



Routine fresh produce supply chain monitoring – making the most of your data

The convergence of two recent advances in technology: the evolution and spread of wireless communications networks and the miniaturisation of sensor technology, have led to the availability of small, inexpensive, connected devices to monitor just about everything.

From smart TVs and watches to driverless cars, most new products realised in the past five years have integrated Internet of Things (IoT) technology. IoT, along with cloud computing are earmarked for the majority of technology investment dollars in the next five years according to an industry insights survey conducted by Euromonitor International.¹

Progressive businesses and industries around the world have been quick to capitalise on the advantages IoT technologies offer and supply chain logistics is no exception.

In the past, in-depth monitoring of fresh produce export shipments has largely been confined to those requiring temperature logging to meet importation requirements. Cheaper sensors and web-connected logging systems with the ability to measure everything from temperature and humidity to GPS location, gas concentrations and vibration have opened up the possibility to gain far greater insight into what is happening in every single consignment of fresh produce from farm-gate to plate.

The ultimate benefit of IoT technology and the primary motivation behind its development and rapid growth is the feedback-control relationship between sensors and infrastructure: the ability to detect the state of a device or environment and to initiate a control mechanism in response.

As established shipping infrastructure plays catch up with the digital technology driven revolution, shipping containers are being retrofitted with monitoring and control systems allowing direct manipulation of temperatures and gas concentrations remotely in

response to changing environmental conditions.

Until then, we have to rely on the post-hoc monitoring data alone to refine our understanding of what is happening in-transit with the aim of ‘doing it better next time’, this post-mortem approach that may address issues of claims against quality loss or non-compliance but does little to improve future consignments, particularly if the data is not readily accessible.

Even so, the potential for supply chain improvement through the analysis of monitoring data is huge, particularly when coupled with other sources of data and information such as dispatch documentation, shipping logs and QA assessments at market.

Inspecting temperature data and location data of completed shipments can help identify if too low or high temperatures contributed to quality issues, and where in the chain this might have occurred. Typically accessing temperature data alone would involve requesting access to strip chart recordings or physically retrieving a USB logger that had been placed into a shipment at despatch.

With access to real-time monitoring data, produce can be redirected to a new market as needed, while produce that may have reduced shelf life due to poor temperature management can be pushed through to retail as a priority, ensuring it reaches the consumer in optimum condition. This feature, combined with eliminating the cost of logger retrieval and reducing the risk of data loss has led to increased interest in real-time monitoring of fresh produce consignments.

As monitoring becomes routine and every consignment leaving a farm contains a monitoring device, the challenge then becomes how to efficiently and quickly access, interpret and respond to the huge amount of data generated.

This is where dashboards come into their own. Traditionally the province of space agencies and high finance, dashboarding has become the go-to method of presenting concentrated analysis and interpretation of high volume, high velocity and variable data.

Dashboards can present in real-time as well as historical data of various types within a single, interactive view, visually highlighting key points to facilitate rapid, strategic decision-making. Interactivity allows disaggregation and ‘drilling down’ into the data, allowing for further insight into trends and the root causes of anomalies, particularly as data is amassed over time.

In Figure 1, the monitoring data from several shipments of citrus from farm to market can be seen in a single view. Online, the dashboard would be interactive allowing the user to drill down into the data of particular shipments. For example, those destined for the Sydney market or those that had delayed cooldown.

One of the strengths of dashboards is that they are highly customisable; allowing the user to dictate the appearance and data presented to best suit their use case.

There are several software^{2,3} and online⁴ solutions to creating your own, customised dashboards and many companies more than willing to design and host innovative solutions to data management.

Many suppliers of temperature loggers already present monitoring data in dashboard format online. There may however, be a limit to how long they are willing to host the data on their online servers and while reports and data are available for download by the user, for rapid insight and decision making, nothing beats having your data in a consistent easily digestible form from the outset.

Logger suppliers that provide API (application programming interface) access allow your software or third party provider to download the data of each new

shipment automatically, combining it with existing data and rendering it in a readily accessible form to facilitate rapid insight and permit more in-depth analysis.

Each business will have unique concerns based on their particular use case. A customised dashboard can directly address known supply chain issues and present new data in a readily consumable visual form leading to new insights. In the words of Ben Schneiderman: “Visualization gives you answers to questions you didn’t know you had.”

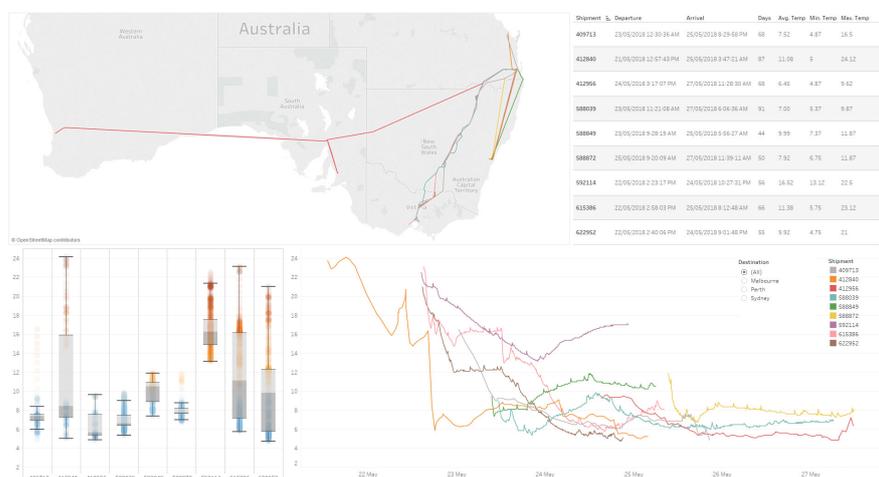
Tailoring a data management and visualisation solution to meet a fresh produce supply chain business’ particular needs, allows high volume data from a variety of sources to be integrated and presented to the end user in a platform that highlights critical data points, facilitating rapid, informed decision making. By engaging in real-time monitoring and high volume data analysis solutions now, businesses can make the most of the data generated today and be ready for the coming changes in technology that will inevitably lead to greater control of consignments in transit.

In summary:

- The availability of real time temperature and location logging offers opportunities for identifying and addressing issues in fresh produce supply chains.
- Transport companies are developing the technology to remotely control shipping conditions.
- Insights can be gained into supply chain issues and possible improvement opportunities through real time and historical data analysis.
- Dashboards are a solution to managing the velocity and volume of data generated through real time monitoring.

Bibliography

1. Michelle Evans (2018). Retrieved from <https://www.forbes.com/sites/michelleevans1/2018/05/31/iot-will-have-the-most-impact-on-business-in-the-next-five-years-survey-says/#2fd7f46f5a3d>
2. Tableau <https://www.tableau.com/>
3. PowerBI <https://powerbi.microsoft.com/en-us/>
4. The Dash <https://www.thedash.com/>



“If you can’t measure it, you can’t improve it.”
Peter Drucker

Figure 1. Tableau dashboard combining multiple shipments of produce.