# Gavi Use Case – “TruSupply” *(Trusted Supply Chain Management)*

# Expanding the Logic of TruBudget to Supply Chain Management

## The Context: A global vaccination network

Gavi is an international organization bringing together the public and private sector with the shared goal of creating equal access to new and underused vaccines for children living in the world’s poorest countries.

## The Challenge: A lack of reliable real-time data along global supply chains

Vaccines have to be transported a long way including several players and procedural steps. At all time, a certain temperature range must be maintained. Too low or high temperatures damage the vaccines and thereby whole shipments can be destroyed causing significant delays and financial losses. Moreover, a lack of reliable real-time data hampers the efficient management of vaccine stock levels leading to wastage or shortage.

## The Solution: A Blockchain-based Supply Chain Management tool

The blockchain technology used for TruBudget seems to be a promising solution to control such a complex global supply chain which includes several different players. Similar to TruBudget, a blockchain-based workflow tool and platform could be developed to connect all parties. Additionally, a *smart meter*, a device recording the temperature during the entire journey, should be attached directly to the vaccines in each delivery. At each step of the supply chain the respective company or public authority would then be required to report the shipping status and temperature range. The key benefit for Gavi would be to obtain trusted real-time data on the status of shipments, on temperature conditions of vaccines during the entire supply chain and the use and stock level of vaccines.

In detail, such a solution would bring about the following advantages:

* One platform connecting all business partners of a supply chain
* Trusted real-time data on status, conditions and use of each shipment
* The blockchain as a shared and tamper-proof point of reference for information
* Immediate notice on delayed or damaged products

In sum, TruSupply would increase efficiency and accountability. The blockchain solution reduces the risk of fraud and increases the individual accountability of all providers involved in a supply chain.

## Details of “TruSupply”

**2 Sub-Categories: “Supply Chain” and “Vaccination Activities”**

Regarding the data of interest for Gavi it seems promising to divide the vaccination process into two categories: the supply chain and the actual vaccination activities. Each category would provide slightly different information. The “supply chain” category would include information on who delivered to whom, the type of process, the date, the temperature range, the status and an optional comment. The vaccination section would provide information about daily vaccination activities of individual health centers: the date, temperature range, status, number of people treated and stock level of vaccines. Please see the next page for a visual illustration.

**QR code and mobile app to ensure usability**

Upon creation of an order, a shipment specific QR-code would be generated. This code would be attached to the outside of the packaging. Via a mobile app authorized smartphones could then scan the code and directly enter information as well as add documents such as for example photos of a damaged product.

**Reciprocal control along the supply chain to increase data reliability**

Along the entire supply chain it is crucial to maintain a certain temperature range in order to not damage the vaccines. To increase data reliability and establish clear accountability for possible damages service providers should directly control each other. Taking a hypothetical example, this would work as follows. Gavi orders a certain amount of DTP from Novartis. Novartis receives the order and will then proceed with packaging the product. When handing over the shipment to the logistics company DHL, DHL would check that up to the moment of handover no anomaly regarding the temperature occurred. DHL will enter the relevant information via the platform which will be saved on the blockchain. DHL would thereby have to approve that Novartis has fulfilled its tasks with regard to certain criteria (Temperature). From that moment onwards DHL assumes full responsibility until the point when UPS takes over (role and liability of governmental institutions such as customs have to be worked out). UPS, again, will check the temperature range for the previous delivery steps and save the information on the blockchain. In this setup each firm is not only responsible to maintain the required temperature range for the time it is in charge of the shipment but also to ensure that the temperature range has not been violated previously.

**Option to include *Smart Contracts***

Using the blockchain technology allows for *Smart Contracts*. These are contracts which can be automatically executed by a computer if certain conditions are met. The necessary information would be obtained from the blockchain. For example, if a shipment status is reported as damaged by one party of the supply chain compensation could happen automatically. Additionally, a new order could automatically be requested to minimize the delay.

The following overview illustrates step by step how such a system could look like.

Folder: **Shipment** “**DTP** (Diphtheria, Tetanus, and Pertussis)”

|  |
| --- |
| Vaccination Senegal 2018 |
| Shipment DTP 1/10 |
| Budget: 1 000 000€ |
| Supplier: Novartis |
| Order submitted: 20.06.2018 |
| Estimated delivery date: 04.07.2018 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| From | To | Process | Date | Temperature Range | Comment |
| Gavi | Novartis | Order | 20.06.2018 | - | - |
| Novartis | DHL | Packaging | 22.06.2018 | 5-8°C | - |
| DHL | Customs Senegal | Shipping | 23.06.2018 | 4-7°C | - |
| Customs Senegal | UPS | Customs Clearing | 15.07.2018 | 5-7°C | Delivery delayed |
| UPS | UPS | Storage | 16.07.2018 | 4-6°C | - |
| UPS | Health Center Dakar 1 | Distribution | 18.07.2018 | 5-8°C | - |
| UPS | Health Center Dakar 2 | Distribution | 19.07.2018 | 5-7°C | - |
| UPS | Health Center Dakar 3 | Distribution | 19.07.2018 | 4-6°C | - |

Example of a damaged shipment:

|  |
| --- |
| Vaccination Senegal 2018 |
| Shipment DTP 1/10 |
| Budget: 1 000 000€ |
| Supplier: Novartis |
| Order submitted: 20.06.2018 |
| Estimated delivery date: 04.07.2018 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| From | To | Process | Date | Temperature Range | Comment |
| Gavi | Novartis | Order | 20.06.2018 | - | - |
| Novartis | DHL | Packaging | 22.06.2018 | 5-8°C | - |
| DHL | Customs Senegal | Shipping | 23.06.2018 | 4-15°C | Damage: Shipment stopped |
| Customs Senegal | UPS | Customs Clearing | - | - | - |
| UPS | UPS | Storage | - | - | - |
| UPS | Health Center Dakar 1 | Distribution | - | - | - |
| UPS | Health Center Dakar 2 | Distribution | - | - | - |
| UPS | Health Center Dakar 3 | Distribution | - | - | - |

Folder: **Vaccination Activities**

There should be an additional layer with one sub-folder for each health center.

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| Vaccination Senegal 2018 |
| Health Center Dakar 1 |
| Vaccine: DTP |
| Number of vaccinated 2018: 4050 |

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Temperature Range | Treated Persons | Stock |
| 19.07.2018 | 3-7°C | 25 | 125 |
| 20.07.2018 | 5-8°C | 24 | 101 |
| 21.07.2018 | 4-7°C | 28 | 73 |
| 22.07.2018 | 5-7°C | 31 | 42 |
| 23.07.2018 | 4-6°C | 27 | 15 |
| 24.07.2018 | 4-5°C | 15 | Stock depleted |