Tracking & Tracing

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Value creation through contemporary traceability

Vorráðstefna Vörustjórnunarfélags Íslands 7 maí 2019

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Agenda

- Setting the Scene - definitions
- The 8 attribute framework
- Industry 4.0 and applications on T&T
- Value creation
- What to come ?

T&T examples of purposes

- Fulfill the legal frameworks for production and distribution, e.g. food industry that traces where the raw material is coming and who the buyer is.
- Follow goods during transport and keep control of inventories.
- Guarantee of products and raw material origin, e.g. food, pharmaceutical and brand products.
- Ethical issues of production and logistics activities.
- Registration of ingrediencies/production for the purpose of evaluation of environmental impacts.
- Create internal traceability e.g. tools and resources.
- Guarantee effective recalls.
- Etc.

But have different applications in different industries

- Retailers
- Food sector
- Pharmaceutical
- Transport / Logistics
- Construction industry
- OEM producers in various industries
- Utility industry
- Government
- Service providers
- Etc.

Defining Tracking & Tracing

Track: The capability to follow the path of a specified unit and/ or lot of trade items downstream through the supply chain as it moves between trading partners. Trade items are tracked routinely for availability, inventory management and logistics purposes (*following the entity* on its way from A to B).

Trace: The capability to identify the origin of a particular unit located with the supply chain by reference to the records held upstream in the supply chain (*finding the entity* between A and B).

Tracking and tracing: linking up an object, moving from a consigner (A) to a consignee (B) through public space, with an information system.

A T&T system constitutes *the interface* between a physical transportation system and an information system.

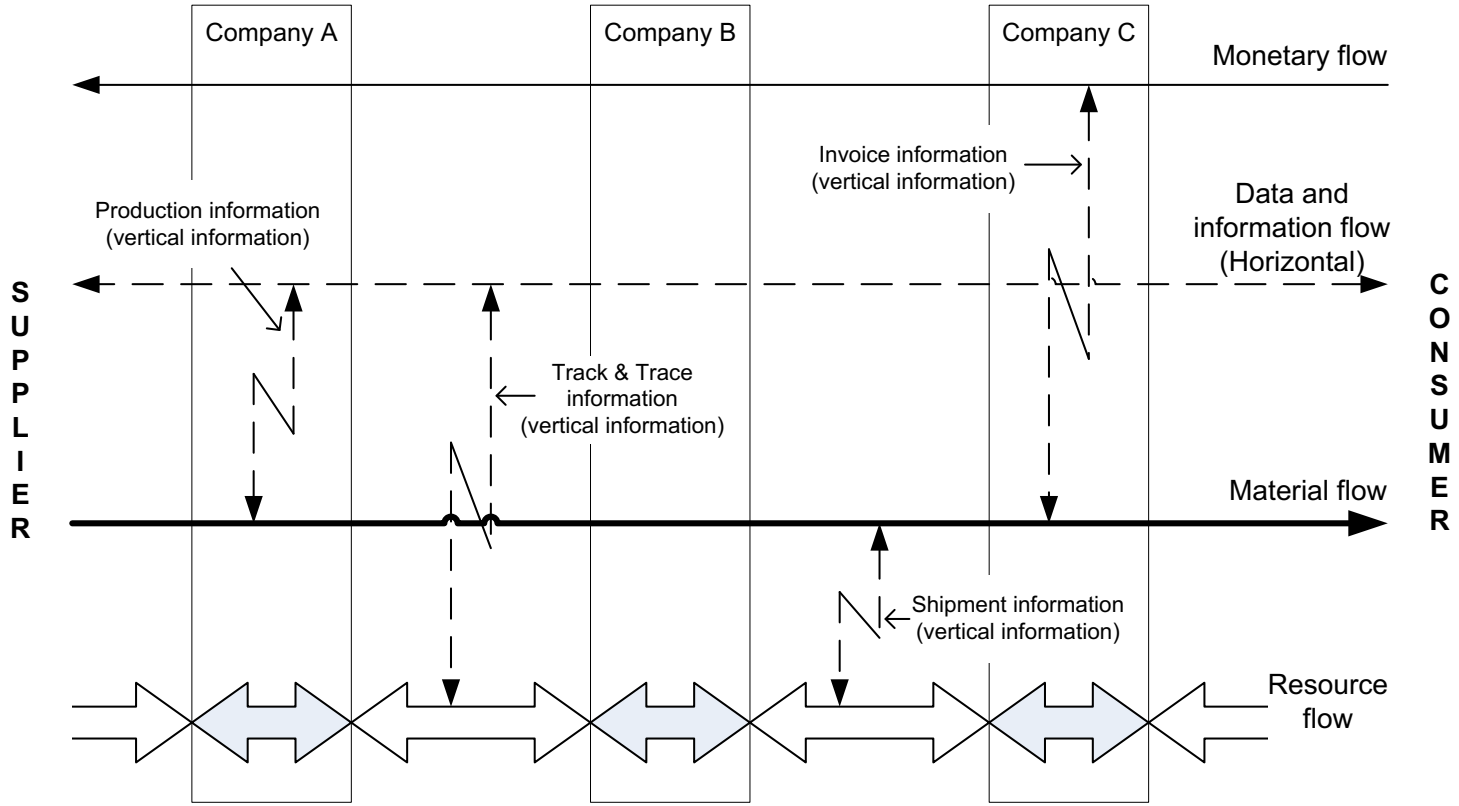
Defining T & T, cont.

Internal traceability / Vertical: Traceability within a company's own span of operations to track/ trace a product/ component (i.e. tracing of an object within an organization, company, or partner in the supply chain).

External, or chain traceability / Horizontal: Processes that take place between trading partners to track/ trace a product (i.e. tracing of an object between different organizations, companies, or partners in a supply chain).

Whole chain traceability: Vertical + Horizontal traceability

Track and Trace – the vertical and horizonal integration for Industry 4.0

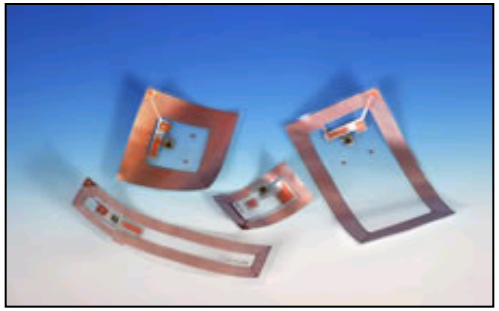


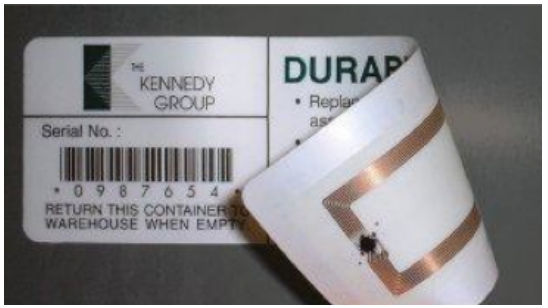
T&T - the 8 attributes

- Goods identification technology;
- Scope of the tracking and tracing systems;
- Registration timing and placing;
- Hierarchical level;
- Attributes recorded;
- Organization of the information system;
- Accessibility of the information system;
- Activity level of the tracking and tracing system.

Goods identification technology

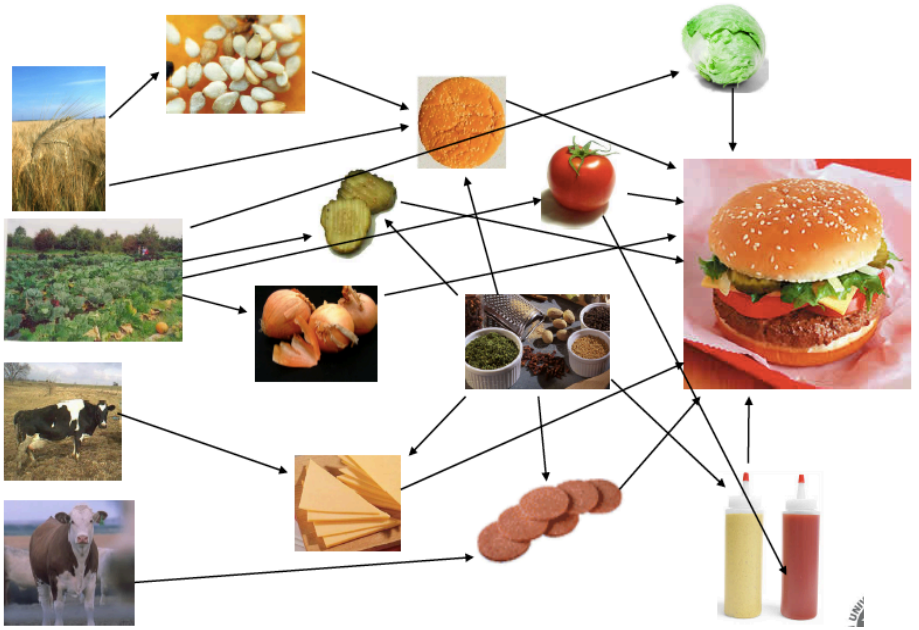
- Human readable text
- Bar- or dot-codes
- Radio frequency tags (RFID)





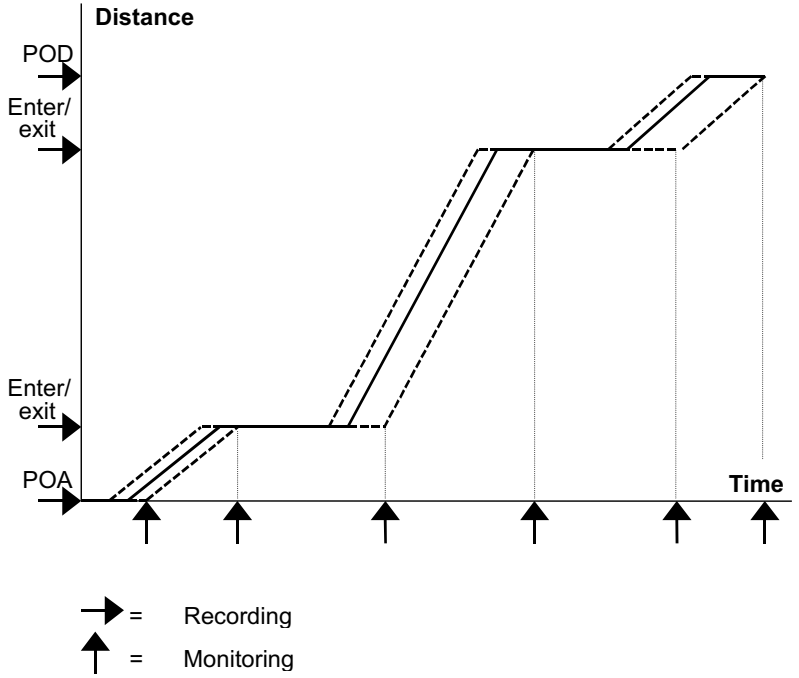
Scope of the T&T systems

- Transportation (transformation of place)
- Storage (transformation of time)
- Conversion process (transformation of form)



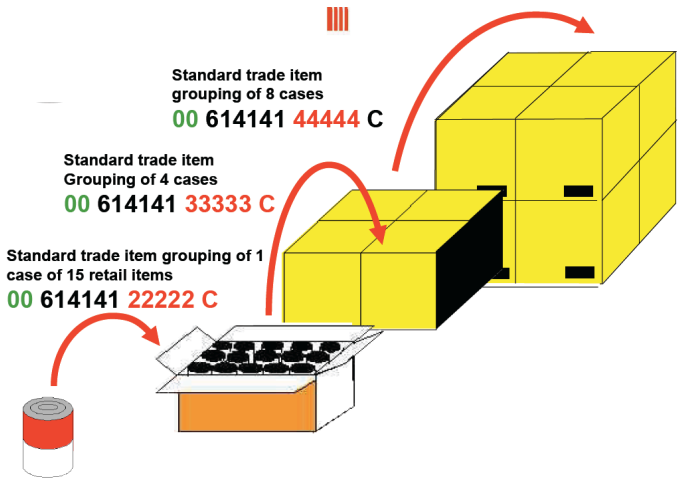
Registration time/place

- Various POA
- In-between, from one party to another
- Various POD



Hierarchial level of a T&T system

- The product units themselves
- A box cont. several products
- A large box with many smaller ones
- A container loaded with pallets
- A vehicle loaded with pallets / containers
- Several boxes, pallets, or containers together making up a shipment

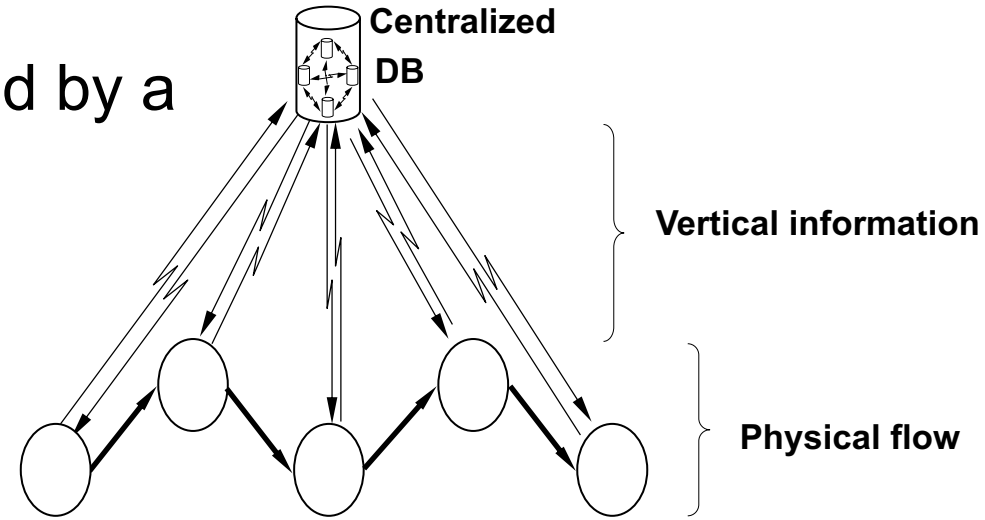


Attributes recorded in a T&T system

- The identity
- The current location
- The time
- The quantity
- The quality
- The status

Organisation of the information system

- Each partner
- One central system operated by the most powerful partner
- One central system operated by a third party service provider



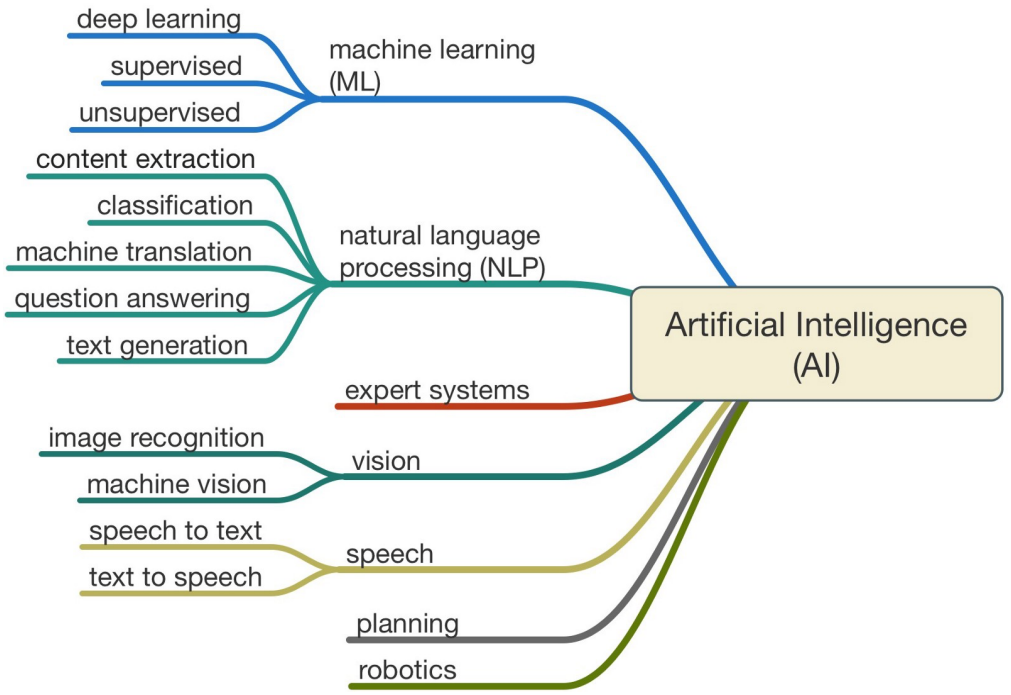
DB = Data base

Accessibility of a T&T system

- Non-automated
- Semi-automated
  - Automated
- Automated

Activity level of a T&T system

- A passiv system
- A semi-active system
- An active system



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T&T - the original

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Tracking and tracing: principles and practice

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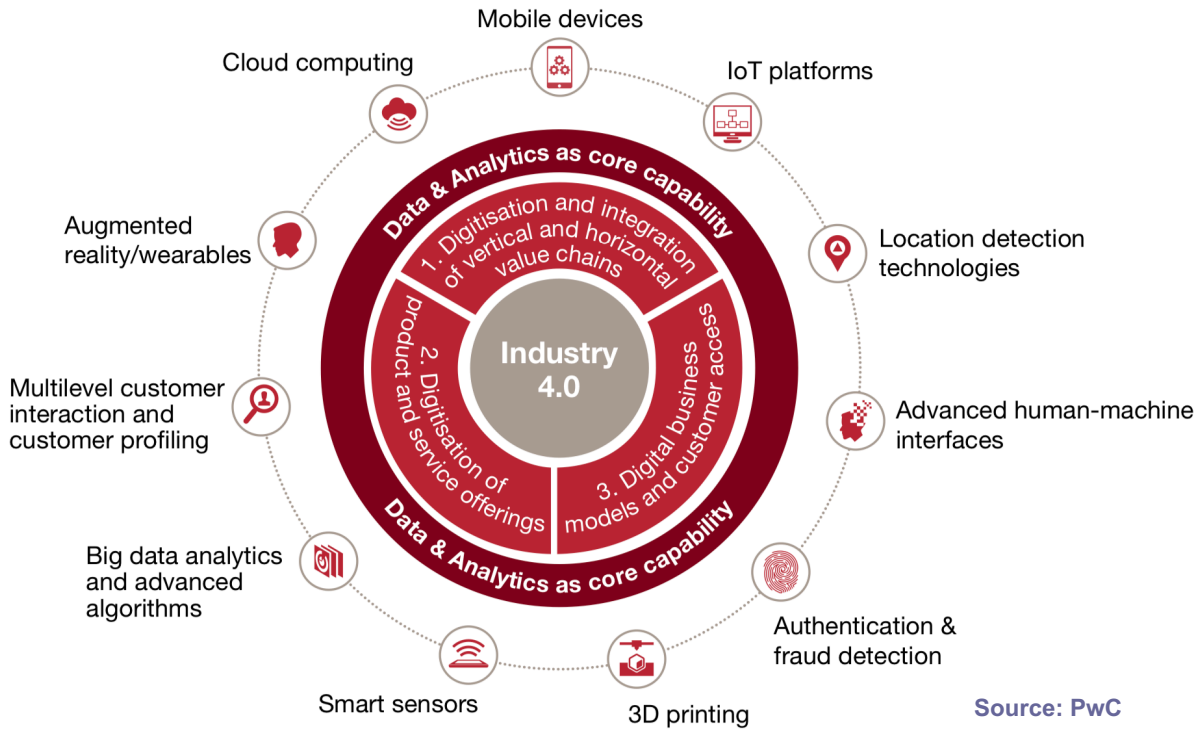
Abstract: The meaning of the concepts tracking and tracing is clarified, trying to avoid overlap and making them a complementary pair. Tracking and tracing systems are classified using eight attributes. Seven applications of tracking and tracing systems are analysed using these attributes. It is seen that most existing tracking and tracing systems are of a relatively simple type, but current plans and designs lead one to expect more advanced systems in the near future.

Keywords: Tracking; tracing; goodsflows; external logistics; transportation.

Industri 4.0

Digital transformation is the enabler! It includes:

- Big data
- Advanced analytics
- Augmented reality.
- Internet of Things (IoT)
- Artificial Intelligence (AI)
- Smart sensors
- Additive manufacturing (3D printing)
- Blockchain
- Cloud computing
- Etc.



T&T link to Industry 4.0

The T&T 8 attributes: / Industry 4.0 parameters:	Big data	Advanced analytics	Augmented reality.	Internet of Things (IoT)	Artificial Intelligence (AI)	Smars sensors	Blockchain	Cloud computing
Goods identification technology;			X	X		X		
Scope of the tracking and tracing systems;	X	X						
Registration timing and placing;	X	X						
Hierarchical level;				X	X			X
Attributes recorded;	X	X				X		
Organization of the information system;							X	X
Accessibility of the information system;							X	X
Activity level of the tracking and tracing system.		X	X		X			

T&T link to Smart sensors

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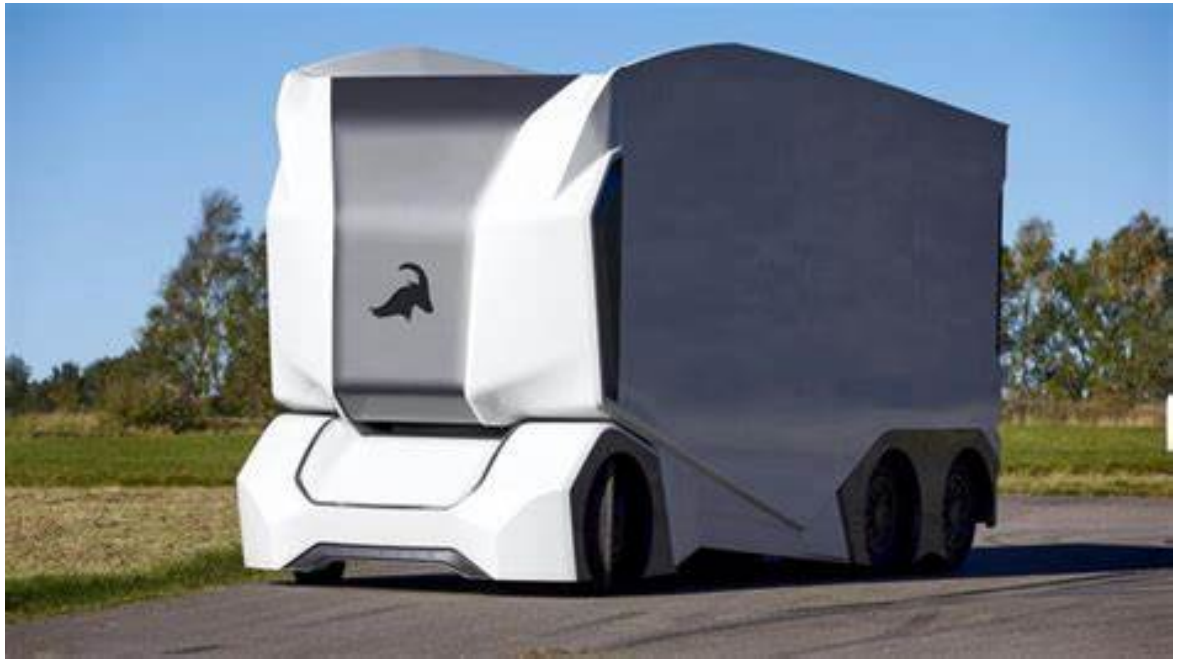
Goods identification technology;			X	X		X		
Scope of the tracking and tracing systems;	X	X						
Registration timing and placing;	X	X						
Hierarchical level;				X	X			X
Attributes recorded;	X	X				X		
Organization of the information system;							X	X
Accessibility of the information system;							X	X
Activity level of the tracking and tracing system.		X	X		X			

T&T link to Blockchain

The T&T 8 attributes: \ Industry 4.0 parameters:	Big data	Advanced analytics	Augmented reality.	Internet of Things (IoT)	Artificial Intelligence (AI)	Smars sensors	Blockchain	Cloud computing
Goods identification technology;			X	X		X		
Scope of the tracking and tracing systems;	X	X						
Registration timing and placing;	X	X						
Hierarchical level;				X	X			X
Attributes recorded;	X	X				X		
Organization of the information system;							X	X
Accessibility of the information system;							X	X
Activity level of the tracking and tracing system.		X	X		X			

… and even more futuristic



What to come ?

9:10	*Breaking through in a hyperconnected world* Robert Beideman, Chief Solutions & Innovation Officer GS1 Global
10:00	Kaffihlé
10:30	Hvernig mætum við upplýsingaþörf neytenda í breyttu umhverfi Valur Gunnlaugsson, sérfræðingur Matís
10:55	*Vision of* EndToEnd traceability in the icelandic fishing industry - Heildarrekjanleiki hjá íslensku sjávarútvegsfyrirtæki, dæmi um notkun IoT rekjanleikakerfis (EPCIS) Gagnalaug ehf, Douglas Hill project manager
11:15	Hvernig hindrar lyfjaiðnaðurinn sölu á fölsuðum lyfjum VISTOR, Gunnur Helgadóttir forstjóri
11:30	Rekjanleiki í byggingariðnaðinum, til að byggja visthús þarf áreiðanleika, rekjanleika og traust. BYKO, Finnur Sveinsson Umhverfisfræðingur
11:50	Samantekt Ráðstefnustjóri tekur saman efni ráðstefnu og rýnir í þær breytingar sem framundan eru Sigurður Hjalti Kristjánsson, sviðstjóri og ráðgjafi hjá Capacent

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