

# Cold Chain Management

## *Supply Chain Technology and Product Integrity*

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**FRESH PRODUCE**  
Malaysia

# Sensitech Overview

*Sensitech is the leading provider of cold chain visibility solutions that enable our customers to track and monitor assets across the supply chain, protecting the value, quality and integrity of their temperature sensitive products.*

- Founded in 1990
- Acquired by Carrier Corp., a UTC company, in June 2006
- Operations in more than 30 countries around the world
- Monitored more than 7 million shipments in 2009
- ISO 9001:2000 and ISO 9001:2008 registered company



# Better Cold Chain Management Will...

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**Maximize product quality**

**Avoid temperature related perishable shrink**

**Contribute to product safety**

**Drive consumption through increased customer satisfaction**

**Support brand equity**



# Common Temperature Problems

## Warm Temperatures



## Chilling Injury



## Freezing Injury



## Fluctuating Temperatures



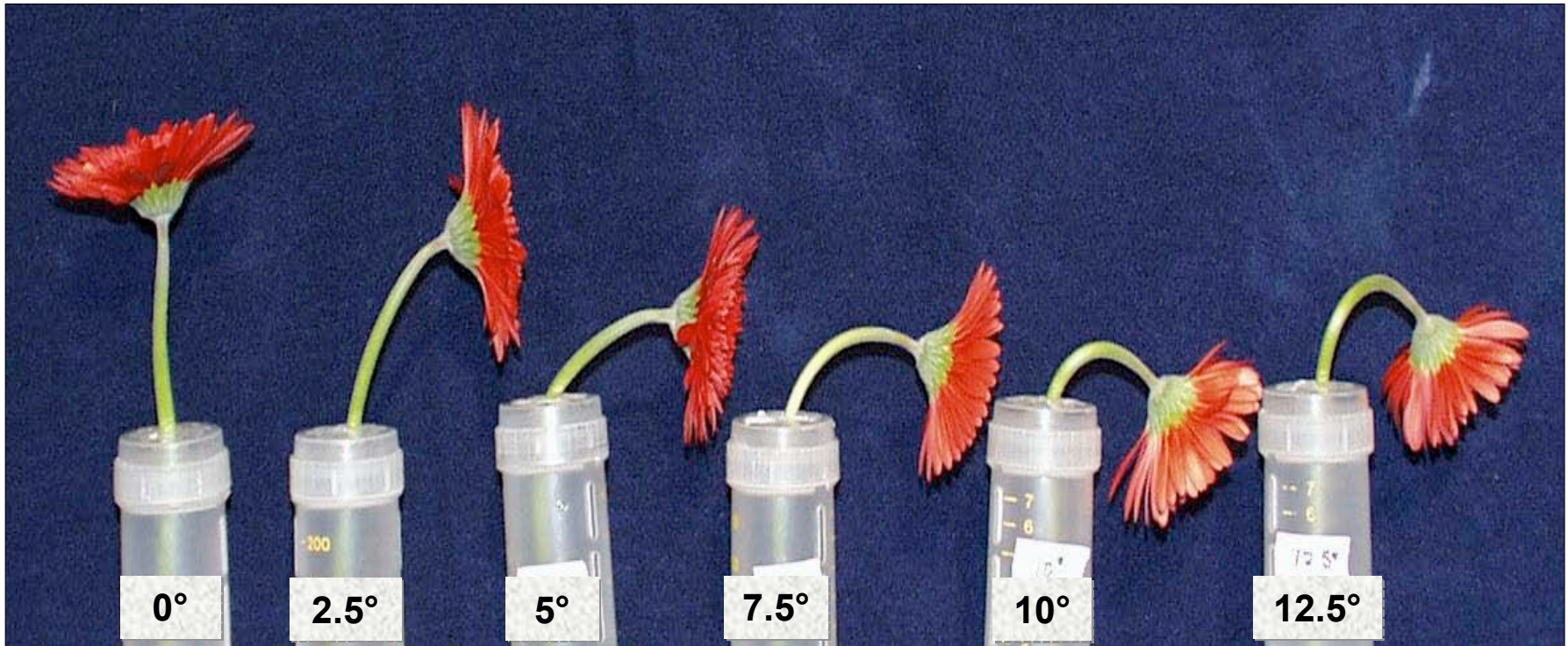
# Broccoli



Source: UC Davis

# Gerbera Vase Life

5 days storage, 1 day in vase at 20°C



Source: Dr. M. Reid, UC Davis

5 days storage at temperatures  
indicated + 8 days in vase at 20°C



# Evolving Data Collection Technology

## Mechanical

- Manual process
- Read printed paperwork
- Transaction level monitoring
- No supporting technology required



## Electronic

- More precise than strip-chart recorders
- Wide range of features
- Alarming capability
- Data can be shared and analyzed
- Supports Cold Chain Improvement Efforts



## Wireless

- Near real time
- Hands free
- Automated
- Uninterrupted collecting of data
- Segmented view of the supply chain

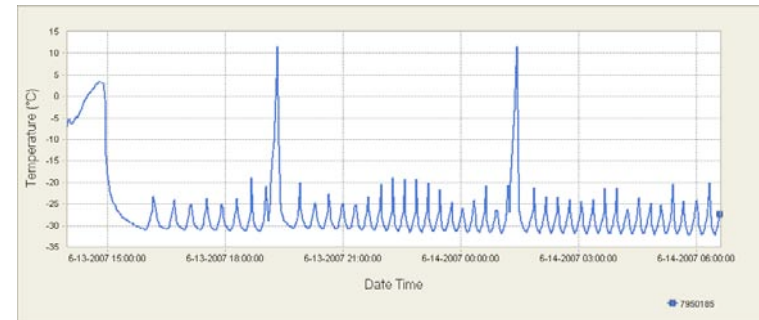


# Principal Uses of Temperature Monitoring

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## Use Data from Single Shipments

- Used for accept/reject decision making
- Used to determine responsibility and resolve disputes
- Valid and valuable use, but limited



## Aggregate Data from Many Shipments

- Analyze to see trends and patterns
- Process improvement
- Focus and prioritize resources
- Improve quality and profits



# Hardware, Software and Services

*Solutions ranging from the evaluation of individual transaction integrity to the evaluation of the integrity of the entire cold chain process*



# Export Program Example



## Large Exporter in South Africa

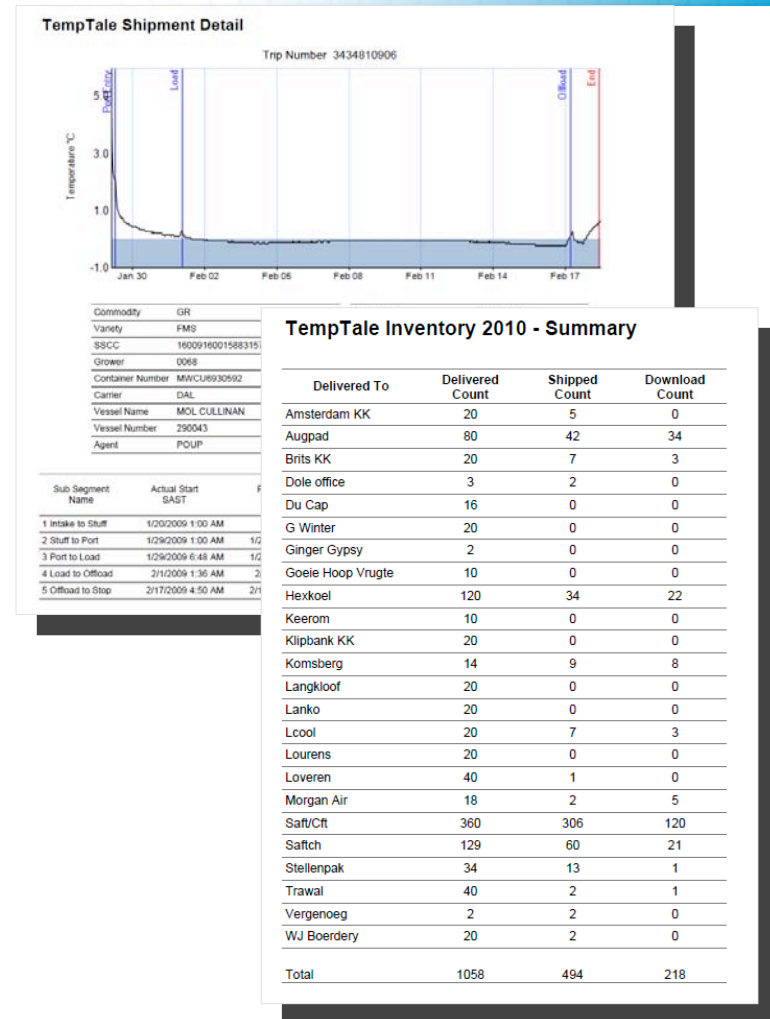
30 suppliers • 15 carriers • 8 commodities • 85 receiving locations

## Lengthy Supply Chain

- Arrival at Exporter for Consolidation
- Loading and Transport to Port
- Port Arrival and Transport via Sea
- Arrival at Import Port
- Transport to Importer Distribution Center
- Arrival at Final Destination

# Export Program Goals

- Ensure cold chain compliance among trading partners
- Non-intrusive program administration
- Understand patterns and trends as they develop
- Focus and prioritize resources
- Improve process to positively impact quality and profits



# Ensuring Partner Compliance

## Inventory Reports

Who buys? How many? When placed? When downloaded? Unique Serial ID

Inventory Lists TempTale Inventory 2009 Delivered To Dole SA

1 of 10 100% Find | Next Select a format Export

### TempTale Inventory 2009

Serial Number	Delivered To	Season	Monitor Type	Comment	Date Sent	Valid To	Container Load Depot	Agent	Stuff Date	Down-load?	Monitor Start Time
3434805916	Dole SA	2009	TempTale4		12/19/2008	11/20/2009					
3434805924	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	DFEU	12/20/2008	Yes	12/20/2008
3434805966	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	DFEU	12/20/2008	Yes	12/20/2008
3434805967	Dole SA	2009	TempTale4		12/19/2008	11/20/2009					
3434805981	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	DFEU	12/20/2008	Yes	12/20/2008
3434805982	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	DEGROOTE	12/20/2008	Yes	12/20/2008
3434805983	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCPT	DFEU	2/6/2009	Yes	2/7/2009
3434805984	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCPT	DFRANCEU	12/24/2008	Yes	12/24/2008
3434805985	Dole SA	2009	TempTale4		12/19/2008	11/20/2009					
3434806901	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	DFEU	1/22/2009	Yes	1/23/2009
3434806902	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	DFEU	1/1/2009		
3434806904	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	VBHDA	2/2/2009	Yes	2/3/2009
3434806905	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	GRAPEDIR	1/1/2009		
3434806906	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	OGL FOOD	2/2/2009		
3434806907	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	FRUCHTEU	1/30/2009		
3434806908	Dole SA	2009	TempTale4		12/19/2008	11/20/2009	SAFTCFT	FRUCHTEU	1/1/2009		
3434806909	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	VBHDA	2/7/2009	Yes	2/7/2009
3434806910	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	DFEU	2/2/2009	Yes	2/3/2009
3434806921	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	OGL FOOD	2/2/2009		
3434806922	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	FRUCHTEU	2/8/2009		
3434806923	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	DFRANCEU	2/2/2009	Yes	2/3/2009
3434806924	Dole SA	2009	TempTale4		2/4/2009	11/20/2009	CERKOEL	DFRANCEU	3/23/2009		
3434806925	Dole SA	2009	TempTale4		1/9/2009	11/20/2009	SAFTCH	DFEU	1/22/2009	Yes	1/23/2009

# Non-intrusive Program Administration

## Summary Statistics Reports - Emailed

Report emailed (daily, weekly, monthly) – shipment info with trip graph

Message

Shipment List - HEXKOEL - Message (HTML)

From: CustomerReports@sensitech.com  
To: pierre\_fourie@za.dole.com  
Cc: Jesus Eduardo Ponce; sensitec@iafrica.com  
Subject: Shipment List - HEXKOEL

Sent: Fri 2/12/2010 1:00 AM

Monitors downloaded over the last 7 days.

### Shipment List by Loading Depot

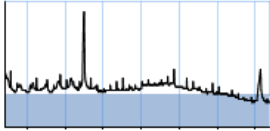
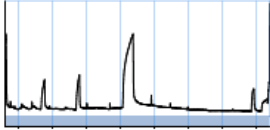
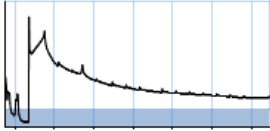

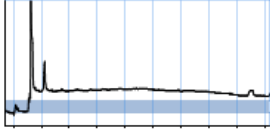
Download Date 2/5/2010 12:00 AM - 2/12/2010 8:00 AM SAST

Trip Number	Start Date SAST	Container Load Depot	Grower	Commodity	Container Number	Vessel Name	Mean Temp °C	Std Dev	Length (days)	Graph
<a href="#">3476916361</a>	1/24/2010 1:39:13 AM	HEXKOEL	0301	GR	PONU4801060	MOL CULLINAN	0.1 ± 0.9	16.5		
<a href="#">3476916360</a>	1/23/2010 3:47:59 AM	HEXKOEL	0004	GR	MWMU6386067	MOL CULLINAN	1.1 ± 0.8	17.3		
<a href="#">3473906616</a>	1/21/2010 9:06:46 AM	HEXKOEL	0004	GR	MWMU6334443	MOL CULLINAN	1.8 ± 0.2	18.1		
<a href="#">3473906647</a>	1/20/2010 3:09:51 AM	HEXKOEL	0004	GR	MSWU0042928	MOL CULLINAN	0.6 ± 0.6	20.3		
<a href="#">3473906447</a>	1/22/2010 3:46:19 AM	HEXKOEL	0146	GR	MWMU6419670	MOL CULLINAN	0.1 ± 0.6	17.3		
<a href="#">3476916367</a>	1/24/2010 1:11:18 AM	HEXKOEL	0414	GR	MSCU7428663	MSC MARINA	0.2 ± 0.8	18.7		

# Intuitive Reporting

## Shipment List Reports

Full access 24/7 via ColdStream® Reporting Portal - rapid access to key logistical and temperature information; unique user ID assigned for security purposes: trading partners only see their own applicable data

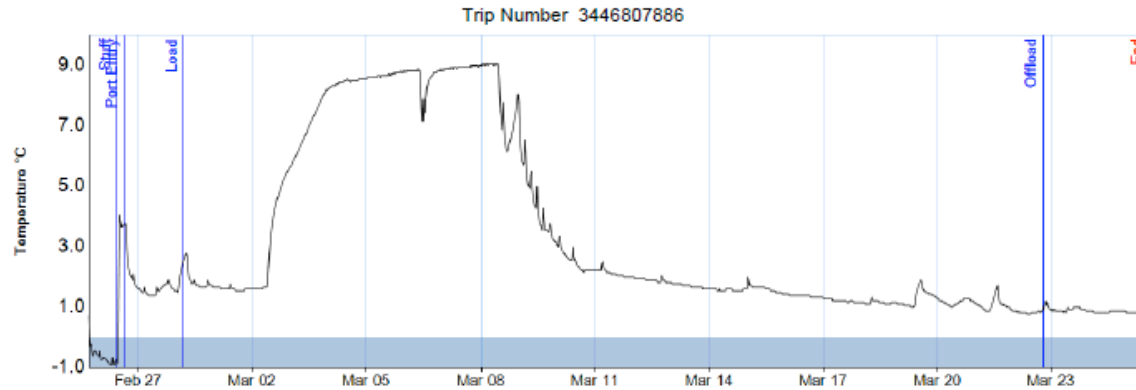
Trip Number	Start Date EST	Commodity	Carrier	Port of Load	Port of Discharge	Container Load Depot	Container Number	Vessel Name	Mean Temp °C	Std Dev	Length (days)	Graph
<a href="#">3419924806</a>	1/28/2010 7:24:01 AM	GR	SAFM	CPTIN	TIL	SAFTCFT	PONU4900520	DAL KALAHARI	0.2 ± 0.2		20.8	
<a href="#">3473904837</a>	2/2/2010 9:45:37 PM	GR	MRSK	CPTIN	RTM	HEXKOEL	MWCU6561529	LARS MAERSK	1.2 ± 1.4		23.3	
<a href="#">3419924880</a>	1/29/2010 6:59:52 AM	GR	MSC	CPTIN	RTM	SAFTCFT	CRLU1194909	MSC LORETTA	1.2 ± 0.9		20.1	
<a href="#">3434820296</a>	1/20/2010 9:33:12 AM	GR	MRSK	CPTIN	TIL	GOUDAFF	MAEU5773192	MOL CULLINAN	0.4 ± 0.1		19.9	
<a href="#">3419924025</a>	1/23/2010 10:01:55 AM	GR	MSC	CPTIN	RTM	SAFTCFT	CHIU9053986	MSC MARINA	0.7 ± 0.7		19.0	

# Customized Reporting Available

## Segmentation Reports

Complement Shipment Detail Report with segmentation data and condition by segment.

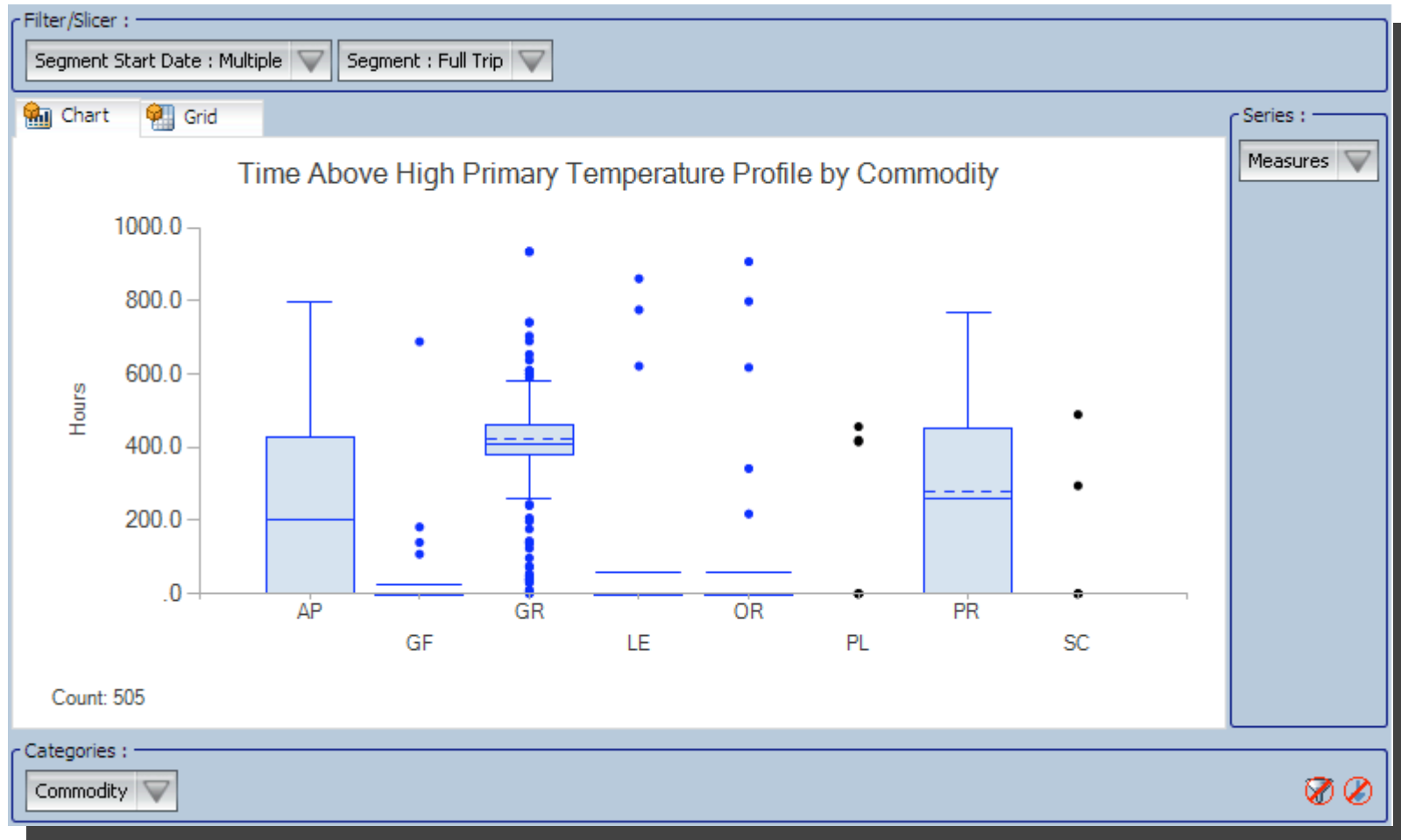
### TempTale Shipment Detail



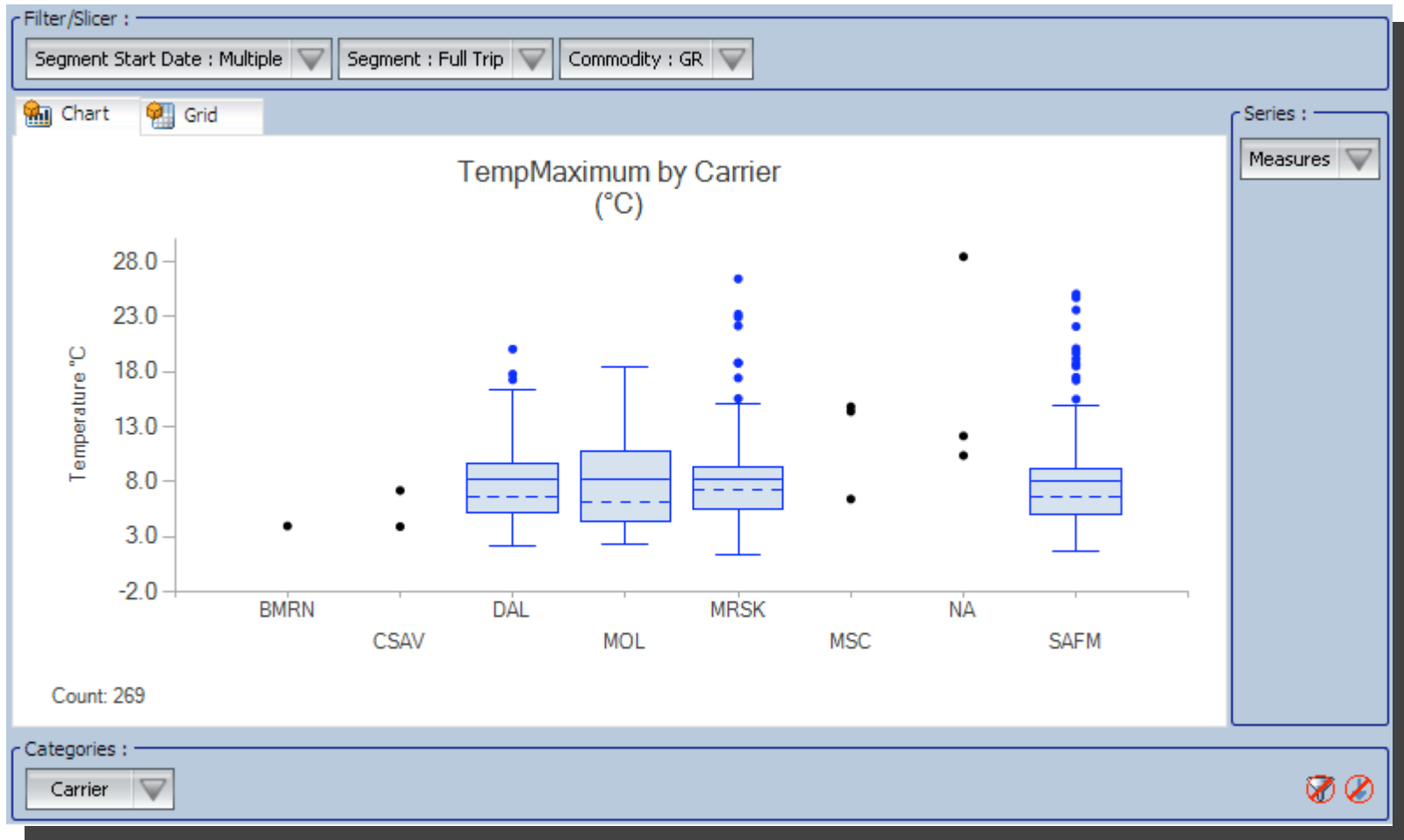
Commodity	PL	Serial Number	3446807886
Variety	ANG	Monitor Start SAST	2/25/2009 4:59:28 PM
SSCC	160091600150523515	Monitor End SAST	3/25/2009 1:59:28 PM
Grower	0028	Length (days)	27.9
Container Number	MWCU6527205	Mean Temp °C	3.1 ± 2.9
Carrier	DAL	Min / Max Temp °C	-0.9 / 9.1
Vessel Name	MAERSK BENTONVILLE	Hours Below -1.0 °C	0.0
Vessel Number	290059	Hours Above 0.0 °C	651.0
Agent	DFEU		

Sub Segment Name	Actual Start SAST	First Point SAST	TT Length (days)	Actual Length (days)	Mean Temp °C	Std Dev	Min Temp °C	Max Temp °C	Hours Below -1.0 °C	Hours Above 0.0 °C
1 Intake to Stuff	2/18/2009 1:00 AM	2/25/2009 4:59 PM	0.7	8.4	-0.6	0.3	-0.9	0.7	0.0	0.5
2 Stuff to Port	2/28/2009 10:28 AM	2/26/2009 10:29 AM	0.2	0.2	2.2	2.2	-0.9	4.1	0.0	3.5
3 Port to Load	2/26/2009 3:00 PM	2/26/2009 3:29 PM	1.5	1.5	1.8	0.5	1.4	3.8	0.0	37.5
4 Load to Offload	2/28/2009 4:56 AM	2/28/2009 4:59 AM	22.5	22.5	3.5	3.0	0.8	9.1	0.0	542.0
5 Offload to Stop	3/22/2009 6:49 PM	3/22/2009 6:59 PM	2.8	2.8	0.9	0.1	0.8	1.2	0.0	67.5

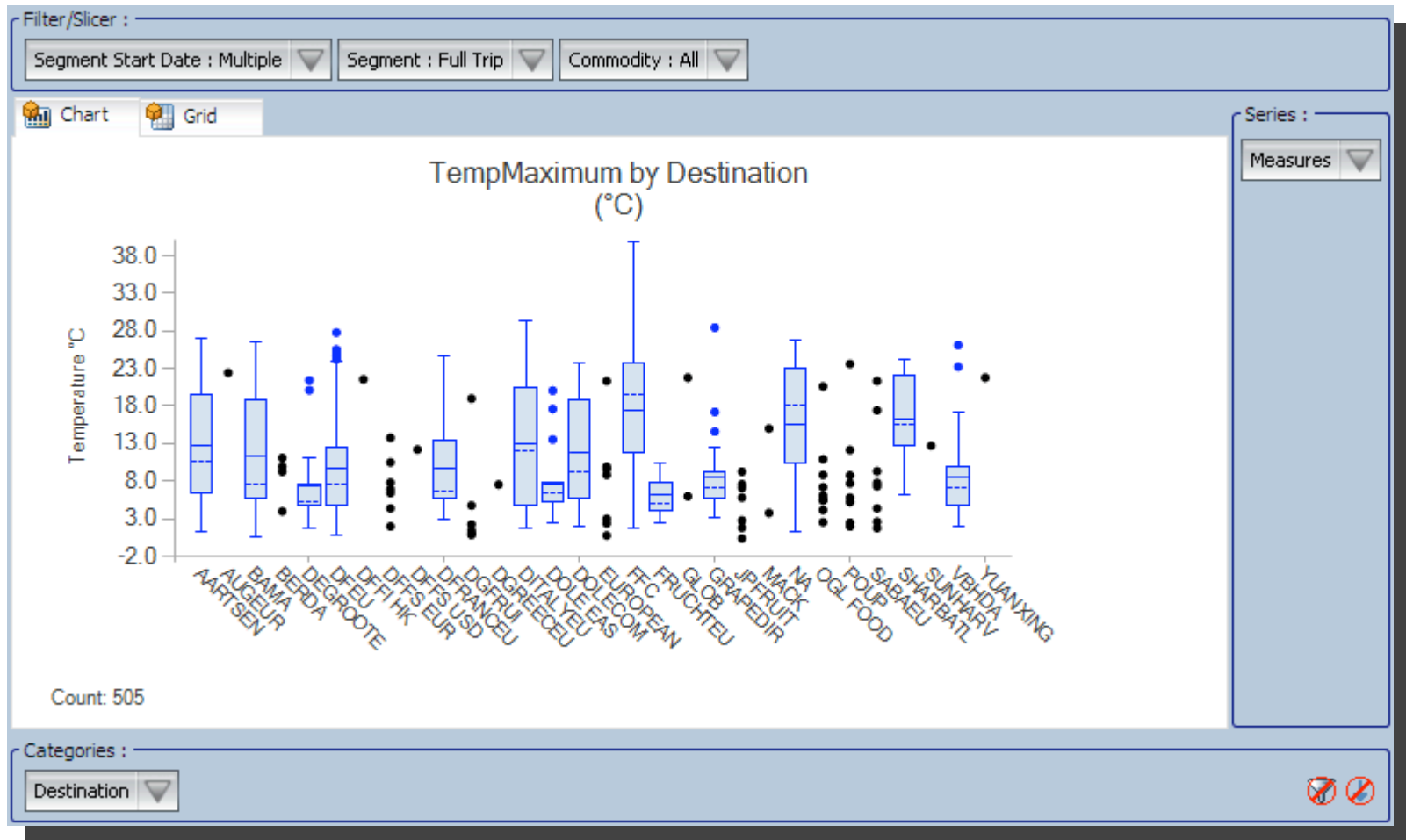
# Analysis by Commodity



# Analysis by Carrier by Commodity

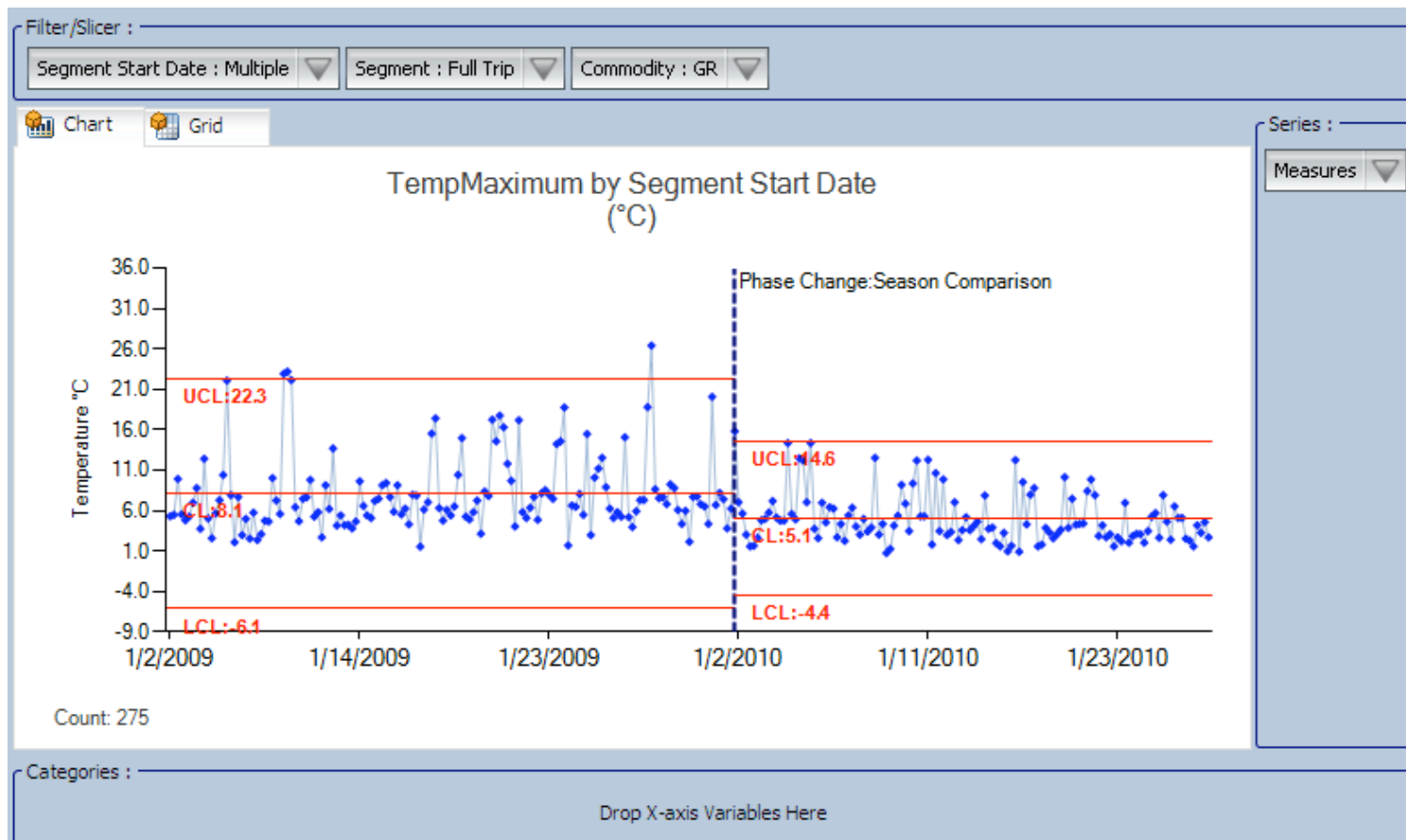


# Analysis by Receiving Location



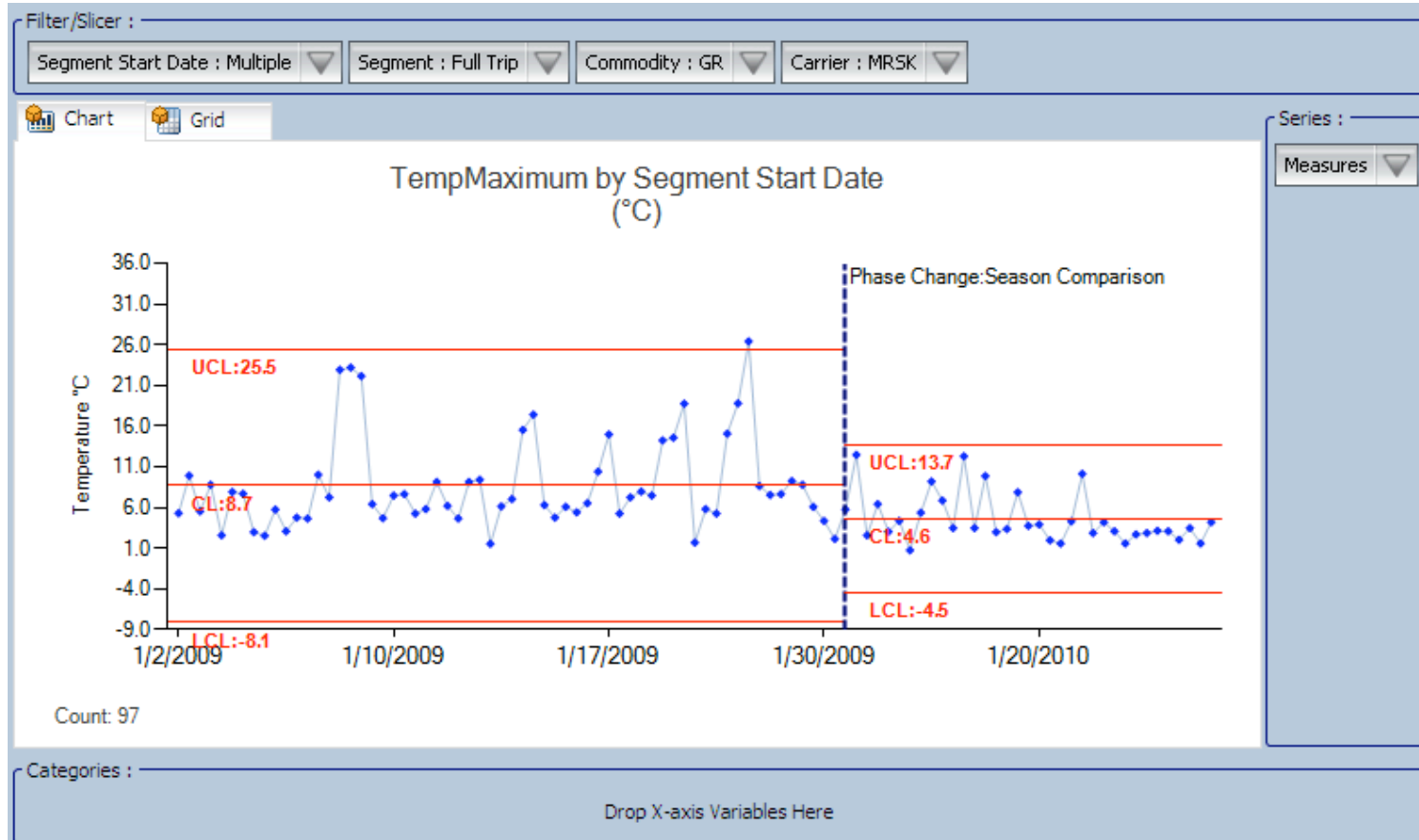
# Results – by Commodity

Comparing January 2009 to 2010: 3°C reduction in maximum temperatures for grapes; dramatic improvements in consistency



# Results – by Carrier

Comparing January 2009 to 2010: 4°C reduction in maximum temperatures for grapes from one carrier; amazing improvements in consistency



# The value of 3% - Which would you buy?



“Brown Stemming” due to temperature abuse

# Supply Chain Tech in the Produce Industry

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**A global business involving multiple trading partners and vendors**

**Business relationships are seasonal**

**Data sharing is essential to drive value**

**Technology vendors must be well adapted**

- **Global presence**
- **Low tech footprint**
- **Low start up and support costs**

