



Building Radio frequency IDentification solutions for the Global Environment

WP5 – Anti-Counterfeiting

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BRIDGE Webinar

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Counterfeiting

... is not limited to luxury watches and handbags
... its importance is world-wide recognized,
... and it has an increasing tendency

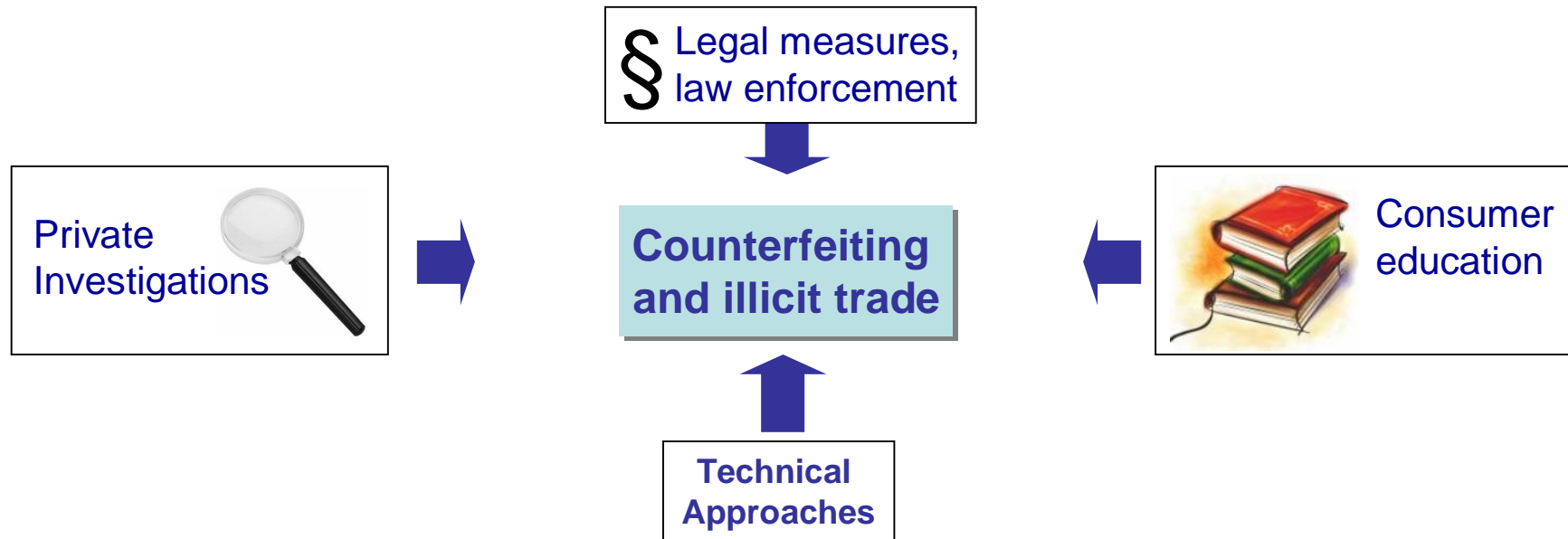


(EU 2006) EU/US Action Strategy for the Enforcement of Intellectual Property Rights, proposed at the EU/US Summit: June 21, 2006, Vienna/Austria

21 June 2006

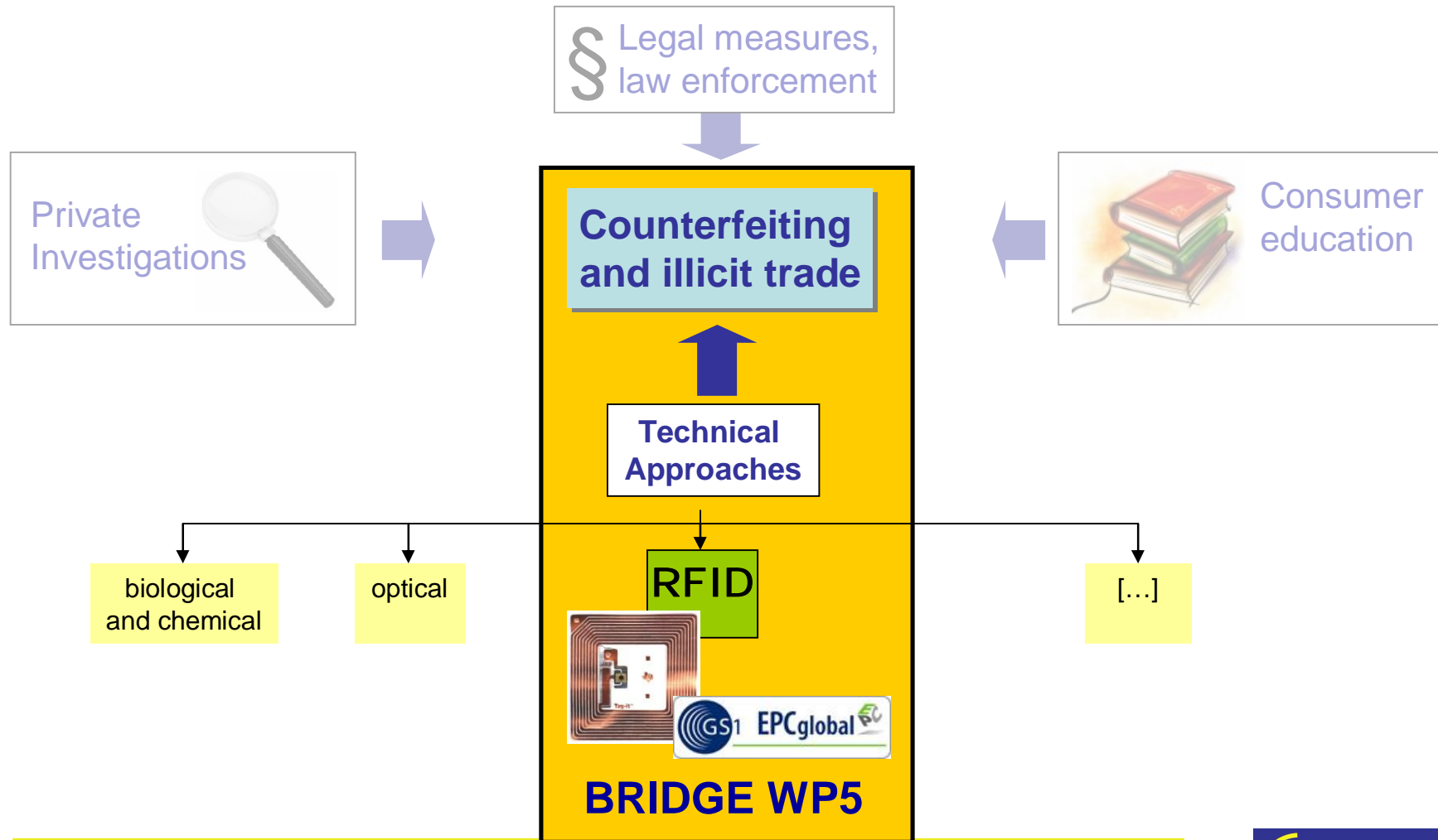


Measures against Counterfeiting





Measures against Counterfeiting

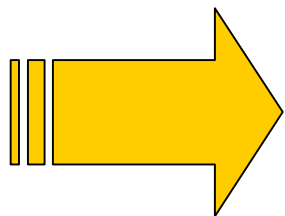




Why RFID?

Traditional anti-counterfeiting is highly efficient, but operation slow & costly
→ mass-testing impossible
→ e.g., customs only check 5-8% (DE, CH)

German Customs authority (2007): “Once the counterfeit product is between your hand, it’s easy to identify it as such.”
“What is difficult is to find out where to look – it’s like **searching the needle in the haystack!**”



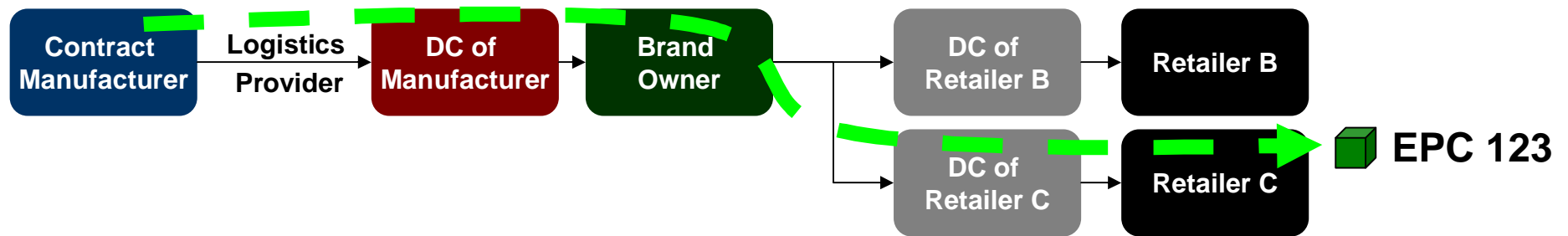
RFID trace-based anti-counterfeiting

- **automated operation**
- **leverage RFID investments** (passive, non-crypto RFID)



Product-trace based anti-counterfeiting

Our Approach



Physical Supply Chain

EPCglobal Network

EPC Events

Analyze **product trace** for counterfeit indications in each SC step



EPC 123

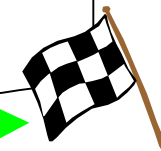
- At Manufacturer (CM)
- Manufactured at CM
- Shipped to DC of CM

EPC 123

- At DC of Manufacturer
- Received from CM
- Shipped to ...

EPC 123

- At Retailer C
- Received from DC of Retailer C
- Sold / killed





BRIDGE WP5 - Anti-Counterfeiting

Mission and Partners

Mission

Build **Product-trace based anti-counterfeiting solution**, using the EPCglobal Network Infrastructure

Goals

Protect licit distribution channels from counterfeits

- Increase detection rate of counterfeits
- Increase counterfeiters' risk of detection
- Lower profit margins

Partner

SAP, ETH, Special-Interest Group Anti-Counterfeiting (SIG)



Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich





Webinar Overview

- Problem with traditional Anti-Counterfeiting
- Idea behind Product-trace based ACF
 - Concept of Trace Analysis
 - Techniques for Trace Analysis
 - Conclusion
- Previous and Future Work of WP5



Recent Real-world Example

CF injection into licit distribution channels

Counterfeit USB-Memory Sticks

- 3+ brands affected
- 1GB actual memory, pretending 8 GB
- sold at retailers throughout Germany, Austria
- injected into licit SC on way from contract manufacturer to retailer, mixed with genuine products
- 15.000 counterfeited, 60.000 recalled

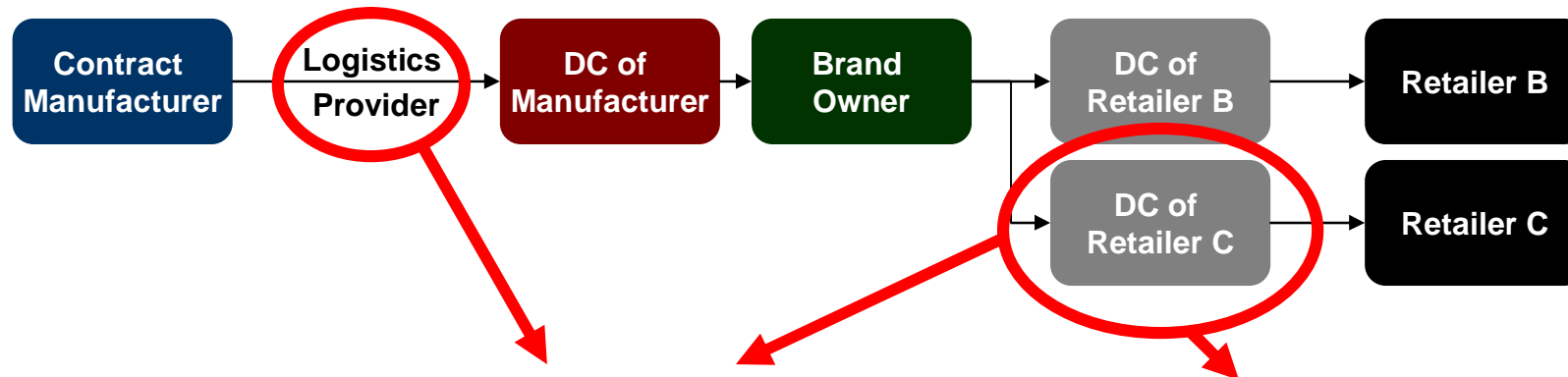


source (in German)
<http://www.heise.de/ct/tv/artikel/101787>



Example

CF attacks to licit distribution channel

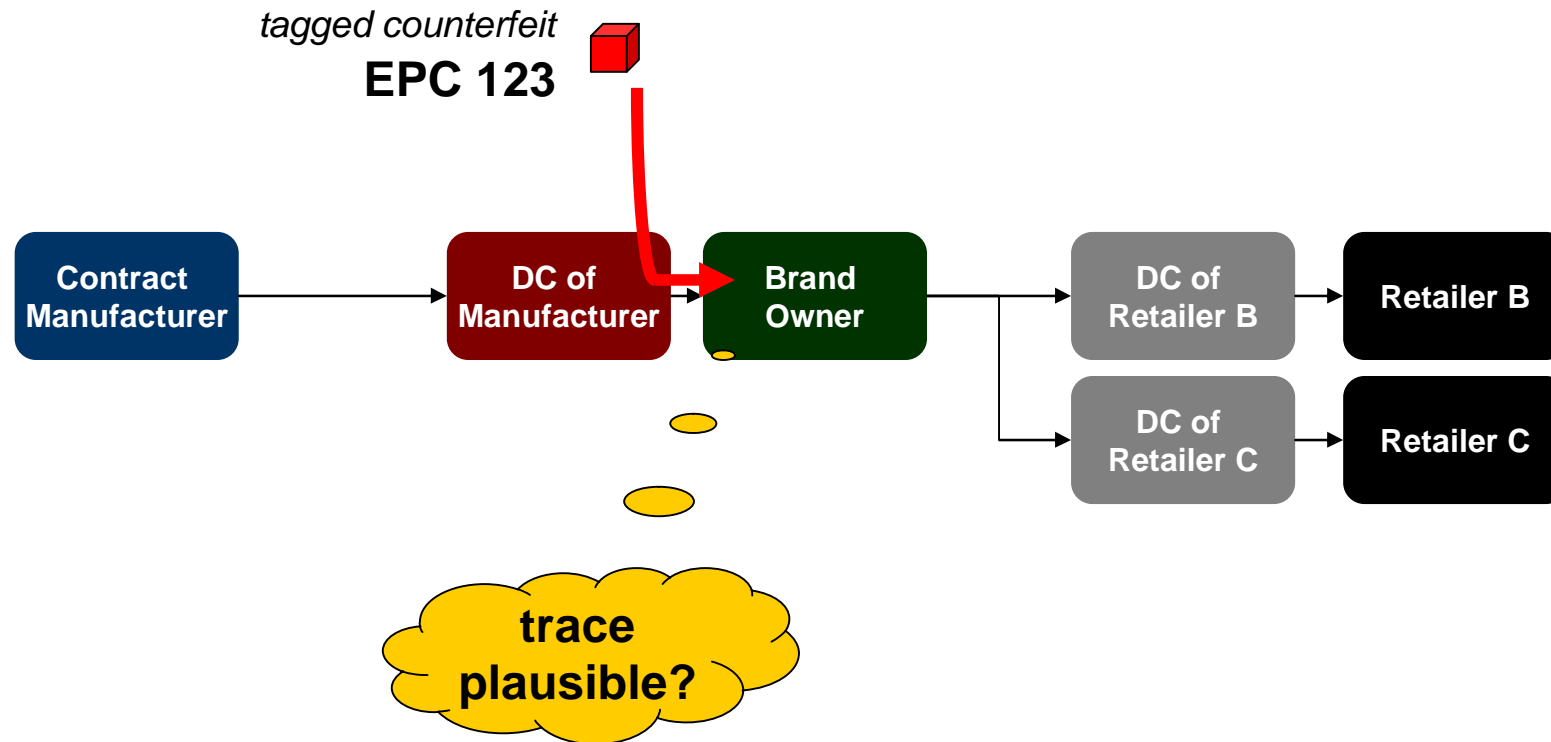


Attack Type Description	replace original product with counterfeit 	counterfeit injection
Business Case	Get original at price of CF to sell or keep	Sell CFs at price of originals: multiply sales
Scale	One-to-one ☹️	Mass counterfeiting ☹️



Detecting Counterfeit Injection

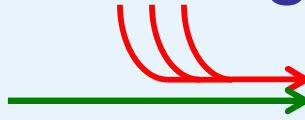
Trace Analysis (1/3)



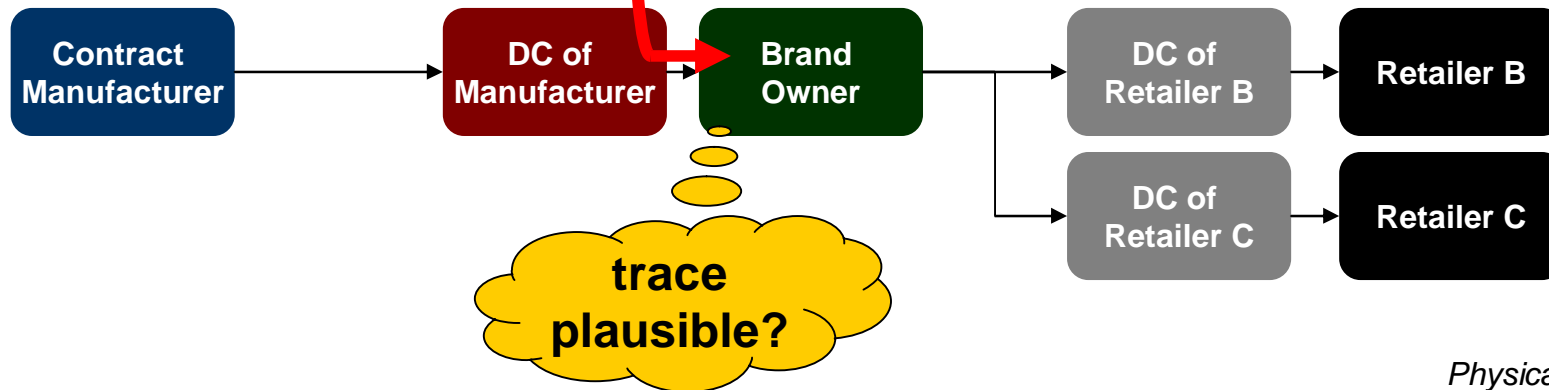


Detecting Counterfeit Injection

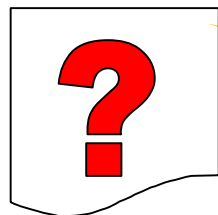
Trace Analysis (2/3)



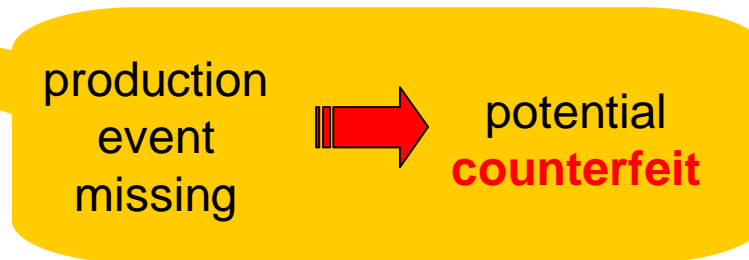
tagged counterfeit
EPC 123



Physical Supply Chain



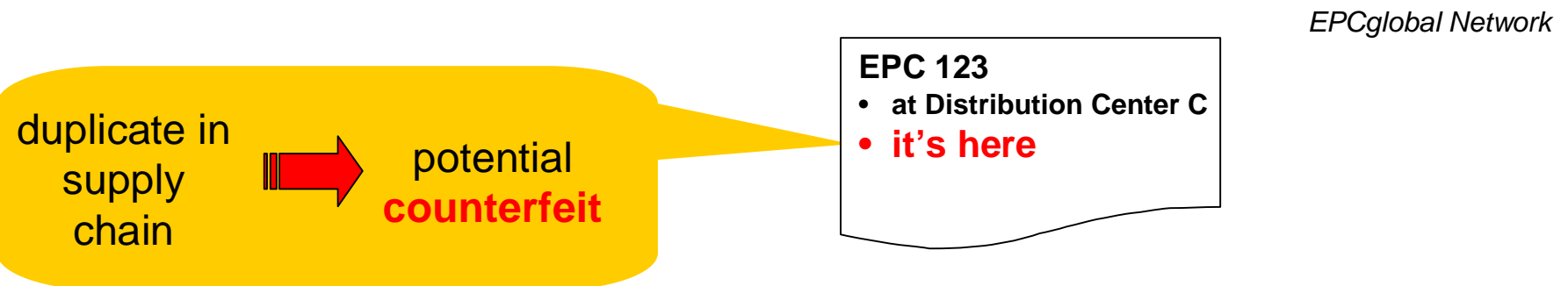
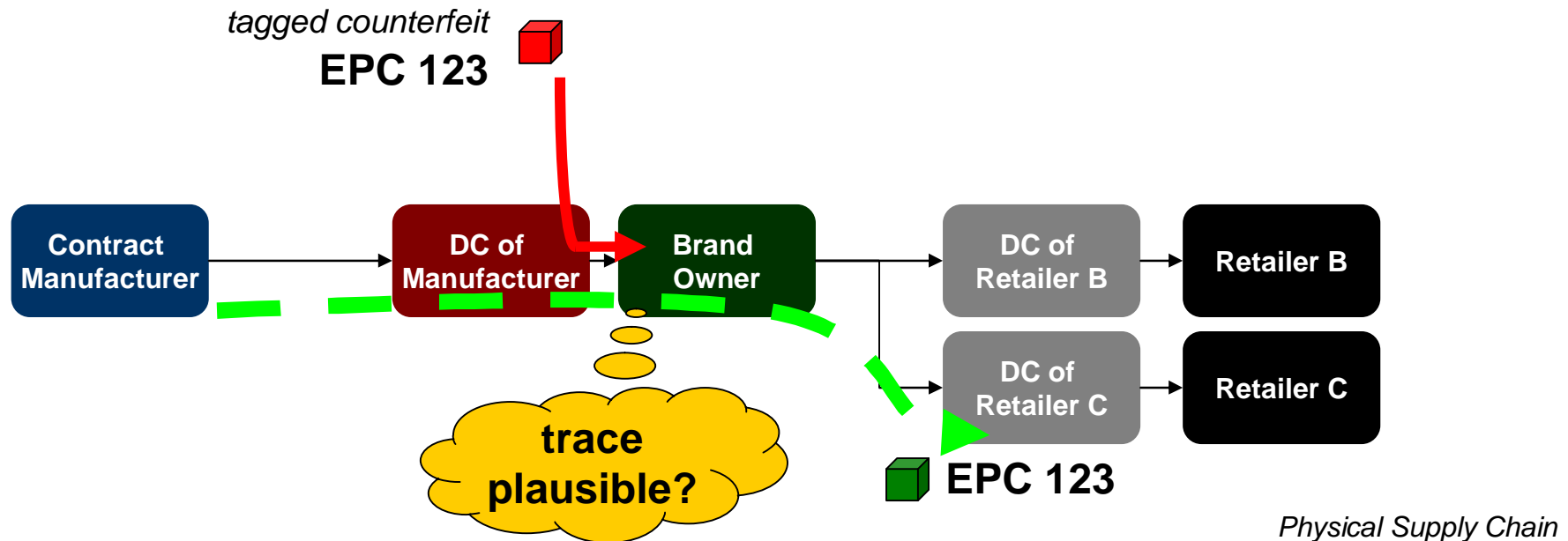
EPCglobal Network





Detecting Counterfeit Injection

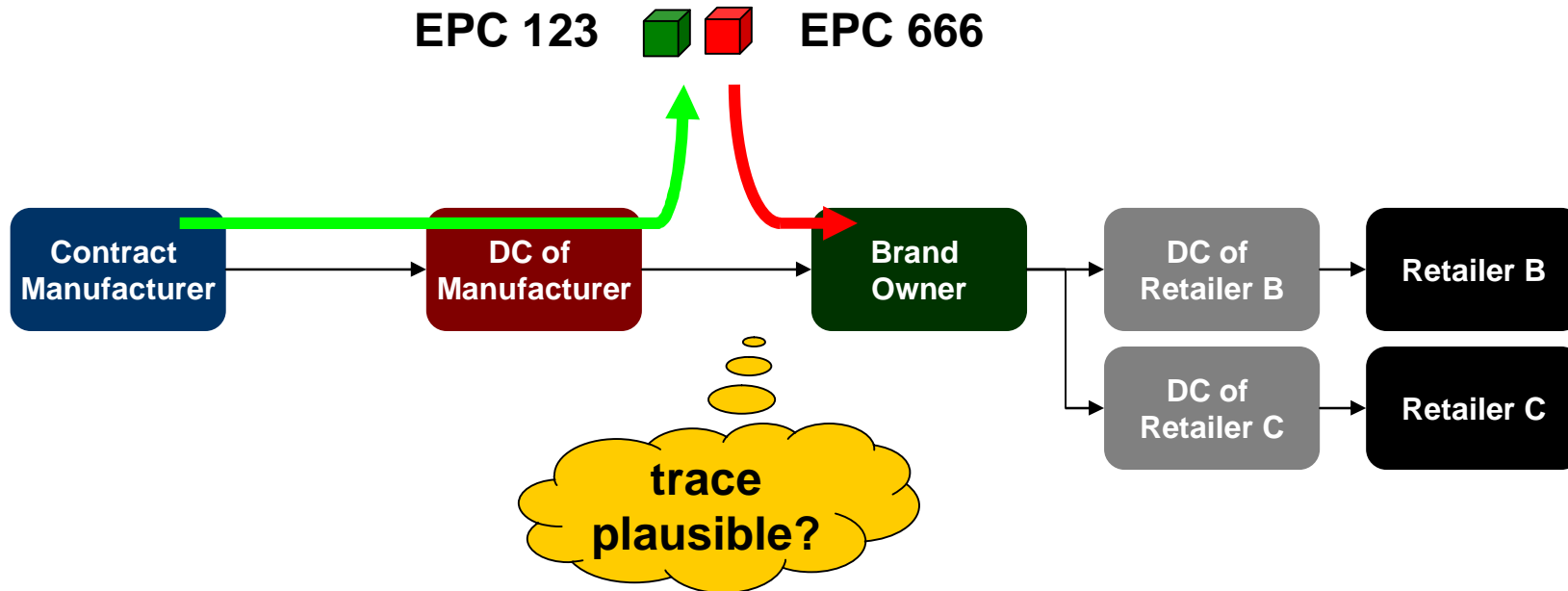
Trace Analysis (3/3)





Detecting Replacements

Trace Analysis (1/2)



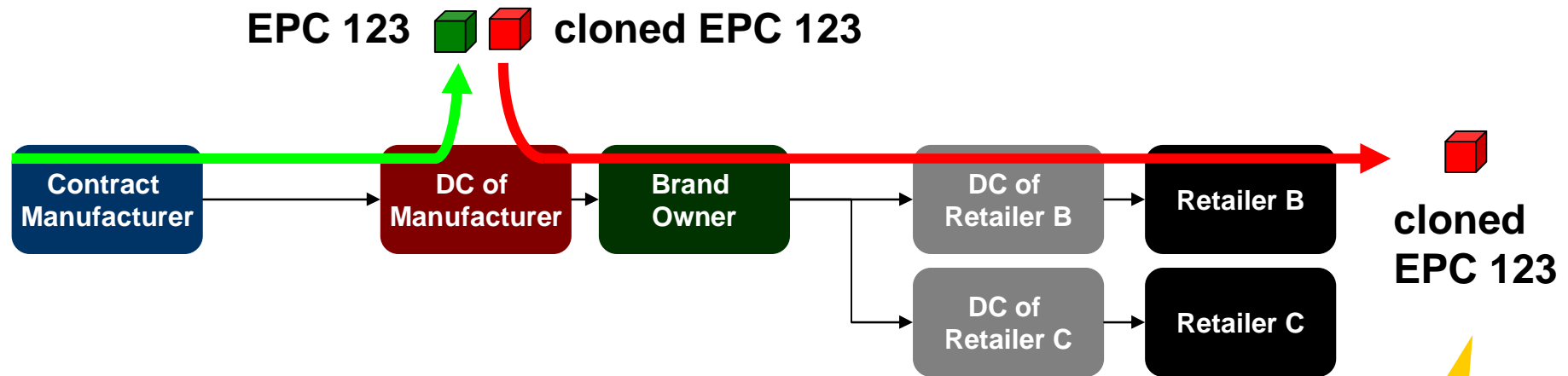
Replacement with different EPCs

- detected as counterfeit insertion (previous slides)
- e.g., no production event, duplicate EPCs, ...



Problem: Cloned Replacements

Trace Analysis (2/2)



Replacement with **cloned** EPCs

- trace indistinguishable from
- CF trace analysis: false negative

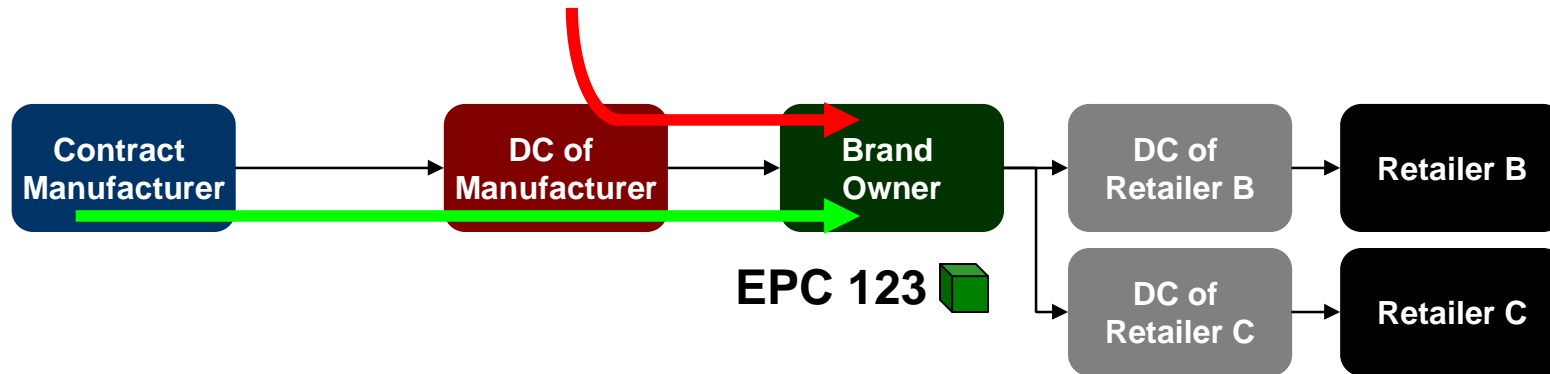
Trace looks OK,
but counterfeit



But: Duplicate Detection

Trace Analysis (2/2)

 cloned EPC 123





Take-home Message

Pros and Cons of Trace-based Anti-Counterfeiting

- **not 100% secure** (1-to-1 replacement)
- Protect licit supply chain from CF injection
- Increase counterfeiters' risk of detection
- Lower counterfeiters profit margins
- Leverage investments in RFID/ EPC technology
 - combining with other applications: Recall, Compliance, ...

Attack Type Description	replace original product with counterfeit	counterfeit injection
Business Case	Get original at price of CF to sell or keep	Sell CFs at price of original; multiply sales
Scale	One-to-one	Mass counterfeiting



Techniques for Trace Analysis

Building a Trace-based solution

Trace-Analysis Challenges

- data volume
- data sharing

Machine learning

- Prototype created
- Academic publication: *Probabilistic Approach for Location-Based Authentication*, M. Lehtonen, F. Michahelles, and E. Fleisch. First International Workshop on Security for Spontaneous Interaction, September 2007

Rule engine

- Prototype under development
- Demo at *Internet of Things Conference*, March 26, Zurich



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- **Previous and Future Work of WP5**



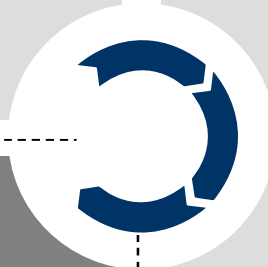
Previous and Future Work

***D5.1 Problem Analysis
Report (Dec 06)***

***D5.2 Requirements
Report (Apr 07)***

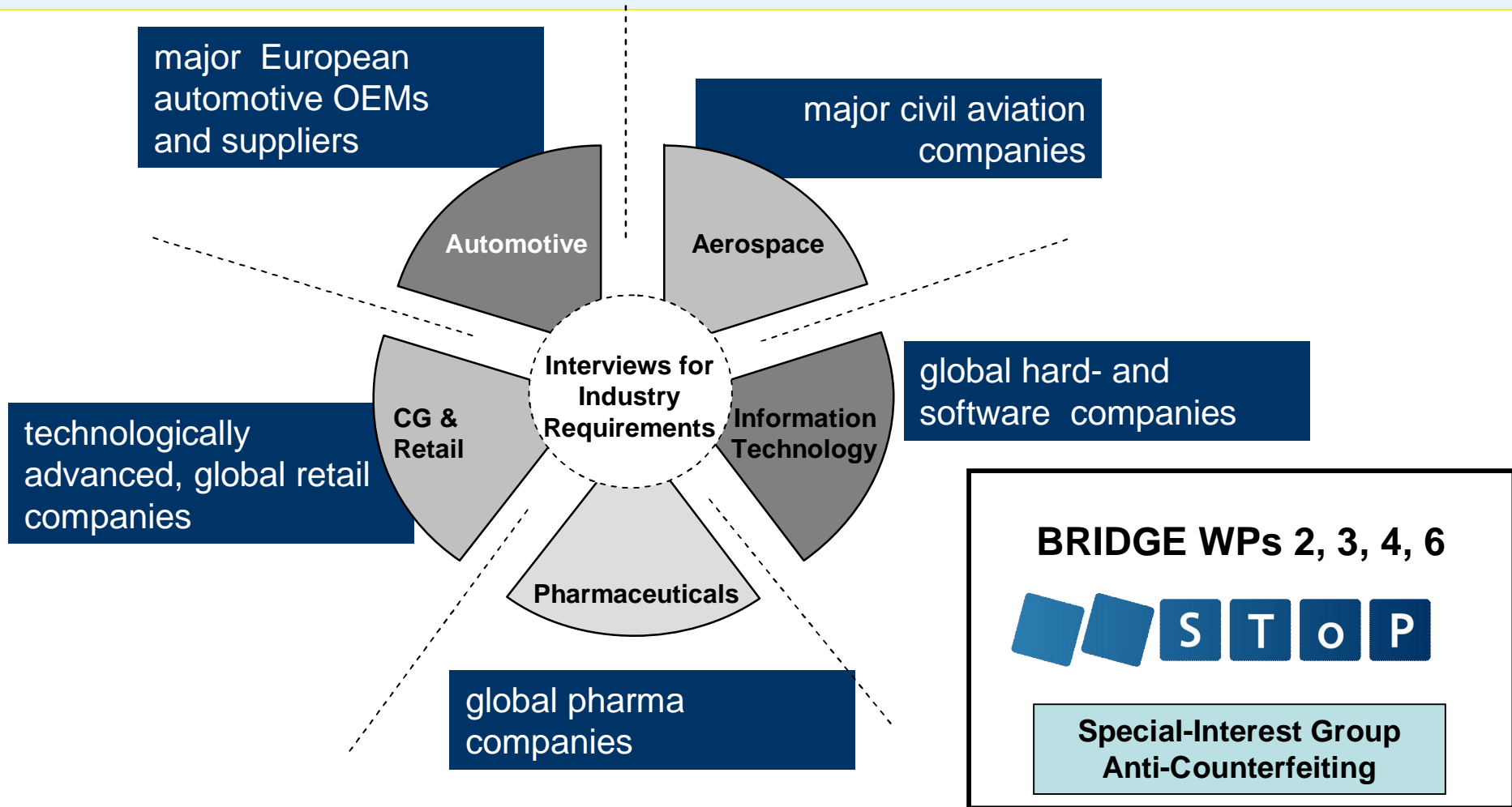
***D5.4 Prototype
Development and Report
(Jun 08)***

***D5.3 Business Case
Report (Dec 07)***





Collaboration & Interaction





Thank you!

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