



The illustration depicts a diverse group of people in a cityscape. On the left, a woman with curly hair stands holding a smartphone. Next to her, a woman in a blue shirt and red pants walks while looking at her phone. In the center, a person is seated in a wheelchair, also using a mobile device. To the right, a man with a beard sits on a park bench with his phone. Further right, an elderly man with a cane stands holding a smartphone. The background features stylized buildings, trees, and clouds. In the top left corner of the illustration area is the CORONA WARN-APP logo, which consists of a circular icon with a network-like structure and the text 'CORONA WARN-APP' below it.

**CORONA  
WARN-APP**

**Fighting COVID-19 with Privacy Preserving Digital Tracing**

**T** ■ ■ ■ LIFE IS FOR SHARING.

23. Juni 2020

## #together: Developing the Corona-Warn-App



## The Challenges

- > Many stakeholders
- > Strong time pressure
- > High complexity
- > Technically demanding
- > Maximum IT security
- > Maximum data privacy
- > Large public interest

# The Project ... 50 Days ... A Couple of Challenges + Several Stakeholders

Apple | Google API

Open Source

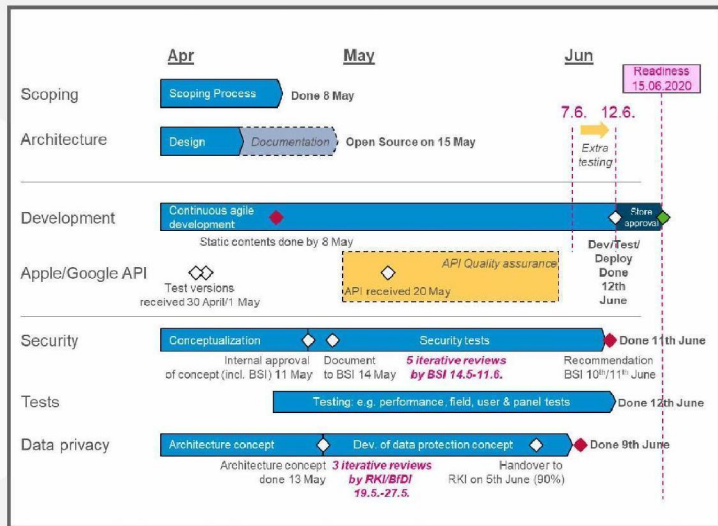
User Friendly App

Scalable, Robust Backend & Network

Data Privacy

Lab Connectivity

Calibration



The Approach: Fully Agile Project Across Company Borders And All Stakeholders

SAP

Bundeskanzleramt

Bundesministerium für Gesundheit

Presse- und Informationsamt der Bundesregierung

Fraunhofer

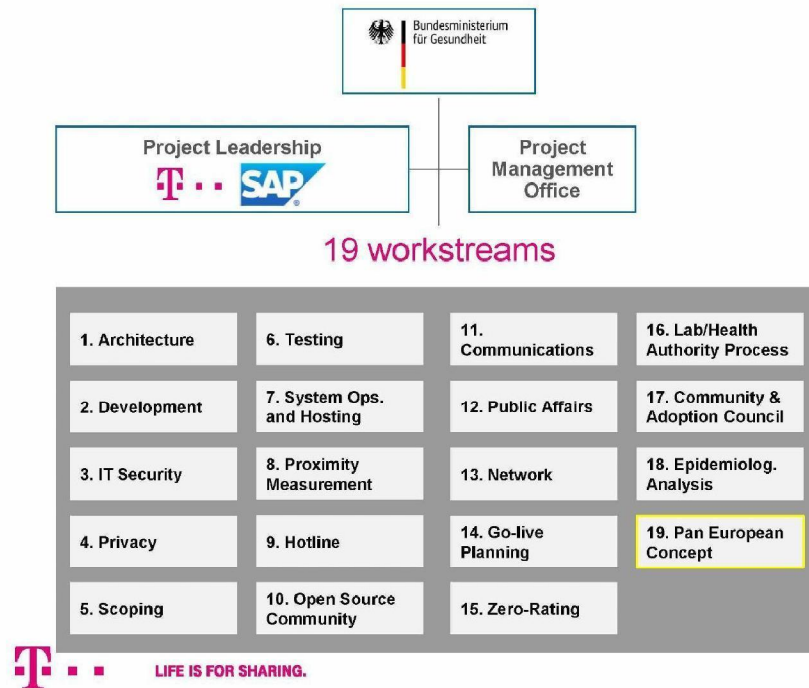
ROBERT KOCH INSTITUT

Apple

Google

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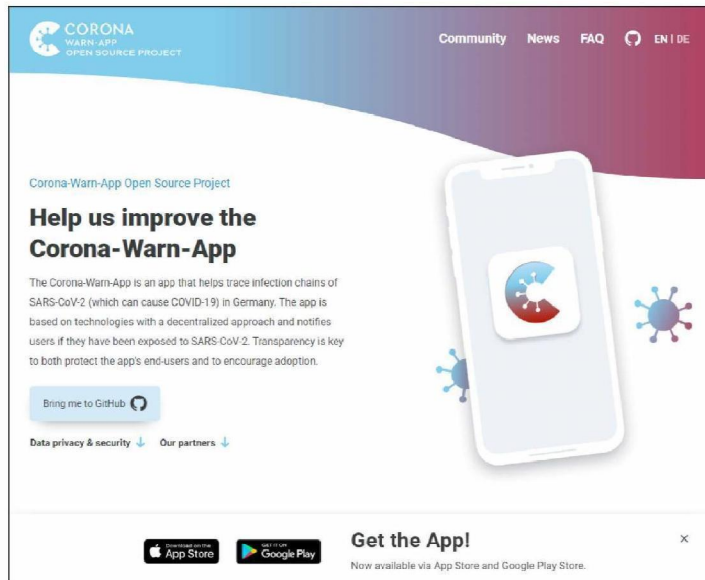
## The project: 19 workstreams, agile working mode, high-performing organization



- High-performing project organization, processes and governance
- Agile working mode with daily scrums
- Weekly top-level meetings with ministers, incl. Health Minister, Interior Minister and Head of the Chancellery
- Complex stakeholder management with several government authorities and other project partners
- Strong content work in all workstreams
- Joint team effort of T/T-Systems, SAP

## Making of CWA: Open Source Community & Transparency is Key for Success

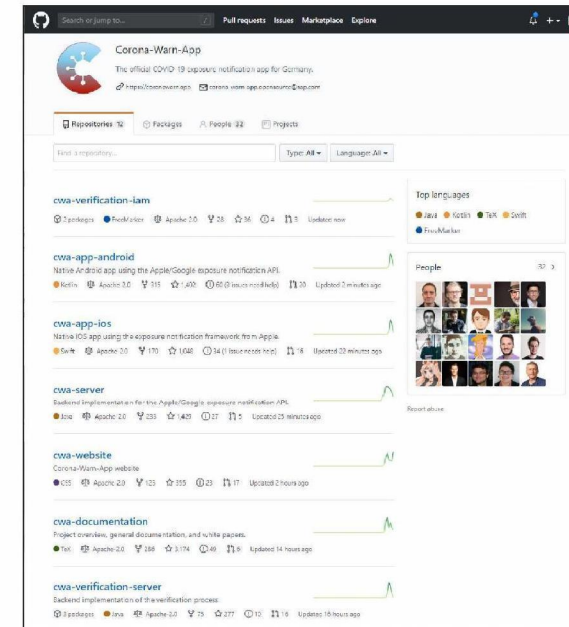
> 70.000 Visitors/Contributors / 500 forks / X0.000 Commits



<https://www.coronawarn.app/en/>



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<https://github.com/corona-warn-app>

- subject to change -

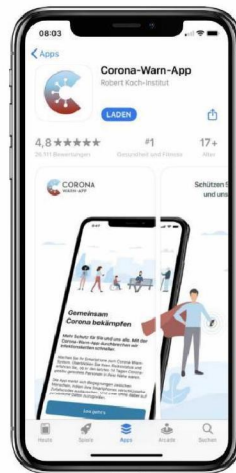
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## Most successful app launch of all time in Germany: 6.5M downloads within 24h

**CORONA  
WARN-APP**

**6.5M**  
Downloads  
within 24h



**App Store: 4.8/5**  
(25k Reviews)



**Play Store: 4.7/5**  
(30k Reviews)

## Most successful app launch in German history

- 6.5M downloads Day1
- Current Count 12.5M
- #1 in App stores
- Excellent ratings

Note: Numbers as of 17 June 2020  
Source: Apple / Google



## Despite early criticism, media and government extremely impressed by results

“The Corona-Warn-App project is the *first time in the history* of the federal republic that something like this has been *achieved* on behalf of the government *so quickly and on such a scale*”

 heise online

“This process can become *a blueprint for future IT projects* of the federal government”

 NETZPOLITIK.ORG



“It is *not the first warning app* worldwide to be presented, *but I am quite convinced it is the best*”

Sources: 1) [heise.de](https://www.heise.de), 4 June 2020 2) [netzpolitik.org](https://www.netzpolitik.org), 15 June 2020 3) Head of the Chancellery Helge Braun in a press conference on 16 June 2020

**Corona-Warn-App: More than a App ...**  
 ... we digitize core processes of the current health system AND we trace proximity



## Goal:

Working together to quickly interrupt infection chains

## Result:

- App for Android and IOS
- Proximity Tracing Server
- Lab Integration server
- Verification Server
- Portal Server
- CDN
- Zero-Rating
- Labs & Health Authority Integration
- 2 Support Hotlines



## Key Principles



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- **Simplicity:** Well-structured, barrier-free & multilingual user interface
- **Data minimization:**
  - High degree of privacy, **no personal data**
  - No extra burden on users' data balance
  - **No GPS data**
  - No access to local phone data (address book etc)
- **Use of standard technology:** **Bluetooth Low Energy** for contact tracking is available on most devices
- **Speed:** Digitalization of the test process saves time - information flows to the contact chain quickly and more completely
- **Security & transparency:** Intensive protection via open source, tests and operation in a high-security data center

# App with decentral approach

With minimal data collection maximum efficiency in interrupting infection chains

## What the app covers:

Contact tracing and digital verification of test results



Contact registration  
via Bluetooth



In case of a positive  
test: Sending  
pseudo-ID of infected



Local comparison of ID  
and warning of affected  
contacts

- **Speed:** Automatic matching of contacts and warning (efficient, digital lab process)
- **Scalability:** Complete automation of anonymous contact tracing
- **High privacy:** No personal data entry required, usage of pseudonymous IDs
- **Accuracy:** Automatic digital recognition of encounters, no manual tracing
- **Improvement of app:** Bluetooth calibration (distance) and refinement risk estimation/scoring



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## What the app does not cover



- **No epidemiological discoveries:**  
no data basis for the determination of 'R'-value;  
no visibility of specific infection chains („Graph“)  
  
→ „Phase 2“ to incorporate some form of data acquisition –  
voluntary for users. Concepts to be exchanged with BMG/BSI.
- **No self-learning app:** Optimization of risk parameters only  
possible with external research data
- **No Geo/GPS information:** Hotspot identification has to be  
executed differently

## Decentral Proximity Tracing: How it basically works



1.

The app **records proximity durations** to other devices the user approaches and also running the app.



2.

If a user verifies a positive COVID-19 diagnosis, the device **keys can be uploaded**



3.

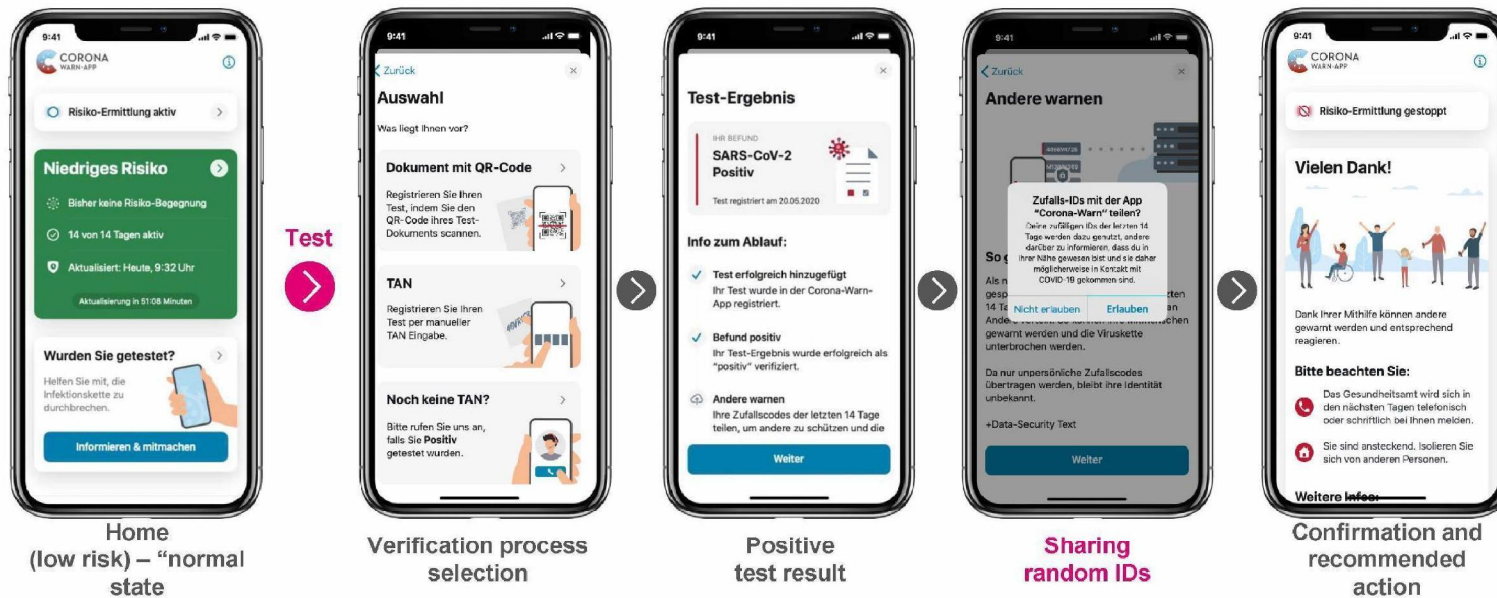
All devices running the app download all infection keys and perform a **local matching** to notify the user



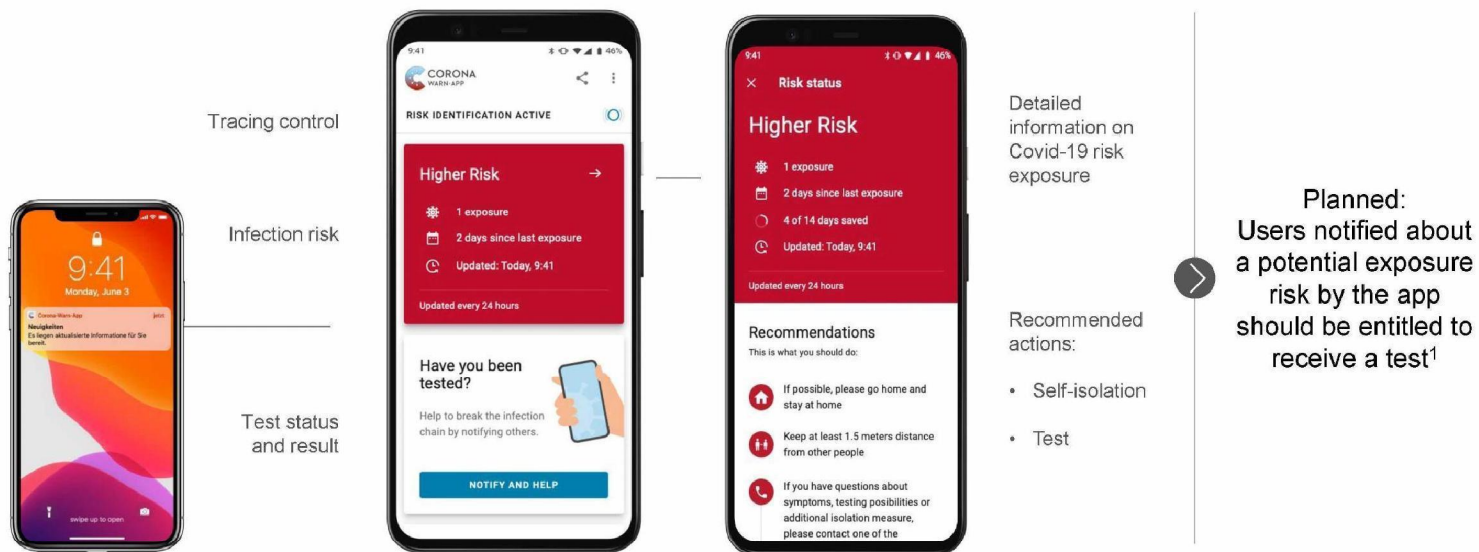
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Note: The bluetooth beacon randomly generates transmission keys, that do not allow any tracking to the user. The transmission keys are changed every 10-20 due for security reasons.

## Users who tested positive can complete the verification & notification process in the App through the digitized lab process



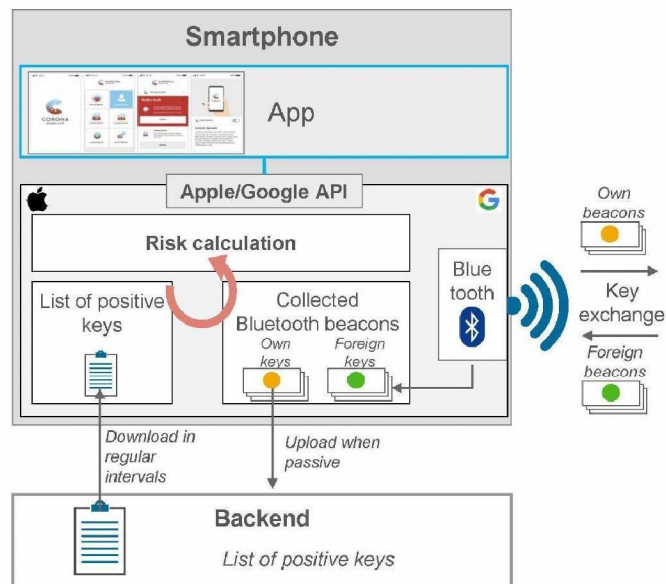
## In case of an increased infection risk after a critical contact, the App notifies the user and provides recommendations



1. [Arzteblatt.de 27/5](https://www.aerzteblatt.de/nachrichten/72775), in accordance with a draft version for the "Verordnung zur Leistungen der gesetzlichen Krankenversicherung bei Testungen für den Nachweis des Vorliegens einer Infektion mit dem Coronavirus SARS-CoV-2" des BMG

## Apple / Google APIs support app functionality

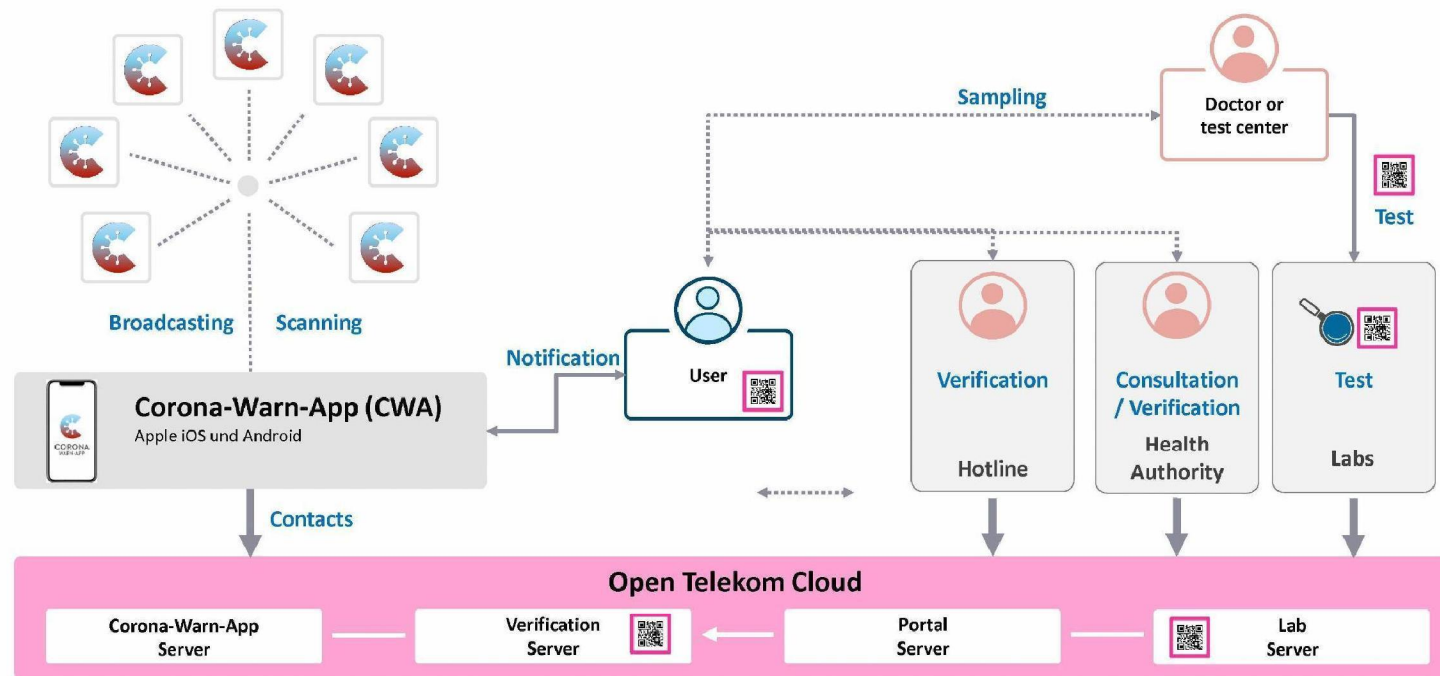
### Interplay between app and operating system (OS)



### OS functionality

- Bluetooth distance measurement (performed in background)
- Generating and storing daily keys and temporary Bluetooth beacons
- Requesting and receiving foreign keys from other smartphones in proximity
- Risk calculation, using adjustable risk parameters
- Communicating risk assessment to app
- **Note: Contact tracing functionality in OS can only be activated with an official national Corona Warn App installed**

## Beyond the app, we helped digitize labs and authorities in a complex landscape

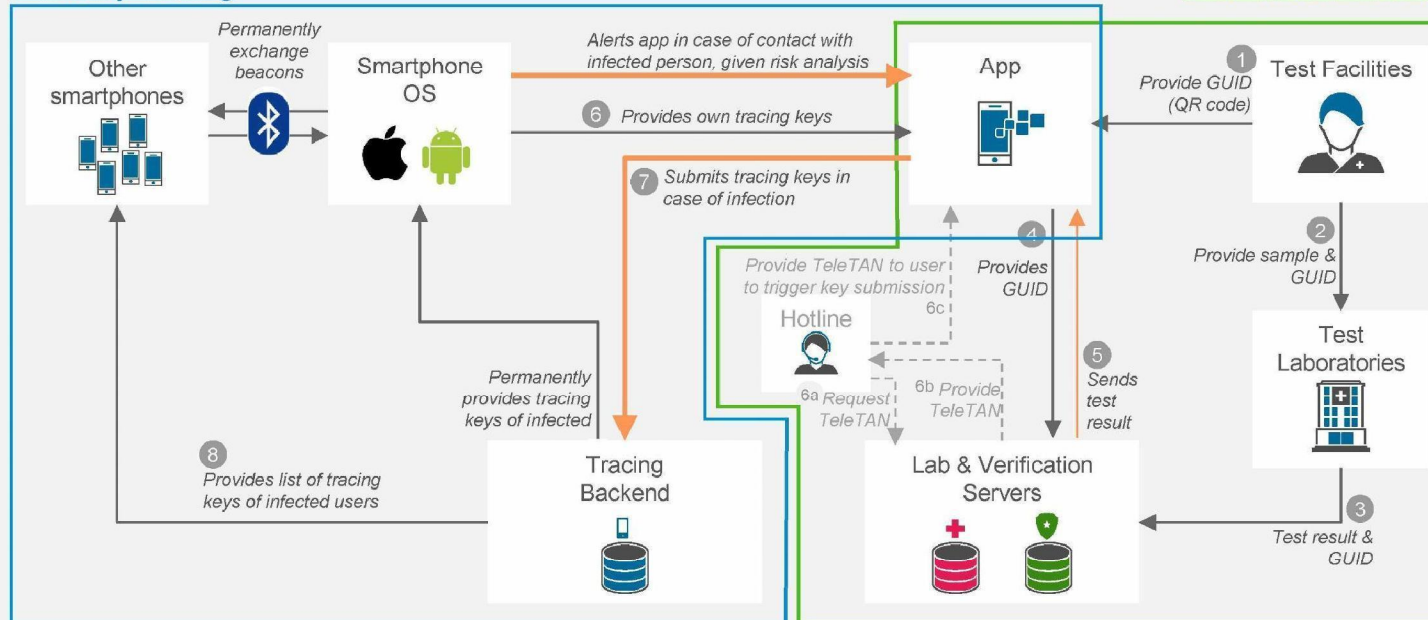


# Tracing app is embedded into an ecosystem

Simplified

## Proximity Tracing

## Verification / Testing



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→ Default process

--- Additional steps in backup process

① - ⑧ Sequence in process after testing

- subject to change -

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## Key GDPR Principles are Covered

### Principle

### Implementation



**Lawfulness, fairness and transparency**

- ✓ No personal data recorded by app
- ✓ Any data sharing is voluntary, data remains anonymous



**Purpose limitation**

- ✓ Clear purpose (contact tracing)
- ✓ Storage of data only as long as necessary (14 days)



**Data minimization**

- ✓ No personal data collected
- ✓ No location-based data collected



**Accuracy**

- ✓ Minimal data stored prevents inaccurate data from being stored in the first place
- ✓ Individuals may erase data (e.g. by uninstalling)



**Storage limitation**

- ✓ Periodic deletion of data
- ✓ Once epidemic is over, data can be removed from server



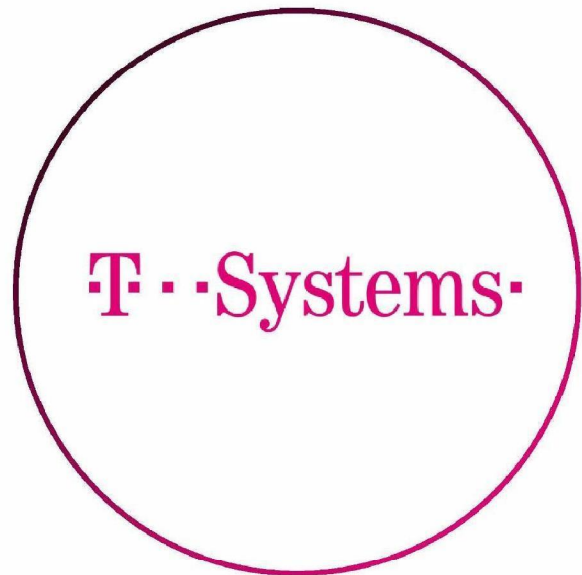
**Integrity and confidentiality**

- ✓ Technical precautions protect data from unauthorized or unlawful processing



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Your partner: T-Systems



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• **Digital:** Highest expertise

• **Team player:** Strong partners

• **Reliable:** On-time delivery

• **Agile:** Modern working mode

• **Motivated:** Going the extra mile

## Whats Next? Some Features will be added

Safeguarding

Operations

Feedback

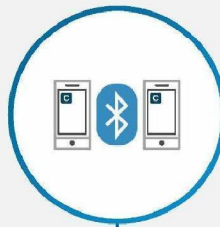
Improvement

Phase 2 next 6 weeks



### Interoperability between countries

Ensuring interoperability between tracing apps in different countries and adhering to different technical systems



### Improvement of BT measurement

Achieving higher precision of Bluetooth measurement with further testing and improvements of A/G Bluetooth interface



### Improvement of risk scoring

Better understanding of epidemiological parameters to improve Risk Scoring



### Monitoring of pandemic response

Monitoring of total pandemic response measures to enable effective steering and easing measures



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# Adoption: Massive Push on all Channels

## Campaign on German Government



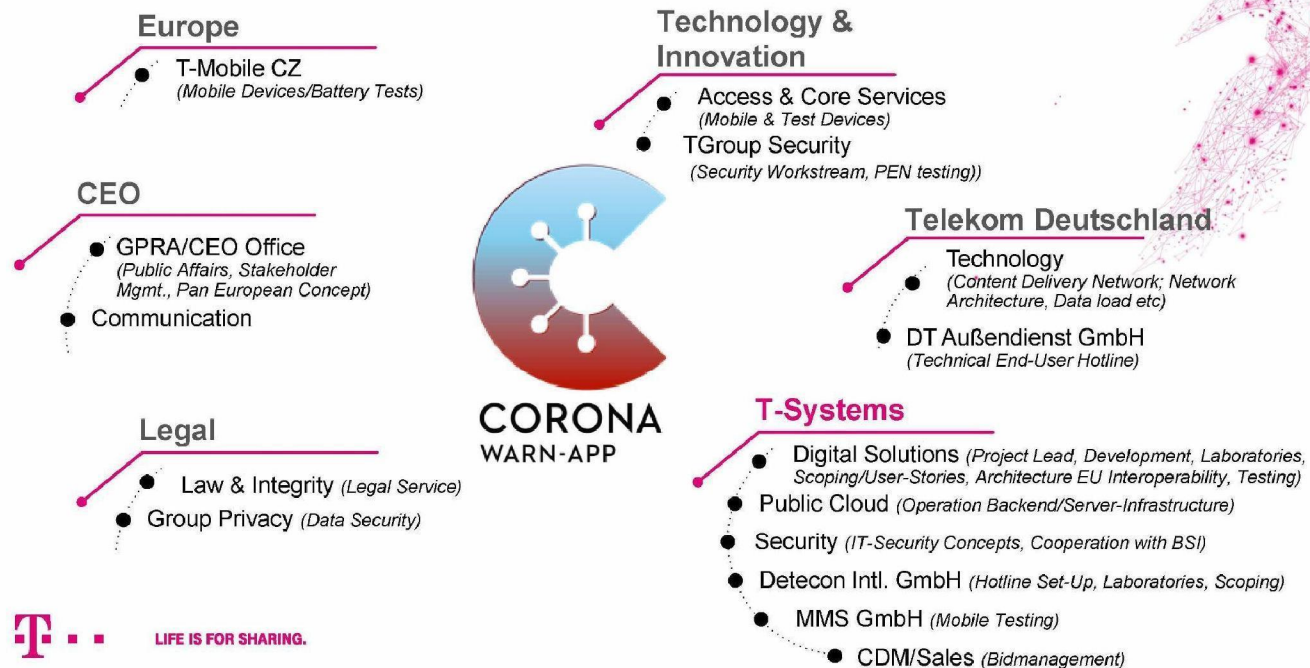
## Campaign Material for Supporters



## DAX30 CEO Call with A. Merkel



Depending on your needs, T-Systems leverages the Telekom Group and other partners to provide the best results – like the app!



June 23, 2020



Backup

## Summary: Development of Corona-Warn-App for the German Ministry of Health

### The Challenge



Development of official German COVID-19 contact tracing app

Short delivery timeline from project start to app launch (~7 weeks)

High number of target users (30M+) strived for

End-to-end development scope: from phone apps to server backends

Technical challenge: thorough testing and improving API for contact tracing

### Our Approach



One-team collaboration approach with SAP and Fraunhofer IIS

Fully agile project delivery to meet tight development and testing timeline

Fully remote working setup across all teams

Emphasis on data privacy and strict open-source approach

Daily touchpoints with critical stakeholders to ensure close alignment

### Result



On-time delivery of app and backends, lab connection, and required hotlines

Significant improvements to Bluetooth API and measurement calibrations

First Bluetooth contact tracing app fully compatible between Android and iOS

Positive community feedback for open-source strategy and attention to privacy

Govt agency requirements regarding data privacy and IT security fully met

#### Involvement of many high-level stakeholders



*"The Corona-Warn-App project is the first time in the history of the federal republic that something like this has been achieved on behalf of the government so quickly and on such a scale"*

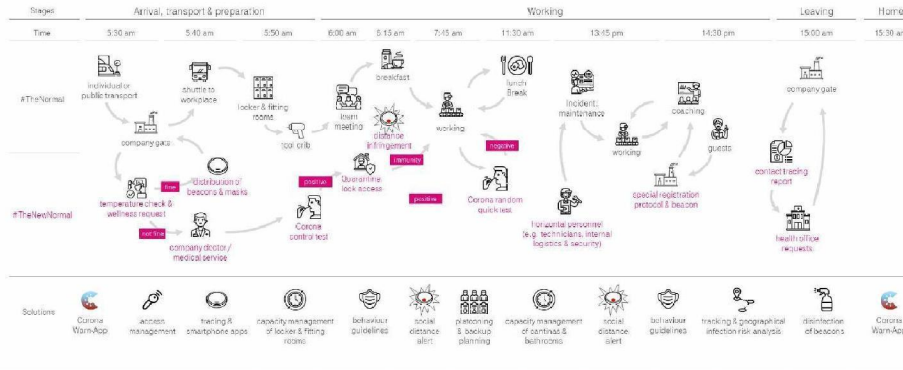
Heise.de<sup>1</sup>, June 4, 2020



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1. Link: <https://www.heise.de/hintergrund/Corona-Warn-App-Quellcode-Analyse-eines-beispiellosen-Open-Source-Projektes-4774655.html>

## #TheNewNormal – Safeguarding people and operations



### T-Systems – Managing #TheNewNormal



**T-Systems** Let's power higher performance

## Let's integrate your enhanced operations

- 1 Define your specific safeguarding journey (1 day workshop, € 5.000,- fixed price)
  - 2 Assess status quo and draft #TheNewNormal (1 week sprint, € 25.000,- fixed price)
  - 3 Define your "new" landscape and integration and plan the incremental implementation
  - 4 Implement and extend your systems in SCRUM mode and orchestrate providers
- Let's get in touch now!

**Your contact**  
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