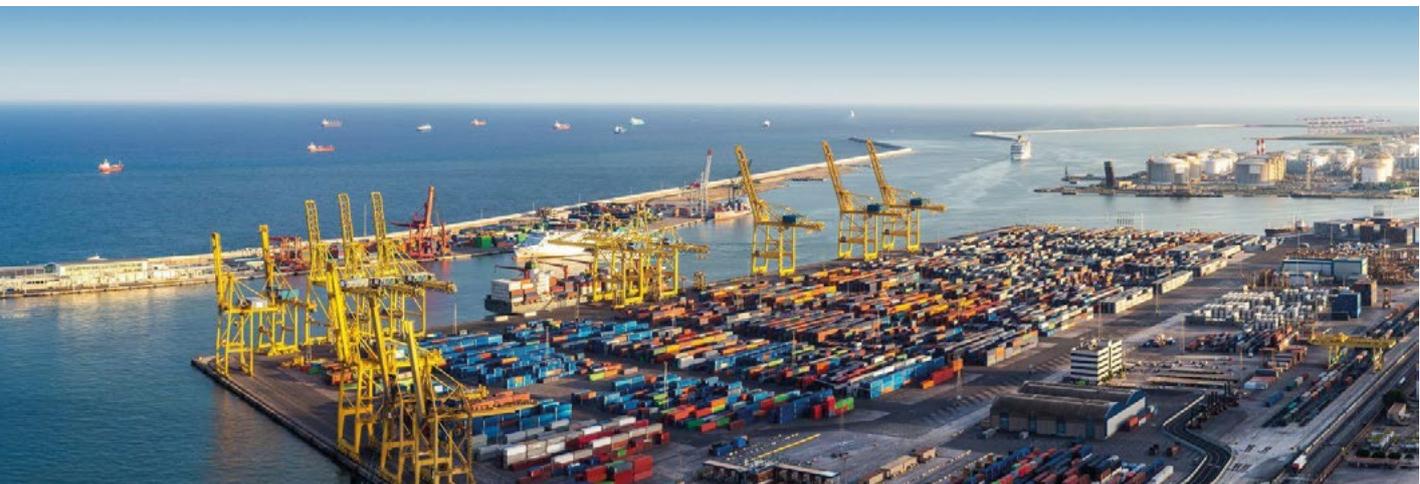


2L

[Label | Less]

The Digitally Autonomous Organisation



The following paper describes the basic mechanisms behind some of the E2E pillar concepts, including Simple Links (2016), TimeBinder (2017) and 2L (2018).



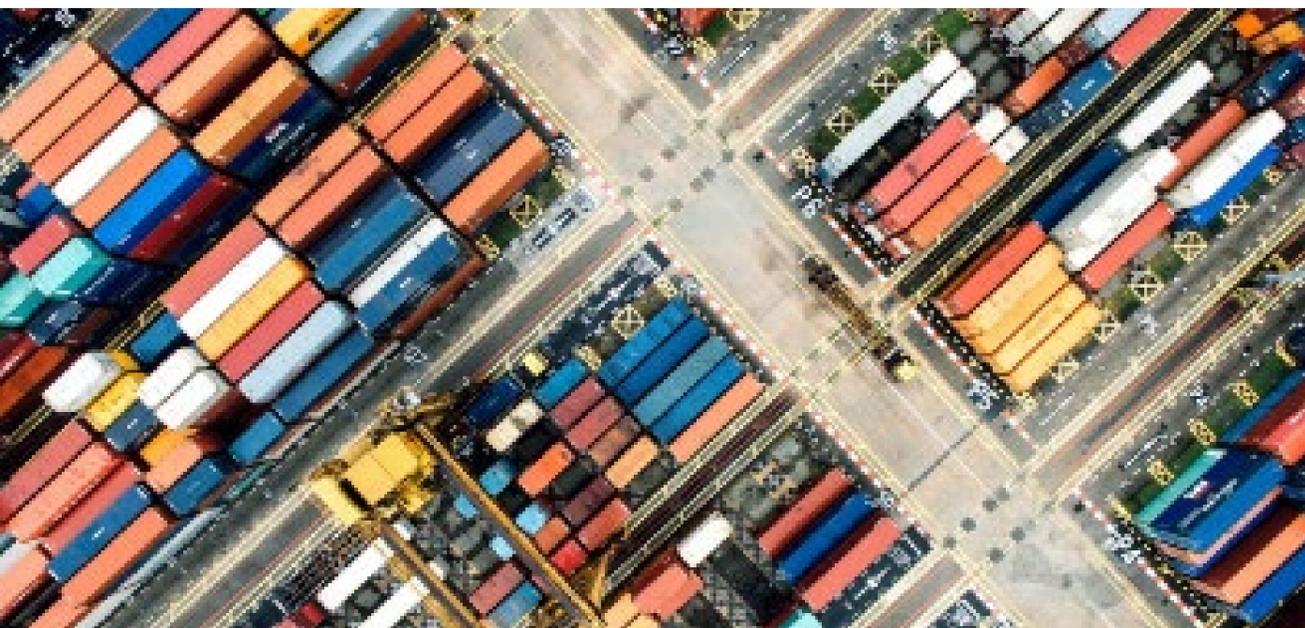
- Leaving tagging behind to move towards space management.
- Leaving events behind to move towards continuous management.
- Leaving limited search behind moving towards DataPorts.

1. Simple Links

2. TimeBinder

3. Label-Less

4. Autonomous Organisation





Simple Links Connecting the physical and the digital

The Simple Links concept foresees that objects exchanging URIs create a value net of meaningful data communication pipes and data highways. The key here is the seamless, fast and easy connectivity of digital and physical assets, like connecting an image to a product.

Simple Links common devices like mobile phones to connect two objects who have their representative avatar (better digital twin) in the cloud – no device attached. It additionally introduces the concept of logistic hierarchy: items

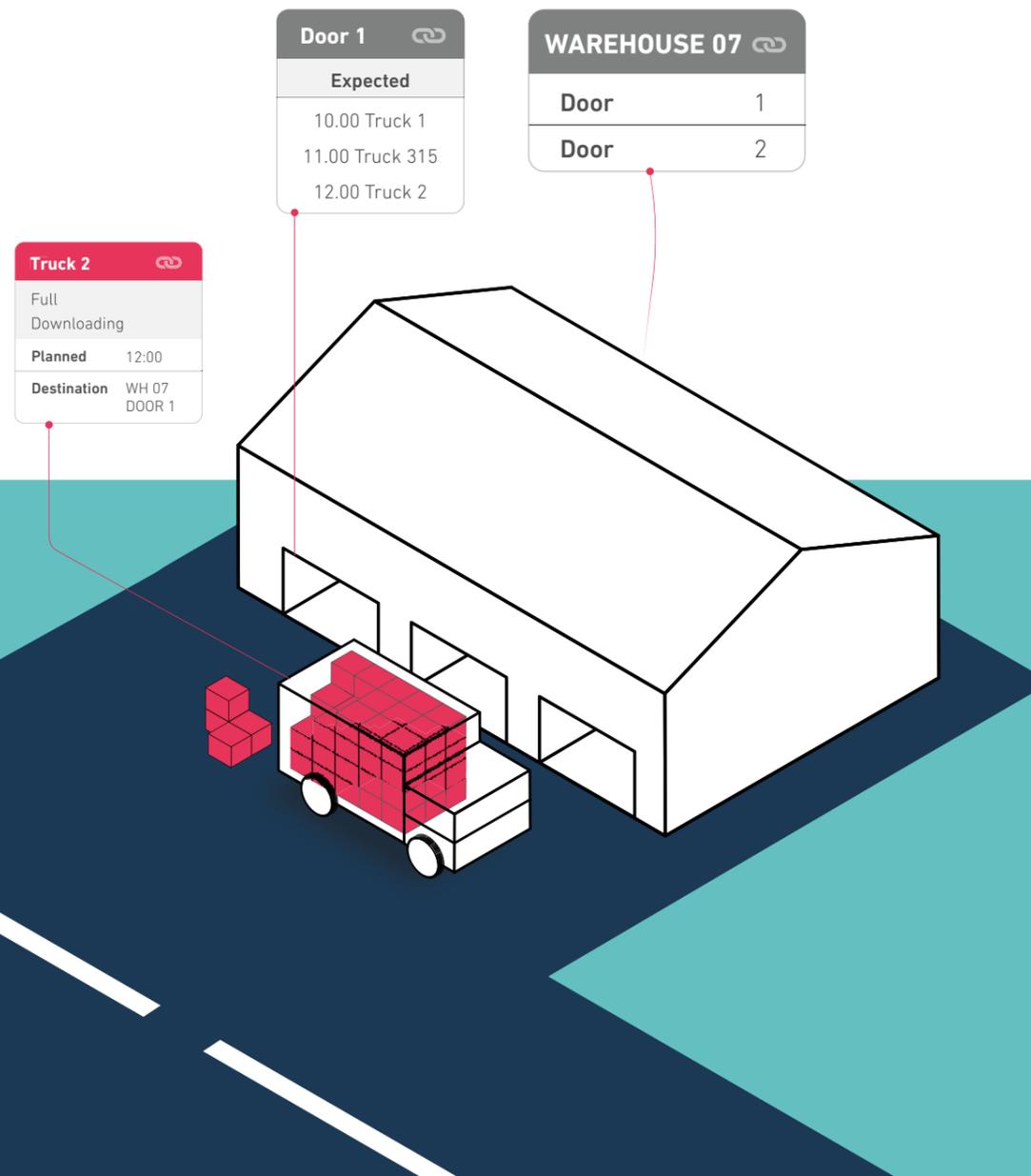
are either “inside/outside”, “separated/merged” when occupying the same space.

Example: A product is in a box. The box is on a pallet. The pallet is on a rack. The rack is in a warehouse, separated from other racks. This simplified framework allows

us to ‘structure’ the digital world in a similar way as we perceive the real physical world.

DataPorts, a bi-directional URI that enables Machine-to-Machine communication.

The communication between web-services (avatar) play a key role. Each webservice is accessible via and communicates through





TimeBinder

Making the digital reliable

Function 1

October 2017: E2E presents a new view on identification. This concept foresees the emergence of ID systems which can be verified assessing an item or digital asset like a simple links webservice. Standardisation will focus on tools and algorithms to scan and analyse an item.

- The perception that a passport number or social security number identify a person is wrong. Both are an aleatory 'unique' key to support the easy localisation and look-up in specialised and mostly proprietary centralised data bases of a document (passport, insurance document). The document in turn contains a group of additional data points (age, size, eye colour, picture, place of birth, gender, fingerprint, etc.) which in conjunction help to identify the person.
- If applied as outlined here, a brown and rotten banana will have a different hashtag assigned than a yellow one when scanned.
- We are talking the real, 'self-assigned' ID of products, which can be controlled at any given place and point in time.

TimeBinder Fulfills Two Functions:

- TimeBinder foresees that a set of standardised measurement tools and algorithms measure weight, senses consistence, volume, form, odours, colours, images and human readable printed information (picture), origin and ingredients (DNA sequence/frequency). These are data points considered immutable (ideally) over time. A classical example would be the one of calibrated scales. The weight of an item can be controlled at various points in time. TimeBinder adds the option to control the composition of an item at any given point in time.

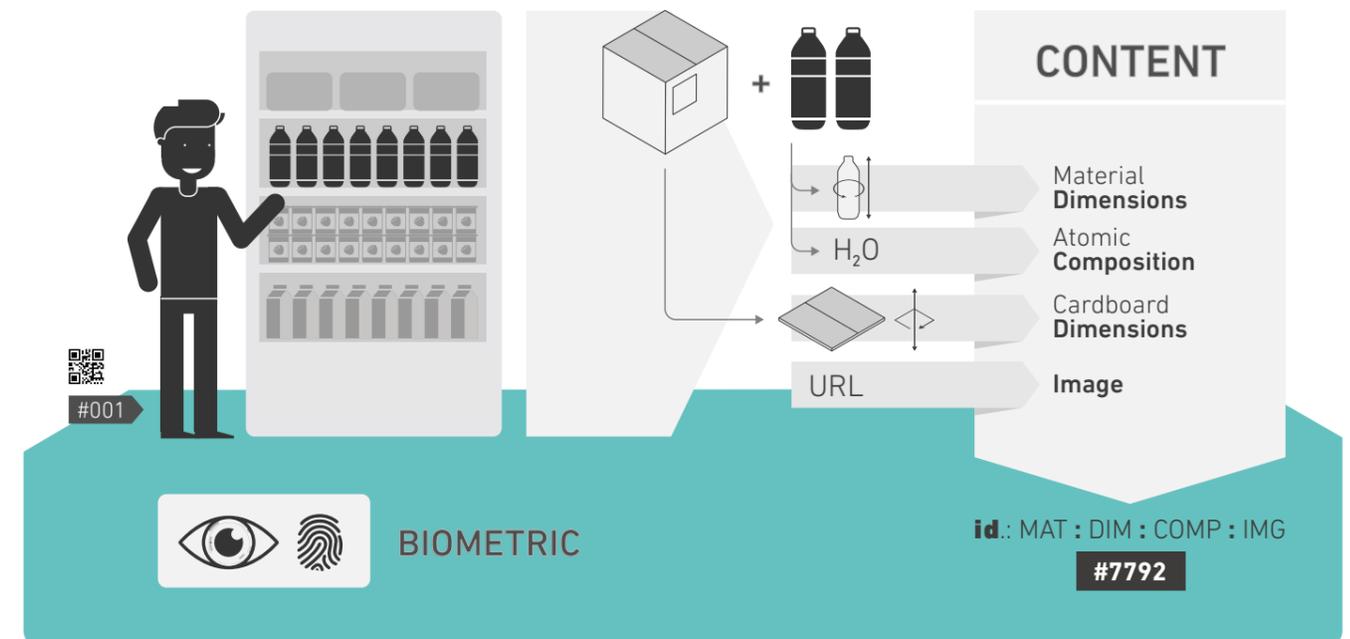
Function 2

- Make digital information provided reliable. Imagine a truck loading a pallet directly at the manufacturer's plant. The driver connects the truck's avatar (webservice) with that of the pallet exchanging the URI between both services via a mobile device. While connecting both assets, he is not copying data of the pallet, like content and state. When the truck delivers the pallet 3 days later he hands over the link to the receiving asset, which could be a distribution centre.

How can all involved be assured that the data provided through the pallet webservice (the content at the site the URI is pointing at) is still the same and has not been changed by accident or manipulated within duration of the 3 day transportation lap?

TimeBinder proposes to use a standardised algorithm to hashtag a data set or document. This hashtag is also called SimpleKey. Example: If the receiver (retailer running the DC) connects through a DataPort to the manufacturer and retrieves pallet data, the data sheet supplied should deliver the

same hashtag when supplied for the first time to the truck driver. This includes a process change: handover (URI exchange) of items is only executed if both business partners agree on submitting the same hashtag of a joint agreement. The joint agreement can be as simple as the PDF formatted Advanced Shipping Notice.



Label-Less (2L)

The continuum replacing events

Case Study

With Label-Less (2L), the supply chain moves from punctual scanning to continuous contextual witnessing in connected spaces. What does this mean?

2L assumes that the supply chain from producer to retail is channeled without gaps through networks of camera and/or sensor monitored aisles. A world of 'always on' microphones, ambient sensors and cameras surveying the flow of loading units and items throughout the supply chain.

What makes this possible is the fact that internet-connected cameras, sensors and tags are dropping in price, becoming 'smarter' and making new supply chain processes possible.

Example 1: In a production facility, the first bottle leaves the filling machine. A camera sees this and captures time, place, plus information it obtains from the filling machine. It combines this information to create the bottle's own webservice and generates the hashtag on the stored information. The camera will handle the URI and the hashtag over to the carton which will carry the bottle and will save the location of the bottle in the carton given the carton is labeled with fronttop images.

Example 2: Let us assume a camera is fixed to the interior roof of a truck that is able to see the empty storage capacity. It now gets the information that pallet 'xyz' enters the truck and in turn, this information gets through a registered device like the camera of the forklift driving into the truck. It identifies the pallet as a pallet (image recognition) and in augmented reality connects the ID 'xyz' to it. When deposited in a corner of the empty haul, the camera stores this information: it creates a new hashtag combining information on the place in the truck, time, temperature. These references are stored at the pallet's webservice. Now the next pallet is on-boarded and positioned next to the first one. Later pallets are positioned on top of it. Slowly, the camera can produce a 3D model of the truck interior load with IDs attached virtually.

Still, there is no label on any of these pallets. Cameras and sensors are able to identify them through their location (GPS, room coordinates, time).

When unloaded, the camera inside the truck will tell the camera on the forklift which pallet is currently unloaded - and its name (ID).

The forklift camera identifies the pallet it carries as a pallet and stores the assigned ID to it which the truck camera hands over. When it drives through the warehouse, the warehouse cameras identify the moving forklift and the pallet it carries, together with the ID 'xyz' all 'eye witnesses' obtain from the forklift camera.

All cameras together - especially the one tasked with monitoring the shelf rack the pallet is finally stored on - confirm that the forklift has stored the pallet 'xyz' at the right location and inform the ERP system.

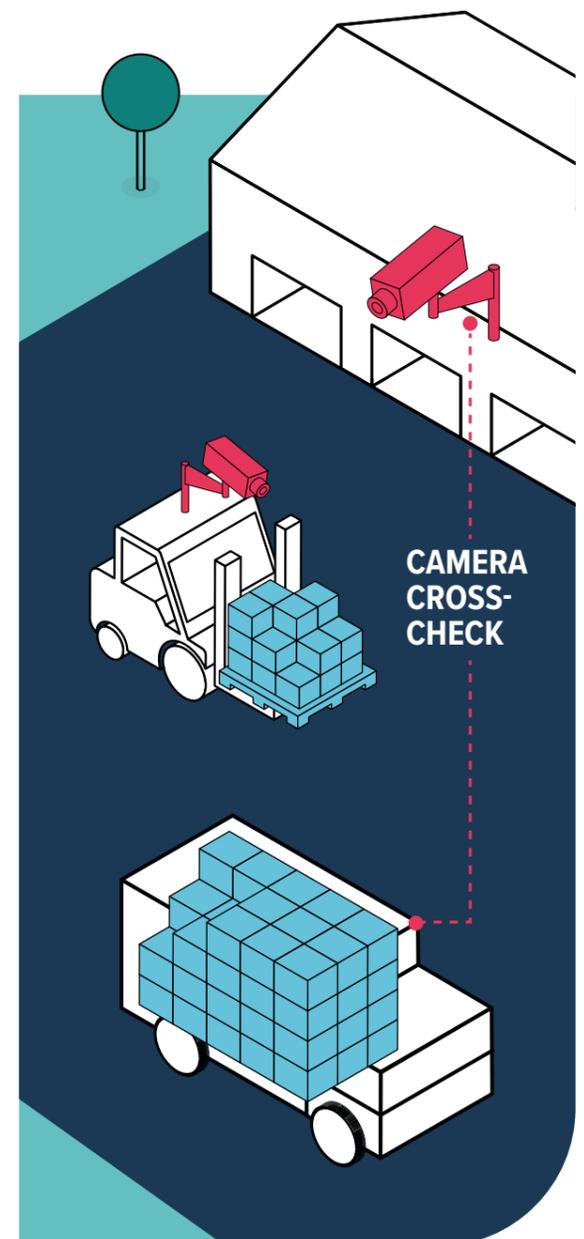
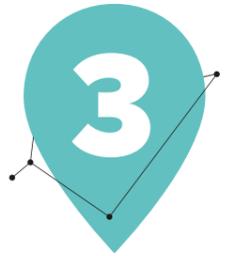
Contextual Witnessing

In addition to the cameras, a network of interconnected sensors and other internet-based data streams can support the movement of items through the supply chain.

This can be visualised as a network of smart devices wrapped around a 'pipe' through which products are moved. The "length" of a supply chain is measured not only in kilometers anymore - but with the number of tags which survey the trail of an item through the sensor tunnel mentioned above.

This can be environmental data like temperature, night or daylight, and speed, positioning/coordinates, traffic data, etc.

Thus, in an automated world characterised by the rising possibilities of the Internet of Things (IoT), fueled by more and more economically viable devices, items controlling and surveying 'the space' will be always 'on'. Augmented reality IDs of boxes, pallets and bags will be tightly linked to a live image, microphones (voice recognition), current GPS and other environment data. But none will need to bear a label - this is completely optional. Machines will manage the space, be it a rack in a warehouse or the upper shelf in a store. Means, software will maximise space turnover, utilisation, security. Software will compete against software maximising gains, comparable to AI in the financial sector.



Autonomous Organisation

Combined, the above concepts enable the setup of a complete 'Digitally Autonomous Organisation' (DAO).

A clear first candidate would be a retail store where cameras survey the back-store storage and know where each box, pallet or bag is stored.

The Power of Machine-to-Machine Cross-Checking

Different sensors play together to provide an optimised experience. They can identify the person that enters (face recognition), the box they open and the item taken out. A shelf can talk with the employee. The voiceover can be a comment from the staff saying something like 'taking out blue plastic figure' and cameras can certify the transaction.

Again, only if voice and camera confirm the witnessed transactions, related data is transmitted and stored.



Summary

Simple Links lays the foundation for inter-connectivity, providing all participants with the option to keep anchored to the moving items and read relevant sensor data, make decisions and inform results to other connected entities.

TimeBinder proposes a new set of IDs, namely the SimpleKey. It secures dynamic IDs of items, even allowing for items to change their ID depending on the need though always lining it to its origin(s).

2L - Label-Less proposes to use cross-check sensor input like cameras and microphones to confirm and seal transactions from machine-to-machine (example: autonomous forklift to autonomous truck).

Part of the identification and decision making will be outsourced to these devices which have become affordable.

Planning capacities will/can be outsourced to more powerful systems which have access to more information. A camera can identify that a shelf is only fitted with three bottles knowing that ten were filled the other day. But only the ERP might know that the re-ordering policy foresees to trigger a new load when only two bottles are left.

The machines will do the business. Machine-to-Machine. M2M.

About The Consumer Goods Forum

The Consumer Goods Forum ("CGF") is a global, parity-based industry network that is driven by its members to encourage the global adoption of practices and standards that serves the consumer goods industry worldwide. It brings together the CEOs and senior management of some 400 retailers, manufacturers, service providers, and other stakeholders across 70 countries, and it reflects the diversity of the industry in geography, size, product category and format. Its member companies have combined sales of EUR 3.5 trillion and directly employ nearly 10 million people, with a further 90 million related jobs estimated along the value chain. It is governed by its Board of Directors, which comprises more than 50 manufacturer and retail-er CEOs.

For more information, please visit:
www.theconsumergoodsforum.com.



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Innovation & Consult helps companies in the derivation of the digital requirements from the corporate strategy, which leads to a concrete digitisation agenda with clear statements, measures for business segments, market performance and functions. With the exact idea of the key processes, which are to be supported by digital technologies, the implementation is carried out. Once the implementation programme is clear, organisational structures and management processes (structures, sequences, interfaces, responsibilities) have to be adapted to the digitisation.

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