Digitalisation of the Ambulance Process

DigiBP AS21, Group project – **Team Echo**

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1 Scenario

The project task is to create an innovative scenario with a user centred design and show the benefits of its digitalisation.

1.1 Brainstorming

We started by writing down our ideas in OneNote. We then discussed all the proposed options and took a vote. In the end, the "Emergency Process" convinced everyone unanimously. It is in our opinion an interesting topic, which involves many decisions and has a lot of potential for digitalisation.

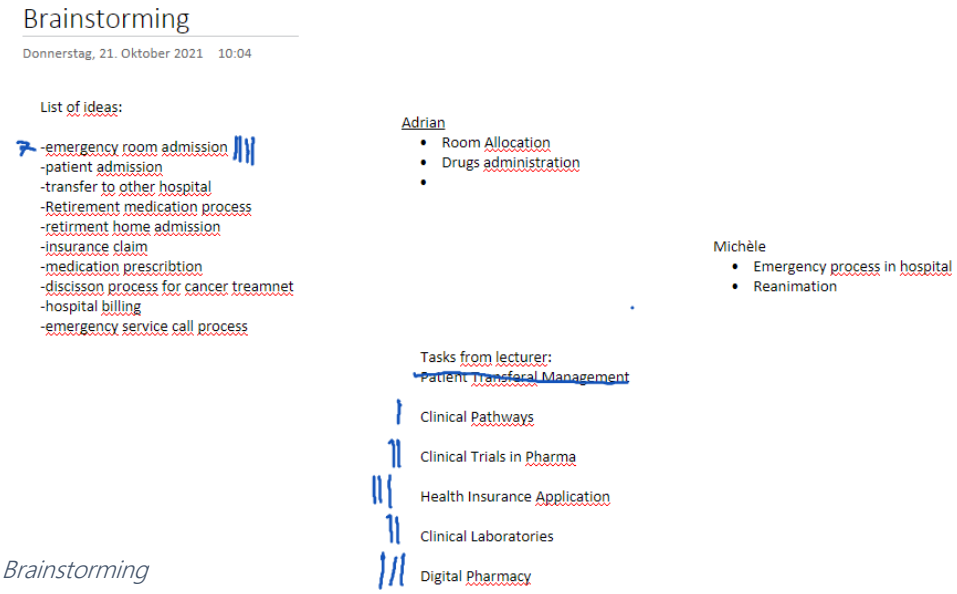


Figure 1 - Brainstorming

1.2 Scenario

The ambulance process concerns the emergency call of an injured person, the pick-up by an ambulance, the triage and the subsequent emergency treatment in hospital.

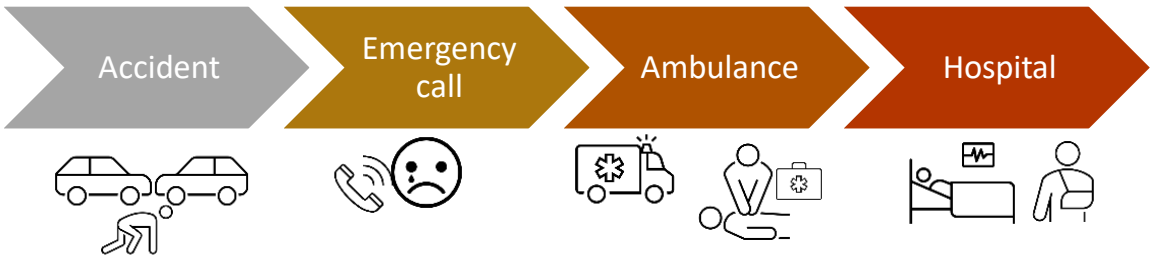


Figure 1 – Emergency service scenario

For this scenario we first created a step-by-step draft for the BPMN:

- Start-event: Emergency call
- Task: get patient information: address, symptom, localization, number of injured people

- Decision (DMN): is an ambulance needed at all? If no, terminate process; if yes, continue
- Decision (DMN): which ambulance and how many: according to location/availability
- Call-Service tells Ambulance if it's big emergency (blue light) or not (normal driving)
- Paramedic does triage -> Decision first-aid or go back without patient
- Decision: which hospital? → Automate by selecting the correct hospital
    - Check insurance: hospital in the canton you have insurance (depending on severity)
    - Check nearest hospital
    - Check availability
- Drive back to hospital
- Paramedic gives doctor a briefing
- Bring patient to a room
- Get patients data
- Medical checks by experts
- Decision: Treat patient or send home or transfer to specialist hospital
- End-Events
    - Patient accepted for further treatment
    - Patient received exit form
    - Hospital received patient transfer agreement

What could be premature end points?

- The patient dies during the transfer
- The patient dies at the scene
- The patient does not need to go to the hospital
- False alarm

1.3 Benefits

The digitisation of the ambulance process has several benefits:

The emergency call centre may be temporarily overloaded and the caller unable to be put through. By automating the call, the caller can order an ambulance without waiting.

A large amount of time is spent on decisions. For example, checking where the closest hospital is and checking that has enough capacity. Through automation, a suitable hospital can be found in seconds.

By automating scores (for example the triage), completeness can be guaranteed. When the paramedic fills in the form, no important information is forgotten and it is automatically sent to the right place.

2 Process Modelling

In this chapter we explain how we modelled the scenario with the appropriate standards and conventions in camunda.

2.1 BPMN

First, we created a detailed BPMN with different processes. This process was too complex to integrate in Camunda, so we had to cut it down to a smaller "one pool process".

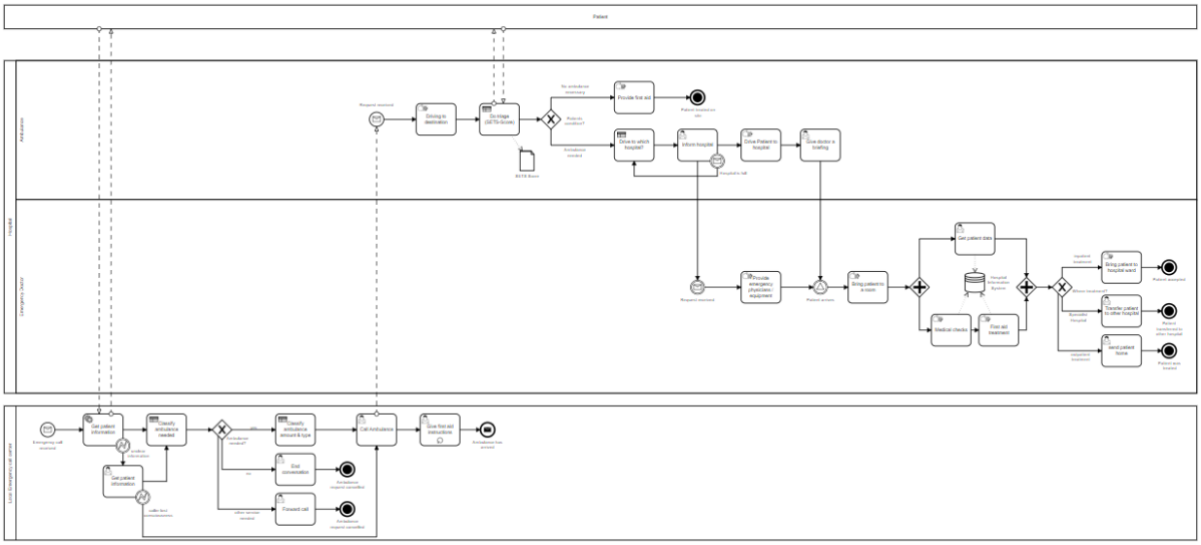


Figure 3 – detailed process

After refining the previous process, we had the following process left:

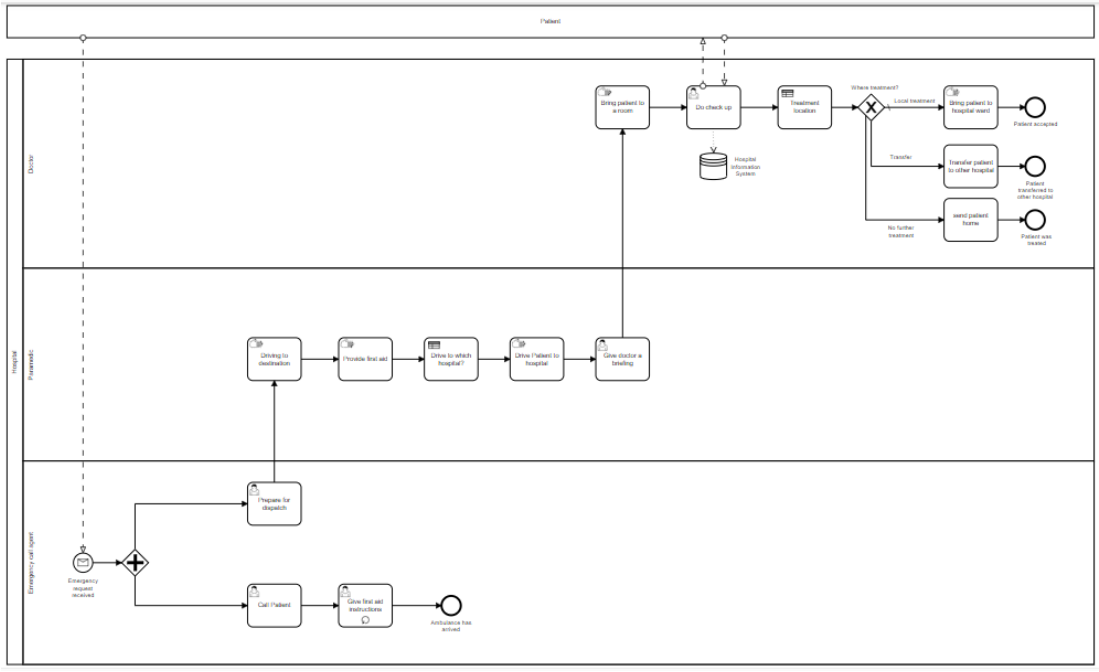


Figure 4 – refined process

2.2 Task & roles refined process

In the refined process has one pool with three different lanes: emergency call agent, paramedic and doctor. The patient pool is shown as a black box. The process is triggered by using the chatbot.

2.3 DMN

For our process we decided to do two DMNs (Decision Model and Notation). The first DMN decides to which hospital the paramedic should drive the patient. The decision is based on the patients age and location of the accident.

Drive to which hospital? **Hit Policy:** First

	When	And	Then	
	Age (integer)	AccidentLocation (string)	Hospital (string)	Annotations
1	"<18"	"Aargau"	"UKBB - Universitäts-Kinderspital beider Basel"	
2	"<18"	"Basel"	"UKBB - Universitäts-Kinderspital beider Basel"	
3	"<18"	"Luzern"	"Kinderspital - Luzerner Kantonsspital"	
4	"<18"	"Solothurn"	"UKBB - Universitäts-Kinderspital beider Basel"	
5	"<18"	"St. Gallen"	"Kinderspital Zürich - Eleonorenstiftung"	
6	"<18"	"Zug"	"Kinderspital - Luzerner Kantonsspital"	
7	"<18"	"Zürich"	"Kinderspital Zürich - Eleonorenstiftung"	
8	"<18"	-	"UKBB - Universitäts-Kinderspital beider Basel"	
9	">=18"	"Aargau"	Kantonsspital Aarau	

Figure 5 – DMN Drive to which hospital?

The second DMN is used in the hospital to decide where the treatment should happen. The decision is based on age. If an operation or monitoring is necessary and if we have a specialist in our hospital. There are three different output possibilities: local treatment, transfer or send patient home.

Define treatment location **Hit Policy:** Unique

	When	And	And		Then	
	Age (integer)	Operation (boolean)	Monitoring (boolean)	SpecialistAvailable (boolean)	TreatmentLocation ("local","noFurtherTreatment","tr...)	Annotations
1	>=18	true	-	true	"local"	Treatment in own hospital
2	>=18	true	-	false	"transfer"	Transfer patient to other hospital
3	>=18	false	false	-	"noFurtherTreatment"	Send patient home
4	>=18	false	true	-	"local"	Treatment in own hospital
5	<18	true	-	-	"transfer"	Patient too young, transfer patient to children hospital
6	<18	false	true	-	"transfer"	Patient too young, transfer patient to children hospital
7	<18	false	false	-	"noFurtherTreatment"	Send patient home

Figure 6 – DMN Define treatment location

3 Interfaces

To offer easy access to the emergency service, we created a google site with the integrated google dialogflow chatbot, which triggers the process flow. Additionally, we created an app which can be accessed by the paramedic, where they can find the patient information as well as their location. The data is synchronized with the help of integromat.

- Link to the website: https://sites.google.com/view/digibp-echo
- Link to use the app in the browser: https://www.appsheet.com/start/d8319de6-210c-403e-84ba-f66f587d6f6b

4 Service Integration

For this process we implemented/used the following external services: Integromat, Google Dialogflow, Google Sheets, Google Maps, Appsheet mobile app, website (google sites). To trigger the process, collect the data and synchronize the website with the app. We created two integromat scenarios. The first scenario sends the patient information from the chat bot to a google sheet and triggers the process flow.

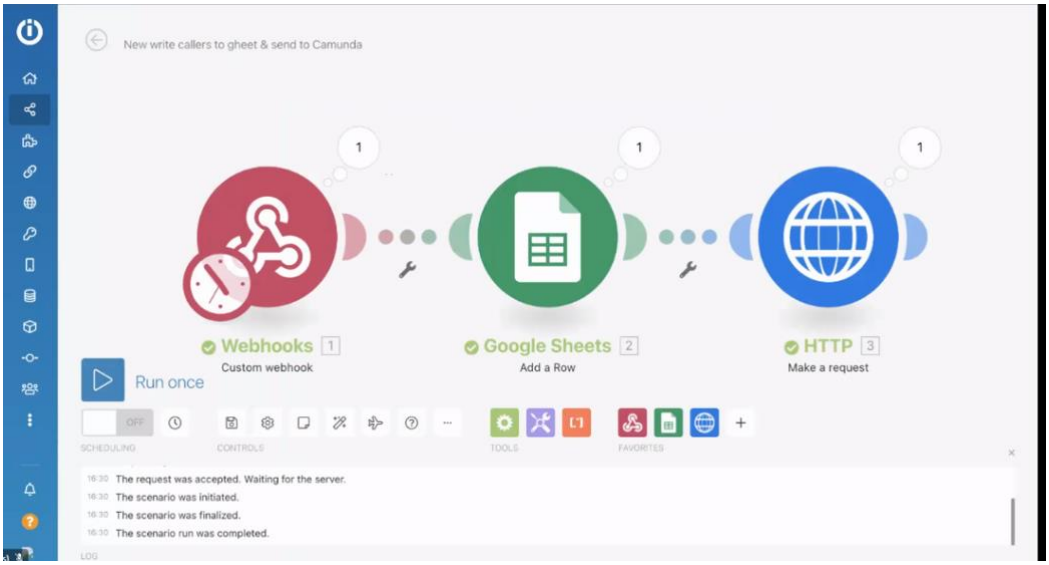
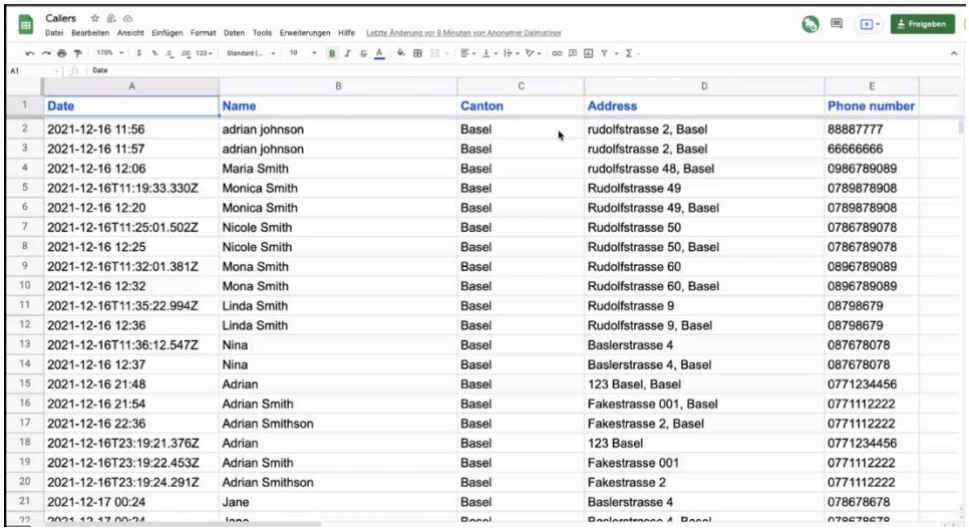


Figure 7 – First scenario, save data and trigger process

As mentioned above the data is stored in a google sheet.



Callers

	A	B	C	D	E
1	Date	Name	Canton	Address	Phone number
2	2021-12-16 11:56	adrian johnson	Basel	rudolfstrasse 2, Basel	88887777
3	2021-12-16 11:57	adrian johnson	Basel	rudolfstrasse 2, Basel	66666666
4	2021-12-16 12:06	Maria Smith	Basel	rudolfstrasse 48, Basel	0986789089
5	2021-12-16T11:19:33.330Z	Monica Smith	Basel	Rudolfstrasse 49	0789878908
6	2021-12-16 12:20	Monica Smith	Basel	Rudolfstrasse 49, Basel	0789878908
7	2021-12-16T11:25:01.502Z	Nicole Smith	Basel	Rudolfstrasse 50	0786789078
8	2021-12-16 12:25	Nicole Smith	Basel	Rudolfstrasse 50, Basel	0786789078
9	2021-12-16T11:32:01.381Z	Mona Smith	Basel	Rudolfstrasse 60	0896789089
10	2021-12-16 12:32	Mona Smith	Basel	Rudolfstrasse 60, Basel	0896789089
11	2021-12-16T11:35:22.994Z	Linda Smith	Basel	Rudolfstrasse 9	08798679
12	2021-12-16 12:36	Linda Smith	Basel	Rudolfstrasse 9, Basel	08798679
13	2021-12-16T11:36:12.547Z	Nina	Basel	Baslerstrasse 4	087678078
14	2021-12-16 12:37	Nina	Basel	Baslerstrasse 4, Basel	087678078
15	2021-12-16 21:48	Adrian	Basel	123 Basel, Basel	0771234456
16	2021-12-16 21:54	Adrian Smith	Basel	Fakestrasse 001, Basel	0771112222
17	2021-12-16 22:36	Adrian Smithson	Basel	Fakestrasse 2, Basel	0771112222
18	2021-12-16T23:19:21.376Z	Adrian	Basel	123 Basel	0771234456
19	2021-12-16T23:19:22.453Z	Adrian Smith	Basel	Fakestrasse 001	0771112222
20	2021-12-16T23:19:24.291Z	Adrian Smithson	Basel	Fakestrasse 2	0771112222
21	2021-12-17 00:24	Jane	Basel	Baslerstrasse 4	078678678

Figure 8 – Google sheet to store the patient data

The second integromat scenario sends the patient information from the chatbot to the appsheet. The app then sends a notification to the paramedic's phone (appsheet internal process).

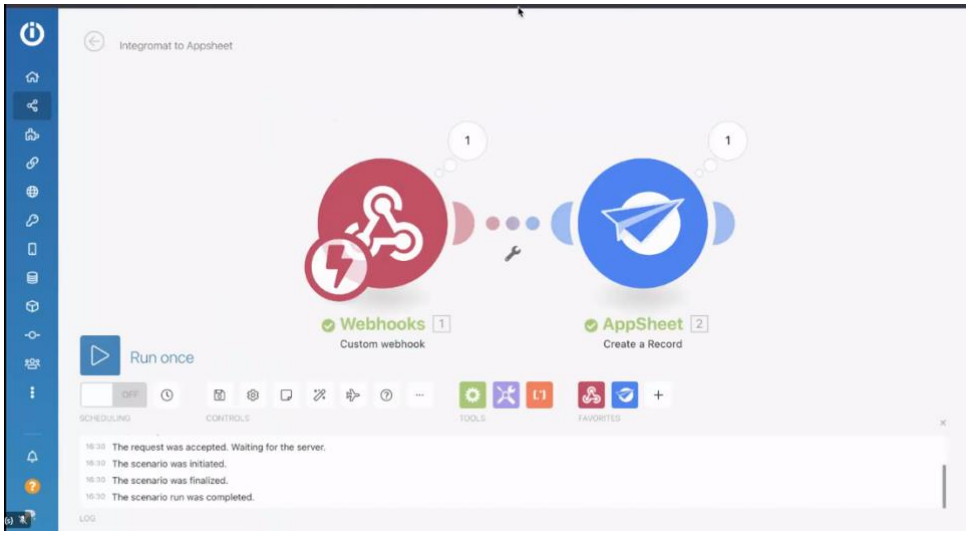


Figure 9 – Send patient information from the chatbot to appsheet.

5 Links

Video on SWITCHTube

- https://tube.switch.ch/videos/NBbokyjVC6

Emergency service website

- https://sites.google.com/view/digibp-echo

Google sheet

- https://docs.google.com/spreadsheets/d/1-ItPmNLtE1ge84TAZbSCsejQhcTdEIR421aFEsS-cC4/edit#gid=0

App "Emergency Manager"

- https://www.appsheet.com/start/d8319de6-210c-403e-84ba-f66f587d6f6b

Dialogflow

- https://dialogflow.cloud.google.com/#/agent/emergency-call-qhun/intents

Integromat

- https://www.integromat.com

DigiBP classroom instance

- https://digibp.herokuapp.com/camunda/app/welcome/default/#!/login