



SAP Innovation Awards 2019 Entry Pitch Deck

Hypertrust X-Chain Patient Data Care leveraging the closed-loop supply chain to fight cancer with autologous cell therapies

Camelot ITLab GmbH



<https://youtu.be/eqcSI6fBMLY>

Hypertrust X-Chain

by Hypertrust Patient Data Care, a Camelot ITLab Spin-off

“Quote”

If there was one technology I would trust the life of my child with it would be Hypertrust X-Chain.

Andreas Göbel, Managing Director
Hypertrust Patient Data Care

Challenge

Autologous cell therapies have been identified as successful to fight cancer. However there is the obstacle of tracking the extracted cells from the patient across the whole supply chain (including logistic and pharma companies) while establishing trust between all parties and making sure that the patient is treated with the correct medicine.

Solution

Securing a patient-centered closed-loop supply and distributed data chain for autologous cell therapies leveraging blockchain and IoT technologies.

Outcome

Secure and reliable user friendly system for a trustworthy document exchange. With this solution the patient receive highest quality standard for their treatments.

80% healing probability for
children suffering from cancer

60% survive rate with
autologous cell therapies

4 out of 10 patients have
been sustainably healed after
autologous cell therapies



Business Challenge & Objectives

Data protection

The data of the whole supply chain process shall not be shared with all parties. The closed loop supply chain of personalized treatments involves many parties, often even competing parties of the same branch.

Chain of identity

Integral part of a closed loop supply chain is to ensure that the final product is returned to the correct patient, from whom the raw material was extracted. Any deviation would result in fatal consequences, physical injury or even death.

Chain of custody

The chain of custody, refers to the chronological documentation that records the sequence of custody, control, transfer, analysis, and disposition of physical or electronic evidence. In many legislations, a consistent chain of custody is a requirement to get a commercial approval to sell a new medicine.

Orchestration and automation

The manufacturing process of personalized medicine starts with the input generation and ends with the application of the final product/medicine, the whole supply chain is a heavily distributed manufacturing process, involving many different external parties. From a final product producer's point of view, this process is difficult to almost impossible to manage.

Frictionless & automated supply chain processes: The system guarantees a frictionless and automated supply chain process through all steps of the manufacturing process of personalized treatments. Because of the shared database all participants still own their processes but can be orchestrated by the leading pharma company.

Chain of identity/custody: Blockchain based supply chain management with X-Chain creates and preserves a trustworthy and immutable chain of identity for personalized treatments.

Data protection: Blockchain based supply chain management with X-Chain is capable to let any party in the network share its information with the needed parties only.

Orchestration and automation: Blockchain based supply chain management with X-Chain centrally manages a distributed manufacturing process with a workflow engine implemented immutably in smart contracts which act on an immutably stored workflow model.

Paperless & complete patient centric audit log: All important steps of the manufacturing process as well as the complete chain of identity and custody are immutably stored on the blockchain, being validated constantly by the network.

Authenticity & security mechanism: Contributed data to the chain of identity and custody is uniquely signed by the network participant, manipulations are no longer possible on system level.



Project / Use Case Details

An example implementation of “Blockchain based supply chain management with X-Chain” can be depicted on top of the autologous T-cell therapy use case (famous product example: Gilead Yescarta). These treatments can be used to treat patients suffering of the blood cancer “diffuse large B-cell lymphoma” and certain types of Leukaemia, after earlier treatments have failed. The costs for such a treatment are very high (several hundred thousand U.S. Dollars).

After the diagnosis and the selection for the treatment the doctor registers the patient and selects a treatment date via the accelerator solution.

As it is a classical closed loop supply chain, it involves the extraction of a raw material (T-cells) from the patient in a step commonly known as “apheresis”. The connected apheresis centre gets a form of the treatment and an appointment information which they must confirm in the system. Because of a configured segregation of duties situation, a second doctor has to confirm the correctness of the treatment prescription.

Finally, the patient will be guided to visit the apheresis centre at the scheduled date to get the T-cell samples extracted. Afterwards the extract needs to be cooled down to cryogenic temperatures (below -180°C) before it is shipped the pharma company. Due to the low temperatures, the shelf live duration of the raw material is long (up to several months). For other treatments this may vary heavily, reducing possible transport times down to just a few hours in case of fresh raw materials. All these boundary conditions can be configured in the solution.

At the next step the specific blood of the patient is thawing at the pharma company and prepared for several production steps. The cells of the patient are mutated to “healing” cells - the final medicine is created, again cooled down to cryogenic temperatures to increase shelf live and transported to the treatment centre to be injected to the patient.

After subsequent check-ups of the patient the result of the treatment is recorded and can be shared with health insurance companies for reimbursement purposes.



Benefits and Outcomes

Business / Social

- Frictionless & automated supply chain processes
- Transparency
- Patient Data Security
- Paperless & complete patient centric audit log
- Authenticity & security mechanism
- Data protection
- All involved parties share only relevant data with as few other parties as necessary

IT

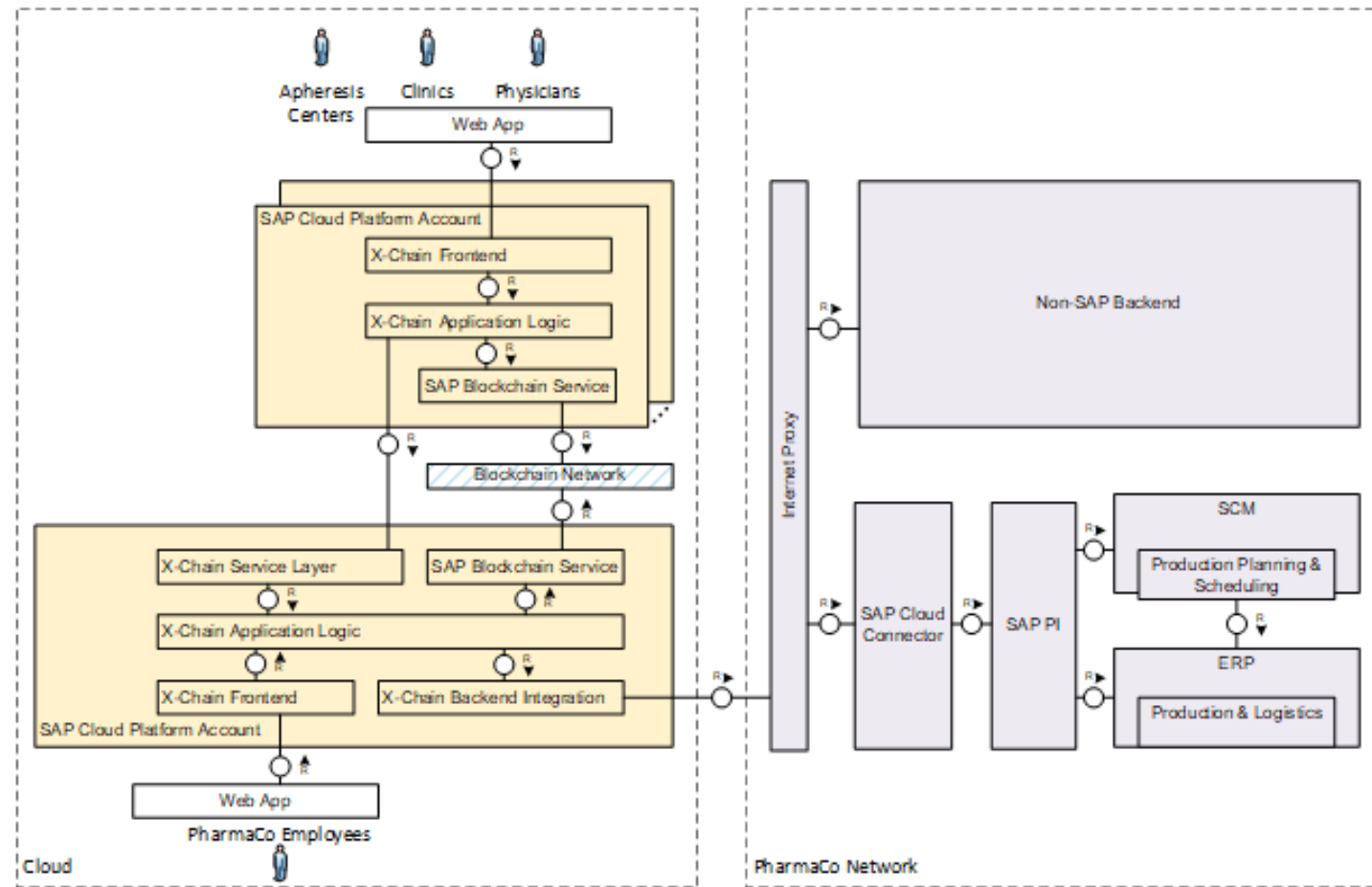
- Information on blockchain is inalterable
- Real time data tracking
- Frictionless & automated workflows

Human Empowerment

- An opportunity to heal cancer because of a high standard and fully documented supply chain
- Patient Data Security
- Trustworthy document exchange
- Patient satisfaction



Architecture





Deployment

Date of Deployment or POC: 08.11.2018

Number of live users: 0

SAP Technologies Used:

SAP Cloud Platform Cloud foundry live

SAP IoT Platform live

SAP Cloud Platform Blockchain Services live

Server Processor:

Linux Distribution:



Emerging Technologies and Use Cases

The following Emerging Technologies and use-cases are part of the project and describe the contribution

	Technology or Use Case	Yes/No	Contribution to Project
1.	Machine Learning / Artificial Intelligence	NO	
2.	IoT	YES	Leveraging IoT technology to track raw material and the finished product throughout the complete closed loop supply chain
3.	3D printing	NO	
4.	Blockchain	YES	Usage of blockchain technologies to establish trust between all involved parties within the closed-loop supply chain
5.	API Economy / Integrate the Intelligent Enterprise	NO	
6.	Cloud Native / Event Based Architectures	YES	Combining IoT and Blockchain SAP cloud Services with third party cloud components
7.	Extending the digital core with SAP CP / ABAP in SAP CP	YES	Integrating a blockchain network with SAP SCM planning capabilities
8.	SAP Leonardo Application (extending SAP application, using Industry Innovation Kits or result of Design Thinking workshop)	NO	

CAMELOT's long-lasting relationship with SAP for more than 20 years as innovation partner, global implementation partner and SAP customer can be described as a 360° relationship



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