

ISO TC 204 WG 5 소개

2017. 11.



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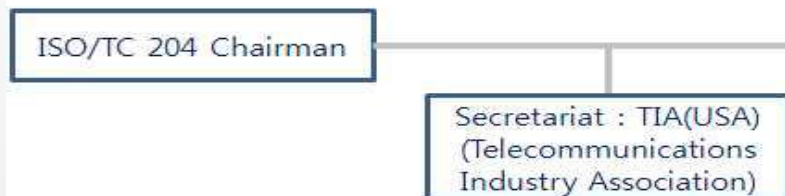
Korea Expressway Corporation



- 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
국토교통 부 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

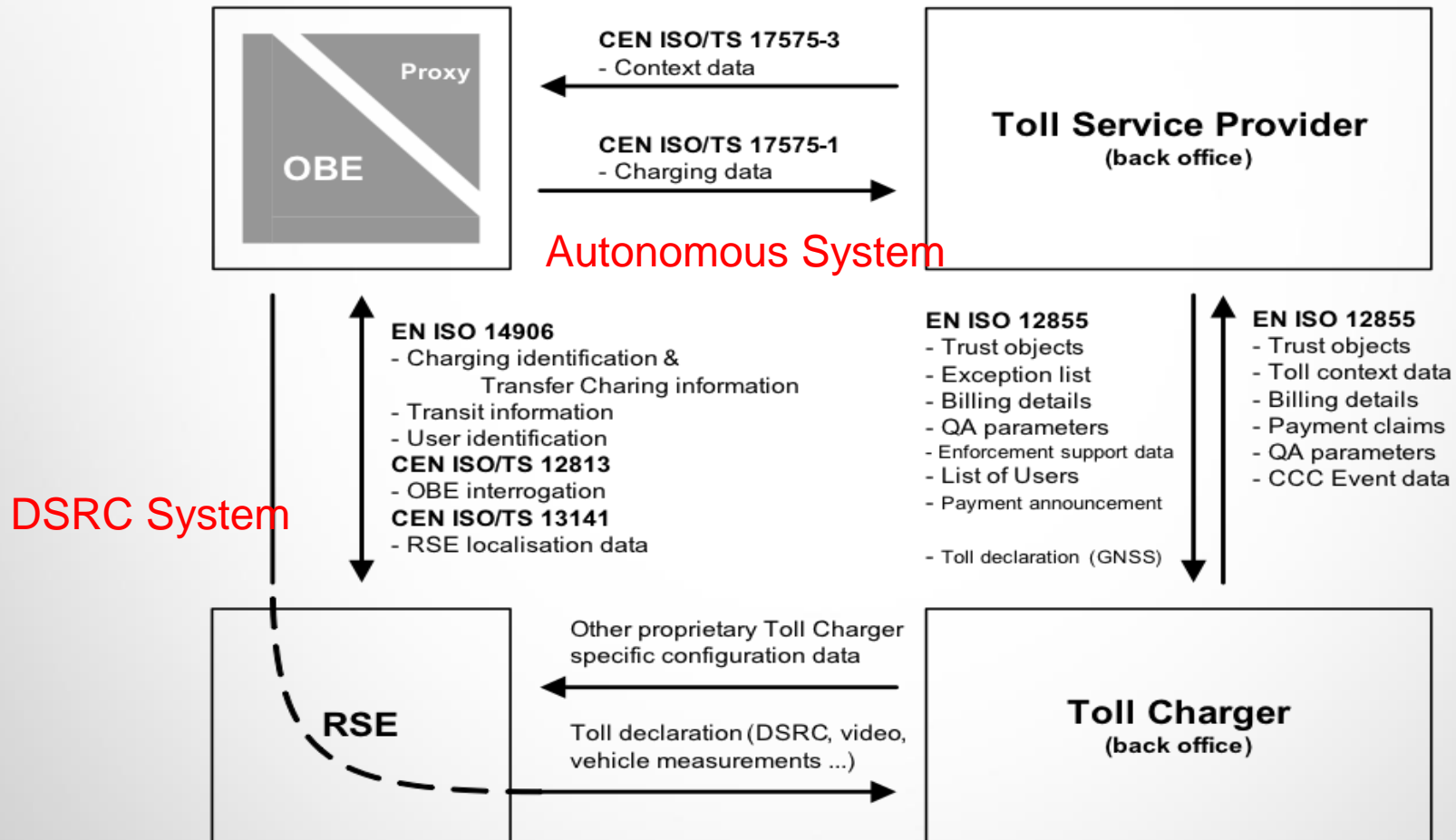


- WG5는 전자요금징수(EFC : Electronic Fee Collection) 시스템의 정보, 통신, 제어에 대한 표준을 담당하고 있으며, CEN TC 278과 연계하여 표준 제정함
 - 통신방식 : 단거리 전용통신(DSRC)와 위성항법시스템(GNSS/CN)
 - * GNSS/CN ➤ Autonomous System(2008 TC 204 meeting)
 - * Autonomous System is joint work item between ISO and CEN(2010)
 - ❖ 참여국가 : 총 18개국(노르웨이 등 유럽 16개국, 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, SG2 : 테스트, SG5 : 성능 모니터링



List of WG5 Items

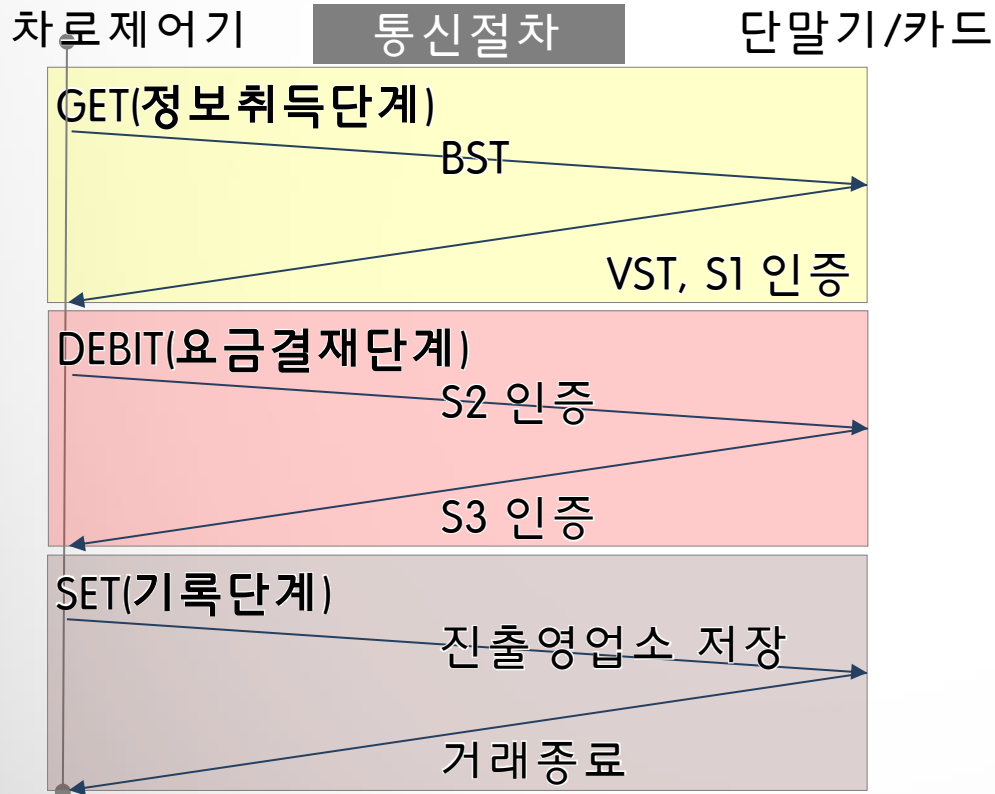
- IS 17573 EFC System- Architecture for Vehicle-related tolling :
EFC Architecture and frameworks of EFC conditions





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

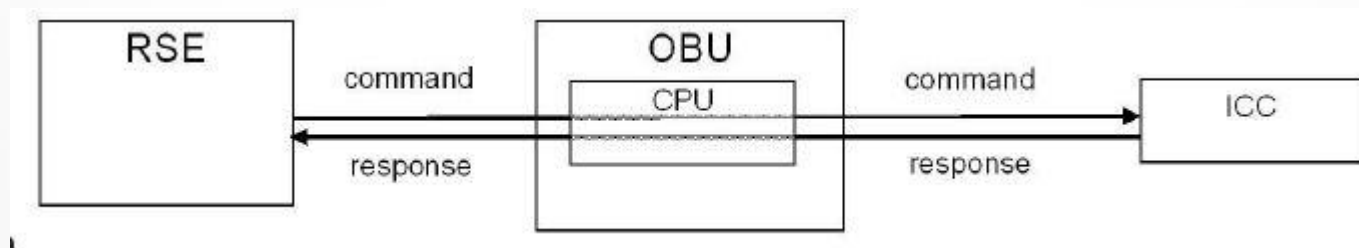
ISO 17573 : Autonomous , OBE+RSE

- ▶ 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

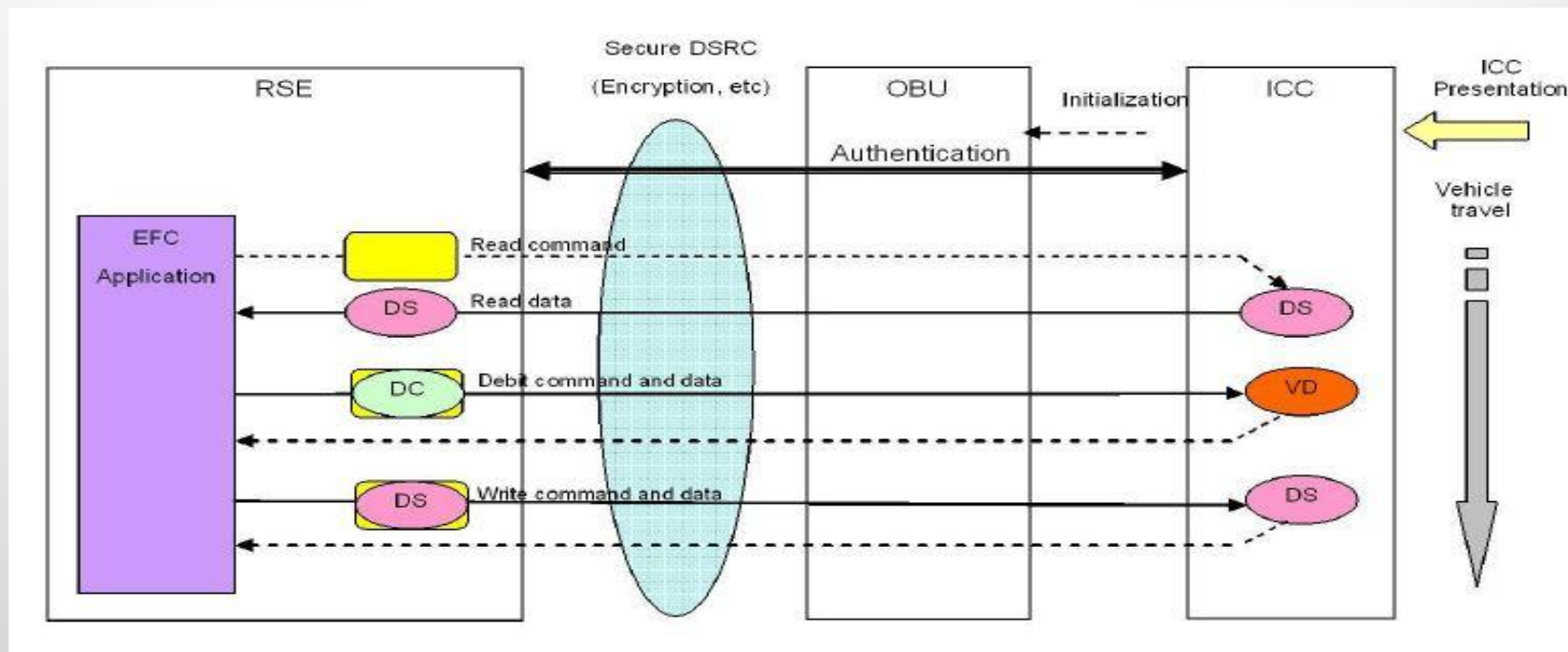


ISO 25110 Transparent Type

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

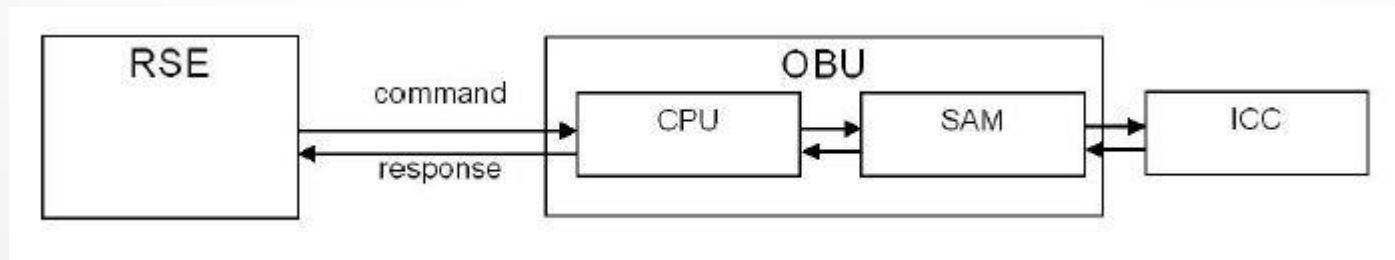
Parameter	ASN.1 Type	Value	Remarks
ResponseParameter	ChannelRs ::= SEQUENCE { channelId ChannelId, apdu OCTET STRING }		Always to be present
Return Code(Ret)	Return Status		Optional use



ISO 25110 Caching Type



Caching type 구성



Process

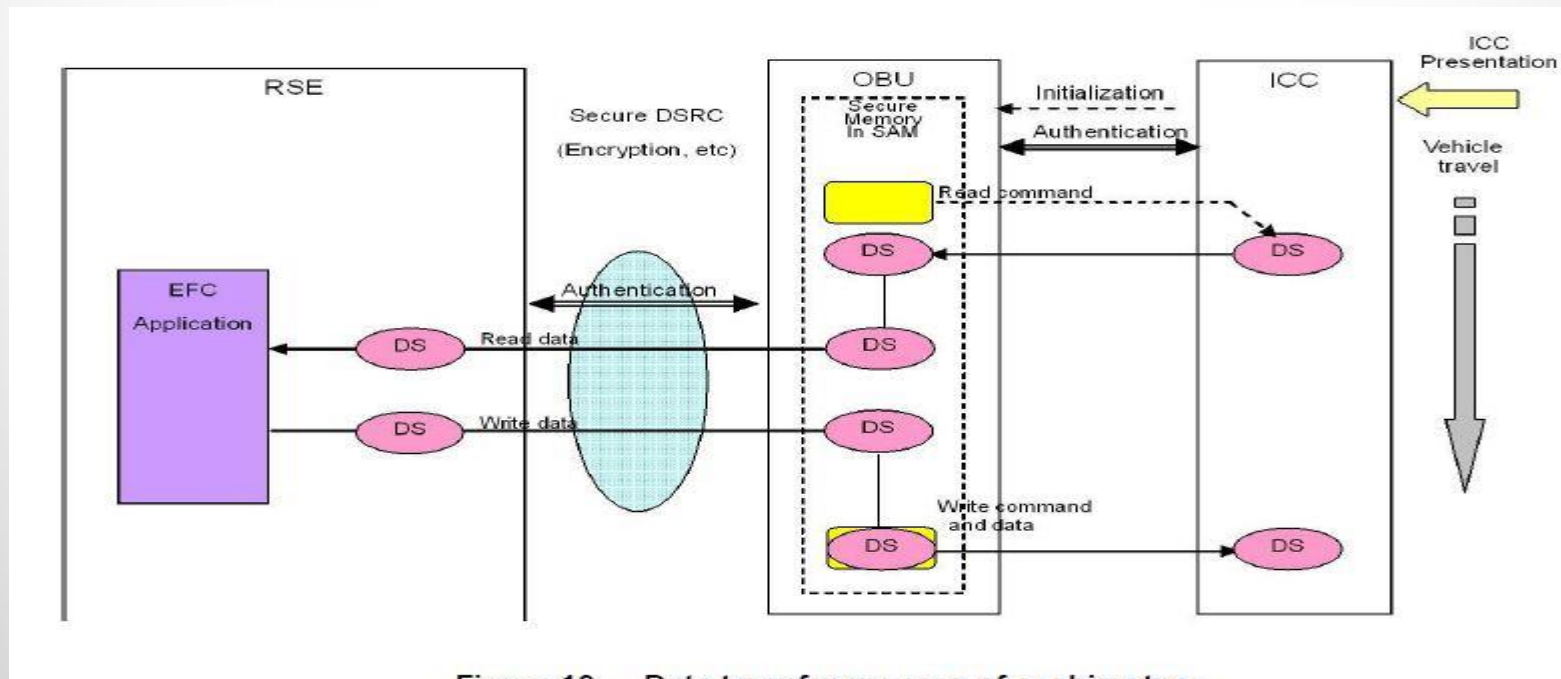
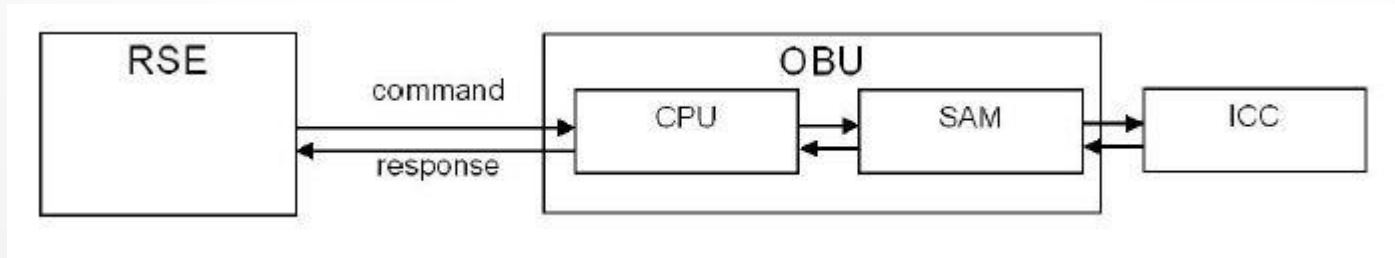


Figure 10 Data transfer process of caching type



ISO 25110 Caching Type

Caching type 구성



Process

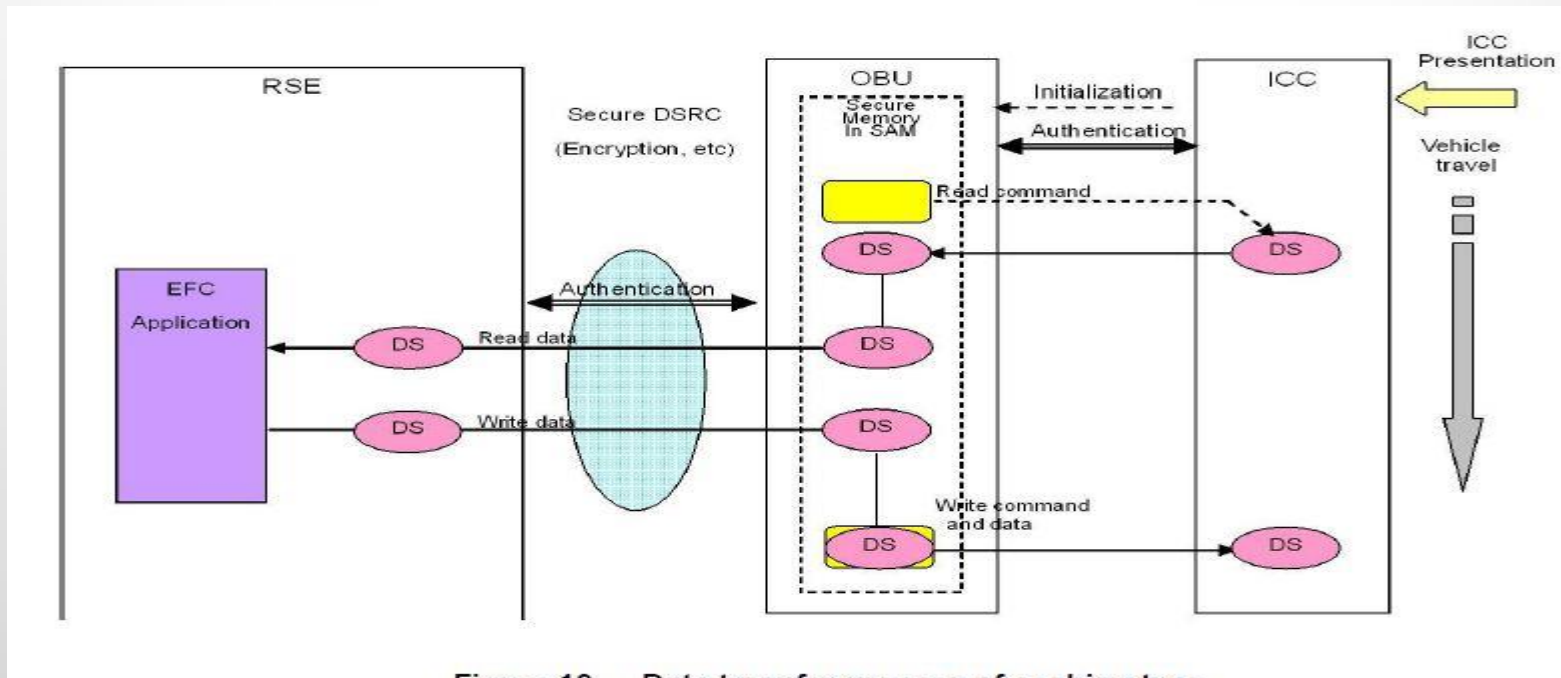


Figure 10 Data transfer process of caching type



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

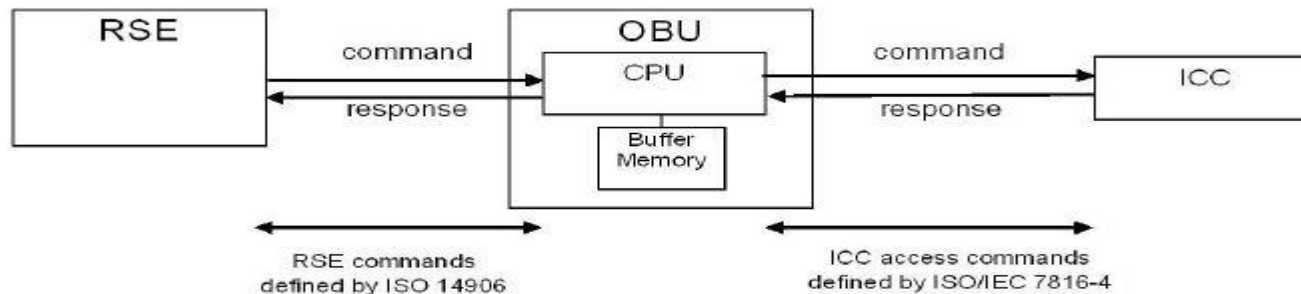
Parameter	ASN.1 Type	Value	Remarks
ResponseParameter	ChannelRs ::= SEQUENCE { channelId ChannelId, apdu OCTET STRING }		Always to be present
Return Code(Ret)	Return Status		Optional use

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

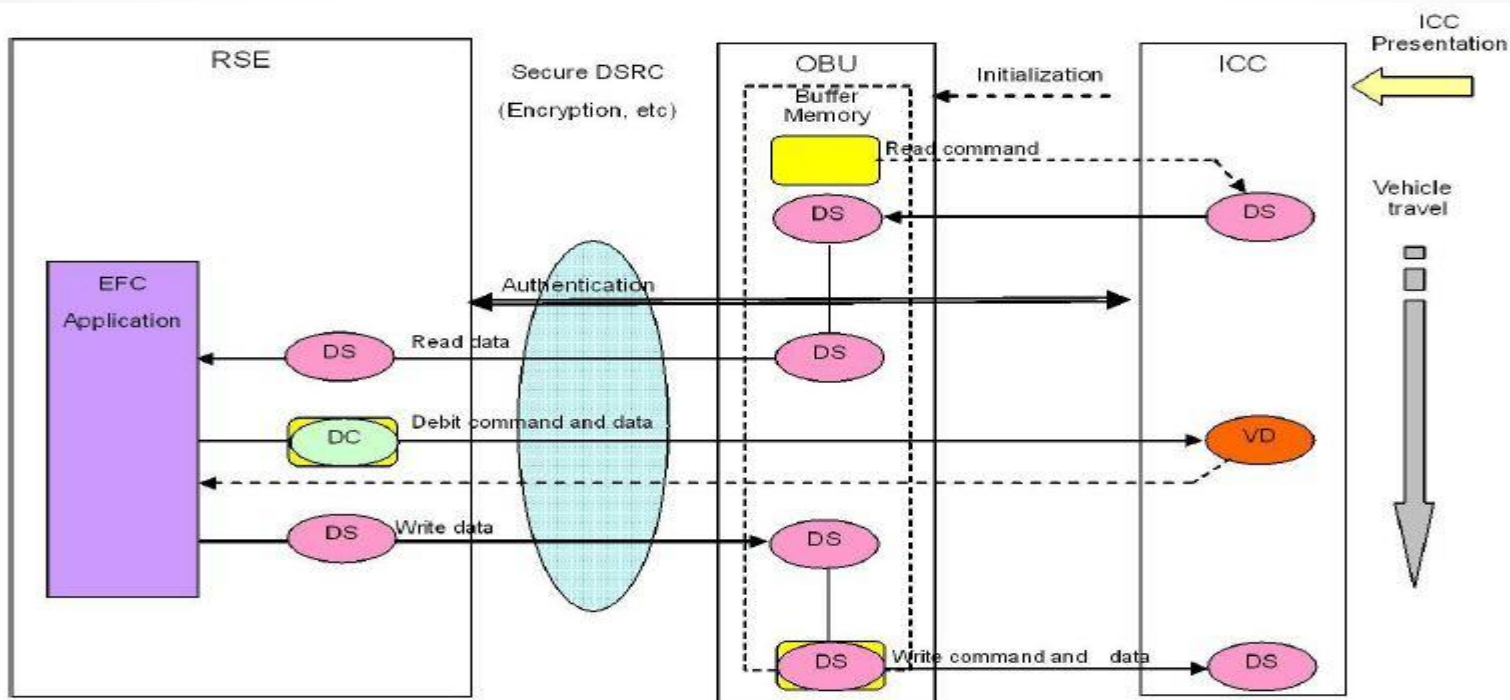


ISO 25110 Buffer Type

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

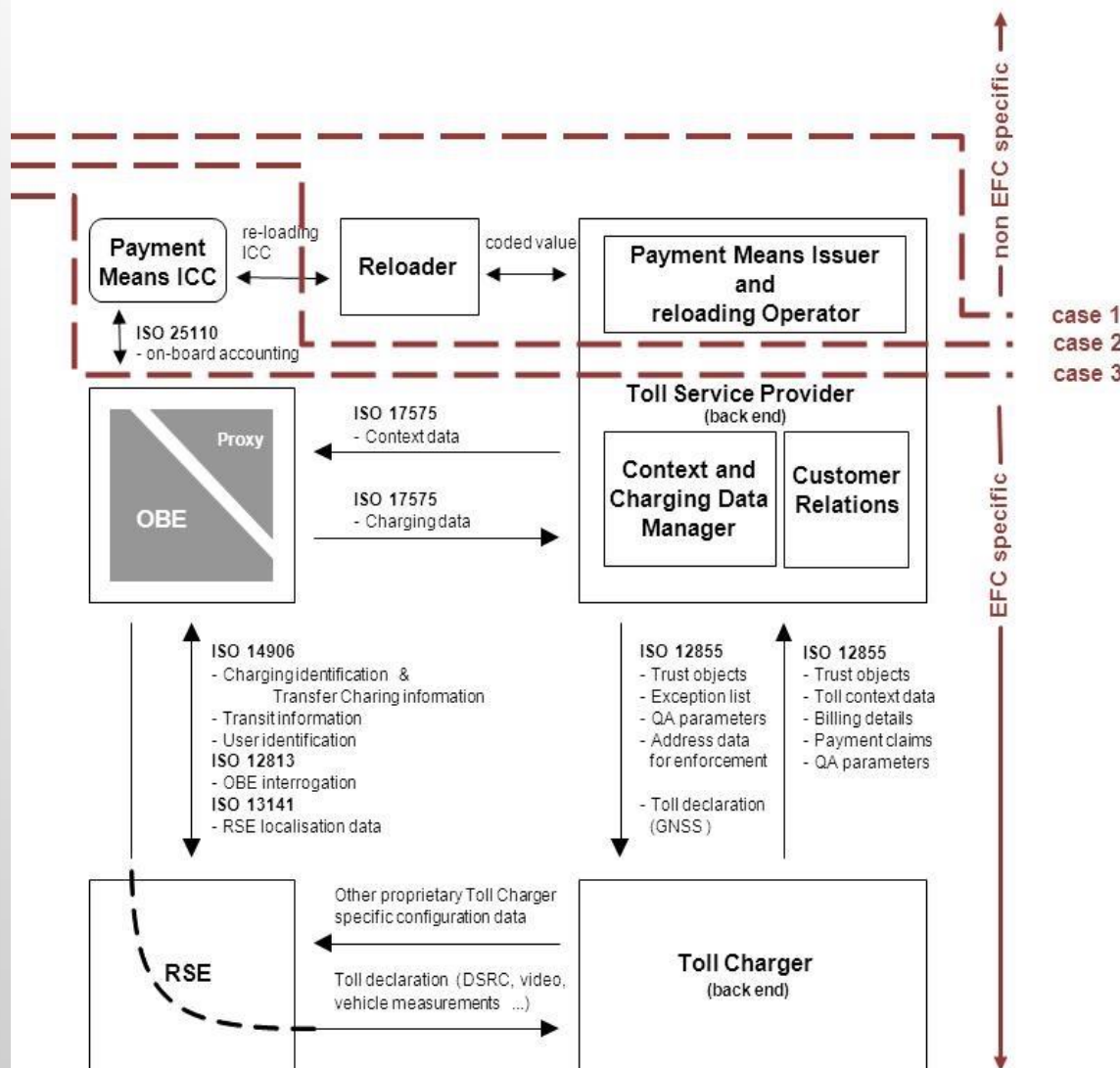
Parameter	ASN.1 Type	Value	Remarks
ResponseParameter	DebitRs ::= SEQUENCE { debitResult ResultFin, debitAuthenticator OCTET STRING }		Always to be present
Return Code(Ret)	Return Status		Optional use

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 표준제정





TR 19639 보고서 내용

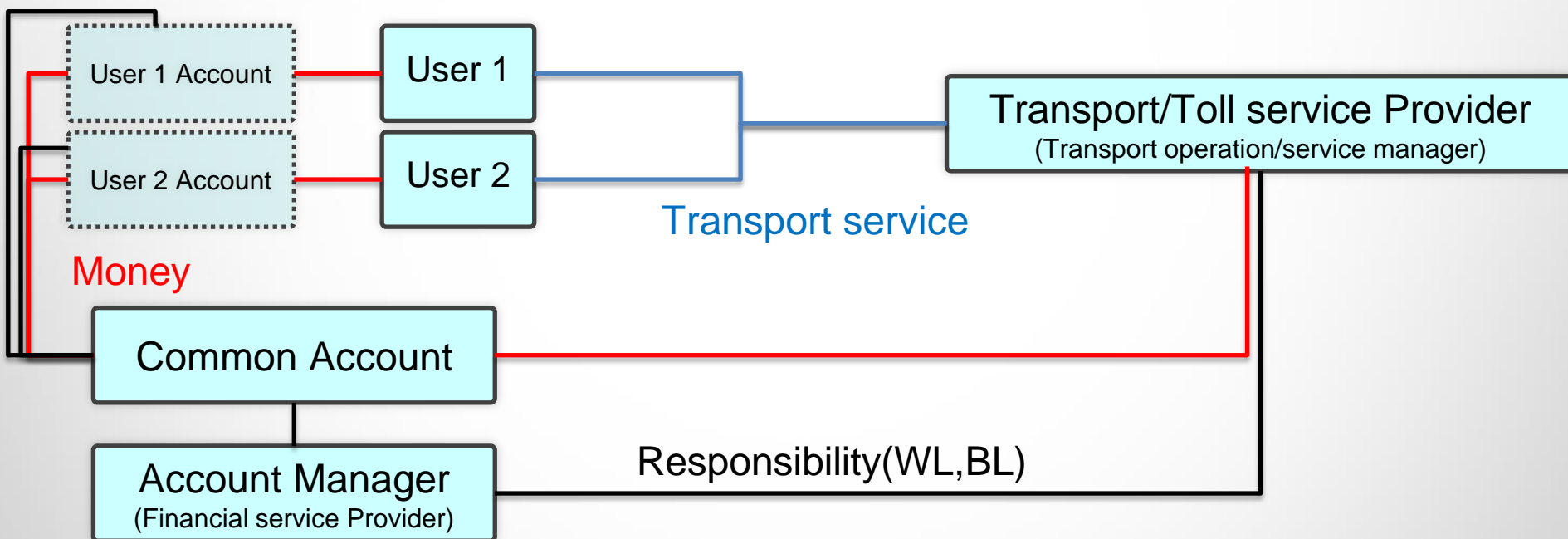


Region Item	Europe	Asia
1.EFC method	DSRC based EFCAutonomous system	DSRC based EFC(Autonomous system - in Future)
2.Account method	Central account (mainly)	On-Board account (mainly)
3.Payment method	Debit or credit from user's account in central systems	Prepaid card and/or Credit card
4.Payment means 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.)

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>



■ Red lines are expressed on Money aspect

■ Blue lines are expressed on Charging aspect

■ Black lines are expressed on responsibility(Whitelists / Blacklists)



진행중인 표준(1)



- TR 21190 (Investigation of charging policies and technology for future standardization)

■ Scope

- 신,구 요금정책 확인 및 기능적인 요구사항 정리
- 기존 기술과 **emerging** 기술 분류
- 신규 영업 정책과 기존 **efc** 기술 표준의 차이 분석

■ 요금정책

- 기존 : 도로건설비용, 도로관리비, 도로확장비, 배출가스 감소비
- 신규 : 낮은 **efc** 비용을 통한 도로 건설비 상환(신흥국),
환경세를 대처하기 위한 도로 관리에 대한 재정 지원
c-its 기술과 **efc** 조합

■ 기능 요구사항

- **EFC** 기능인(Charging, Enforcement, Information provision)에 따라 정책목표(건설, 유지관리 비용에 대한 재정자원, 교통관리, 환경보호, 요금비율의 공정성) 설정

■ 요금기술(DSRC, Autonomous, RFID, ANPR, WAVE, WIM)



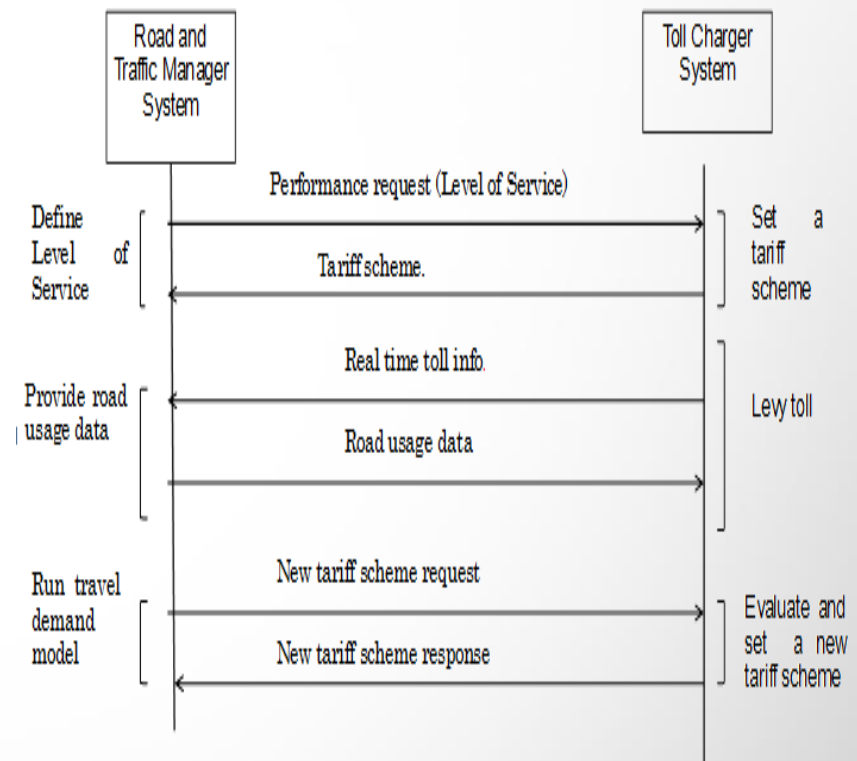
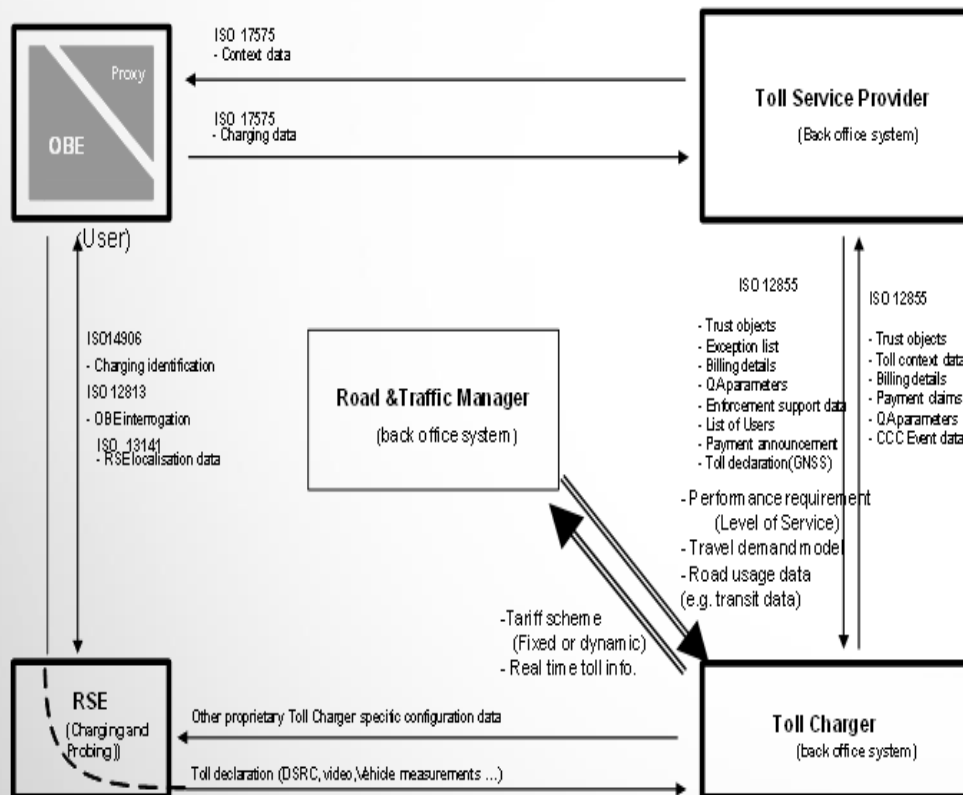
진행중인 표준(2)



● TS 21192 (Support for traffic management)

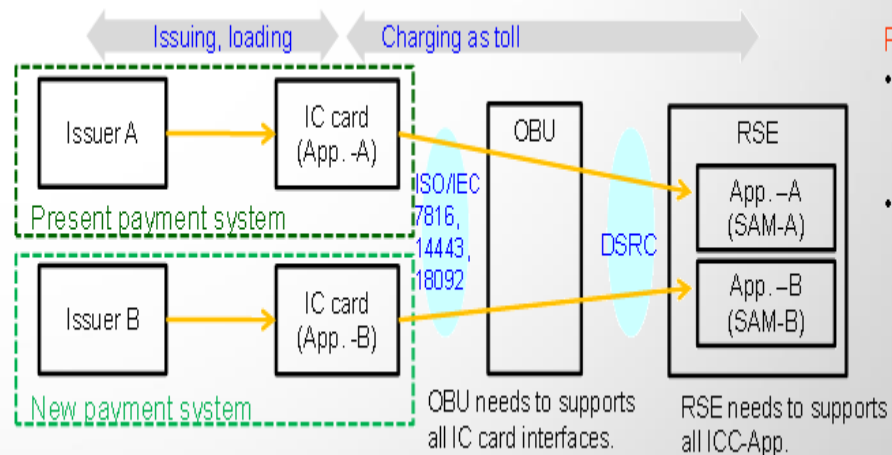
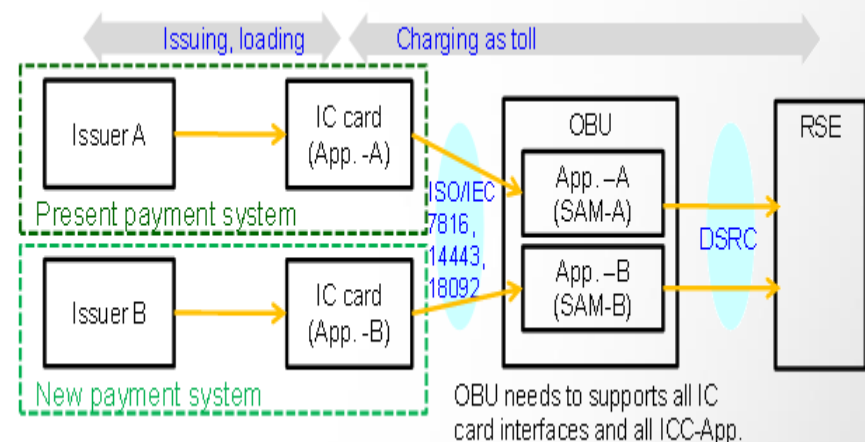
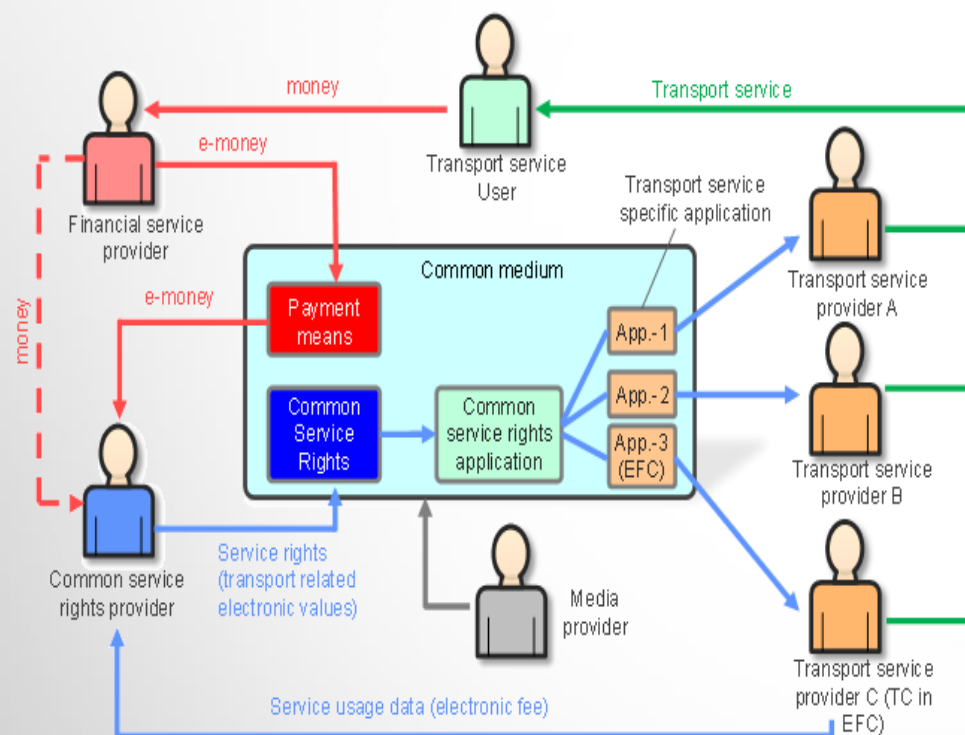
■ Scope

- TC와 RTM과 정보교환을 통한 요금제도, 서비스레벨



진행중인 표준(3)

- TS 21193 (Requirements for EFC application I/F on common media)
 - 19639 의 TS 표준(COMMON MEDIA 에 대한 EFC 기능요구사항, APPLICATION DATA , 보안요구사항 정의)





신규 ITEM(1)



- Requirement investigation on charging performance for several toll domain

■ 목적

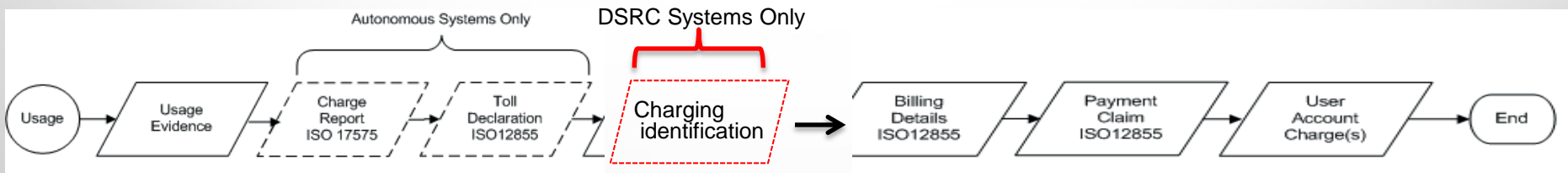
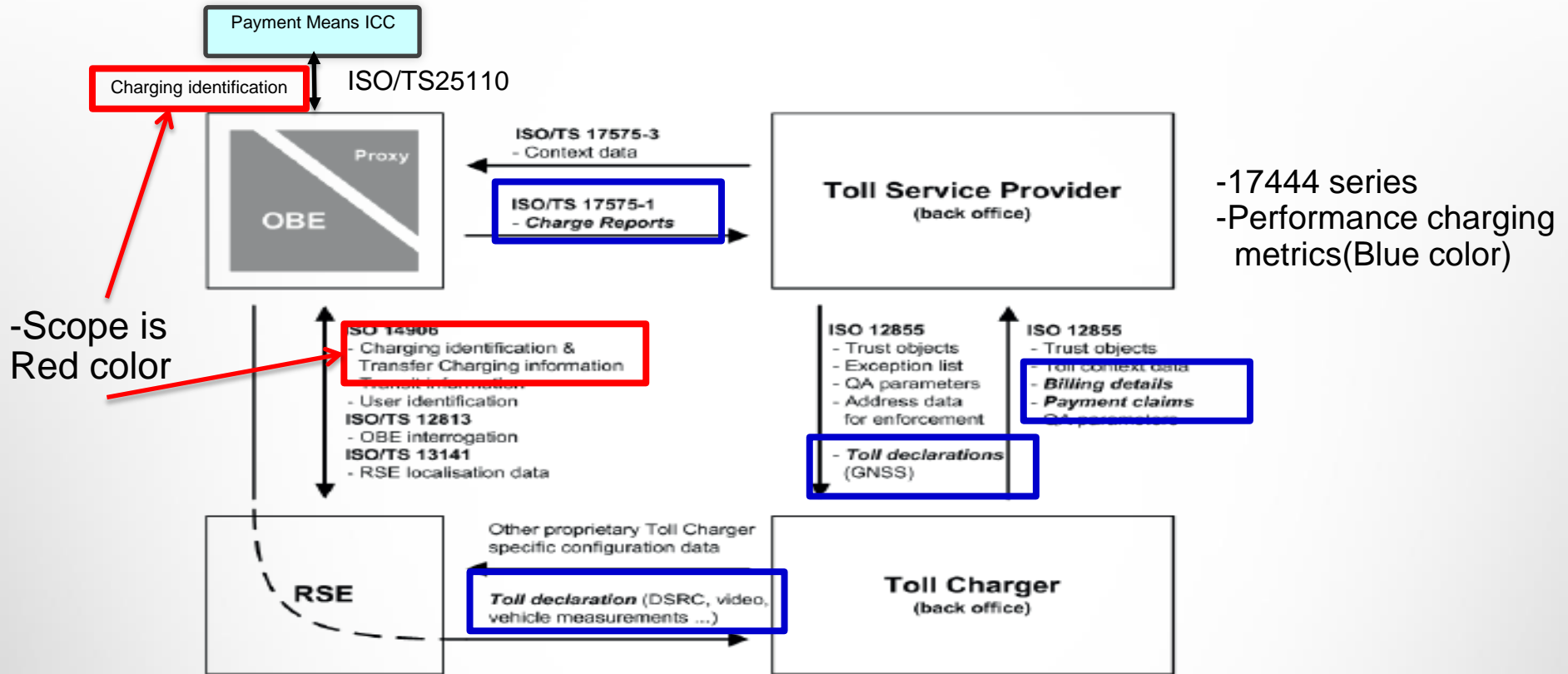
- 19639에서 본 바와 같이 카드는 EFC 시스템에서 요금수단으로 많이 사용되고 있으며, 25110에 따라 성공적인 요금징수를 위하여 처리 속도는 중요함
- 또한, 한국에서는 톨도메인이 고속도로 뿐만 아니라 주차장과 휴게소 회차시스템에도 이용되고 있음
- 이에 Charging performance를 위하여 17444 에 있는 Monitoring component가재구성 할 필요가 있음

■ Scope

- 17444 DSRC SYSTEM과 연관된 EFC 표준 분석
- EFC 외부 시스템(enforcement camera와 detection vehicle sensors)의 charging 에서의 역할
- EFC 표준의 수정사항 요구

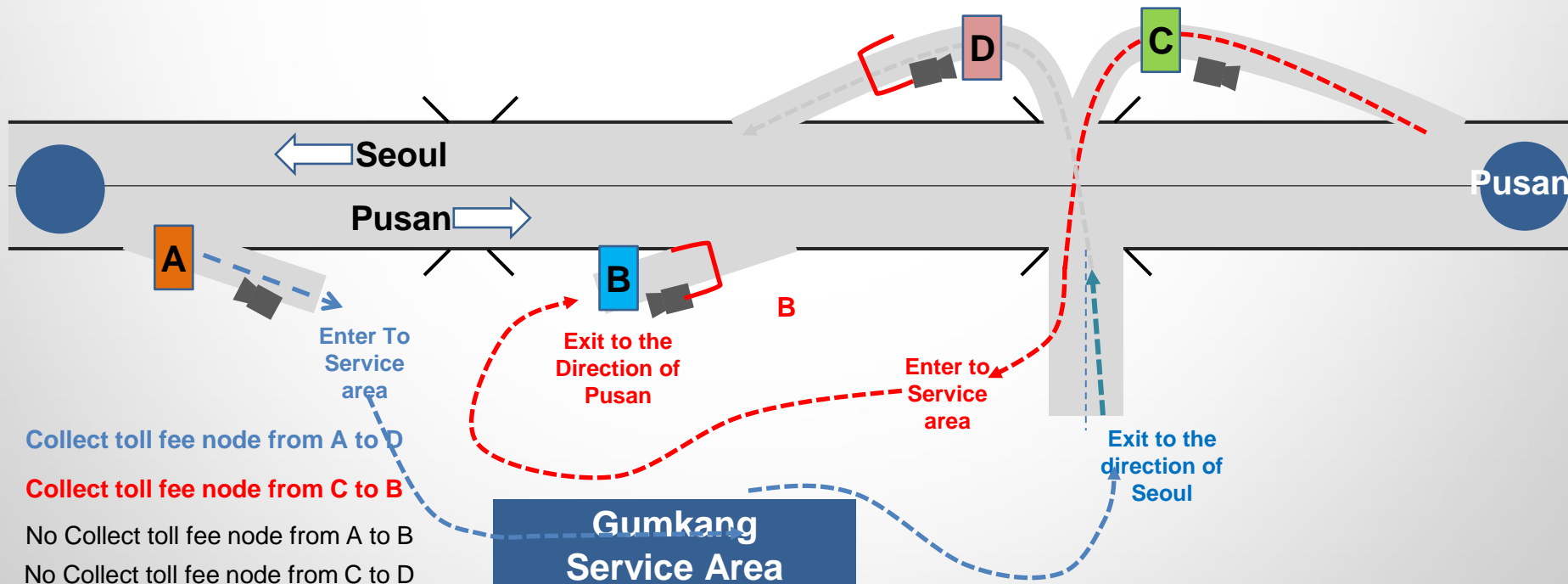


신규 ITEM(2) Scope



신규 ITEM(3) the Role of Several Toll domain

Toll domain	Road network EFC	Parking area EFC	Service area EFC
1. Toll scheme	Continuous toll scheme(Distance)	Continuous toll scheme (Time)	Discrete toll scheme (Distance and Time)
2. Purpose of enforcement camera	To Catch violator	To calculate toll fee using vehicle VNPR entry time	To calculate toll fee for a turning around vehicle using vehicle VNPR entry
3. Purpose of detecting sensor	To collect vehicle's entry, exit data for matching vehicles To send a trigger signal to the enforcement camera	To collect vehicle's entry, exit data for matching vehicles To send a trigger signal to the enforcement camera	To collect vehicle's entry, exit data for matching vehicles To send a trigger signal to the enforcement camera

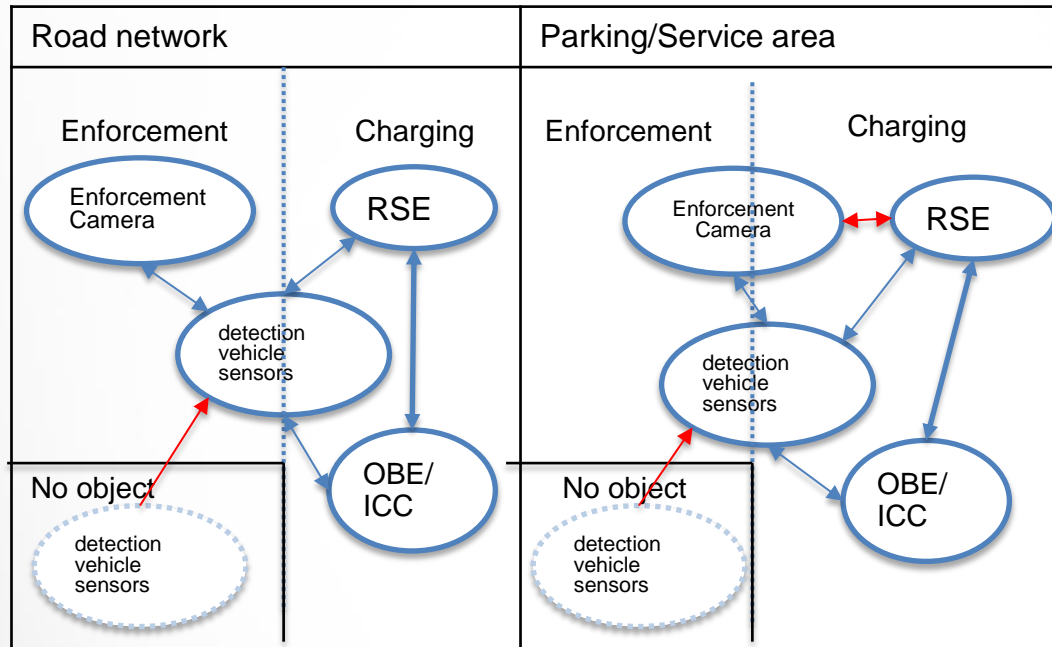




신규 ITEM(4) 각각의 toll domain 에서의 요구사항



- Functional structure each toll domain



The enforcement camera is an important factor in charging

- (Road network) The charging permitted time should be finished between the detecting vehicle's entry/exit time because of the correct matching vehicle
- (Parking area) ① Enforcement camera from entry gate recognizes VNP and records the vehicle's entry time, and In exit gate, the charging fee is calculated by combination between entry/exit VNPR and Time
② The charging process between RSE and ICC through OBU should be finished before getting the vehicle exit signal through detection vehicle sensors
- (Service area) ① Enforcement camera judges the user's driving direction through VNPR and DSRC system collects toll and parking fee by getting the information from the enforcement camera
② The charging process should be finished before getting the vehicle exit signal through detection vehicle sensors

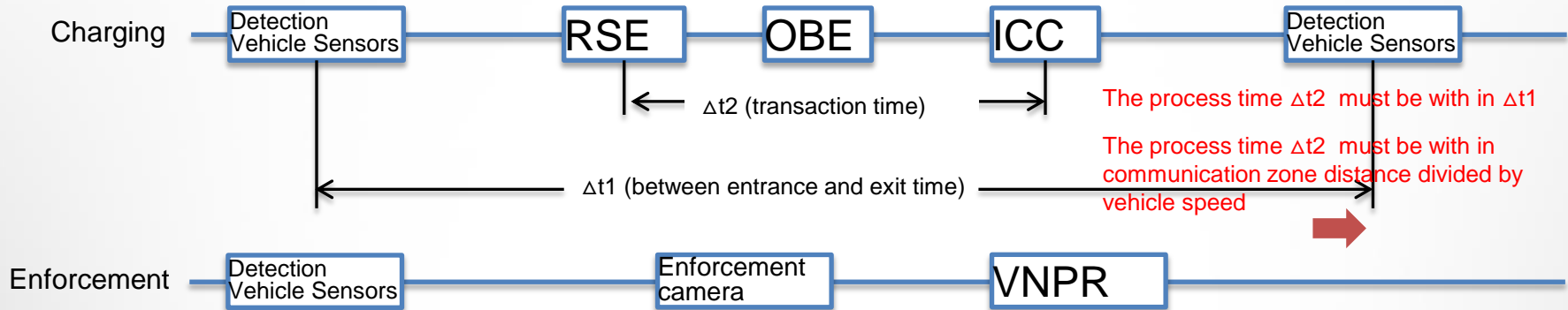


신규 ITEM(4) 각각의 toll domain 에서의 요구사항(2)



① Road network

- Sequence flow of EFC transaction



- Monitor components for Charging and Enforcement

EFC Functions	Charging	Enforcement
detection vehicle sensors	-Delivery Time (to the RSE) -Correct detecting vehicle rate	-Delivery Time (to the Enforcement camera)
RSE↔OBE/ICC	-Transaction time -Communication success rate from ICC to RSE through OBE	
Enforcement Camera		-Correct VNPR rate

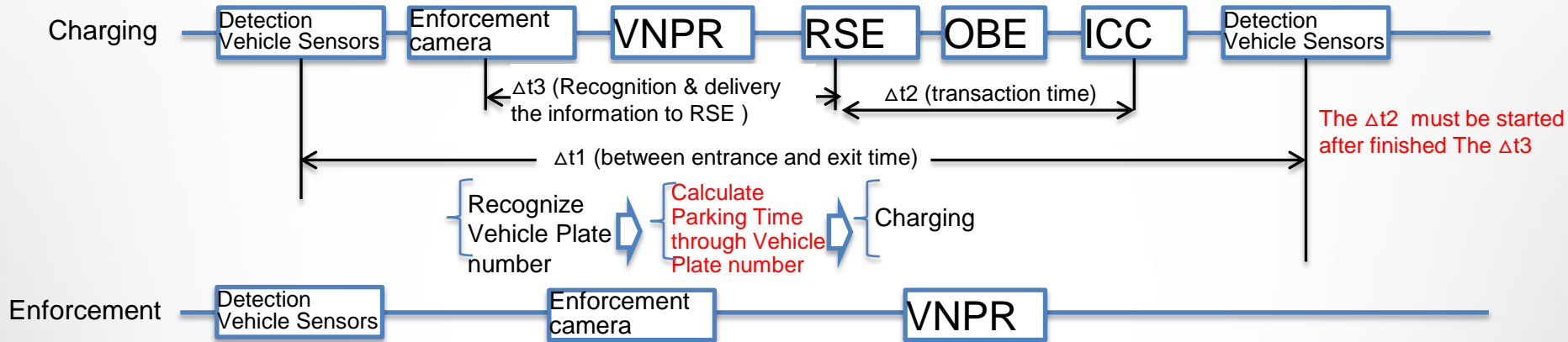


신규 ITEM(4) 각각의 toll domain 에서의 요구사항(3)



② Parking area

- Sequence flow of EFC transaction



- Monitor components for Charging and Enforcement

EFC Functions	Charging	Enforcement
detection vehicle sensors	-Delivery Time (to the RSE) -Delivery Time (to the Enforcement camera) -Correct detecting vehicle rate	-Delivery Time (to the Enforcement camera)
RSE↔OBE/ICC	-Transaction time -Communication success rate from ICC to RSE through OBE	
Enforcement Camera	- VNPR Time - Delivery Time (to the RSE) - Correct VNPR rate	-Correct VNPR rate

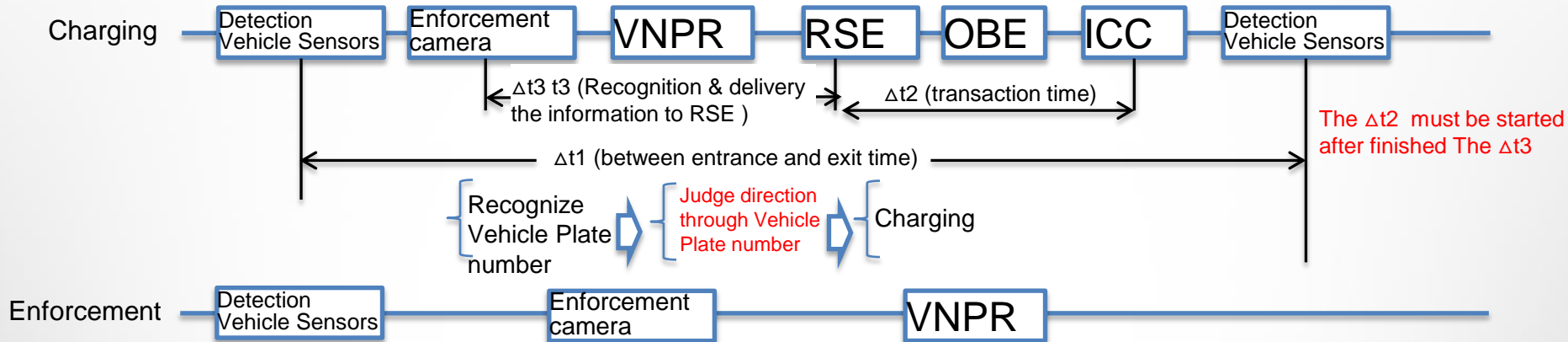


신규 ITEM(4) 각각의 toll domain 에서의 요구사항(4)



③ Service area

- Sequence flow of EFC transaction



- Monitor components for Charging and Enforcement

EFC Functions	Charging	Enforcement
detection vehicle sensors	-Delivery Time (to the RSE) -Delivery Time (to the Enforcement camera) -Correct detecting vehicle rate	-Delivery Time (to the Enforcement camera)
RSE↔OBE/ICC	-Transaction time -Communication success rate from ICC to RSE through OBE	
Enforcement Camera	- VNPR Time - Delivery Time (to the RSE) - Correct VNPR rate	-Correct VNPR rate

<Schedule>

- Start drafting :2016. 9
- NWI proposal :2017. 10 Poland ISO meeting
 - ▷ 추가 보완사항 요구
- ❖ 한중일 협력회의 : 2017. 12
- ◆ 2차 NWI proposal:2018. 4 Seoul ISO meeting
- DTR ballot :2019. 04
- NWI Propose : 2019. 4. TR 을 바탕으로 TS 제안

Thank You

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