Decentralized Identity Foundation

Hospitality & Travel Special Interest Group

Use Case developed by Travel Change and Disruption Team

FINAL – 25 September 2021

1. **Use case name:** As an independent traveler, Bob, has a travel itinerary and there is a need to make a change.

2. **Short Description:**

The traveler (Bob) has a travel itinerary including multiple travel elements by providers. In this case, Bob has a flight, a hotel booking, a dinner reservation and a ground transfer.

For either a personal reason or a travel disruption beyond Bob/s control, a change in plans must be made and communicated to the relevant travel providers.

3. **Base Use Case:** None.

4. **Plain Language Description:**

Two to three paragraphs describing a real-life sequence of events that occur in the use case. Use real-sounding names appropriate for people, places, companies, and other named things. Describe the state changes and outcome for each actor. Give a clear description of each actor, such as "Alice, a corporate travel manager for IBM," or "Jim, a traveler who recently bought a Tesla."

Make the chronological order clear, using language to indicate any preconditions, the sequence in which the events occur, and the ending state.

If this is a variation of another (base) use case, state only how the use case differs from the base use case.

Bob is taking a business trip to New York City. He has booked flights from San Francisco to JFK Airport in New York City. He has made a reservation for a room at The Carlyle in New York City. He has a dinner reservation at Brasserie Les Halles. He has arranged for a car service to pick him up from JFK Airport and take him to The Carlyle.

Bob boards the flight in San Francisco. As a result of bad weather on route the nonstop United Airlines flight must be diverted to Chicago. Bob needs to deplane in Chicago and his airline has proactively made new reservations for Bob on another United flight from Chicago to New York City to allow him to arrive in his destination, albeit much later than he had planned.

Bob's onward arrangements need to be updated, however, due to the flight change in Chicago there is no time for Bob to inform his travel providers. Also, due to the short transfer time Bob's stowed baggage is not transferred to the new aircraft. The airline puts his baggage on another flight and pays the fee for Bob's baggage to be delivered to the hotel when it arrives in New York City.

As a result, the following information needs to be updated and distributed to the travel providers in his itinerary. The following actions now must take place:

- Update the hotel of a later arrival time.
    - ETA
- Update the airline on where his late bags must be delivered.
    - Hotel address and location details
- Update the ground transfer on his new arrival time.
    - ETA-Time of booking-Flight Number
- Cancel Bob's dinner reservation because his arrival time is too late in the evening.
    - Inform the restaurant and his dinner guest.
    - Create a restaurant dinner or waitlist reservation for the next night.

5. Relevance:

Why is this a relevant use case for SSI? What aspects cannot be, or have not effectively been, addressed by existing (non-SSI) processes and systems, or can only be addressed sub optimally (such as only by sharing more information than is really needed)?

The opportunity of the use case and application of technology are the smoothing of the travel process and the automation of the information exchange. All entities in the cycle will receive information and decide whether the information will trigger responses or actions on their part.

1. Update the hotel on Bob's later arrival time.
    a. The hotel can manage room usage and may have opportunities to increase revenue (e.g., late checkout / non arrival).
    b. The hotel may need to reassign another room.
    c. The hotel may need to manage amenities for the guest to be replaced/moved/delivered later.
    d. The hotel may be able to better manage room inventory and cleaning programs aligned with revised arrival times / dates.
    e. There may be other commercial or policy decisions that must be made in relation to the reservation.
2. Update the airline on where Bob's late bags must be delivered.
    a. Provide hotel address and location details, avoiding the need for the customer to file a PAWOB (Passenger Arriving Without Bags) Report at the baggage counter.
    b. Advise the downstream operation or contractor on loss / delay of bags and delivery destination.
3. Update the ground transfer on Bob's new arrival time.
    a. ETA-Time of booking-Flight Number

b. Update reservation details
c. Update driver / vehicle information
d. Improve scheduling due to the disruption.
e. Reassign the vehicle / driver to other travel requests or revenue opportunities.
f. Avoid lost productivity.

4. Bob's dinner reservation no longer is relevant as he arrives too. Cancel the dinner reservation.
    a. Cancel the reservation.
        i. Potential financial impacts or deposits may be in play.
    b. Allows the restaurant to rebook the table.
    c. Handling of dining reservations could be rule-based, referencing the customer's digital wallet, SSI profile, and other default settings in the wallet.
5. Update Bob on any changes and actions that have taken place.

6. Assumptions:

List any key assumptions that must be true in order for the use case to be operative. If none, indicate None. Note that for some use cases, it may be difficult to distinguish assumptions (typically items outside the control of this effort) from dependencies (things within its control that are prerequisites); in this case simply combine the two and note in 7 "same as 6".

"Adoption advocacy," or the assumption that there is adequate communication and advocacy to spur initial adoption, is an assumption for most use cases and need not be identified separately.

- Bob has a Digital Wallet, equipped with a User Agent that is supported by DID and SSI via his profile.
- Travel Providers can support the exchange of information and resolution of notifications received from Bob's identity hub and or user agent when a disruption or change occurs.
- Permissions, settings, and rules for sharing of Bob's information must have been configured (or defaults created) in advance and may be conditional; specific information needs only to be shared in the event of a specific disruption. For example, the hotel travel provider need only be informed of a change in ETA if Bob now arrives after 11 pm because of the flight disruption.
- Bob's User Agent – in concert with background access to Bob's Identity Hub) – must support specified and conditional data-sharing. This occurs as Bob is enroute on his revised connection from Chicago to New York City. Changes initiated by the airline while Bob is in transit will take place in an automated manner based upon Bob's predefined rules.
- The User Agent and Travel Providers (or intermediaries representing them) are conducting real-time, secure, peer-to-peer communications. The user profile and persona must have been created in advance.
- The travel itinerary must have been stored in Bob's identity hub prior to the trip.

7. Dependencies:

List any key dependencies that must be met in order for the use case to be operative. If none, indicate none.

- SSI and other DID technologies have been adopted by Bob and relevant travel providers that are managing his travel disruption.
- Bob's personal preferences are stored in his identity hub and travel providers have Bob's permission to act.
- Acceptance capability of each of the travel providers that can interact with Bob's background user agent.
- All travel providers that are part of Bob's journey are equipped to accept "Travel Change or Disruption Notification" in his itinerary.
- Bob's user agent automates activity on his behalf.

8. Industry and Consumer Benefit:

Explain how addressing the use case via SSI solves an industry and/or consumer problem, and key ramifications of doing so. How big/pervasive is the problem? Who does it affect? What (qualitatively or quantitative) would be the impact of solving it?

Consider citing the minimization of shared information as a benefit, reducing the question to "what information needs to be shared to answer the true question," for example "are you of legal age to buy alcohol" vs. asking to see an ID that has lots of other personal information.

Travel disruptions are all too common, such as: flight delays and cancellations, traffic delays getting to an airport, security delays, rental car or taxi shortages, and overbookings of all types of travel components.

In addition, many travelers make changes either (or both) last-minute before travel and during their journey. These changes are made after traveler reservations are set, and often after funds have been exchanged. These changes have financial impacts on both customer and travel provider that are different than random disruptions not controlled by traveler or provider.

Traveler Benefits:

- The traveler, being the initiator of remedial actions, is provided greater visibility and certainty of process as actions to remediate the disruption are undertaken.
- As many remedial actions can be automated, the traveler benefits from a more efficient processes requiring fewer manual actions at the behest of travel providers. The last seat on an alternative flight or the last room in an unplanned hotel are more likely to still be available through efficient, automated processes under the control of the traveler.
- Actions can be automated by business rules to take effect when no manual intervention is possible or necessary, for example when a traveler is flying and has no internet connection. Typical business rules:
    - A requirement that a flight arrives before a certain time
    - A preference for an airline with which the traveler has status
- A traveler can choose which issues and remediations deserve manual intervention. For example, a traveler with an important meeting may be willing to purchase a separate ticket on a different airline if this is the only way to ensure on time arrival in the destination.

Travel Provider Benefits:

- Timely, accurate, and trusted information received directly from the traveler allows the travel provider (restaurant, hotel, car rental etc.) or intermediary, to minimize operational disruption:
    - Restaurants may be able to accept another reservation having been notified of a cancellation.
    - Hotels may be able to monetize an unexpected late arrival by providing another guest with a late checkout for a fee.
    - Airlines may be able to eliminate staff time simply to find out where to deliver a bag.
    - Travel insurance providers can mor accurately assess and pay a claim.

9. DIF Components Used:

List each element of the DIF architecture that would be used in the solution, with a summary of its role and any requirements that might be unusual; extensions or changes that may be needed to address hospitality and travel requirements; and where use-case specific data and processes would be accommodated (including APIs and schemas). Include a sequence diagram.

Architectural elements may include W3C Decentralized Identifiers (DID), Decentralized Data Stores (e.g., blockchains and ledgers), DID User Agents (aka Wallets), DIF Universal Resolver, DIF Identity Hubs (currently in formulation), DID Attestations, Apps and Services using SSI Data, W3C Verifiable Credentials, W3C Verifiable Presentations, W3C Resolver.

Bob must have:

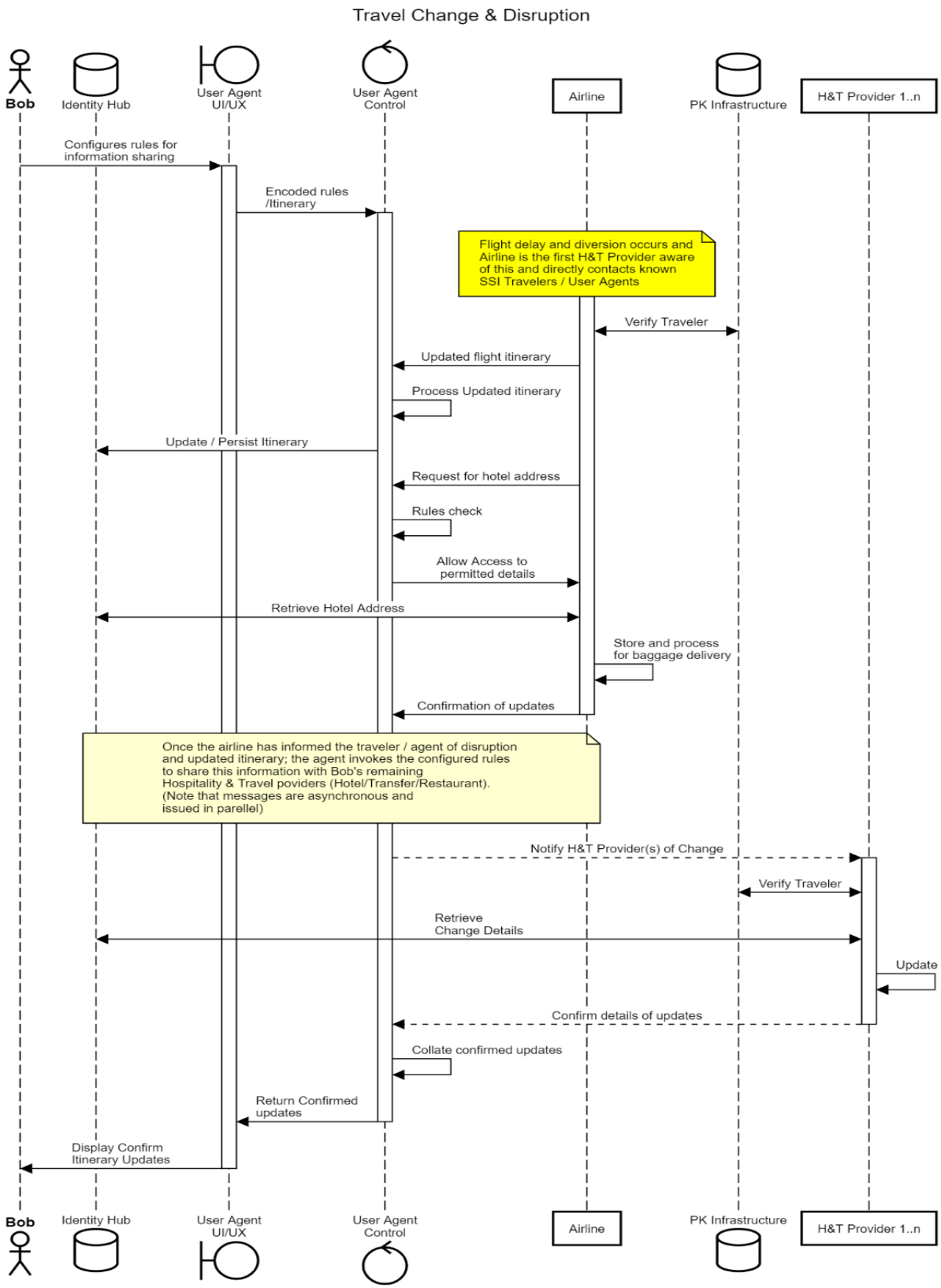
- A valid W3C Decentralized Identifier (DID)
- A DIF Identity hub, a place to store information that is referenced from the DID that contains
    - Personal information such as name, address etc.
    - Itinerary information stored at the granular level regarding Bob's journey

Travel Providers must each have:

- A valid W3C Decentralized Identifier (DID)
- A DIF Universal Resolver

Sequence Diagram

Page following.



10. Trust Considerations

Where is trust required (and by implication not currently present) for a presented identity or credential to work in the real-world travel domain? Who or what might realistically provide the necessary level of trust?

The overall use case is based upon the premise that all entities including the traveler and travel providers accept, adopt and work with the Decentralized Identity environment which provides an adequate level of trust within the context of this example.

11. Current vs. Proposed System Topology

Describe (visually if possible) the flow of information and parties involved (e.g., suppliers, B2B tech vendors, consumer apps) as the problem is handled in the current environment, highlighting any anomalies or challenges; also contrast the proposed environment.

The typical current process is depicted in Figure 1.

- Hotels often receive no information about the customer whatsoever, or they may receive information that is incomplete or out of date.
- Bob has a frustrating experience because there is no simple way to address the changes in his travel itinerary without the need to initiate manual, direct communication with all the travel partners involved in his trip.

Figure 1: *Typical Current Process*

Hotel Arrival Change

Bob learns of disruption from Airline and contacts the hotel to update plans.

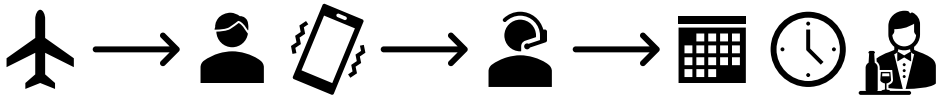
Airline Bag Delivery

Bob learns of disruption from airline and contacts Bag Handler to arrange for his late baggage to be deliver to the hotel.

Ground Transfer Pickup

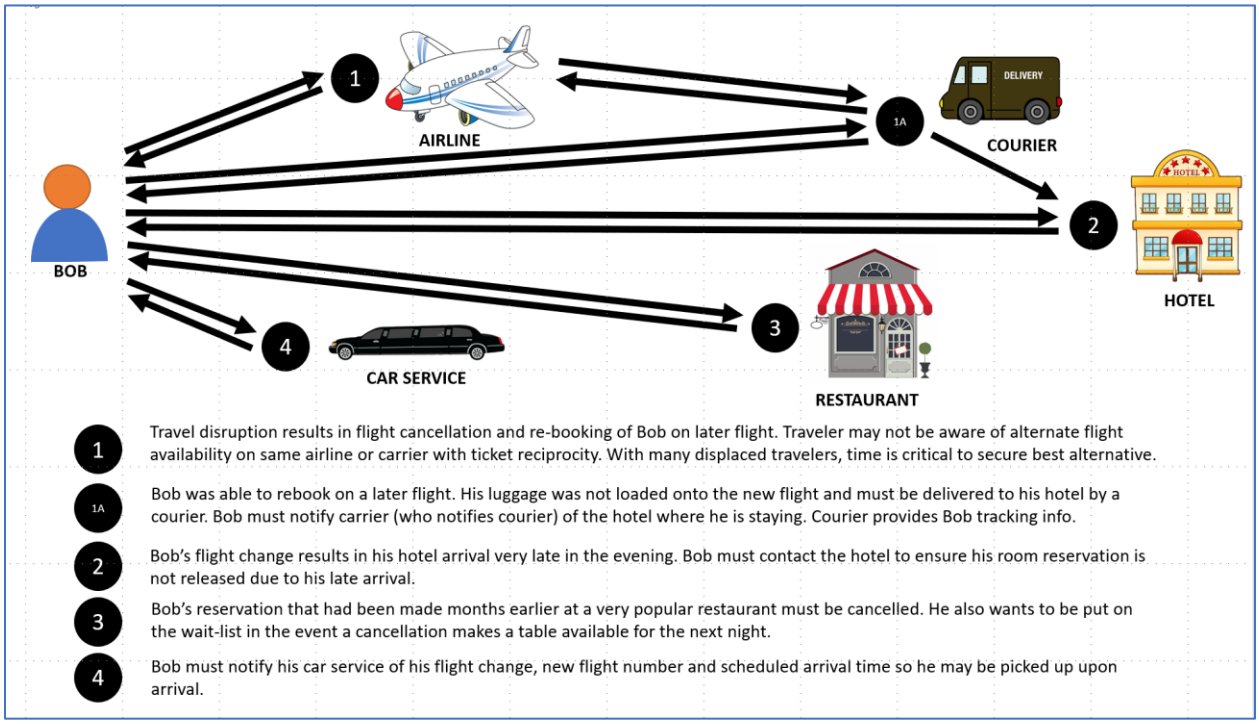
Bob learns of disruption from airline and contacts ground transport company who reschedules his airport transfer.

Restaurant Reservation



Bob learns of disruption from airline and contacts restaurant to change date/time/cancel dining reservation.

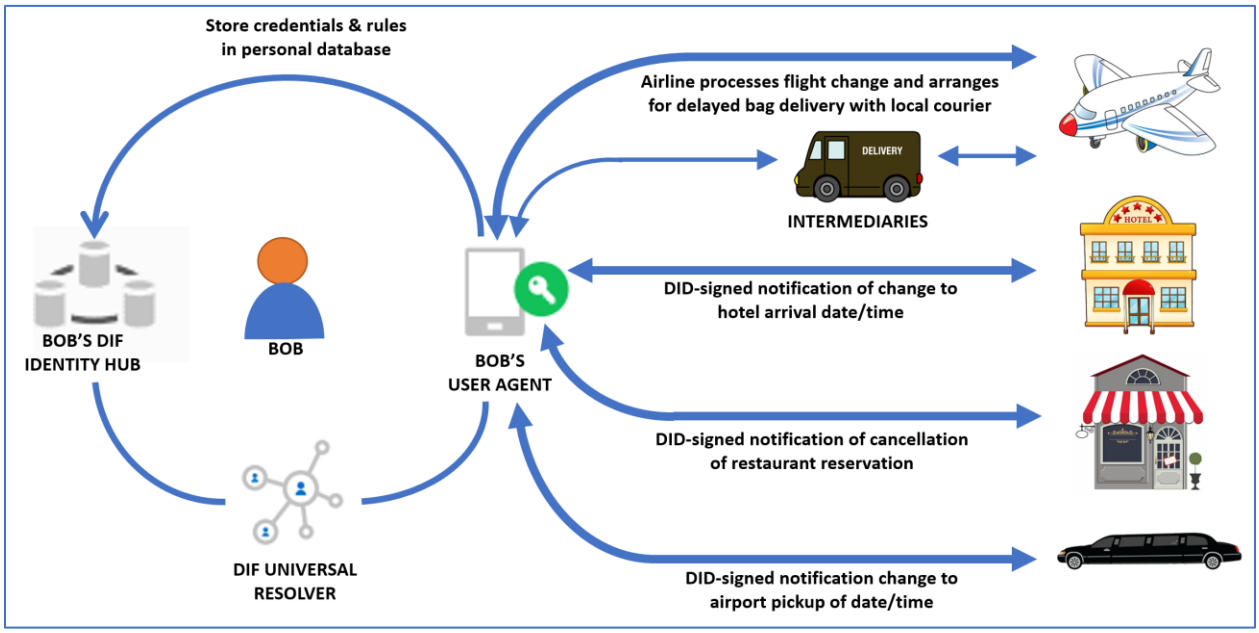
Figure 2*: Visual representation of Bob's tasks to change plans and update arrangements with exclusive travel providers.*



With SSI, the process is shown in Figure 3.

- Credentials for Bob's age, employment, and AAA membership are signed by the relevant parties, stored in Bob's DIF Identity Hub, and presented to hotels or intermediaries by Bob's user agent along with details of his booking request (location, dates).
- The user agent issues responses allowing the travel partners to adjust Bob's travel itinerary. The process is automated, and adjustments are made automatically to the connected travel partners.
- Where Bob defines rules that he must approve, the approvals are queued for his review when he is able to connect to a network to review the updates triggered by the disruption to his flight.

Figure 3: *Process with SSI*



12. Blockers and Enablers:

What are the barriers to implementing SSI for this use case? What work is already being done elsewhere that can be leveraged? For example, does a network of trust need to be formed so verifiers do not need to create an unmanageably large list of known issuers? If so, are industry groups or governmental agencies or B2B tech vendors already working on the problem, or would it need to be a ground-up effort? Would key players support or resist the new approach? Note that barriers and enablers may have no impact on the validity of the use case but might be useful in prioritizing efforts that face fewer barriers to implementation.

Blockers:

- Customer identity and profiles exist in a variety of systems within the travel ecosystem. Currently most of these user identities are stored centrally and controlled by a travel supplier or intermediary and are triggered by a log on to a supplier or intermediary site. The consumer currently has no control on how PII is stored and what parts of their PII is used to develop a quote.

A shift to SSI/DDID requires a change in this approach to customer data and all parties will need to understand the benefit to embrace this shift.

- The fragmented hotel tech stack is a barrier. B2B tech vendors who serve the lodging sector must be made aware of the value SSI/DDID provides to adapt their systems to integrate specific consumer PII, including preferences referenced in user identity hub, as a basis for the creation of offers.
- Large entities in specific segments such as corporate travel programs may experience resistance from established partner travel intermediaries who may use control of identity as a lever through which to control the travel booking process. Allowing current intermediaries to control this trust verification further centralizes the booking process and conflicts directly with the SSI/DDID objective.
- Evolution of the hotel tech stack will be required to integrate with identity hubs. For maximum benefit, we envisage a hotel identity hub to:
    - Contain attributes about the hotel (such as features and amenities) and its products
    - Contain a real-time or near real-time inventory cache
    - Integrate with hotel systems for bookings and access to inventory

Enablers:

- A hybrid environment will exist for some time. To drive true decentralized SSI, pilot projects need to be created by early adopters to demonstrate the value of SSI to all stakeholders.
- A considerable number of new hotel companies have appeared during the last five years, many with newly built tech stacks, and all targeting the young digitally equipped consumer. These small to mid-size companies are the hotel industry's innovators and early adopters. POC focus should target these companies.
- Digital health credentials, many based on SSI/DDID, will become common in many parts of the world this year (2021) as travel restrictions ease. The experience of storing and using credentials in a common identity wallet may serve as early pilots to introduce consumers and travel providers to the future opportunity for SSI/DDID.
- There are currently several 3rd party companies and organizations offering decentralized identity solutions. DIF H&T SIG can act as a conduit to introduce qualified SSI/DDID practitioners to interested travel providers and travel tech vendors wishing to onboard SSI/DDID technologies.
- The large number of PII data breaches and government fines assessed have raised risk awareness among travel suppliers with respect to stored PII and made it more attractive to store less PII data. The regulatory environment (GDPR, CCPA, etc.) has been moving rapidly to consumer self-control of PII and will continue to do so, making this approach more viable for companies striving for compliance.
- Even without breaches or other major events, organizations must actively comply with and support the rights introduced by these acts. For example, an EU consumer can ask for details of all their personal data, an explanation for what that data is being used for, withdraw consent for the use of that data (for certain or all purposes) and ask for it to be erased. Organizations must have the ability to respond to such requests in an accurate and timely manner or face fines/sanctions.

- The impact of SSI/DDID on personal data and sensitive information will reduce the need for businesses to securely store customer data through the ability to request and use permissioned customer data (credit card and customer PII) only when required.
- Improved personal information provided by customers will improve compliance efforts for travel providers through a deeper level of visibility. For example, ADA and traveler disability data supporting targeted service and improved experiences.

13. Contributors

Contributors to this use case, and the discussions leading to it, are listed below. Many thanks to all for their efforts and insights.

- Andrea Cartwright
- Brian Lewis
- Colin Bidewell
- David Chestler
- Doug Rice
- Dror Tirosh
- Gene Quinn
- Guilain Denisselle
- Mark Fancourt
- Mark Haley
- Nick Price
- Robert Cole