

ISO TC 204 WG 5 소개

2016. 10.



Mr. Bo rueppang@ex.co.kr

Korea Expressway Corporation



개도국 ITS 표준 적용 사항

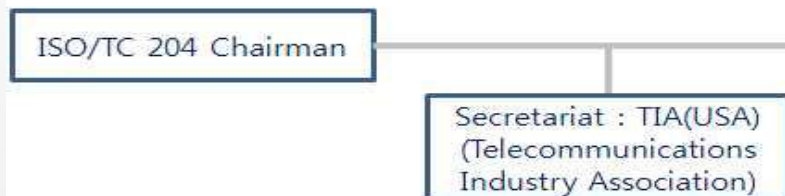
구 분	개도국 표준 적용 현황
아키텍처	ISO 14813-1 : 2007 ITS service domains (Reference model architectures)
V2I-A	ISO 14906(EFC-Application Interface domain for DSRC)
	EN 13372 (Road Transport and Traffic Telematics for DSRC)
	EN 15509 (RTTT EFC interoperability application for DSRC)
V2I-L1	ISO 15628(ITS DSRC Application)
V2I-DATA	ISO/IEC 1179(Specification and Standardization of Data Elements)
V2I-TI	ISO 14817(Transport information and control systems)



- ISO : 세계에서 가장 큰 규모의 국제표준 제정기구(1947년 설립)
 - * ISO(International Organization for Standardization)
식품안전, 컴퓨터, 건강 등 일상생활에 필요한 표준을 제정하고 있음
- ISO/TC 204 : ITS분야를 담당(1992년 설립)
- ISO/TC 204 WG은 총 18개 그룹으로 구성되어 있으며
국토교통부 담당 WG은 총 6개임
 - * WG1(아키텍처), WG5(전자지불), WG8(대중교통), WG9(교통정보)
WG10(여행정보), WG18(C-ITS)

ISO TC 204 조직구성

ISO/TC 204 Organization



Working Groups

Lead Country

WG 1 : Architecture	United Kingdom
WG 3 : ITS Database Technology	Japan
WG 4 : Automatic Vehicle Identification/ Automatic Equipment Identification	Norway
WG 5 : Electronic Fee Collection	Sweden
WG 7 : General Fleet Management/ And Commercial/Freight Operations	Canada
WG 8 : Public Transport and Emergency	United States
WG 9 : Integrated Transport Information, Management and Control	Australia
WG 10 : Traveller Information Systems	United Kingdom
WG 11 : Route Guidance and Navigation Systems	Vacant(휴면)
WG 14 : Vehicle/Roadway Warning and Control Systems	Japan
WG 15 : Dedicated Short-Range Communications	Germany(휴면)
WG 16 : Wide Area Communication	United States
WG 17 : Nomadic Device	South Korea
WG 18 : Co-operative System	Germany
Ad hoc WG : u-ITS	South Korea

Liaison within ISO/IEC

TC 8
 TC 22
 TC 104
 TC 154
 TC 211
 ISO/IEC/JTC 1
 ISO/IEC/JTC 1/SC 31
 TC 122-TC 104 JWG
 IEC/TC 9

Liaison with organizations outside

ITU-R SG5 (WP5A)
 ITU-R SG6 (WP6A)
 CEN/TC 278
 APEC
 IEEE
 OGC
 UN/CEFACT/TBG3
 IrDA
 ETSI/ERM/TG37
 WCO

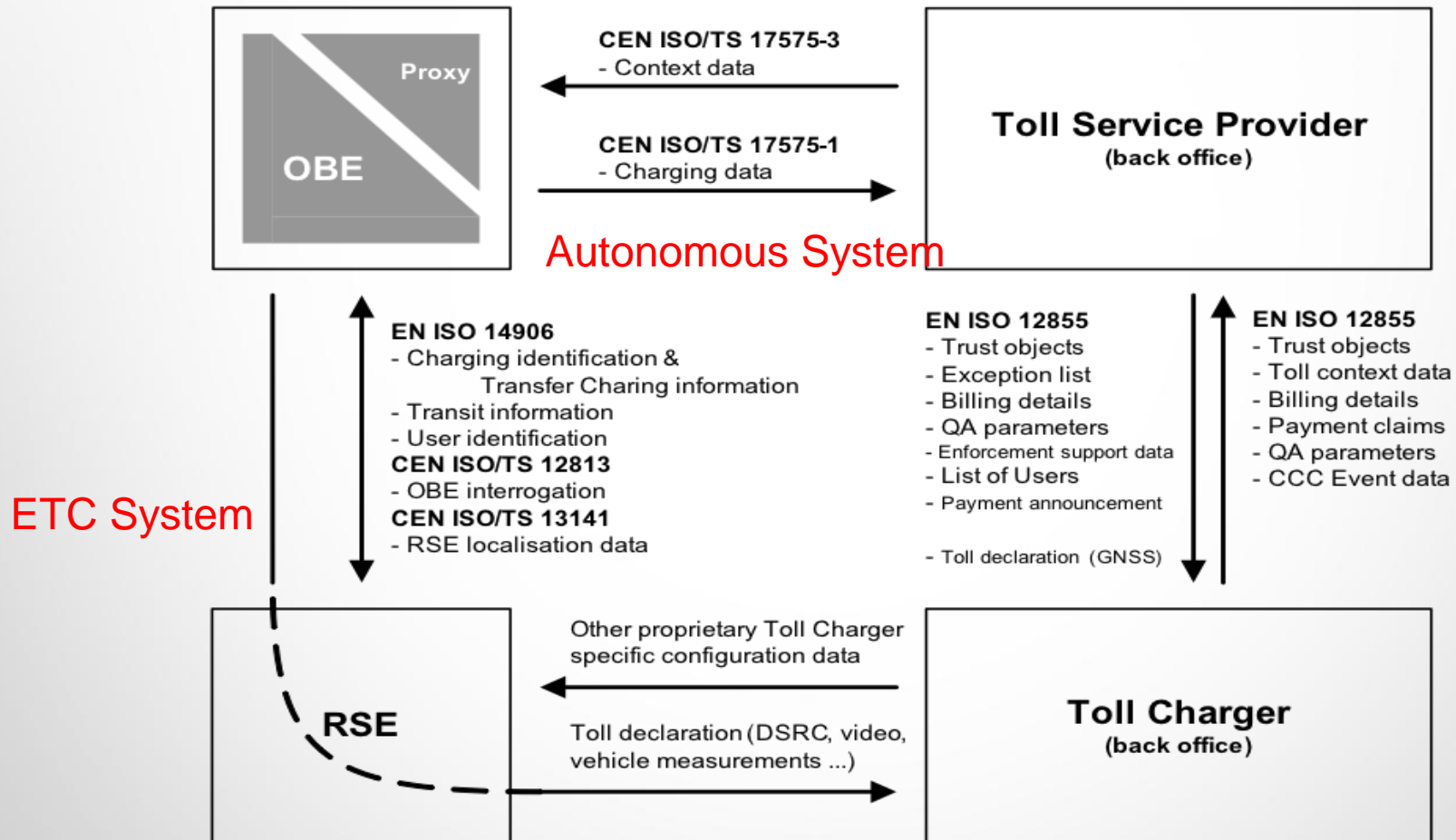


- WG5는 전자요금징수(EFC : Electronic Fee Collection) 시스템의 정보, 통신, 제어에 대한 표준을 담당하고 있으며, CEN TC 278과 연계하여 표준 제정함
 - 통신방식 : 단거리 전용통신(DSRC)와 위성항법시스템(GNSS/CN)
 - * GNSS/CN ➤ Autonomous System(2008 TC 204 meeting)
 - * Autonomous System is joint work item between ISO and CEN(2010)
 - ❖ 참여국가 : 총 18개국(노르웨이 등 유럽 16개국, 아시아 2개국 등)
 - ❖ 표준내용 : 전자요금징수를 사용하기 위한 정보교환, 테스트 방법 등에 관련된 표준
 - ❖ WG5는 분야별로 전문적이고 효과적으로 표준을 개발하기 위해 3개의 소위원회를 두고 있음
- SG1 : 정보교환, 아키텍처, 보안, SG2 : DSRC 기반 EFC, GNSS/CN 기반 EFC, 테스트



List of WG5 Items

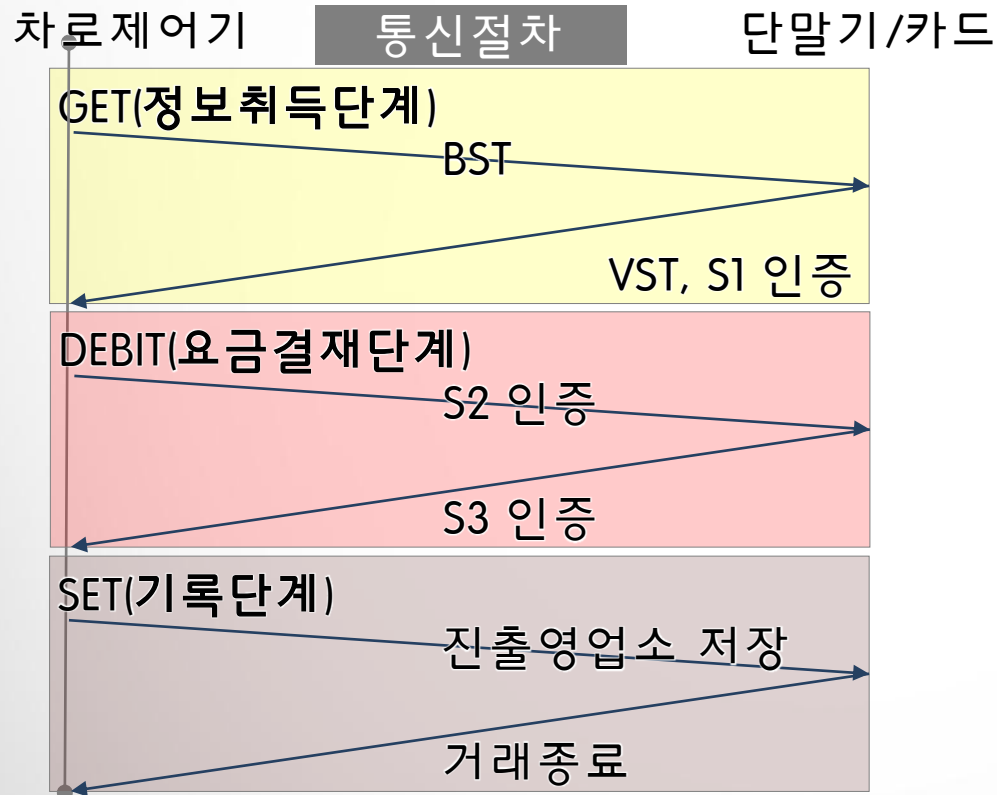
- IS 17573 EFC System- Architecture for Vehicle-related tolling :
EFC Architecture and frameworks of EFC conditions





우리나라 hipass system

- IS 14906 : RSE-OBE 간의 인터페이스 표준을 따름



IS 14906

6.2 initialisation

BST: BeaconID, Time,
ApplicationList

VST : OBEConfiguration

6.3 Transaction

GET : contractvehicle,
ReceiptServece part,
PaymentMeansBalance

Debit : DebitPaymentFee

SET : ReceiptServicePart



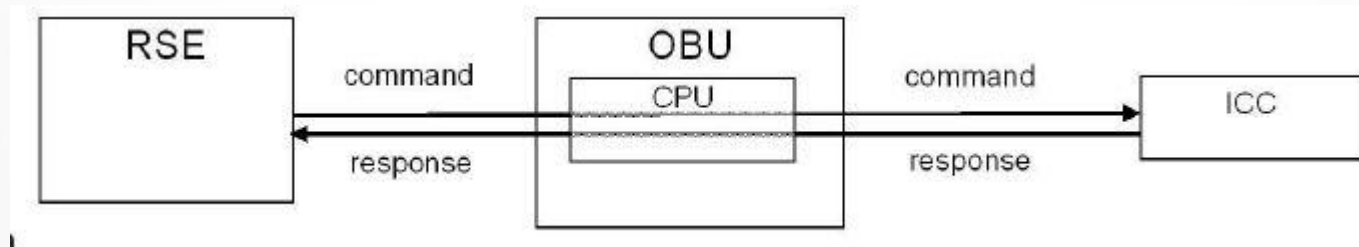
한국 ETC & ISO 표준

한국 ETC : OBU + 전자카드 , RSE + PSAM

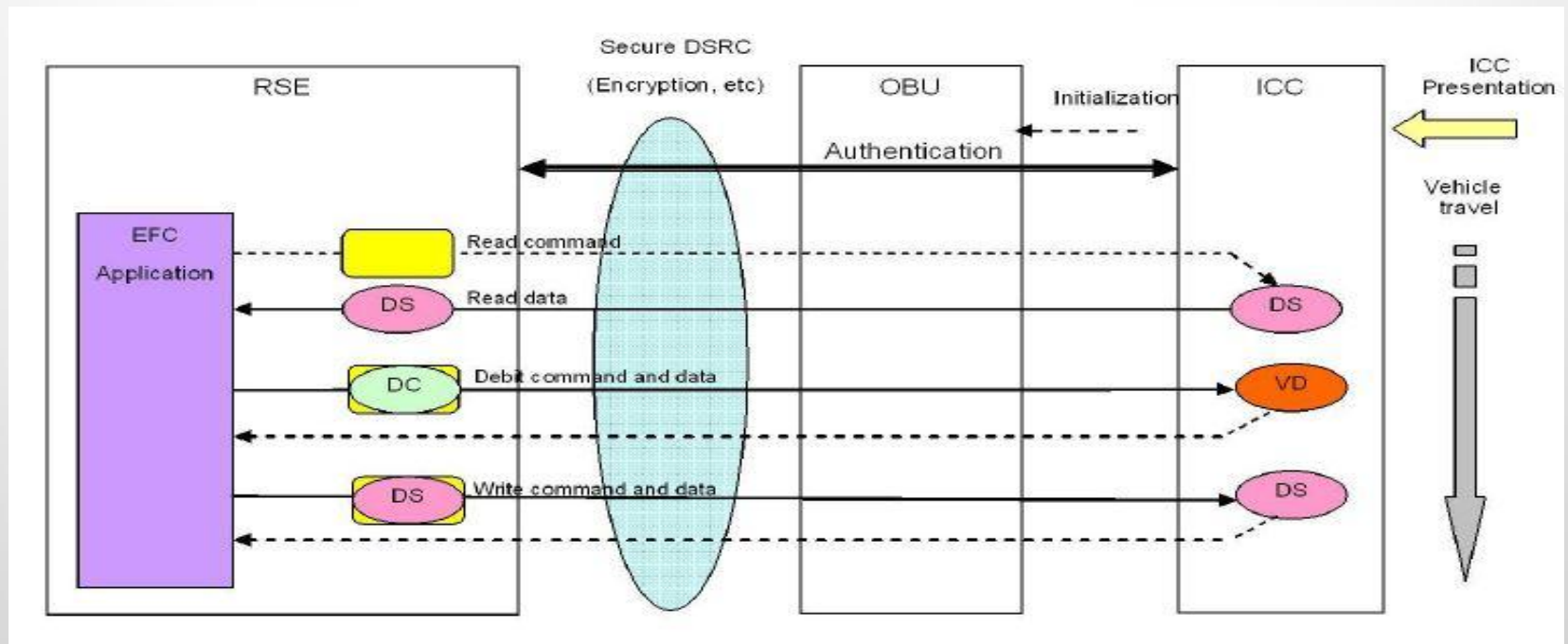
ISO 17573 : Autonomous , OBE+RSE

- ▶ 전자카드를 활용한 ETC ISO 표준이 없는 사항임
- 전자카드를 사용하고 있는 국가(대부분 아시아 국가 : 한국, 일본, 중국, 싱가포르)에서는 ISO 표준이 필요한 사항임
- 이와 관련하여 2008년 ISO/TS 25110에서는 ISO 14906(RSE<->OBE 인터페이스)에 ICC 를 이용하는 OBU 타입 별 RSU<->OBU<->ICC 인터페이스를 정의하였음

Transparent type 구성



Process





ISO 25110 Transparent Type

Transparent type 인터페이스

Table 1 — TRANSFER_CHANNEL.request

Parameter	ASN.1 Type	Value	Remarks
Element Identifier EID	Dsrc-Eid	0	
Action Type	INTEGER(0..127,..)	8	Transfer Channel
AccessCredentials	OCTET STRING		
ActionParameter	ChannelRq ::= SEQUENCE { channelId ChannelId, apdu OCTET STRING }		Always to be present Channel ID=ICC (3)
Mode	BOOLEAN	TRUE	

The apdu in ActionParameter shall contain the ICC command.

Table 2 — TRANSFER_CHANNEL.response

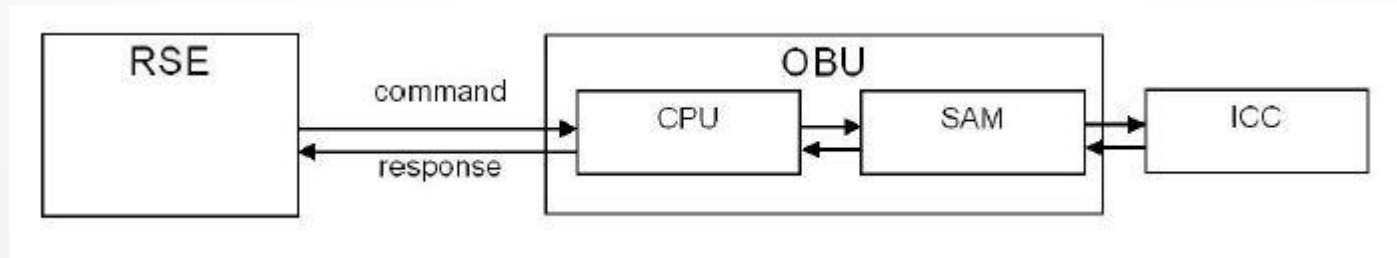
Parameter	ASN.1 Type	Value	Remarks
ResponseParameter	ChannelRs ::= SEQUENCE { channelId ChannelId, apdu OCTET STRING }		Always to be present
Return Code(Ret)	Return Status		Optional use



ISO 25110 Caching Type



Caching type 구성



Process

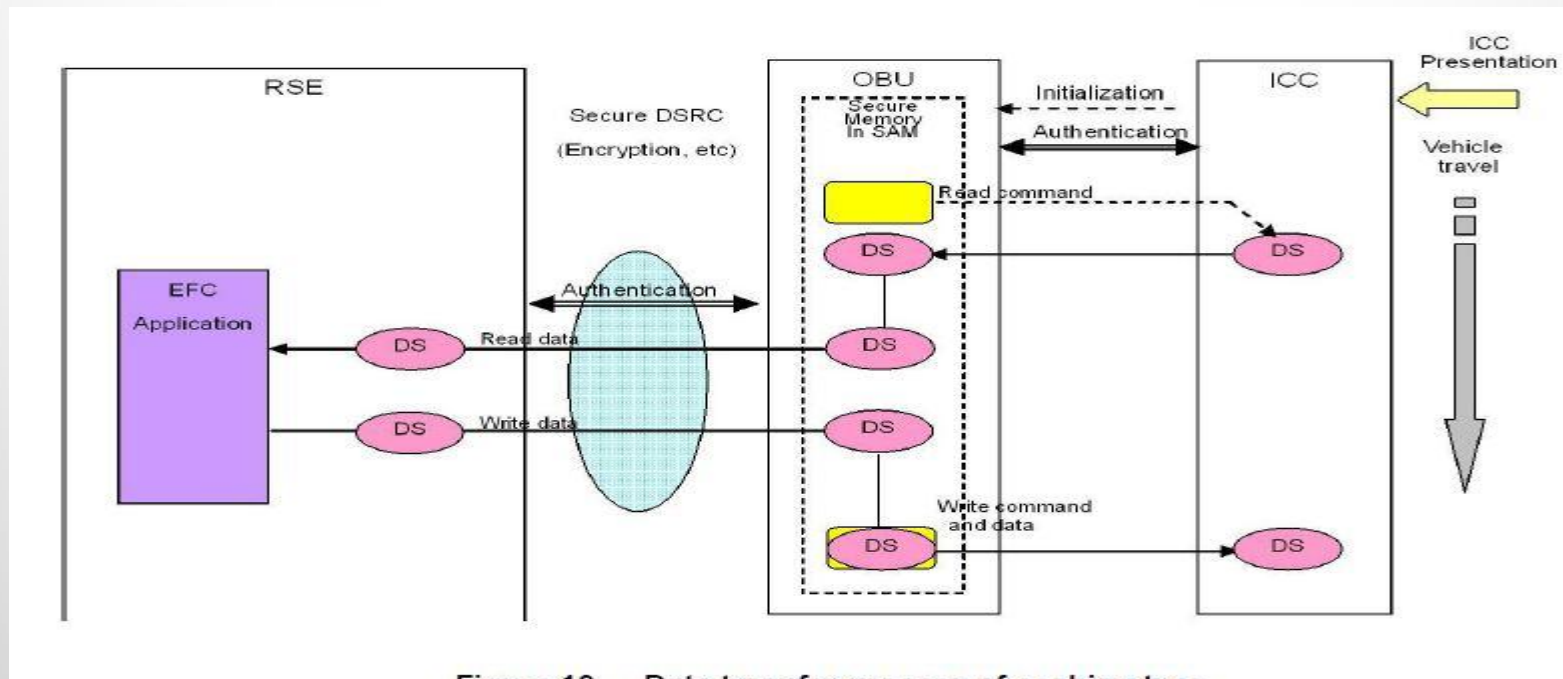


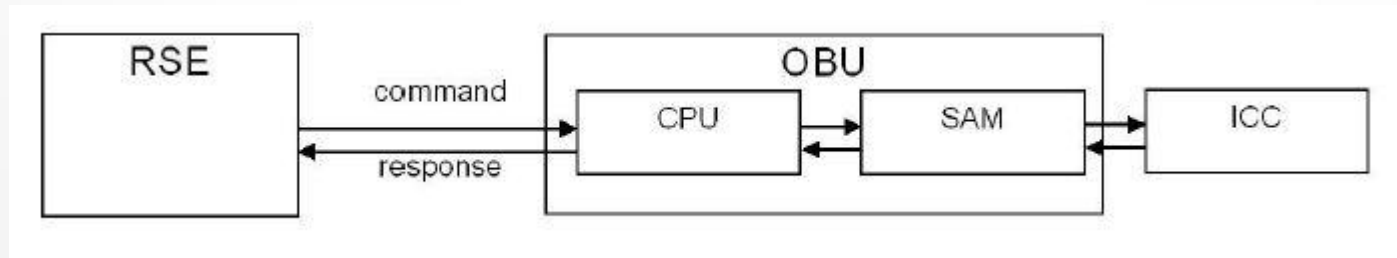
Figure 10. Data transfer process of caching type



ISO 25110 Caching Type



Caching type 구성



Process

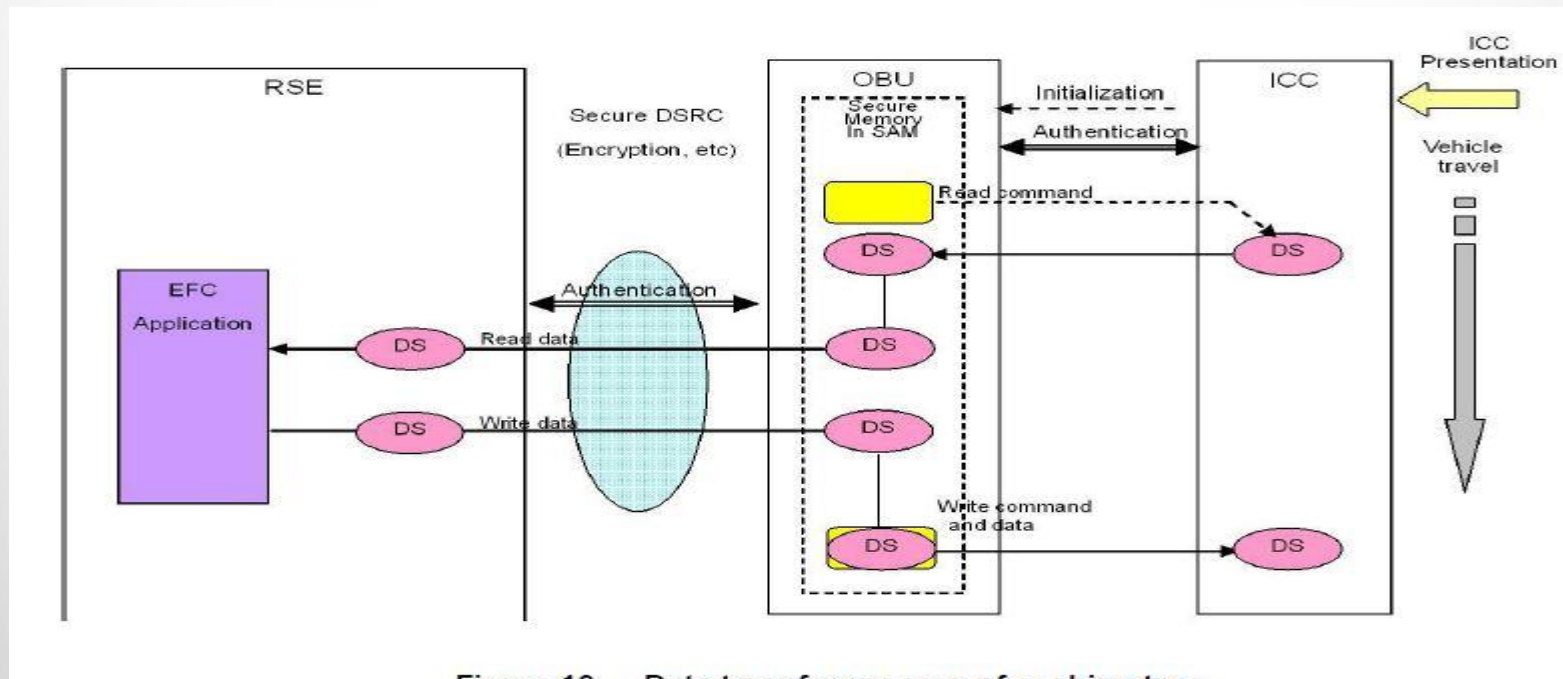


Figure 10. Data transfer process of caching type



ISO 25110 Caching Type

Caching type 인터페이스

Table 3 — TRANSFER_CHANNEL.request

Parameter	ASN.1 Type	Value	Remarks
Element Identifier EID	Dsrc-Eid	0	
Action Type	INTEGER(0..127,...)	8	Transfer Channel
AccessCredentials	OCTET STRING		
ActionParameter	ChannelRq ::= SEQUENCE { channelId ChannelId, apdu OCTET STRING }		Always to be present Channel ID=SAM1 (1) or SAM2(2)
Mode	BOOLEAN	TRUE	

The apdu in ActionParameter shall contain the ICC command or its data elements.

Table 4 — TRANSFER_CHANNEL.response

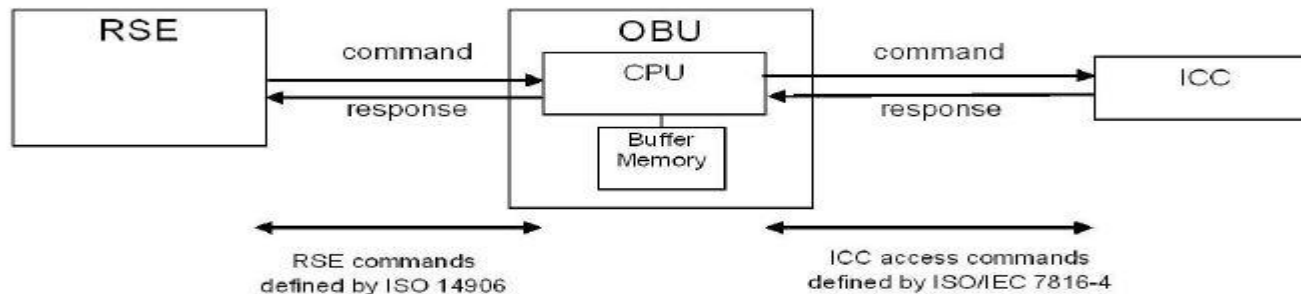
Parameter	ASN.1 Type	Value	Remarks
ResponseParameter	ChannelRs ::= SEQUENCE { channelId ChannelId, apdu OCTET STRING }		Always to be present
Return Code(Ret)	Return Status		Optional use

The apdu in ResponseParameter shall contain the ICC response or its data elements.

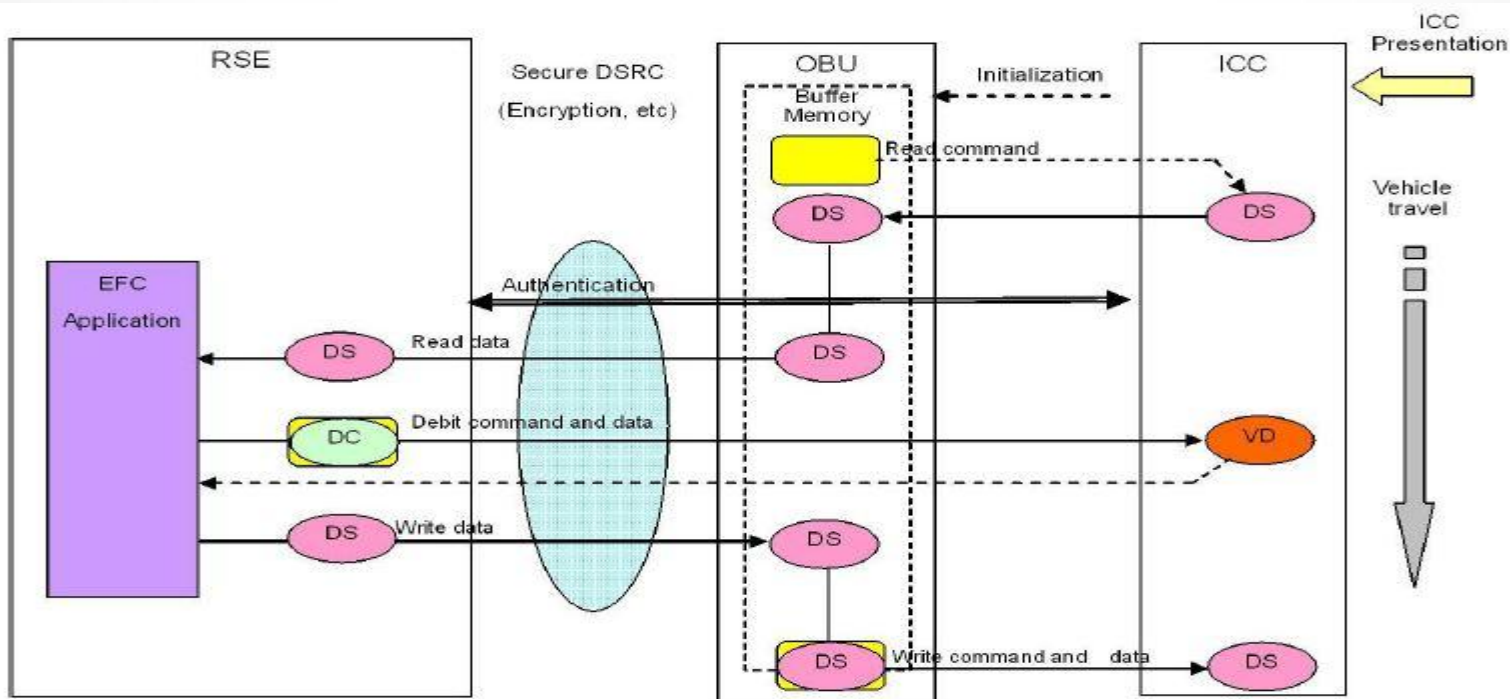


ISO 25110 Buffer Type

Buffer type 구성



Process





ISO 25110 Buffer Type



Buffer type 인터페이스

Table 5 — DEBIT.request

Parameter	ASN.1 Type	Value	Remarks
Element Identifier EID	Dsrc-Eid		Unequal 0
Action Type	INTEGER(0..127,...)	13	
AccessCredentials	OCTET STRING		Optional use
ActionParameter	DebitRq ::= SEQUENCE { debitPaymentFee PaymentFee, nonce OCTET STRING keyRef INTEGER(0..255) }		Always to be present
Mode	BOOLEAN	TRUE	

Each parameter in ActionParameter shall contain data elements of the debit command for ICC.

Table 6 — DEBIT.response

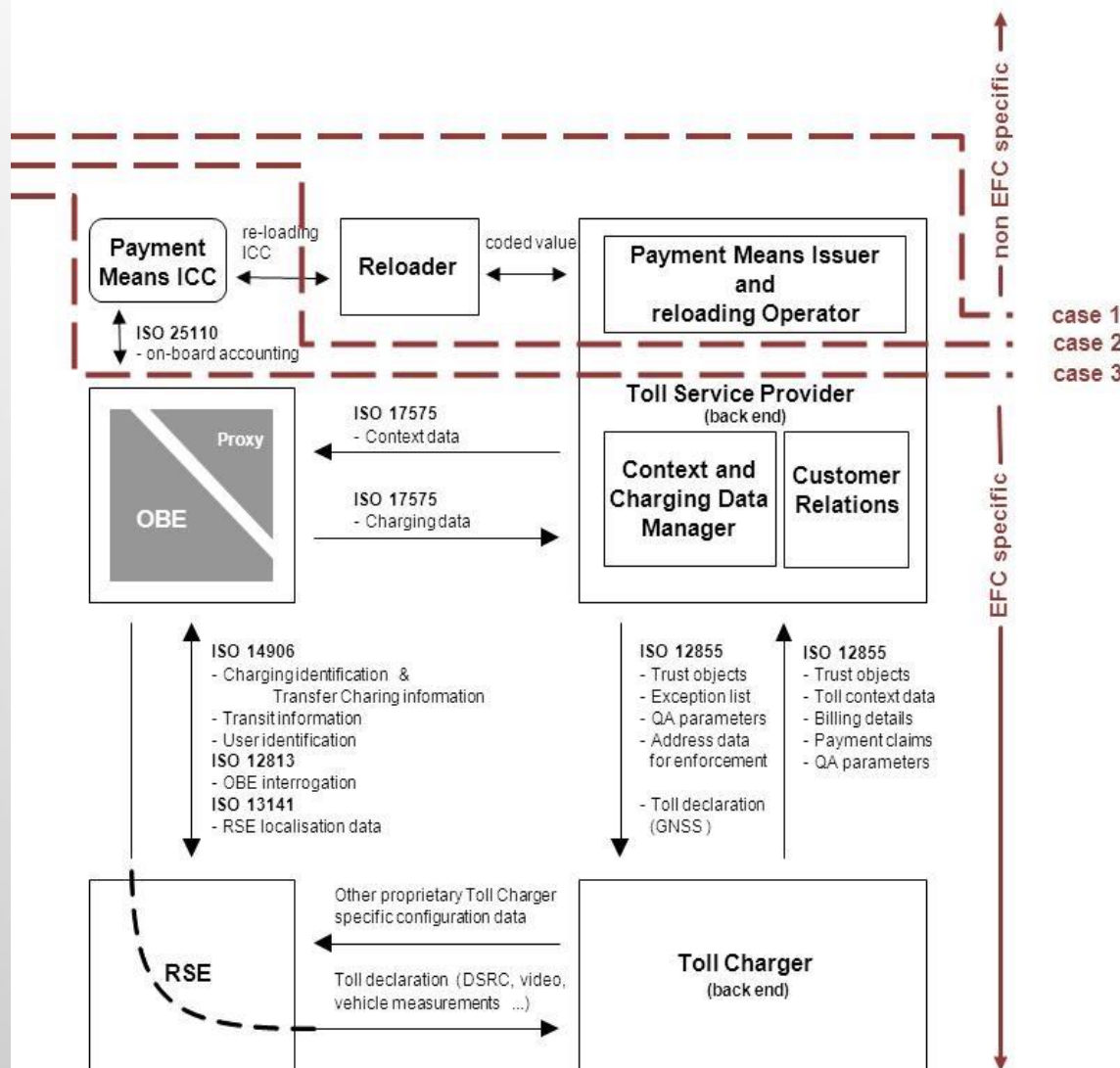
Parameter	ASN.1 Type	Value	Remarks
ResponseParameter	DebitRs ::= SEQUENCE { debitResult ResultFin, debitAuthenticator OCTET STRING }		Always to be present
Return Code(Ret)	Return Status		Optional use

Each parameter in ResponseParameter shall contain data elements of the debit response for ICC.



카드에 대한 아키텍처 필요성

2012년 한국, 일본 공동으로 ISO TR 로 아키텍처 추가 제안



Part-1(TR): Investigation of EFC standards for common payment schemes for multi-modal transport services

Part-2(TS) : Information exchange between related entities(tentative)

Part-3(TS) : Requirements for common payment scheme(tentative)



TR 19639 보고서 내용

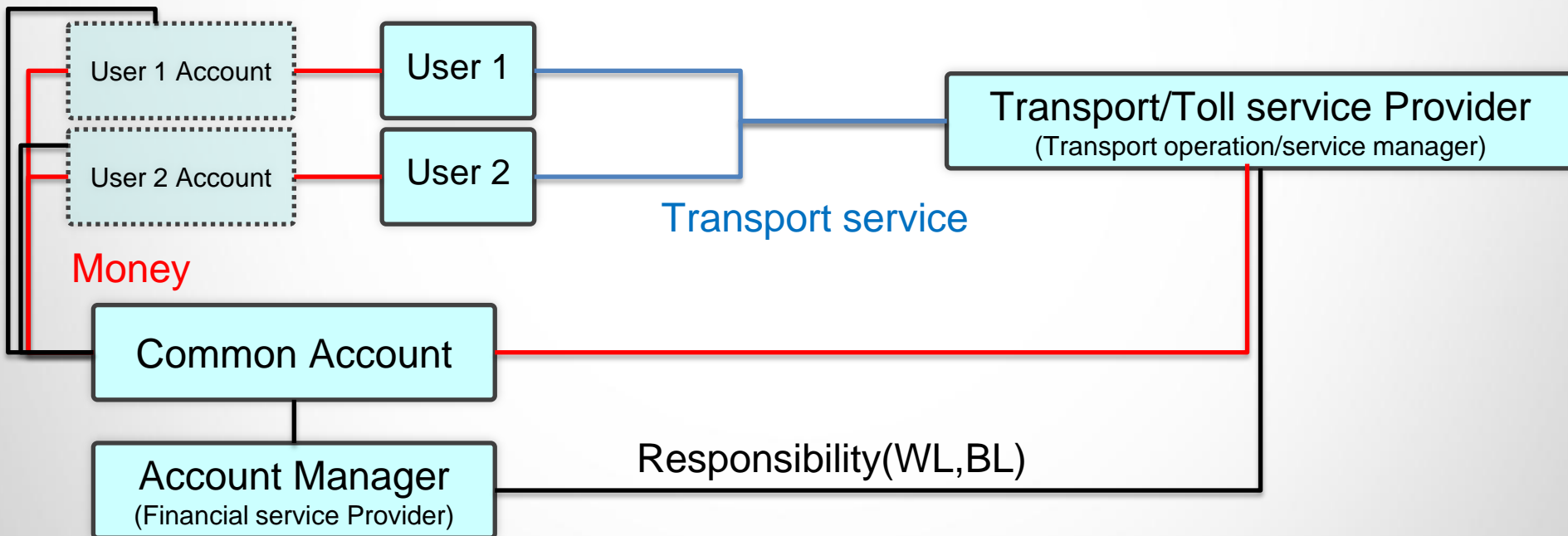


Region Item	Europe	Asia
1.EFC method	DSRC based EFCAutonomous system	DSRC based EFC(Autonomous system - in Future)
2.Account method	Central account (mainly)	On-Board account (mainly)
3.Payment method	Debit or credit from user's account in central systems	Prepaid card and/or Credit card
4.Payment means issuer	Service provision, banks or toll road operators Payment means is often the unique OBE I	Transport related institute (Toll road operator) and/or Financial related institute (Bank, Credit card)
5.OBU issuer	Service provision, banks or Toll road operators	OBU dealers or Toll road operator
6.OBU holder	Service provision (mainly)	User
7.Toll payer	Payment means holder, Vehicle owner	Payment means holder
8.Common payment with public transport	--	YES (Interoperability with public transports will be realized utilizing the Payment means according to the operation configuration of the Payment means issuer.)

PNWI – Reloading Interface

- Payment means in the EFC –ISO 19639 clause 5.1
 - 1) OBU(Europe)
 - 2) IC-Card(Asia)
- Account method in the EFC –ISO 19639 clause 5.1
 - 1) Central account(Europe mainly)
 - 2) On-Board account(Asia mainly)
- Central payment account is considered as one of the common service rights method for public transport in WG8

<Concept of Common service on service aspect in 19639>



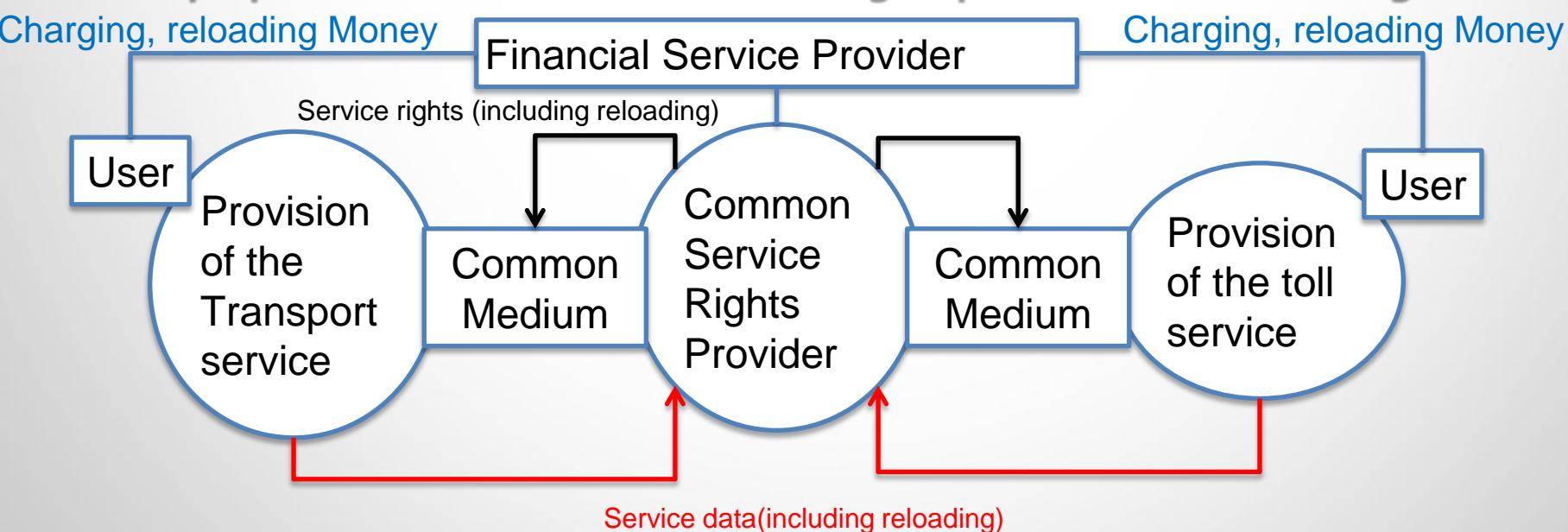
<Concept of Common service on Payment means in 21193>



The role of Common Service rights provider

- The role of Common service rights provider is based on providing between Provision of toll service (ISO 17573) and Provision of other Transport service(21193)
- Common Service rights is authorized to common medium after checking user's status from Common Account manger or Financial service provider
 - ▷ For Provision of transport service, Common service rights provider should make common medium get an appropriate transport service.
Even if the common medium is not enough electronics values to get common transport service, the common service rights provider should check user's circumstance(in that case users applied the reloading service in advance) and be in duty to provide service .. That's for user convenience
 - ▷ Because, Many Transport users are using Pre-paid common medium to charge Transport fee And Common service rights Provider is also connected to Financial service provider So. It means that this re-loading service environment has been already formed
 - ▷ Also, the responsibility of reloading service is in all entities same as charging service

So I propose the role of common service rights provider to add reloading service





Reloading interface of common service

- 1 | Title and Scope
- 2 | Purpose
- 3 | Contents of table





- **Title** : EFC - Framework for common payment scheme for multi-modal transport services Part-2 Reloading interface definition for pre-payment EFC
- **Publication Type** : Technical Specification
- **Scope of the proposed deliverable**
 - Common payment scheme for multi-modal transport services (such as toll roads and public transport) and becoming implemented all over the world. These systems are often based on a common payment media (e.g. IC cards) for use in more than one transport service. ISO TR19639 explains to analysing the present set of EFC standards for their applicability for using common payment media for multi-modal transport services and to make proposals for supporting standards for that purpose. This might include to; define reloading transaction by use of DSRC link and other.
- The scope of part-2 includes;
 - Reload methods for common payment media..
 - On-line POS reloading interface
 - Off-line Toll booth reloading interface
 - Auto-reloading EFC interface



Scope(2)



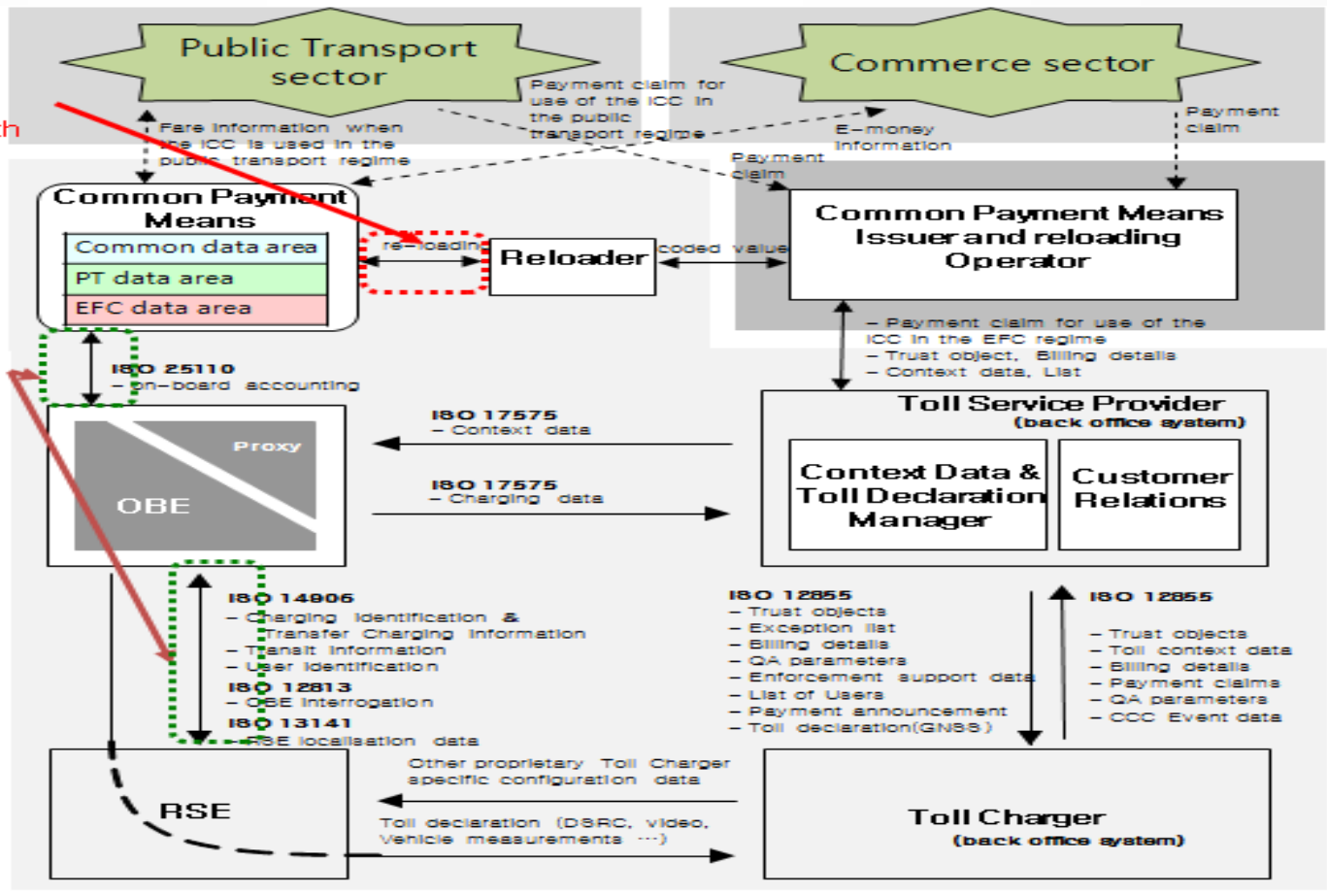
Scope of Part2

- on-line POS
- off-line toll booth

Scope of Part2

- auto-reloading

EFC/Road sector



- In 19639 Reloaders can be contained within EFC entity
- Therefore, The reloading way of POS or Toll booth can be possible to include WG5 agenda



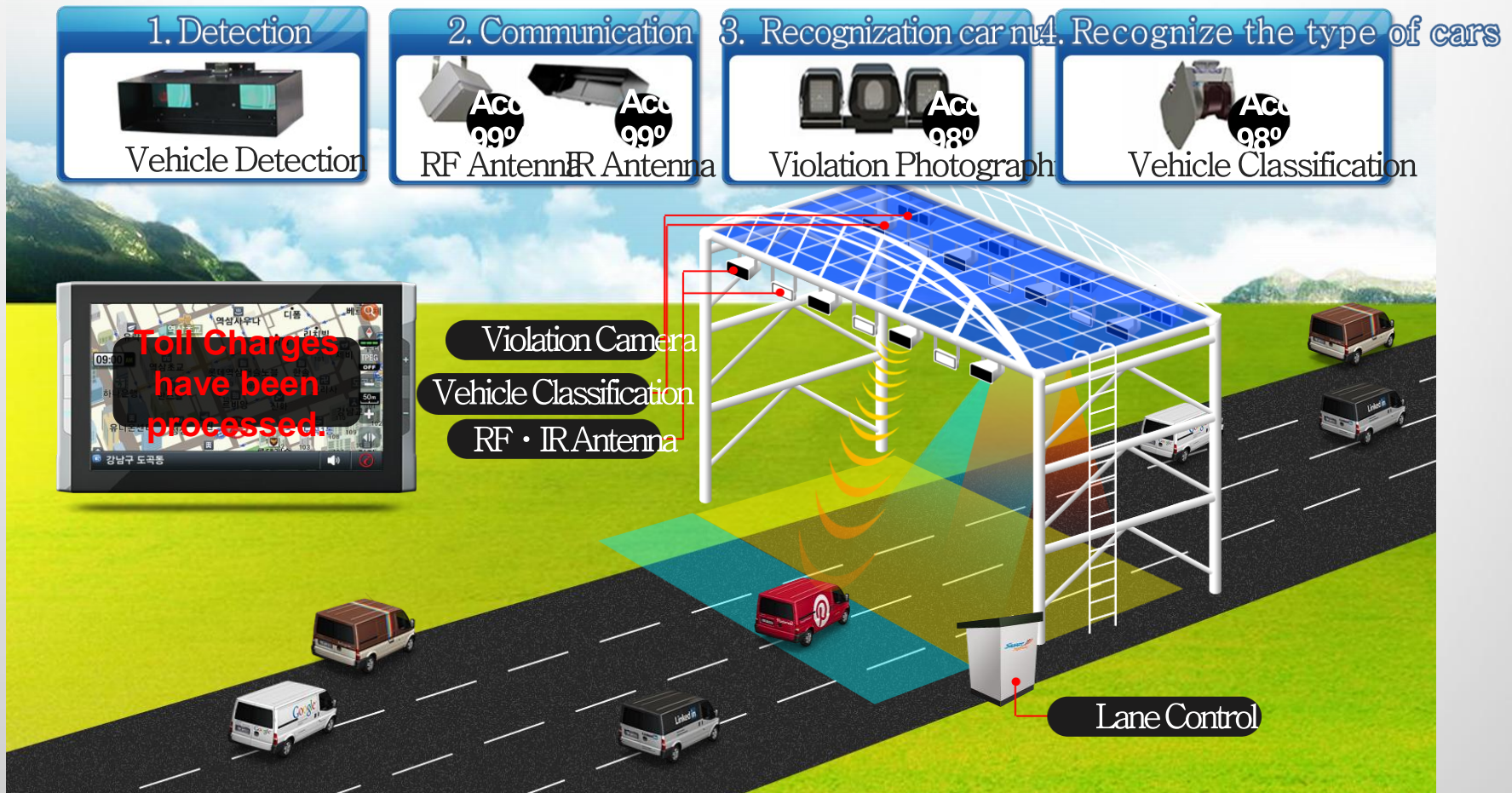
2016년 19639 완료

2016년 9월 19639-part2 : Reloading Interface 5개국 동의를 얻지 못함

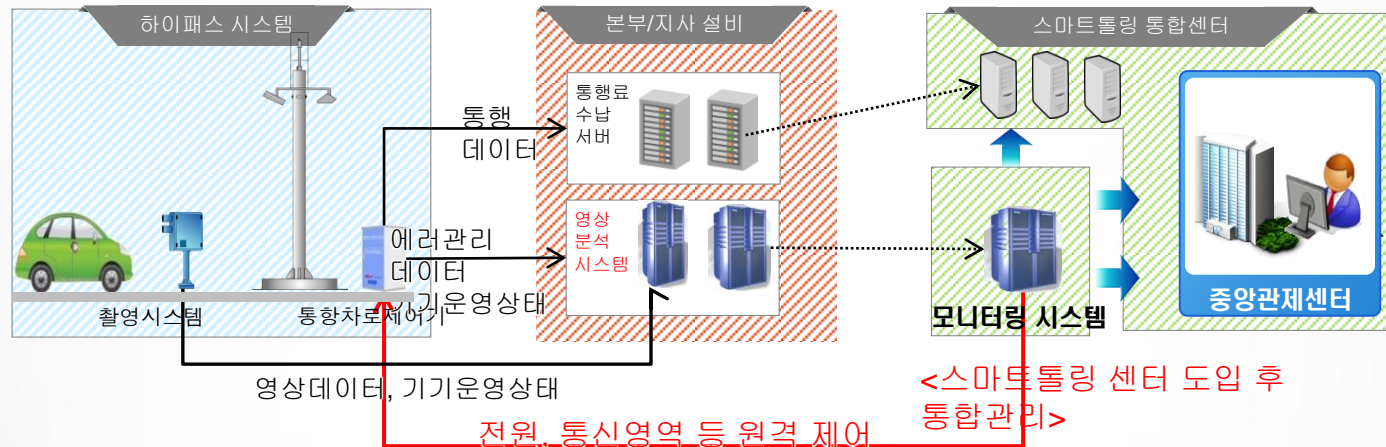
- 일본, 한국, 오스트리아 만 동의를 얻음
- 향후 추진계획 : 중국, 프랑스에 대한 이해 설득 예정
- 추가 NWI 준비 : EFC 원격관리 시스템 조사(TR)

NWI : Investigation EFC moniterring system

배경 : 2020년 스마트톨링 시스템을 위한 무인원격관리 시스템 조사



NWI : Investigation EFC moniterring system



조사내용 : 국가, 시스템 유형(autonomous system, rfid, ETC)별
모니터링 현황 파악

- 보수코드, 원격제어 범위 방법, 전원제어
- 이벤트 발생 시 유지관리 방안

<Schedule>

- Start drafting :2016. 9
- Investigation of China. Japan, America, Singapore
- NWI proposal :2017. 4 France ISO meeting
- DTR ballot :2019. 04
- NWI Propose : 2019. 4. TR 을 바탕으로 TS 제안

미션 : **ETC** 관련 원격유지관리 기술표준을 한국주도로 제정

- Mr. Bo
- rueppag@ex.co.kr

