

# A new approach to servicing customer shelf life needs

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# Plant Initiated Project (PIP)

At ALC we've done a PIP – lots of parts:

1. Destruction shelf life test – store at -1°C until no good
2. Our Japanese supply chains – micro and sensory
3. Reports on:
  - “High” micro counts and shelf life
  - Our international supply chains – data loggers
  - Sponging and excision
4. Domestic retail supply chains – micro and sensory

Acknowledge:

Long set up the PIP and helped with the data logging – big time!

John was our lab boy

# Roadmap

1. The current system for shelf life testing for domestic customers
2. A new deal

We'll do it conversation style

# The way we are

## **Scope of testing**

- Industry needs to do shelf life testing for:
  - Retail ready cuts
  - Cuts for further processing
  - Export products

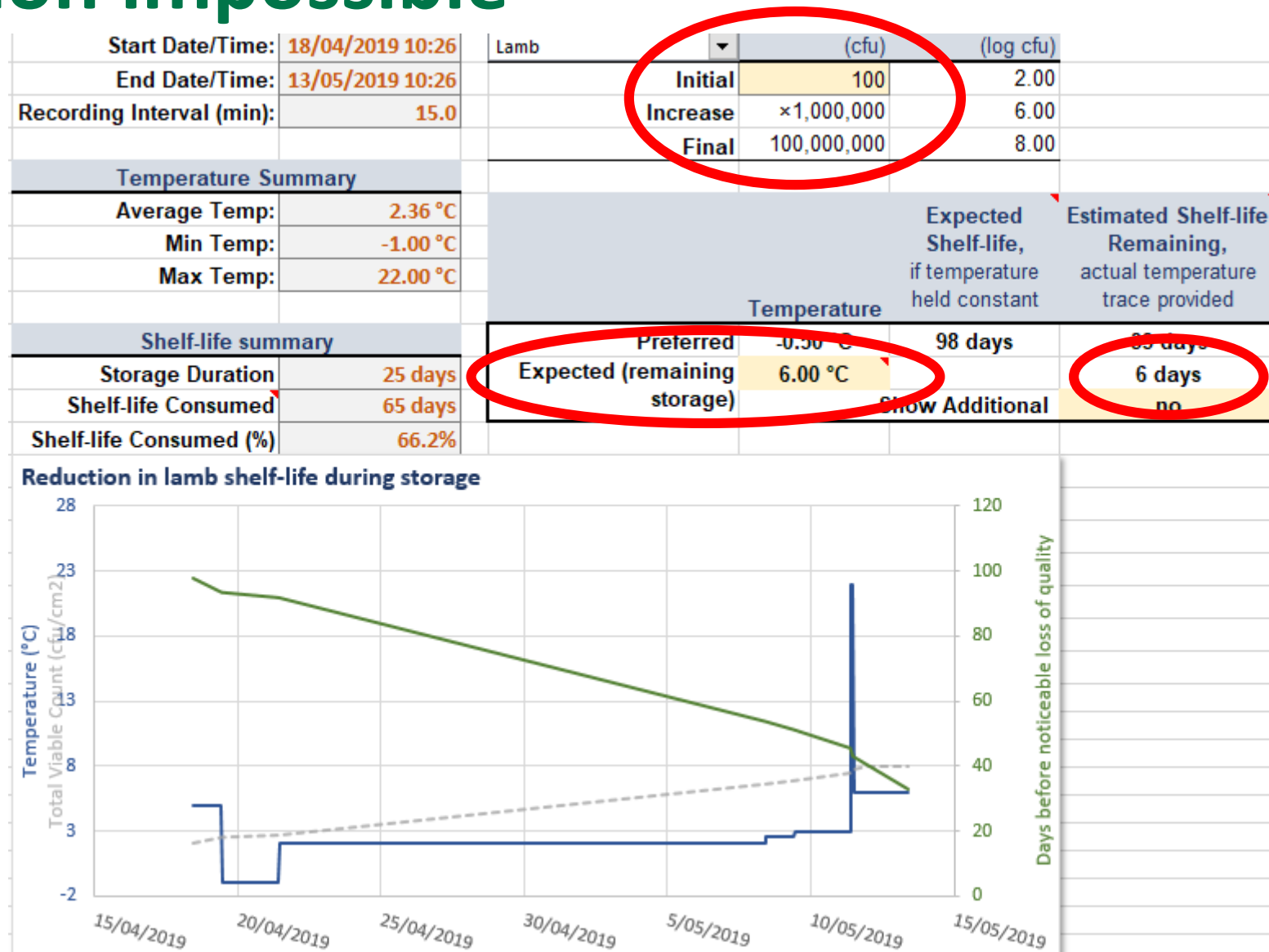
## **Frequency of testing**

- Daily retention samples for each batch and type
- Quarterly at start and end of life
- Annually

# Typical supply chain to retail display

Process stage	Temperature (°C)	Time (days)
Slaughter, boning	5	1
Transport to customer	-1	2
Further processing	2	17
Distribution	2.5	1
Retail	3	2
Customer purchasing	22	0.1
Customer	6	2

# Mission impossible



# Out of spec – Big time

<i>Enterobacteriaceae</i>	<1,000 cfu/g	≥1,000 cfu/g	≥100,000 cfu/g + Sensory
<i>Escherichia coli</i>	<100 cfu/g	≥100 cfu/g	≥100 cfu/g + Sensory
Standard Plate Count	<1,000,000 cfu/g	≥10,000,000 cfu/g	≥100,000,000 cfu/g + Sensory

# The story so far

- You start with raw materials with a low count
- You comply with customer requirements for further processing
- You insert typical temperatures and times for the retail supply chain and customer use
- You've spent a grand on meat samples, about \$1300 on micro plus staff time and couriers

AND YOU'RE OUT OF SPEC

AND YOU HAVE TO KEEP DOING IT



# Shelf life and ESAM testing– What it costs us

Testing type (Micro only)	\$/ Year
Shelf life	82,000
ESAM	115,000
Carton trim sample	45,000
<b>Total</b>	<b>\$242,000</b>



# The future - A new deal

We designed a PIP to help get a better system for:

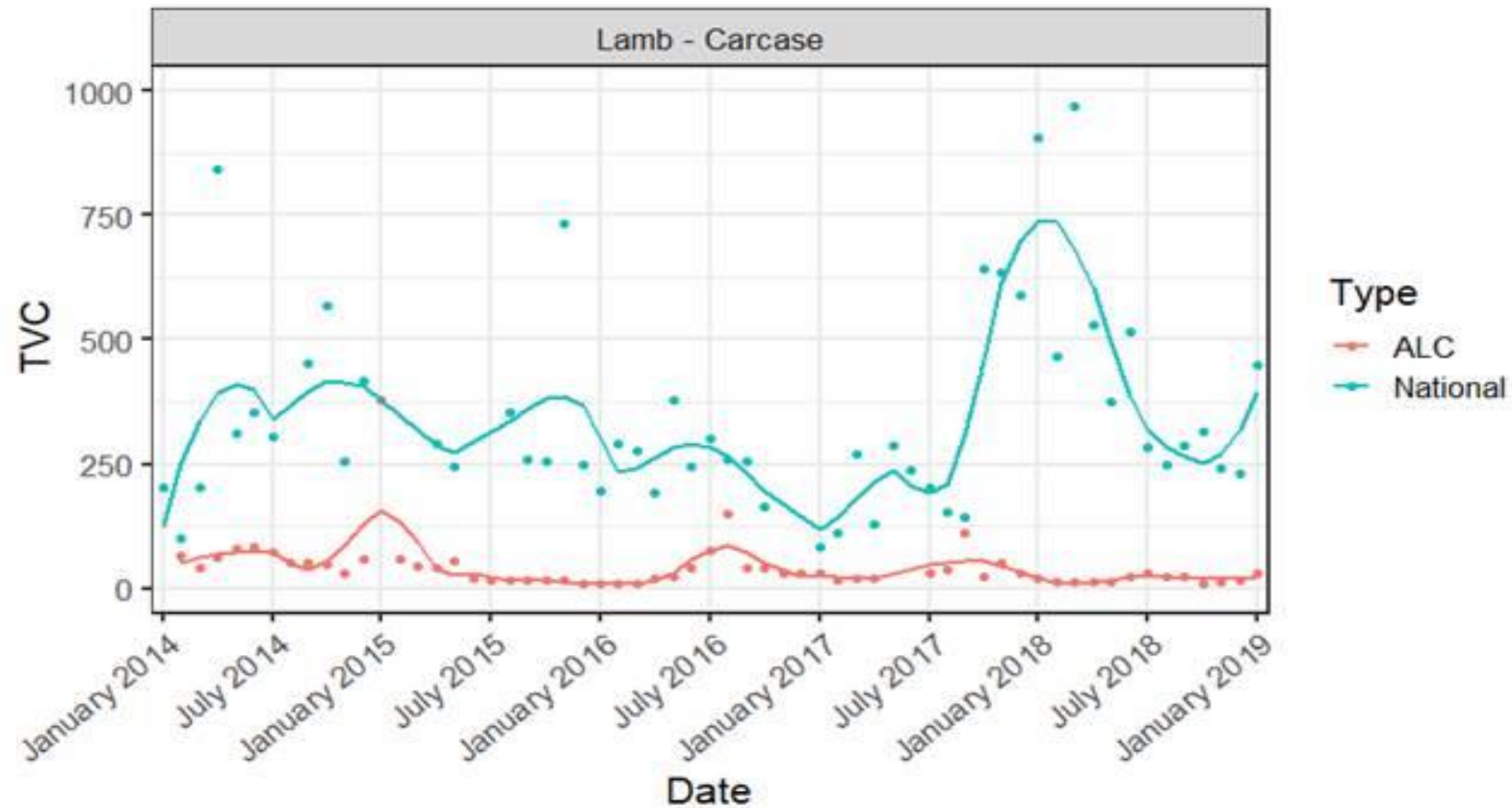
- Us
- Our customers
- Industry

This is what we did:

1. A baseline survey of our products
2. Validation of our supply chains (for Retail Ready, Further Processing and Export products)
3. UTas prediction to see how our shelf life and micro stacked up

# Starting material - carcass hygiene - ESAM

Many improvements on plant – our APC looks OK



# Baseline survey - cuts

- Ten cuts, five replicates
- APC, *E. coli*, *Enterobacteriaceae*

Cuts	APC (Mean log cfu/cm <sup>2</sup> )
All cuts	2.0 (100)
Minimum (Bone-in Loins)	1.7 (50)
Maximum (Bone-in Shoulder)	2.5 (320)

*We can safely use 100 cfu for the shelf life tool*

# Validating our shelf life – further processing

We stored Bone-in denuded racks and Boneless legs, simulating the supply chain from Colac to the retailer's further processing facility, where they can hold product for up to 20 days from DOK before processing it.

Supply chain simulated	Days	Temperature (°)
Slaughter/chilling	1	4
Hold Colac	5	-1.0
Transport to processing facility	1	1
Storage at processing facility	13	0.5-1

After 20 days we did sensory and micro testing and downloaded data loggers from each carton.

# Validating our shelf life – sensory testing

We used the MLA's national guidelines

Score	Drip	Vacuum	Appearance	Odour
5	None	Complete adhesion	Deep red colour	Fresh
4	Slight	Good	Light red colour	Slight sour/dairy
3	Acceptable	Moderate	Slight discolouration	Sour/dairy
2	Heavy	Poor	Poor colour	Strong sour/dairy
1	Extreme	None/blown	Severe discolouration	Off odours

The sensory panel (5 QA staff) assessed the products (n=5) after 20 days and found it in excellent condition for further processing

	Mean scores for each attribute	
	Denuded Racks	Boneless Leg
Overall appearance	4.8	4.0
Vacuum	4.8	5.0
Colour after 5 minutes	5.0	4.8
Odour after 5 minutes	5.0	4.8
Average	<b>4.9</b>	<b>4.7</b>





## Denuded lamb rack 20 days

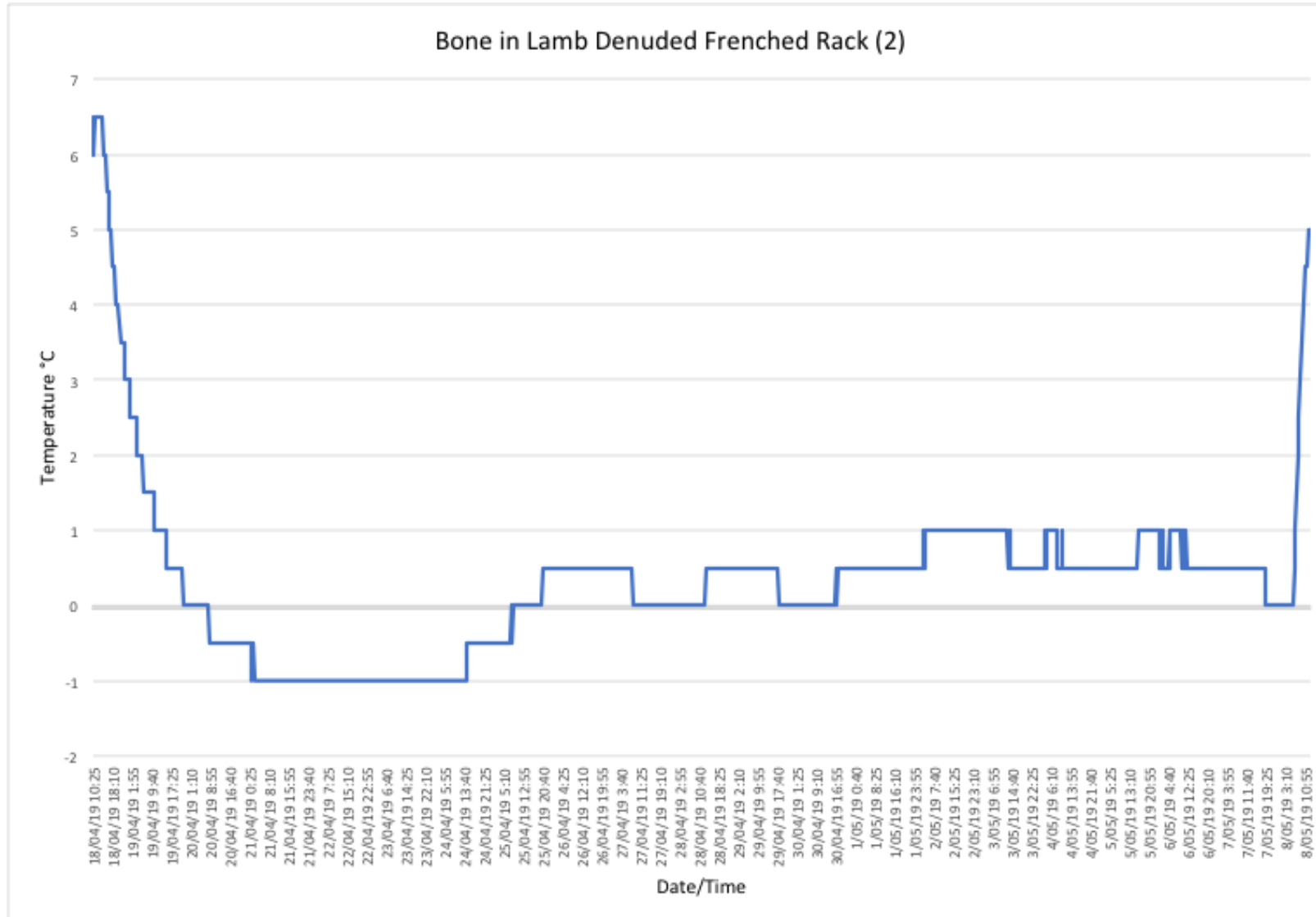




## Boneless lamb leg butterflied 20 days



## Stored 20 days



# Validating our shelf life – Day 20 micro testing

We did APC, *E. coli* and *Enterobacteriaceae*

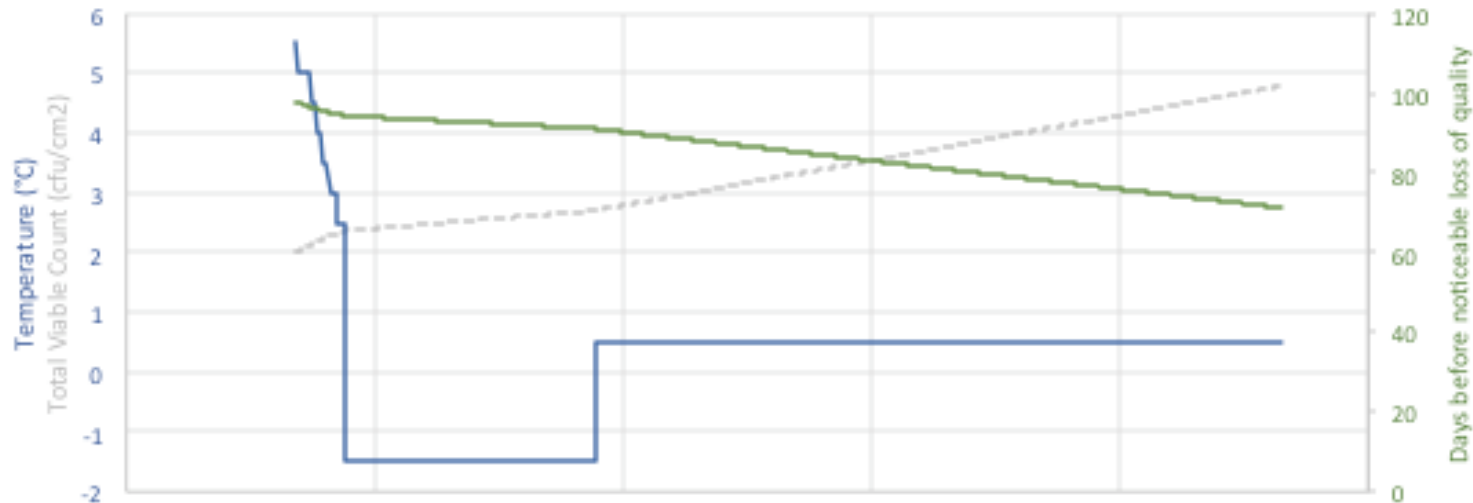
Cut	APC	<i>E. coli</i>		<i>Enterobacteriaceae</i>	
	Mean	Prevalence (%)	Mean*	Prevalence (%)	Mean*
Bone-In Denuded Rack	3715	60	1.6	100	6.5
Boneless Leg	758	20	0.3	100	24

\* The mean is of positive samples only (cfu/cm<sup>2</sup>)

# U Tas prediction

End Date/Time:	8/05/19 5:56	Initial	100	2.00	
Recording Interval (min):	15.0 min	Increase	×609	2.78	
		Final	60,900	4.78	
Temperature Summary					
Average Temp:	0.16 °C	Temperature		Expected Shelf-life, if temperature held constant	Estimated Shelf-life Remaining, actual temperature trace provided
Min Temp:	-1.50 °C				
Max Temp:	5.50 °C				
Shelf-life summary		Preferred	-0.33 °C	98 days	74 days
Storage Duration	20 days	Expected (remaining storage)	5.00 °C	Show Additional	16 days
Shelf-life Consumed	27 days				no
Shelf-life Consumed (%)	27.1%				

Reduction in lamb shelf-life during storage



# Where to from here - A new deal from the retailers?

A system based on:

- A baseline to establish micro at the start of shelf life
- Specified product temperature and time in the supply and consumer phases
- Validating shelf life based on micro and sensory evaluation
- Periodic (Annual and Quarterly) verification using UTas tool

**NO MORE FRIDGES FULL OF CUTS**

**NO MORE COURIERS TO THE LAB**

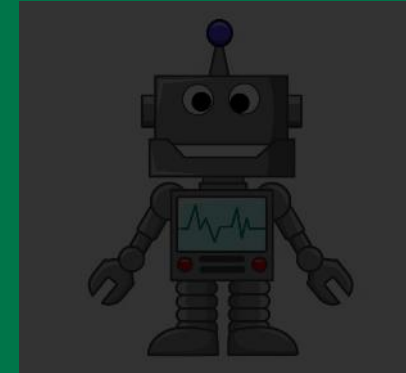
**AND NO MORE BIG BILLS**



# MLA Shelf life update

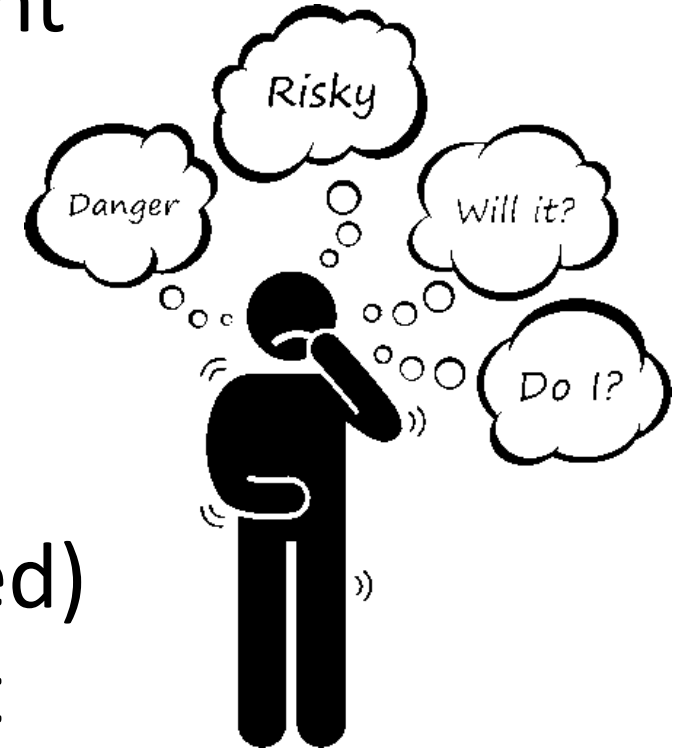
Long Huynh

## 1. Where we were



# Common uses of the model

- Predicting the remaining shelf life of product
- Remaining shelf life of a botched shipment
- Educating customers
- Pushing for reduced testing
- Changing of shelf life requirements
- Investigating customer complaints (limited)
- Manipulating cooling rates or investment



The shelf life model can do more than predicting shelf life



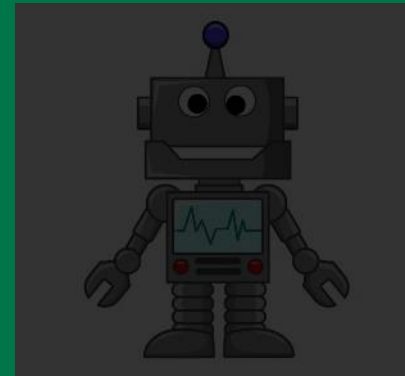
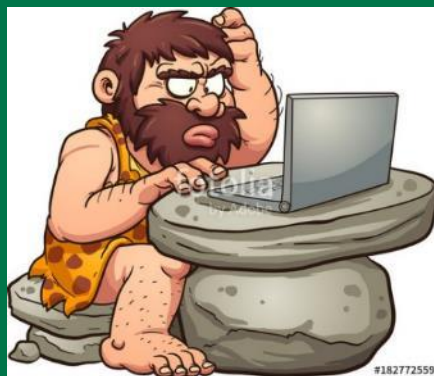
# How to use the shelf life model

LIVE DEMO

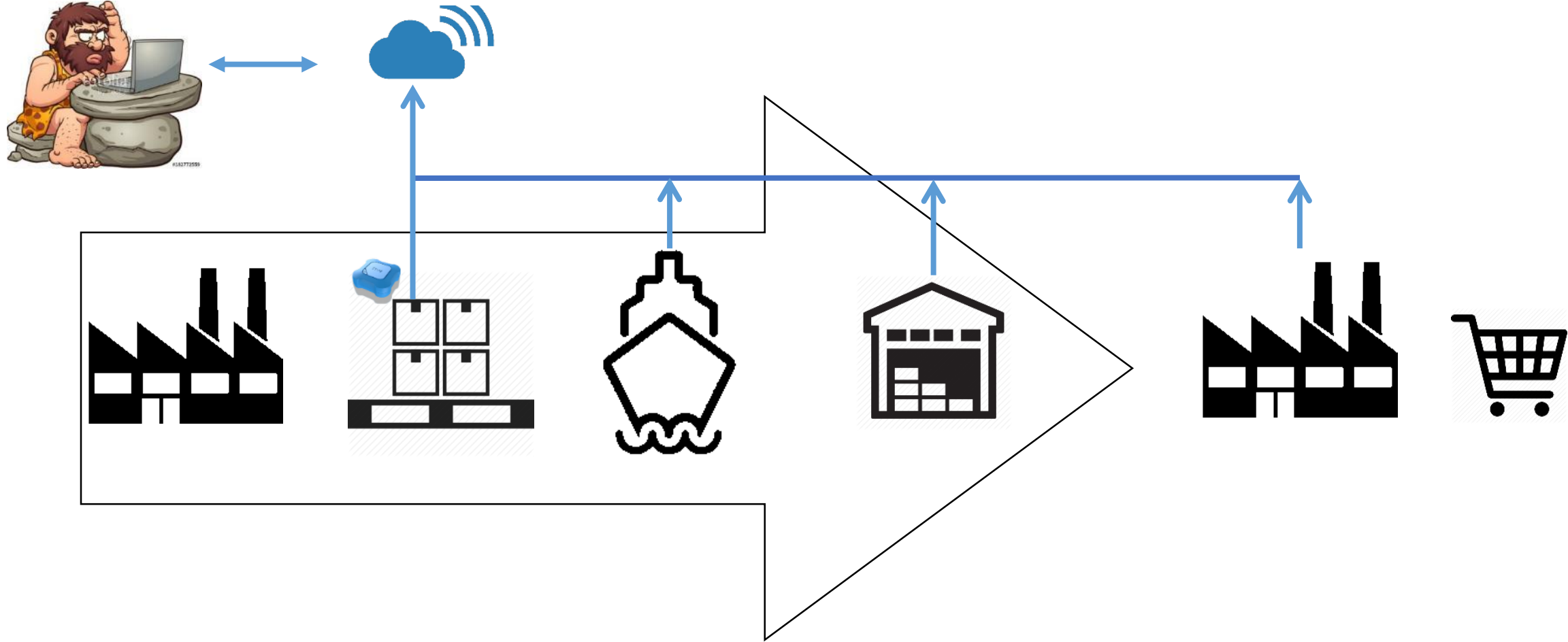


The shelf life model is that easy to use

## 2. The present



# The next leap in loggers



Guarantee data collection is no longer in the past and wont blow the budget

# Options – But not all are equal

Cloud Loggers	Monthly subscription fee	Logger cost
Reusable	\$0 – 120	\$150 – 300 (If lost)
Disposable	0	\$50-100



Selecting the right loggers to use is important



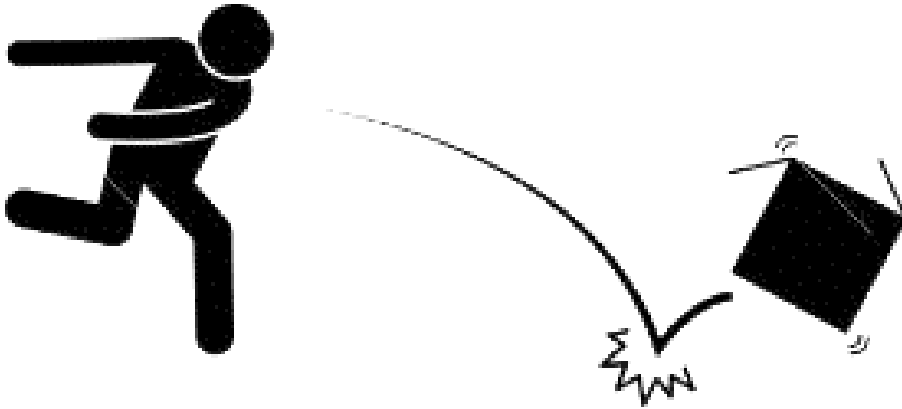
Battery life

What does it record

User interface

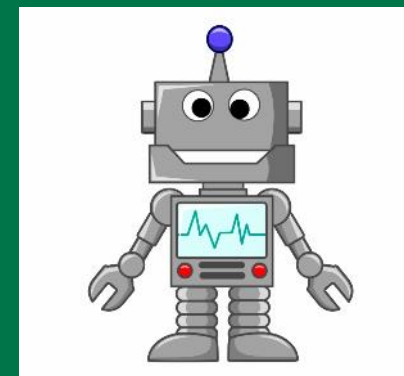


# What else can you record?



Some loggers record more than just temperature

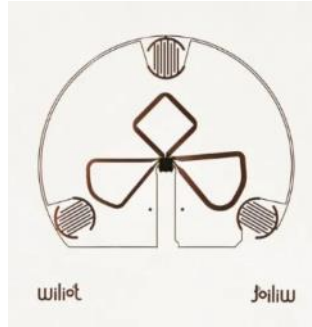
### 3. Where to and beyond



# What's Coming



PRINTED  
ELECTRONICS



willot

Joiluw



AUGMENTED  
REALITY



DATRMX



PDF417



QR



SUPPLY CHAIN  
CONTROL



SMART  
LABELS



CONDITION  
MONITORING



FIGHTING  
WASTE



FOODWATCH



Data collection is happening, its a matter of when, not if.



# A glimpse of the future - Data automation

PO # XXXX7281XX

84

Remaining Shelf life

0.0

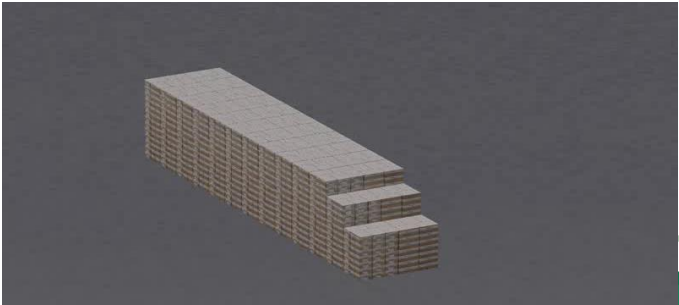
Average Temp

23

Shelf life left @ 4°C

Lamb Shipment

Logger ID: X666XX





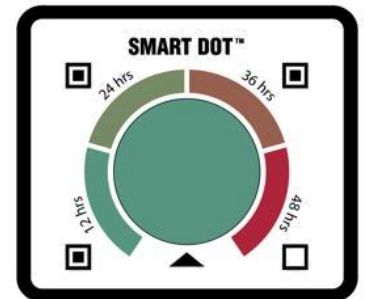
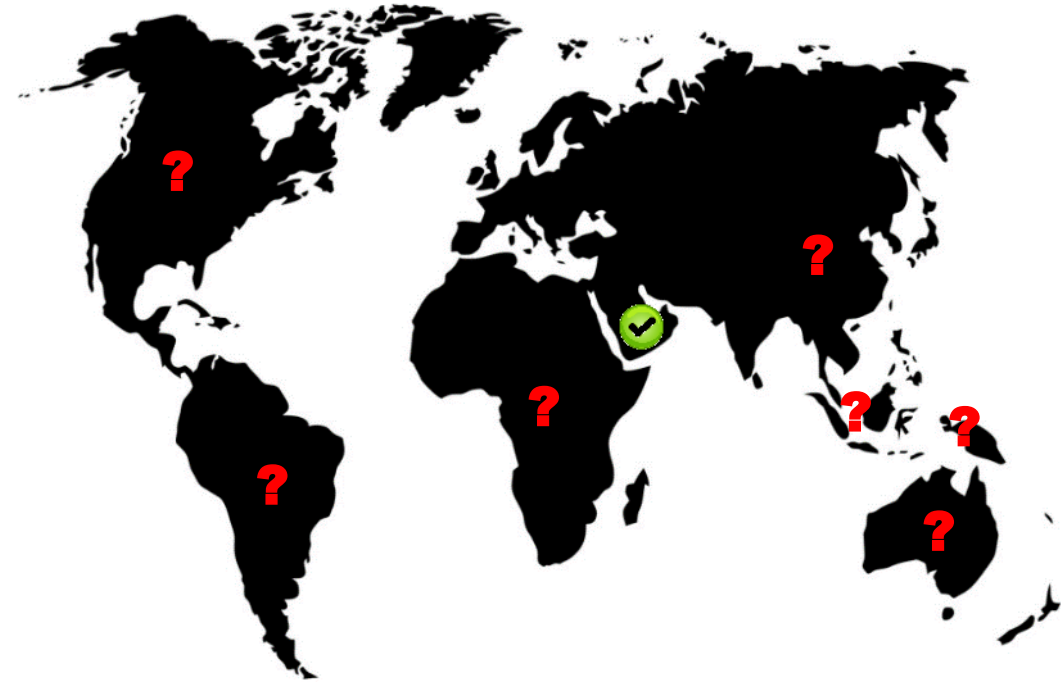
# Join us – we need your help

## We can provide:

- Access to the Shelf life model and training
- Cloud loggers to track your supply chain or oversea markets
- Implement the model into the list of tools you use
- Testing scenario in your supply chain
- Resources and tools if you want to go solo
- **Rethink and redefine the current standards of Shelf life (Lets build a case together)**

## We need your help:

- Advice on: new low cost shelf life model (Label), Automated SL model in loggers
- Shelf life Model PLUS



**Come on the journey with us – we need your help**

# MLA Shelf life update

1. The shelf life model does more than predicting and is easy to use

2. Remote loggers allow tracking of cold chain through to customer for a realistic cost

3. We need your help to drive change and shape the future

Ensuring we are dictating the future, and saving big bucks on the way

# Questions

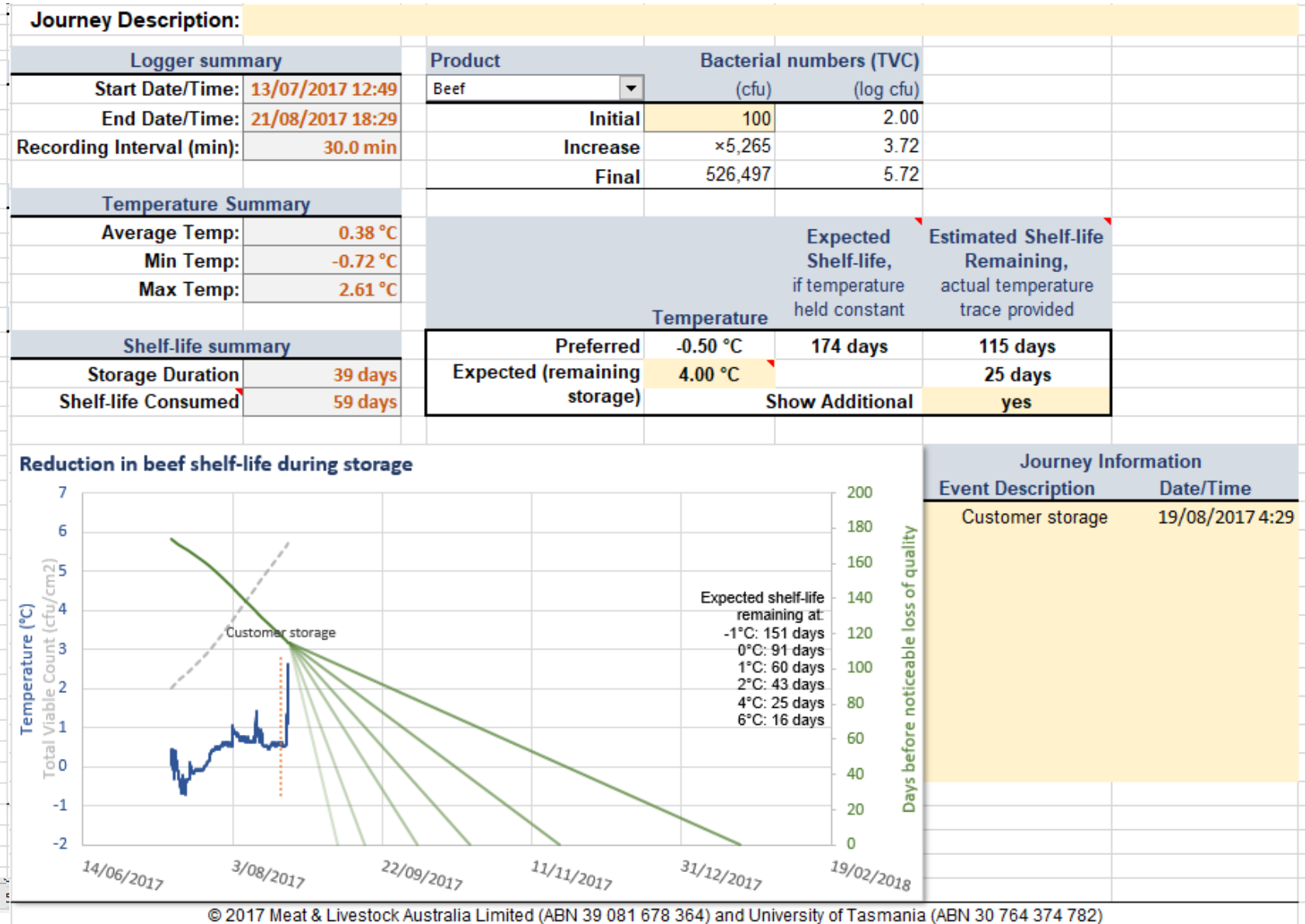
**For further information, please contact:**

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# How to use the shelf life model



The shelf life model is that easy to use