



# Secure Asset Transfer Protocol (SATP)

## *Future Extensions for Consideration during Re-chartering* Ledger State Views and Data Sharing

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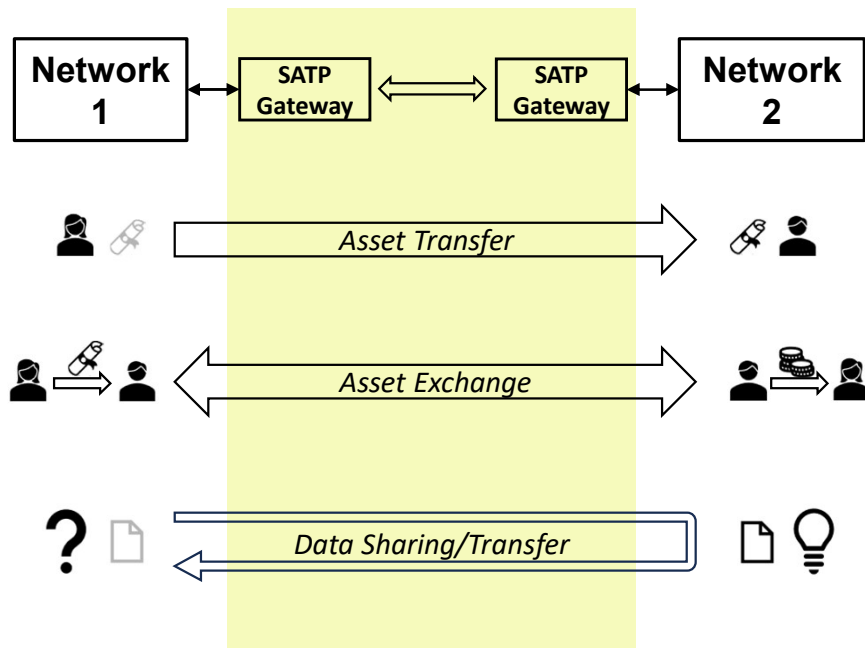
Views and Addresses: <https://datatracker.ietf.org/doc/draft-ramakrishna-satp-views-addresses/>

Data Sharing: <https://datatracker.ietf.org/doc/draft-ramakrishna-satp-data-sharing/>

## Summary and Objectives

- Every digital asset system needs a way to expose internal state to external entities
- External entities need ways to request and validate state from asset systems
- This is challenging when the systems are distributed ledger networks, especially private ones
  - It's not just about exposing a service API, because there is no unitary or centralized authority to speak for the network
  - Veracity and authenticity of state in distributed ledger networks are (i) established and (ii) validated by collectives
- Gateways, introduced in the SATP architecture, provide vectors for such “data sharing”
  - But more is needed for state requests to be routed amongst gateways, and sanity checked and translated into data queries and data responses that can be understood by the opaque and heterogeneous systems behind the gateways
  - Hence the need for standardized ways to identify/address ledger states maintained by collectives and the packages of those states intended for external validation and consumption

# Enabling Network Interoperability



SATP Architecture Draft

<https://datatracker.ietf.org/doc/draft-ietf-satp-architecture/>

## Section 3: International Trade and Supply Chains

*Linking networks specializing in portions of these processes*

## Section 4: Decentralized Finance and CBDC

*Transfers, settlements, payments, and contract fulfilments, across networks specializing in currency management and financial instruments*

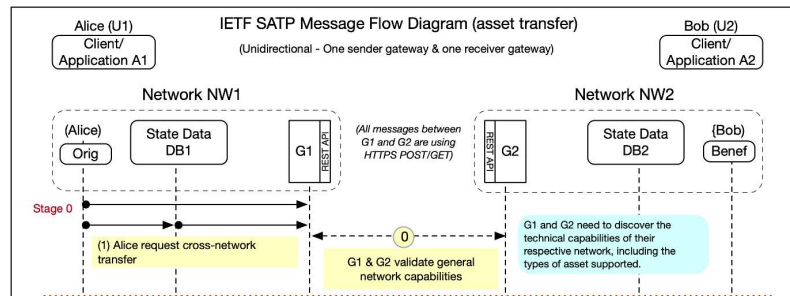
## Section 5: Decentralized Commerce

*Sales of, and payment settlements for, tokenized goods and services across networks specializing in content management and currency payments*

SATP Use Cases Draft

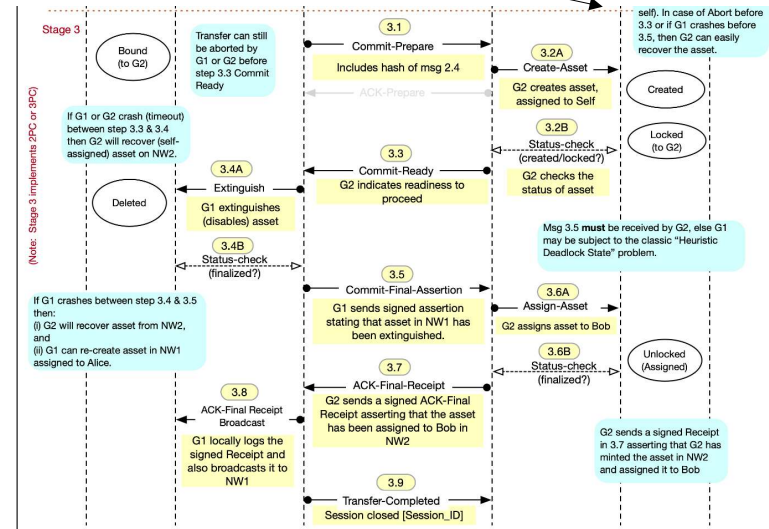
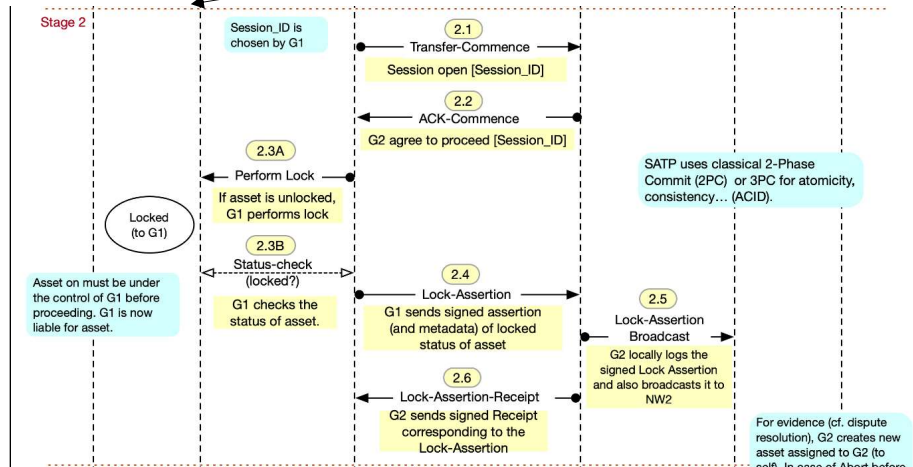
<https://datatracker.ietf.org/doc/draft-ietf-satp-usecases/>

# Complementing SATP Core Protocol



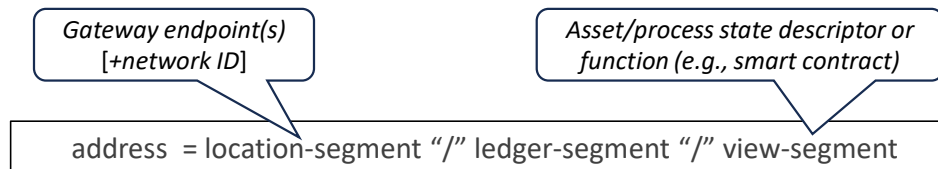
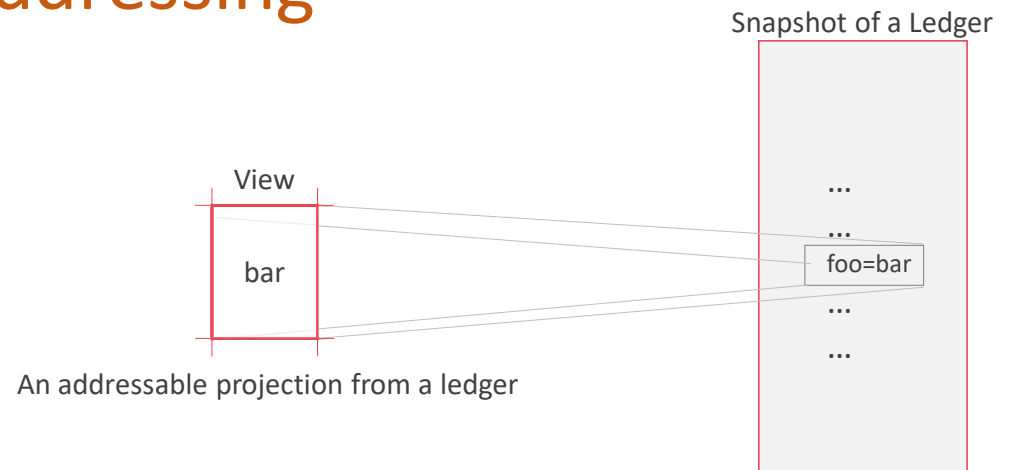
Cross-network discovery of network capabilities and asset characteristics

Cross-network queries for lock/mint verifications after crashes and session losses



# Remote State Views and Addressing

- View is information derived from ledger
- View is also proof of state of a blockchain
- Especially significant in permissioned ledgers



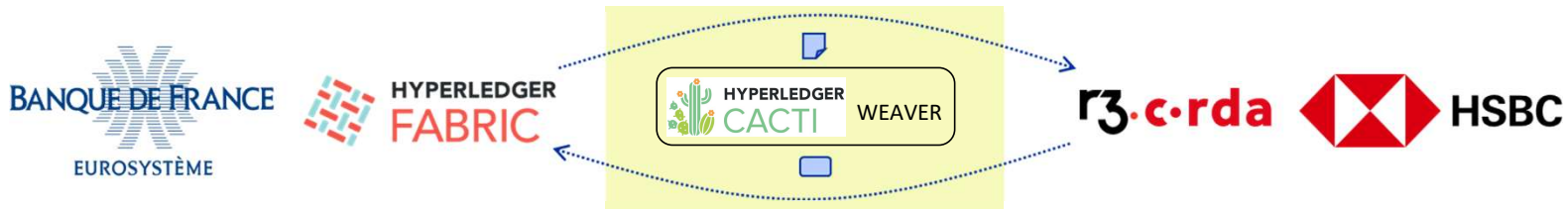
**Hyperledger Fabric** <gw-address>/<network-id>/<channel-id>/<chaincode-id>:<function-id>:<arg-1>:<arg-2>:.....  
localhost:9080/network1/mychannel:simplestate:Read:a

**Corda** <gw-address>/<network-id>/<cordapp-node-addresses>#<flow-id>:<arg-1>:<arg-2>:.....  
relay-corda:9081/Corda\_Network/corda\_partya:10003#com.cordaSimpleApplication.flow.GetStateByKey:H

# Proof Points

- Peer-reviewed publications
  - Enabling Enterprise Blockchain Interoperability with Trusted Data Transfer, Middleware 2019 - Industry Track: <https://arxiv.org/abs/1911.01064>
  - Verifiable Observation of Permissioned Ledgers, ICBC 2021: <https://arxiv.org/abs/2012.07339>
- Open-source implementation within Hyperledger Cacti
  - Code: <https://github.com/hyperledger-cacti/cacti/tree/main/weaver>
  - Spec: <https://github.com/hyperledger-cacti/cacti/blob/main/weaver/rfcs/protocols/data-sharing/generic.md>

Part of a series of experiments (in 2021) exploring the potential for a Digital Euro  
Showcased at the Hyperledger Global Forum (HGF) in Dublin, Ireland in September 2022



<https://www.finextra.com/newsarticle/39417/banque-de-france-demos-ledger-interoperability-in-cbdc-trials>

<https://newsroom.ibm.com/2021-12-16-HSBC-And-IBM-Successfully-Design-And-Test-Interoperable-Multi-Ledger-Central-Bank-Digital-Currency,-Securities-And-Foreign-Exchange-Settlement-Capability>

# What to Standardize

- Need a universal communication format and mechanism for applications, relying on gateways only for message routing and network action triggers and not for decision-making
  - Addressing asset states through a hierarchy of gateways, networks, and procedures/contracts
  - Structured way to describe state (with optional authenticity proofs) that is agnostic of network or asset types
  - General-purpose request-response protocol
- Data structures
  - Views
  - View addresses
  - View requests
  - View responses (Views + Proofs)
- API
  - Gateway-to-gateway
  - Client-to-gateway
- Other considerations: policy
  - View request access control policies
  - View verification policies

