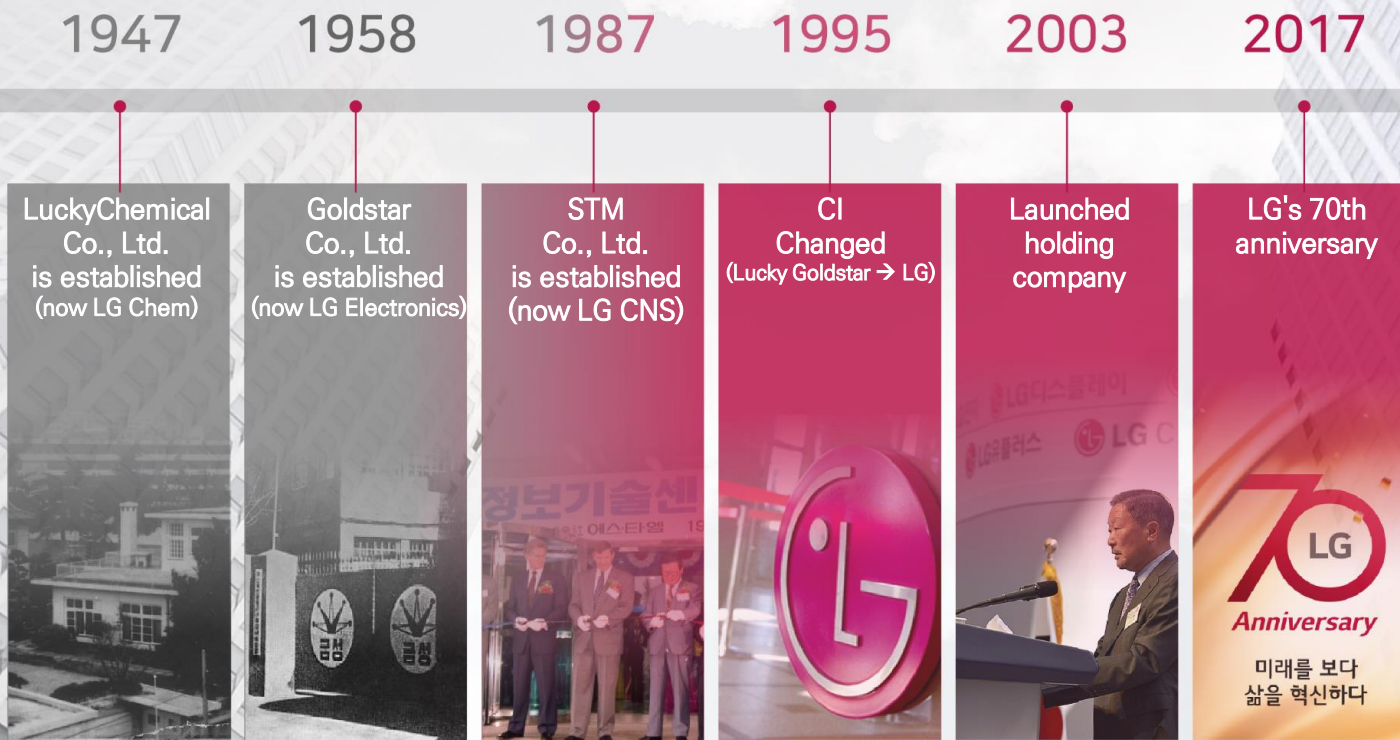# Trust network use case for Blockchain/DID based services; South Korea's Mobile Driving License

LG CNS

LG CNS in LG Group

About LG

History

1947	1958	1987	1995	2003	2017
LuckyChemical Co., Ltd. is established (now LG Chem)	Goldstar Co., Ltd. is established (now LG Electronics)	STM Co., Ltd. is established (now LG CNS)	CI Changed (Lucky Goldstar → LG)	Launched holding company	LG's 70th anniversary

Overview

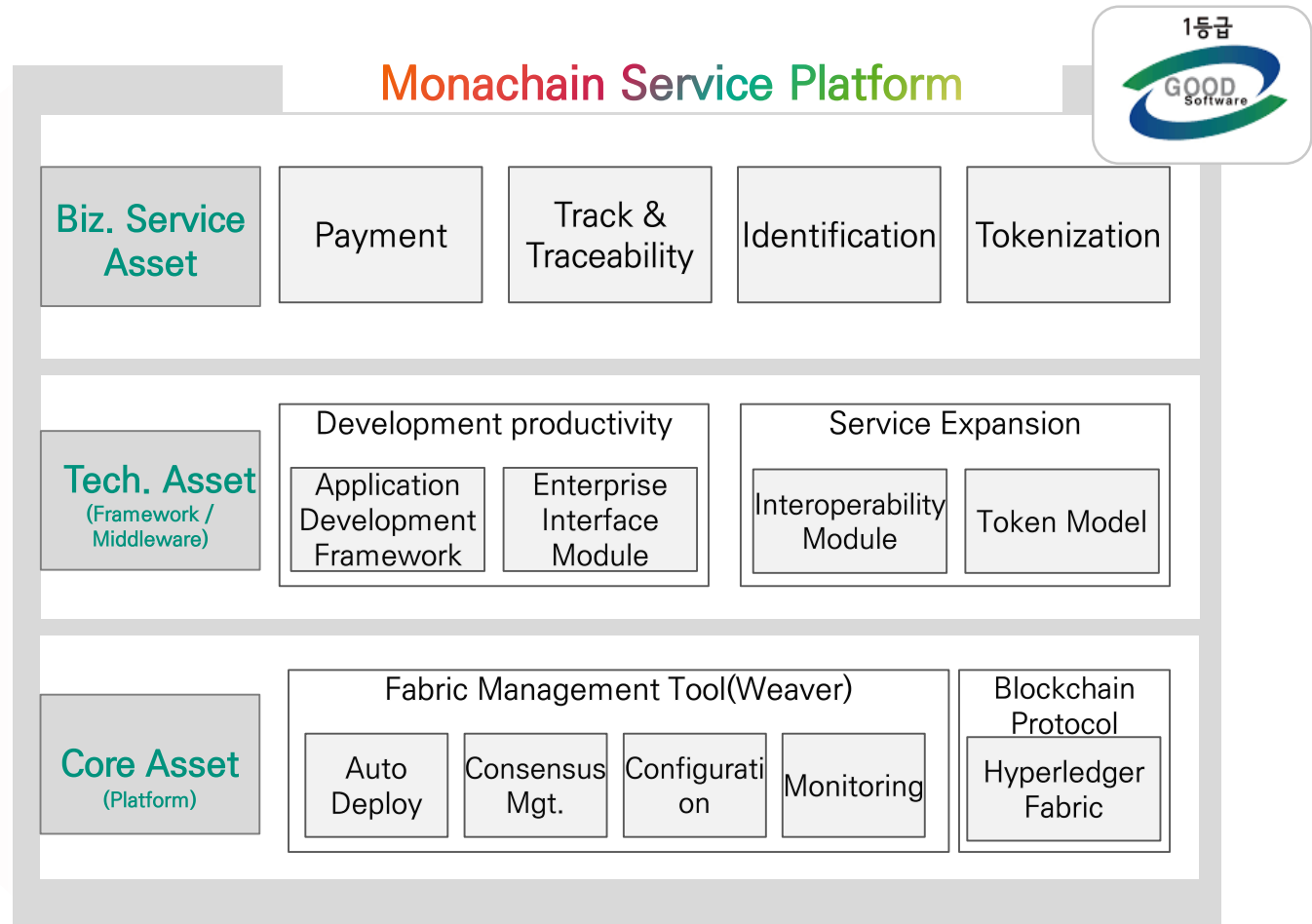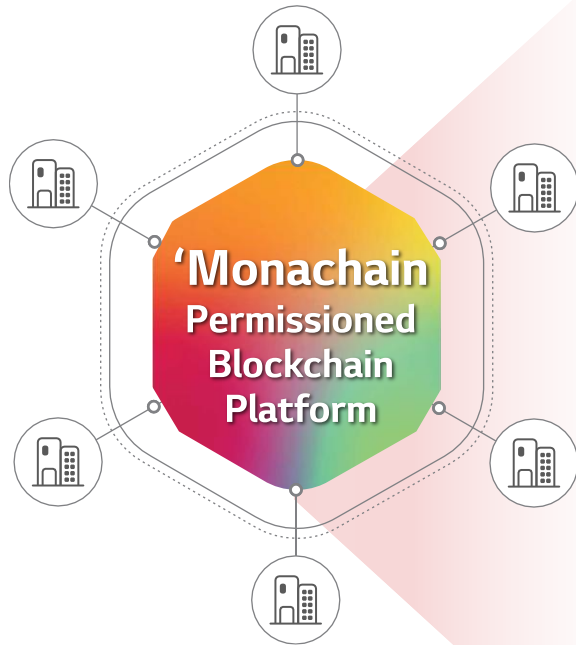| Sales	$134 Bil.
Number of employees	250 K
Affiliated Companies	67

LG Electronics, LG Display, etc.

Electronics 13 Companies

LG Chemical, LG Household & HealthCare

Chemicals 25 Companies

LG CNS, LG U+, etc.

Communication & Services 28 Companies

*As of 2021

Blockchain Value Enabler

LG CNS

1등급
GOOD Software

Monachain Service Platform

'Monachain
**Permissioned
Blockchain
Platform**

Biz. Service Asset	Payment	Track & Traceability	Identification	Tokenization

Tech. Asset (Framework / Middleware)	Development productivity		Service Expansion	
	Application Development Framework	Enterprise Interface Module	Interoperability Module	Token Model

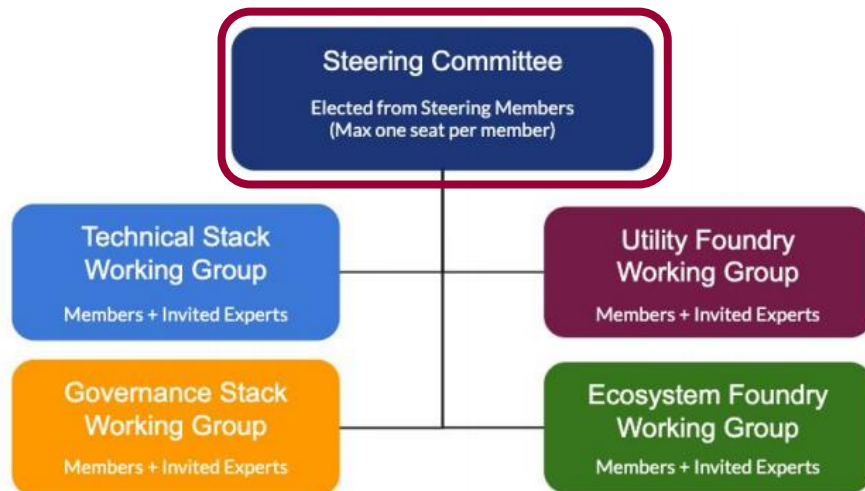| Core Asset (Platform)	Fabric Management Tool(Weaver)				Blockchain Protocol
	Auto Deploy	Consensus Mgt.	Configuration	Monitoring	Hyperledger Fabric

Based on Hyperledger Fabric, it is a permissioned platform that provides to optimally support the customer's needs for a blockchain based business.

Blockchain Value Enabler

※ image source: https://trustoverip.org/about/members/

Blockchain References

Blockchain Value	Major Biz Domain	Blockchain Reference · Monachain
Trust-based Data Sharing	Payment	• Korea KOMSCO Blockchain based community currency platform • Expansion with LG Science Park and KB Financial Partners • Magok community currency platform at LG Science Park
Business Process Innovation (Speed & Cost Reduction)	Track & Traceability	• Ministry of Food and Drug Safety Imported Food Safety Data Platform • Blockchain based smart digital freight invoice platform • EV batteries' life cycle management Blockchain Platform in Jeju • Blockchain based tracking system of EV' reusable batteries in Jeju • LG U+ Smart Insurance claims of lost/damaged phones • Distribution platform and service for eco-friendly agricultural products based on Blockchain in Chullanam-do Province • Blockchain consulting and PoC for SCM/logistics for LG Group
DID based New business opportunities	Decentralized ID	• Ministry of the Interior and Safety, Digital Driver's License • Ministry of the Interior and Safety, Digital ID card of public officers • Blockchain based trust autonomous driving platform in Sejong city
Digital Sharing Economy (Data Sharing and Compensation)	Tokenization	• Woori Bank Blockchain Platform and CBDC Pilot • Shinhan Bank Simulation PoC for CBDC Issuance • Bank of Korea Blockchain based asset trading & Payment PoC • KB Kookmin Bank Blockchain-based digital asset trading platform

Understanding of Korea's ID Concept

Korea's Top 3 ID cards

	Resident Registration Card	Passport	Driving License
Issuer	행정안전부	외교부	경찰청
Related Law	Resident Registration Act	Passport Law	Road Traffic Law
Type	Plastic card (Forgery prevention technology applied)	Electronic Passport with IC Chip (Unique)	Plastic Card (Forgery prevention technology applied)

Issued according to the relevant laws and regulations by the government

The state formally certifies an individual's identity

However, the current identity authentication system is...

Offline

Concerns about Forgery

Financial institution
Public institutions

Identification
with a physical card

- ☑ Identity verification with a plastic card with disclosed information
- ☑ Inconvenience, vulnerable breakage
- ☑ Concern of Forgery and tampering

ID authentication method

"Confusing"

Online

Vulnerable to Leakage

Internet Banking
Public Website
Shopping/Commerce

Mobile
SNS
CA

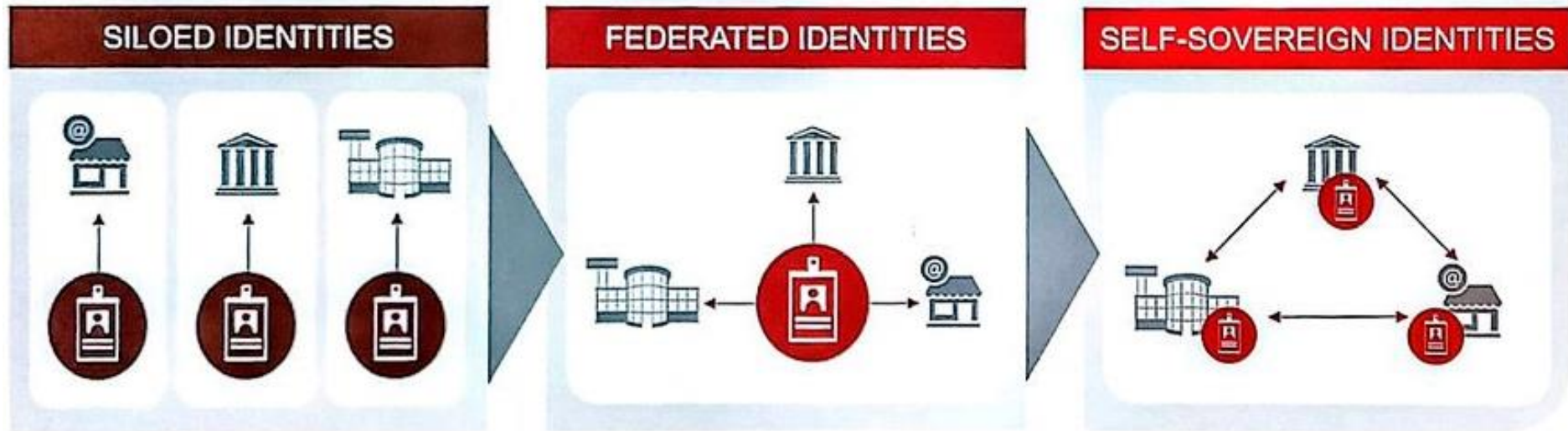Service Provider

- ☑ Various authentication in untact era – public certificates, mobile authentication
- ☑ Mass personal information leakage – Big brother issue
- ☑ Concerns about surveillance society

Vulnerable to personal information leakage

Paradigm Shift to Digital ID

SILOED IDENTITIES → **FEDERATED IDENTITIES** → **SELF-SOVEREIGN IDENTITIES**

Siloed(Centralized)

- Personal information is stored and managed by each service provider by governing the Personal Information Protection Act

- In order to use the service, personal information should be provided. IDs/PWs are different from each service provider and should be maintained by person efforts and the inconvenience of memory
- Still popularly used system

Federated

- Reliable 3rd party authentication method to conquer disadvantages of siloed identities

- Oauth service providers such as Google, Naver, and Kakao are representative.

- As a result, personal information is becoming more centralized, increasing the threat of massive personal information theft attacks, and 3rd party dependence.

Decentralized

- Personal information is owned by individuals, not service providers, and used for authentication

- As the service provider can authenticate without storing personal information, only the amount of personal information necessary for the service is stored

- The duty and right for the handling of personal information is moved from a service provider to an individual
  - the technical implementation of self–sovereign identity is DID(Decentralized ID).

DID and VC

DID (Decentralized Identity/Identifier)

- DID(identity) is a SSI's technical implementation model and identity information authentication system in which a personal information management entity generates and manages IDs.
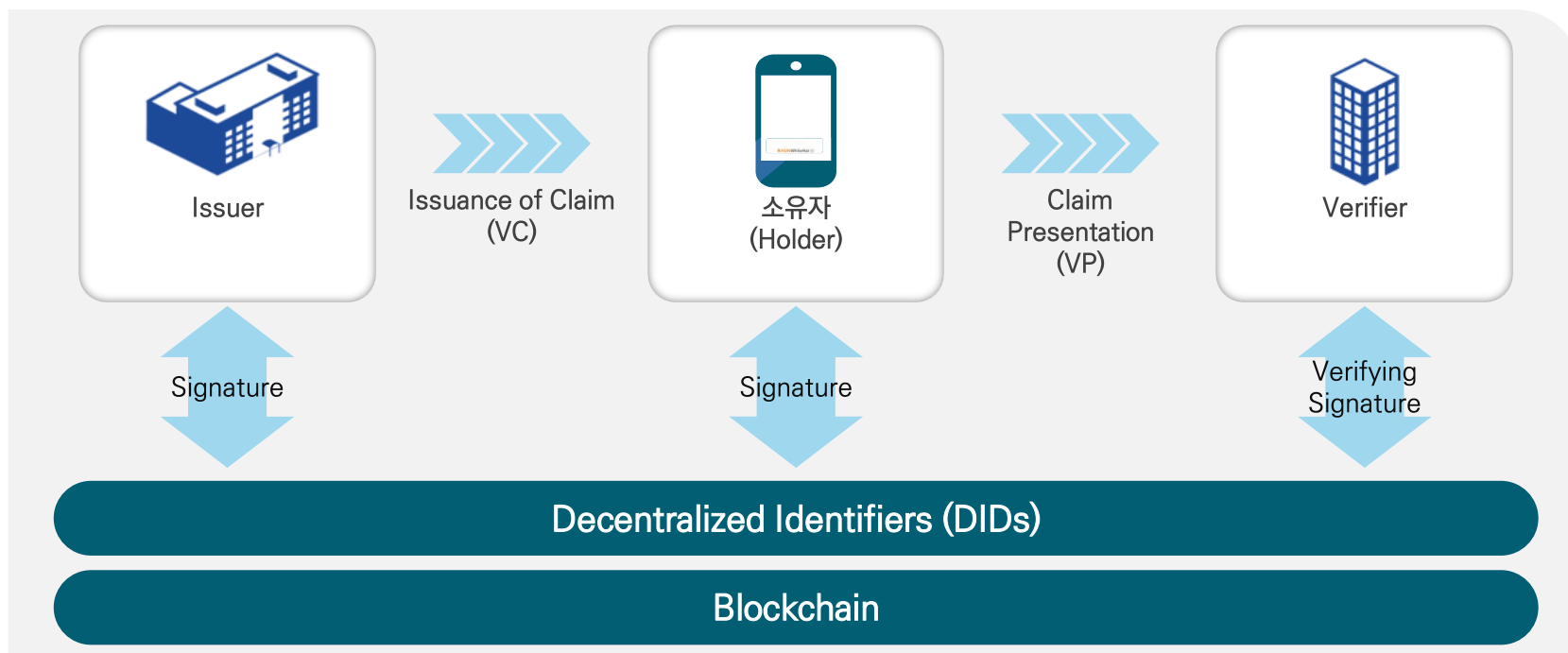- DID(identifier) in a narrow sense is the only identifier in the DID blockchain network.
- Example "did : Igcns :3k9dg345adf4958djfik"

Verifiable Credential

선택/제출

DID VC1(대학 증명)

DID VC2(성인 인증)

DID VC3(주소지 증명)

사용자
디지털 지갑
(Wallet)
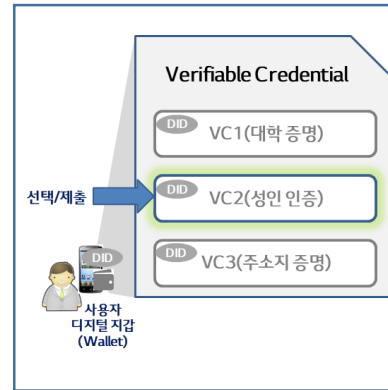
VC (Verifiable Credential)

- VCs include DIDs, details of certified qualification for DID owners, and individuals can own multiple VCs, just like they own several IDs.
- The signature of the agency that issued the VC is included for example adult certification, driver's license, resident card, university graduation certificate, student ID, home address, etc

Issuer

Issuance of Claim
(VC)

소유자
(Holder)

Claim
Presentation
(VP)

Verifier

Signature

Signature

Verifying
Signature

Decentralized Identifiers (DIDs)

Blockchain

Roadmap for national digital ID

Pilot (2020)

LG CNS

Mobile Public Officer ID

The Ministry of the Interior and Safety, National Personnel Office

Era of national digital ID

news1

Phase I (2021 ~ 2022)

Foundation

In Progress

Mobile Driving License
(National Police Agency Road Traffic Authority)

Distinguished service to Veteran
(Ministry of Patriots and Veterans Affairs)

Phase II (2023 ~ 2024)

Expansion

Certificate of registration for the disabled
(Ministry of Health and Welfare)

Youth card
(Ministry of Gender Equality and Family)

- Public and private converged services
- Review and design of various civil services

Phase III (2025 ~)

Completion

Foreigner registration card
(Ministry of Justice)

Additional expansion plans
(resident card)

- Converged services In-App implementation
- Implementation of various civil services

DID/blockchain based mobile identification platform

DID/blockchain-based National ID card common platform
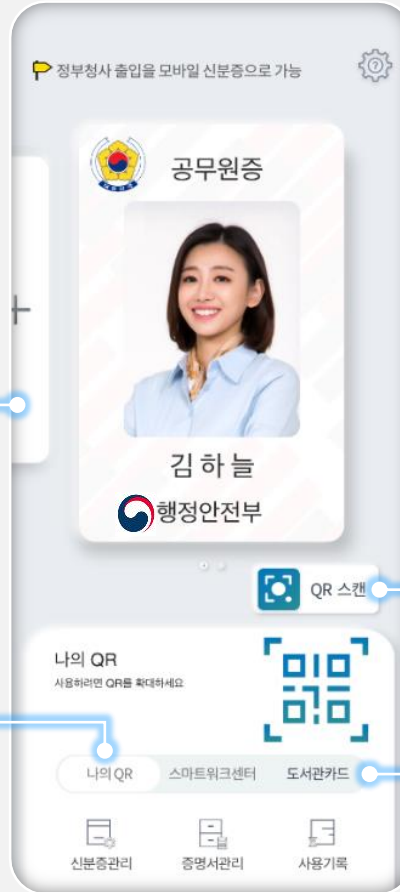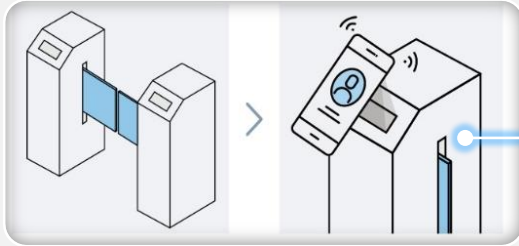
Mobile ID of Public Officer

(Entering the government building)

(System Log-in)

Scanning QR

SWC

5G Notebook

Library
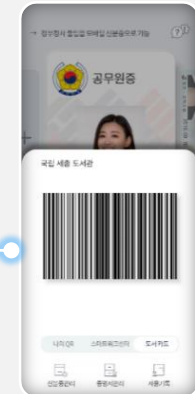
Press Release of Mobile Public Officer ID

전해철 장관, 모바일 공무원증 출입 시연

등록일 : 2021.01.13. 작성자 : 행정안전부 조회수 : 960

"
전해철 장관이 13일 오전 정부세종2청사 집무실에서 모바일 공무원증으로

행정안전부 업무시스템에 로그인을 시연해 보고 있다.
"

□ 자신의 신분증(신원정보)을 본인 스마트폰에 발급받아 보관하면서 신원확인 요청이 있을 때마다 본인의 판단에 따라 제공 여부를 결정할 수 있습니다. 신분증 사용 이력은 본인만 확인할 수 있도록 개인 스마트폰에 저장되며, 중앙서버에는 저장되지 않습니다.

모바일 공무원증으로 정부청사 게이트 출입

"
본격적인 모바일 시대를 맞아 공무원증도 모바일을 통해 사용할 수 있게 되었습니다.

모바일 공무원증이 공직사회에 안정적으로 뿌리내려 모바일 신분증 시대의 서막을 여는 주춧돌이 되길 바랍니다.

황서종 인사처장
"

Korea Mobile Driving License

Identify yourself with your mobile
Whatever you want anywhere

Issuer/Operator

Issuance **KoROAD 도로교통공단**

Operation **KOMSCO 한국조폐공사**

Publicly trusted ID card issuance/operating agency

Holder

Self-Sovereign Identity

Integrated online and offline authentication

Verifier

Public	Web Verification	Certificates	...
Financial	Bank Account	Certificates	...
Private	Rent Car	CVS	...

ID Verification

Decentralized (DID) Blockchain Platform

As a national ID,
Guarantee Creditworthiness

Safe and reliable
Establishing a common national platform

Useful and various
Service Expansion for people

Mobile Driving License VC

Mobile ID App VC

Mobile Driver License Information(VC)

Identification

Qualification

※ English Version of VC is included

Address Information(VC)

Up-to-date Address
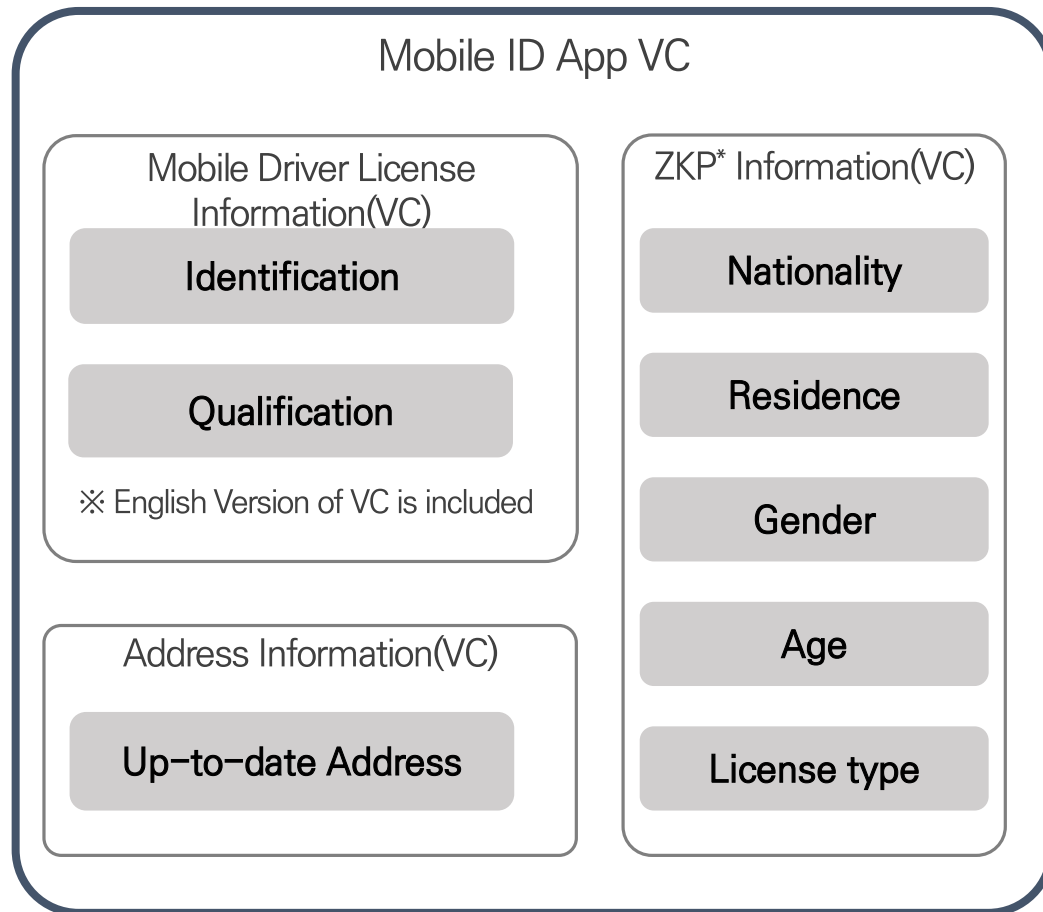
ZKP* Information(VC)

Nationality

Residence

Gender

Age

License type

*ZKP: Zero-Knowledge Proof

Implementation Direction

- Driving License Information((VC)
  - Issued by the National Police Agency by integrating identity VC and qualification VC into one driving license VC (Identification, Qualification, Korean and English version)

- ZKP Information VC)
  - Submission of use by nationality, residence, gender, age, and license type

- Up-to-date Address (VC)
  - Address VC is issued separately in the name of the National Police Agency in the same way digitally when changing an address
  - Issuance in Korean/English

Mobile Driving License Blockchain/DID Platform

Application

Management UI
(Admin, Statistics)

Mobile App
(Biometrics(Facial Recognition, Fingerprint),
NFC, etc)

DID

Issuer

DID Encryption
Signature

Holder

VC Store, DID
Encryption Signature

Verifier

DID Decryption
Signature Verifying

Blockchain Ledger

Decentralized Repository
(Public Key, DID, DID Document etc)
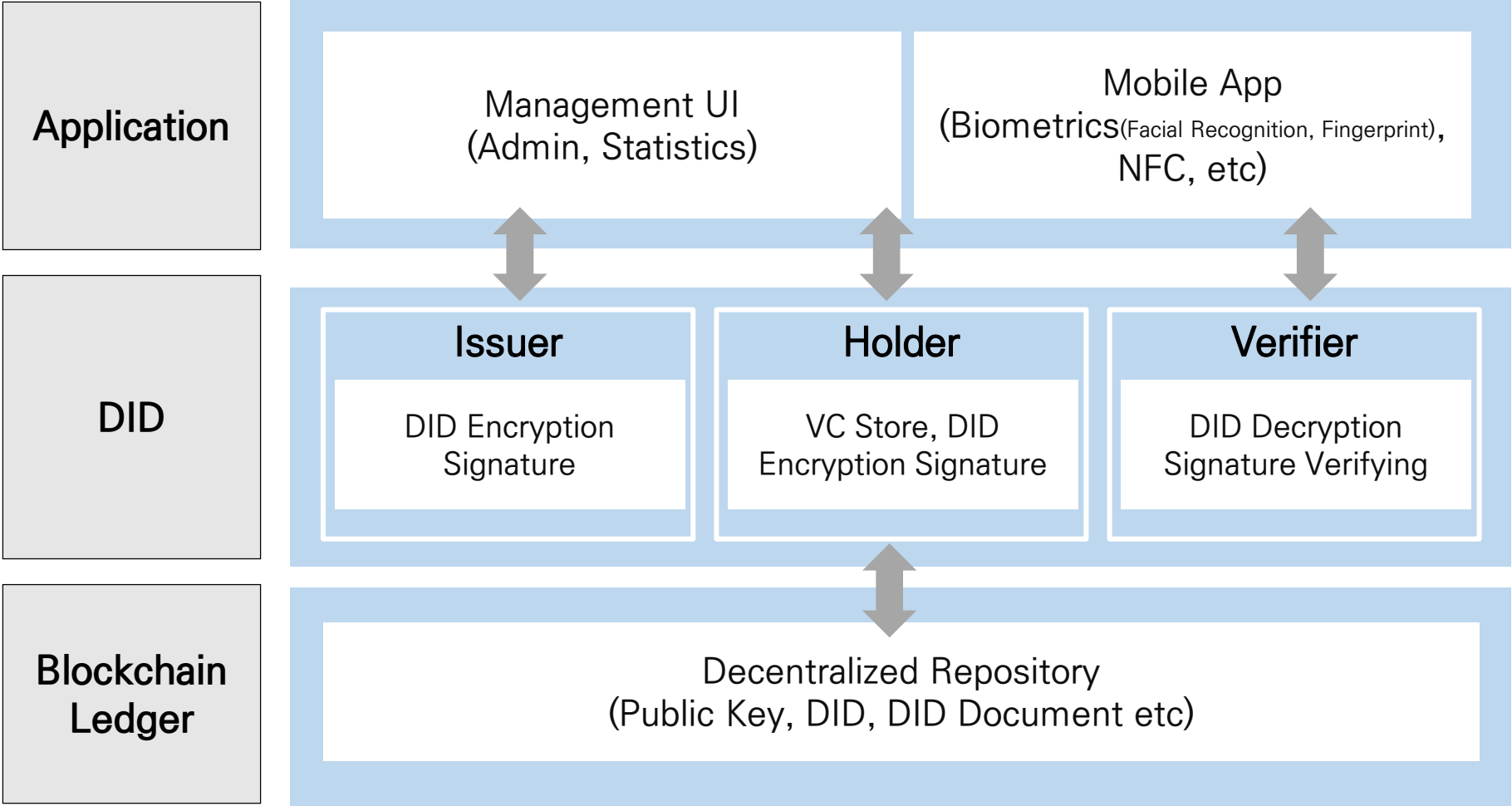
How can you trust someone in online?
Is DID/Blockchain enough?

Credible Issuance Process(Simplified)

1 — Must visit the driving license test center ⭐

2 — Fill out the issuance application form (Personal Information) ⭐

3 — Authentication and reception

4 — QR/IC Card ⭐

5 — Issuance of mobile driving license at site

6 — Registration of authentication method (Biometrics) ⭐
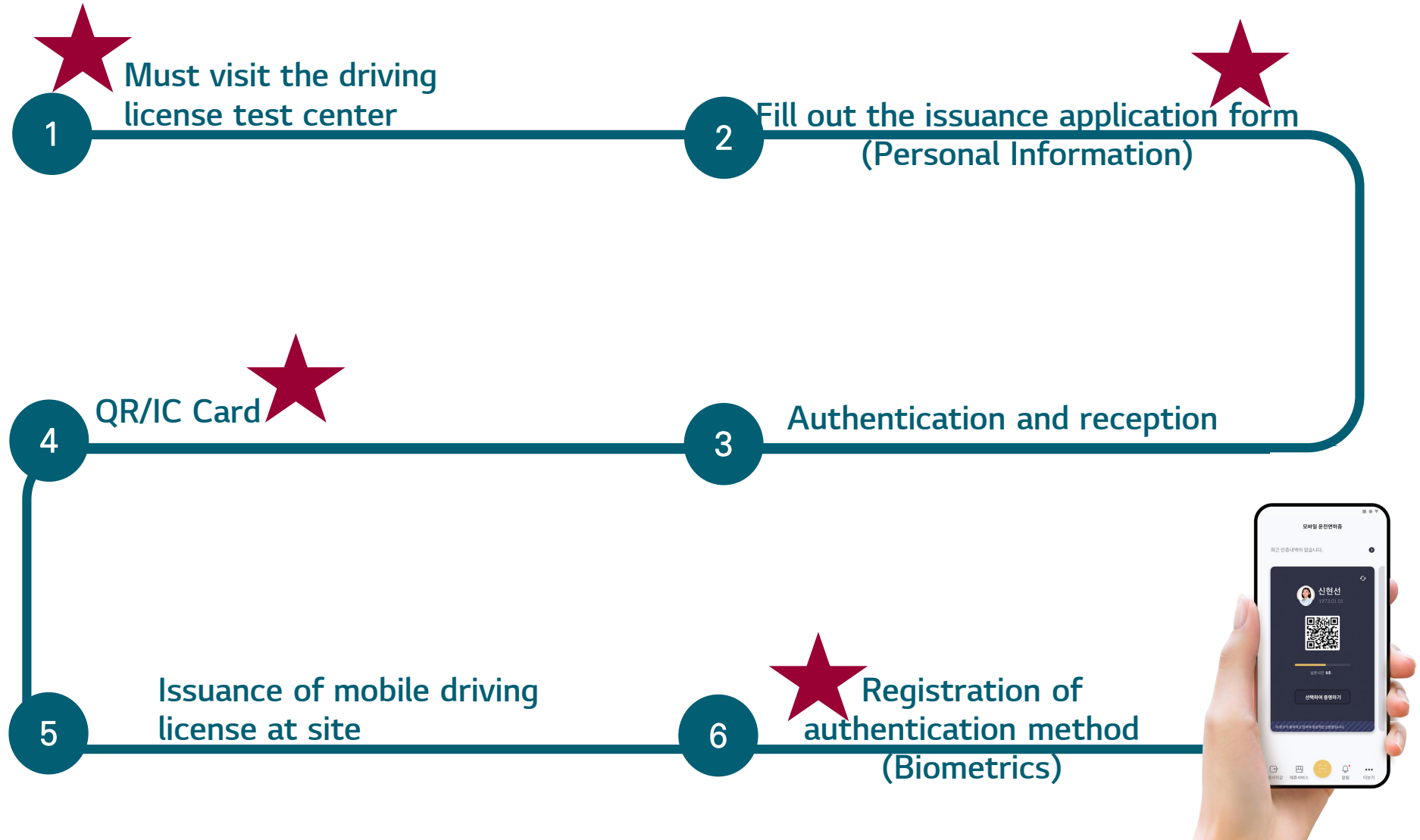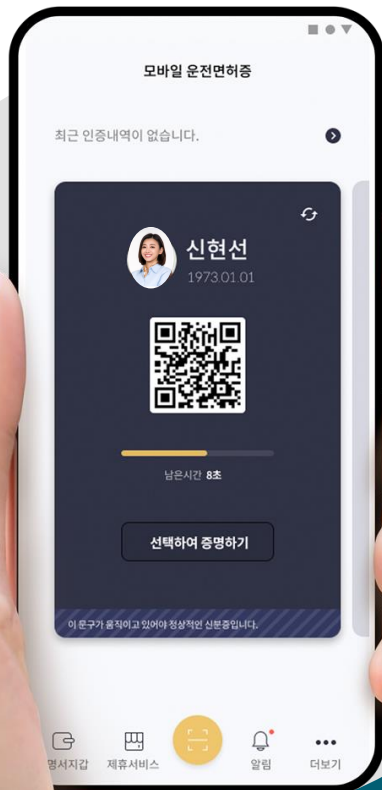
Major Considerations

Issuer

- How to secure public credibility of a national ID?
- How to safely store an ID on a personal device?
- How to handle various ID and credentials??

Verifier

- 'How do I prove 'I am me'?
- How to secure the legal status of mobile ID?
- How will it spread nationwide?

Finally, Mobile Driving License

Mobile Driving License App

Smart driving card equipped with the same IC chip as the e-passport

모바일 운전면허증

최근 인증내역이 없습니다.

신현선
1973.01.01

남은시간 8초

선택하여 증명하기

이 문구가 움직이고 있어야 정상적인 신분증입니다.

명서지갑   제휴서비스   알림   더보기

+

1종보통

IC Chip

신현선
12-34-567890-12

생년월일   1990.12.25   성별   여
적검/갱신   2023.01.01~
기   간   2023.12.31
식별번호   UFOWWE
발급일   2011.11.12

서울지방경찰청장

Expected Values

When the mobile driving license are available

Issuer	Holder	Verifier
With a national digital ID common platform	By having control over personal information with self-sovereign identity	As reliability and security are guaranteed, in various places

Versatile and Safe

- As a trust national backbone network, it will be jointly used for issuing various ID cards.
- Leading national innovation in the ID authentication system to improve public services and support rational policy decision.

Only Necessary Info.

- Manage my personal information more securely both on & offline
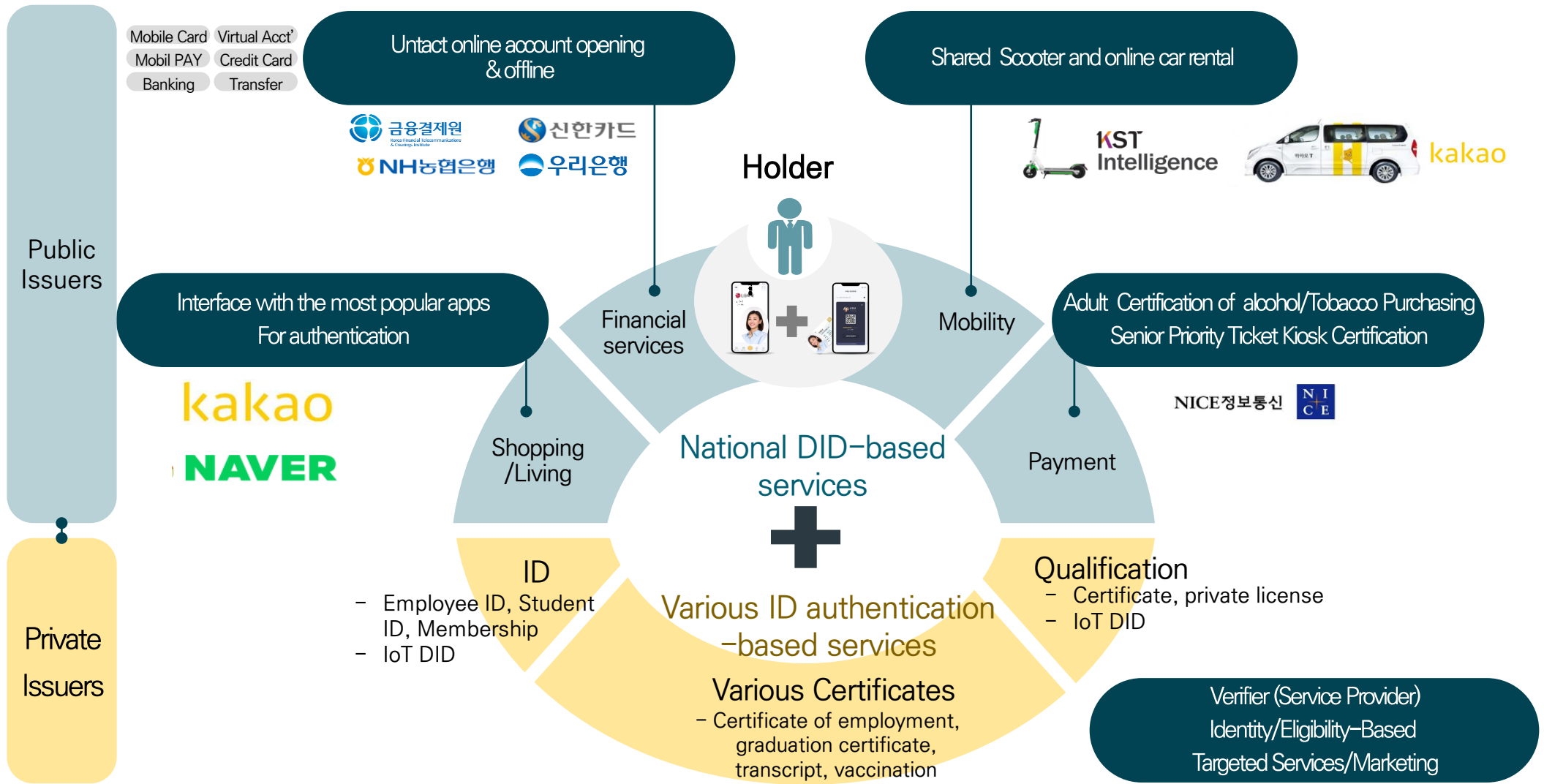- As a sovereign data, providing minimal information where it is absolutely needed

more reliable and more useful

- Reduce the burden of ID verification
- Reducing the burden of certification payment costs
- Easily utilize provided SDK

DID-based Ecosystem

Public Issuers

Private Issuers

Mobile Card Virtual Acct'
Mobil PAY Credit Card
Banking Transfer

Untact online account opening & offline

금융결제원 Korea Financial Telecommunications & Clearings Institute

신한카드

NH농협은행

우리은행

Shared Scooter and online car rental

KST Intelligence

kakao

Holder

Interface with the most popular apps For authentication

kakao

NAVER

Financial services

Mobility

Adult Certification of alcohol/Tobacco Purchasing Senior Priority Ticket Kiosk Certification

NICE정보통신 NICE

Shopping /Living

National DID-based services

+

Various ID authentication –based services

Payment

ID
– Employee ID, Student ID, Membership
– IoT DID

Qualification
– Certificate, private license
– IoT DID

Various Certificates
– Certificate of employment, graduation certificate, transcript, vaccination

Verifier (Service Provider)
Identity/Eligibility–Based
Targeted Services/Marketing

Digital Innovation Enabler

Thank you

Digital Innovation Enabler, LG CNS

Buildings E13, E14, LG Science Park, 71, Magokjungang 8-ro,
Gangseo-gu, Seoul, Republic of Korea
TEL: +82-2-2099-0114 / Website: www.lgcns.com