**Zilliqa hackathon, King’s College, London, 6-7 October 2018**

**“Know your supplier”**

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| ***Nudge 1*** | * *Your challenge is to design a smart contract solution to support effective* ***traceability*** *of suppliers, goods and their constituent components from the* ***point of origin to final consumption or final user*** |

The smart contract solution **must** be suitable for the **traceability** of one or more of the following:

* Fruit, vegetables and livestock
* Precious metals and stones
* Oil & gas
* Equipment and manufacturing goods (eg car parts)
* Pharmaceuticals
* Technology products & components
* Luxury goods (eg fine wine, fashion clothing, etc)

**Core features**

Your solution should include data points as outlined below to prove the transparency and source of supply from point of origin through to consumption. You may choose as many of the **optional** data points below as necessary to deliver the solution.

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| **Data point** | **Detail** |
| **Organisational information** | Name, location, company ID, contact details |
| **Date and location of production** | Date and location the resource was picked, mined, born etc |
| **Product specification** | Weight, number, volume, quantity |
| **Quality** | Raw material, quality/grade |
| **Analysis and grading** | Rating, ranking, specification |
| **Storage** | Processing location and storage |
| **Sale** | Details or seller and buyer |
| **Shipment terms** | Type of shipment, temperature requirements, vehicle, time of departure and arrival |
| **Customs receipt** | Location, date, arrival, departure |
| **Delivery/Bonded warehouse** | Location, temperature, time of arrival/departure etc |
| **Manufacturing** | Repeat of previous information to trace how the raw material changes from source to end consumption eg through dilution/mixing/addition of substitutes etc |
| **Further production details** | For example detail of other goods produced/manufactured at that site for allergy/contamination purpose such as nut allergy, meat processing etc |
| **Final onward shipment to distribution warehouse** | Type of shipment, temperature requirements, vehicle, time of departure and arrival |
| **Warehouse to end consumption or user** | Type of shipment, temperature requirements, vehicle, time of departure and arrival |

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| ***Nudge 2*** | * *You should start by defining the sector you wish to focus on*   + - *What are the key 1-3 objectives of the design?*     - *What is the ‘****what*** *problem are we solving’ of your design?*     - *What is the ‘****how*** *are we solving it’ of your design?*     - *What are your success criteria for measuring how effective the solution is?* |

**Example objectives to be created by your team as core principles for your area of focus:**

* *Avoid fraudulent production of alternatives and ensure product authenticity (eg counterfeit pharmaceuticals, fine wine)*
* *Stop contamination of meats to avoid horse meat scandals, limit unnecessary livestock destruction in the event of CJD outbreak (instantly analyse meat and supply base data on a national level to identify the affected cases)*
* *Facilitate ethical consumer choice such as; buying petrol from oil companies with sustainable sources, buying meat and food produced by truly ethical suppliers, reduce the overall criminal presence and influence throughout the end to end supply chain*
* *Prevent illegal diamond/precious gem mining and ensure traceability from ethical sources along all stages of the supply chain*
* *Prevent illegal use of car parts and black market ‘chop shops’*
* *Encourage carbon neutrality: eg the cost and environmental impact of shipping water around the world rather than consuming at source*
* *Stop the illegal pharmaceutical industry and encourage original consumption rather than fraudulent and dangerous alternatives*
* *Demonstrate ‘Proof of delivery’ and receipt of Government aid and emergency supplies into conflict/poverty zones*

**Optional features**

***The features outlined below are optional and do not need to form part of the core solution, they are intended as a guide for additional added value items that you may wish to include.***

**Additional data sources can be built into the solution:**

* Companies House records and all publicly available data
* Financial reports and annual statements
* Stock analyst and market reports
* Company sensitive information that should not be revealed due to intellectual property rights
* Hidden subset of data for government use in the event of national outbreak or for provision to real time analytics to the Office of National Statistics
* The end product could trace its origins and components back to the original source
  + *e.g. a sustainable Cobalt mine used to produce raw materials for smartphones*
  + *e.g. a pizza could have raw ingredients from Italian tomatoes, british basil, Spanish meat, French cheese etc*

**Zilliqa token**

***This is also an optional feature but would be a very valuable addition***

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| ***Nudge 3*** | * *You may wish to introduce a tokenised ecosystem using your knowledge of the Zilliqa token and its role and function within the smart contracts* |

The smart contract will need to be secured and all data captured and stored onto the blockchain. You may wish to include an overview covering if and how the Zilliqa token ($ZIL) will play a role in the design.

You may wish to explore a payment based system whereby all parties in a supply chain agree to the conditions of shipping and once the product/good arrives and the relevant conditions are met the smart contract releases payment.

**Considerations**

As with all data based systems the value of information output will only be as valuable as the information collected so the principle of ‘garbage in, garbage out’ applies here as humans will most likely be registering the information used at each stage of the process. Any systems, checks and safeguards you can implement to limit this data pollution/manipulation risk will be valuable.

**References and context**

The attached links are intended as background reading and reference materials to help you consider how you might address the proposed challenge. There are no hidden answers or clues, they are merely reference materials to help your thinking.

**Know your vendor PwC video:**

* <https://www.youtube.com/watch?v=LYkLHJU6iuY>

**Counterfeit pharmaceuticals**

* <https://www.pharmamanufacturing.com/articles/2017/keeping-it-real-the-fight-against-fake-drugs/>

**Diamond mining**

* <https://www.hrw.org/news/2018/06/22/civil-society-call-tackle-abuses-conflict-and-lack-transparency-diamond-supply-chain>
* <https://www.amnestyusa.org/reports/chains-of-abuse-the-global-diamond-supply-chain-and-the-case-of-the-central-african-republic/>

**Bottled water global shipping**

* <https://www.thenational.ae/uae/global-environmental-impact-of-bottled-water-is-enormous-1.88275>

**Counterfeit fine wine**

* <https://www.thedrinksbusiness.com/2018/07/spanish-fine-wine-counterfeiting-network-dismantled/>

**Horse meat scandal**

* <https://www.bbc.com/news/uk-21335872>
* <https://www.prospectmagazine.co.uk/life/five-years-on-from-the-horsemeat-scandal-our-flawed-food-system-has-still-not-been-fixed>

**Cheese analogue**

* <https://www.sciencedirect.com/science/article/pii/S0958694601000735>

**Cobalt mining abuse**

* <https://www.cbsnews.com/news/the-toll-of-the-cobalt-mining-industry-congo/>

**General supply chain insights**

<https://blokt.com/news/blockchain-in-agriculture-and-food-supply-chain-to-become-a-429-7-million-market-by-2023>

<https://www.cnbc.com/2018/09/19/wef-tianjin-tradeshift-ceo-talked-about-blockchain-in-the-supply-chain.html>

https://www.forbes.com/sites/insights-penske/2018/09/04/how-blockchain-may-impact-logistics-supply-chain-and-transportation-a-conversation-with-the-blockchain-in-transport-alliance/#22f81a26f2b3