Seiche. Redefining Sovereignty through Systems' Synchronisation

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Abstract

Overlapping jurisdictions and supranational infrastructures generate an increasingly complex topology; the design, management and mapping of interactions is therefore a crucial task.
Seiche is a platform that enables the definition and management of techno-legal procedures of information exchange between institutions that regulate such systems and the organisations that operate within.
It acts as an interface between legal and data workflows, fostering system synchronisation and mapping dynamic networks of emergent sovereignties.
The proposal is applied and tested in the form of a speculative narrative set in Khorgos, Kazakhstan; a logistic enclave between two infrastructural and political realities – the cornerstone of China's Belt and Road Initiative.

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Seiche: (/ˈseɪʃ/)
***A standing wave in an enclosed or partially enclosed body of water**

Introduction

Citizenship and sovereignty are traditionally rooted in territorial belonging; however, as transnational flows of people, capital, goods and information continue to expand, this conception is undermined. Flows are sustained on infrastructures of supranational scope, thus conflicts over citizenship can, in most cases, be understood as conflicts over such infrastructures.

Decision-making regarding flow, access and motility of citizens and goods takes place in very specific places. Borders, customs and other controls are precisely the touchpoints between jurisdictions and infrastructural systems. Decisions rely heavily on techno-legal procedures of information exchange. The deployment of supranational infrastructures, special economic zones, international trade agreements, state coalitions and other economic and political instruments, generate an increasingly complex topology of overlapping nested jurisdictions and cross-jurisdictional interactions. The design, management and mapping of information exchange protocols among these operational institutions and organisations is a vital task.

Driven by promises of automation, increased efficiency and growth margins, data sharing is becoming a frequent narrative in the logistics industry. Diversity of strategies, from centralised options based on co-owned databases, to decentralised systems based on smart contracts and blockchains, are currently being implemented. There is no single solution, but are all based on ubiquitous sensing apparatuses and mobile data storage infrastructures. Such transitions take a slower path when it comes to systems that manage humans rather than cargo.

While this might appear to be an eminently technical transformation, reality is far more intricate. The lack of trust due to strategy and security concerns about information sharing is a key factor in stopping procedural automation. This applies to states, government branches, institutions and corporates alike. Extra layers of difficulty appear to coordinate operations among systems that track entities of a different categorical order, use different protocols or simply speak a different language.

Seiche proposes:

– Firstly, a tool that enables the design and management of techno-legal procedures of information exchange. Assisting independent legal entities to co-design data exchange protocols and infrastructures to implement them in their own terms by interfacing legal and data workflows.

– Secondly, a platform that allows to manage, map and visualise the implemented exchange protocols among individual entities, associations of entities, and complex organisations of a different nature.

Seiche emerges on the premise that:

– The proliferation of sensing infrastructures does not only hold the potential of tracking people and cargo, but also to visualise systems and power structures while moving bureaucracy to the back end.

– New levels of control require new rights, and ultimately, new levels of freedom in exchange. Therefore, it is crucial to consider the implications of a system – of these characteristics – growing at scale, and the relationship with final users – i.e. human and non-human entities or associations of entities moving across sovereign spaces.
– The way different organisations interact is as important as how they behave within the proprietary walls of their respective clusters. However, if Seiche is successful in facilitating interactions, the interstitial space between well-established actors can be used as leverage to grow as a platform.

In the following text we explain the key conceptual and technical elements to understand the interface before testing its implementation in Khorgos – the cornerstone of China's Belt and Road Initiative.

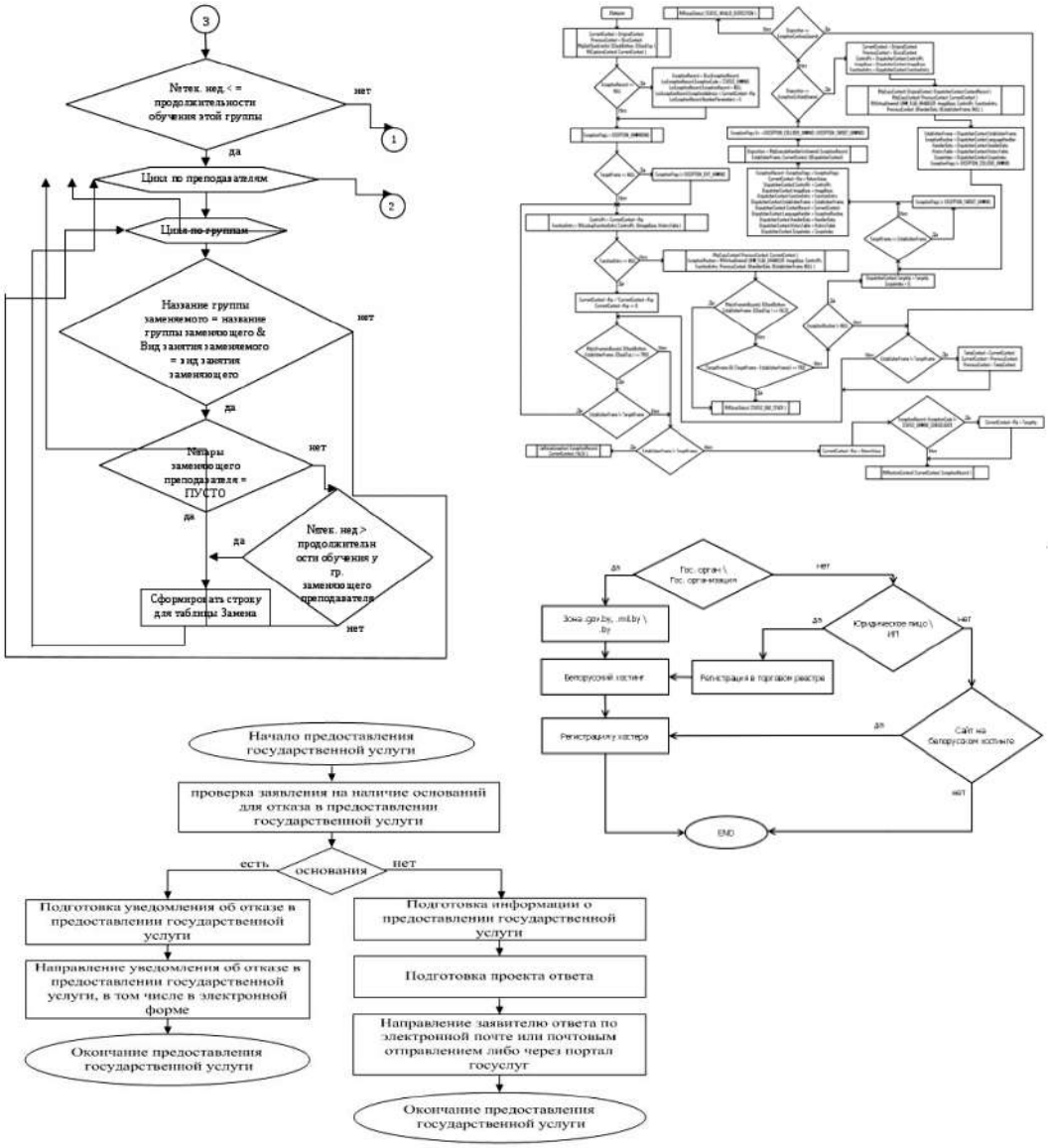


Fig. 1 – Algorithmic representation of law.

Concept 1
Legislation as Software

Legislation is a way of programming society to function in a particular way; sets of rules that can be represented as algorithms dealing with particular classes of objects.
Seiche grows on the conception that the production of law, the production of legal documents and the production of the code that will manage the soc *Concept* io-technical assemblages that control its application, will become intervinded process.

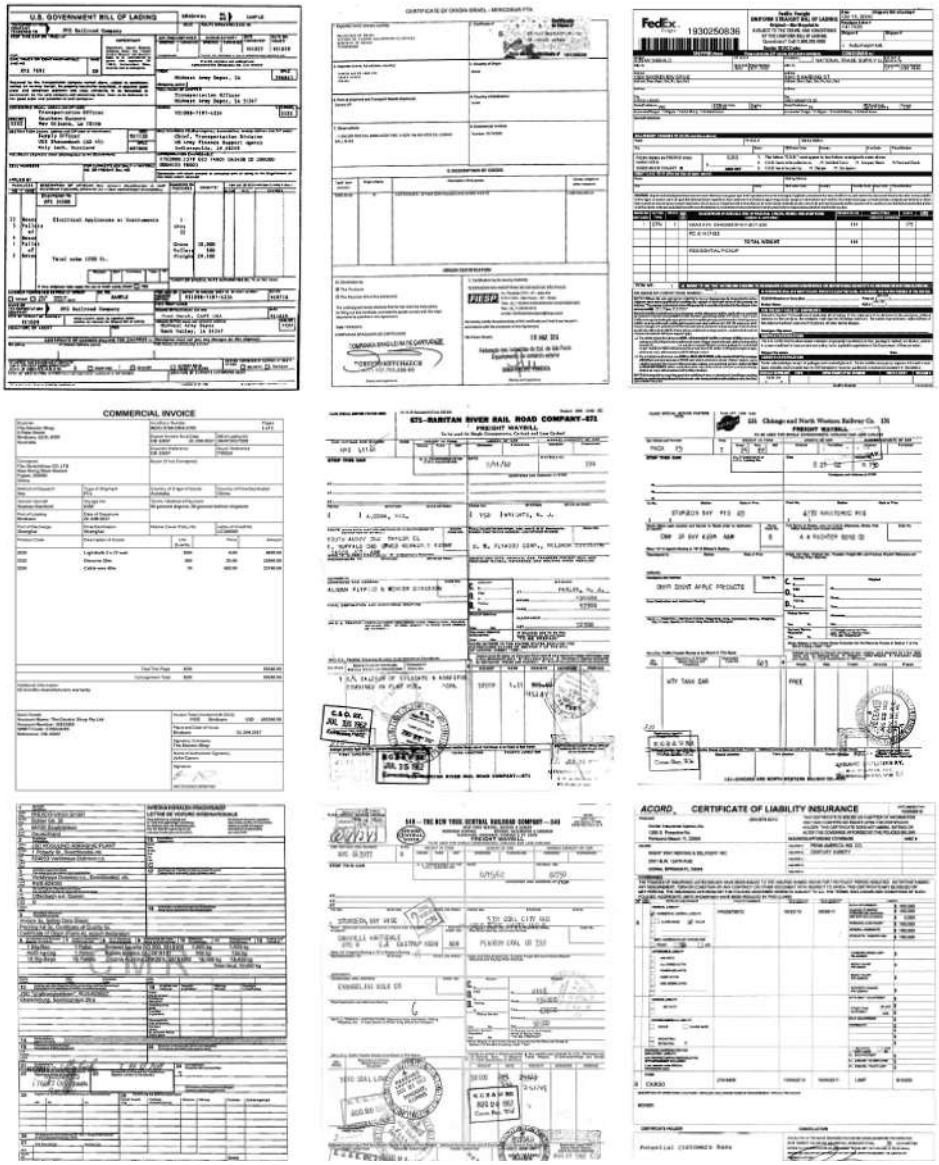


Fig. 2 – Logistic paperwork.

Concept 2
Bureaucracy as Data Workflow

The application of law relies on a collection of data. Bureaucracy is an orchestrated and repeatable pattern of activities that is enabled by a systematic organisation of resources in order to process that information.

The United Nations Conference on Trade and Development (UNCTAD) estimates that the average customs transaction involves 20-30 different parties, 40 documents, 200 data elements (30 of which are repeated at least 30 times) and the rekeying of 60-70% of all data at least once (9th WTO Ministerial Conference, Bali, 2013).

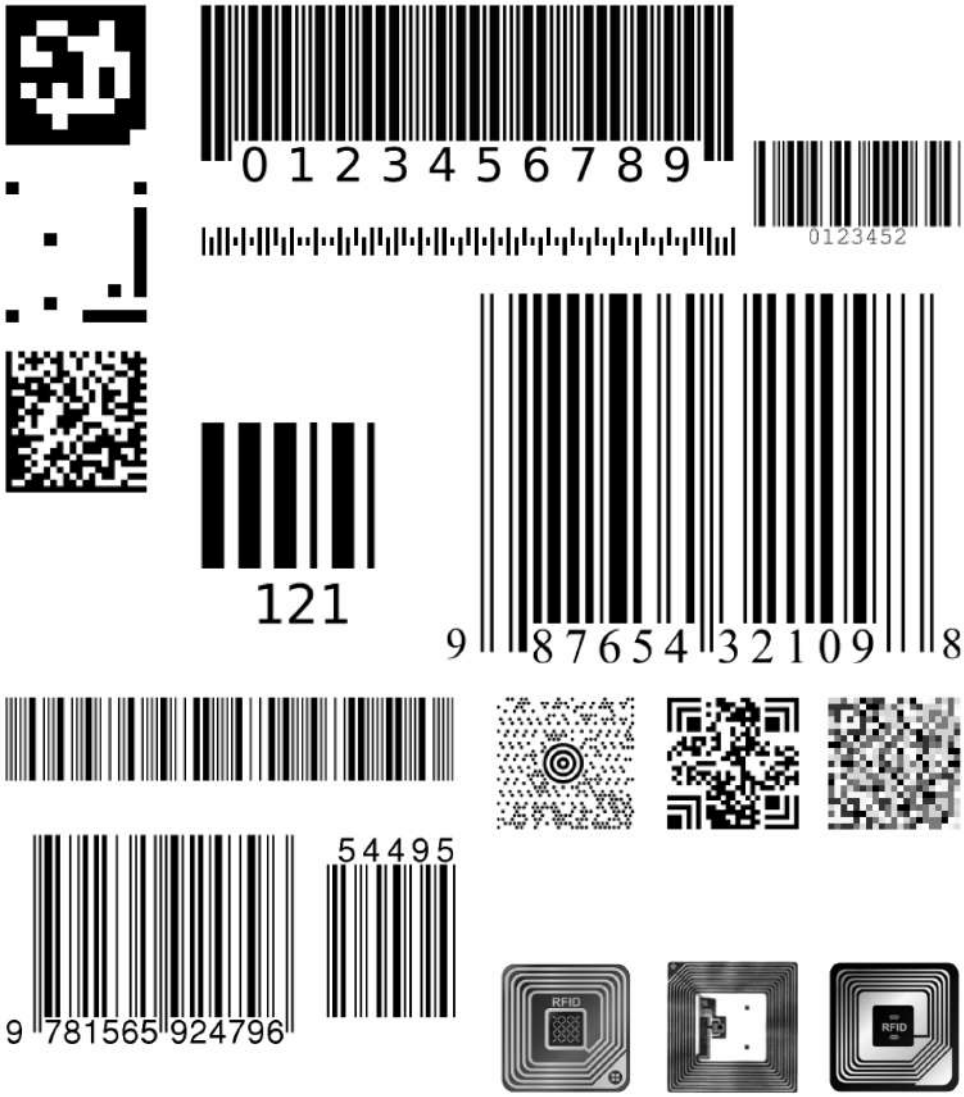


Fig. 3 – Machine readable formats.

Concept 3
The Urban Fabric as Hardware

Entity-associated data has been optically represented in a machine-readable format since the 1950s, first as linear or one-dimensional, later as a two-dimensional format. Radio-frequency identification (RFID) and other smart technologies are used today to track and identify objects of a different order. The urban fabric is an inhabited machine that does not only host, but implements legislation, by collecting, storing and managing the exchange of data required for decision-making.

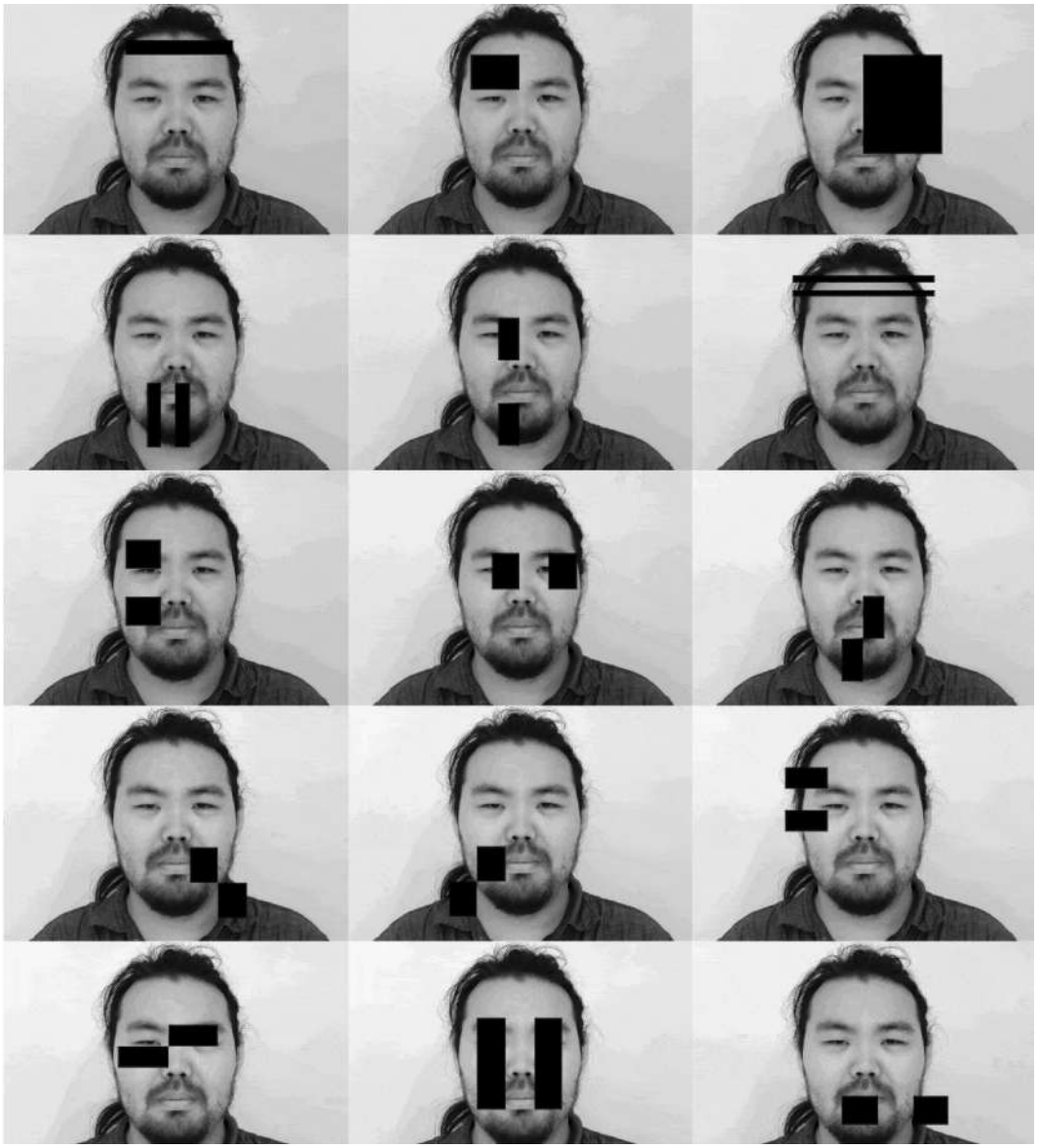


Fig. 4 – Facial recognition protocol.

Concept 4
Human and non-Human Actors as Identifiable Entities

From the Chinese social credit system to Facebook and Google identifiers, from national smart IDs to decentralised self-sovereign digital identity platforms – human and non-human actors are becoming increasingly similar in the way they are enabled to move across systems through the same processes of localisation, identification and authentication.

Seiche: a Design Tool
Seiche is an interface that facilitates:
– *Design of Automated Procedures*
by interfacing legal and data workflows.
– *Management of Data Exchanges*
from sensing systems to application apparatuses.
– *Maintenance of a Techno-Legal Repository*
to accelerate community-driven regulation refinement processes.
– *More Dynamic Lawmaking*
by shortening the iteration of legislative development processes.

By implementing:
– *Ontological Analysis for Object Classification*
to reveal the entities operated by legal texts and transform object descriptions into a machine readable format.
– *Visual Programming Patterns for Data Workflows*
to allow interested parties to visualise and modify processes of information exchange in their own terms.
– *Natural Language Processing*
to consequently generate an actualised version of the legal text in natural languages.

Fig. 5 – Seiche interface.

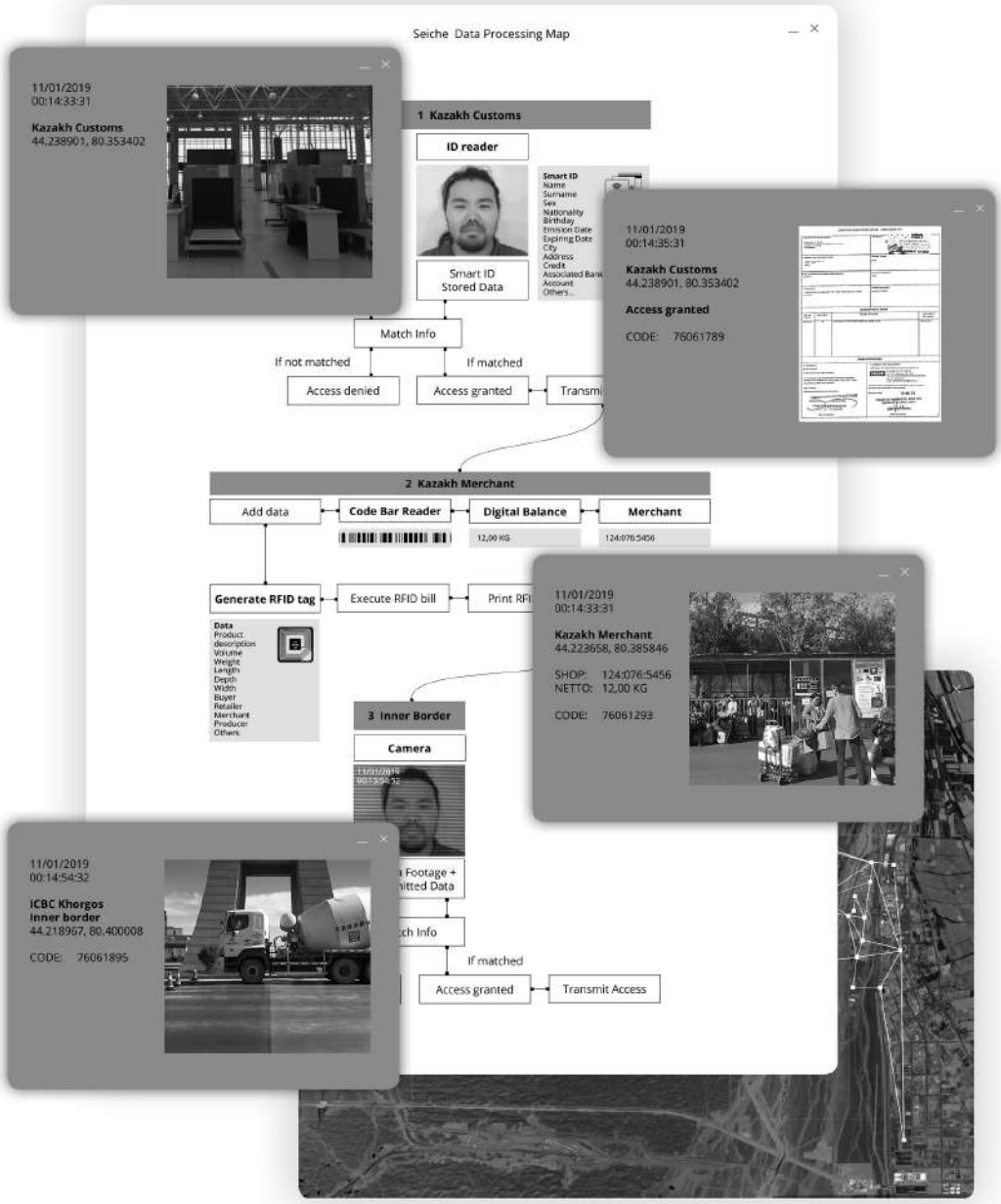


Fig. 6 – BRI map.

Case Study: Khorgos

To test what Seiche postulates, we selected Khorgos – the cornerstone of the Chinese Belt and Road Initiative as our first case study.
Khorgos is an emerging urban ecosystem on the border between China and Kazakhstan. A logistic enclave between two infrastructural and political realities that works as a paradigmatic embodiment of the cross-jurisdictional condition and the materialisation of associated complexities.
The Belt and Road Initiative is a Chinese-led long term geopolitical strategy and investment plan aiming to generate a strong Eurasian Trade Zone around the old Silk Road and, arguably, the most ambitious global infrastructure project today. More than 60 countries and an ecosystem of corporations have participated in a project that aims to link 65% of the

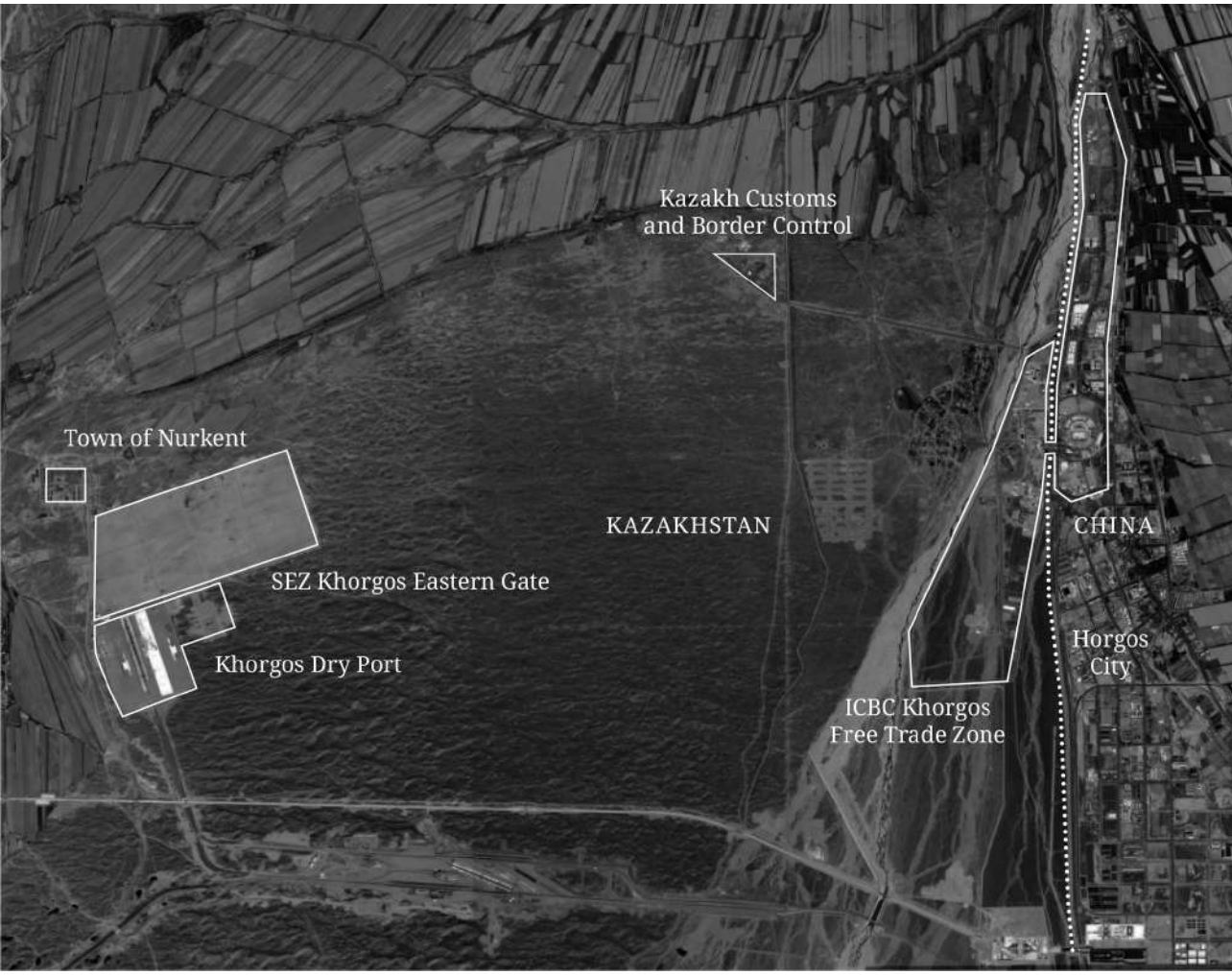


Fig. 7 – Khorgos map.

global population through infrastructure, urban development, international trade agreements and the delimitation of special economic zones around the corridor.

Khorgos consists of:

- SEZ Khorgos Eastern Gate
- Khorgos Dry Port
- ICBC Free Trade Zone
- Nurkent
- Customs
- Horgos City (Chinese side)

Khorgos Dry Port

China and the Commonwealth of Independent States (CIS) have different railroad track widths. At the Khorgos Dry Port, cargo is transported from one track to the other.
The Khorgos Dry Port is a highly automated, information-rich environment that facilitates cross border movement of cargo and goods, east and west. Freight and shipments are tracked and planned in advance through the use of GPS and shorter range wireless tracking devices. Most cargo that goes through Khorgos comes from Lianyungang Port; both ports share ownership and databases.

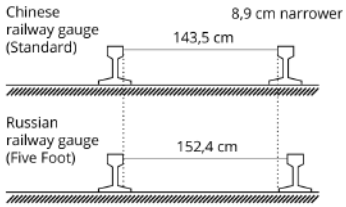


Fig. 8 – One railway, two systems.

Figs. 9 – Khorgos Dry Port lateral view.
Fig. 10 – Khorgos Dry Port front view.
Fig. 11 – Khorgos Dry Port top view.

International Center for Cross Border Cooperation (ICBC Khorgos)

Under the promise of a new Dubai, a huge construction site is growing in a desert, which was literally empty a few years ago. The ICBC is a Free Trade Zone that enjoys a special legal and tax regime for cross border trade.
The complex is enclosed within its own borders, highly securitised and divided in two national blocks. Access and exit to the ICBC are independently regulated by Chinese and Kazakh customs offices. Chinese and Kazakh citizens can only access and exit the complex through their respective national offices. Once access is granted, individuals can remain at either side of the zone for 30 days without a visa.
Thousands of Kazakh citizens access the ICBC on a daily basis to purchase tax free Chinese goods to be resold on the outside. It is common for them to go through customs control at least twice a day facing a slow, analogic, highly protocolary and bureaucratic process; indeed, an underground economy of professional carriers is growing.

Fig. 12 – ICBC Khorgos construction site.
Fig. 13 – ICBC Khorgos inner border.
Fig. 14 – ICBC Khorgos exterior border.

Khorgos Dry Port and ICBC Running on Seiche

Fig. 15 and Fig.16 use the Seiche interface to explain data and legal workflows of an average shipment through Khorgos Dry Port and a journey through ICBC Khorgos. They involve the movement of associations entities through jurisdictions enabled by digital infrastructures. Such infrastructures are specific; in specific places and owned by different legal bodies. In order to achieve a seamless flow of entities, the involved organisations exchange information according to the following protocols.

Figure 15
Products with different code-bars are packaged within a single box and with an RFID tag containing the code-bar, then manually-entered information about the package is generated, printed and stuck on the package. Several packages are registered as a shipment through an RFID reader antenna. RFID data input, including key characteristics of the shipment, are used to automatically fill the legal documents that are digitally sent to Chinese customs and the logistic company, or, registered in the blockchain before the shipment departs with a road operator. Once the logistics company receives the package it uses RFID data concerning the destination and temperature requirements to organise shipments of matching properties on specific containers. RFID data and the legal documents of different shipments are aggregated into a Smart container memory bank, which also contains its own legal documents. The Smart container is then sent to Lianyungang Port through a second road operator. Containers are distributed in different trains according to destination data and sent towards Khorgos. Carriage and container data is uploaded to a shared database accessible by Khorgos Dry Port operators who can then proceed to organise the reception and to cross-check data with Chinese customs before arrival. Once cargo arrives to Khorgos Dry Port, information is cross-checked with an updated container memory bank for security reasons. A bill is then executed and cargo is moved to a CIS carriage and shipped towards Europe.

Figure 16
A Kazakh citizen enters the ICBC gates where their face and smart ID are digitally cross-checked for access validation. Once access is granted, their smart ID account is activated for purchase within the networks of Kazakh and Chinese merchants. When purchasing products within the ICBC, codebars and weight information is aggregated into an RFID code that is then printed and stuck on the package and associated to the user's smart ID; this data is then passed to Kazakh customs. The user can continue their journey to ICBC's Chinese side with a seamless face check. When purchasing goods from the Chinese merchant network the same process is repeated, and data of the new RFID is associated to the ID and sent to Kazakh customs. Prior to a person's arrival, Kazakh customs know the products and weight a particular citizen is carrying. A balance and an RFID reader

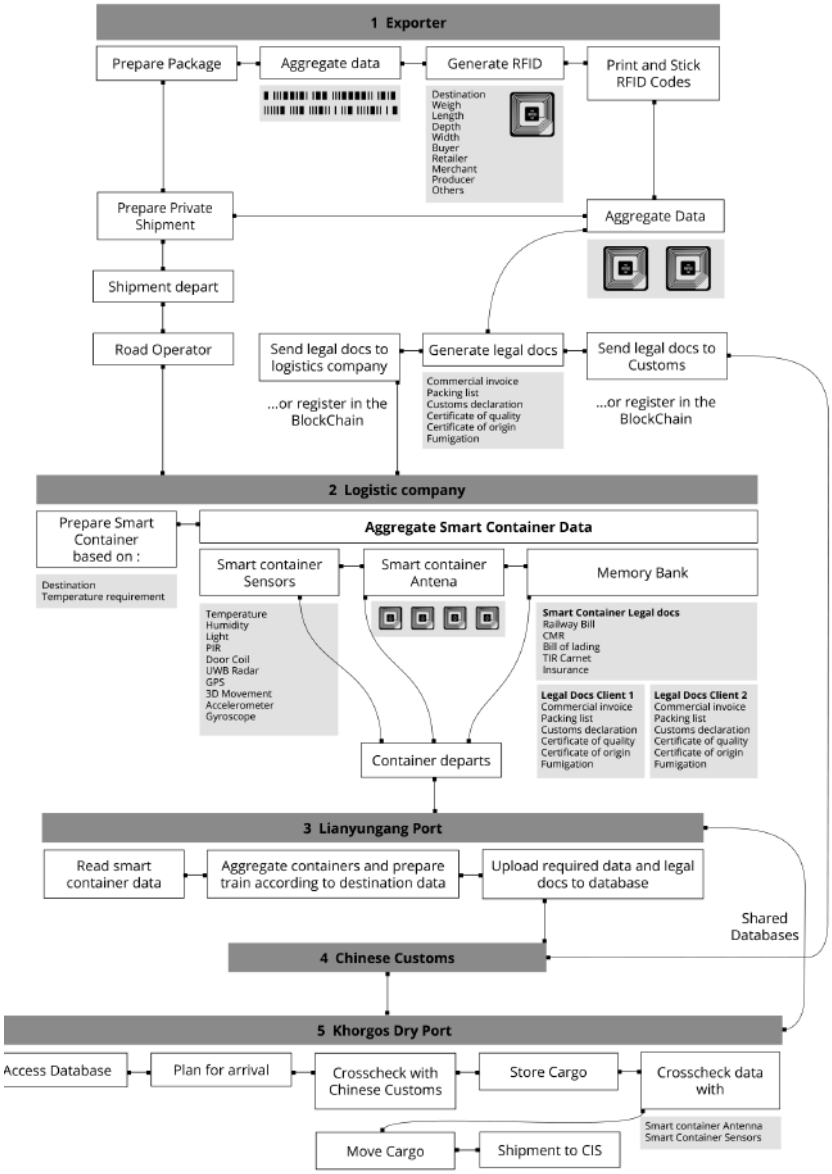


Fig. 15 – Khorgos Dry Port data workflows.

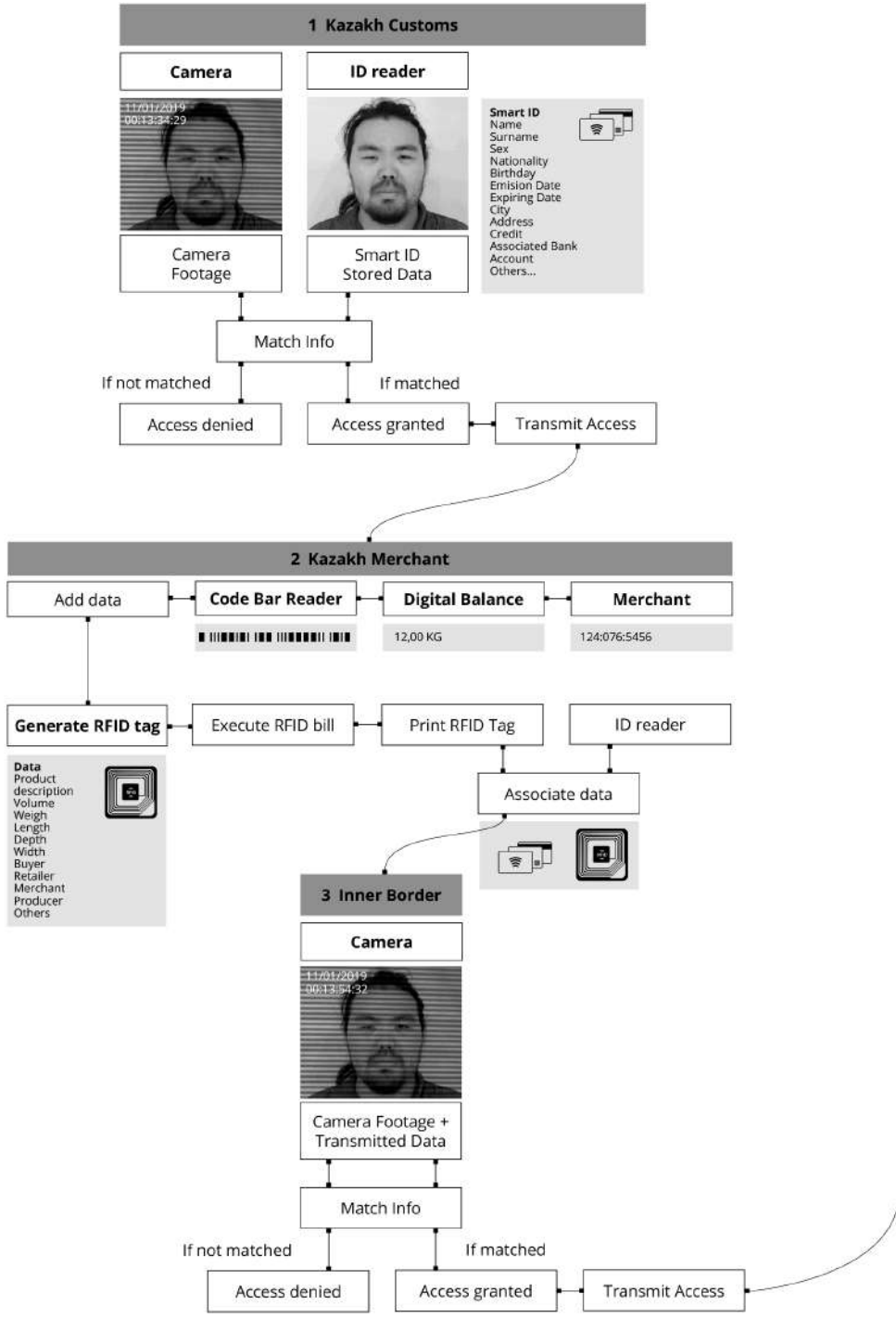
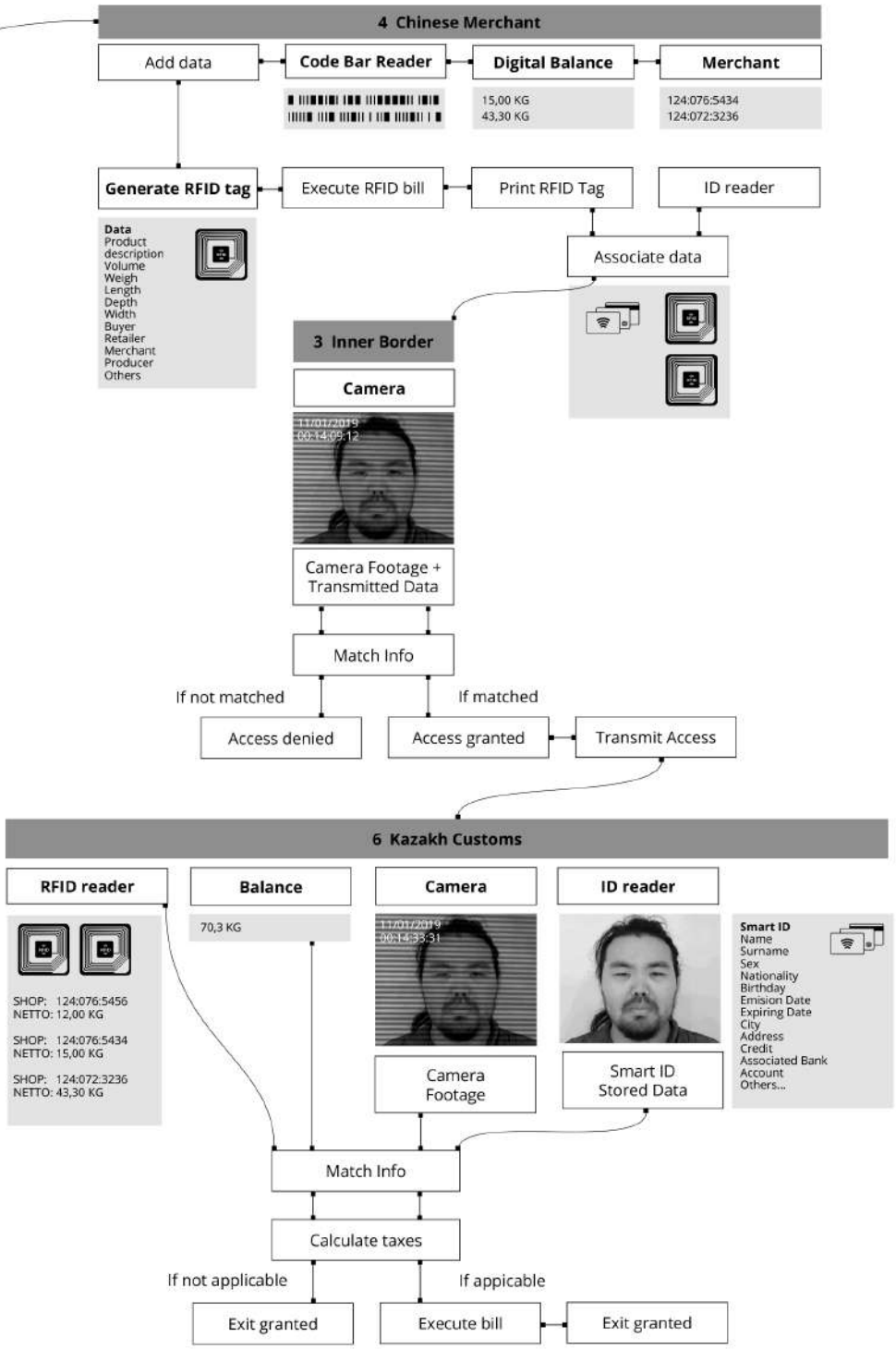


Fig. 16 – ICBC Khorgos data workflows.


4 Chinese Merchant
Add data
Code Bar Reader
Digital Balance
Merchant
15,00 KG
43,30 KG
124:076:5434
124:072:3236
Generate RFID tag
Execute RFID bill
Print RFID Tag
ID reader
Data
Product description
Volume
Weigh
Length
Depth
Width
Buyer
Retailer
Merchant
Producer
Others
Associate data
3 Inner Border
Camera
17/01/2019 00:14:09:12
Camera Footage + Transmitted Data
Match Info
If not matched
If matched
Access denied
Access granted
Transmit Access
6 Kazakh Customs
RFID reader
Balance
Camera
ID reader
70,3 KG
17/01/2019 00:14:33:31
SHOP: 124:076:5456
NETTO: 12,00 KG
SHOP: 124:076:5434
NETTO: 15,00 KG
SHOP: 124:072:3236
NETTO: 43,30 KG
Smart ID
Name
Surname
Sex
Nationality
Birthday
Emision Date
Expiring Date
City
Address
Credit
Associated Bank
Account
Others...
Camera Footage
Smart ID Stored Data
Match Info
Calculate taxes
If not applicable
If appicable
Exit granted
Execute bill
Exit granted

antenna are used to cross-check the information on arrival. If the total weight stands above 50 kilograms, then taxes apply, and the bill is directly executed from the credit on the user's smart ID account. After the transaction is complete, exit is granted and data of the journey is erased or stored in a shared database according to the selected pre-sets.

Seiche: a Mapping Platform
Although Seiche is a design tool that facilitates a task that is already being faced by organisations, states and institutions across the globe, the proposal cannot be completed without explaining how the platform is presented to final users.
In the introductory paragraph, current crises of citizenship are presented in relation to global infrastructures, but how can any political demand be articulated around something that is not fully visualised or comprehended in the first place? We understand that the design of interfaces through which citizens interact with infrastructural systems as a territory of contestation and competition, and ultimately as a key factor in the materialisation of Seiche.
For that reason, Seiche puts special emphasis on the mapping of the designed exchanges and its relationship to the physical spaces in which they occur and the enabling infrastructures. Once a decision-making process is solved by establishing an information-exchange protocol in the design tool, Seiche mapping platform will enable:

– *Access and Motility Assessment*
of any entity or association of entities through a particular procedure by simulating operability.
– *History of Interactions*
of moving entities and sensing apparatuses through the designed protocols which explains the history of sovereign systems an entity or an individual have moved across.
– *Dynamic Network of Emergent Sovereignties*
where instances of authentication among systems can be registered to visualise the use and evolution in time and space of a particular set of exchange rules.

Capabilities of relevance today, but even more important, as ubiquitous authentication processes and back-end automation progressively replace hard conceptions of border and direct systems interfaciality.

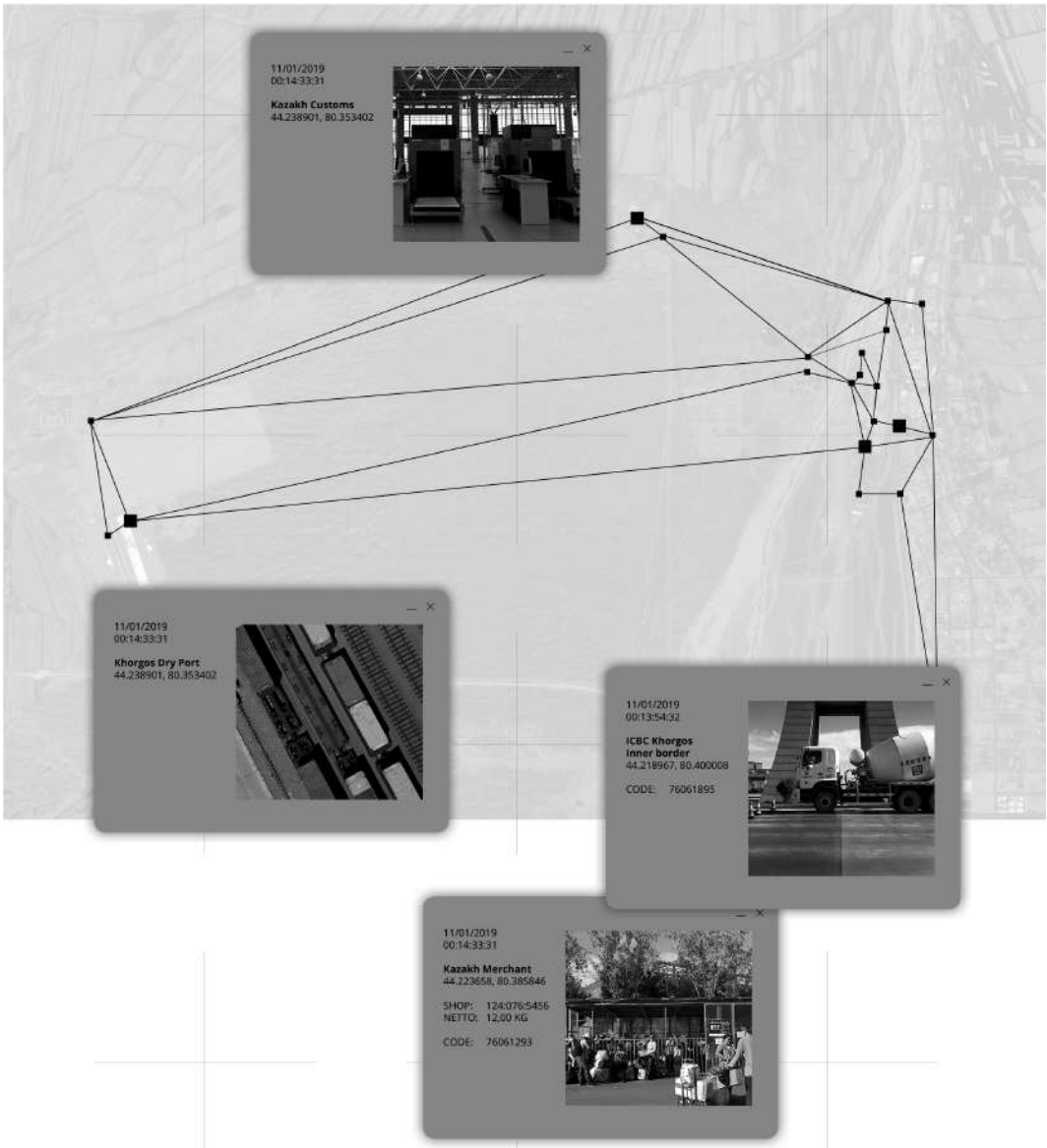


Fig. 17 – Dynamic network of emergent sovereignties.