cov-ID

Privacy & Security in the Age of Pandemics

cov-ID

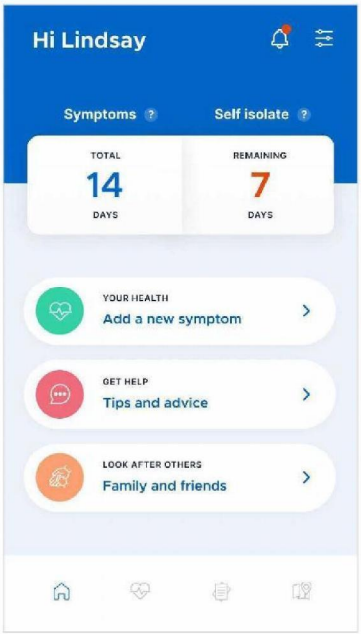
Privacy & Security in the Age of Pandemics

History has shown that States of Emergency very easily lead to the erosion of civil liberties, the reach of which go well beyond the context of the catalysing event: situations where the necessary and just extension of executive power ultimately embolden the chilling effects of censorship and control. Humanity is in the middle of a global health crisis, and in light of lessons learned from recent history, it seems prudent to adopt a strict approach of guaranteeing the privacy of the individual whilst simultaneously enabling governments, health-care professionals, employers and academic researchers access to aggregate data that is needed to affect positive change, to direct policy, and to get the epidemic under control. The IOTA Foundation has started to develop **cov-ID**, a self-sovereign identity and data sharing solution specifically geared to tackle this crisis.

This needs careful consideration based on the premise that individuals around the world will be facing profound changes of their social and economic environments. Livelihoods will be impacted as the job market changes and employers begin to require regular testing and vaccination. Personal liability and responsibility will become the drivers of herd immunity; enshrined not only in cultural norms but also at border crossings and checkpoints. Our holistic solution will enable individuals to securely maintain their health records, share data with relevant authorities in privacy-preserving ways, and get crucial insights into their communities. In scenarios where the pandemic will hit the population in several waves, and lockdown is only enforced when critical thresholds of active disease is reached, the tool will be even more useful due to its ability to provide early warning. It will enable the trust to make exemptions from the lockdown for those who have developed antigens or have been successfully vaccinated.

Audience

With this backdrop in mind, **cov-ID** seeks to address the needs of two primary audiences: "Individuals" and "Authorities". Individuals are the human beings who use the application to get curated news / up-to-date infographics about the disease, chronicle their health, and opt-in to sharing their personal data. Authorities are identifiable and trustworthy organisations like public foundations, universities, employers and governmental agencies that use this data. To be clear: Individuals must explicitly choose with whom they share their personal information.



Individuals (Data Donors)
In times of crisis, **cov-ID** will help individuals stay informed with trusted data while empowering them to contribute to the fight against the pandemic:

- Assist individuals in self-reporting their health status and other key metrics to caregivers and other authorities
- Enable the sharing of data that is privacy-preserving and GDPR / CCPA compliant
- Make reliable information available in real-time, preventing fake news and panic
- Check-in with loved ones and local communities
- Match volunteers with demand from vulnerable populations
- Certify key events such as negative test results or positive antibody test results to be shared with employers, border agencies and other public bodies
- Store credentials and interact with health-care professionals.

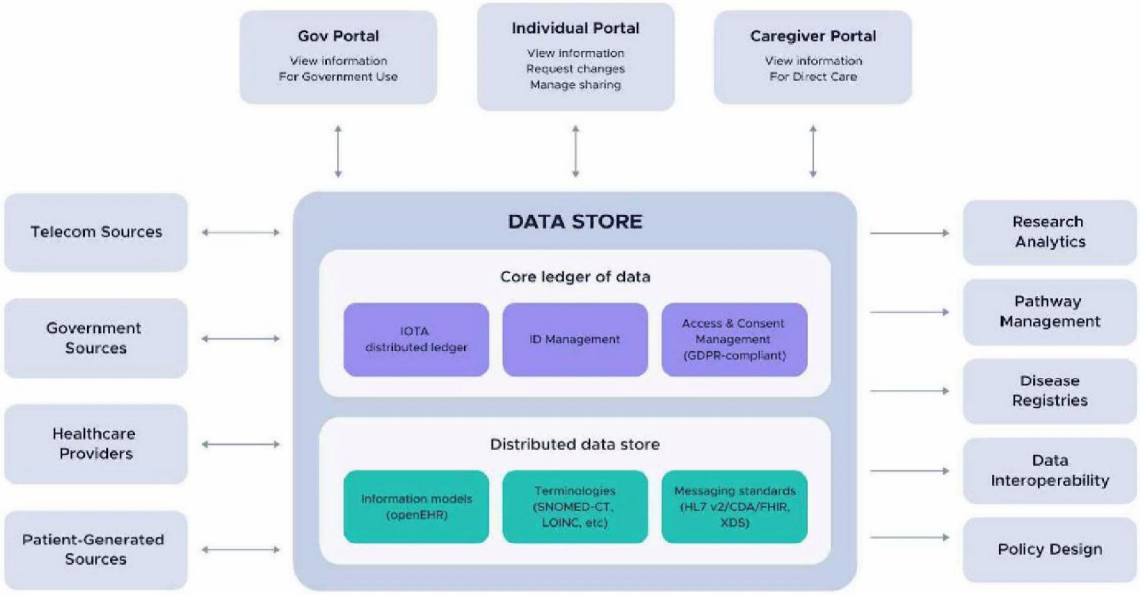
Authorities (Data Processors)
With public institutions under pressure, our solution will support the decentral collection, harmonisation and evaluation of high-quality, high-periodicity data for governments, employers, researchers, health care providers and certification authorities. (Note: This list below is not exhaustive and seeks to explore the ways in which Authorities can interact with the data.)

- Increase the data available to trusted authorities based on voluntary, privacy-preserving collection methods
- Improve resilience of crucial IT infrastructure by securing and storing data decentrally
- Empower data custodians to share data without exposing personally identifiable information
- Leverage big-data analysis and federated machine learning for evidence-based action
- Directly contact and warn people and communities at risk
- Prevent spread of disease among employees and ensure continued operation
- Guarantee the health of all customer-facing employees, increasing trust in the organization
- Track provenance and health along chains of custody
- Prepare and react quickly to employees self-reported health status

Solution

We envision three applications working together in tandem:

1. The first is a free mobile app, for the Individuals to engage with verified news sources, recording their health, storing health certifications and enabling them to share their data with authorities and friends.
2. The second is a desktop app for the Authorities to use for managing their credentials, collecting data, and exporting to other formats useful and appropriate to their particular needs.
3. Thirdly, the critical component of secure decentralized data distribution and access will be run on a federation of servers.



Please note: this diagram is a mashup of diverse technologies consisting of open-source projects stemming from the IOTA foundation and other resources. Please review the Technical Addendum at the end of this document for implementation details.

One Trusted and GDPR Compliant Data Hub with Integration for Third-Party Solutions

We are building an open-source platform that will allow third party development teams and integrators to easily extend its core functionality. With well-defined software development kits (SDK) and extensible data exchange formats (schemas), the straightforward process will be documented and supported by the IOTA team. The strong security posture makes it ideally suited not only for hackathons and open-source experimentation, but also in production for mission critical services for individuals and authorities alike. Effective GDPR compliance is an integrated part of the solution and the benefit over centralized cloud-based solutions due to the use of the IOTA protocol and the integration of Digital and Decentralized Identities for individuals, organisations and governments.

IOTA - A Free and Open Source Protocol for Society

IOTA is a secure data communication protocol and zero-fee microtransaction system utilizing distributed ledger technology. This allows participants in the IOTA network ("the Tangle") to securely and immutably encrypt, transfer and store data. The Tangle provides a single source of truth and trust in data, with a goal of being the backbone of (every)thing in a highly networked world. IOTA is developed as Open Source with the full benefits of transparency of and visibility into the code base, better reliability, security and freedom from becoming locked-in by vendor or technology. Depending upon the decision of the working group, the solution will be based on any combination of a private network and/or the public IOTA mainnet.

- Eclipse Unified Identity Protocol (UIP): A completely free-to-use implementation of self sovereign identity, creating trust in data and its origin with a privacy first approach. Includes zero-knowledge and minimal disclosure encryption techniques. (Developed under the Eclipse Foundation)
- IOTA Access: Secure and hardware-enforced access control to data for Authorities

- IOTA Streams: Encrypted data streams provably from the same origin.
- IOTA Token: A feeless token that can be used to incentivize and reward data sharing.
- IOTA Chronicle: A high performance and decentralized storage that indefinitely stores historical transactions. Useful to reliably request data such as Identities.

Digital Identities

The need for verifiable personal information can be fulfilled by digital identity. When Individuals provide personal information to an Authority or other Individuals, in a "Bring Your Own Identity" (BYOI) manner, they will be able to prove that their personal information is perfectly accurate. With digital identity, the Individual can decide what information to share and with whom they would like to share it. This will maintain and even improve their privacy.

Using the standards proposed by W3C, the Unified Identity Protocol (UIP) is an implementation of digital identity on IOTA. Using this protocol, a new digital identity (DID) can be created by anyone or anything at any time. Verifiable Credentials strongly enhance the use of DID which are statements about the creator of the DID. They can be shared and verified via BYOI and the DID creator remains in complete control of the process. The IOTA Foundation is developing Selv, a data wallet app for iOS and android to easily create a DID, and receive and share verifiable credentials. Unified Identity is a highly technical topic, so we recommend that you consult this document that describes UIP in much greater detail.

Principles

When building technology, intent matters. How we work:

- **Human Centric Design:** We iteratively learn together with our partners, build capacities, and employ participatory approaches across cultures and geographies.
- **Tangible Results:** We create impact that is supported by evidence and aligned with the response of the WHO and leading research institutions on epidemiology.
- **Ecosystem Approach:** Impact is transversal and we work across silos to bring together diverse expertise from civil society and industry, creating value for both.

Qualification, Experience and References

The IOTA Foundation is one of the leading institutes for distributed ledger research and development. Actively collaborating with many (multi)national corporations, academics and governments, the protocol is being developed as open-source software that seeks to provide trust in a digital world.
The IOTA Foundation is proud to attract an international set of best-in-class experts in technology, cryptography, research and development, identity, security, and industrial domain expertise.
Immutable, secure and outage-proof data transfer and storage is the DNA of IOTA. The underlying principles of IOTA are being tested and used across different industries to ensure the trust in data without any vendor lock-in. IOTA's open platform is the technology best suited for consolidating the ongoing efforts of fighting COVID-19, and it does this by sharing trusted data from multiple sources and across data-silos, while maintaining the data protection rights of the individual.

Excerpt of References and Endorsements:

- The IOTA and Eclipse Foundations Launch Tangle EE Working Group to Accelerate Commercial Adoption of IOTA
- Cities of the future: IOTA, Jaguar Land Rover, Engie Lab Crigen & Entra
- IOTA, Dell Technologies, and Linux Foundation Collaborate on Rebuilding our Trust in Data
- IOTA Links with STMicroelectronics to Accelerate IoT Technology Integration
- IOTA & EVRYTHNG, a new collaboration for supply chain transparency
- IOTA becomes founding member of International Association of Trusted Blockchain Applications- INATBA
- Green light from the EU Commission for IOTA and the European smart city consortium +CityxChange
- Extensive list of academic publications, 3rd party patents including the IOTA technology and industry collaborations

Get Involved

IOTA takes an ecosystem first approach. Our network comprises several hundred experienced distributed ledger, IoT, and AI developers and our partner network includes leading corporate actors, governments, start-ups, and research institutions worldwide. Our goal is to quickly and efficiently tap into this potential and bring together diverse partners to contribute missing pieces to challenging problem-solving puzzles. To tackle the Covid crisis and the other pandemics that will inevitably follow it in future, we are looking for support and expertise in the following areas:

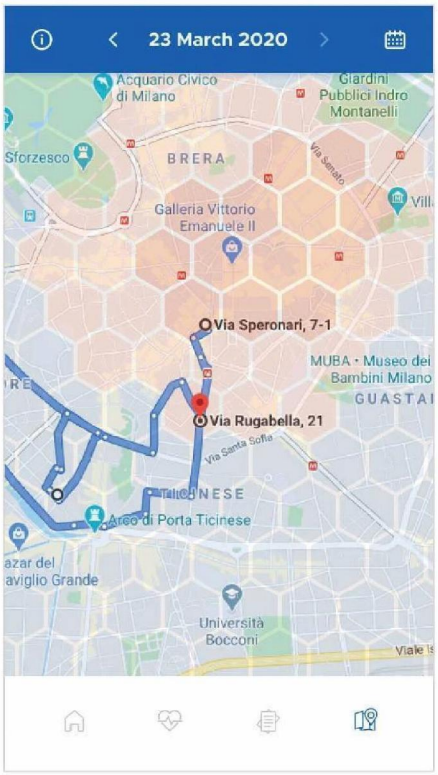
- Expertise from all sectors in building and implementing cov-ID as a secure and useful tool
- Financial support to expedite and expand the development of the cov-ID solution
- Data and analytics to improve the accuracy and relevance of the cov-ID app

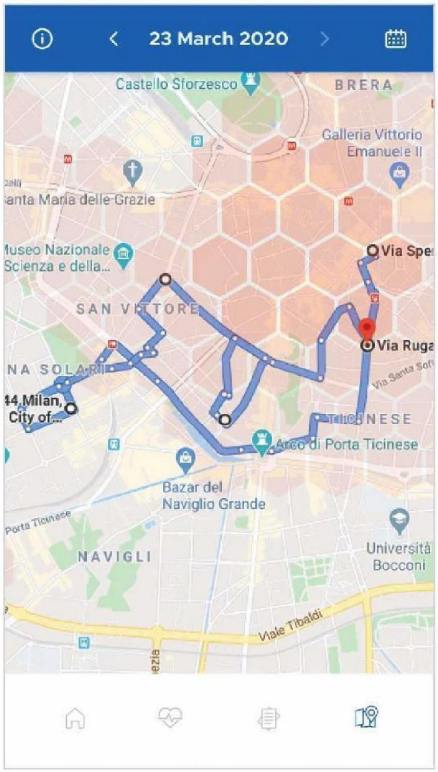
About the IOTA Foundation

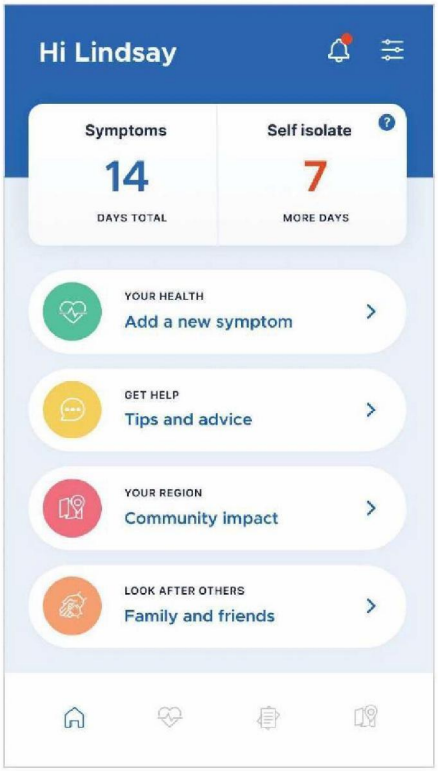
The IOTA Foundation is a not-for-profit organization established in 2017 and headquartered in Berlin, Germany that consists of 118 individuals distributed across 26 countries. The Foundation's mission is to drive the development and standardization of new distributed ledger technologies (DLTs) that enable permissionless innovation ecosystems. The IOTA Foundation works to realize this potential by actively building a collaborative ecosystem of developers, start-ups, private enterprises, and government, civil society and academic institutions. The IOTA Foundation takes a society-first approach to cutting-edge technological innovation. We employ a collaborative philosophy focused on end-user empowerment and social good rather than towards profit. Concretely, we engage in engineering, research and community organizing efforts around the IOTA Tangle – a new generation of DLT specifically designed to be the open and free trust layer for the Internet-of-Things (IoT).

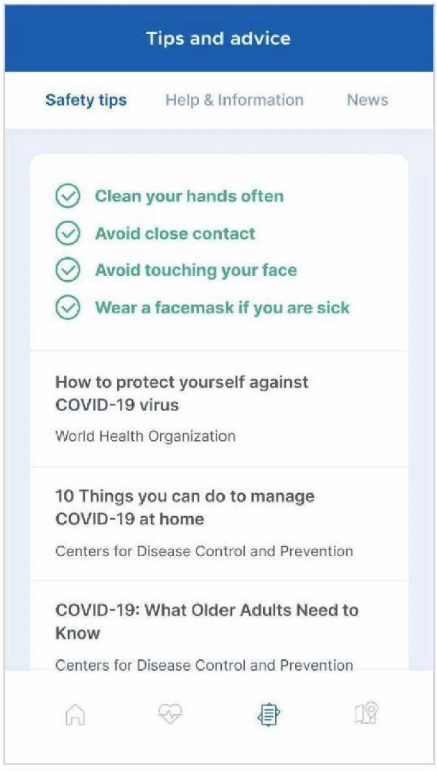
Our aim is to make a universally utilizable distributed ledger protocol available to the public. One that is stable, scalable, fast and free for all to use. The core functionalities of this DLT protocol include secure data transfer, fee-less micropayments, tamper-proof record-keeping, user-controlled data privacy, distributed computing, and real-time data monitoring and reporting processes.

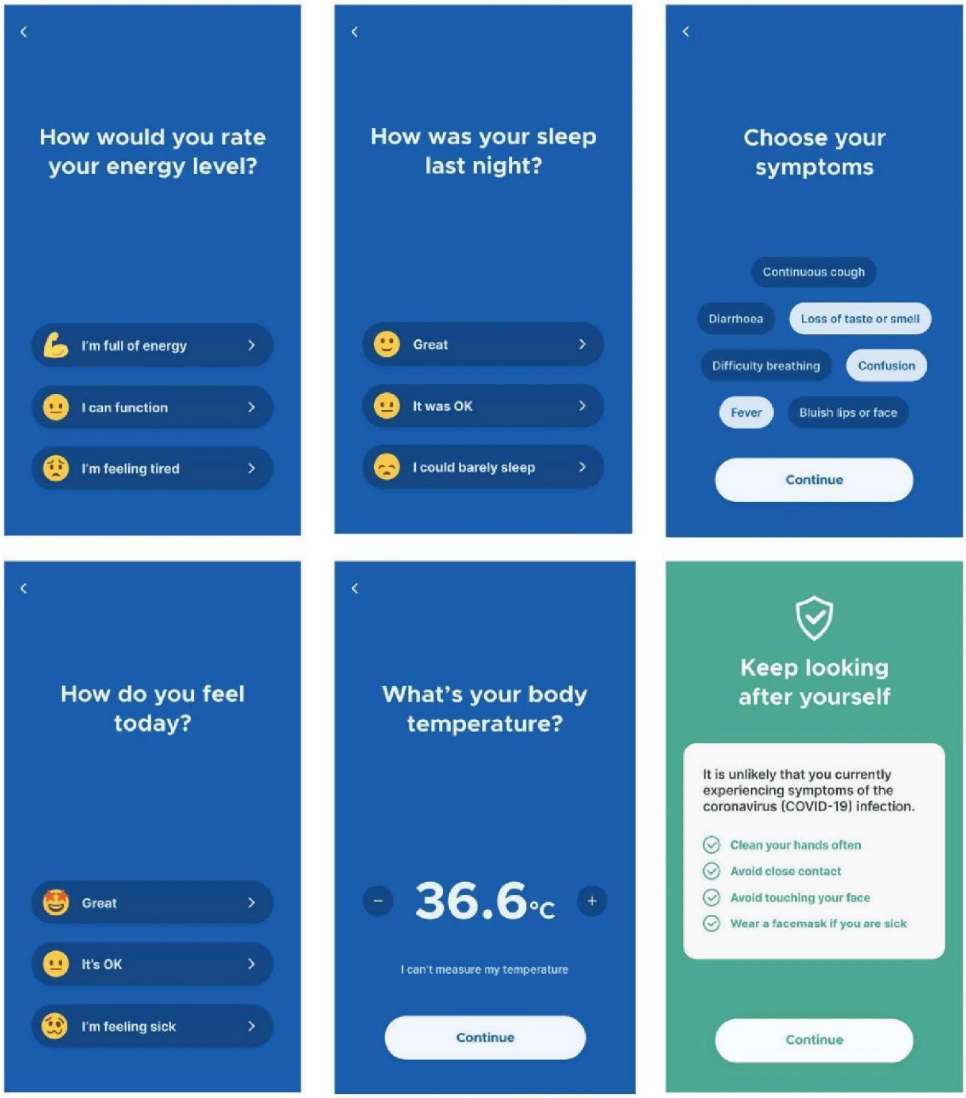
UX Research

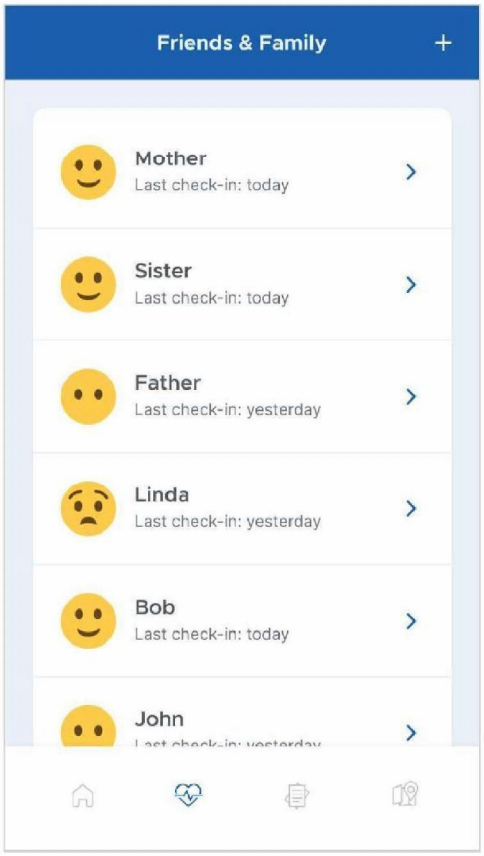

23 March 2020
Acquario Civico di Milano
Giardini Pubblici Indro Montanelli
Sforzesco
BRERA
Galleria Vittorio Emanuele II
Via Speronari, 7-1
MUBA - Museo dei Bambini Milano
Via Rugabella, 21
Via Santa Sofia
Arco di Porta Ticinese
Università Bocconi

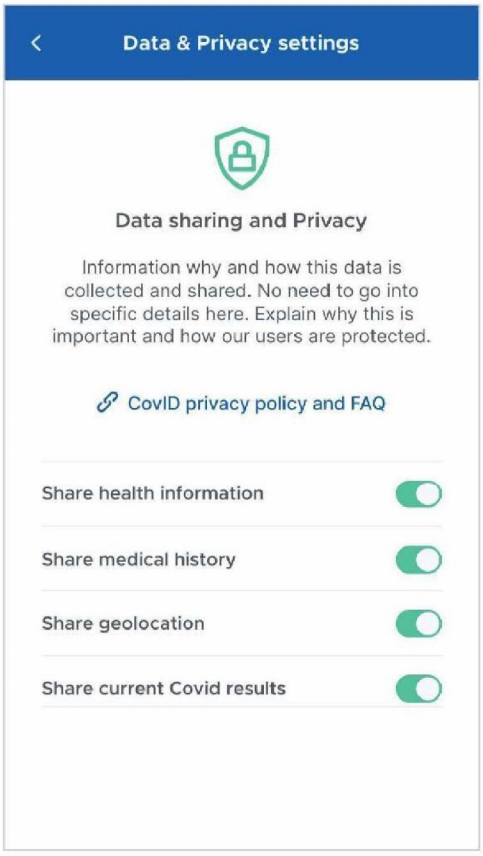

23 March 2020
Castello Sforzesco
BRERA
Galleria Vittorio Emanuele II
Museo Nazionale Scienza e della...
SAN VITTORE
Via Rugabella, 21
Arco di Porta Ticinese
Bazar del Naviglio Grande
NAVIGLI
Università Bocconi
Viale Tibaldi


Hi Lindsay
Symptoms
14
DAYS TOTAL
Self isolate
7
MORE DAYS
YOUR HEALTH
Add a new symptom
GET HELP
Tips and advice
YOUR REGION
Community impact
LOOK AFTER OTHERS
Family and friends


Tips and advice
Safety tips
Help & Information
News
Clean your hands often
Avoid close contact
Avoid touching your face
Wear a facemask if you are sick
How to protect yourself against COVID-19 virus
World Health Organization
10 Things you can do to manage COVID-19 at home
Centers for Disease Control and Prevention
COVID-19: What Older Adults Need to Know
Centers for Disease Control and Prevention


How would you rate your energy level?
I'm full of energy
I can function
I'm feeling tired
How was your sleep last night?
Great
It was OK
I could barely sleep
Choose your symptoms
Continuous cough
Diarrhoea
Loss of taste or smell
Difficulty breathing
Confusion
Fever
Bluish lips or face
Continue
How do you feel today?
Great
It's OK
I'm feeling sick
What's your body temperature?
36.6°C
I can't measure my temperature
Continue
Keep looking after yourself
It is unlikely that you currently experiencing symptoms of the coronavirus (COVID-19) infection.
Clean your hands often
Avoid close contact
Avoid touching your face
Wear a facemask if you are sick
Continue


Friends & Family
Mother
Last check-in: today
Sister
Last check-in: today
Father
Last check-in: yesterday
Linda
Last check-in: yesterday
Bob
Last check-in: today
John


Data & Privacy settings
Data sharing and Privacy
Information why and how this data is collected and shared. No need to go into specific details here. Explain why this is important and how our users are protected.
CovID privacy policy and FAQ
Share health information
Share medical history
Share geolocation
Share current Covid results

Collaboration Partners

Technical partners

filancore schluss

TAURI

Supporting Partners

tmforum

TM Forum Catalyst Digital Business Marketplace III

Champions

Agile Fractal Grid BT

NTT etisalat

Participants

accenture BearingPoint // Beyond

{d|g} IOTA mvine

intel UNIVERSITY OF SURREY