QROWD - Because Big Data Integration is Humanly Possible

Innovation action

D1.2 – Hackathon

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EXECUTIVE SUMMARY

This document reports on the results of the hackathon organised in October 2018 and on ideas to go forward with the WP1 pilot. The deliverable is public. The main target readers of the document are the QROWD project partners, and other research projects having the objective of organising a Hackathon. The hackathon described in this document was very successful and part of its outcomes are very relevant for further development of the first QROWD use case concerning the Touristic Network. Therefore, this hackathon may inspire other research and innovative projects.

As a direct outcome of the Hackathon, the results summarised in this document are already being used as input for the two WP1 coming deliverables in the: D1.3 and D1.4 as the results of the hackathon influenced the description and the implementation of the Touristic Network (BC1-UC#1).

This document provides a description of:
- the event itself,
- the use case presented by QROWD
- the results of the QROWD use case
- the outcomes for QROWD and for a global industry such as TomTom.

The hackathon was organized by TomTom as TomTom is experienced in the organization of successful and large hackathons. TomTom indeed understands the added value generated by organizing hackathons in research for more innovative products and services. Therefore, it was a suitable opportunity for QROWD to take part in this hackathon and to present the Touristic Network use case as a one of the competing challenges in this event. It was also an opportunity to explore new ideas thanks to TomTom’s development teams’ expertise. All of these circumstances ensure positive results presented in this document.
"Insanity: doing the same thing over and over again and expecting different results." This quote attributed to Albert Einstein illustrates how changing habits, ways of doing things, sometimes processes, can lead to more successful innovations. Conversely, continuously repeating the same processes, habits, way of thinking, etc. "over and over again" does not necessarily lead to novelty and innovative ideas. Hackathons are indeed a playground for companies, universities, research centres and others to try something else, new techniques, to find out new uses for datasets, etc. They are big events which have as their main goal to foster creativity and push forward innovation in the IT sector.

Every year, the Navigation Product Unit in TomTom organizes a very successful semi-internal hackathon called “What the Hack?”. This event is among the most appreciated ones by TomTom employees and other participants. Every year, lots of efforts are made to define very relevant challenges presented during this hackathon as they are always very well connected to TomTom’s areas of interest. Results are very often impressive and sometimes unexpected. New processes are tested. New prototypes are built. Occurring issues are sometimes solved. It is a great place to test new ideas.

“What the Hack? #4”, which took place on 22-24th of October 2018, gathered more than 450 participants. It was even more successful in terms of results and of diversity of participants (from different product units and sites) than the hackathons organised in previous years. Three companies and one university were invited to take part in the prestigious event. These were:
- ParkWhiz, an American e-parking service company (https://www.parkwhiz.com)
- Klebert Engineering, a German company providing expertise on maps for infotainment and autonomous vehicles (http://klebert-engineering.com)
- Kompasapp, a city exploration app (https://kompasapp.com)
- The University Birmingham.

They supported the different challenges.

QROWD also participated in the hackathon, as the project team proposed the implementation of the Touristic Network’s use case (BC1-UC#1) as a challenge part of the competition. It was indeed the opportunity of exploring new features and ideas in order to improve the QROWD use case and to progress with its development. The purpose of this challenge was at the beginning about implementing the Touristic Network which is the first use case in the first QROWD business case. The use case is described in the D1.1 Datasets Release for Model Region and in Chapter 3, 1.3 in this document.

In Chapter 2, the TomTom hackathon called “What the Hack? #4” is introduced in more detail in order to better understand the value of this event. In Chapter 3, the QROWD challenge, which competed among other challenges in “What the Hack? #4”, is presented. The results obtained are also described. In Chapter 4, the different benefits of the results obtained from the QROWD challenge for TomTom and for
Hackathon
QROWD are explained.
2. DESCRIPTION OF "WHAT THE HACK? #4"

1.1 The organisation of the "What the Hack? #4"

The Hackathon has taken place in different TomTom office locations every year since 2015 (Berlin in 2015, Lodz in 2016, Amsterdam in 2017, Berlin in 2018). This event is traditionally organized by the Navigation Business Unit. Recently, the event has opened to more product units and gathered more and more employees across product units and countries. TomTom employees from all over the world, mainly Europe, attend this event to participate in one of the different challenges. Software engineers are encouraged to participate mainly, but also UX designers, project managers and other employees are invited to join the event.

In 2018, the fourth version of the “What the Hack?” took place in Berlin. On this occasion, the venue was: Bolle Festsäle in Alt-Moabit 98, Berlin. The event gathered approximately 450 employees from all TomTom product units and from the different offices all around the world. The event started on the evening of 22\textsuperscript{nd} October and ended on 24\textsuperscript{th} October.

The various challenges were selected two weeks before the event. Before the hackathon started, participants in the event were able to vote the different challenges proposed by TomTom employees. More than 70 proposed challenges were originally proposed, and only 35 of them were voted to be implemented during the hackathon.

Below is a short overview of the event agenda. A copy of the full agenda is attached as Annex 1:

- **On 22\textsuperscript{nd} October:**
  “What’s the Hack? #4” started in the afternoon by a mini replication of the hackathon to introduce coding to the children of the Berliner employees.

  The event officially started at 18:00 with several presentations which were given by various personalities: TomTom CEO, M. Harold Goddijn, M. Heiko Schilling (VP Product Unit Navigation), M. David Beckett (Pitch coach), and others.

  Dinner was served at 19:40. From 19:40 to 23:00, every ambassador of previously selected challenges, representing in total 35 challenges, had the mission of making up a team of 8 to 10 employees. To do so, each ambassador stood at one table. The participants searching for a challenge had to visit the different tables where the ambassadors were standing and ask questions in order to join their favourite challenge. This was the way used to make up the teams and develop the different competing challenges.

- **On 23\textsuperscript{rd} October:**
  The hacking time officially started at 10:00 and ended the next day. 24 hours were dedicated to implementing the different challenges.
On 24th October:
At 10:00 the hacking time ended. From 11:00 to 16:00, the results of the different challenges were presented by every ambassador in a 4 minutes pitch format. After 16:00, the attendees voted for their favourite challenge via an app. At 19:00, the winning teams were announced during the Winning Ceremony led by M. Alain De Taeye (Management Board) and M. Charles Davies (CTO). The hackathon ended with a nice networking and celebration event.

1.2 What are the benefits of the hackathon?

In the item entitled “What the Hack? - TomTom Hackathons” and published on LinkedIn on 6th November 2018, Dr. Heiko Schilling (VP Navigation in TomTom) writes: “A TomTom hackathon brings together a cohort of software engineers and other specialists from all corners of the organization and the world. It’s an intense experience where we solve tomorrow’s mobility challenges over a span of 24 hours. And the best part is that we solve these challenges together, in one place, rather than at our own desks. The time at our hackathons reminds us how much we enjoy our work and the company of our colleagues.”
(Source: https://www.linkedin.com/pulse/what-hack-tomtom-hackathons-heiko-schilling/)

Figure 1: Participants of the « What the Hack? #4”

1) Benefits for TomTom as an industry

“For large organizations in particular, hackathons can be adapted to greatly accelerate the process of digital transformation. [...] By giving management and others the ability to kick the tires of collaborative design practices, 24-hour hackathons can show that big organizations are capable of delivering breakthrough innovation at start-up speed. And that's never been more critical: speed and agility
Hackathon are today central to driving business value, making hackathons a valuable tool for accelerating organizational change and fostering a quick-march, customer centric, can-do culture.” This quote refers to the article published by McKinsey in October 2015. This quote emphasises the fact that a hackathon is beneficial for large industries as it stimulates internal collaboration, innovation and helps them being more flexible with processes. (Source: https://www.mckinsey.com/business-functions/digital-mckinsey/our-insights/demystifying-the-hackathon)

The first main goal of such an event is indeed to stimulate innovation, therefore R&D. This precious time is used as an opportunity to generate, explore and experiment with new ideas, to stimulate innovation and foster creativity. One of the biggest challenges is to manage the development of new products/features out of all the ideas generated during hackathons. Unfortunately, very often ideas never reach the production phase.

Hackathons’ challenges are tackled in groups. As mentioned in the title of the book written by Ken Blanchard: “High Five! None of Us Is as Smart as All of Us”, gathering people from all over the world and from different product units and teams creates a favourable environment to stimulate innovative ideas. In addition, it is a nice opportunity to meet with peers from other locations and teams. It improves cross-Product Unit collaborations, more specifically when hackathon teams are well-mixed. In fact, organizing such an event can create more engagement, especially if the event is a success. The employees feel more engaged with the company they work for and invest more of their time and energy.

Photo 1 & 2: Teams working on various challenges

In the “What the Hack? #4”, the 35 teams were mostly composed by mixed teams from different TomTom offices all over the world, and also from different product units. Of course, some challenges were mainly picked up by specific teams, often already working on this project/issue. This was the case of challenges which were related to very specific skills and projects.

The hackathon was the opportunity to stimulate interactions and innovation cross-product units. As a result, prototypes developed in cooperation with different product units are very often the most interesting ones because different knowledges from different teams are used in a complementary way. The outputs are much more valuable.
2) Benefits for the participants

The hackathon is always an opportunity for sharing knowledge and skills among participants, and among colleagues from different offices and teams. This is indeed a nice way of receiving recognition from colleagues/peers. Therefore, the hackathon offers the opportunity to learn something new from others and create new skills. Participants are free to join any challenge. This time and space are dedicated to advancing on problems they are interested in. They meet other teams facing different problems and sometimes similar problems. The Hackathon is indeed the perfect place for networking and getting inspired by others. Hackers learn from others. The positive energy created by such an event is indeed contagious.

Motivated by getting awards, participants are much more engaged in implementing the various tasks of their challenges. Indeed, some of them do not hesitate to stay overnight. The motivation is much higher, also because everyone wants their project to be completed and they want to win. Hackathons led by competition create a sense of accomplishment. Even without winning, most of the results from every challenge are very interesting, and some of them might in the future be implemented into the different processes or be launched in production as new features or new products.

In addition, these events arouse their feeling of engagement toward their company. Hackathons are indeed very well appreciated by participants. Every year they look forward to this event as it is always lots of fun.
3. DESCRIPTION OF THE QROWD CHALLENGE

1.3 Presentation of QROWD's original use case

The original description of the challenge presented during “What the Hack? #4” referred to the first QROWD use case (BC1-UC#1), called the Touristic Network. The Touristic Network use case is described in D1.1 Datasets Release for Model Region. This deliverable was published in November 2017.

Here is a brief description of the challenge as it was originally presented and planned during the hackathon:

"As a tourist in the Dolomite mountains, I would like to optimize my vacation time, relax and avoid being stuck in traffic jams. Enjoying skiing, I would love that: From wherever I am located, I get informed by an easy-understandable map (Schematic map / Metro-like look). A map which tells me about how much time is needed to drive to every of the ski resorts around and how challenging the ski slopes are. In a second step, I would like to be advised on the three best options according to the information available on ski resorts (POIs) and the travel time."

The concept of the Touristic Network is to develop an app informing the users about how much time is needed to reach every ski resort in Trentino by car. The calculation of the travel time takes into account probable delays (traffic jam, incidents). The users are guided regardless of where they are coming from. Additionally, information on available services and the status of ski resorts is conveyed. That information is expected to be collected from POI datasets and might also be collected via crowdsourcing tools developed in QROWD as the Virtual City Explorer (WP3). This would help the users to select the optimal route option to drive to the best ski resort that meets their needs.

In order to share the information to users in the most effective way, different ways of schematizing road networks were explored. In fact, the idea is to visualize this network as metro-lines in major cities. From this simplified overview, users should be able to decide which ski resort would be the best option to travel to in time efficiency, avoiding traffic jams along the way.

The scheme below describes the information the Touristic Network app would provide its users with.
The main idea of presenting the Touristic Network as a challenge during the hackathon was to explore new ideas to improve the use case and also to start its implementation by integrating all the components/layers together.

The Touristic Network comprises several main components:

- First of all, the multi-destination routing engine leading to every ski resort. This is the core of it. The origin of the multi-destination starts regardless of where the app user is coming from. The destinations are all the open ski resorts in Trentino.
- The output from the multi-destination routing creates a network with multi-routes. This multi-destination network is expected to be schematized to offer a simplified view. This means that algorithms simplifying routes also need to be
- Information on live traffic flow and live traffic incidents should also be integrated and visualized on the final schematised map of the road network. This information should be calculated for every segment of route in order to be detailed enough.
- In addition, all the information collected for every ski resort is also expected to be integrated as a component of the Touristic Network.
- The dynamic weather as a layer is optional.

Below are the different components of the Touristic Network:

The underlying value adding idea is to make app users enjoy their vacation time even more by making the best choice in the ski resort they will visit. This app should support them during their trip and help them avoid queues in very popular ski resorts and enjoy the different services that best fit their tastes and needs.

1.4 What happened during the Hackathon?

The team implementing the “Touristic Network” was constituted at dinner time on 22nd October. The team was composed by:
- 9 software engineers,
- 1 UX designer,
- and 1 project manager.

Eight software engineers were from the “Navigation” product unit and one was from “Autonomos”, which is the product unit researching on autonomous driving. Two of them were architects. This was indeed very beneficial during the shaping part of the project. The project manager was from the “Traffic and Travel Services” (TTI).
product unit. The teammates came from different office locations, such as Amsterdam, Lodz and Berlin.

Once the hacking time started, the team had to define again the challenge in order to fit the different participants’ skills and wishes. The reshaping operated during a brainstorming session where all the participants could freely push the project to various directions and propose different options according to their skills and interests. The challenge was reshaped in a more routing/navigation focus as the team was mainly composed by people working in the Navigation product unit with expertise on building navigation algorithms. The schematic city network and simplified lines happened not to be the main concern anymore. It appeared that there was no expertise available in the team on schematising road networks.

During this brainstorming session the purpose of the app was defined, as well as its features and its architecture to develop the different components of the app. Once the guidelines were defined, all the members of the team divided the different tasks according to the expertise of each one.

In the implementation phase, different TomTom Map APIs were compiled. Moreover, new algorithms were developed to support the requirements of such an app, as it requires that the route gets calculated covering different aspects.

The design of the app was taken in consideration. The prototype of the app was implemented in close collaboration with the designer who joined the team.

Several use cases were thought and were inspired from interviews run with several participants during the hackathon. In fact, several people were interviewed in order to better understand the different categories of travellers and to answer their needs better.

The team shared many ideas, also related to extra features and on various ways of implementing the itineraries. Unfortunately, several extra features that the team had thought of could not be implemented because of lack of time. The team also faced various issues during the first hacking hours because of lack of expertise on implementing the online API services.

During these 24 hours, time was given to prepare the four minutes pitch to present the work and perhaps win one of the prizes.
1.5 The result of the challenge

As a result of the hackathon, the team worked on creating a touristic routing app which also aims to save planning time while traveling. However, the app concept was slightly different from the original idea described in the BC1-UC#1 in QROWD.

During the hackathon, an app was built to suggest its users travel itineraries from a place to another, around a place or around a country. In this app, the itineraries and stops along the way are suggested considering the user preferences. In this app, types of travellers are predefined. However, users can also choose to configure their own preferences as travellers. Below some traveller characteristics and preferences are listed:

- More adventurous or more touristic highlight
- Alone, couple or with a family
- Dynamic visits or more relaxing holidays
- ...

These preferences have consequences on how people enjoy travelling. This app tries to cover the different types of travellers to suggest to each user a very customised itinerary based on their tastes.

For instance:
- Does the user like a more adventurous trip or a more conformable/relaxing trip?
- Does the user want more than one stop per day in a place of interest?
- Does the user need to stop often during the way because the family has kids in a young age?

Once the user has defined the trip preferences and the trip details (Time/Location(s)) for every travelling journey, the itinerary and the various stops depend of the user’s preferences.

Below the different mock-ups presented during the hackathon can be found. These mock-ups show the first steps where users define parameters in order to request suggested itineraries to the app.
Figure 4: STEP 1/ Mock-up presenting the different types of travellers (configurable by the users themselves)
Figure 5: STEP2 & 3/ Mock-ups presenting the trip details (date and location)
Figure 6: STEP 4/ Mock-ups presenting a suggested itinerary

This example shows a three-day trip proposed by the app around the city of Amsterdam.

In this app, users should also be able to select various places (restaurants, hotels, places of interests, etc.). Various ways on how editing the itinerary to add some stops and to choose these stops were thought during the hackathon. Unfortunately, none of these ideas could be implemented because of lack of time. For instance, one of the ideas was to propose users a Top 5 of best places, and they can choose among these five or shuffle the Top 5 for another Top 5.

Different use cases were also considered. They describe various situations for different types of travellers having different needs and wishes during vacation time.
Table 1: Summary of the three described use cases

<table>
<thead>
<tr>
<th>#</th>
<th>Use Case</th>
<th>The trip</th>
<th>Particularities related to users’ preferences</th>
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<tbody>
<tr>
<td>1</td>
<td>Romantic Getaway</td>
<td>Around Paris</td>
<td>Want to visit nice places around Paris in a one-day trip.</td>
</tr>
<tr>
<td>2</td>
<td>Energetic Family (e.g. 2 medium-age kids)</td>
<td>From Toulouse to Barcelona</td>
<td>Like to visit at least two monuments a day.</td>
</tr>
<tr>
<td>3</td>
<td>Family Camping (e.g. 2 young kids)</td>
<td>Around Saxony in Germany</td>
<td>Need to stop quite often during the way, so the kids can rest.</td>
</tr>
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Below is the description of different use cases:

**1) One day romantic Getaway in the surroundings of Paris**

A couple would like to travel around Paris for one day only. They would like to visit two remarkable monuments and during lunch time go to a pleasant restaurant. They indicate it to the app, mentioning that it is a romantic getaway. They also mention to the app the day they want to travel, and the departure and final-destination, which is Paris in this case. The app suggests an itinerary passing by the Palace of Versailles, the Bistro des deux Ponts in St-Cyr-L'Ecole and the Castle of Vincennes. The couple does not want to go to the Castle of Vincennes. In the app, they edit this stop. The app gives them a Top 5 options. In this Top 5, there is the Castle of Vaux le Vicomte. They prefer to visit this castle. They indicate it to the app which proposes a new itinerary, considering their choice for the Castle of Vaux le Vicomte. They are satisfied with the new proposed itinerary.

Figure 7: An example of a suggested “Romantic” itinerary around Paris by the app visualized on the map
Hackathon

Figure 8: The suggested itinerary with the different stops along the way visualized in a schematic way.
2) The one-day trip of an energetic Family

A family with two 3- and 5-years old kids would like to go to Barcelona from Toulouse in one-day, stopping in different nice areas along the way. They indicate to the app that they would prefer not to drive for periods longer than one hour. They also indicate to the app that they need to stop somewhere every hour. Moreover, they want to stop in two places of interest and in one restaurant at lunch time to eat. The app suggests an itinerary to them passing by:

1) Perpignan to visit the city,
2) a restaurant in Argelès-sur-Mer
3) and the museum of Dali in Figueras.

They are satisfied with the suggested itinerary.

The day of departure, the app guides the family to the different stops along the itinerary.

Figure 9: The suggested itinerary with the different stops along the way visualized in a schematic way and on the map.
3) 3 days camping with the family in Saxony

A family with two 6- and 8-year-old kids would like to spend three days travelling around Saxony to do some trekking activities. They plan to depart from Berlin as they live there. They request the app one to two stops per day to trek and they also request to have pauses often enough when driving in order to rest. The app suggests an itinerary that they validate.

All along the trip, the app accompanies and guides them along the itinerary. During the first day, the family requests the app to find a restaurant close by as no stop was included into the trip at lunch time. The app suggests to them different options of nice restaurants close-by using a Top 5 option. The family chooses one option among this Top 5. The app guides them to the restaurant and updates the itinerary.

Figure 10: The suggested itinerary with the different stops along the way visualized in a schematic way and on the map
1.6 Benefits for an industry as TomTom

The ideas resulting from hackathons are often used within TomTom to develop new products or to settle new processes. Hackathons are really seen as a nice event stimulating innovations and engaging employees to projects they feel have a deep interest.

The Touristic app, presented below and developed during the hackathon, is an interesting idea which unfortunately did not get voted by the participants. Other presented projects seemed more feasible and more oriented to TomTom’s business path. However, the project got many positive feedbacks as it gives answers to a precise need coming from the people who would like to plan their vacations and do not have or do not want to spend too much time planning them. The market of touristic apps, assisting travellers in their daily trips, already exists and is in expansion. The hackathon was a very good occasion to study how TomTom could conceive such an app assisting travellers; but in its own way, re-thought and designed in a “TomTom style”. This was a nice experimentation. The way the app was designed showed some potentials and could be developed in the future by TomTom as a standalone product or as a nice feature proposed to customers as part of a complete package.

The app, as it had been thought, has the objective among others to reduce the necessary time to plan trips. Planning trips take indeed lots of time, especially to people who usually prepare future trips well-ahead. The app suggests itineraries with the different stops. Therefore, thanks to the app, the user can be informed about most of the places of interest and the most renowned one located along the way and surrounding areas. This is particularly very useful in case the user does not know which touristic itinerary to take in order to enjoy the most interesting places. The app can help making decisions in the destination for future trips. It helps to reassure travellers.

Moreover, the Touristic app was thought in a way that it offers a standard product taking into account the user’s customization. The app was conceived for every type of travellers. Of course, travellers who always plan their vacation to feel more secure and/or who want to visit the maximum of best touristic places are more likely willing to use such an app. Although, the app was also thought for more spontaneous travellers as the app is able to search places of interest or even petrol stations during the trip. The app can show the nicest places of interest around the area in real time as soon as it is requested. The app can also be very handy to campers and travellers enjoying motorbike expeditions. This app is a nice way for TomTom, a global industry, to study the need of customization and adaptation to specific cultural and geographic contexts.

Indeed, it is almost a complete app which was thought and developed during the hackathon. Of course, more features would need to be added in order to create a
complete service able to assist travellers well. Carrying out such a project is an opportunity given by hackathons which stimulate innovation and always favour the birth of new ideas which can be turned into products when there are market opportunities.

1.7 How the results from the Hackathon are beneficial for WP1

The Touristic app developed during the hackathon offers another service which is quite different from the original use case described in D1.1 and which is implemented within QROWD. The approach of these two projects are distinct but not incompatible:

- The Touristic Network informs users about travel times needed to reach multiple destinations. Users can choose the best option according to the travel time and information on available services on the different destinations. In the QROWD use case, users are informed about the necessary time to reach every ski resort in Trentino by car.
- While the Touristic app developed during the hackathon suggests itineraries to users considering users’ preferences.

Both projects support the same activity which is tourism. Their approach diverges but is complementary. A more complete touristic app combining these two approaches can be imagined. Indeed, both approaches propose solutions to spend less time planning trips and to enjoy even more holidays and free time.

Below is an example of how both approaches could be combined: Once the user chooses one/several stops (hotels, restaurants, places of interest, petrol stations, etc.), the app displays a multi-destination network leading to every type of requested stops nearby (e.g. a multi-destination network leading to all restaurants located nearby). This would enable the user to be informed about available services in the surrounding area or in the area along the travel itinerary planned in the future.
Hackathon

Figure 11: Example of the app’s operation in the case of future planned trip

I open the App

The App asks me to select one profile or to customize one

- Backpacker
- Chill Family with young kids
- Active Family
- Luxury holiday
- Hyper active monument lover
- ...Invent your profile

The App asks me where is the trip?
- A to B (via points)
- Around A
- Country

I select: From Milan to Rome

The App asks me when is my trip?

I select: from 1/6/18 to 8/6/18

The App suggests me a 1st trip

I do not like it, I request a 2nd

The App suggests me a 2nd trip

I validate it

The trip contains stops:
- To petrol stations
- Car parks near by places of interest
- Recommended hotel, restaurants

I have the possibility of editing/cancel every stops

I decide to edit one stop to a place of interest

I click on the stop I want to edit.

The app shows a multi-destination network informing me on the travel time needed to reach each of the place of interest around the area.

M.1
2h min

M.2
1h 30

M.3
30 min

M.4
15 min

My current location
Place of interests (M.1, ..., M.4)

I choose my favorite option

The change is updated into the itinerary
This example shows how the Touristic Network (BC1#UC1) and the touristic app developed during the hackathon could be combined. Combining these two approaches would definitely improve the QROWD use case. Therefore, it would be considered for further development. In addition, such a combined service could be valuable in the sector of tourism for the city of Trento. In fact, Trento could benefit by making available to citizens and visitors such a combined app, as it is a nice way to encourage and advertise places of interest in Trentino. Therefore, the outcome from the hackathon, in other words the touristic app, is considered to be included in the WP1 for further development.

Moreover, the touristic app developed during the hackathon points out the importance of improving the quantity and the quality of POIs to offer the best service. As a matter of fact, the app should suggest travel itineraries with stops based on accurate datasets. The stops along suggested itineraries need to be relevant and contain detailed information about the place and the available services (e.g. a petrol station with toilets, a cafeteria and an Italian restaurant). Crowdsourcing is indeed seen as a solution to drastically improve the quantity and the quality of POIs. For instance, the Virtual City Explorer developed in the WP3 could be used to collect more POIs or to study “scenic routes” and improve trip suggestion.
5. CONCLUSIONS

“What the Hack? #4” was an extremely successful event, both by the outcomes as by the number of participants. It was well organised. More generally, this three-day event was well appreciated by participants as well as by the organisers. It was an event full of emotions as it was very challenging and enjoyable at the same time. In conclusion, the results from the different challenges were impressive. Participants were very engaged in developing their projects. Some of them stayed overnight, coding for 24 hours non-stop. The engagement and overall success show how much this type of environment fosters novel ideas and innovation.

The challenge presented by QROWD was based on the original architecture and added various new features on top of it. The results are very valuable for TomTom as the touristic app is an innovative idea showing an interesting potential for further development. The results from the Hackathon have also been quite beneficial for QROWD, as the touristic app provides interesting grounds for further collaboration in the development of QROWD legacy exploitation.

The touristic app and the Touristic Network, both can be improved by looking at crowdsourcing. In order to enable these two services to be functional and ensure a very high-quality level service providing relevant information to users, it will be interesting to explore the added-value of using crowdsourcing tools. Community inputs will indeed contribute to drastically improve the quantity and the quality of available POI datasets and particularly POIs on touristic sites. The crowdsourcing tools developed in QROWD, like the Virtual City Explorer, are highly relevant for the future productization of the Touristic Network (BC1-UC#1) and the touristic app. The potential of such crowdsourcing tools is worthwhile being further explored.
# 6. ANNEX 1

## Monday, 22.10.18

<table>
<thead>
<tr>
<th>TIME</th>
<th>MAIN EVENTS</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00-16:00</td>
<td>KidsHack (local Kids Event)</td>
<td>Festsaal</td>
</tr>
<tr>
<td>16:00-17:45</td>
<td>Welcome Desk / Meet&amp;Greet</td>
<td>Kantor Rooms</td>
</tr>
<tr>
<td>18:00-18:20</td>
<td>Welcome speech by Heiko Schilling + Unit leads</td>
<td>Kapelle</td>
</tr>
<tr>
<td>18:20-18:25</td>
<td>Welcome speech by Harold Goddijn</td>
<td>Kapelle</td>
</tr>
<tr>
<td>18:25-18:40</td>
<td>Prof. Günter Ziegler, President FU Berlin</td>
<td>Kapelle</td>
</tr>
<tr>
<td>18:40-19:10</td>
<td>Guest speaker David Beckett (Pitch coach)</td>
<td>Kapelle</td>
</tr>
<tr>
<td>19:10-19:20</td>
<td>Gregory de Jans: Map APIs Prize</td>
<td>Kapelle</td>
</tr>
<tr>
<td>19:40-22:00</td>
<td>Pitching / Dinner / Social Marketplace</td>
<td>Festsaal+Kapelle</td>
</tr>
<tr>
<td>23:00</td>
<td>End of the Day</td>
<td></td>
</tr>
</tbody>
</table>

## Tuesday, 23.10.18

<table>
<thead>
<tr>
<th>TIME</th>
<th>MAIN EVENTS</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30-09:30</td>
<td>Coffee &amp; Networking</td>
<td>Festsaal</td>
</tr>
<tr>
<td>09:30-10:00</td>
<td>Guest Speaker Woody Zuill, (mob programming)</td>
<td>Kapelle</td>
</tr>
<tr>
<td>10:00-12:00</td>
<td>HACK time</td>
<td>Festsaal+Kapelle</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch</td>
<td>Festsaal</td>
</tr>
<tr>
<td>12:00-18:00</td>
<td>HACK time</td>
<td>Festsaal+Kapelle</td>
</tr>
<tr>
<td>19:00-22:00</td>
<td>Dinner</td>
<td>Festsaal</td>
</tr>
<tr>
<td>20:00-OPEN END</td>
<td>HACK time</td>
<td>Festsaal+Kapelle</td>
</tr>
<tr>
<td>24:00</td>
<td>Late-night Snack</td>
<td>Festsaal</td>
</tr>
</tbody>
</table>

## Wednesday, 24.10.18

<table>
<thead>
<tr>
<th>TIME</th>
<th>MAIN EVENTS</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:00-10:00</td>
<td>Coffee &amp; Networking</td>
<td>Festsaal</td>
</tr>
<tr>
<td>09:00-10:00</td>
<td>Prepare presentations</td>
<td>Kapelle</td>
</tr>
<tr>
<td>10:00</td>
<td>Official end of the 24-hours Hackathon</td>
<td>Kapelle</td>
</tr>
<tr>
<td>10:00-11:00</td>
<td>Break (collection of results/ Presentations...)</td>
<td>Kapelle</td>
</tr>
<tr>
<td>11:00-12:00</td>
<td>Presentations of HACK results round 1</td>
<td>Kapelle</td>
</tr>
<tr>
<td>12:00-13:00</td>
<td>Lunch</td>
<td>Festsaal</td>
</tr>
<tr>
<td>13:00-14:15</td>
<td>Presentation of HACK results round 2</td>
<td>Kapelle</td>
</tr>
<tr>
<td>14:15-14:45</td>
<td>Break</td>
<td>Kapelle</td>
</tr>
<tr>
<td>14:45-16:00</td>
<td>Presentation of HACK results round 3</td>
<td>Kapelle</td>
</tr>
<tr>
<td>16:00-16:30</td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>8:00</td>
<td>Welcome Back!</td>
<td>Kapelle</td>
</tr>
<tr>
<td>18:30</td>
<td>Charles Davies: Reflections on Pitches/Challenges /The HACK</td>
<td>Kapelle</td>
</tr>
<tr>
<td>19:00</td>
<td>Winning Ceremony with Alain De Taeye, Charles Davies</td>
<td>Kapelle</td>
</tr>
</tbody>
</table>
7. REFERENCES
