Contact Tracing mobile apps cross-border interoperability

eHealth Network

Technical Experts – "Infected keys" work stream

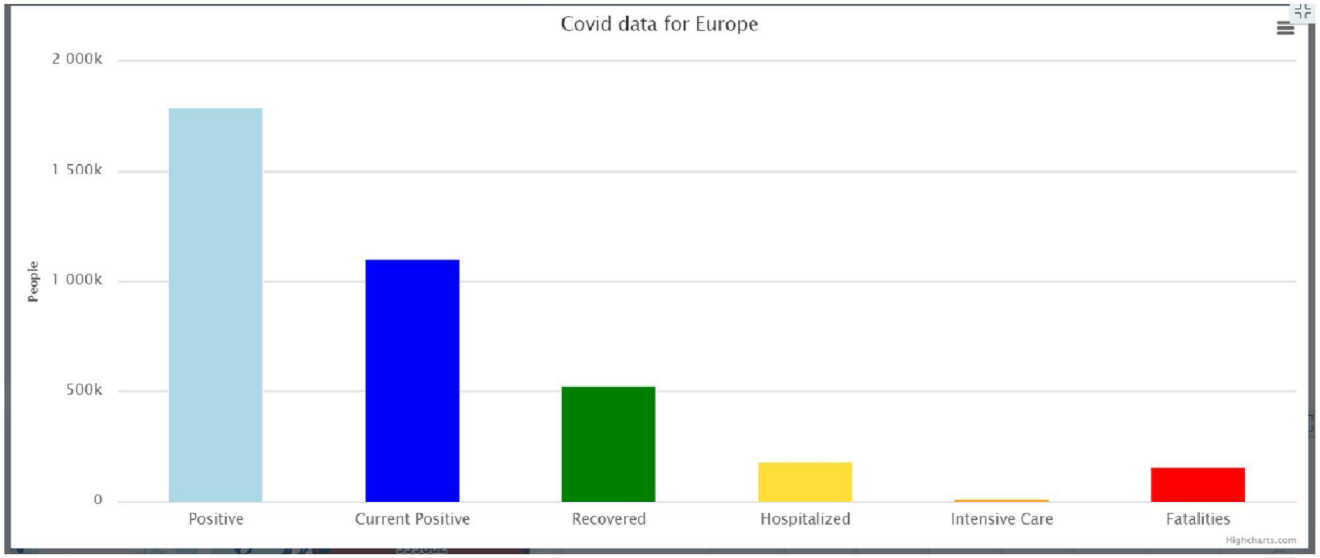
2020-05-25

Meeting purpose

Agree on cross-border interoperability architecture:

1. Essential data to be uploaded
2. Backend – federated or roaming

Covid-19 in Europe



European Commission

#	Country, Other	Total Cases	New Cases
2	Spain	282,370	+466
3	UK	257,154	+2,959
4	Italy	229,327	+669
5	France	182,469	+250
6	Germany	179,986	+273
7	Belgium	56,810	+299
8	Netherlands	45,064	+176
9	Belarus	35,244	+941
10	Sweden	33,188	+379
11	Switzerland	30,725	+18
12	Portugal	30,471	+271
13	Ireland	24,582	+76
14	Poland	20,931	+312
15	Ukraine	20,580	+432
16	Romania	17,857	+145
17	Austria	16,486	+50
18	Denmark	11,289	+59
19	Serbia	11,092	+68
20	Czechia	8,890	+77
21	Norway	8,346	+14
22	Moldova	6,994	+147
23	Finland	6,568	+31
24	Luxembourg	3,990	+9
25	Hungary	3,713	+35
26	Greece	2,876	+2
27	Bulgaria	2,408	+36
28	Bosnia and Herzegovina	2,391	+19
29	Croatia	2,243	
30	North Macedonia	1,941	+20
31	Estonia	1,821	+14
32	Iceland	1,804	+1
33	Lithuania	1,616	+12
34	Slovakia	1,504	+1
35	Slovenia	1,468	
36	Latvia	1,046	+16
37	Albania	989	+8
38	Andorra	762	
39	San Marino	665	+4
40	Malta	609	+9
41	Channel Islands	558	
42	Isle of Man	336	
43	Montenegro	324	

Contact tracing app
Situation across MS (to be confirmed)

	Decentralized (DP-3T or G/A)	Centralized	COVID app not for contact tracing, or contact tracing ruled out	Total
In Use	AT, CZ	NO, HU	SK	5
Planned and/or publicly announced	EE, IE, DE, FI, IT, LV, NL, PL LT, MT, CY, HR, PT,	FR	BE, LU, SE, SL	18
Total	13	3	5	21
To be confirmed	*ES, BU, EL, RO*			

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Pre-COVID cross-border movement within EU

- 17 million EU citizens are living in MS other than their country of citizenship
- 1.4 m cross-border workers
- One-third of EU citizens travel to other MS as tourists
- 2m reimbursements for cross-border healthcare p.a.

Sources: Eurostat and ECA

Android / iOS APIs

- Apple/Google APIs released 22 April 2020
- A/G: Use of country codes of proximity contacts in BLE payload **raises privacy and security concerns:**

  a) It breaks the principle that infected users only upload information about themselves, not about other users;

  b) information collected in proximity encounters is encrypted and cannot be read by the receiving app;

  c) exposing country codes, esp in an open format (without encryption), could lead to "foreigner scanner".

Agreement required on

A. Alternatives *for **determinative data** for cross-border interoperability*

1. ***Infected users' visited countries list: List of countries a user has travelled to***
    1. *Automatically detected by device (part of consent when installing the app)*
    2. *Manually entered by user (not recommended for security and usability reasons)*
    3. ***Hybrid – pop-up window with pre-determined countries automatically proposed (with fall back possibility: user input information manually)***

B. Three options for ***backend architecture*** *for cross-border interoperability*

1. Backend federation
2. Backend federation + Forwarding gateway
3. Trusted traveller server (roaming server)

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Open Issues

- *Automatically detected by device (part of consent when installing the app)*
  - Questions for A&G?

Backend architecture

for cross-border interoperability

Backend architecture (Possible options)

A. Backend federation

- **What it is**: slide 14

+ Lean architecture

- Possibility to identify the MS of origin of infected keys *(the receiving Backend Server) [can be mitigated with dummy keys, but may increase bandwidth]*

B. Backend federation + forwarding gateway

- **What it is**: slide 16

+ Not possible to identify the MS of origin of infected keys

+ Fault tolerance (when B is down [message querying handling]

- Introduction of forwarding server *(single forward infrastructure)*

Which one?

C. Trusted Traveller Server (roaming server)

- **What it is**: slide 18

+ Not possible to identify the MS of origin of infected keys

+ One server can sign "infected keys archives" for all EU MS

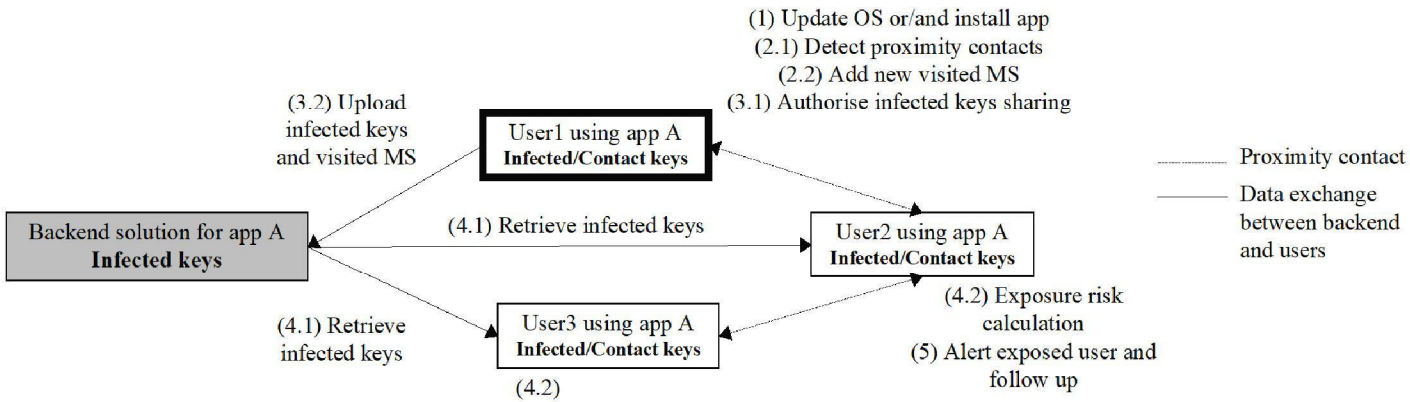
- Single point of failure for travellers

- App travellers still need to check backend servers visited countries.

- What is needed to build such Server

- Increase the amount of storage of keys.

Steps in the contact tracing flow



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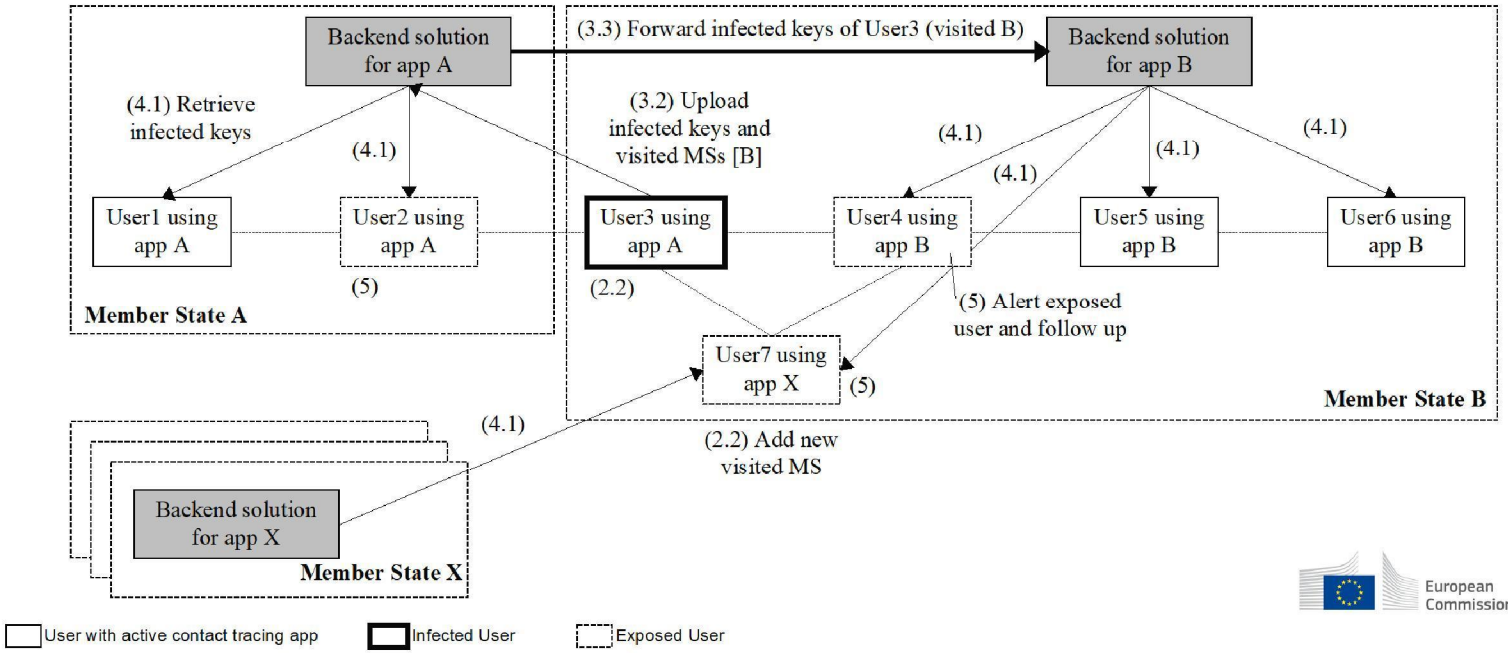
Steps in the contact tracing flow

Number	Step	Description	Decentralised
1	**Enable user with necessary technology**	When a user updates the mobile device operative system or/and installs a contact tracing app	(1) Update OS or/and install app
2	**Proximity contact detection**	When activated by the user, the mobile device technology detects proximity contacts with other app users and record encounter details	(2.1) Detect proximity contacts **(2.2) Add new visited MS**
3	**Infection confirmation**	When an individual is informed, by the relevant authorities, about his/her positive test result for SARS-CoV-2 or suspicion of COVID-19	(3.1) Authorise infected keys sharing (3.2) Upload infected keys **and visited MSs** **(3.3) Forward relevant infected keys to MSs**
4	**Exposure risk calculation**	When a proximity encounter exposure risk score is calculated	(4.1) Retrieve infected keys (4.2) Exposure risk calculation
5	**Exposure alert and follow up**	When a user gets an alert about possible exposure and possible follow up actions	(5) Alert exposed user and follow up

A. Backend federation

(visiting user infected)



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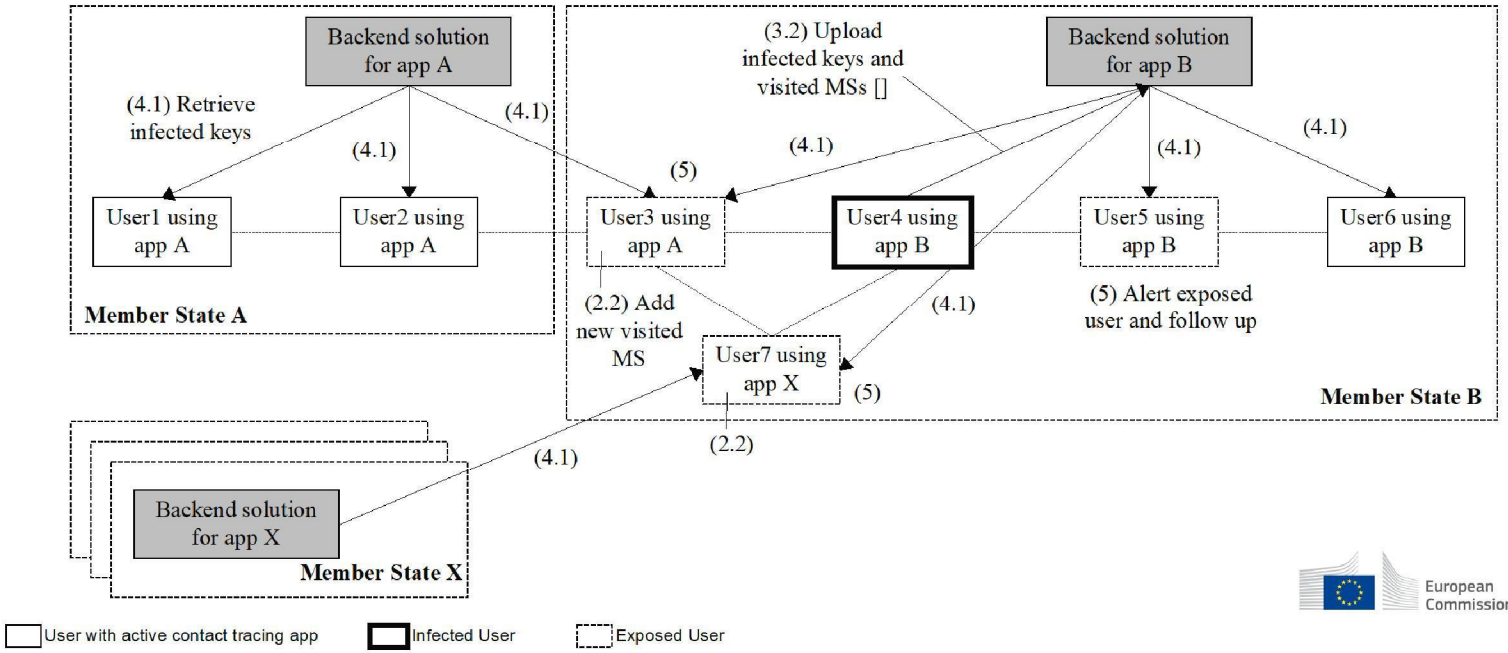
A. Backend federation

(home user infected)



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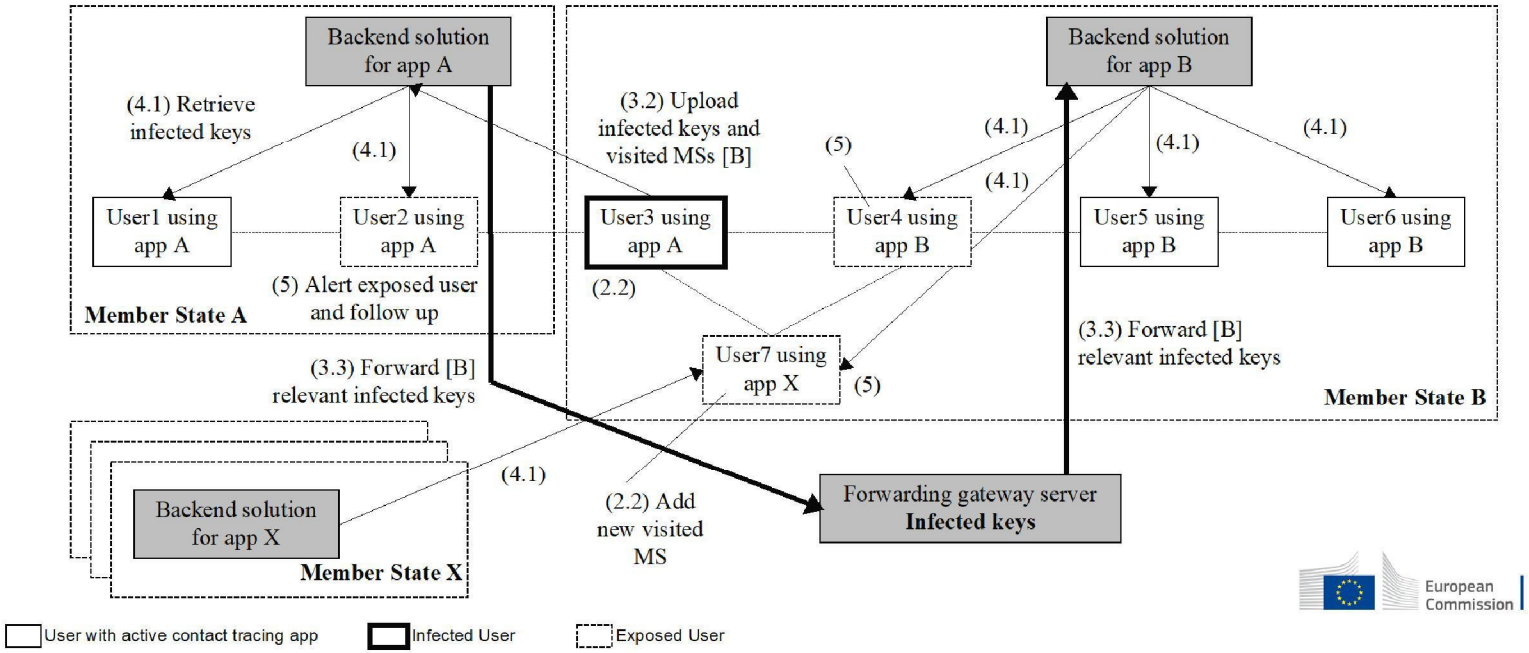
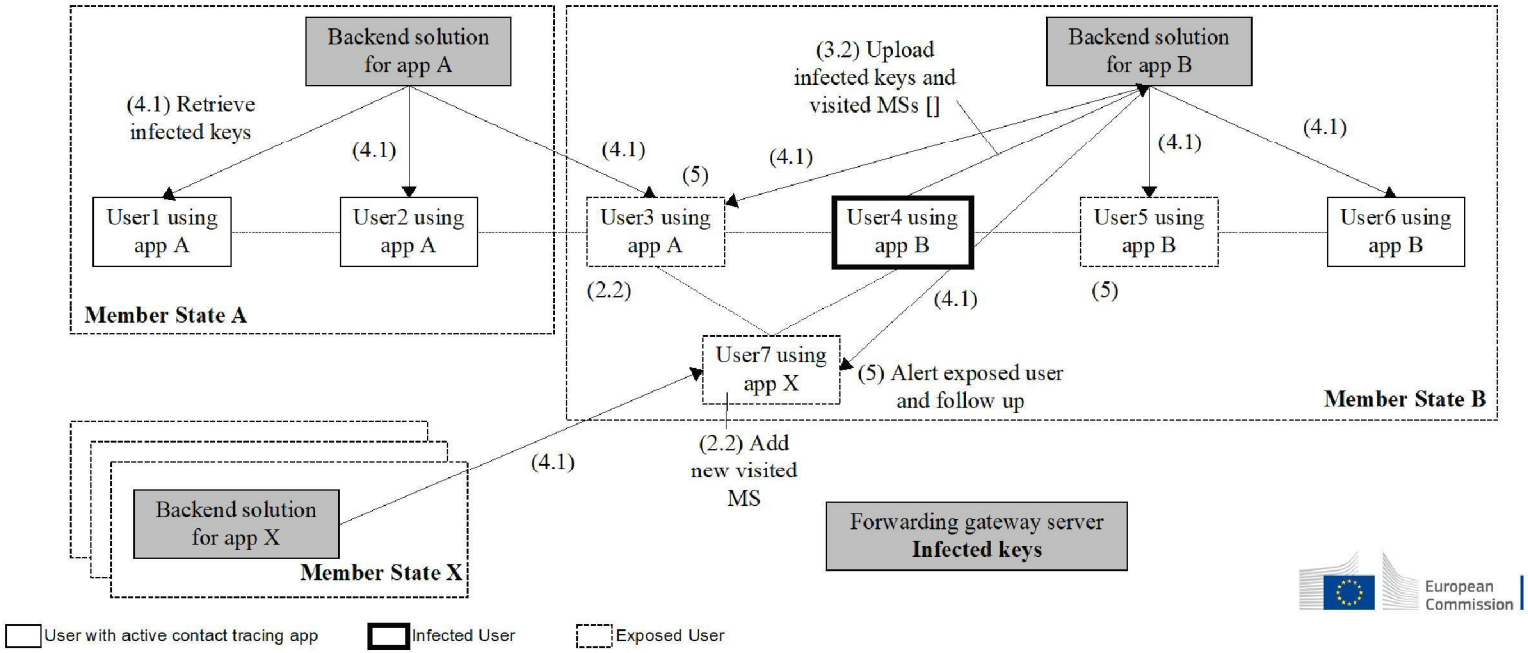
B. Backend federation + forwarding gateway

(visiting user infected)



B. Backend federation + forwarding gateway

(home user infected)



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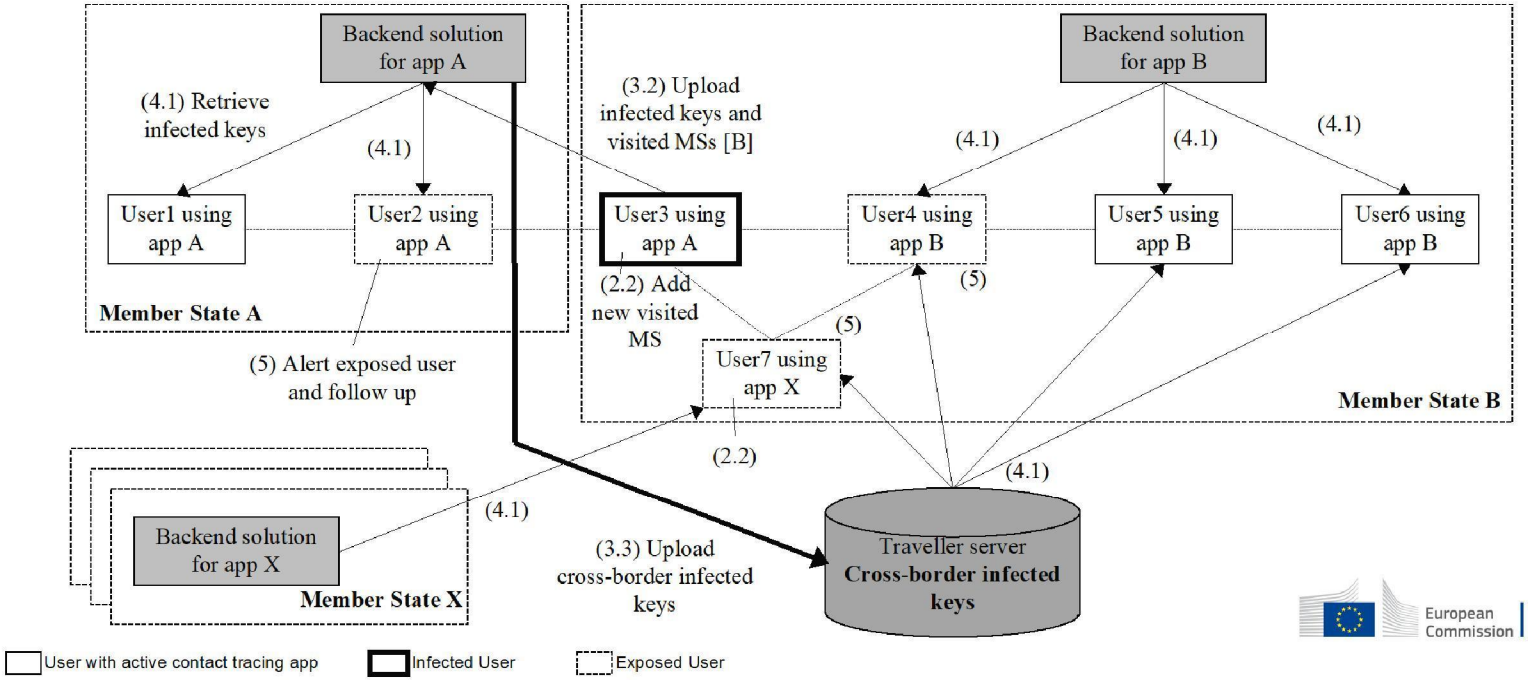
C. Trusted traveller server

(visiting user infected)



C. Trusted traveller server

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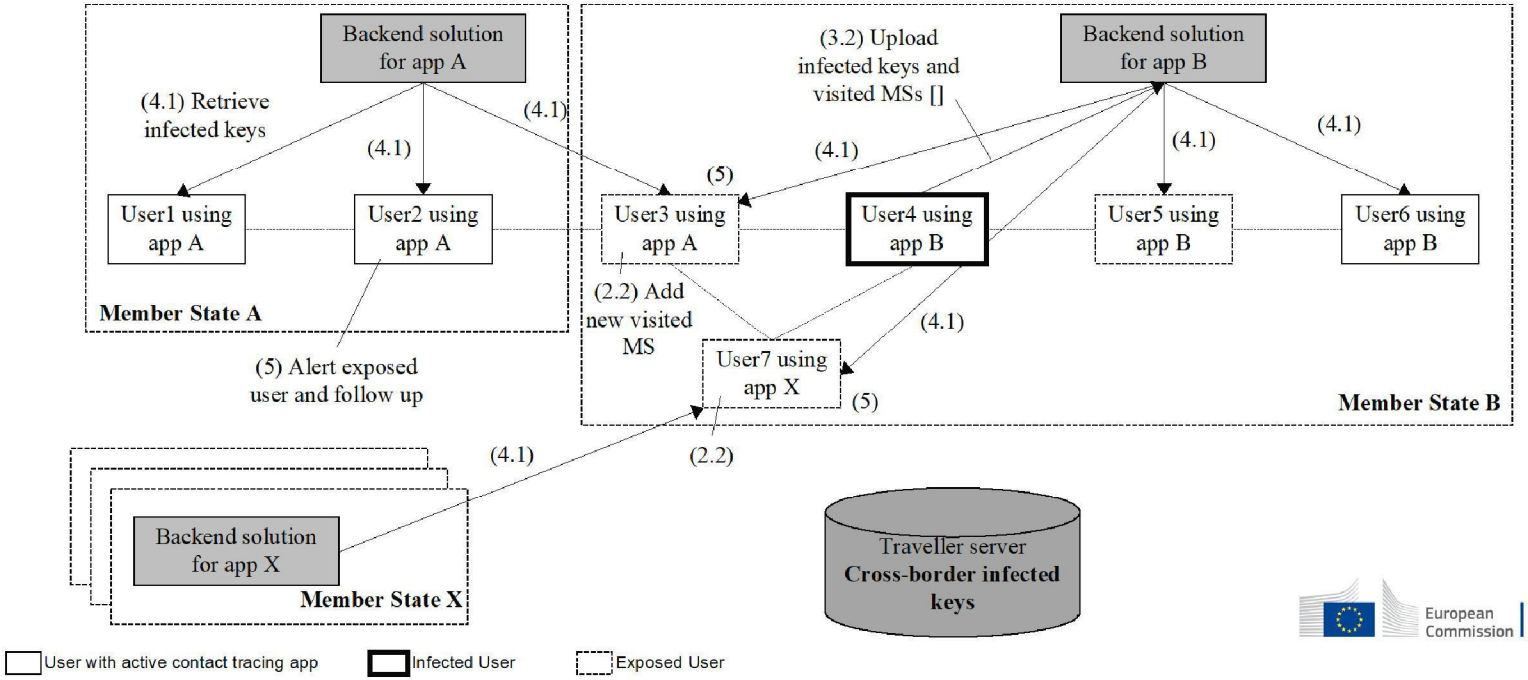

Open questions

- Can an app listen “freely” all Backend servres (from all MS).
  - The end points are public, no app authentication required.

- If a user selects visited all countries, what will be the weight for bandwidth?
  - 10Mb per country, per user, per day (Infected users per country: 900k).

Next steps

- Next meeting: 28 May, 16:30 (120 min)
  - Prepare document with possibilities for the 2 architectures (*including further details on the forwarding gateway*) and Experts will provide *pros and cons*.

NOT YET

- Update Toolbox with agreed way forward
- Implement architecture (coding)
  - App checking backend servers in other (visited) MS
  - Mechanism to validate infected users abroad (automatic)
- Identify and log issues eg with API
  - coordinated discussions with A/G
- Communications