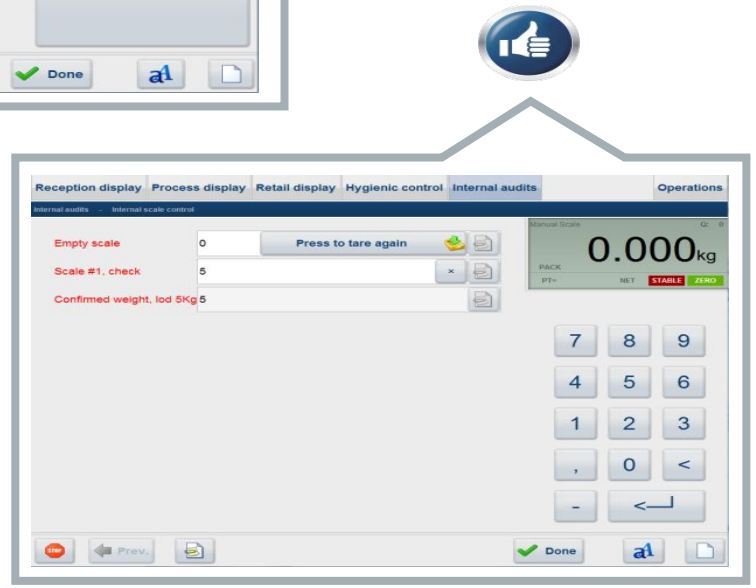
Control production

INNOVA

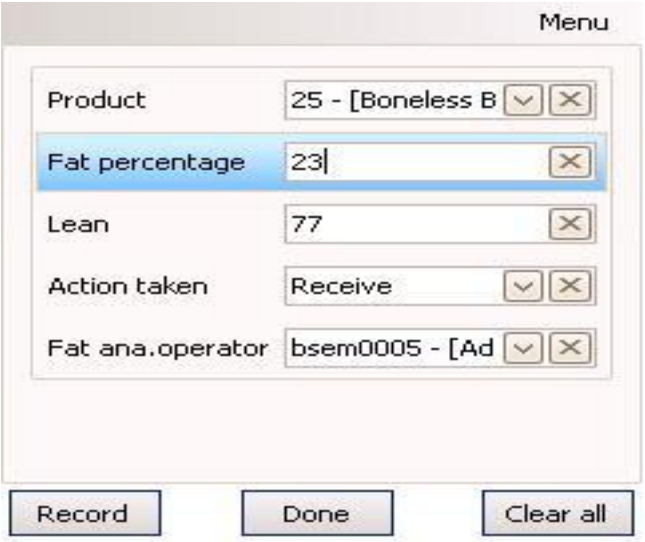
Customize inspection lists

- Specifications for inspection items
- Support material for inspections
- Register the data you need
- Control inspections
- Minimum risk of wrong entries
- Support food safety standards

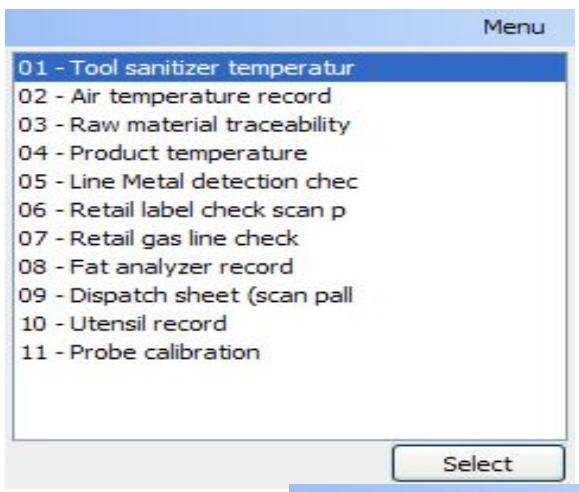


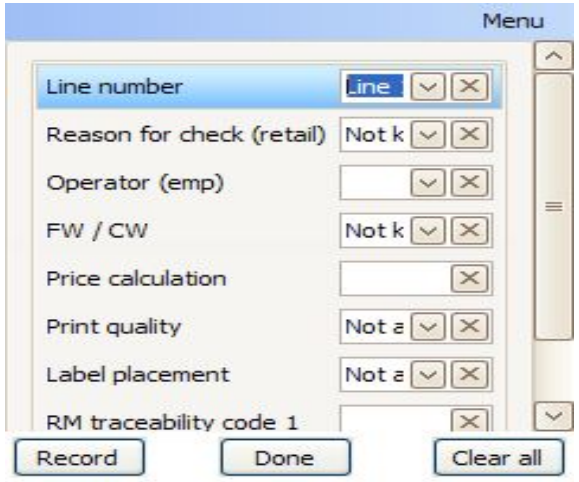


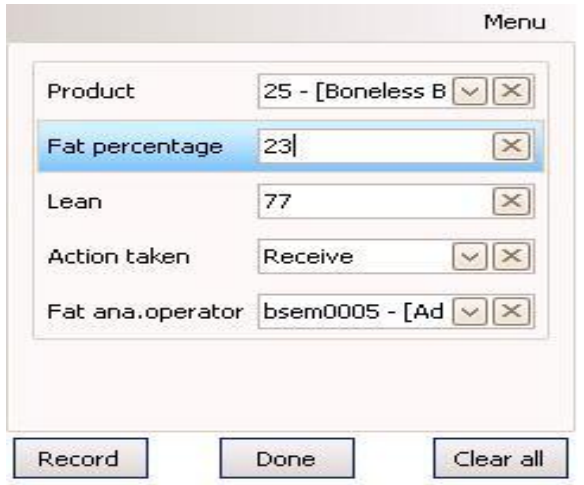
Innova Quality Control - Input devices

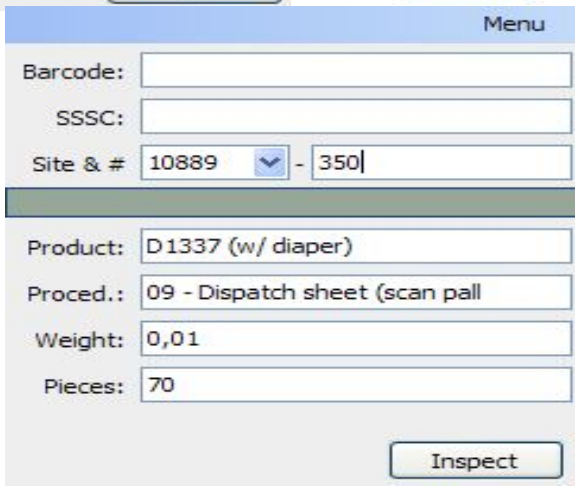


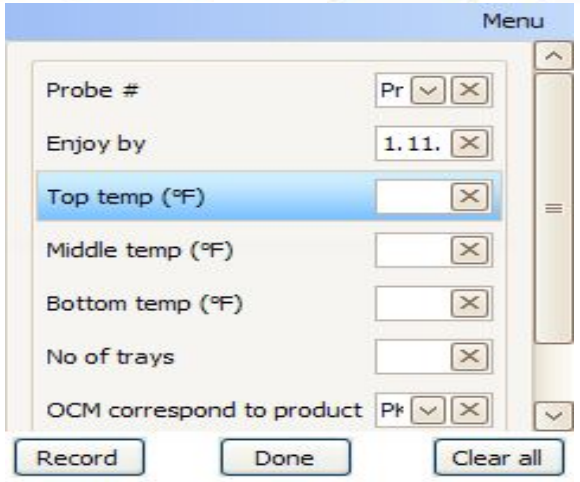
Innova Quality Control – PDA inspections



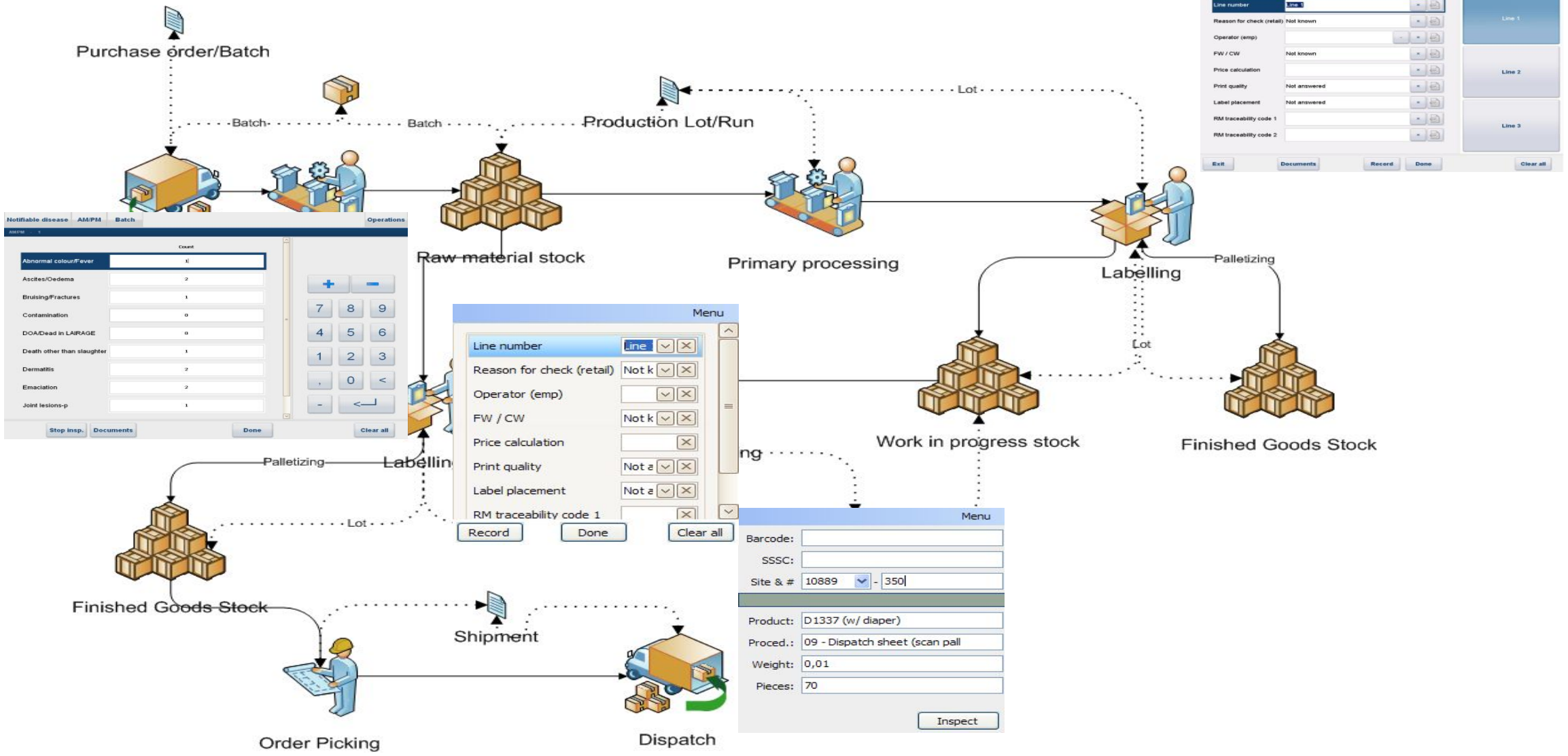






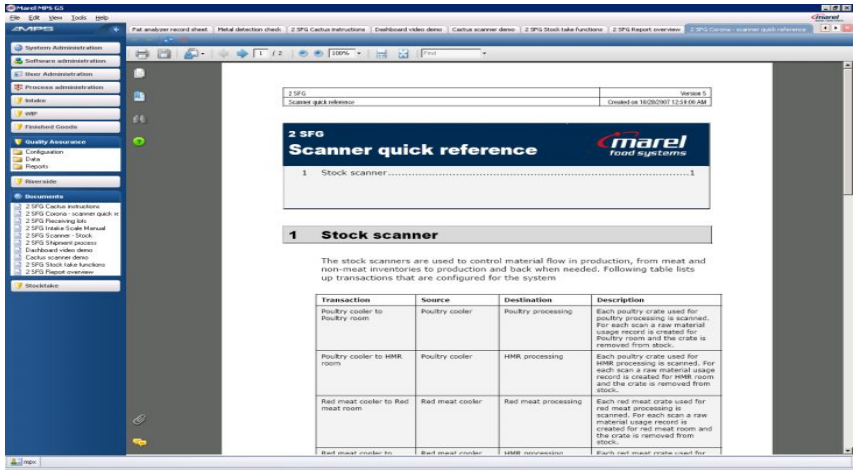


Traceability



Documentation system

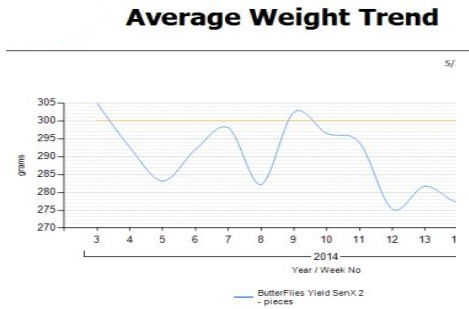
- Documentation repository
- Document viewers, desktop and M6000.
- Attaching and accessing documents on the floor shuch as specifications and instructions.

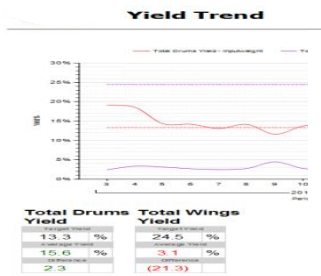


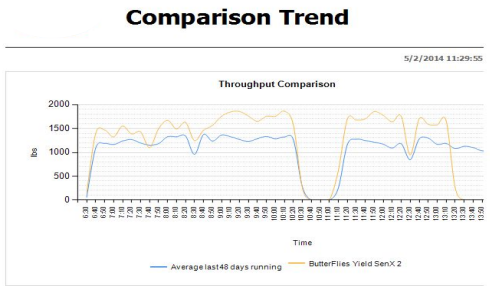
Innova Dashboarding & Reporting

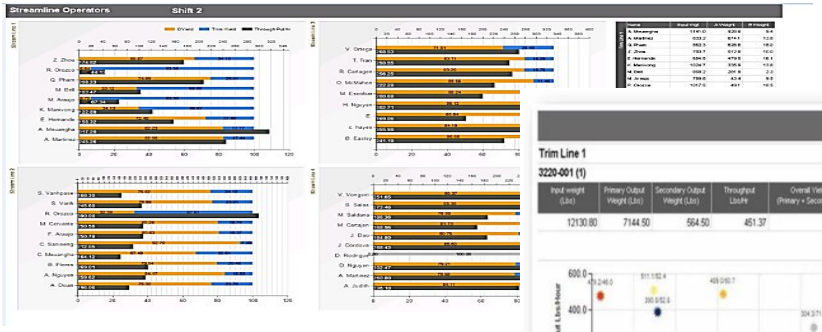
ADVANCING
FOOD PROCESSING

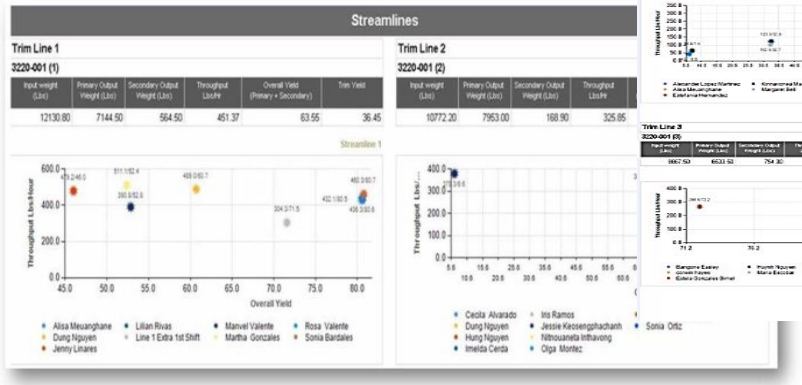
Reporting Examples

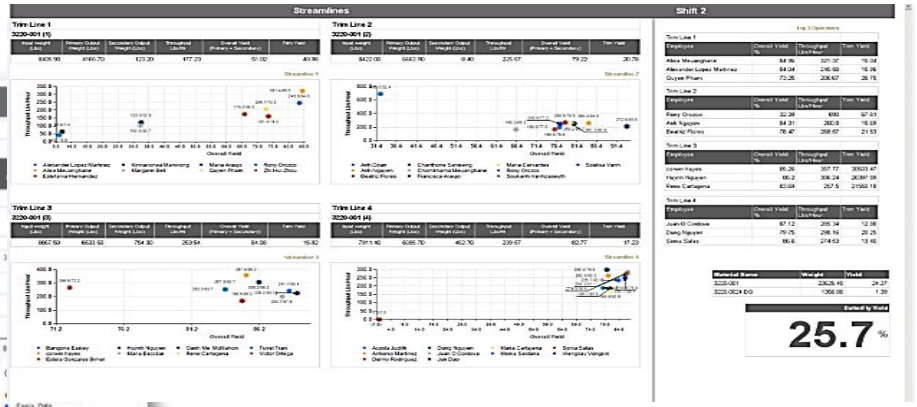




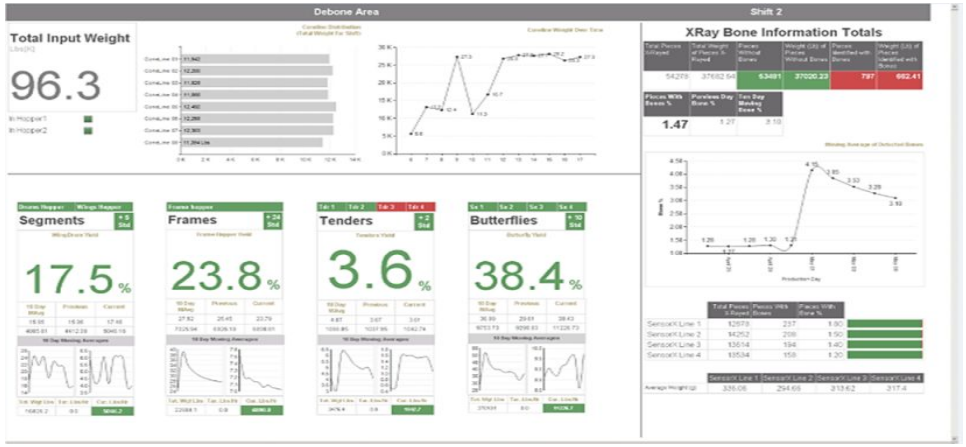




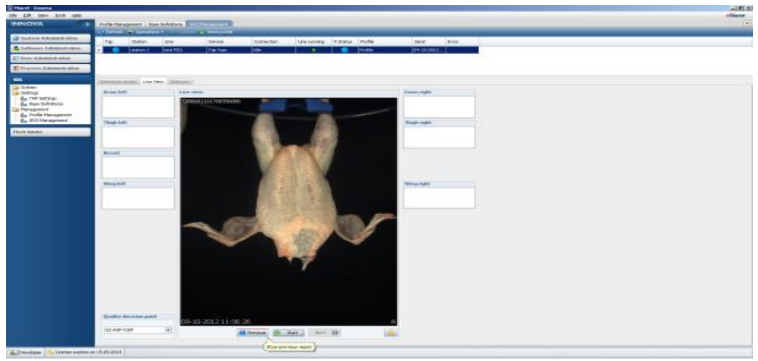


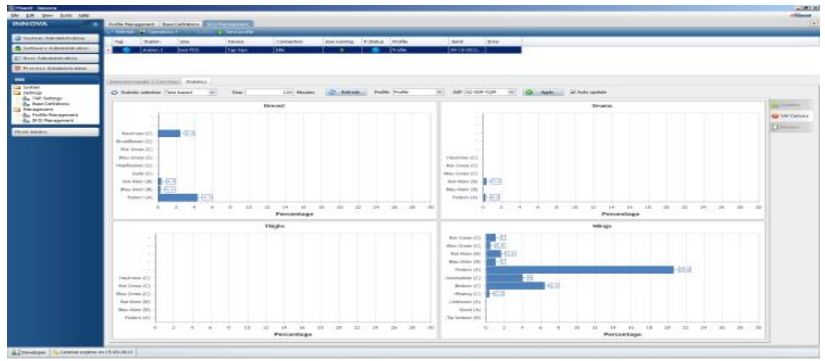


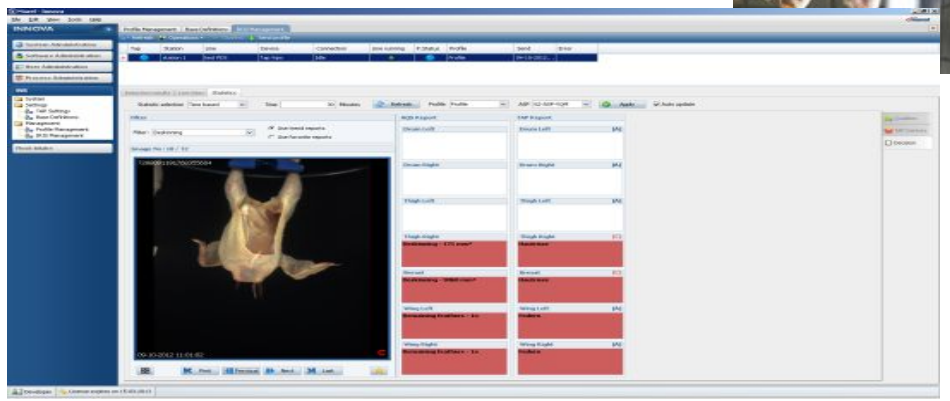
Dashboarding – Examples

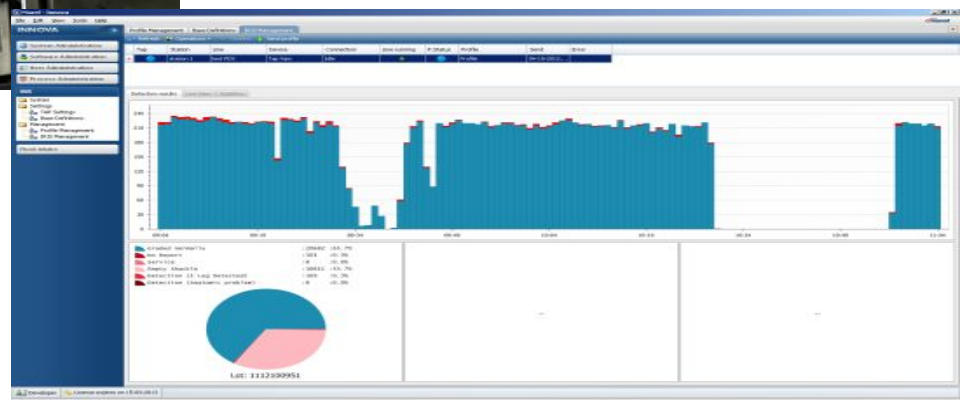


IRIS Dashboarding/Real Time Monitoring



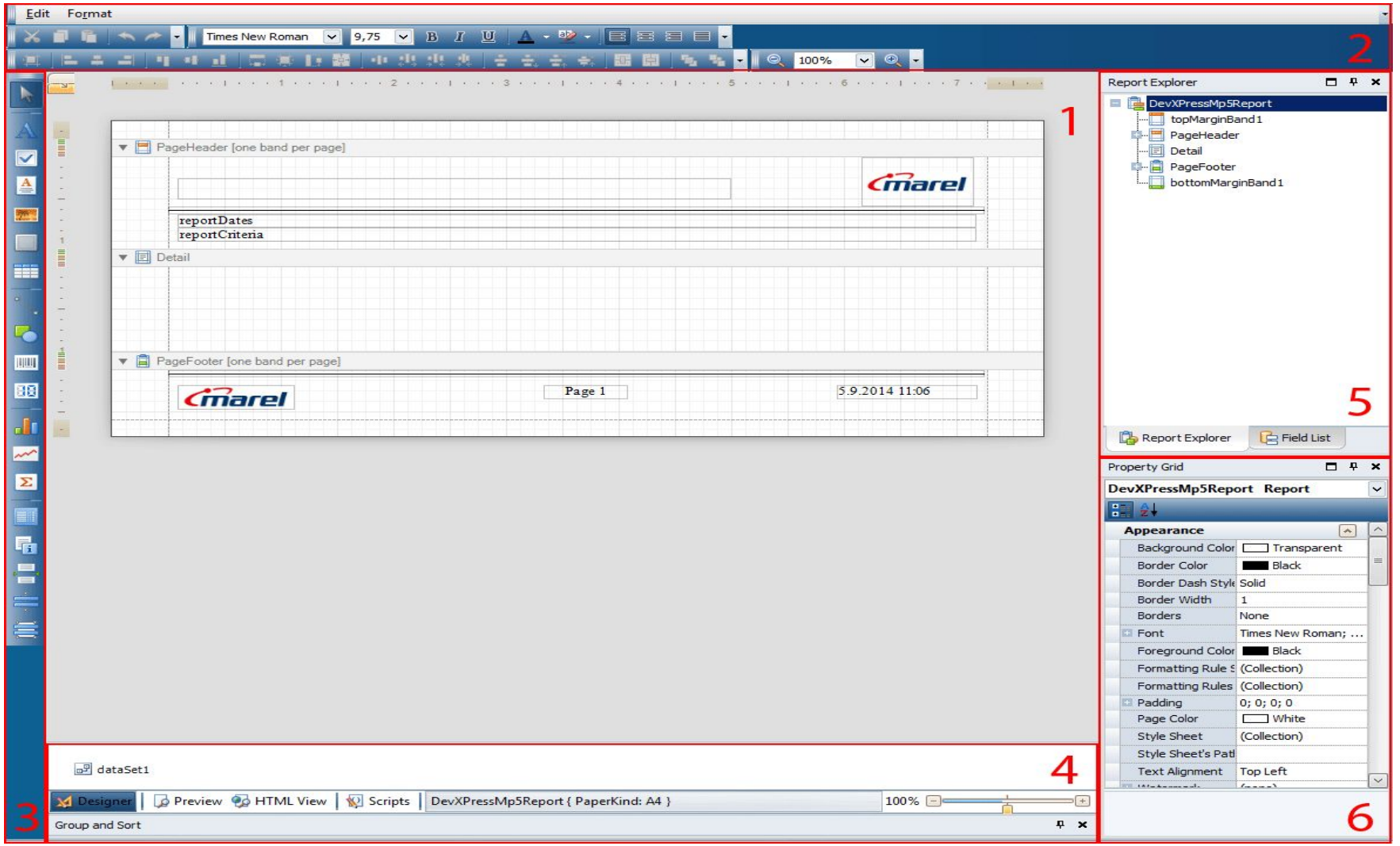




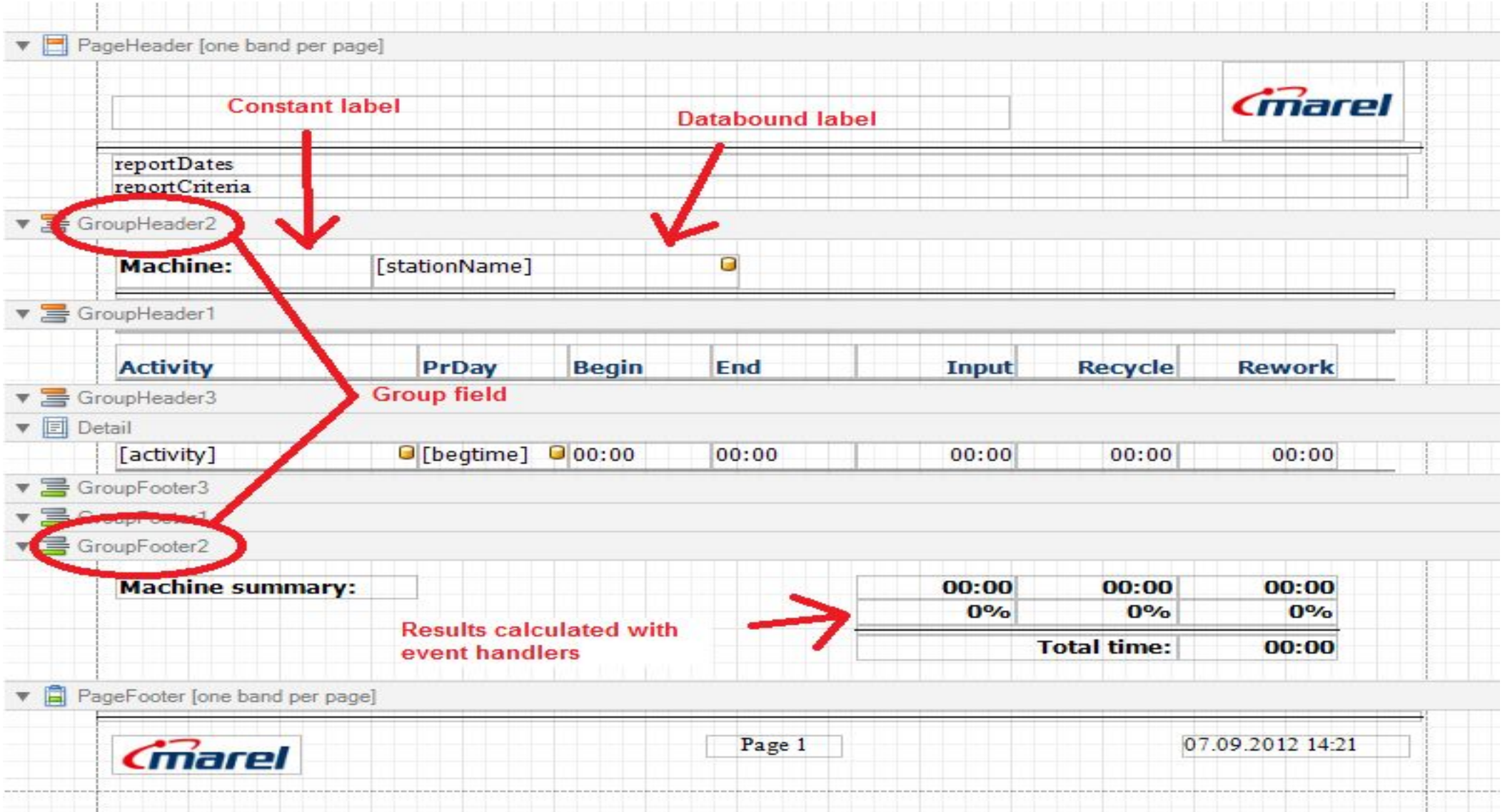


Innova Report designer

1. Report surface
2. Layout and formatting
3. Toolbox
4. Additions
5. Explorer and fields list
6. Selected item properties



Design mode

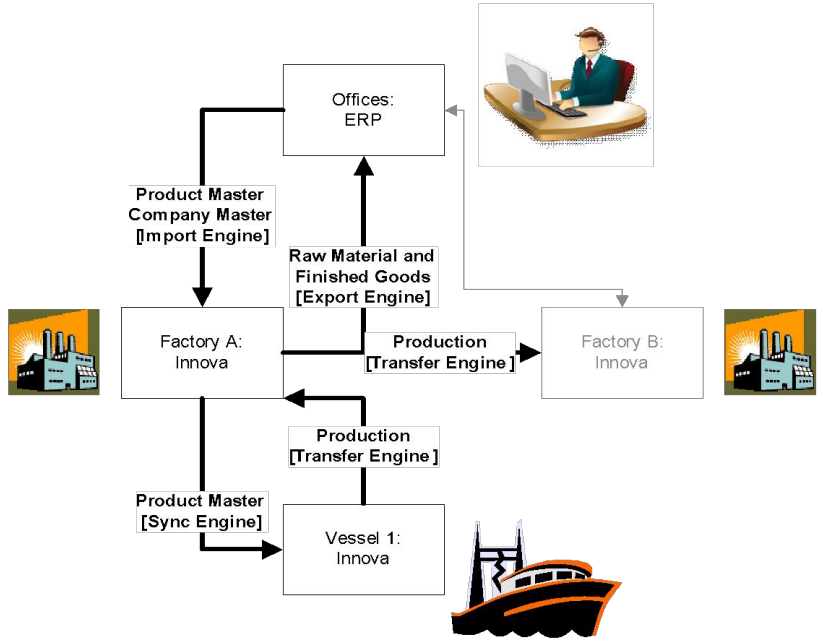

PageHeader [one band per page]
Constant label
Databound label
reportDates
reportCriteria
GroupHeader2
Machine:
[stationName]
GroupHeader1
Activity
PrDay
Begin
End
Input
Recycle
Rework
GroupHeader3
Group field
Detail
[activity]
[begtime]
00:00
00:00
00:00
00:00
00:00
GroupFooter3
GroupFooter2
Machine summary:
00:00
00:00
00:00
0%
0%
0%
Total time:
00:00
Results calculated with
event handlers
PageFooter [one band per page]
Page 1
07.09.2012 14:21

Innova
Integration Services

ADVANCING
FOOD PROCESSING

Innova Integration Services

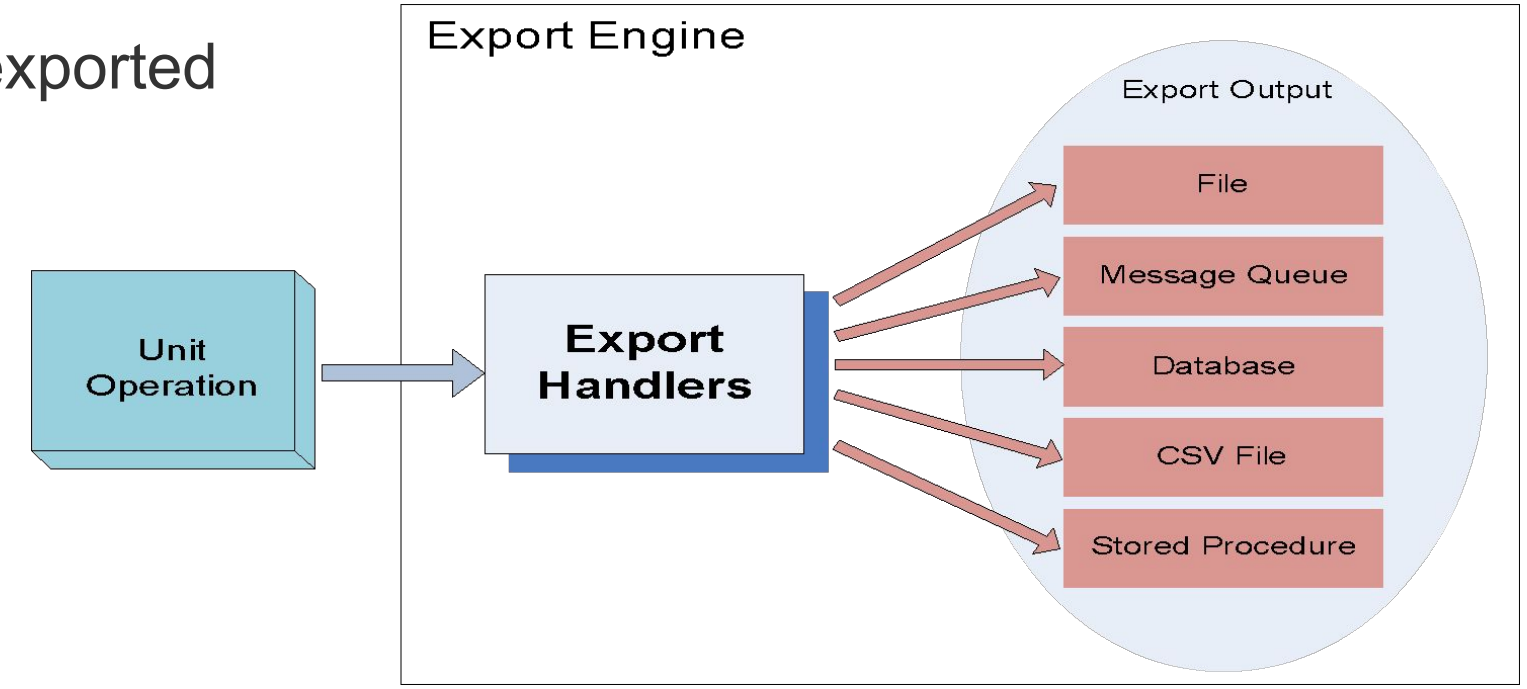
- Transfer product definition from an ERP system to Innova to ensure that a single master product list exists.
- Production, sales and transfer orders can be created in the ERP system and transferred to the Innova system to help control production.
- Transfer production data from Innova to an ERP system.
- Synchronize multiple Innova sites to make sure that master definitions, such as product definitions, are the same on each Innova site.



Export Engine (Innova -> ERP)

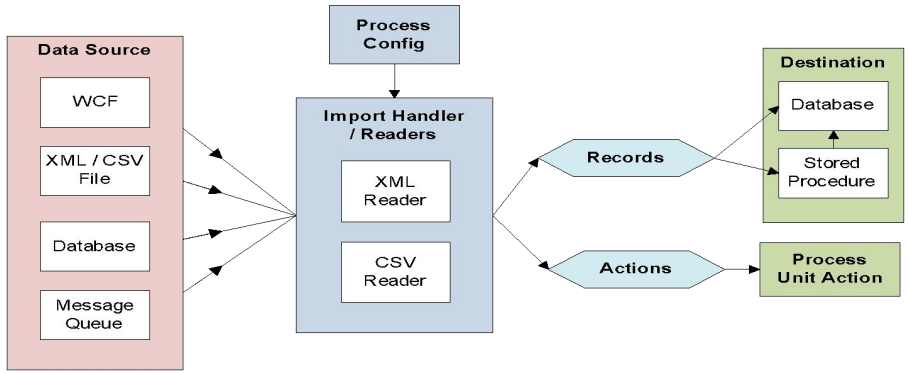
- Configurable transfer of production data from Innova to ERP systems
- Exports triggered by unit operations.

- These entities can be exported
  - Item
  - Pack
  - Stack
  - Pallet
  - Container
  - Shipment
  - Order
  - Order Line
  - Material Transaction



Import Engine (ERP -> Innova)

- Configurable transfer of master data from ERP systems to Innova



- Standard “out of the box” configuration for
  - Customers
  - Products
  - Content Specifications
  - Product Customer Overrides
  - Orders
  - Order Lines

Innova OEE

ADVANCING
FOOD PROCESSING

Are you optimizing your production?

INNOVA

How effectively are your production lines running?

How many production stops do you have?

Are you making enough good products without reworking?

Which lines run the most?

Which lines run the best?

How much time/capacity are you losing?

What are the remaining causes for production stops?

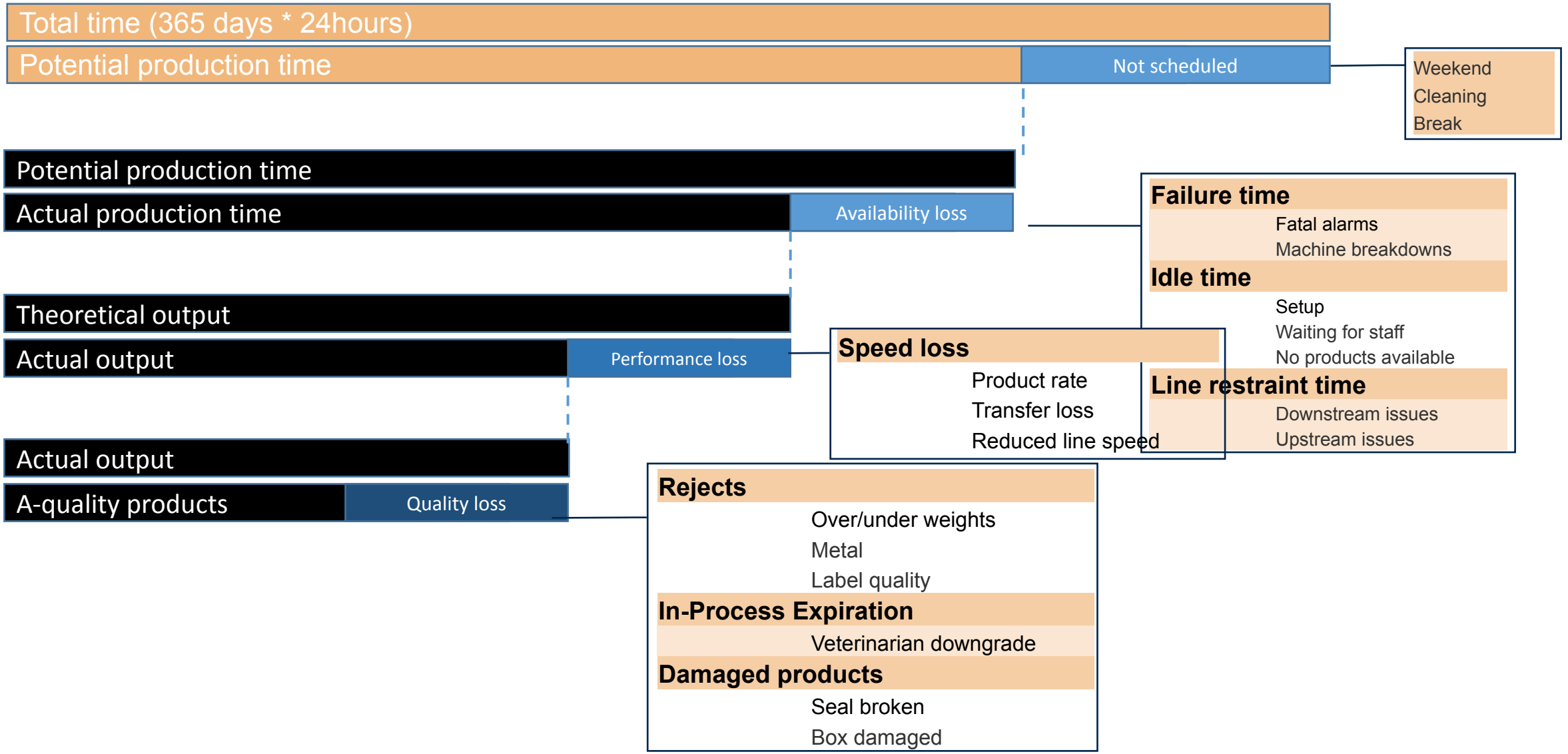
Optimize equipment utilization

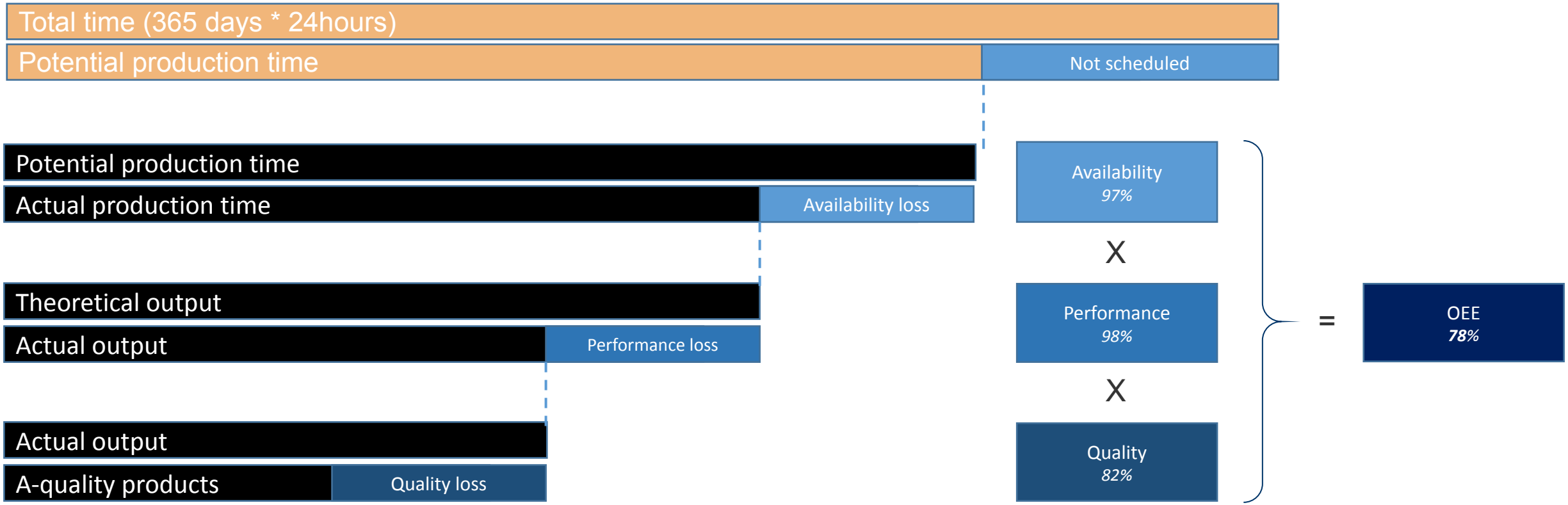
Increase throughput

Reduced cost per produced unit

Fulfill more orders on time

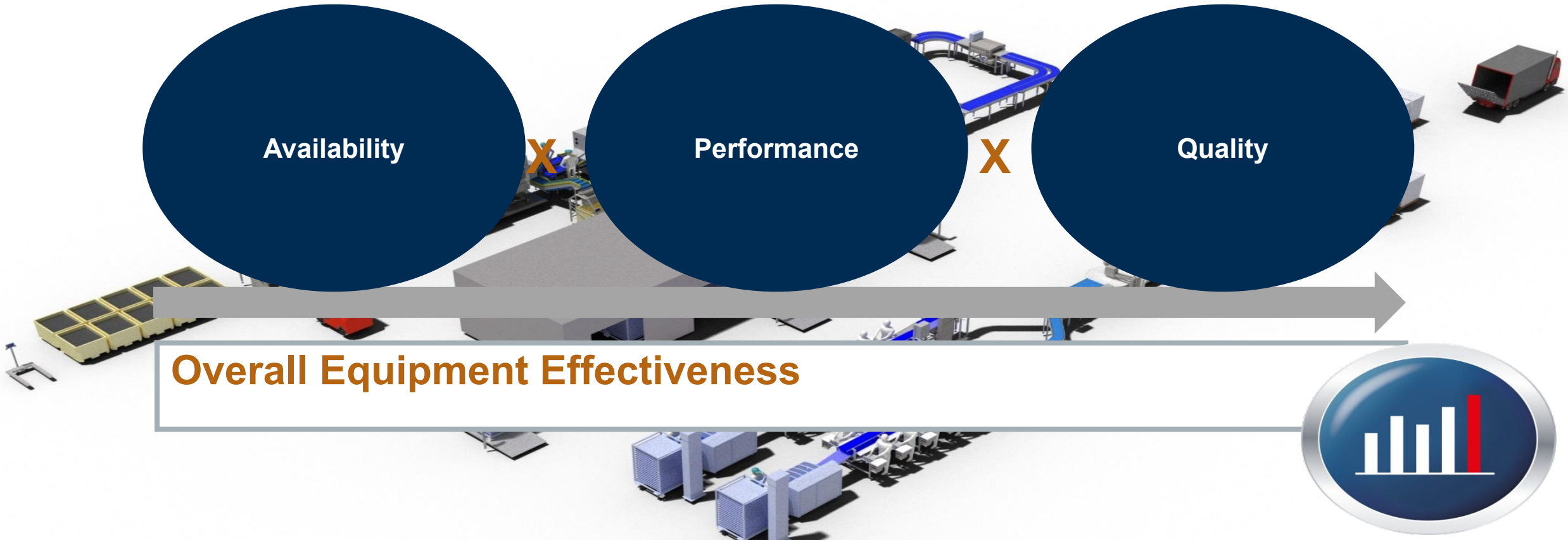
Increased profitability


Total time (365 days * 24hours)
Potential production time
Not scheduled
Weekend
Cleaning
Break
Potential production time
Actual production time
Availability loss
Failure time
Fatal alarms
Machine breakdowns
Idle time
Setup
Waiting for staff
No products available
Line restraint time
Downstream issues
Upstream issues
Theoretical output
Actual output
Performance loss
Speed loss
Product rate
Transfer loss
Reduced line speed
Actual output
A-quality products
Quality loss
Rejects
Over/under weights
Metal
Label quality
In-Process Expiration
Veterinarian downgrade
Damaged products
Seal broken
Box damaged



*compare the **actual situation** with the theoretically **best possible scenario***

OEE is a general method for measuring the effectiveness of a process. The basic idea is to calculate a percentage value that represents effectiveness compared to what could be achieved, based on three factors



Elements of OEE

Availability % = Actual Time / Potential time

Availability is defined as the ratio between the available time (uptime) and the actual production time.

Performance % = Actual throughput / Theoretical throughput

Performance is defined as the ratio between the theoretical production throughput for and the actual produced products.

Quality % = Good Units Produces / total units

Quality is defined as the ratio between the good units produced and the throughput.

Improve Performance with Innova OEE

Innova OEE will accurately calculate OEE figures, report on reasons for stoppages and visually indicate the current status with real-time data analysis

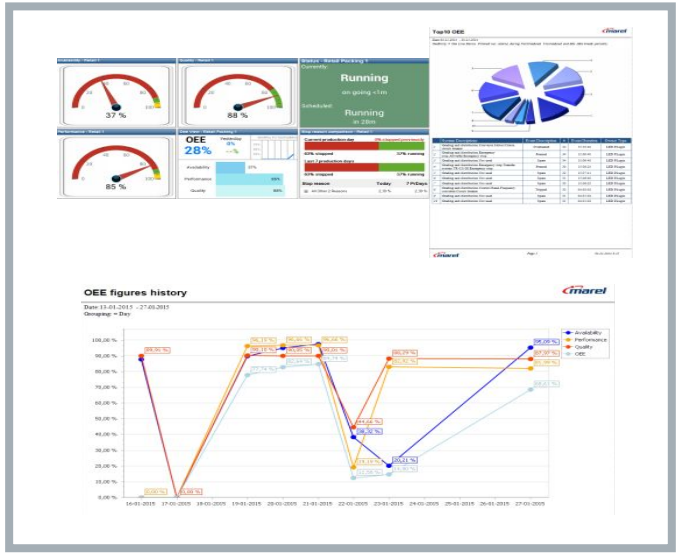
Control

Capture accurate data

- Runtime
- Throughput
- Speed
- Quality
- Rejects
- Stop reasons
- Performance reasons
- Quality reasons

Monitor

Make results visible



Improve

Implement corrective actions

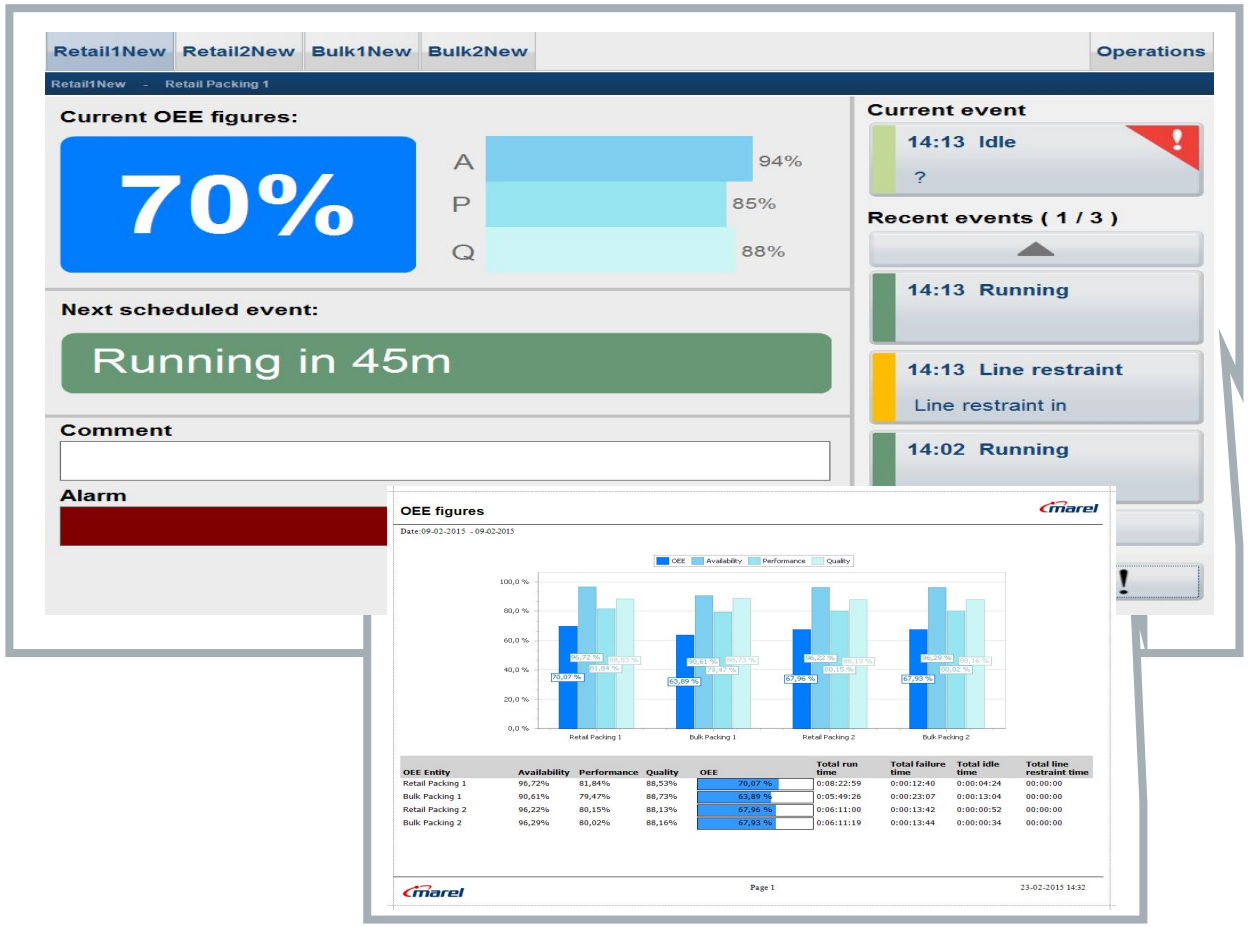
- Optimize workflow
- Optimize program parameters
- Tackle bottlenecks
- Optimize scheduling
- Shop floor ownership
- Continous improvement

Control production

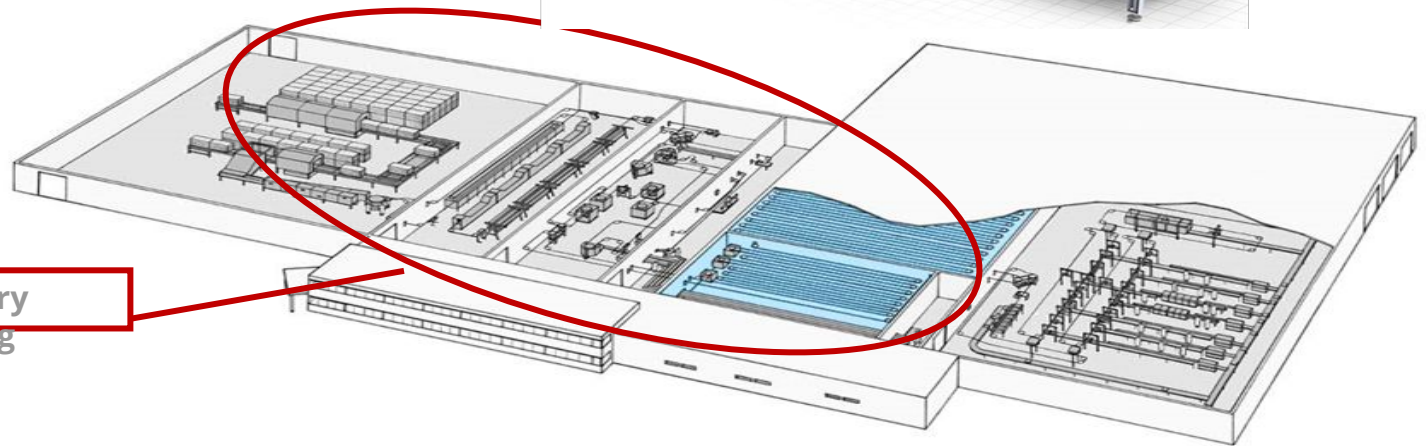
INNOVA

How can Marel help you tackle these barriers?

- Collection of reasons for shop floor stoppages
  - Registers the reason when a stoppage occurs
  - Does not rely on pen and paper or operator memory to recall and forward stoppage reasons for investigation
  - Collects stoppage reasons directly on your existing Marel and 3rd party equipment



Innova OEE – Primary Processing

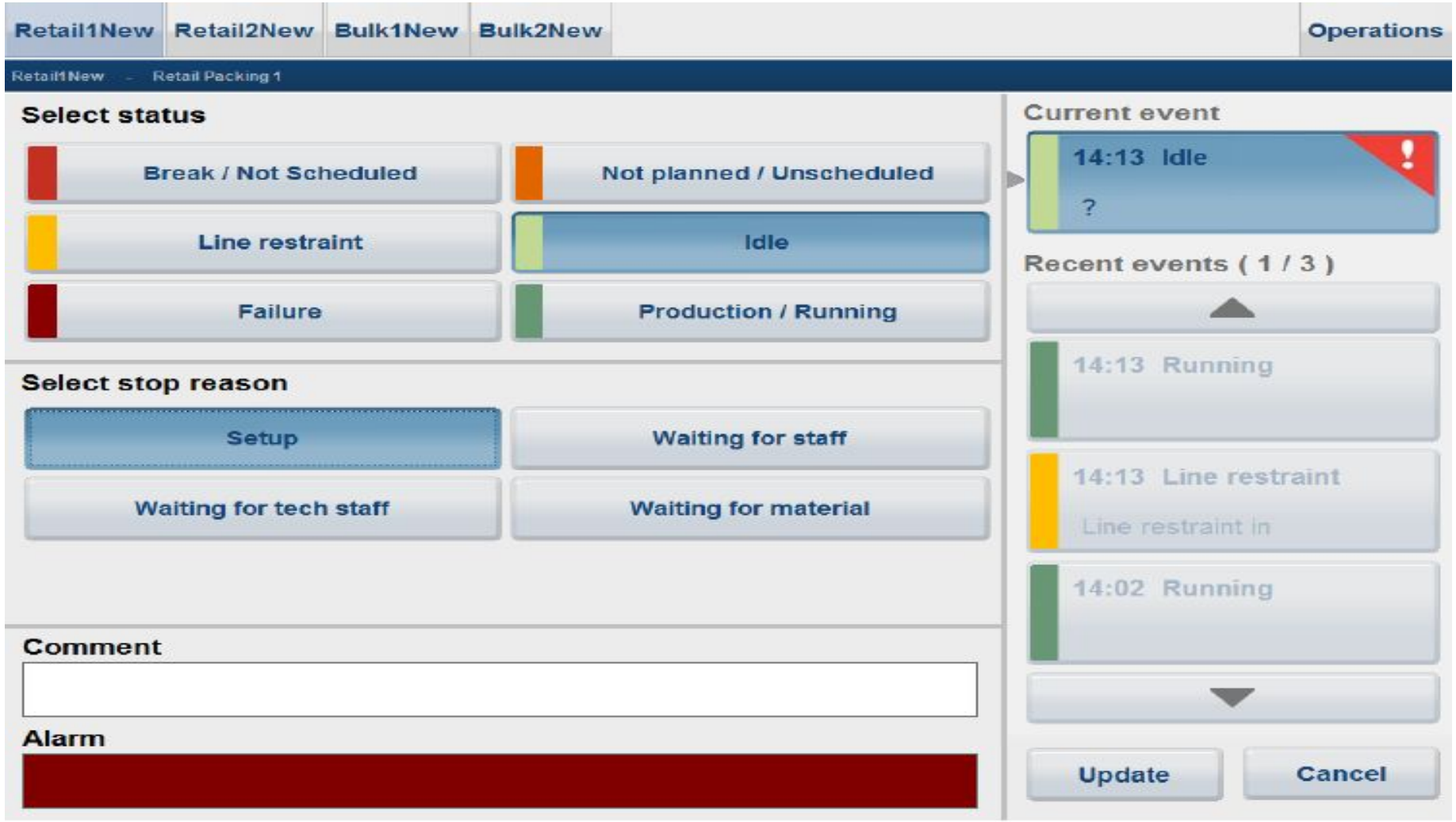


OEE Primary Processing

Monitor in real time

INNOVA

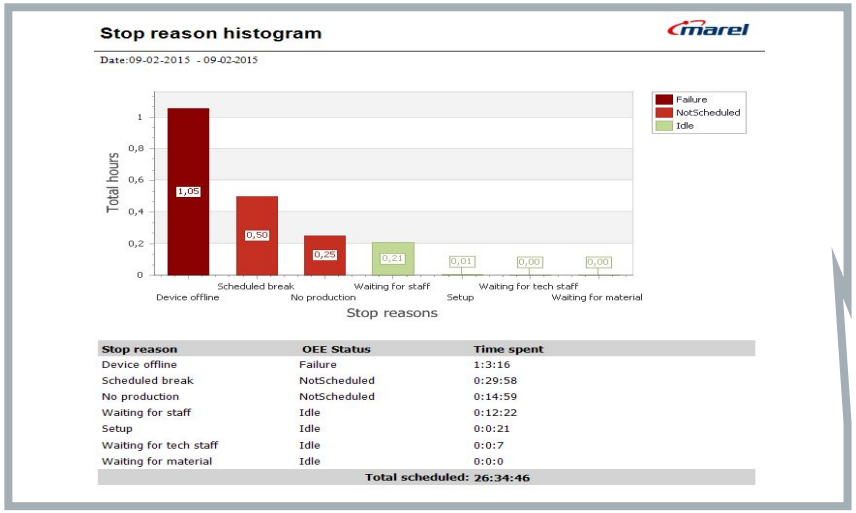
Event status and stop reasons



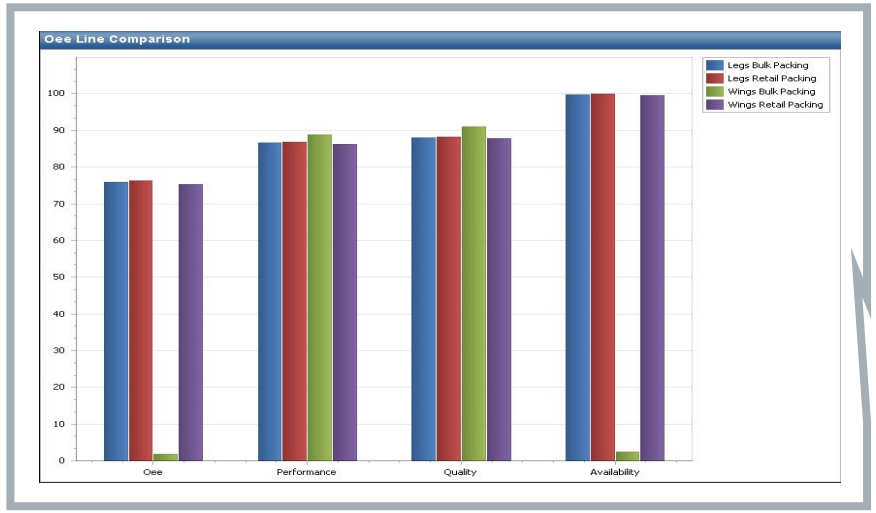
Monitor in real time

INNOVA

How can Marel help you tackle these barriers?



Stop reason	OEE Status	Time spent
Device offline	Failure	1:3:16
Scheduled break	NotScheduled	0:29:58
No production	NotScheduled	0:14:59
Waiting for staff	Idle	0:12:22
Setup	Idle	0:0:21
Waiting for tech staff	Idle	0:0:7
Waiting for material	Idle	0:0:0
	Total scheduled:	26:34:46

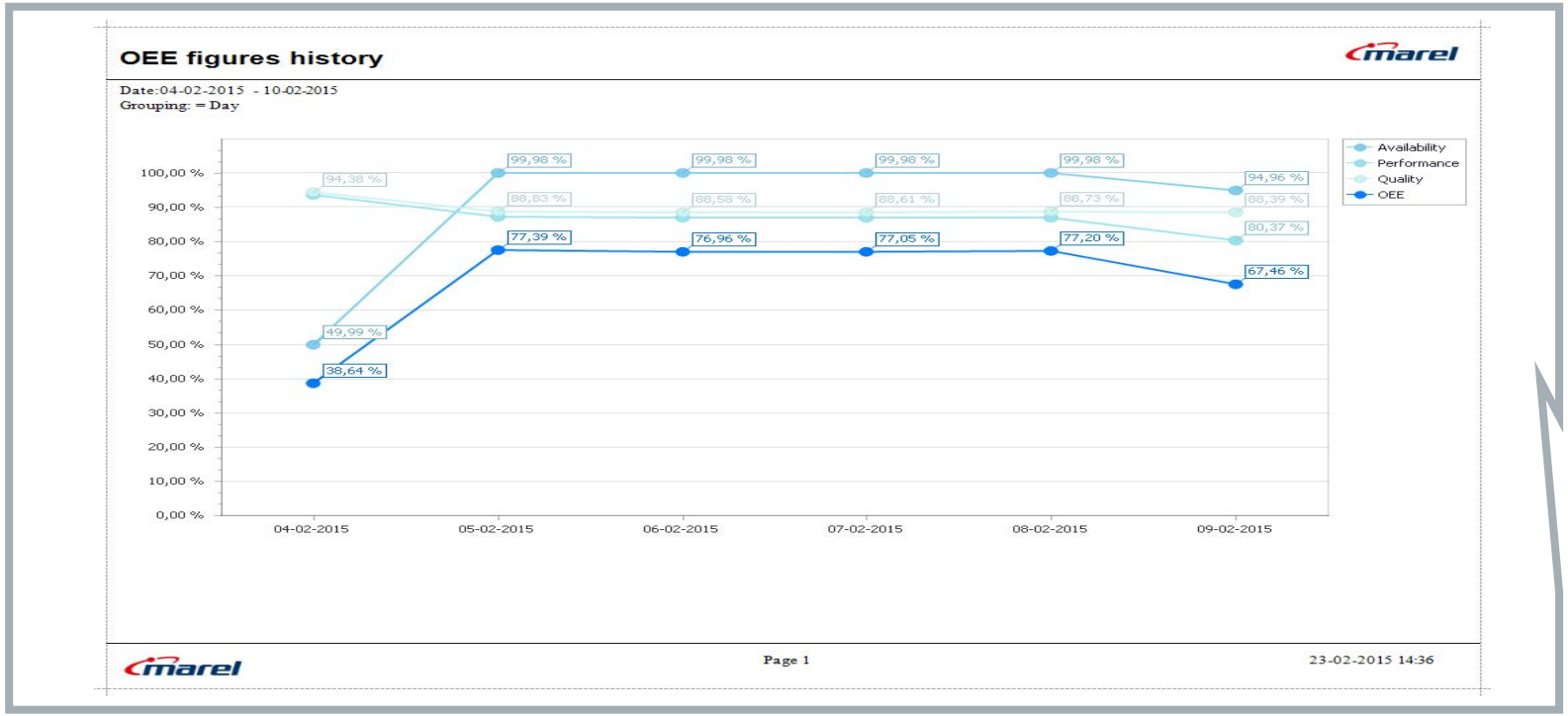


- Fast and easy problem identification with a full report suite and analysis tool
  - Quickly identify and address the cause behind the most time costly production losses.
  - Benchmark multiple lines against each other to spot performance differences.

Monitor in real time

INNOVA

How can Marel help you tackle these barriers?



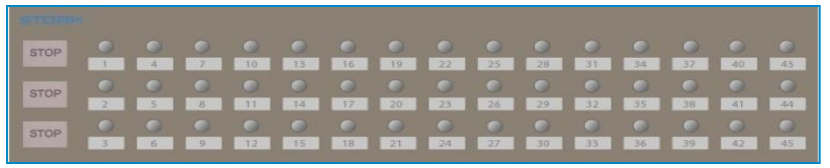
- Track the effects of implemented process improvements and quickly spot whether they yield the expected outcome

Equipment monitoring - why and how?

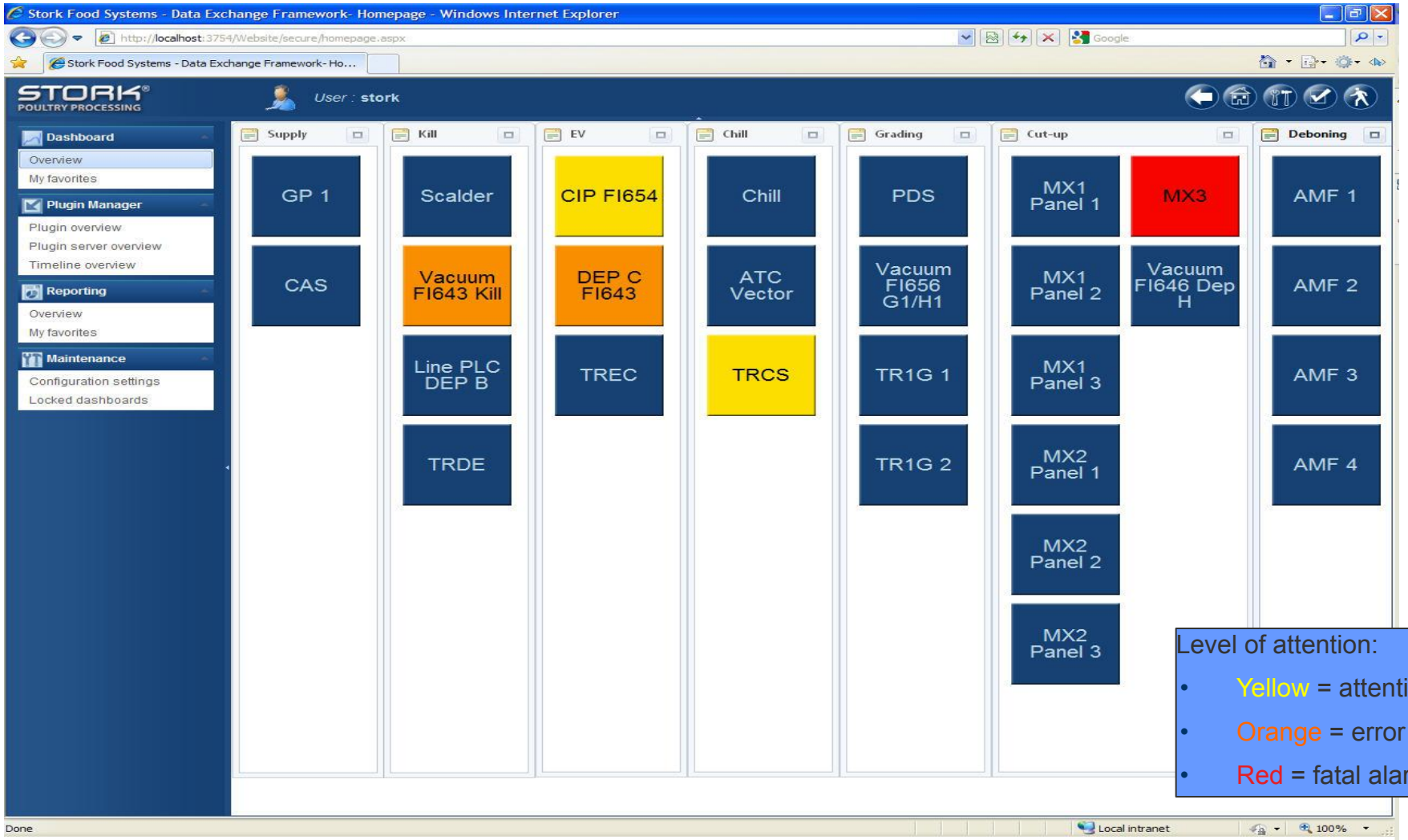
Maximise uptime!

In case of downtime: reduce duration

- Uniform and clear real-time performance info from LED plates and PLC's:
  - "what's the problem and how to solve it"
- Web based:
  - Information available on all devices with web browser
- Collect all real-time data for analysis:
  - Preventive actions: maintenance or inspection schedules



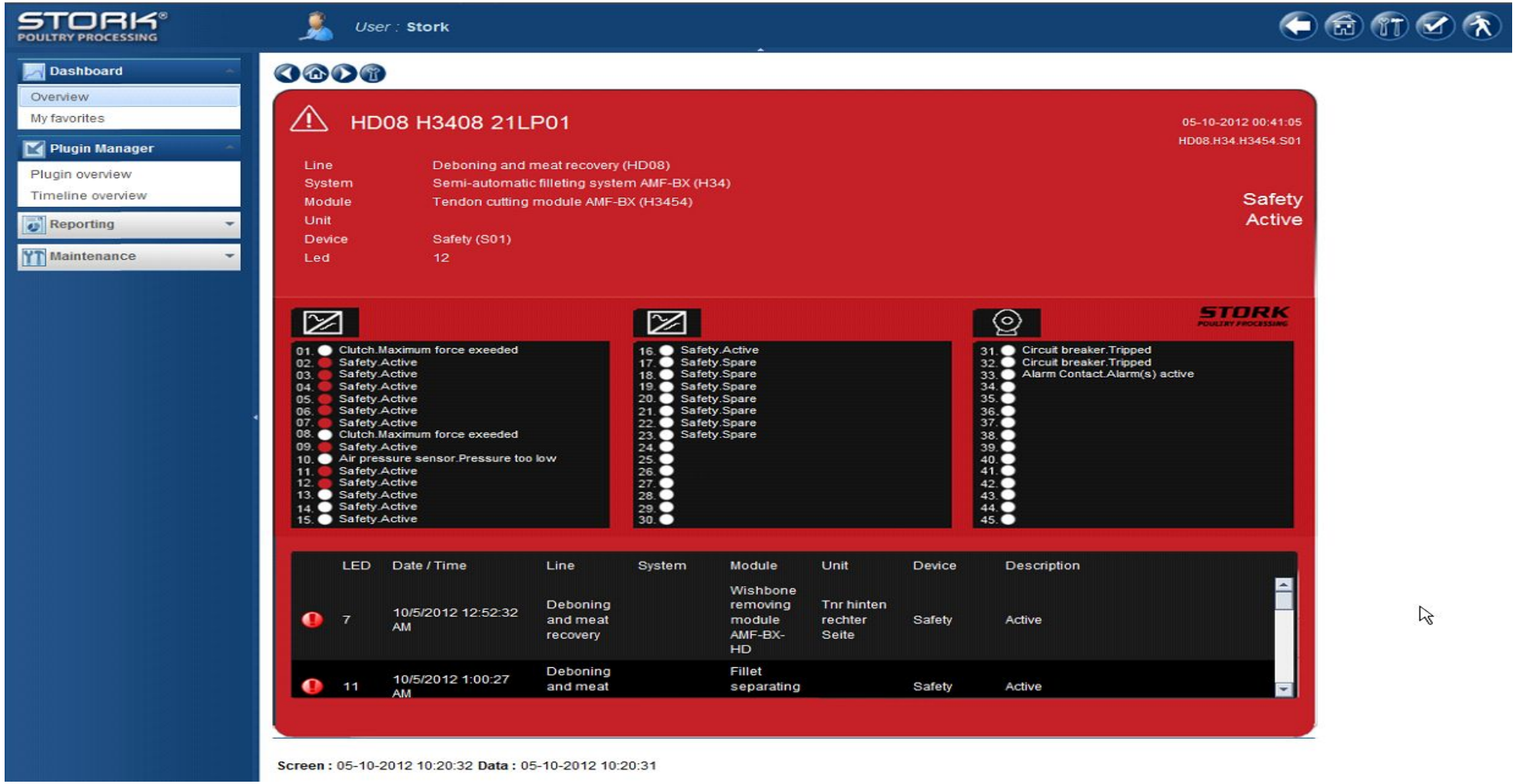
Equipment monitoring dashboard



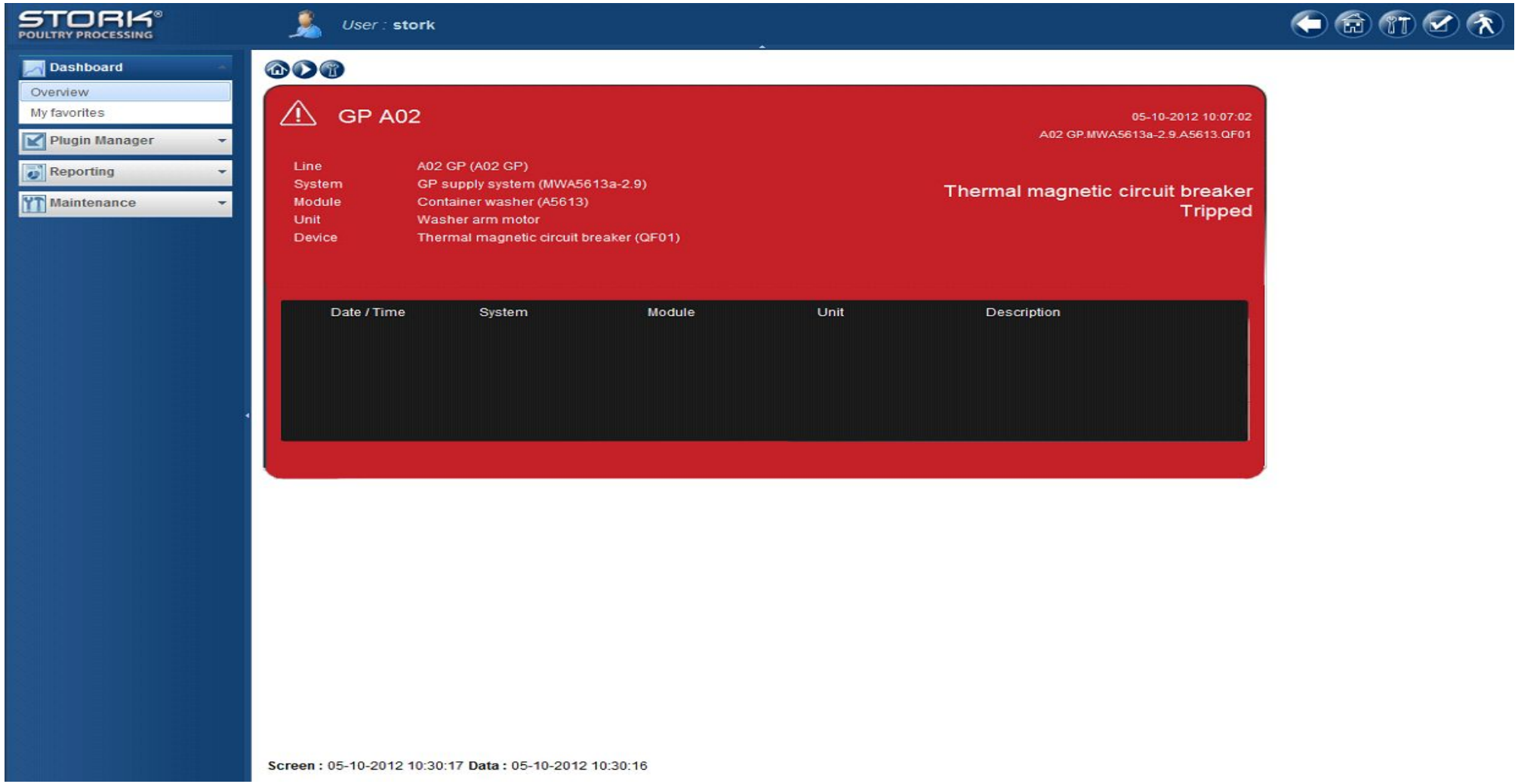
Level of attention:

- Yellow = attention, warning
- Orange = error
- Red = fatal alarm (down/damage)

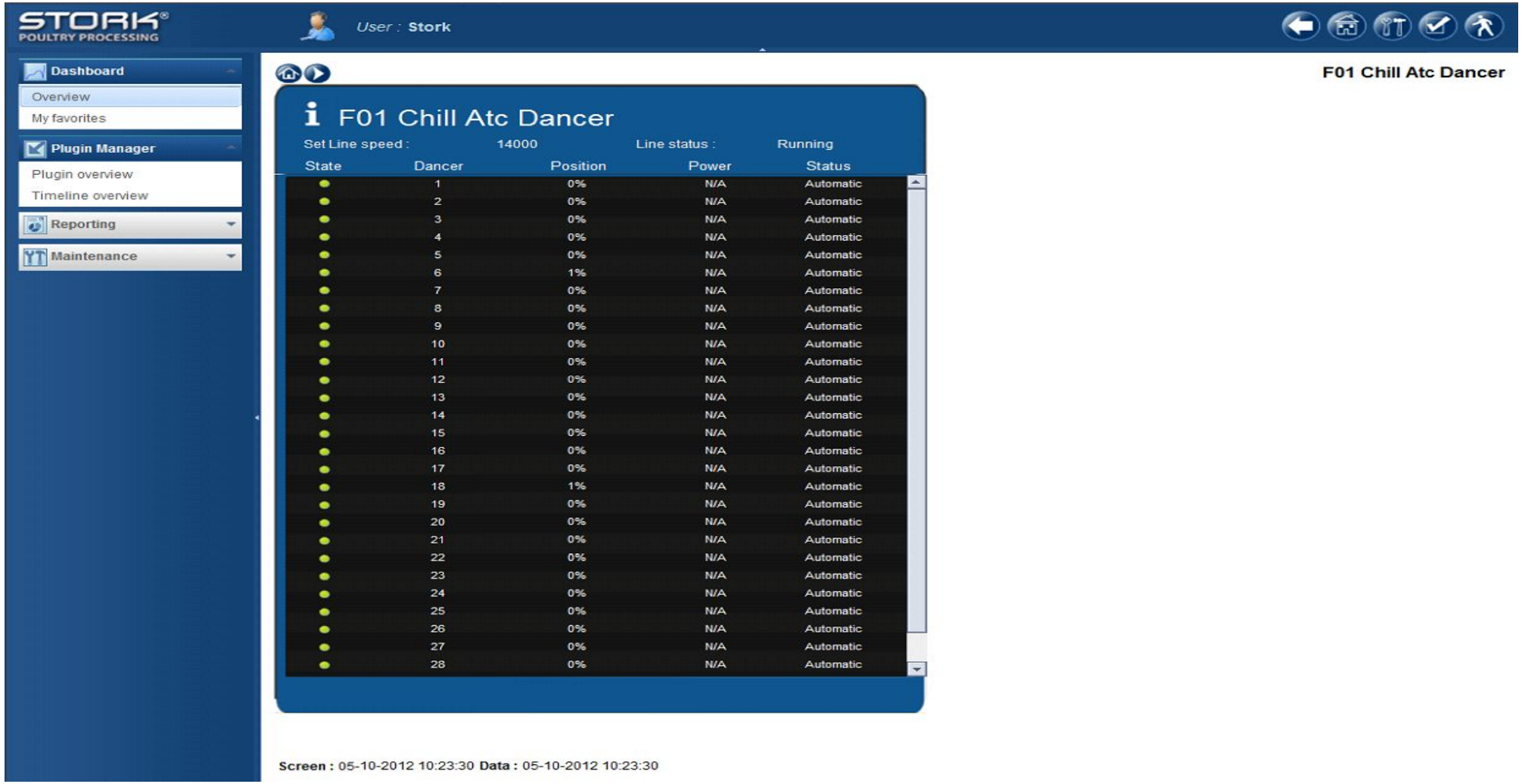
Actual alarms - LED plates



Actual alarms - PLC’s

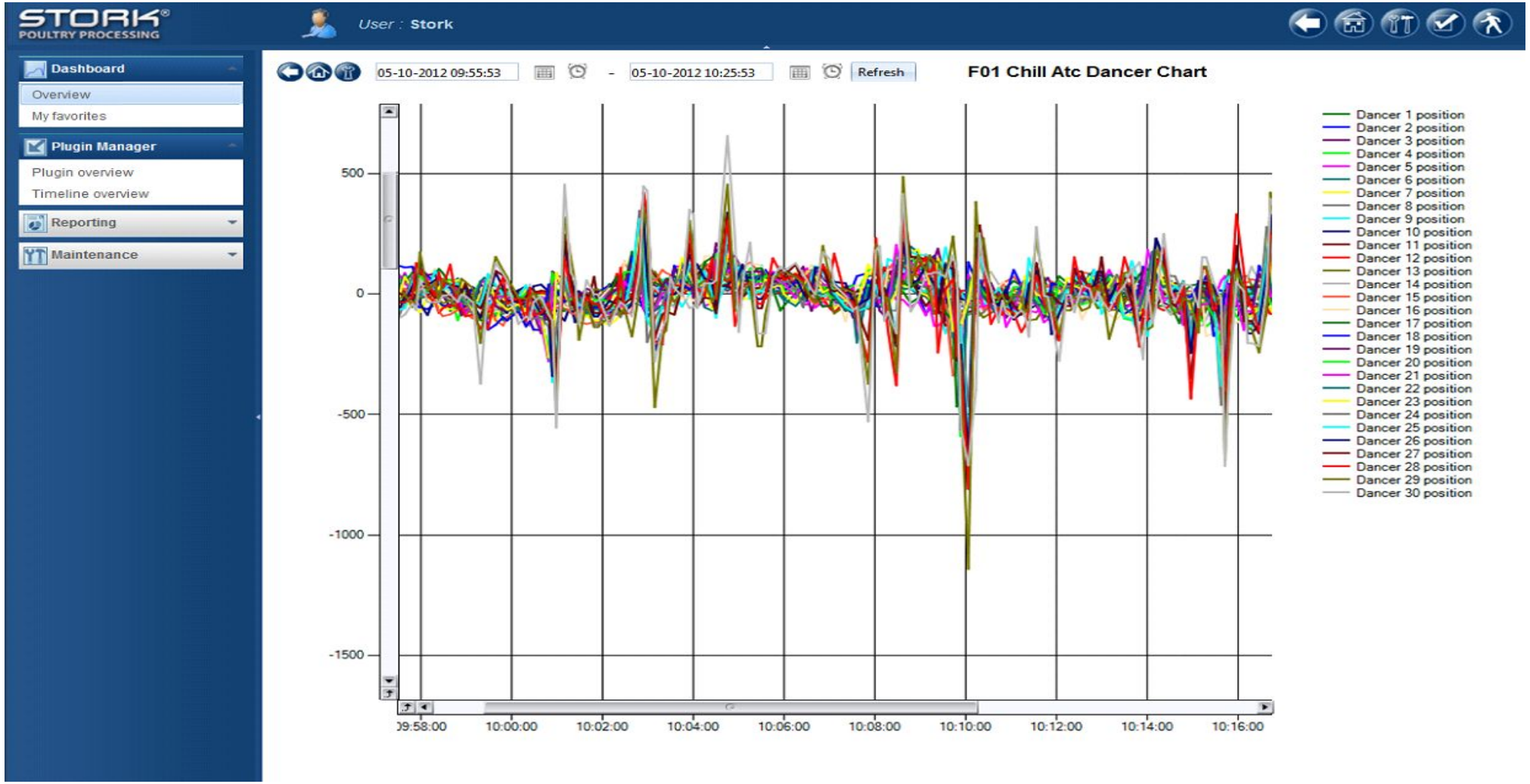


Actual status equipment (eg ATC)

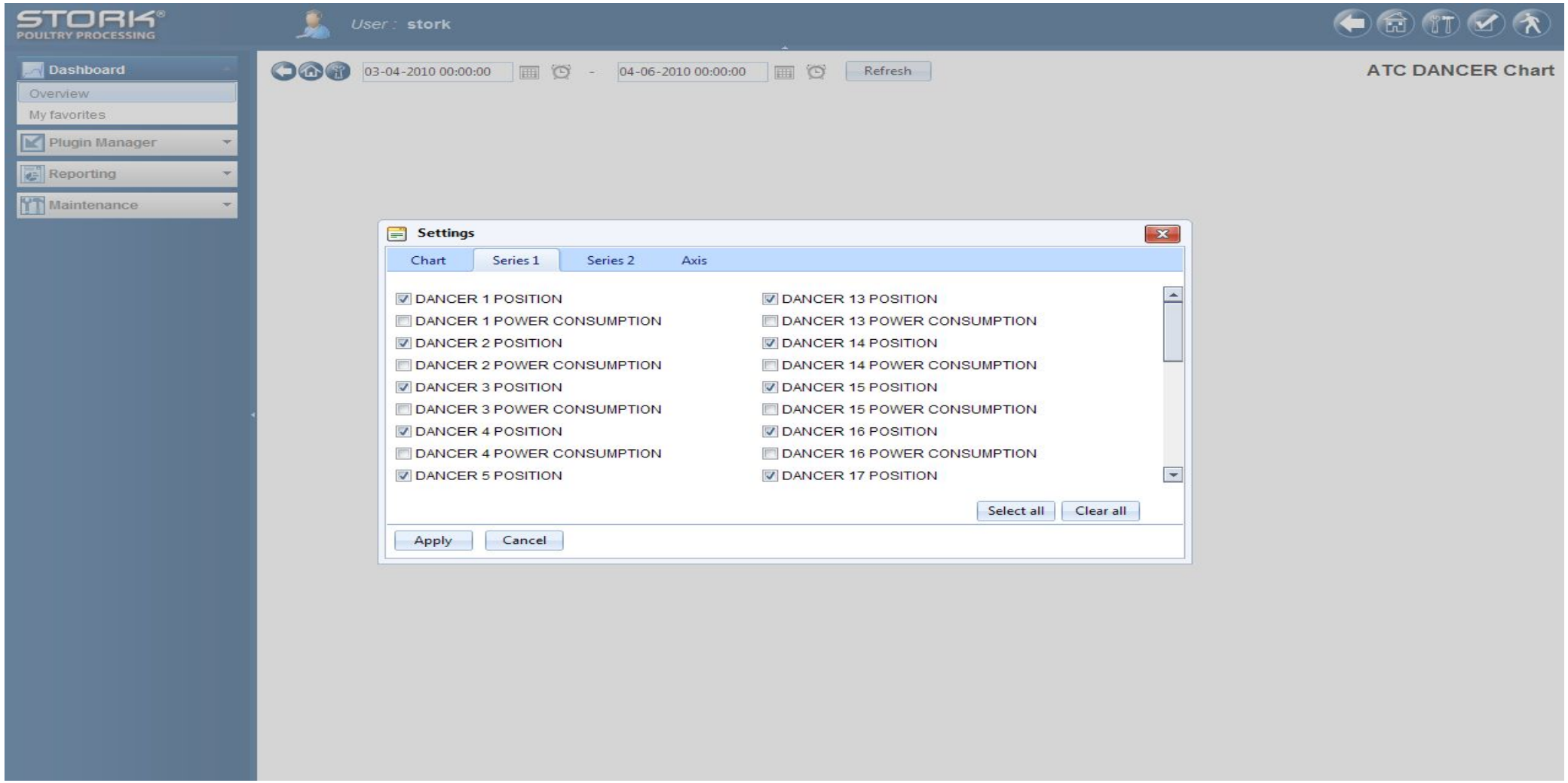


Actual status equipment (ATC: Dancer details)

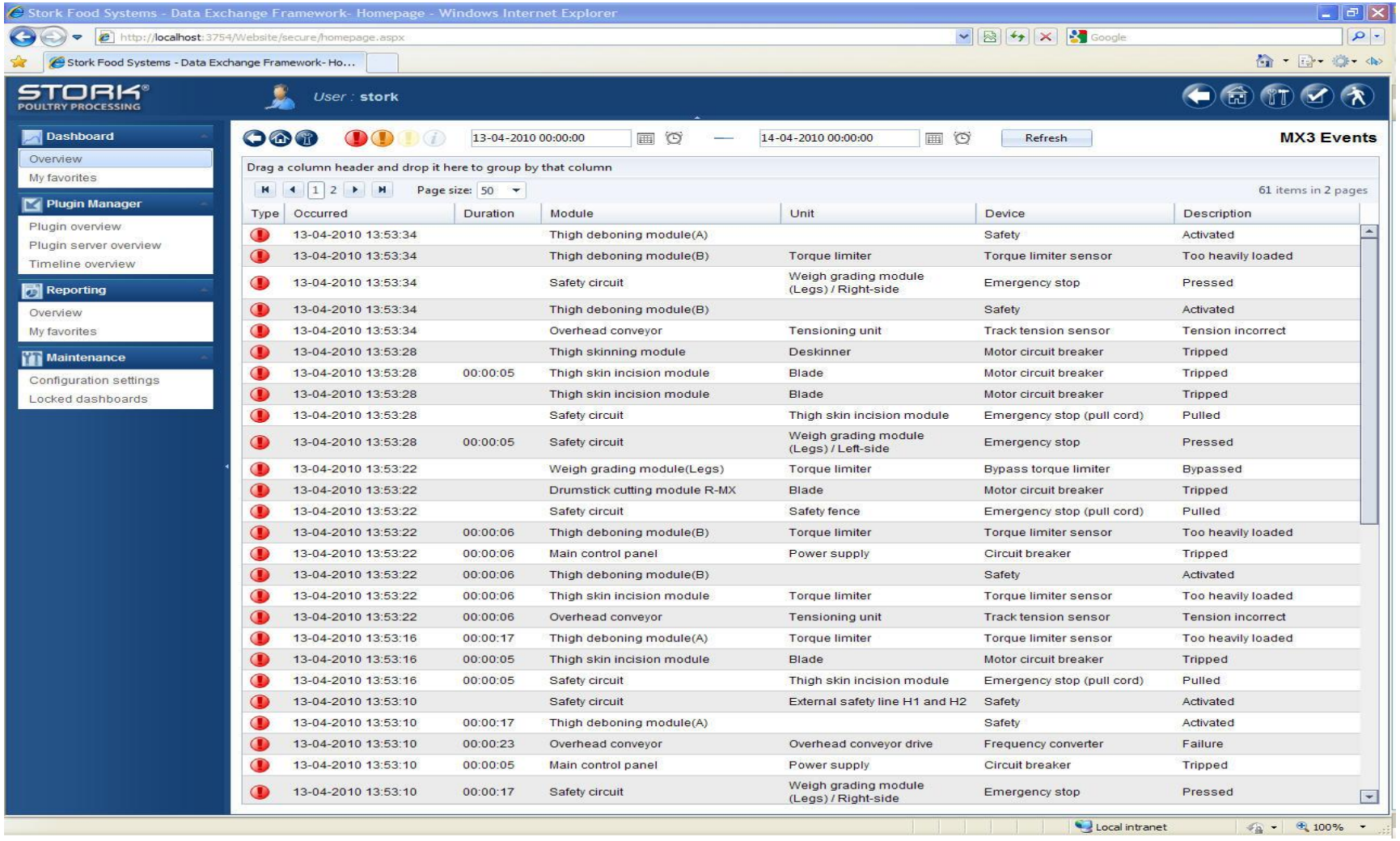
Actual status equipment (ATC: Graph)



Actual status equipment (ATC: Select data for graph)

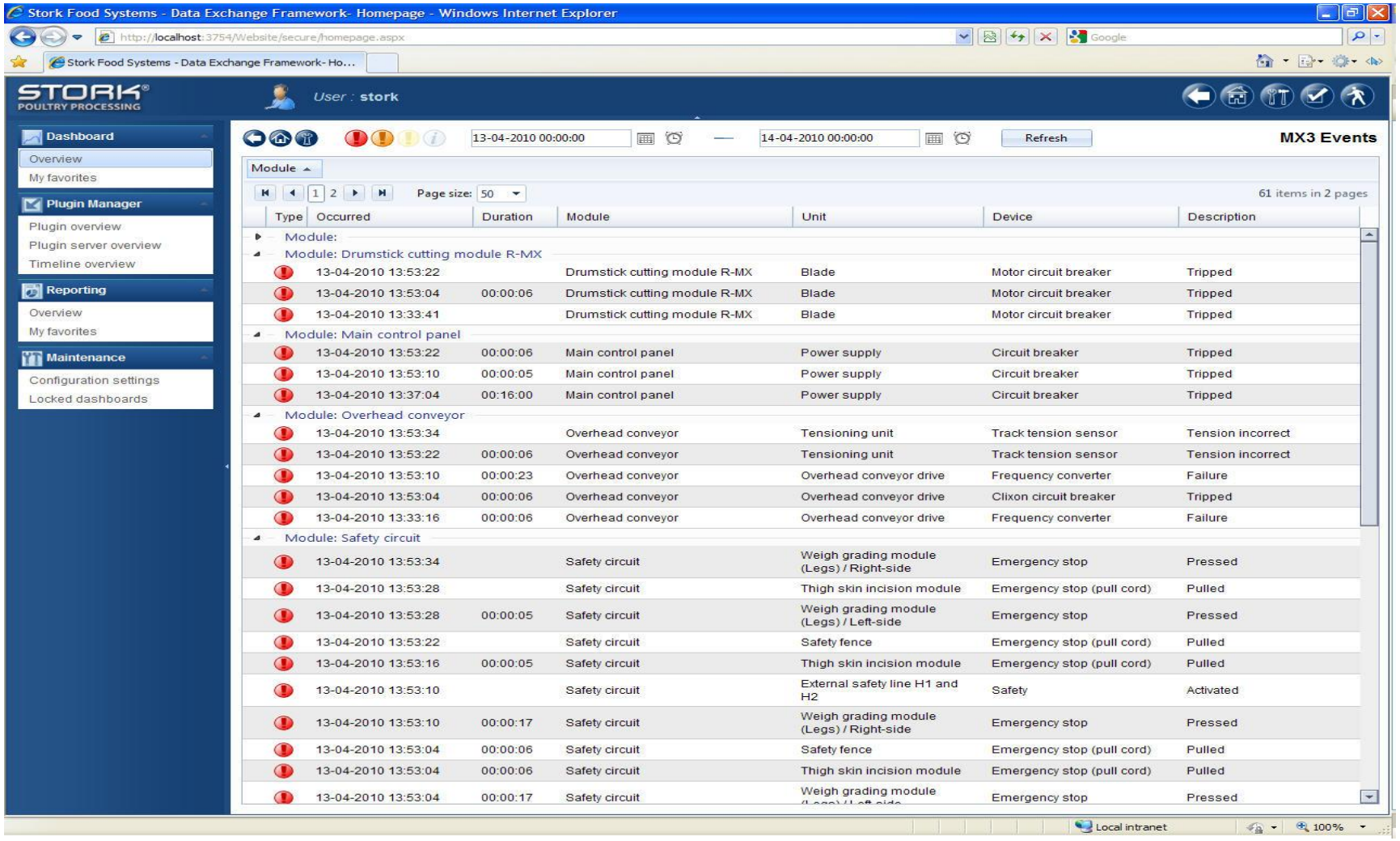


Overview history all alarms

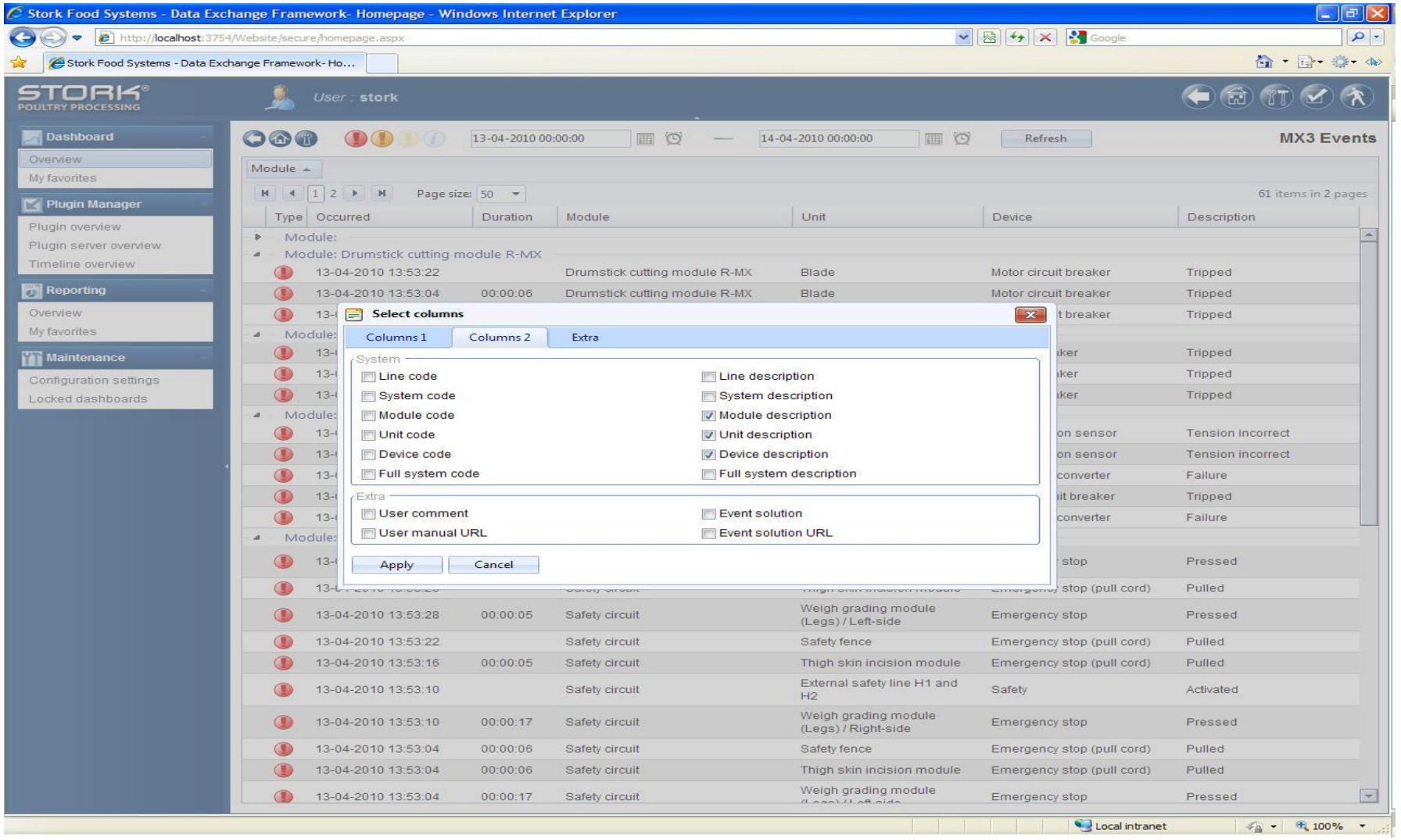


Type	Occurred	Duration	Module	Unit	Device	Description
	13-04-2010 13:53:34		Thigh deboning module(A)		Safety	Activated
	13-04-2010 13:53:34		Thigh deboning module(B)	Torque limiter	Torque limiter sensor	Too heavily loaded
	13-04-2010 13:53:34		Safety circuit	Weigh grading module (Legs) / Right-side	Emergency stop	Pressed
	13-04-2010 13:53:34		Thigh deboning module(B)		Safety	Activated
	13-04-2010 13:53:34		Overhead conveyor	Tensioning unit	Track tension sensor	Tension incorrect
	13-04-2010 13:53:28		Thigh skinning module	Deskinner	Motor circuit breaker	Tripped
	13-04-2010 13:53:28	00:00:05	Thigh skin incision module	Blade	Motor circuit breaker	Tripped
	13-04-2010 13:53:28		Thigh skin incision module	Blade	Motor circuit breaker	Tripped
	13-04-2010 13:53:28		Safety circuit	Thigh skin incision module	Emergency stop (pull cord)	Pulled
	13-04-2010 13:53:28	00:00:05	Safety circuit	Weigh grading module (Legs) / Left-side	Emergency stop	Pressed
	13-04-2010 13:53:22		Weigh grading module(Legs)	Torque limiter	Bypass torque limiter	Bypassed
	13-04-2010 13:53:22		Drumstick cutting module R-MX	Blade	Motor circuit breaker	Tripped
	13-04-2010 13:53:22		Safety circuit	Safety fence	Emergency stop (pull cord)	Pulled
	13-04-2010 13:53:22	00:00:06	Thigh deboning module(B)	Torque limiter	Torque limiter sensor	Too heavily loaded
	13-04-2010 13:53:22	00:00:06	Main control panel	Power supply	Circuit breaker	Tripped
	13-04-2010 13:53:22	00:00:06	Thigh deboning module(B)		Safety	Activated
	13-04-2010 13:53:22	00:00:06	Thigh skin incision module	Torque limiter	Torque limiter sensor	Too heavily loaded
	13-04-2010 13:53:22	00:00:06	Overhead conveyor	Tensioning unit	Track tension sensor	Tension incorrect
	13-04-2010 13:53:16	00:00:17	Thigh deboning module(A)	Torque limiter	Torque limiter sensor	Too heavily loaded
	13-04-2010 13:53:16	00:00:05	Thigh skin incision module	Blade	Motor circuit breaker	Tripped
	13-04-2010 13:53:16	00:00:05	Safety circuit	Thigh skin incision module	Emergency stop (pull cord)	Pulled
	13-04-2010 13:53:10		Safety circuit	External safety line H1 and H2	Safety	Activated
	13-04-2010 13:53:10	00:00:17	Thigh deboning module(A)		Safety	Activated
	13-04-2010 13:53:10	00:00:23	Overhead conveyor	Overhead conveyor drive	Frequency converter	Failure
	13-04-2010 13:53:10	00:00:05	Main control panel	Power supply	Circuit breaker	Tripped
	13-04-2010 13:53:10	00:00:17	Safety circuit	Weigh grading module (Legs) / Right-side	Emergency stop	Pressed

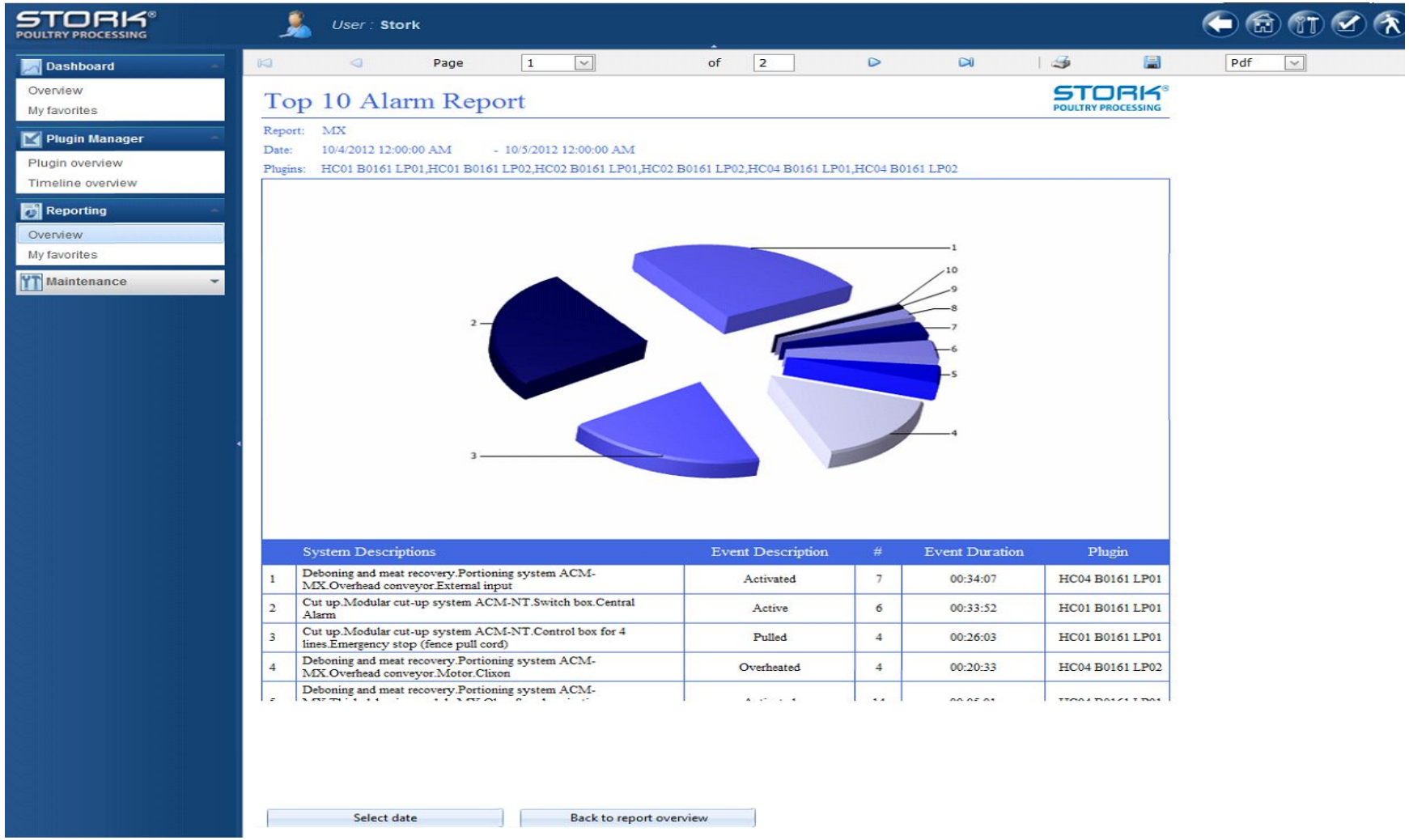
All alarms grouped per module



Select columns you like to present

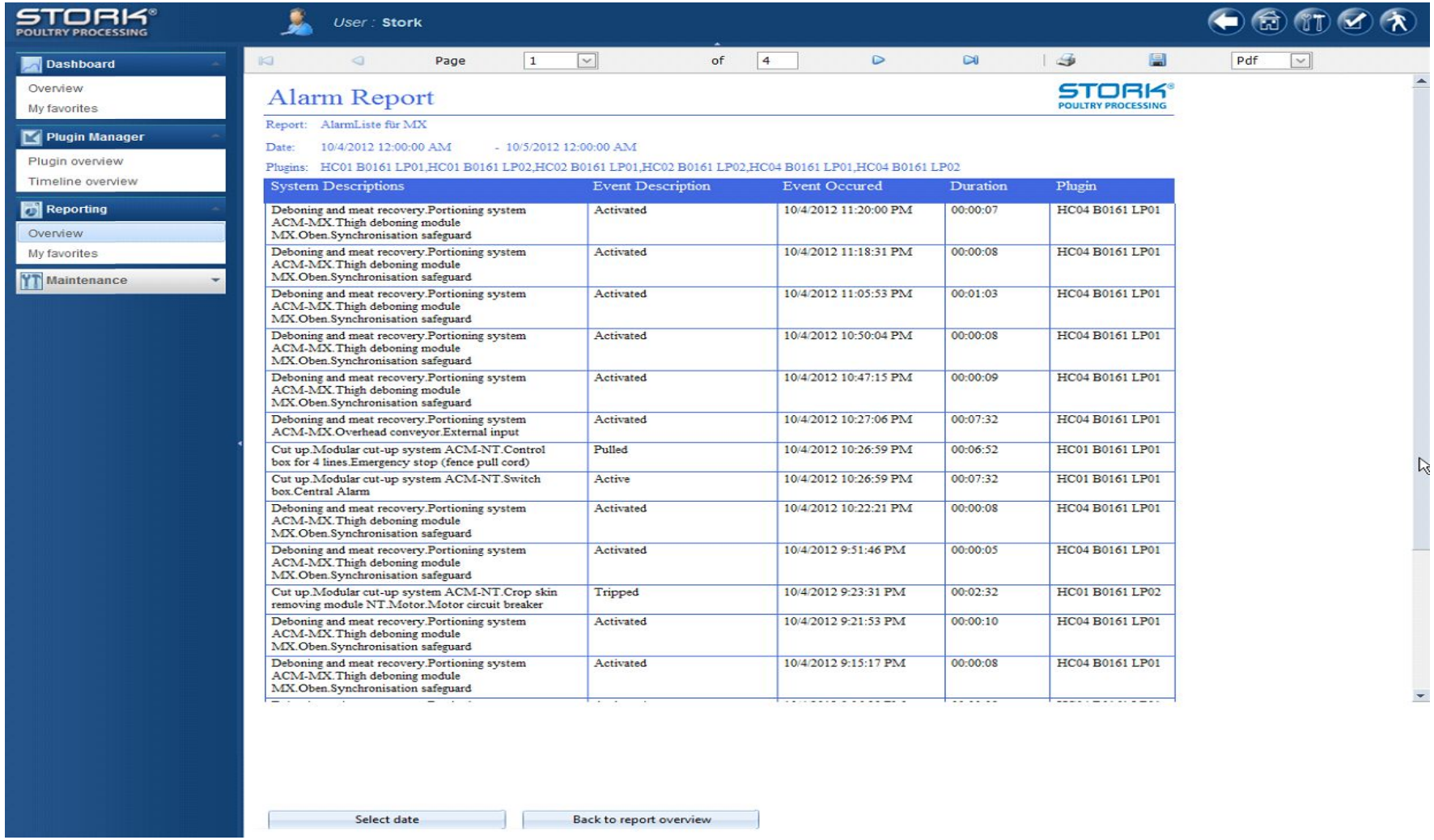


Report TOP 10 alarms



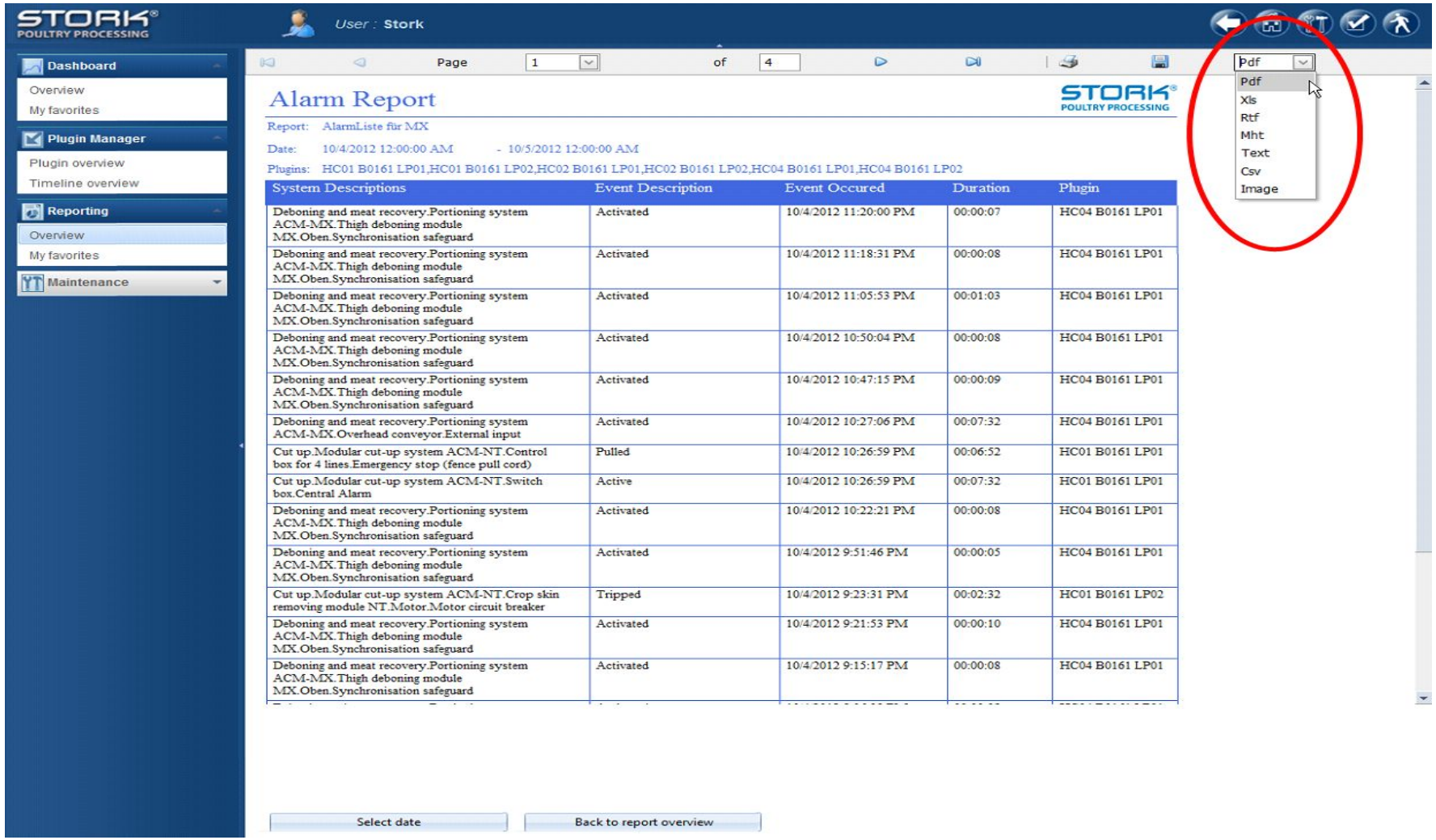
	System Descriptions	Event Description	#	Event Duration	Plugin
1	Deboning and meat recovery.Portioning system ACM-MX.Overhead conveyor.External input	Activated	7	00:34:07	HC04 B0161 LP01
2	Cut up.Modular cut-up system ACM-NT.Switch box.Central Alarm	Active	6	00:33:52	HC01 B0161 LP01
3	Cut up.Modular cut-up system ACM-NT.Control box for 4 lines.Emergency stop (fence pull cord)	Pulled	4	00:26:03	HC01 B0161 LP01
4	Deboning and meat recovery.Portioning system ACM-MX.Overhead conveyor.Motor.Clixon	Overheated	4	00:20:33	HC04 B0161 LP02
	Deboning and meat recovery.Portioning system ACM-				

Report TOP all alarms

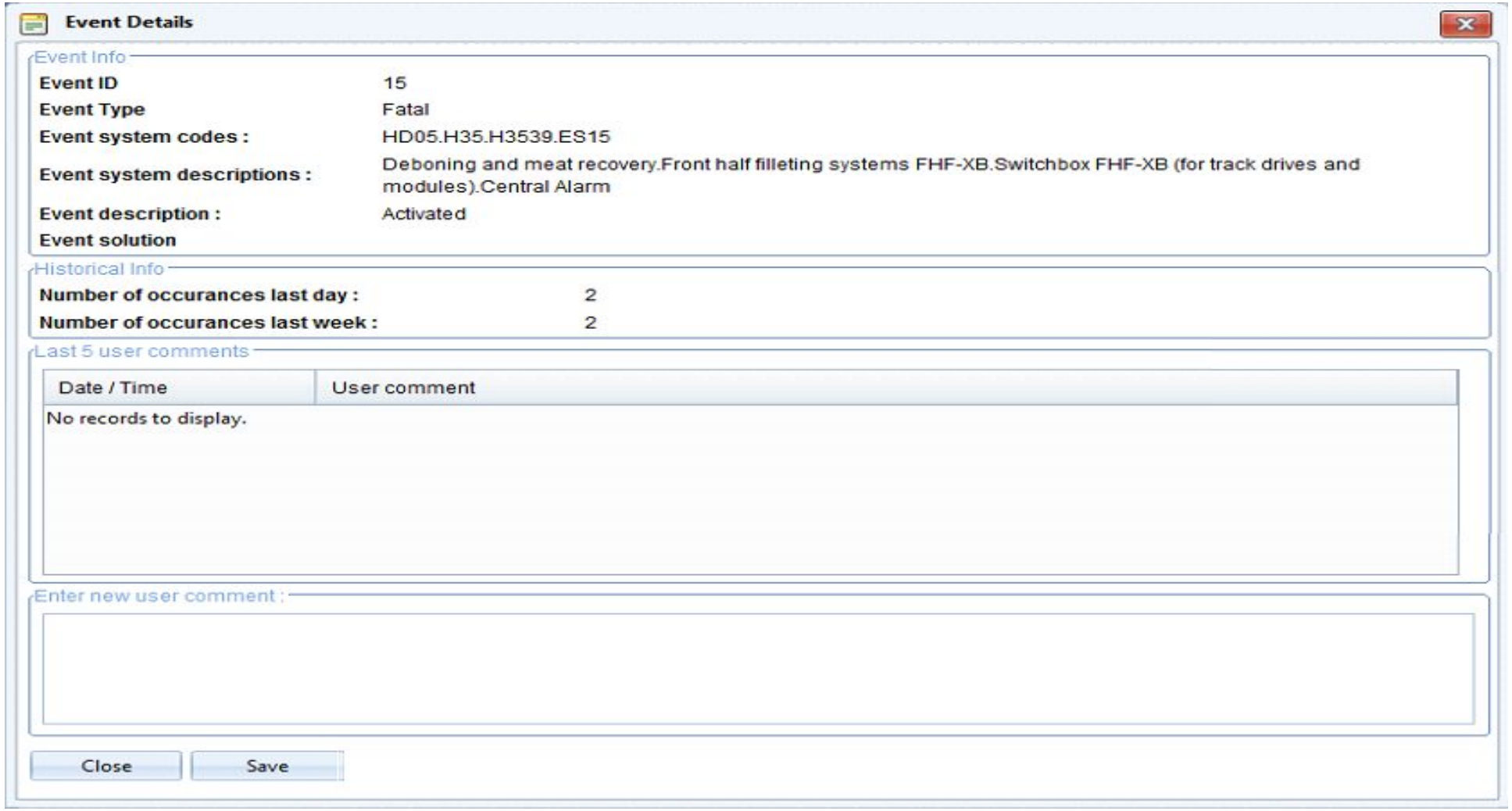


System Descriptions	Event Description	Event Occured	Duration	Plugin
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 11:20:00 PM	00:00:07	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 11:18:31 PM	00:00:08	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 11:05:53 PM	00:01:03	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 10:50:04 PM	00:00:08	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 10:47:15 PM	00:00:09	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Overhead conveyor.External input	Activated	10/4/2012 10:27:06 PM	00:07:32	HC04 B0161 LP01
Cut up.Modular cut-up system ACM-NT.Control box for 4 lines.Emergency stop (fence pull cord)	Pulled	10/4/2012 10:26:59 PM	00:06:52	HC01 B0161 LP01
Cut up.Modular cut-up system ACM-NT.Switch box.Central Alarm	Active	10/4/2012 10:26:59 PM	00:07:32	HC01 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 10:22:21 PM	00:00:08	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 9:51:46 PM	00:00:05	HC04 B0161 LP01
Cut up.Modular cut-up system ACM-NT.Crop skin removing module NT.Motor.Motor circuit breaker	Tripped	10/4/2012 9:23:31 PM	00:02:32	HC01 B0161 LP02
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 9:21:53 PM	00:00:10	HC04 B0161 LP01
Deboning and meat recovery.Portioning system ACM-MX.Thigh deboning module MX.Oben.Synchronisation safeguard	Activated	10/4/2012 9:15:17 PM	00:00:08	HC04 B0161 LP01

Export report to other programs



Manual infeed user comment

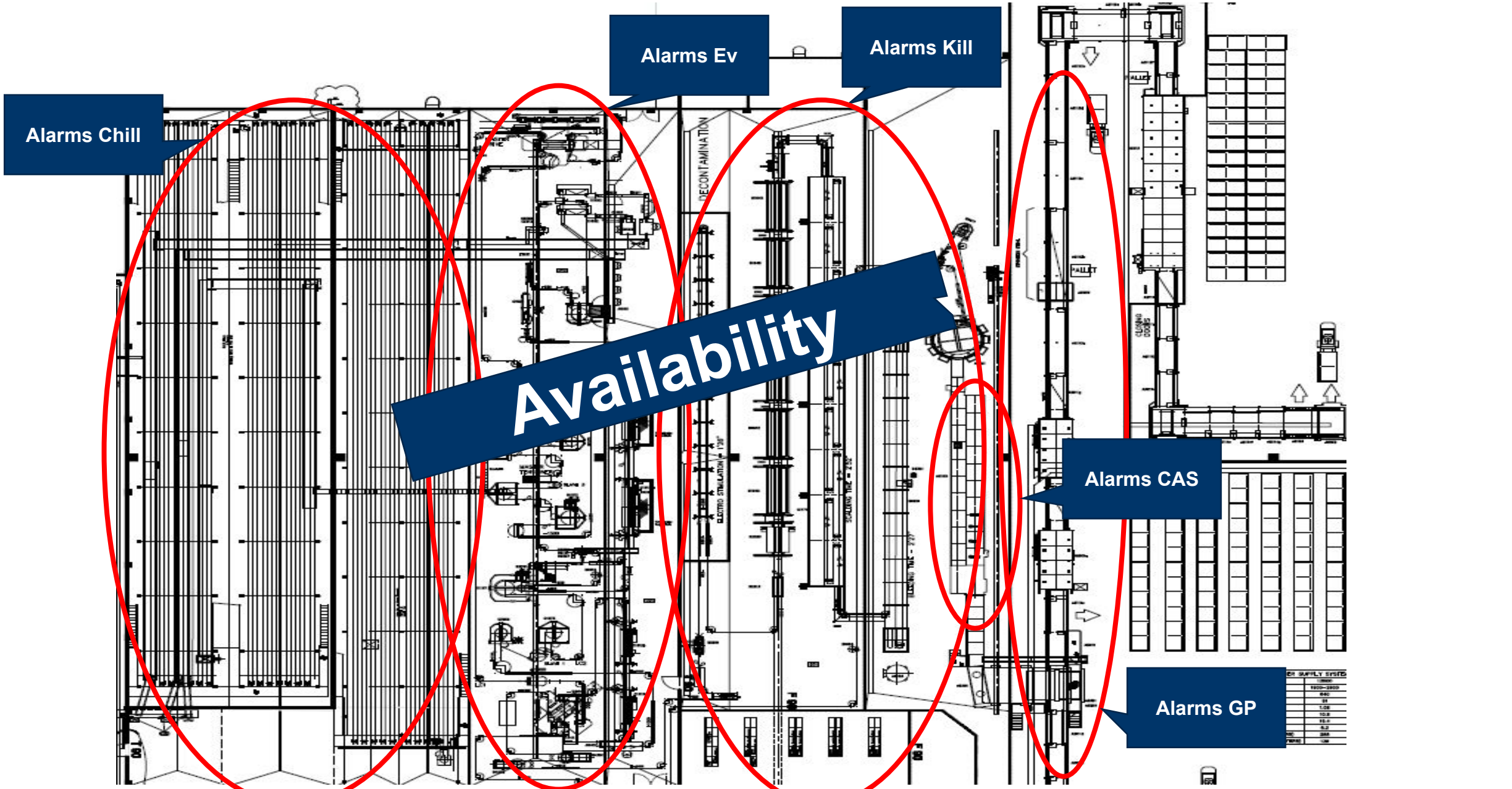


Equipment Monitoring

Available for:

- GP
- CAS
- Transfers (TRDE-NT, TREC, TRCS, TR1G-NT)
- Chiller
- ATC
- CIP
- Department PLC’s
- LED plates on switch boxes

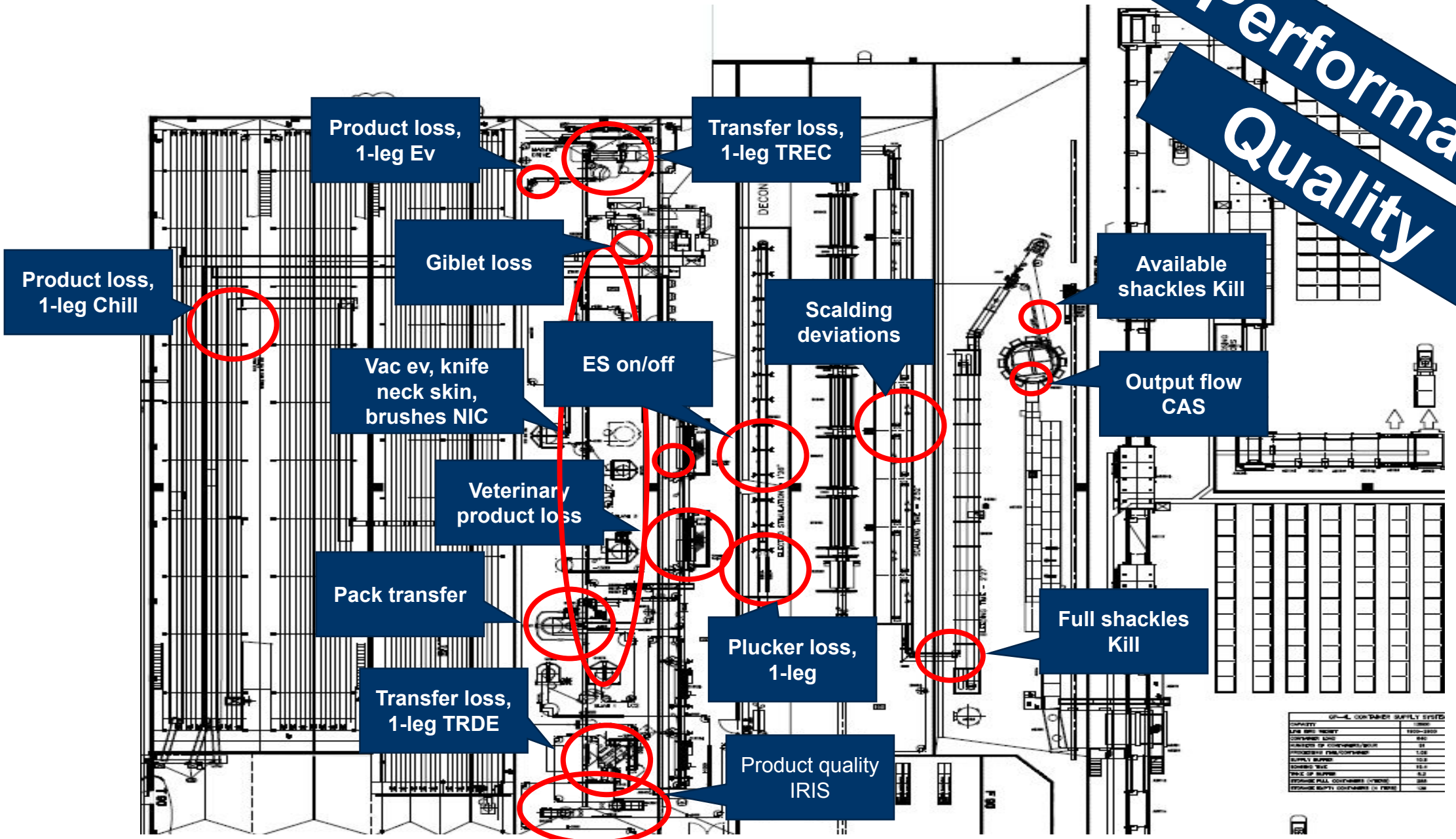
What do we measure?



What do we measure?

Performance

Quality



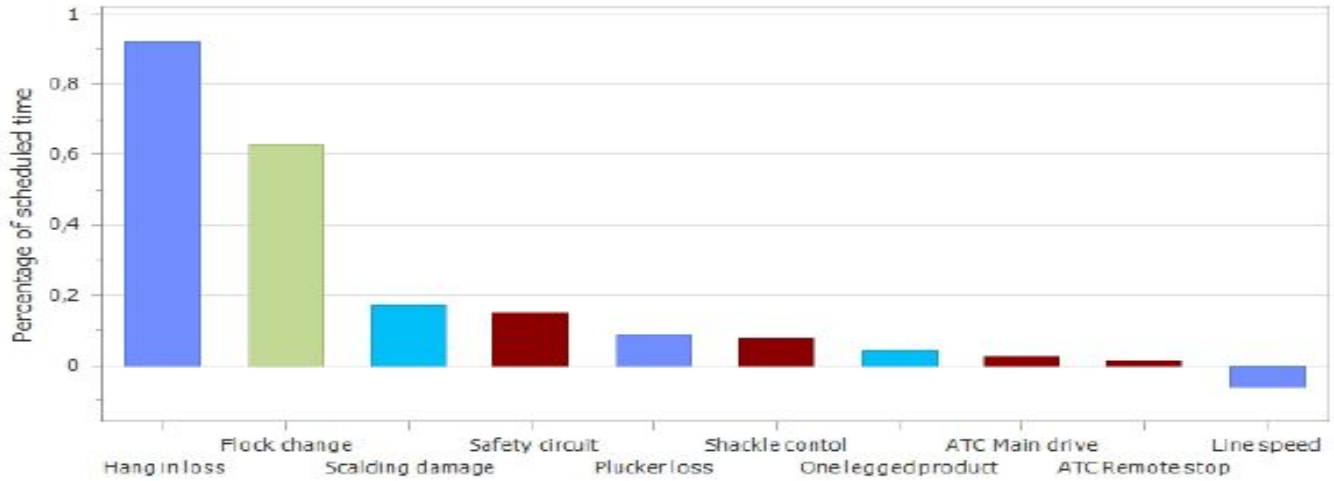
OEE Example kill line

Stop reason histogram

INNOVA

Date:14-3-2016 - 29-3-2016

Date type: = Production Day, Show availability stop reasons, Show performance loss reasons, Show quality loss reasons, Oee entity: = Kill-lline, Oee Status: = (Many), Chart Mode: = Percentage of scheduled time



Reason	Loss type	OEE Status	Duration
Hang in loss	Performance	Running	01:43:13
Flock change	Availability	Idle	01:10:12
Scalding damage	Quality	Running	00:19:06
Safety circuit	Availability	Failure	00:16:22
Plucker loss	Performance	Running	00:09:49
Shackle contol	Availability	Failure	00:08:34
One legged product	Quality	Running	00:04:25
ATC Main drive	Availability	Failure	00:02:53
ATC Remote stop	Availability	Failure	00:01:11
Line speed	Performance	Running	-00:06:52
		Total losses:	**03:48:57**
		Total scheduled:	**186:39:20**

OEE – hang-in loss

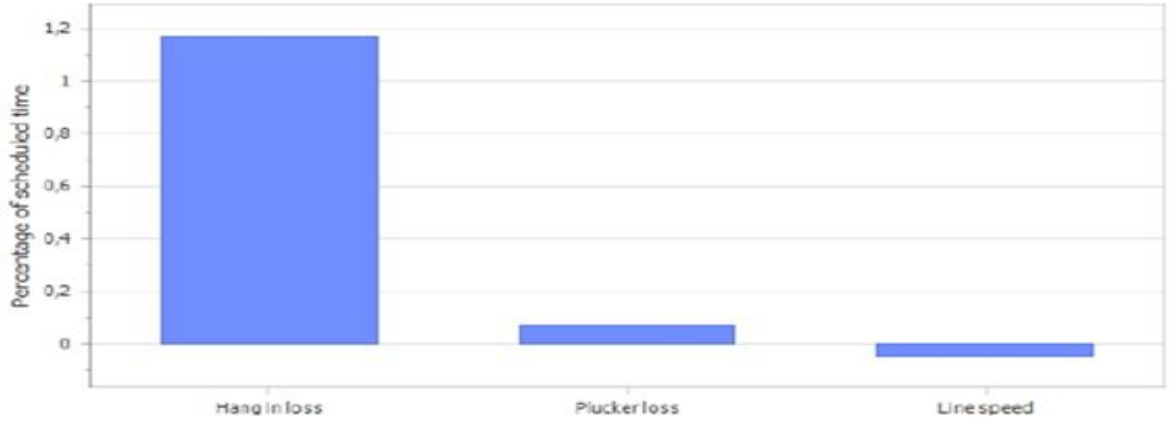
- Hang-in loss per shift

Stop reason histogram

INNOVA

Date:14-3-2016 - 29-3-2016
Date type: = Production Day, Show performance loss reasons, Shift: = (Many), Oee entity: = Kill-lline, Oee Status: = (Many), Chart Mode: = Percentage of scheduled time, Break on Shift

Shift: Shift 1



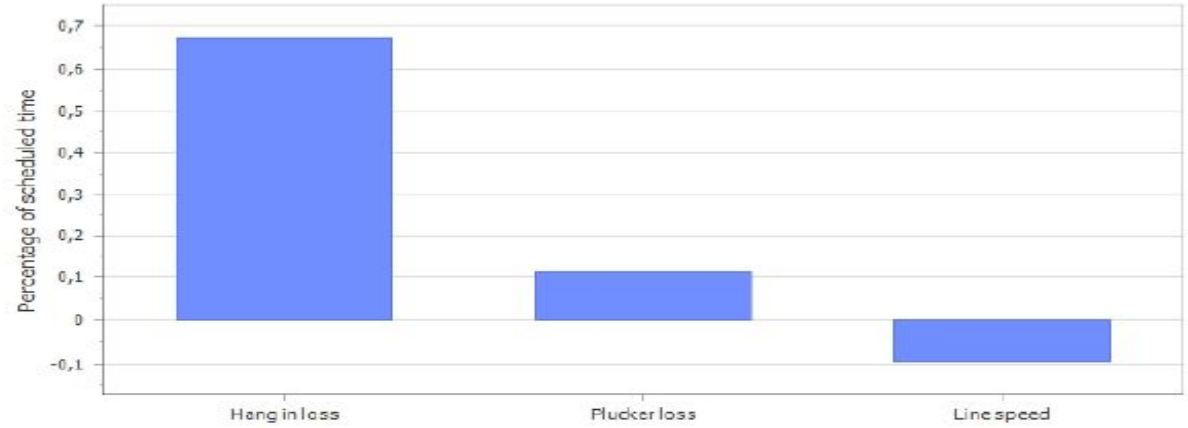
Reason	Loss type	OEE Status	Duration	Amount
Hang in loss	Performance	Running	01:11:08	16077
Plucker loss	Performance	Running	00:04:21	984
Line speed	Performance	Running	-00:02:42	-611
		Total losses:	**01:12:47**	
		Total scheduled:	**101:21:09**	

Stop reason histogram

INNOVA

Date:14-3-2016 - 29-3-2016
Date type: = Production Day, Show performance loss reasons, Shift: = (Many), Oee entity: = Kill-lline, Oee Status: = (Many), Chart Mode: = Percentage of scheduled time, Break on Shift

Shift: Shift 2



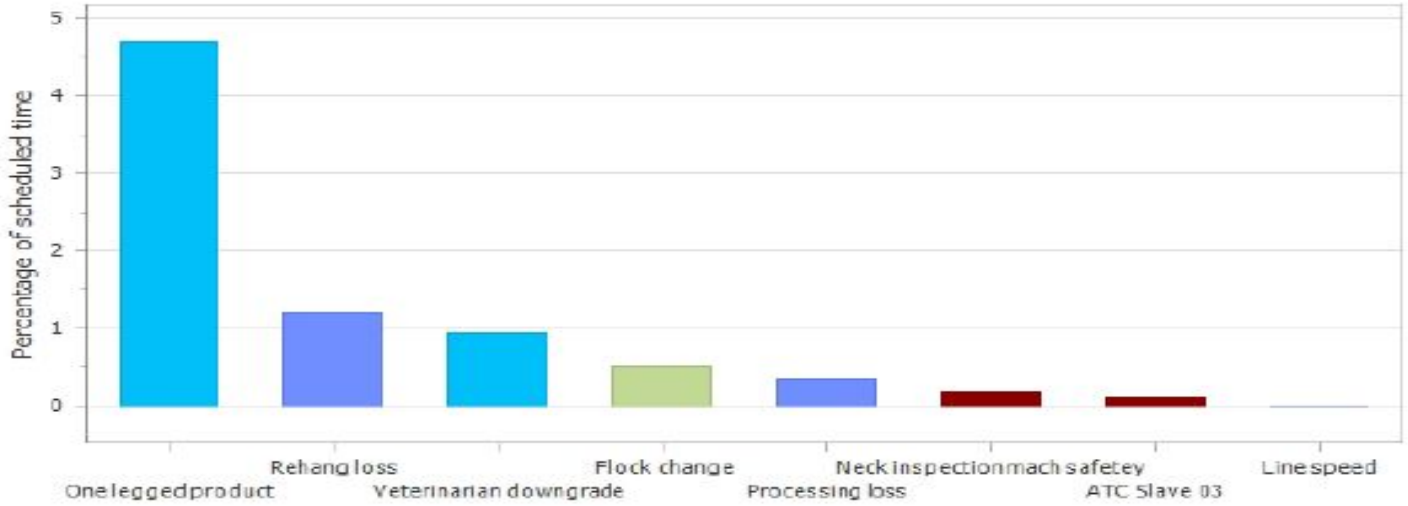
Reason	Loss type	OEE Status	Duration	Amount
Hang in loss	Performance	Running	00:32:01	7237
Plucker loss	Performance	Running	00:05:28	1237
Line speed	Performance	Running	-00:04:29	-1016
		Total losses:	**00:33:00**	
		Total scheduled:	**79:29:57**	

OEE example ev line

Stop reason histogram

INNOVA

Date:29-3-2016 - 29-3-2016
Date type: = Production Day, Show availability stop reasons, Show performance loss reasons, Show quality loss reasons, Shift: = (Many), Oee entity: = EV Line, Oee Status: = (Many), Chart Mode: = Percentage of scheduled time



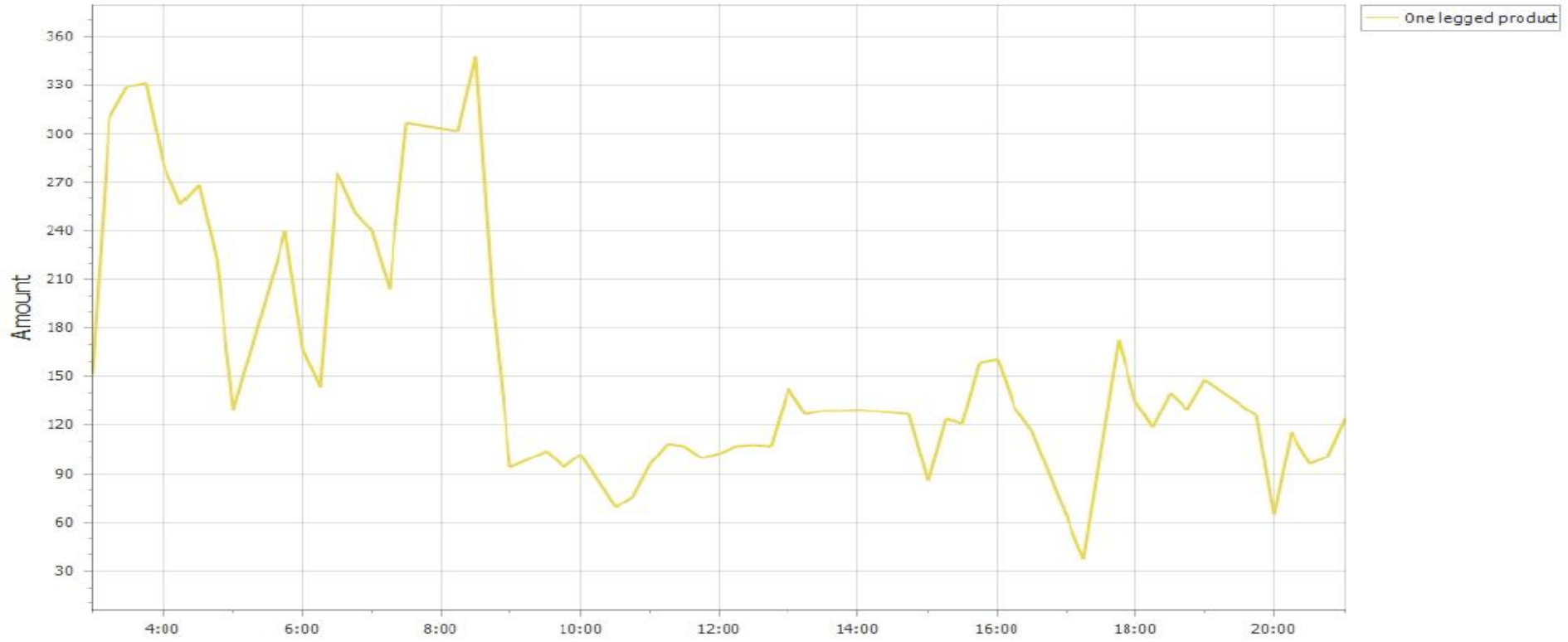
Reason	Loss type	OEE Status	Duration
One legged product	Quality	Running	00:44:48
Rehang loss	Performance	Running	00:11:25
Veterinarian downgrade	Quality	Running	00:08:52
Flock change	Availability	Idle	00:04:53
Processing loss	Performance	Running	00:03:19
Neck inspection mach safetey	Availability	Failure	00:01:38
ATC Slave 03	Availability	Failure	00:00:55
Line speed	Performance	Running	-00:00:04
		Total losses:	**01:15:48**
		Total scheduled:	**15:52:46**

OEE example – products on 1 leg in the shackle

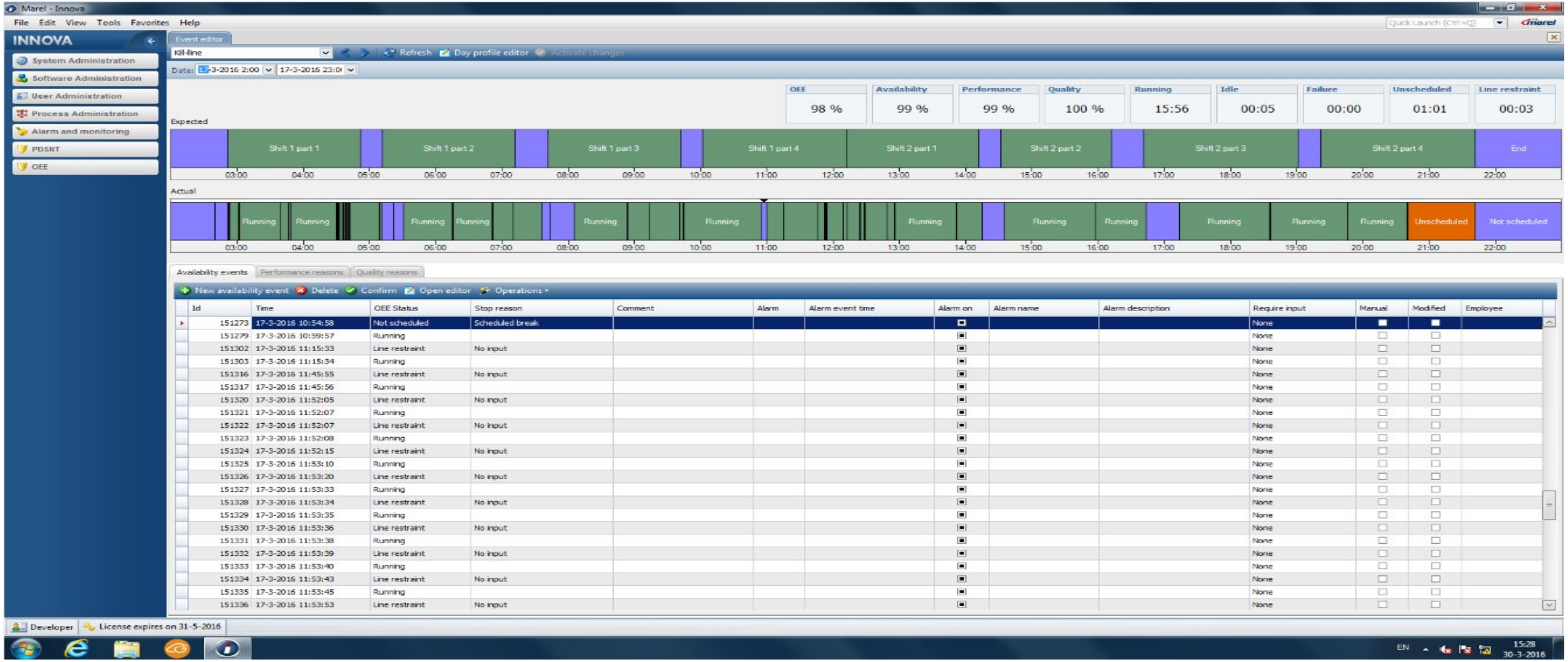
Quality loss history

INNOVA

Date:29-3-2016 - 29-3-2016
Date type: = ProductionDay, Oee entity: = EV Line, Quality reasons: = One legged product, Shift: = (Many), Grouping: = Quarter hour



OEE – event editor with scheduled breaks

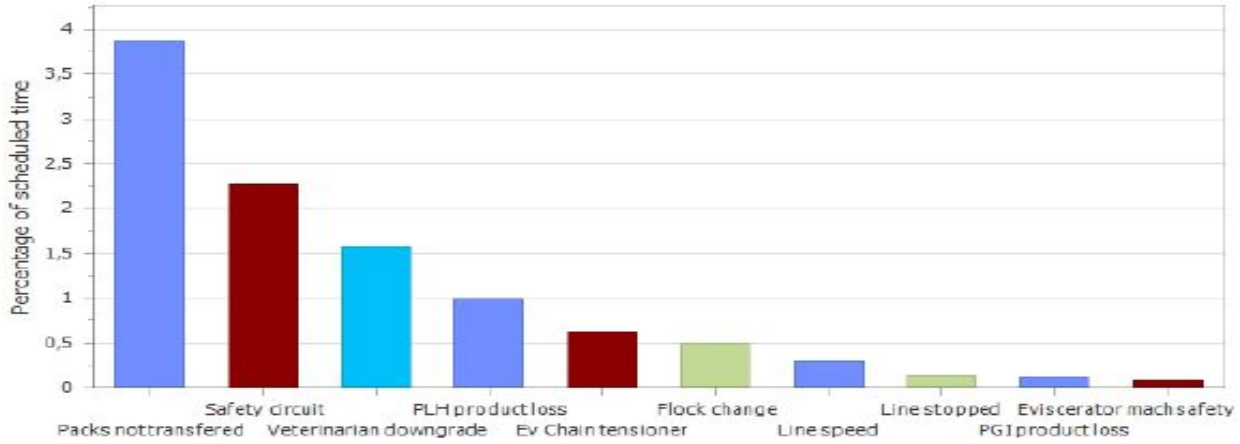


OEE – giblet processing

Stop reason histogram

INNOVA

Date:23-3-2016 - 23-3-2016
Date type: = Production Day, Show availability stop reasons, Show performance loss reasons, Show quality loss reasons, Shift: = (Many), Oee entity: = Gibletline OEE, Oee Status: = (Many), Chart Mode: = Percentage of scheduled time

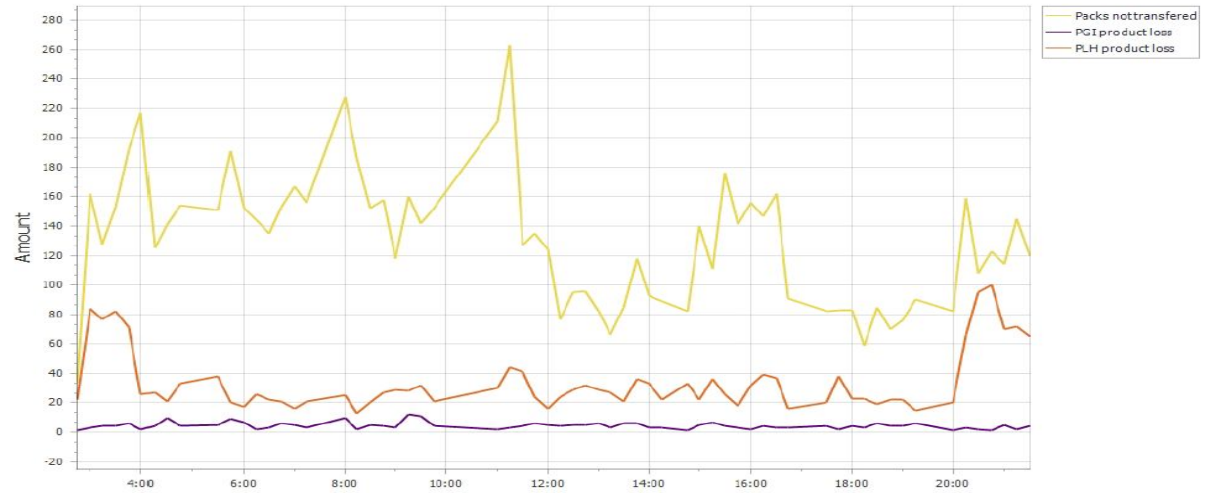


Reason	Loss type	OEE Status	Duration
Packs not transfered	Performance	Running	00:38:18
Safety circuit	Availability	Failure	00:22:27
Veterinarian downgrade	Quality	Running	00:15:32
PLH product loss	Performance	Running	00:09:47
Ev Chain tensioner	Availability	Failure	00:06:06
Flock change	Availability	Idle	00:04:56
Line speed	Performance	Running	00:02:55
Line stopped	Availability	Idle	00:01:25
PGI product loss	Performance	Running	00:01:16
Eviscerator mach safety	Availability	Failure	00:00:41
		Total losses:	**01:43:27**
		Total scheduled:	**16:28:40**

Performance loss history

INNOVA

Date:23-3-2016 - 23-3-2016
Date type: = Production Day, Oee entity: = Gibletline OEE, Performance reasons: = (Many), Shift: = (Many), Grouping: = Quarter hour

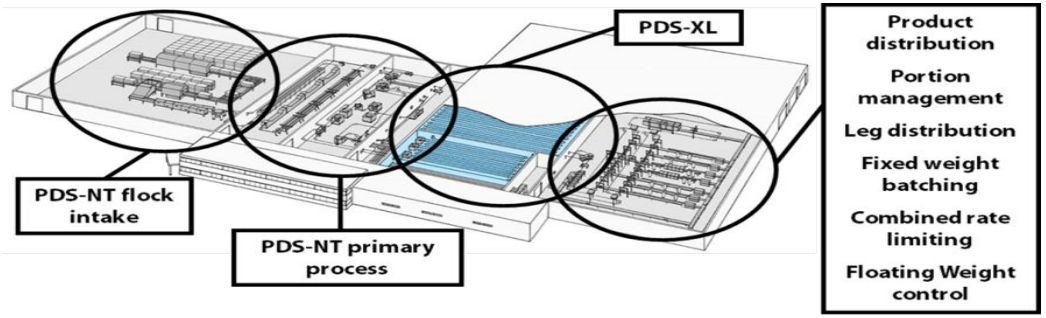


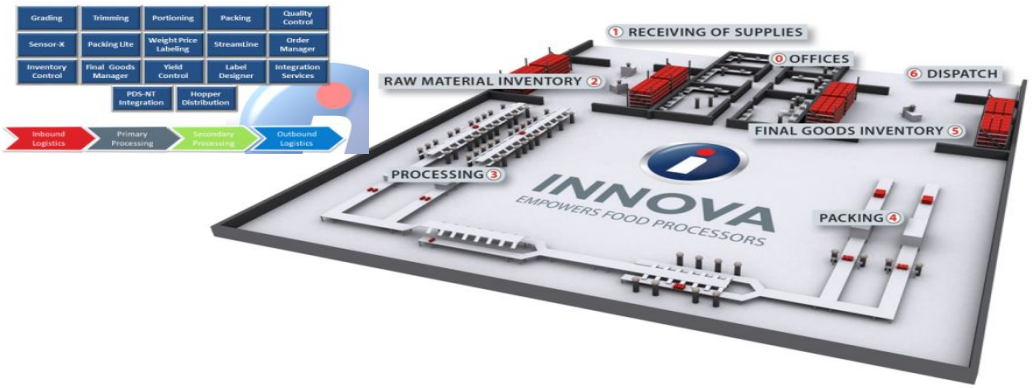
Positioning OEE

OEE

Equipmenmt Monitoring

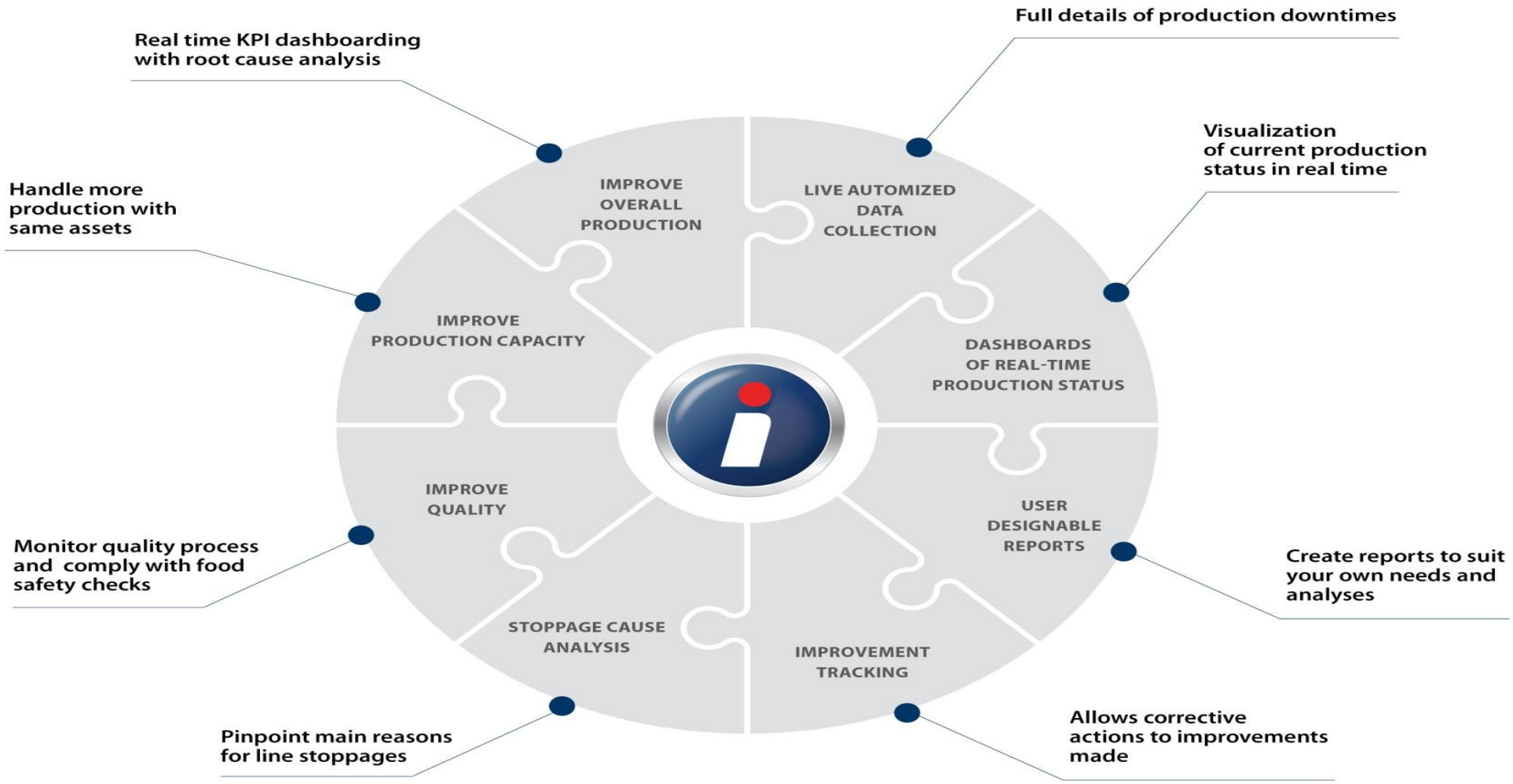
Base modules





The Benefits of OEE with Innova

INNOVA



Innova
Service Portfolio

Innova Service and Support Portfolio

INNOVA SOFTWARE SUPPORT

Provides remote and telephone support during normal working hours, including assistance relating to routine questions regarding software use. Information on new or changed configuration and functionality is provided on request.

- Single point of entry for all Innova service and support
- Defined service levels, such as response times, availability and priority rules
- Escalation process to relevant specialists when required

INNOVA 24/7 SUPPORT LINE

Provides access to emergency support for critical incidents outside normal working hours and is available 24/7/365.

- Fast response time
- Lower risk of production downtime
- Peace of mind

INNOVA SOFTWARE MAINTENANCE

Innova is continuously developed to fit new market needs and requirements. Our Software Maintenance Programme provides users with rights to all new major version releases, service packs and features deployed on a regular basis.

- Access to and rights for all upgrades, such as new version releases, service packs and other features
- Reduction in operational risk, with a highe degree of process and device compliance and protection
- Life cycle support to reduce operational risk, gain better control of IT costs and reduce financial risk

INNOVA SYSTEM MAINTENANCE

Includes a suite of services designed to keep the Innova system and IT infrastructure in an optimal state, in order to prevent or minimise unexpected downtime and disturbance to overall performance.

- System is kept up to date to ensure reliability and availability
- Costly downtime is reduced through preventive maintenance to the server, database, network or other critical IT infrastructure
- Users and operators are evaluated and training plans devised to continually update their competence in operating and maintaining Innova

INNOVA CUSTOMER TRAINING

Designed for IT and technical personnel, operations and production managers, and shop floor operators, the Innova Customer Training Programme aims to ensure that users are continually kept up to date on new developments and that their skills to operate the system are continually improved.

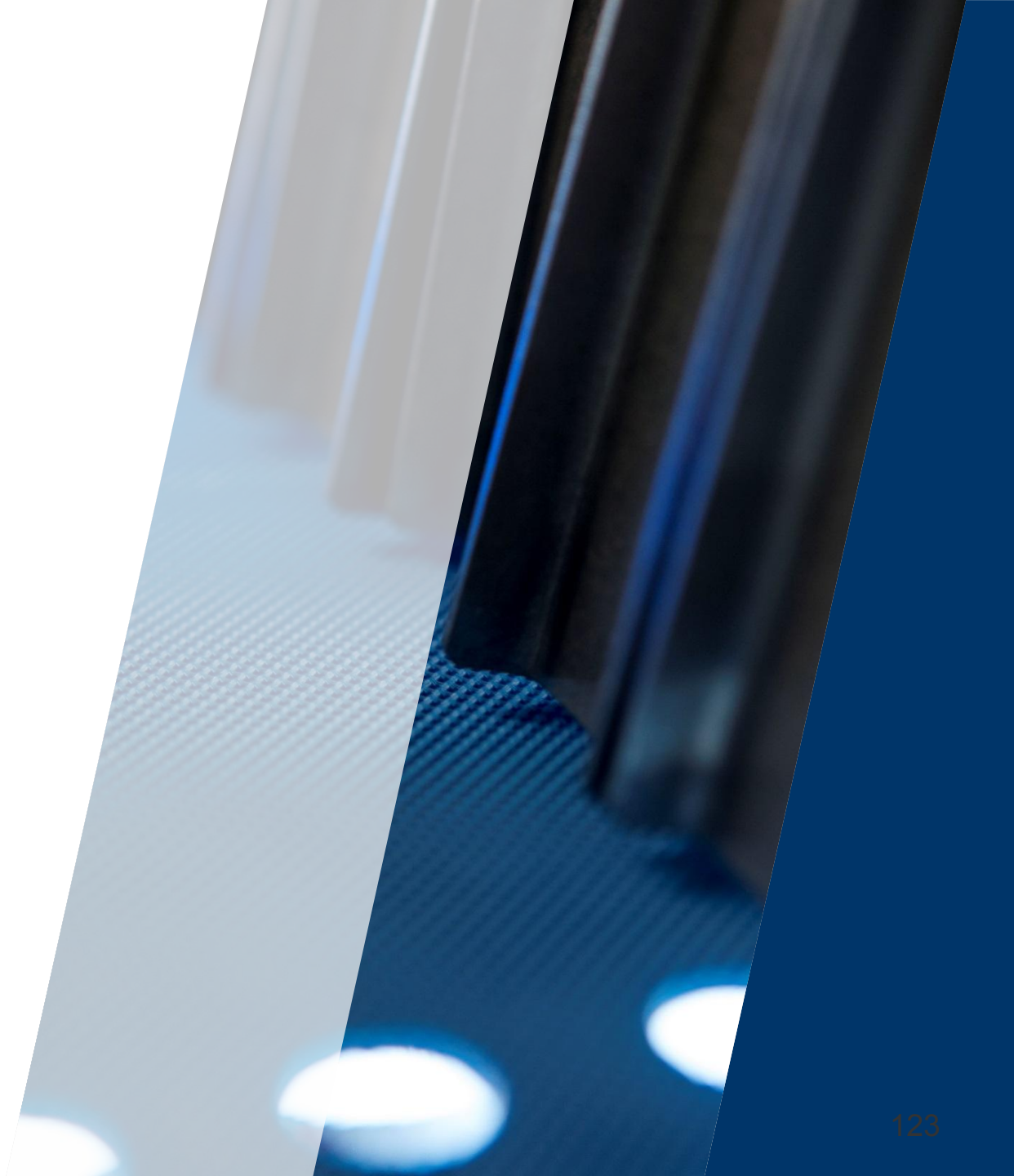
- Continuous skill improvements for customer workforce
- Better system utilisation

INNOVA CONSULTANCY SERVICES

The Innova Improvement Programme is designed to focus on specific improvement tasks with clear financial and business goals for customer operations.

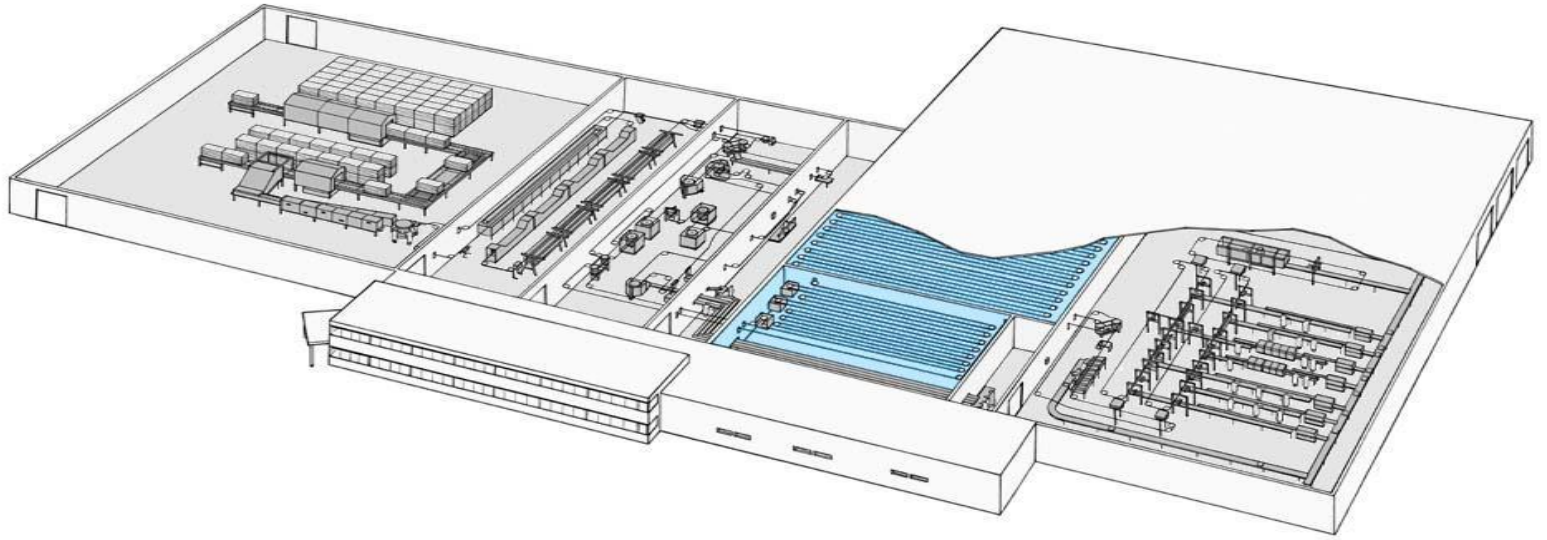
- Analyses future business and financial impact
- Provides improved management tools with improved KPIs

Tabel of content



General introduction - What is PDS-NT

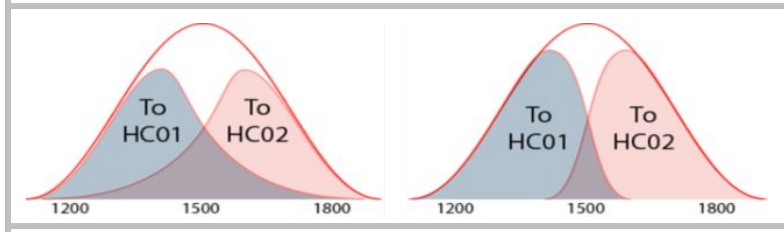
- PDS-NT: Product Distribution System – New Technology
- A plant-wide system to obtain information on each individual bird
- Process each bird into its most profitable form
- Provide the required data for efficient production management
- Tracking and trace birds throughout the complete process
- PDS-NT's focus is on controlling products hanging in a shackle

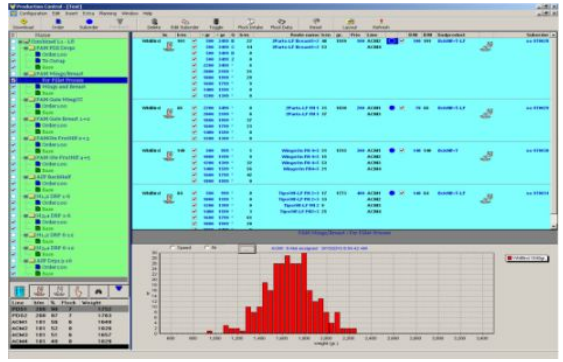


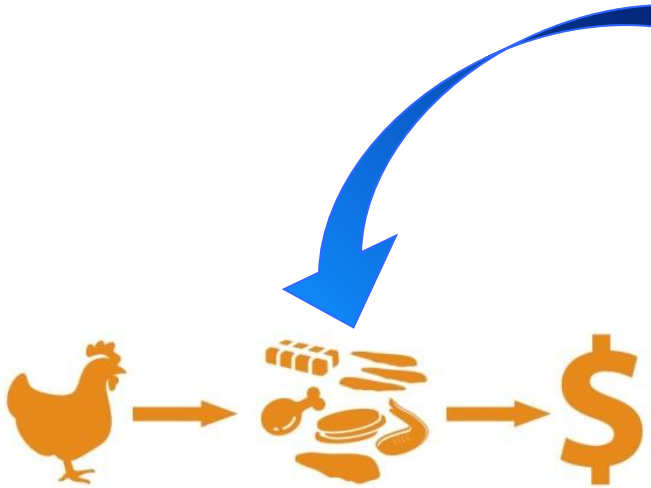
Positioning PDS-NT - Innova

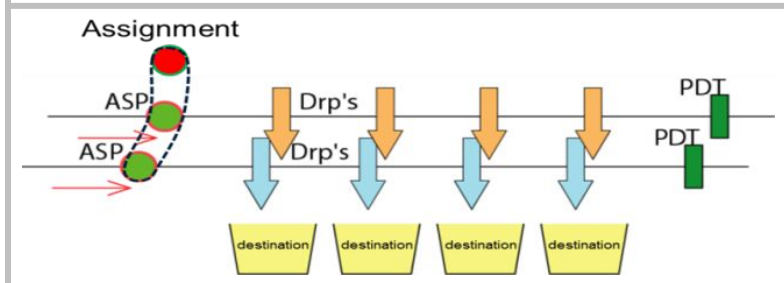
Data collection and control tools

- PDS-XL
- Floating Weight Control
- Recipe Control
- Combined Rate Limiting

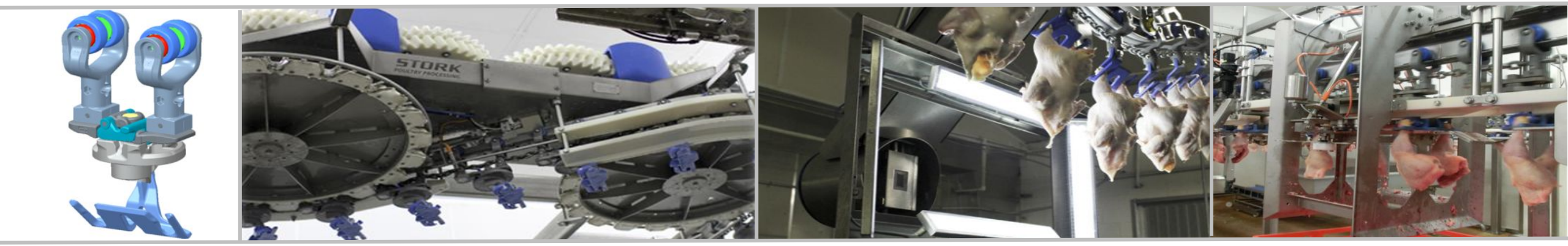




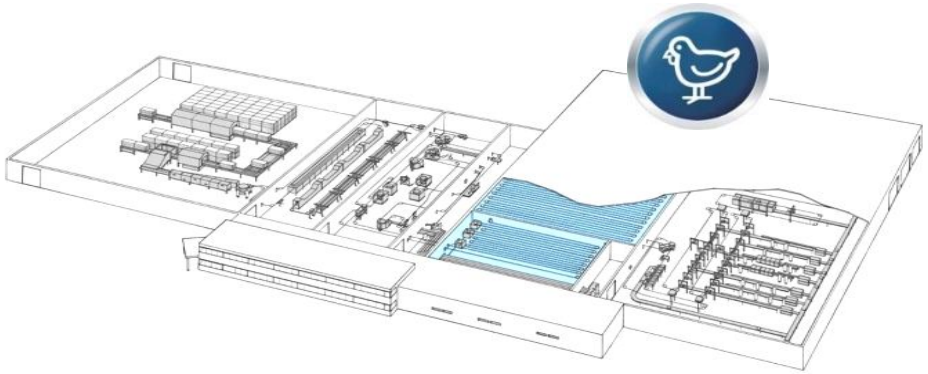




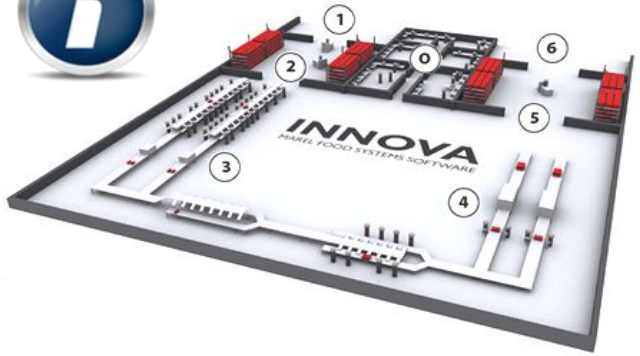
Accurate and reliable data collectors



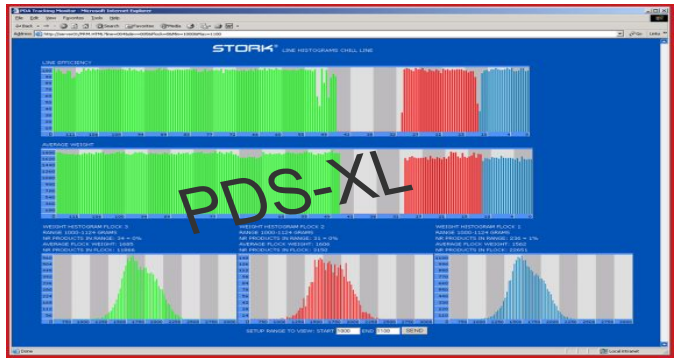
Improved data for process optimization!

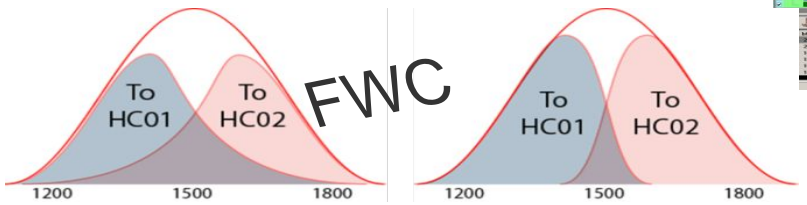


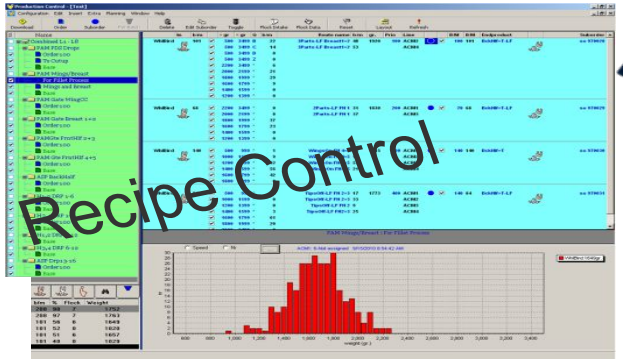
Total process control

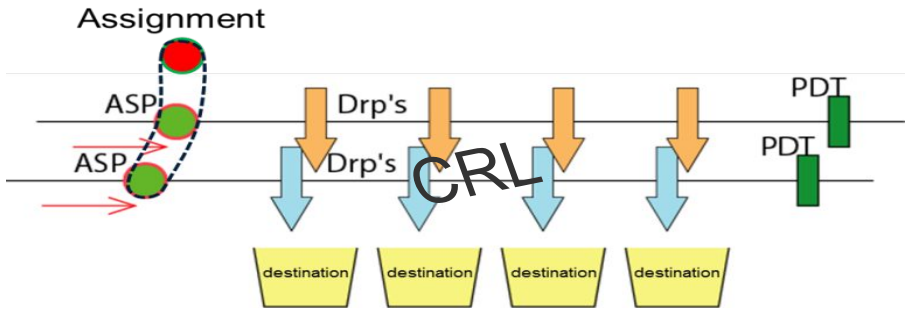


Data collection and control tools



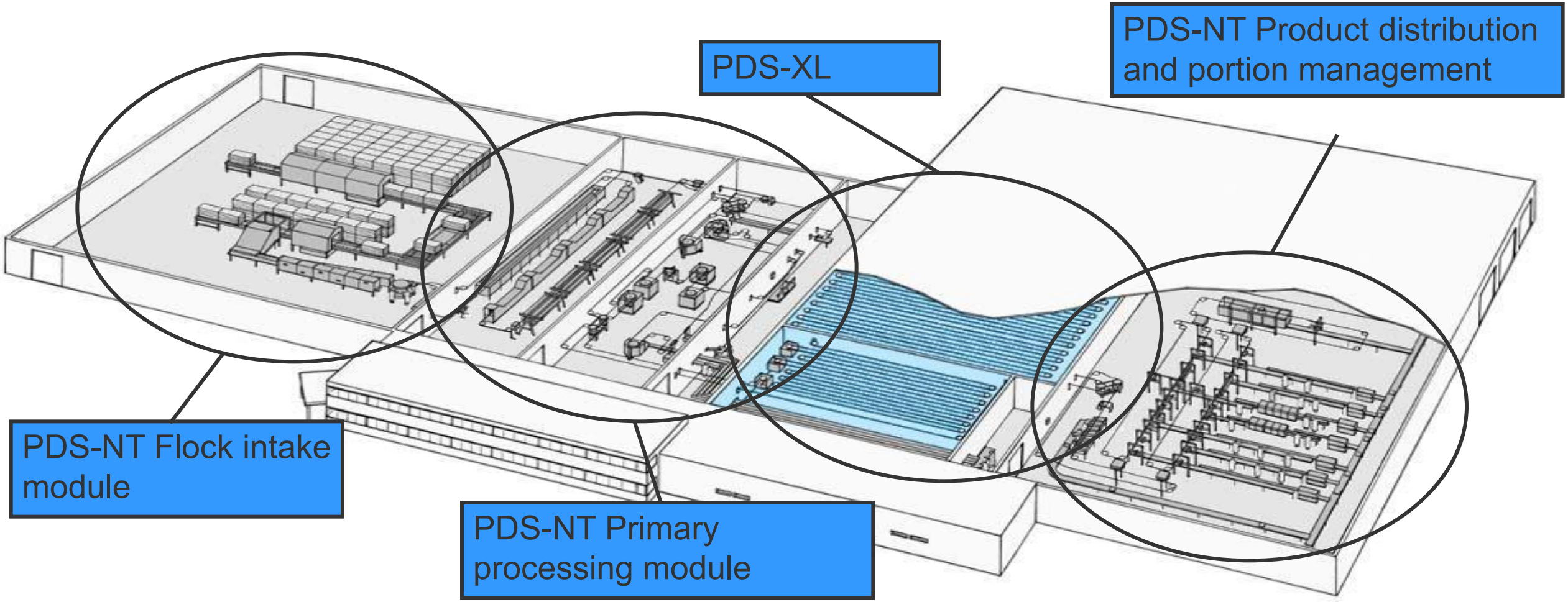






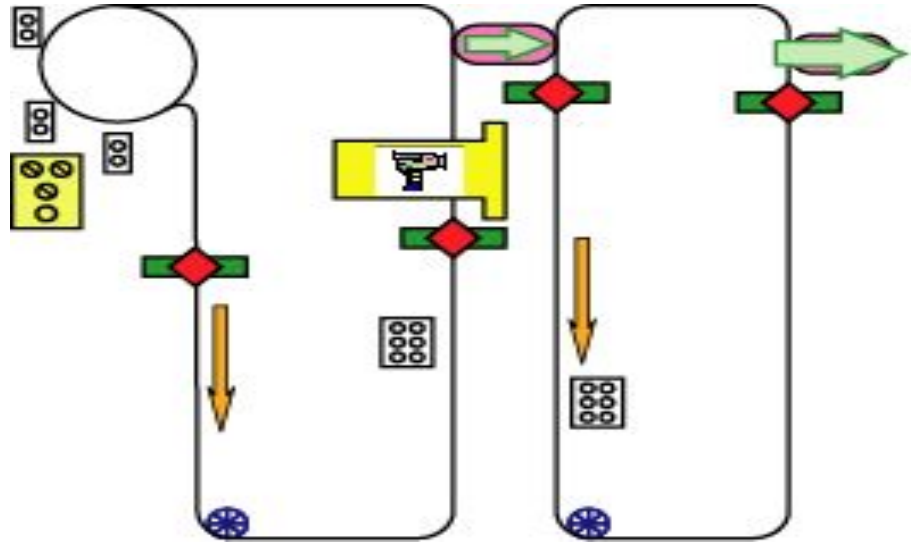
PDS-NT – Standard modules

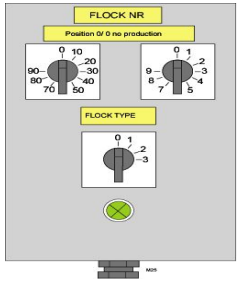
PDS-NT: Logistic information system throughout the process

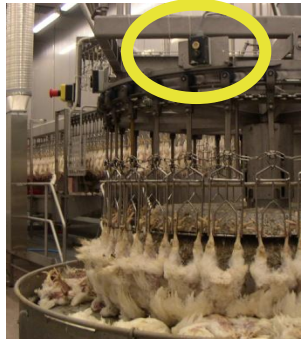


PDS-NT: Primary processing

- Flock switch - Traceability
- DOA pushbuttons
- Count products at several positions
- IRIS Camera Grading
- Buttons for veterinarian defects registration
- Product weighing
- Transfers suitable for data transfer

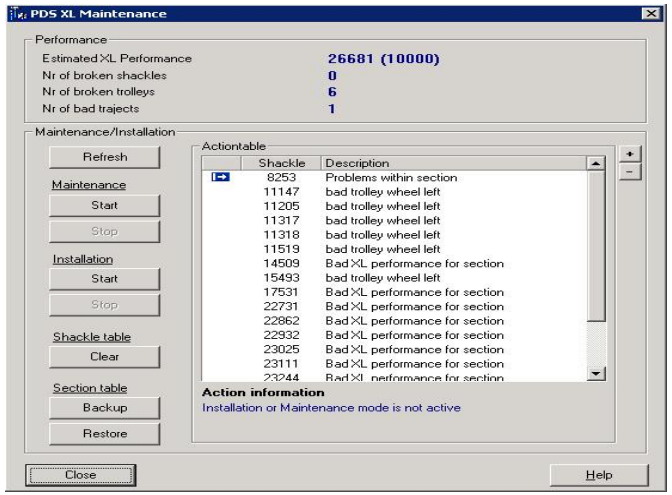


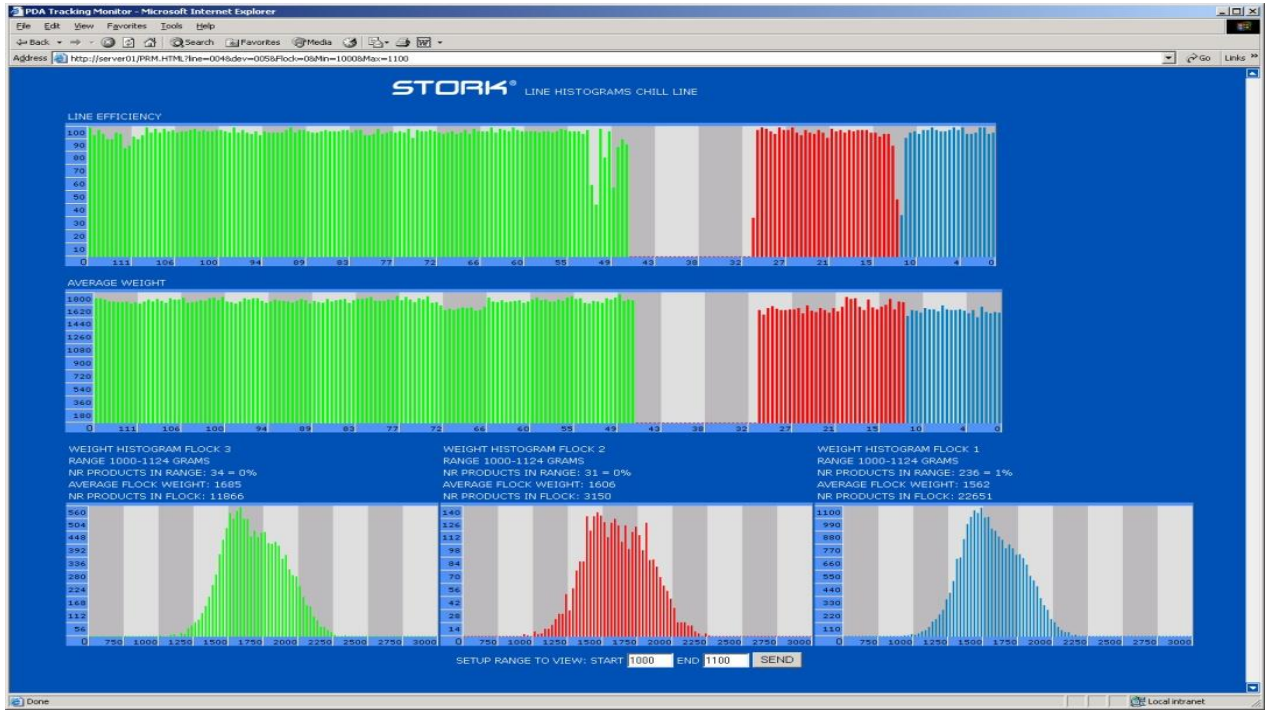




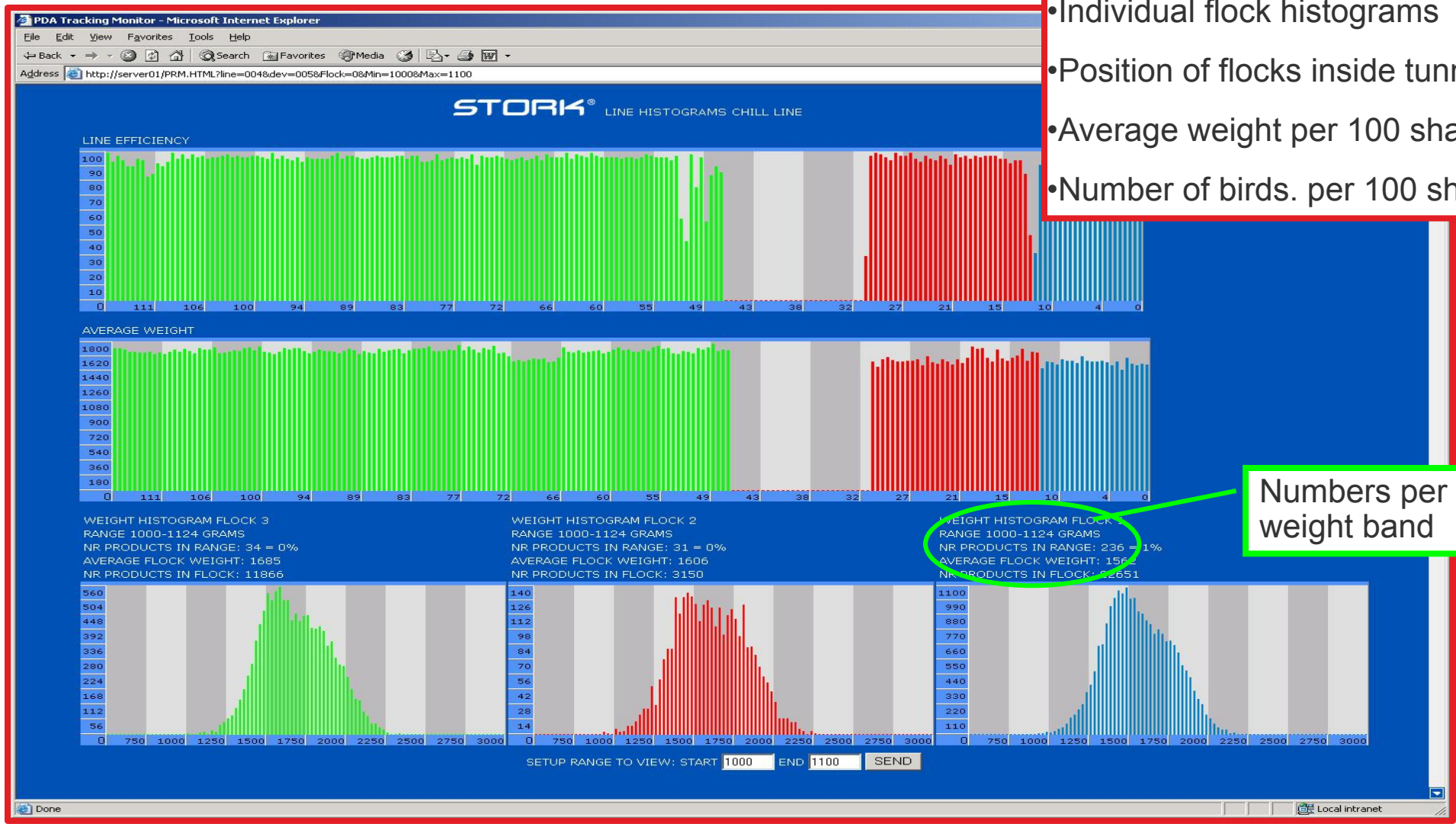
PDS-NT: PDS-XL

- Reliable shackle identification to follow individual products
- Minimize data loss in case of power-problems (automatic backup)
- Data analysis for products in chill
- PDS-XL maintenance tool





PDS-XL information



- Individual flock histograms
- Position of flocks inside tunnel
- Average weight per 100 shackles
- Number of birds. per 100 shackles

Numbers per flock in requested weight band

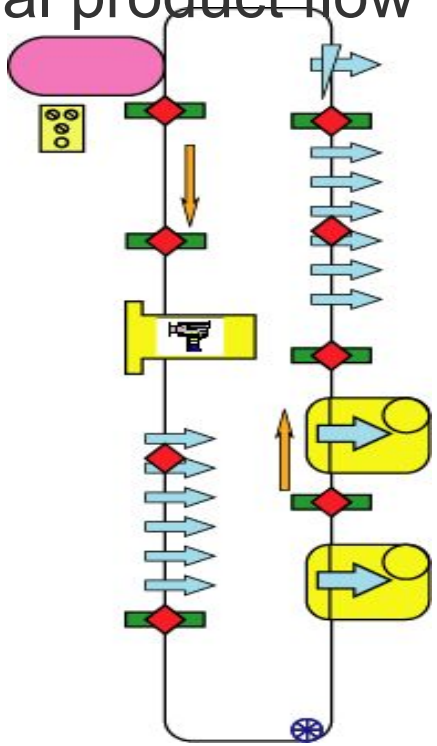
PDS-NT: Product distribution & portioning management

Whole product distribution:

- Dropping in bins

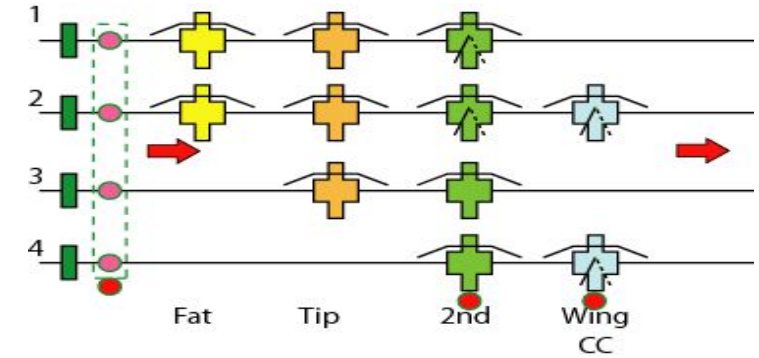
  based on weight, quality and speed

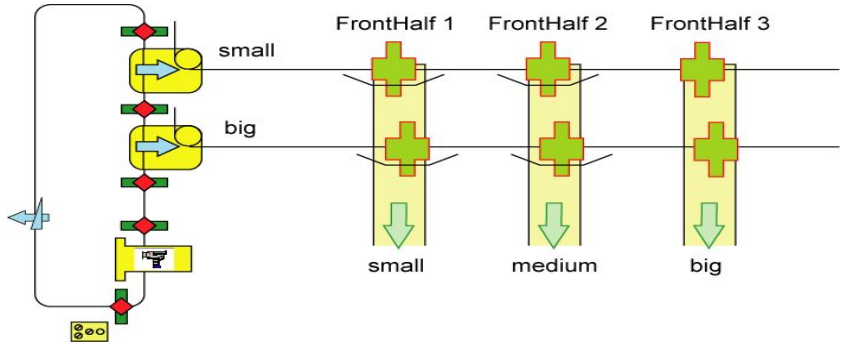
- Optimal product flow to cutup lines



Flexible cut-up:

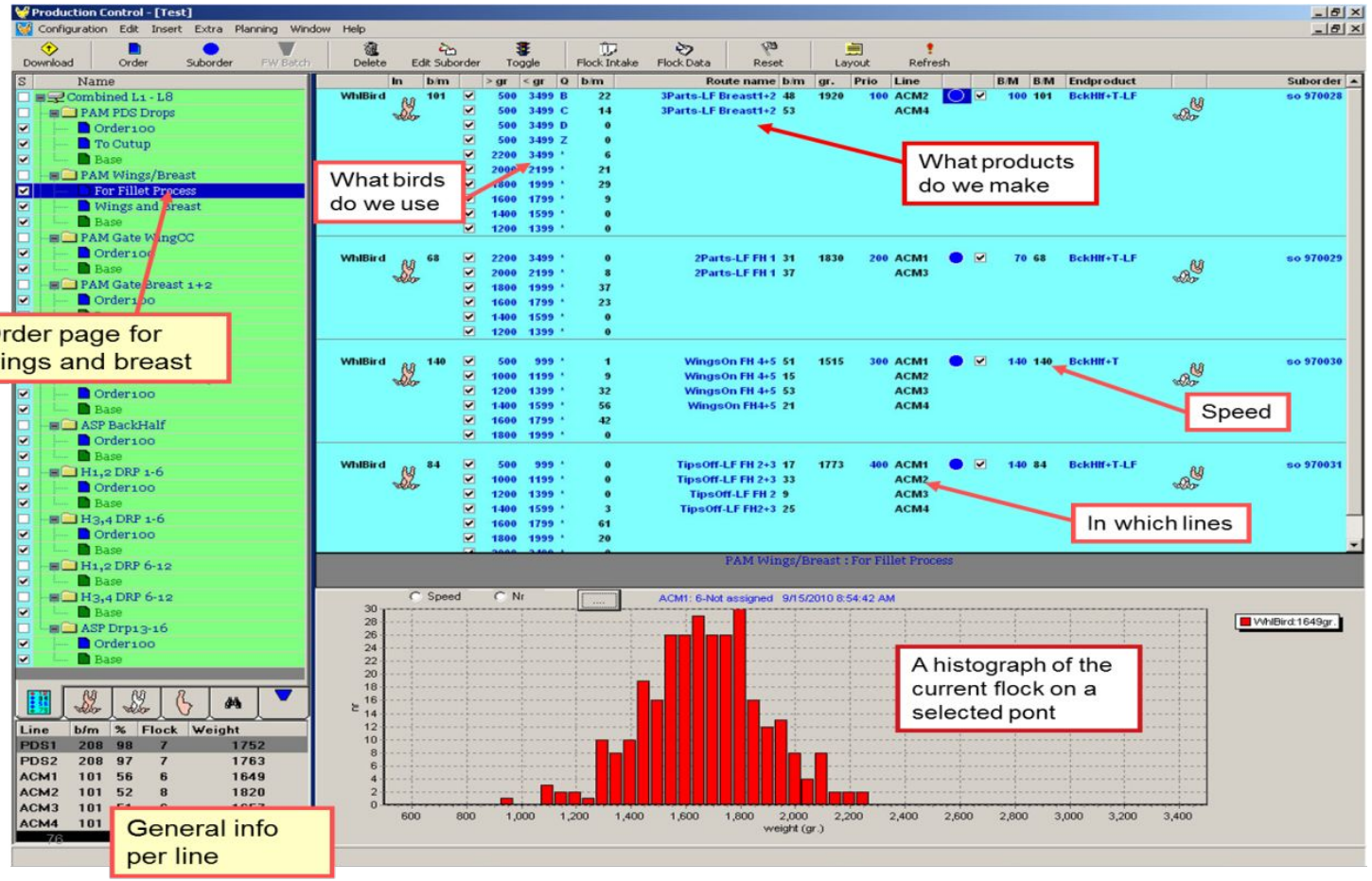
- Allocate products to modules
  - based on weight, quality and speed
- Optimal product flow to filleting lines
  - weight range + speed





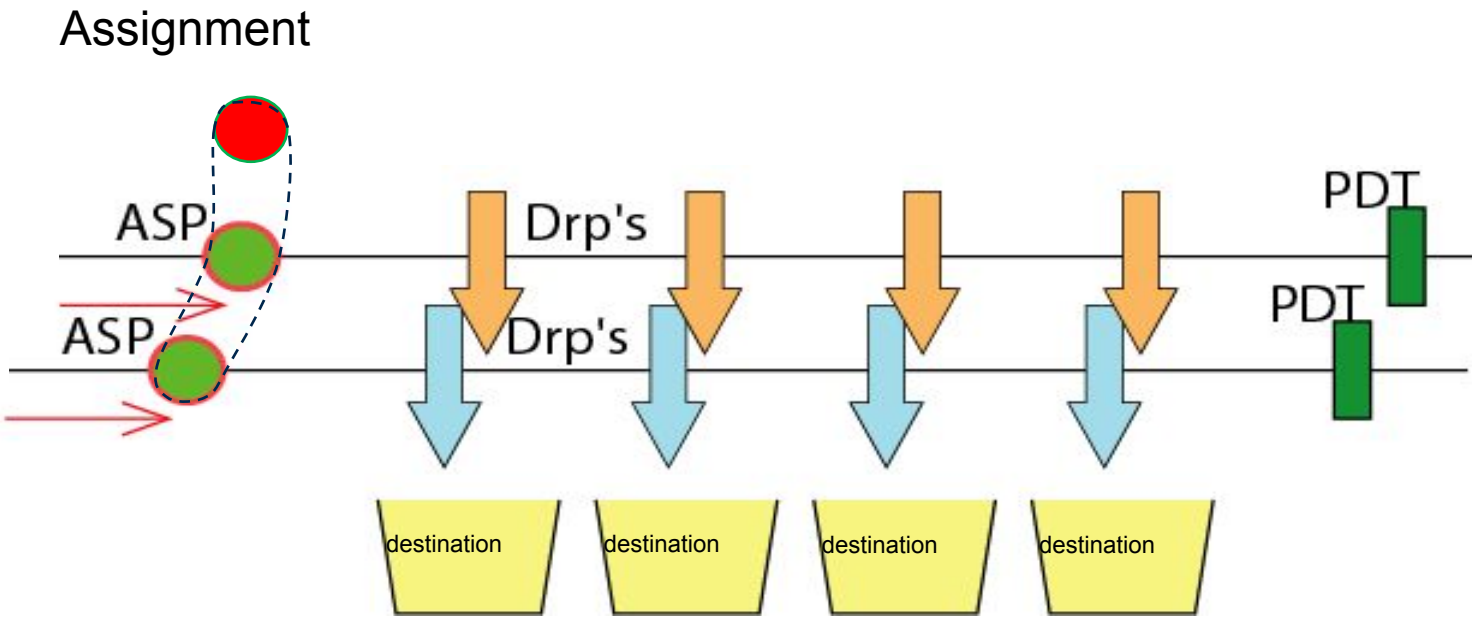
Recipe control

- (Pre-) define orders per processing step
  - continuous
  - batches
- Settings
  - weight
  - quality
  - speed
- Priorities
  - secure maximum added value



Combined Rate Limiting

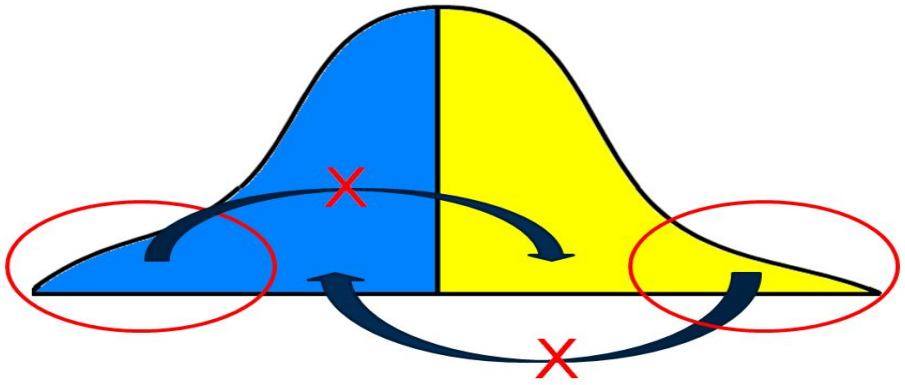
- Products physically divided over parallel lines, but the control system treats them as one combined group of products
- The destination automatically gets the best from multiple lines
- For drop stations, transfers, supply of products to deboning lines, accurate leg batching

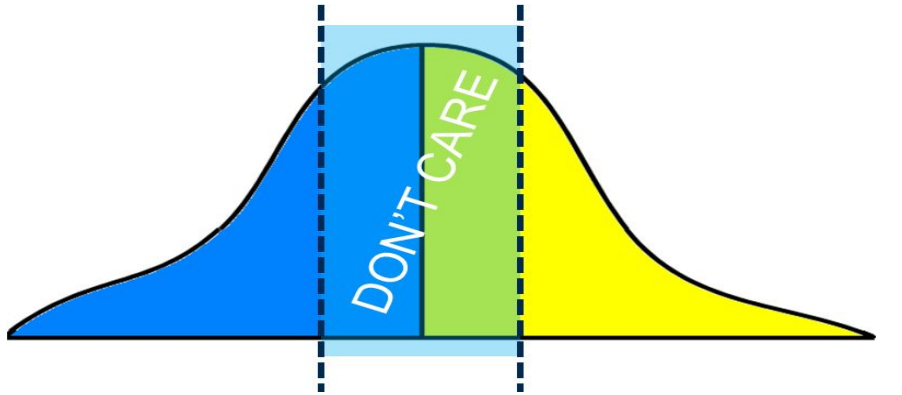


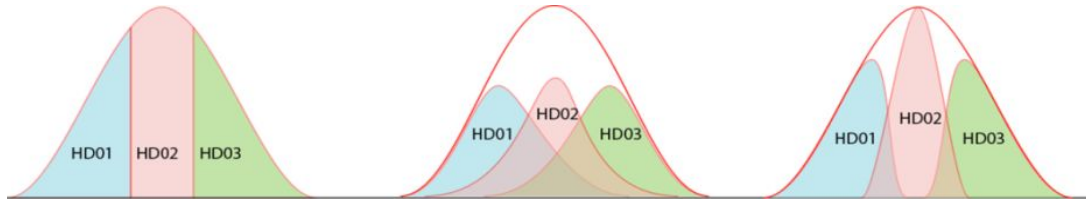
Result: optimal yields and constant product flows

Floating Weight Control

- No lightweight products in the line for heavyweight products and vice versa
- Approx. 30% of standard deviation is *Just as good* area
- *Just as good* products go to destination with lowest active buffer value





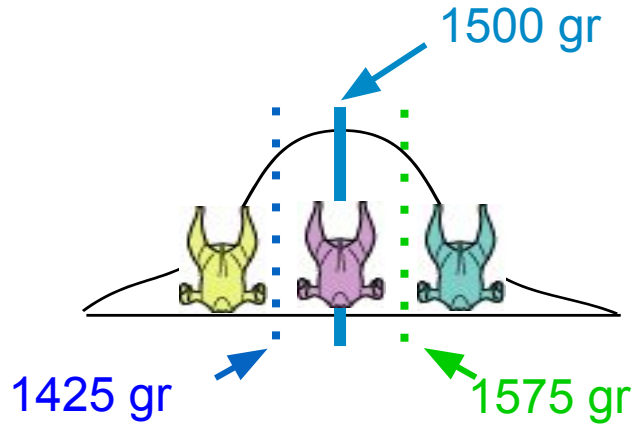


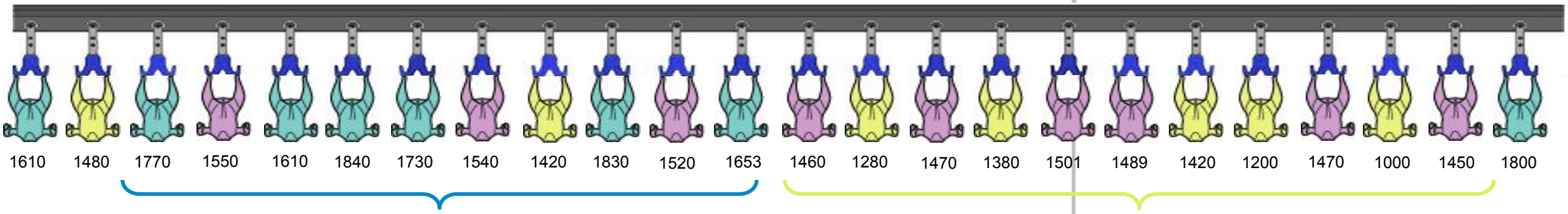
Result: optimal yields and constant product flows

Floating weight range

making use of the 'just as good'

- Flock 1500 grams average weight
- *Just as good* area 1425 – 1575 grams
- Tr1G buffer maximum 9





- Optimize for Tr1G buffer – break patterns
- Assignment *just as goods* to Tr1G with lowest buffer load

Control strategy

Past

- Individual line control
- Raw material allocation
- Push: WB -> parts
- Manual adj
  sup
-
-

Present

"what"

Recipe Control
Combined Rate Limiting
Floating Weight Range
+ Combinations!

s way of thinking
namic" production orders
chieve max addded value per product

Hanging Yield

Line: = Kill

16-10-2014

Line	Speed	Flock	LotCode	Farmer	# Hangin	Break	Stop	Reason Stop	Hangi... Yield
Kill	184	01	1014101601	Allsop	5,323	-	-		85.09
Kill	184	02	1014101602	Allsop	4,818	-	10	motor drive unit is broken and stopped the line	55.01
Kill	184	03	1014101603	Allsop	5,257	-	-		92.07
Kill	184	04	1014101604	Allsop	4,995	-	-		87.29
Kill	184	05	1014101605	Allsop	4,285	-	-		85.16
Kill	184	06	1014101606	Allsop	5,749	-	-		89.53
Kill	184	07	1014101607	Allsop	3,140	-	-		88.73
Kill	184	08	1014101608	Warner	6,565	-	-		91.99
Kill	184	09	1014101609	Bradley	6,610	-	-		90.02
Kill	184	10	1014101610	Warner	6,657	-	-		88.94
Kill	184	11	1014101611	Bradley	6,458	01	-		93.92
Kill	184	12	1014101612	Warner	12,874	01	-		89.61
Kill	184	13	1014101613	Bradley	12	02	-		-03.39
Kill	184	14	1014101614	Warner	6,691	02	-		93.35
Kill	184	15	1014101615	Laneham	6,575	02	-		93.79
Kill	200	16	1014101616	Laneham	6,381	02	-		87.45
Kill	184	17	1014101617	Laneham	6,558	-	-		86.39
Kill	184	18	1014101618	Laneham	6,612	-	-		89.50
Kill	184	19	1014101619	Laneham	6,411	-	-		89.03
Kill	184	20	1014101620	Laneham	2,785	-	-		61.89
Kill	-	21	1014101621	Not assigned	71	-	-		91.03
					114,827	**10**	**10**		

Production flow Kill & EV

Line: = Kill

16-10-2014

Flock	Farmer	H Yield (%)	Kill in	Kill Out	Kill Loss	EV Out	Vet\EV Loss	Chill Rehang	Chill In	Chill In Avg	Chill Out	Chill Loss
01	Allsop	85	5,323	5,216	107	5,232	-16	5,220	5,220	00	4,777	443
02	Allsop	63	4,818	4,772	46	4,746	26	4,727	4,727	00	4,667	60
03	Allsop	92	5,257	5,159	98	5,160	-01	5,135	5,135	00	5,035	100
04	Allsop	87	4,995	4,901	94	4,904	-03	4,869	4,869	00	4,761	108
05	Allsop	85	4,285	4,243	42	4,254	-11	4,190	4,190	00	4,188	02
06	Allsop	90	5,749	5,686	63	5,703	-17	5,697	5,697	00	5,699	-02
07	Allsop	89	3,140	3,091	49	3,106	-15	3,095	3,095	00	3,092	03
08	Warner	92	6,565	6,501	64	6,450	51	6,457	6,457	00	6,458	-01
09	Bradley	90	6,610	6,544	66	6,500	44	6,442	6,442	00	6,440	02
10	Warner	89	6,657	6,568	89	6,520	48	6,526	6,526	00	6,526	00
11	Bradley	94	6,458	6,354	104	6,344	10	6,337	6,337	00	6,337	00
12	Warner	90	12,674	12,498	176	12,583	115	7,437	12,610	1,141	12,609	01
13	Bradley	2,714	12	12	00	11	01	00	11	1,254	11	00
14	Warner	94	6,691	6,621	70	6,628	-07	34	6,598	1,204	6,594	04
15	Laneham	94	6,575	6,526	49	6,389	137	10	6,355	1,136	6,354	01
16	Laneham	88	6,381	6,294	87	6,293	01	27	6,249	1,142	6,248	01
17	Laneham	86	6,558	6,495	63	6,371	124	03	6,304	1,217	6,303	01
18	Laneham	89	6,612	6,505	107	6,460	45	88	6,511	1,378	6,507	04
19	Laneham	89	6,411	6,309	102	6,348	-39	01	6,305	1,373	6,306	-01
20	Laneham	62	2,785	2,725	60	2,733	-08	23	2,749	1,357	2,741	08
21	Not assigned	91	71	70	01	70	00	00	68	1,367	68	00
			114,827	**113,290**	**-46,137**	**112,805**	**734**	**66,318**	**112,455**		**111,721**	**00**

vet inspection

Date:26-08-2011 - 26-08-2011
Lot: = (Many)
01-04-2011

Flock	Grower	Line	Hang In	Undersize	Death	Button 1	Button 2	Button 3	Button 4	Button 5	Button 6	Button 7	Total
1	Avis Lipia	Kill line	7.109	00	02	00	47	08	15	00	00	00	72
3	= Calarasi	Kill line	12.356	00	03	32	307	05	25	00	00	00	372
2	Avis Lipia	Kill line	13.704	00	60	227	57	20	299	00	00	00	663
	Day Total		**33.169**	**00**	**65**	**259**	**411**	**33**	**339**	**00**	**00**	**00**	**1.107**

Anatomic Defects

Date:26-08-2011 - 26-08-2011
Lot: = (Many)

01-04-2011

Flock	Grower	Hang In	Bruise small	Red bruise	Blue bruise	Bruise	Deskinning	Blister	Ammonia burn	Gall stain	Broken	Missing	Tip broken	Incomplete
1	Avis Lipia	6.900	0,01	0	0	9,33	0,65	0	0	0	0,01	0,01	0,66	0,12
2	Avis Lipia	13.202	0,01	0	0	8,68	0,83	0	0	0	0,02	0	0,87	0,28
3	F Calarasi	12.432	0,01	0	0	7,1	1,56	0	0	0	0,04	0,01	1,77	1,17
	Day Total	**32.534**	**0,01**	**0**	**0**	**8,21**	**1,07**	**0**	**0**	**0**	**0,02**	**0**	**1,17**	**0,59**

Distribution PDS

Date:16/10/2014 - 16/10/2014
Lot :

	A			B			C			D			Z			TOTAL		
Range	g	no.	kg	g	no.	kg	g	no.	kg	g	no.	kg	g	no.	kg	g	no.	kg
DROP 1	857	16	13.7	-	-	-	848	4	3.4	801	2	1.6	811	15	12.2	834	37	30.9
DROP 2	851	16	13.6	-	-	-	830	3	2.5	-	-	-	827	9	7.5	841	28	23.6
DROP 3	1591	3878	6172.9	-	-	-	-	-	-	-	-	-	-	-	-	1591	3878	6172.9
DROP 4	1591	1934	3077.1	-	-	-	-	-	-	-	-	-	-	-	-	1591	1934	3077.1
DROP 5	1481	2893	4284.6	1631	181	295.3	1654	58	96	1632	35	57.1	1638	83	136	1498	3250	4869.1
DROP 6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DROP 7	1735	97	168.4	-	-	-	-	-	-	-	-	-	-	-	-	1735	97	168.4
DROP 8	1686	7992	13479.9	1431	645	923.1	1755	230	403.7	-	-	-	-	-	-	1669	8867	14806.6
DROP 9	1452	1328	1929.5	1410	293	413.4	1739	1	1.7	-	-	-	-	-	-	1445	1622	2344.6
DROP 10	1455	4532	6598.5	1412	433	611.6	1864	107	199.5	1838	241	443.1	1829	441	806.7	1504	5754	8659.4
DROP 11	1569	3309	5192.3	1401	485	679.8	1727	405	699.5	1743	656	1143.8	1735	1357	2355.1	1621	6212	10070.5
DROP 12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DROP 13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DROP 14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DROP 15	1424	7	10	-	-	-	1430	4	5.7	1454	3	4.4	1411	4	5.6	1427	18	25.7
DRP MXa	1693	26833	45443.2	1603	2305	3696.5	1665	5577	9287.5	1697	6894	11701.5	1732	9924	17197.7	1694	51533	87326.4
Line clearer	1519	4565	6934.4	1413	554	783	1562	746	1165.3	1563	977	1527.4	2353	1573	3701.5	1676	8415	14111.7
Total dropped	1574	26002	40940.5	1435	2037	2923.2	1738	812	1412	1761	937	1650.1	1740	1909	3323	1585	31697	50248.7
Total	1625	57400	93318.1	1511	4896	7402.7	1662	7135	11864.8	1689	8808	14879	1806	13406	24222.1	1655	91645	151686.7

Flock Weights

Date:26-08-2011 - 26-08-2011
Lot: = (Many)

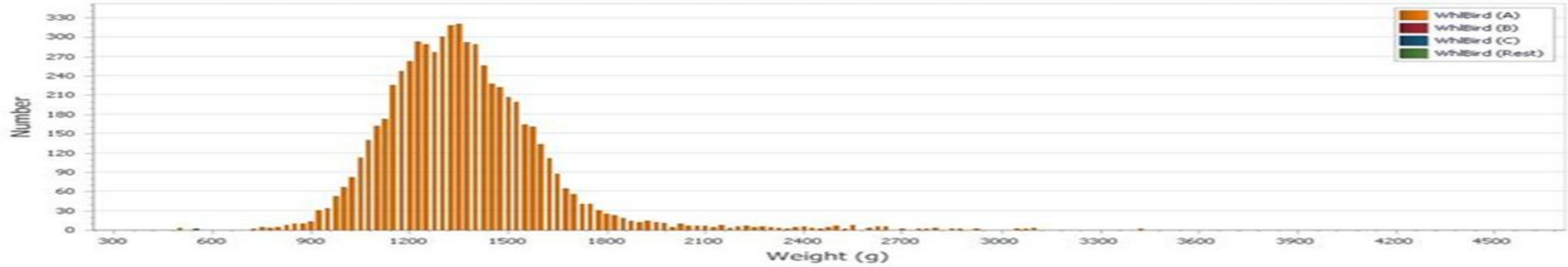
01-04-2011

Start	Flock	Grower	Line	Order #	Container #	Gross	Tare	Net(kg)
06:20:15	1	Avis Lipia	<ill line	1	30	25.724	11.995	13.729
07:34:14	3	F Calarasi	<ill line	1	43	41.308	17.189	24.119
09:24:25	2	Avis Lipia	<ill line	1	56	48.129	22.367	25.762
				3	**129**	**115.161**	**51.551**	**63.610**

TREC qua Histogram

Line: = Kill, Lot: = 1014101619

Nr	Grower	Date	IKB Limit (g)	% < Limit	Count		Weight (kg)		Average Weight (g)	
19	Laneham	16/10/2014 15:17:30	906	1.8	6305	100.0 %	8561	100.0 %	1358	Total
					6304	100.0 %	8561	100.0 %	1358	A
					-	-	-	-	-	B
					-	-	-	-	-	C
					1	0.0 %	0.6	0.0 %	550	Rest



Production flow General

Line: = Kill

16-10-2014

Flock	Farmer	H Yield (%)	Kill in	Kill Out	EV Out	Chill In	Chill In Avg	Chill Out	PDS In	PDS In Avg	Cut Line In
01	Allsop	85	5,323	5,216	5,232	5,220	00	4,777	4,777	1,774	2,985
02	Allsop	63	4,818	4,772	4,746	4,727	00	4,667	5,075	1,798	5,845
03	Allsop	92	5,257	5,159	5,160	5,136	00	5,035	5,317	1,825	3,534
04	Allsop	87	4,995	4,901	4,904	4,869	00	4,761	4,756	1,870	3,297
05	Allsop	85	4,285	4,243	4,254	4,190	00	4,188	4,180	1,856	2,799
06	Allsop	90	5,749	5,686	5,703	5,697	00	5,699	5,691	1,840	3,714
07	Allsop	89	3,140	3,091	3,106	3,095	00	3,092	3,091	1,754	2,089
08	Warner	92	6,565	6,501	6,450	6,457	00	6,458	6,451	1,387	4,236
09	Bradley	90	6,610	6,544	6,500	6,442	00	6,440	6,436	1,491	4,005
10	Warner	89	6,657	6,568	6,520	6,526	00	6,526	6,522	1,388	4,271
11	Bradley	94	6,458	6,354	6,344	6,337	00	6,337	6,336	1,466	4,270
12	Warner	90	12,874	12,698	12,583	12,610	1,141	12,609	12,605	1,469	8,686
13	Bradley	2,714	12	12	11	11	1,254	11	11	1,361	04
14	Warner	94	6,691	6,621	6,628	6,598	1,204	6,594	6,590	1,470	4,629
15	Laneham	94	6,575	6,526	6,389	6,395	1,136	6,354	6,395	1,384	4,451
16	Laneham	88	6,381	6,294	6,293	6,249	1,142	6,248	6,244	1,405	4,619
17	Laneham	86	6,558	6,495	6,371	6,304	1,217	6,303	6,175	1,412	4,100
18	Laneham	89	6,612	6,505	6,460	6,511	1,378	6,507	6,305	1,424	4,097
19	Laneham	89	6,411	6,309	6,348	6,305	1,373	6,306	6,095	1,430	4,098
20	Laneham	62	2,785	2,725	2,733	2,749	1,357	2,741	2,594	1,536	2,371
21	Not assigned	91	71	70	70	68	1,367	68	65	1,457	181
			114,827	113,290	112,805	112,455		111,721	111,671		78,481

Distribution MX prod.

Line: = Kill

16-10-2014

Flock	Farmer	Wgs #	Wgs Kg	Tips #	Tips Kg	1st Joint #	1st Joint Kg	1st+2nd #	1st+2nd Kg	2nd Joint #	2nd Joint Kg	Anl g L #	Anl g L Kg	Anl h L #	Anl h L Kg	Anl h R #	Anl h R Kg	Breast cap #	Breast cap Kg	Drmstrd L #	Drmstrd L Kg
01	Allsop	195	242	2,790	4,995	2,790	4,995	-	-	2,790	4,995	-	-	2,943	5,171	2,862	5,024	2,985	5,236	2,853	333
02	Allsop	419	511	5,426	9,881	5,426	9,881	-	-	5,426	9,881	-	-	5,694	10,142	5,586	9,934	5,845	10,392	5,566	658
03	Allsop	152	189	3,382	6,251	3,382	6,251	-	-	3,382	6,251	161	40	3,328	6,127	3,233	5,945	3,534	6,440	3,229	387
04	Allsop	142	177	3,155	6,068	3,155	6,068	-	-	3,155	6,068	139	35	3,112	5,960	2,993	5,726	3,297	6,245	3,013	374
05	Allsop	86	106	2,713	5,238	2,713	5,238	-	-	2,713	5,238	119	30	2,651	5,123	2,559	4,940	2,799	5,344	2,561	320
06	Allsop	99	123	3,615	6,882	3,615	6,882	-	-	3,615	6,882	191	46	3,468	6,629	3,348	6,393	3,714	7,005	3,363	420
07	Allsop	190	234	1,899	3,478	1,899	3,478	-	-	1,899	3,478	117	30	1,934	3,485	1,891	3,404	2,089	3,712	1,892	225
08	Warner	1,966	2,355	2,270	3,409	2,270	3,409	-	-	2,270	3,409	282	69	3,748	5,096	3,727	5,053	4,236	5,764	3,665	359
09	Bradley	1,323	1,598	2,682	4,300	2,682	4,300	-	-	2,682	4,300	284	74	3,572	5,296	3,548	5,237	4,005	5,899	3,505	535
10	Warner	1,942	2,332	2,329	3,490	2,329	3,490	-	-	2,329	3,490	321	80	3,781	5,143	3,829	5,200	4,271	5,821	3,736	367
11	Bradley	1,251	1,484	3,019	4,827	3,019	4,827	-	-	3,019	4,827	07	02	4,083	6,069	4,079	6,037	4,270	6,311	4,025	431
12	Warner	2,869	3,513	6,017	9,295	6,017	9,295	-	-	6,017	9,295	-	-	8,428	12,181	8,514	12,280	8,886	12,809	8,428	873
13	Bradley	01	01	03	05	03	05	-	-	03	05	-	-	04	06	04	06	04	06	04	-
14	Warner	1,319	1,635	3,310	5,159	3,310	5,159	-	-	3,310	5,159	-	-	4,410	6,485	4,437	6,513	4,629	6,794	4,396	456
15	Laneham	2,082	2,509	2,369	3,632	2,369	3,632	-	-	2,369	3,632	-	-	4,182	5,793	4,238	5,850	4,451	6,141	4,147	423
16	Laneham	1,812	2,174	2,807	4,379	2,807	4,379	-	-	2,807	4,379	-	-	4,357	6,205	4,411	6,258	4,619	6,553	4,305	449
17	Laneham	1,636	1,984	2,464	3,820	2,464	3,820	-	-	2,464	3,820	-	-	3,883	5,514	3,905	5,526	4,100	5,804	3,838	399
18	Laneham	1,598	1,936	2,499	3,858	2,499	3,858	-	-	2,499	3,858	-	-	3,879	5,506	3,903	5,523	4,097	5,794	3,850	405
19	Laneham	1,664	2,064	2,434	3,769	2,434	3,769	-	-	2,434	3,769	-	-	3,892	5,553	3,902	5,560	4,098	5,833	3,841	403
20	Laneham	2,371	3,347	-	-	-	-	-	-	-	-	-	-	2,242	3,170	2,239	3,164	2,371	3,347	2,221	232
21	Not assigned	181	257	-	-	-	-	-	-	-	-	-	-	173	246	173	246	181	257	173	18

PDS-NT in distribution line

SDT
Speed DeTector: measures speed of overhead conveyor

CDT
Carrier DeTector: numbers the carriers

Flock switch
Gives carrier the number of product supplier

PDT
Product DeTector: determines product present or not

Quality
Determines defects on a product.

WGM
Weigher: determines product weight

Computer
Orders define destination on basis of product specifications

Drop & line clearer
Products are dropped according to orders. The line clearer removes products that haven't been dropped.

Collect Information

Assign Products

Distribute Products

Innova Traceability

ADVANCING
FOOD PROCESSING

Traceability in the supply chain

Intake:

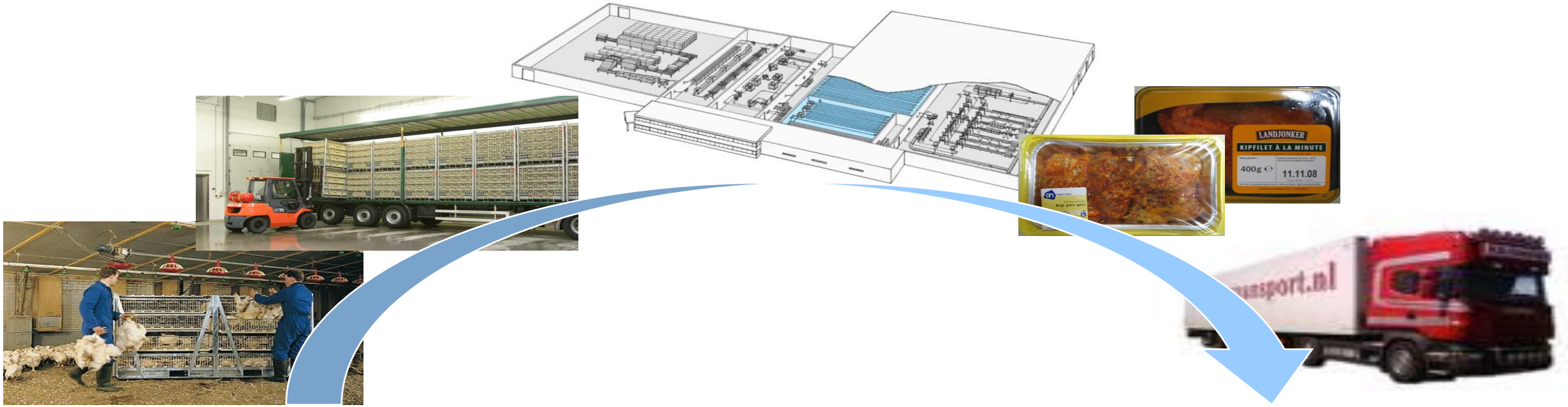
link to farms – live birds

- Processing:

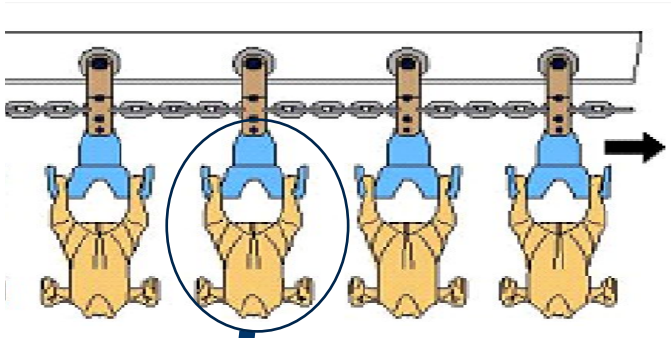
  tracking & tracing in the processing plant

- Shipment:

  link to customers

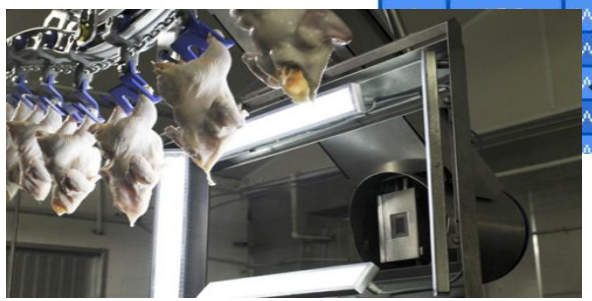


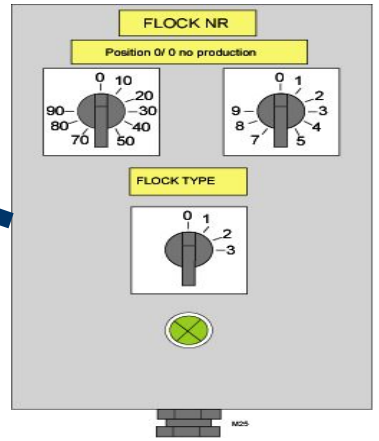
Traceceability: Product in shackle - shackle identification table



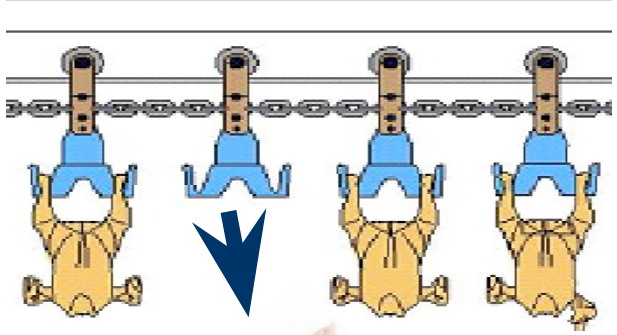
Shackle table

Rel	Shackle	Sd	Pp	WholeWgr	Weight	Qa	AQS	Ac	[illegible]	Fn	Ft	Empty his	Psp	Sor	RId	Str	Asp	Dev
11	116	W	Y	1790	1790	A	Y	1	1	54	1	0	1	1	1	2	13	19
10	117	W	Y	1188	1188	A	Y	1	1	54	1	0	1	1	1	2	13	19
9	118	W	Y	1488	1488	B	Y	1	1	54	1	0	1	1	1	2	13	19
8	119	W	Y	1446	1446	A	Y	1	1	54		0	1	1	1	2	13	19
7	120	W	N	0	[illegible]	-	N	-	-	54	1	[illegible]	-	-	-	-	-	19
6	121	W	Y	1391	[illegible]	B	Y	1	1	54	1	0	1	1	1	2	13	19
5	122	W	Y	1325	1325	A	Y	1	1	54	1	0	1	1	1	2	13	19
4	123	W	Y	1398	1398	A	Y	1	1	54	1	0	1	1	1	2	13	19
3	124	W	Y	155[illegible]	1555	A	Y	1	1	54	1	0	1	1	1	2	13	19
2	125	W	Y	1[illegible]63	1363	A	Y	1	1	54	1	0	1	1	1	2	13	[illegible]
[illegible]	[illegible]	W	Y	1162	1162	A	Y	1	1	54	1	0	1	1	1	2	13	19
[illegible]	[illegible]	W	[illegible]	0	0	-	N	-	-	54	1	0	-	-	-	-	-	19
[illegible]	[illegible]	W	Y	1587	1587	B	Y	1	1	54	1	0	1	1	1	2	13	17
[illegible]	[illegible]	W	Y	1445	1445	A	Y	1	1	54	1	0	1	1	1	2	13	17
[illegible]	[illegible]	W	Y	1431	1431	A	Y	1	1	54	1	0	1	1	1	2	13	17

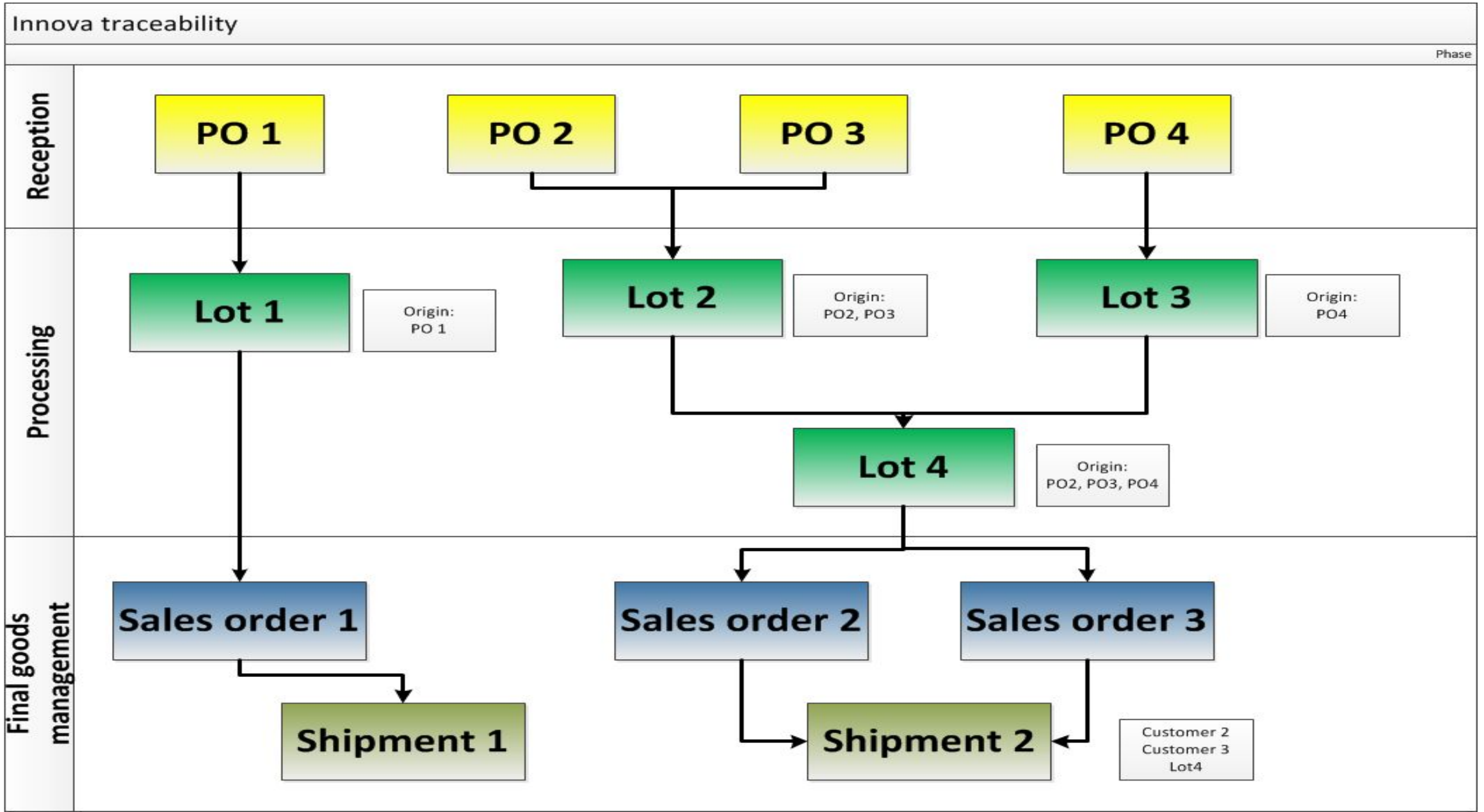




Traceability – Data forwarded to graders, packing scales, printers



9	11		1488	1488	B	Y	1	1	54	1	0	1	1	1	2	13	19


Innova traceability
Phase
Reception
Processing
Final goods management
PO 1
PO 2
PO 3
PO 4
Lot 1
Origin: PO 1
Lot 2
Origin: PO2, PO3
Lot 3
Origin: PO4
Lot 4
Origin: PO2, PO3, PO4
Sales order 1
Sales order 2
Sales order 3
Shipment 1
Shipment 2
Customer 2
Customer 3
Lot4

“Build-In” Traceability Engine in INNOVA

Stack (Box)

Pallet

Traceability in Innova - processes

Same logic used if more than one supplier/vendor/flock is being used at the same time on a specific process

- Lots be automaticly forwarded to a specific device or process when physically at that location
- Can also be controlled by buttons or manually activated if needed
- Can be based on automated and manual data collection

Lot origin, usage and recall details

Lot: =223.2

Lot: 223.2 **Status:** Available **Time:** 15.8.2011 07:30-16.8.2011 13:00

Origin

PO	Supplier	Days	Delivery day	Delivery port	Transporter
Frh. 10.08	Branches INC.	10.8.2011	11.8.2011	Frame creek	Möller Mærsk
Olli 552	Oli hf.	10.8.2011	11.8.2011	Reykjavik	
Sandgerdi	Gardensand	10.8.2011-11.8.2011	11.8.2011	Frame creek	Möller Mærsk
Seaweed 10.08	Skin Island	10.8.2011	11.8.2011	Angle fjord	Steamboats
Station fjord	Fisstv ehf.	10.8.2011	11.8.2011	Reykjavik	
Th.port. 5598	Thorstein Hammer	10.8.2011	11.8.2011	Reykjavik	
Number of POs: 6		**10.8.2011-11.8.2011**			

Used in

Lot	Time
222,12	15.8.2011 12:00-16.8.2011 15:00
222.2	11.8.2011 08:00-11.8.2011 09:00

Lot	Time
222.13	14.8.2011 07:00-14.8.2011 12:00

Recall details

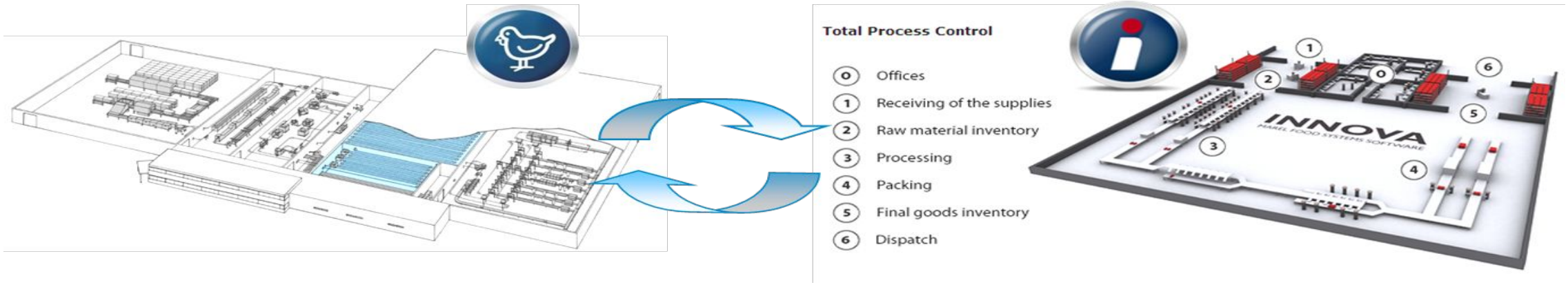
Pallet	Notes	Inventory	Order	Customer	Shipment
2	On order (Open)	Freezer	Minced fish	Dino Slf	
524	On order (Open)		Minced fish	Dino Slf	
492	On order (Open)		Minced fish	Dino Slf	

Pack	Notes	Inventory	Order	Customer	Shipment
26155	On order (Open)		Minced fish	Dino Slf	
26128	On order (Open)		Minced fish	Dino Slf	
26077	On order (Open)		Minced fish	Dino Slf	
25947	On order (Open)		Minced fish	Dino Slf	
25926	On order (Open)		Minced fish	Dino Slf	
26071	On inventory	Product inv.			
26018	On inventory	Product inv.			
26012	On inventory	Freezer			
25986	On inventory	Freezer			
25976	On inventory	Freezer			

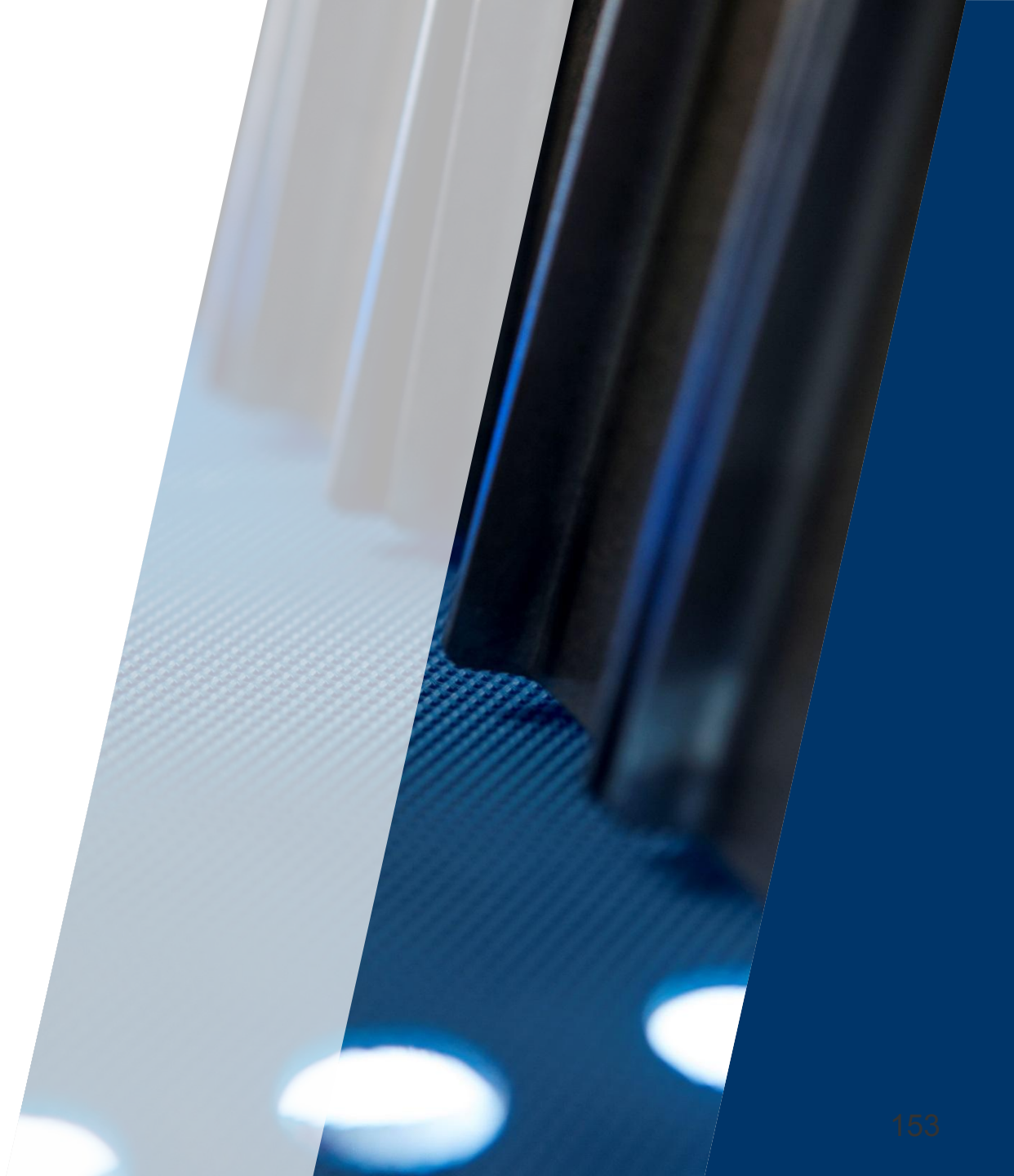
Pallets: 3. Packs: 10

Innova and PDS-NT - Benefits to our customers

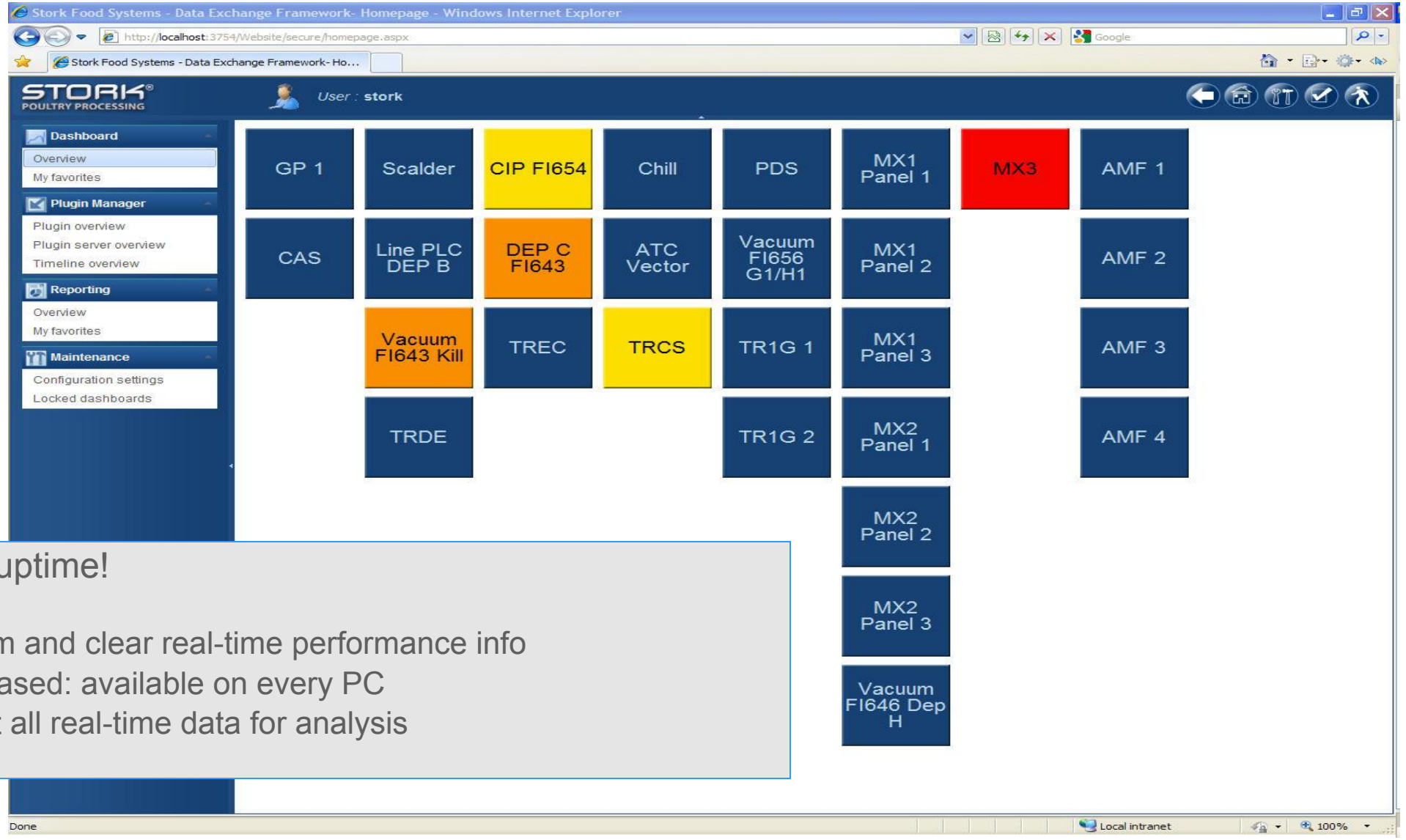
- The ideal tool to increase added value by using individual product info
- Fully integrated process control from supply up till cutup/deboning
- Full tracking and tracing throughout all lines
- Integrated dashboarding and reporting
- Modular system



Tabel of content



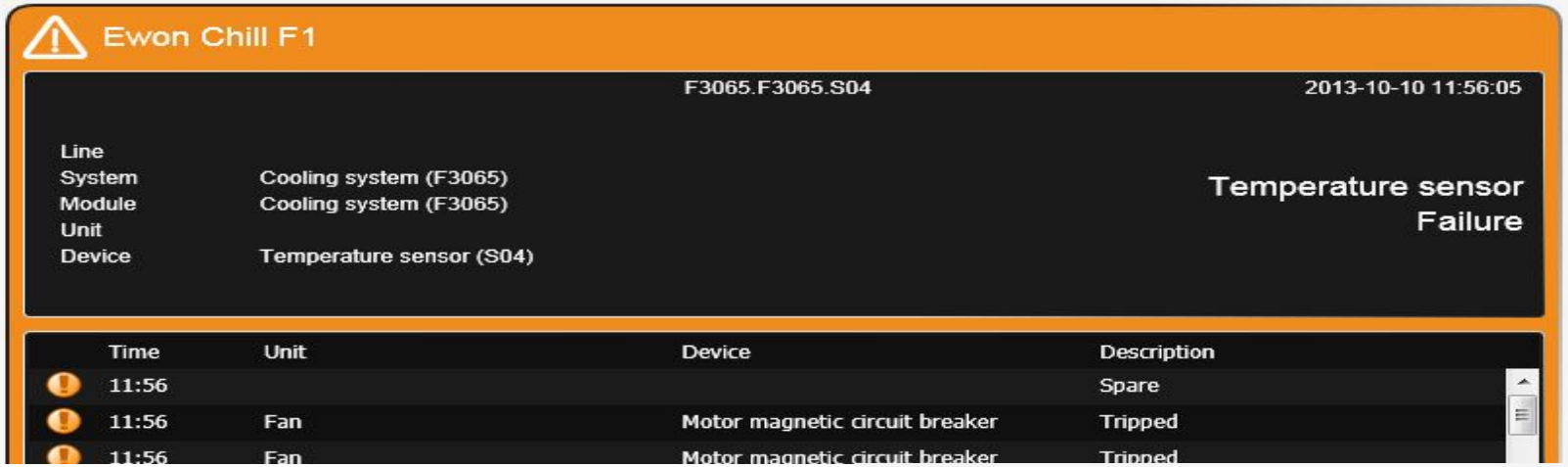
Equipment monitoring dashboard

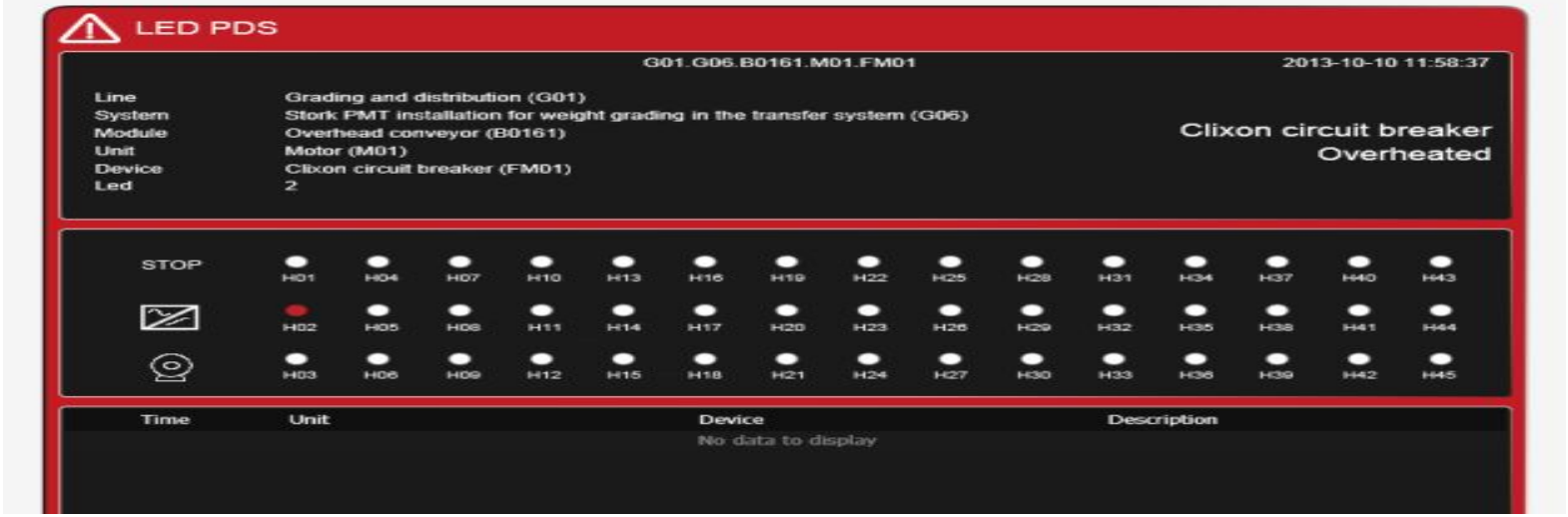


Maximal uptime!

- Uniform and clear real-time performance info
- Web based: available on every PC
- Collect all real-time data for analysis

Actual alarms





Actual status

Ewon Chill Status F1

Section setpoint and process values

Setpoint:	6.0 °C
Process value:	6.0 °C

Valves

V1	0.9 %
V2	0.9 %

Temperature sensors

T1	0.4 °C	T5	-
T2	3.9 °C	T6	-
T3	1.9 °C	T7	-
T4	3.2 °C	T8	-

Pressure sensors

P1	2.0 bar	P5	-
P2	7.5 bar	P6	-
P3	3.7 bar	P7	-
P4	3.0 bar	P8	-

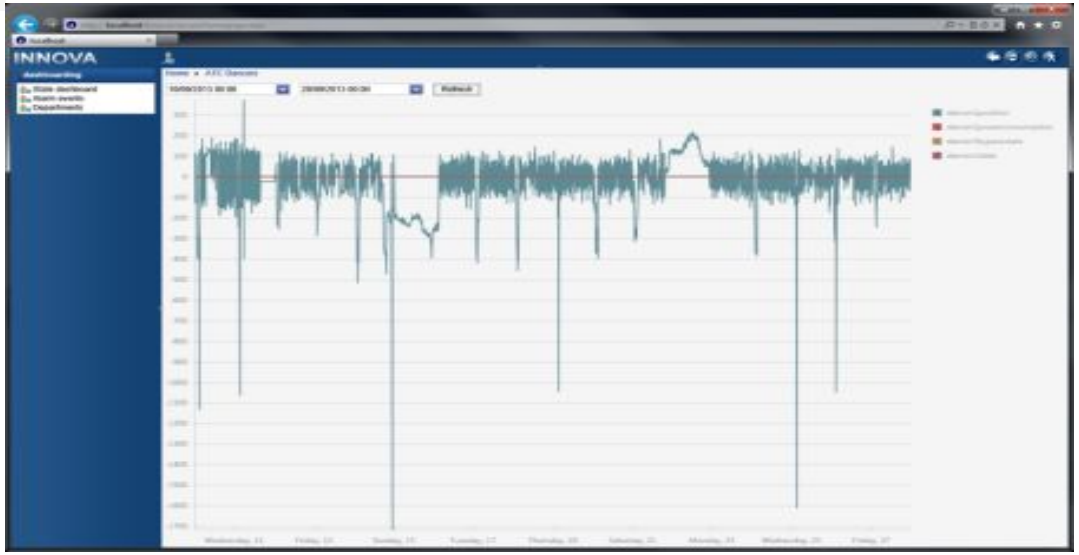
Defrost sensors

D1	3.7 °C	D9	-
D2	1.2 °C	D10	-
D3	7.6 °C	D11	-
D4	2.4 °C	D12	-
D5	-	D13	-
D6	-	D14	-
D7	-	D15	-
D8	-	D16	-

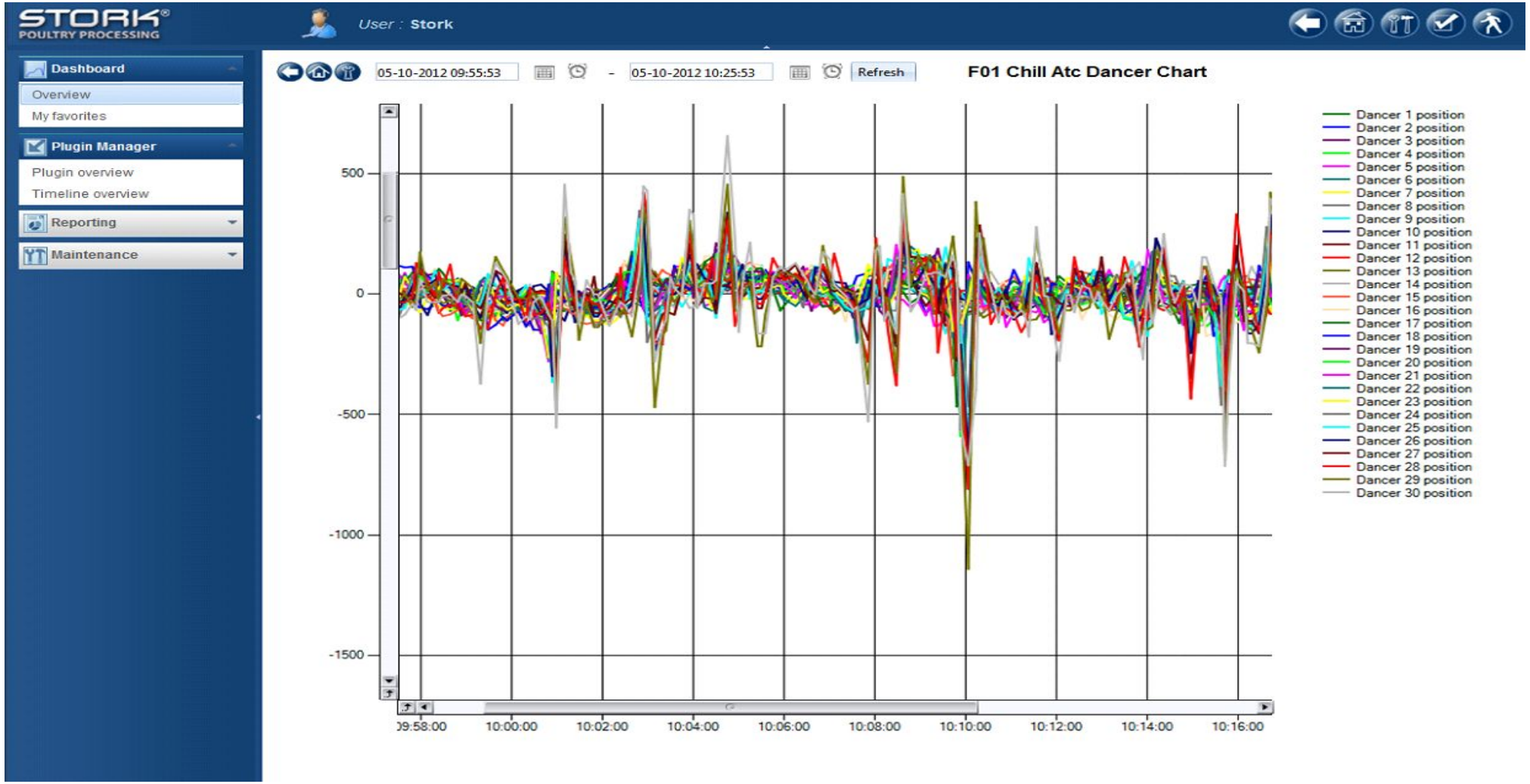
Ewon ATC Ems1

Line speed set-point : 12500
Line state : Running

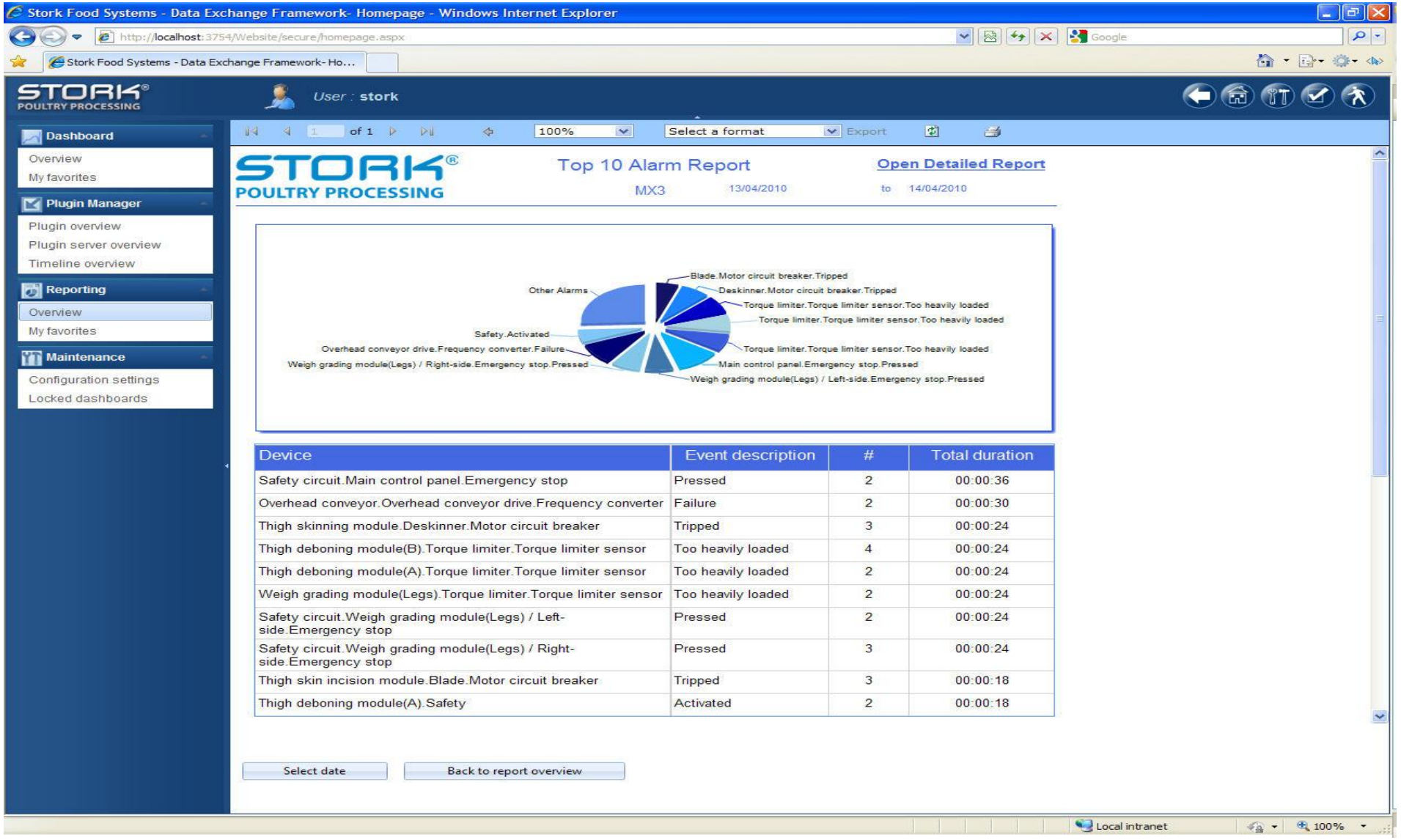
State	Position	History	Power consumption	Bypassed	State	Position	History	Power consumption	Bypassed
1	40%		80%	No	17	40%		80%	No
2	53%		91%	No	18	54%		91%	No
3	-6%		45%	No	19	61%		97%	No
4	52%		89%	No	20	-24%		31%	No
5	-46%		14%	No	21	55%		92%	No
6	59%		95%	No	22	-64%		N/A	No
7	-21%		34%	No	23	-44%		15%	No
8	-9%		43%	No	24	-14%		38%	No
9	18%		63%	No	25	4%		53%	No
10	3%		52%	No	26	40%		80%	No
11	34%		75%	No	27	30%		72%	No
12	48%		86%	No	28	-48%		12%	No
13	-44%		15%	No	29	-50%		11%	No
14	47%		86%	No	30	21%		66%	No
15	30%		73%	No	31	-28%		28%	No
16	49%		87%	No	32	46%		85%	No



Actual status equipment (ATC: Graph)

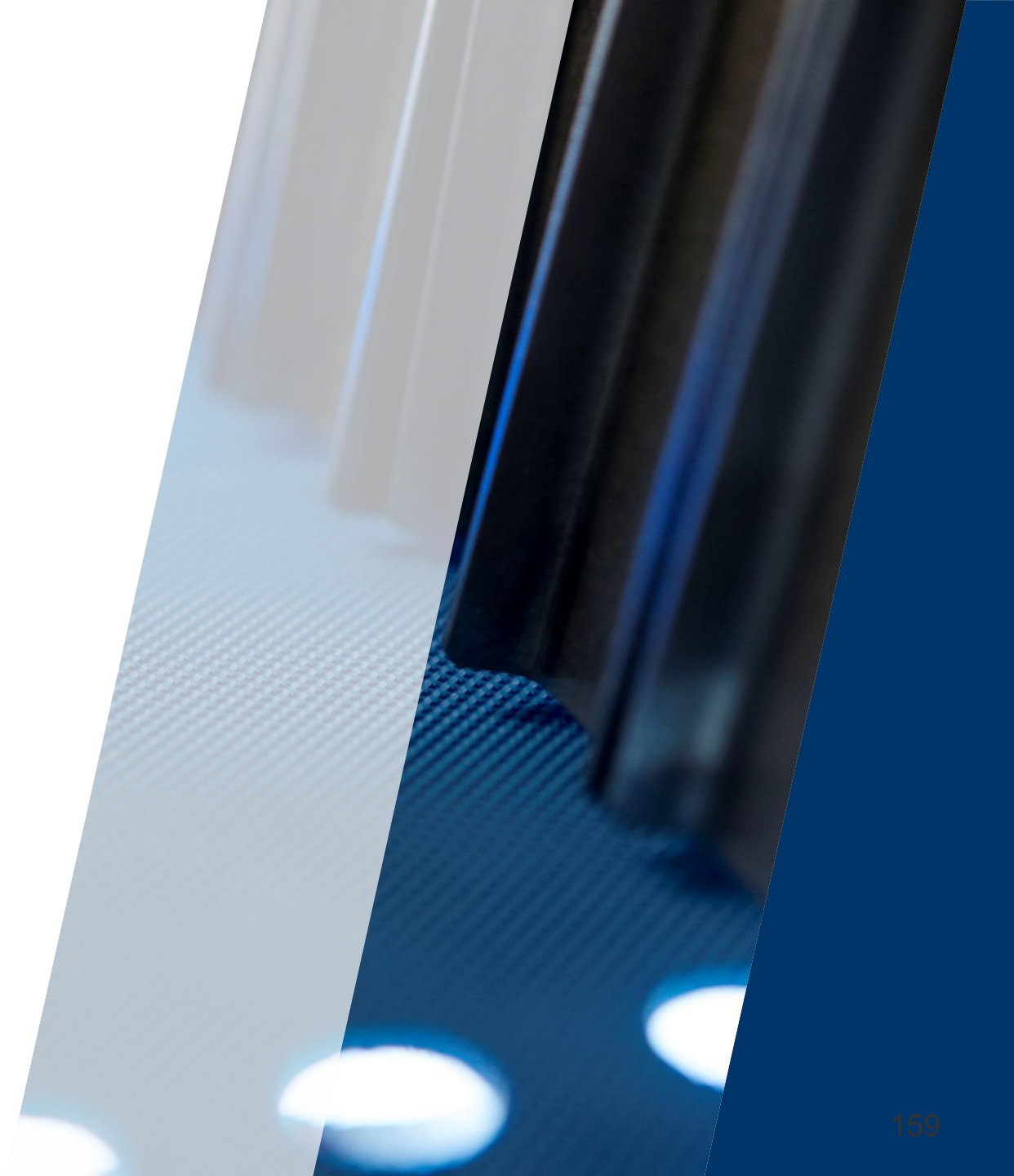


Equipment Monitoring - TOP 10 alarms

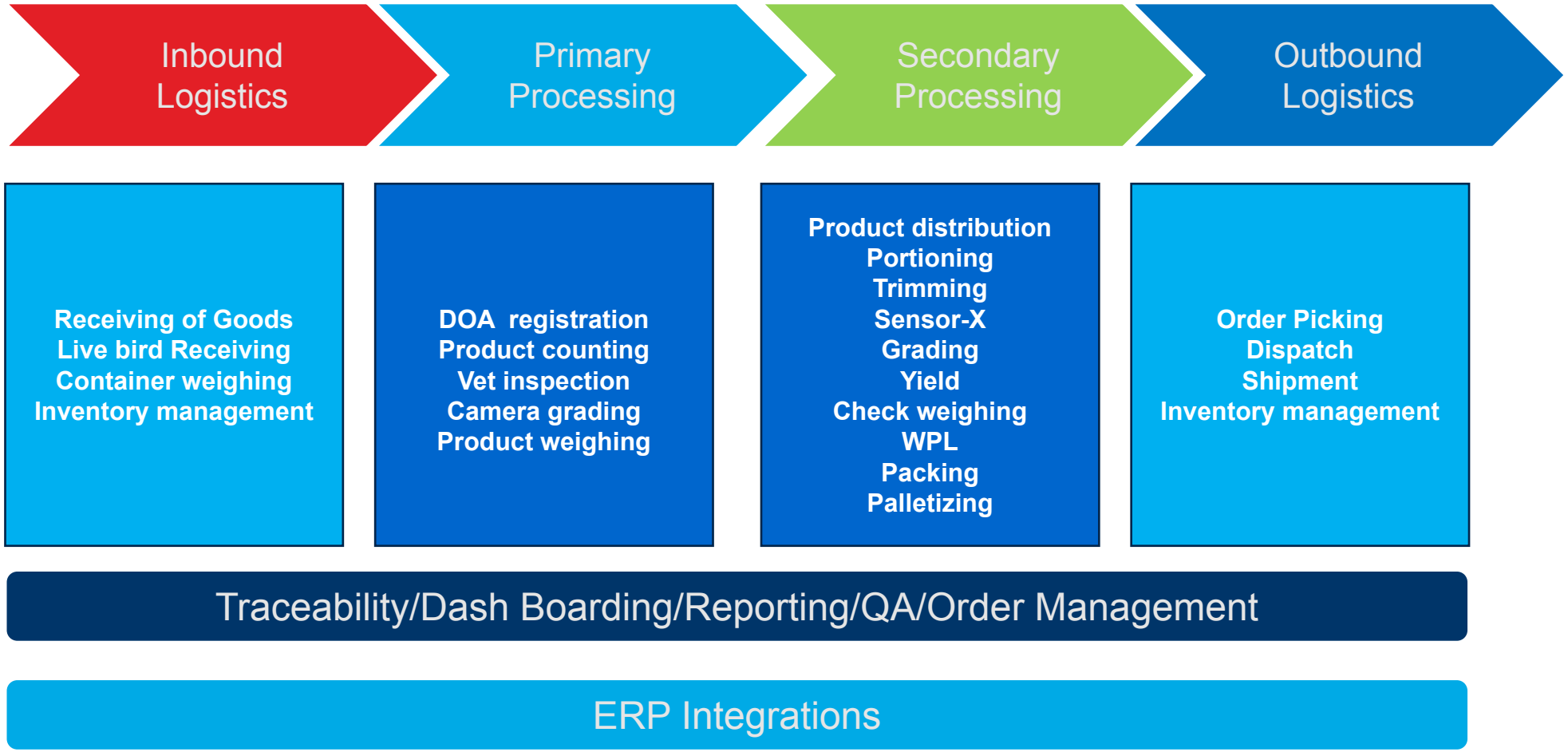


Device	Event description	#	Total duration
Safety circuit.Main control panel.Emergency stop	Pressed	2	00:00:36
Overhead conveyor.Overhead conveyor drive.Frequency converter	Failure	2	00:00:30
Thigh skinning module.Deskinner.Motor circuit breaker	Tripped	3	00:00:24
Thigh deboning module(B).Torque limiter.Torque limiter sensor	Too heavily loaded	4	00:00:24
Thigh deboning module(A).Torque limiter.Torque limiter sensor	Too heavily loaded	2	00:00:24
Weigh grading module(Legs).Torque limiter.Torque limiter sensor	Too heavily loaded	2	00:00:24
Safety circuit.Weigh grading module(Legs) / Left-side.Emergency stop	Pressed	2	00:00:24
Safety circuit.Weigh grading module(Legs) / Right-side.Emergency stop	Pressed	3	00:00:24
Thigh skin incision module.Blade.Motor circuit breaker	Tripped	3	00:00:18
Thigh deboning module(A).Safety	Activated	2	00:00:18

Tabel of content

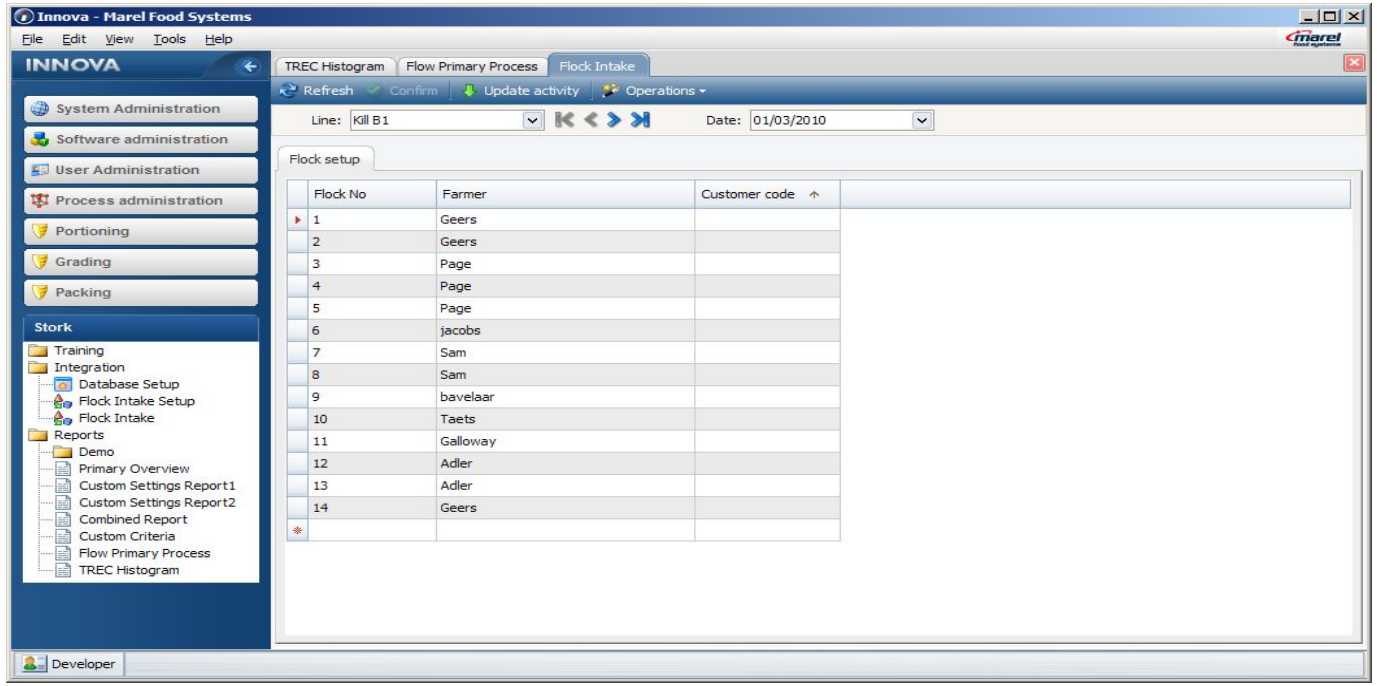


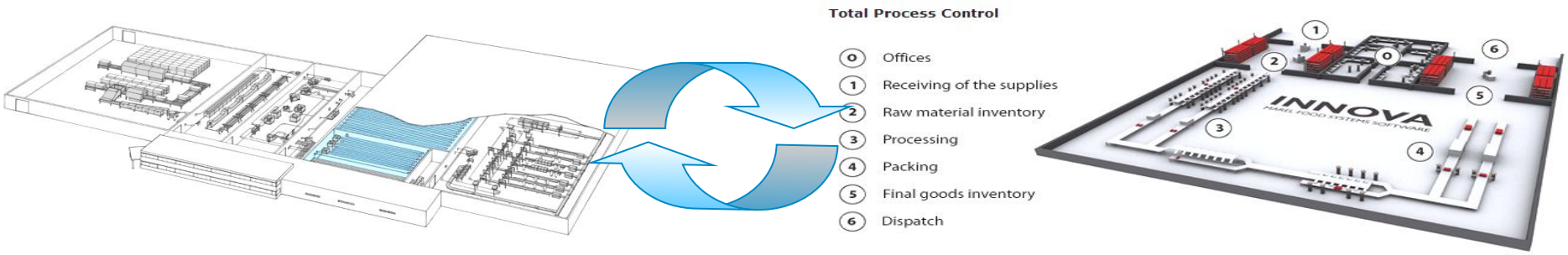
How we cover the entire process



Innova – PDS-NT: integrated T&T

- New Innova application to define flock number for both Innova and PDS-NT





PDS-NT reporting in Innova

Flock Weights

Date:26-08-2011 - 26-08-2011
Lot: = (Many)

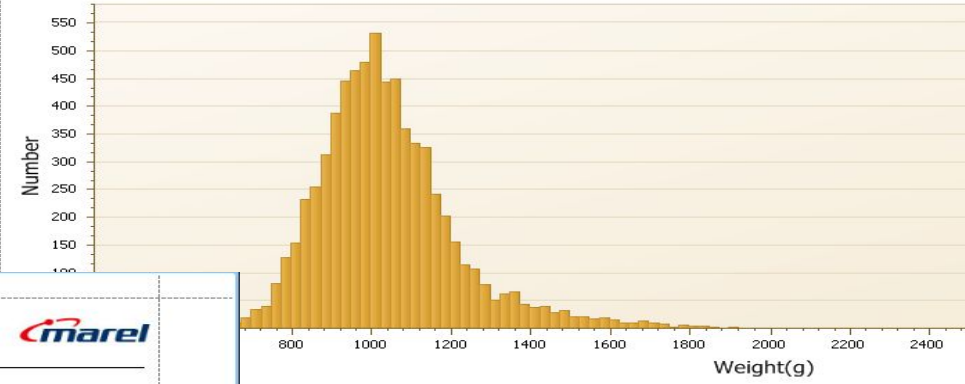
01-04-2011

Start	Flock	Grower	Line	Order #	Container #	Gross	Tare	Net(kg)
06:20:15	1	Avis Lipia	<ill line	1	30	25.724	11.995	13.729
07:34:14	3	F Calarasi	<ill line	1	43	41.308	17.189	24.119
09:24:25	2	Avis Lipia	<ill line	1	56	48.129	22.367	25.762
				3	**129**	**115.161**	**51.551**	**63.610**

PDS Histogram

Lot: = 1011040101
Date:26-08-2011 - 26-08-2011
01-04-2011

Start	Flock	Grower	Product	Mean(g)	Total No	Total(kg)
08:53:49	1	Avis Lipia	WhlBird	1.067	6.899	7.361
08:53:49	1	Avis Lipia	WhlBird Rh	3.125	1	3



Anatomic Defects

Date:26-08-2011 - 26-08-2011
Lot: = (Many)

01-04-2011

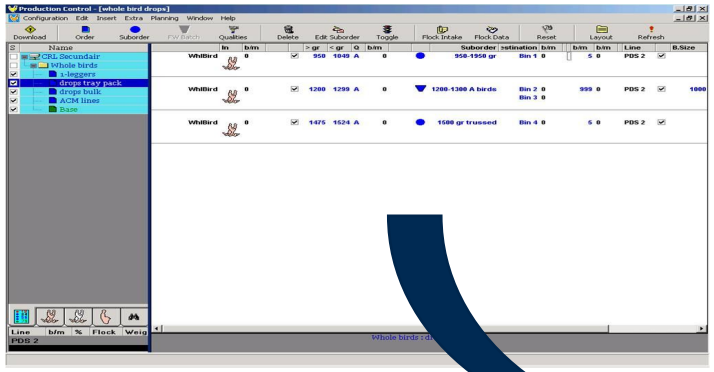
Flock	Grower	Hang In	Bruise small	Red bruise	Blue bruise	Bruise	Deskinning	Blister	Ammonia burn	Gall stain	Broken	Missing	Tip broken	Incomplete
1	Avis Lipia	6.900	0,01	0	0	9,33	0,65	0	0	0	0,01	0,01	0,66	0,12
2	Avis Lipia	13.202	0,01	0	0	8,68	0,83	0	0	0	0,02	0	0,87	0,28
3	F Calarasi	12.432	0,01	0	0	7,1	1,56	0	0	0	0,04	0,01	1,77	1,17
Day Total		**32.534**	**0,01**	**0**	**0**	**8,21**	**1,07**	**0**	**0**	**0**	**0,02**	**0**	**1,17**	**0,59**

vet inspection

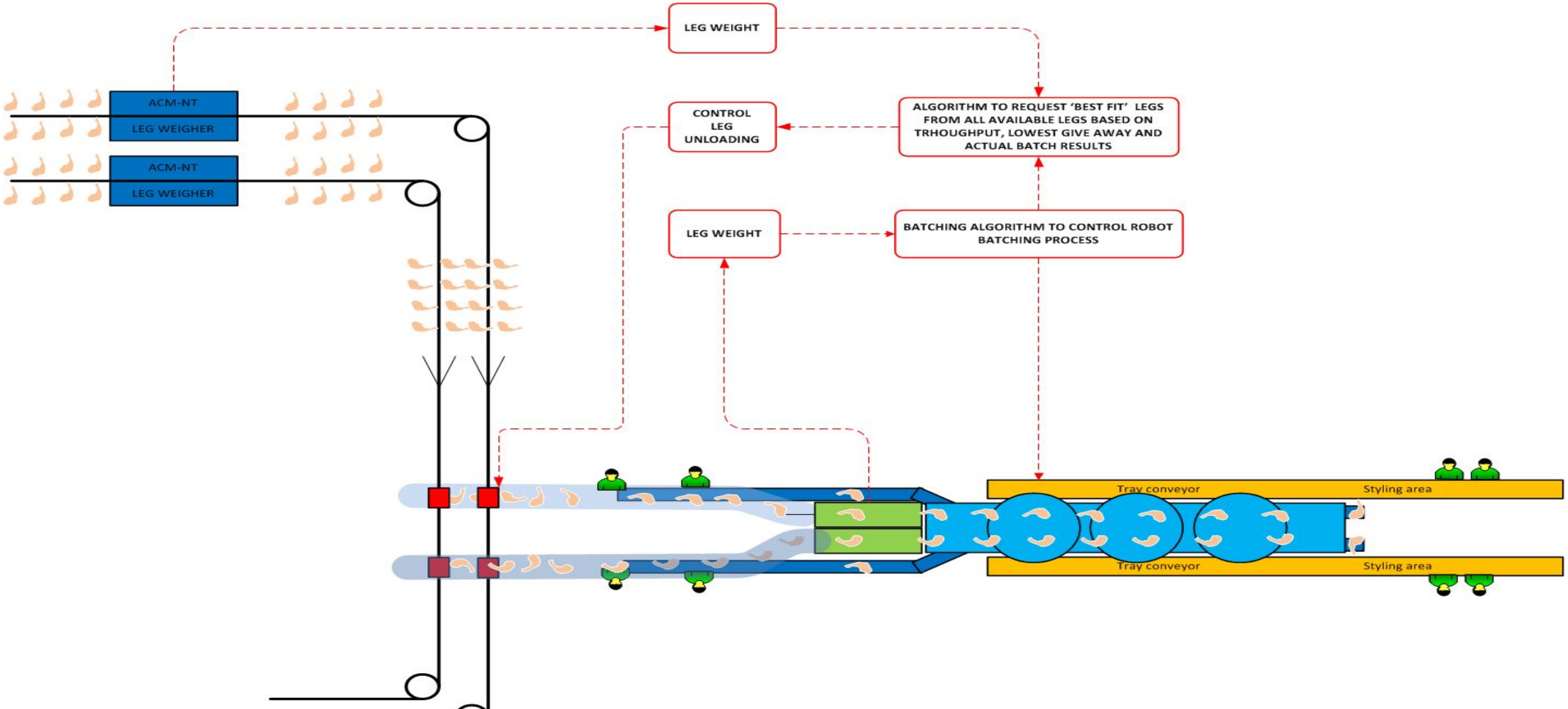
Date:26-08-2011 - 26-08-2011
Lot: = (Many)
01-04-2011

Flock	Grower	Line	Hang In	Undersize	Death	Button 1	Button 2	Button 3	Button 4	Button 5	Button 6	Button 7	Total
1	Avis Lipia	Kill line	7.109	00	02	00	47	08	15	00	00	00	72
3	= Calarasi	Kill line	12.356	00	03	32	307	05	25	00	00	00	372
2	Avis Lipia	Kill line	13.704	00	60	227	57	20	299	00	00	00	663
	Day Total		**33.169**	**00**	**65**	**259**	**411**	**33**	**339**	**00**	**00**	**00**	**1.107**

Label printing PDS-NT data – in development now



Robobatcher integration



With Innova & PDS-NT you get…

- A tool to measure the health of your processes and profitability
- Full control over the production process
- Yield monitoring
- Throughput monitoring
- Inventory control
- Traceability
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- Integration with ERP systems
- Scalability - modularity
- Proven solutions based on +2,000 installations over last 15 years

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Thank you!

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