Stockholm SL Open Pay project – Contactless Validators

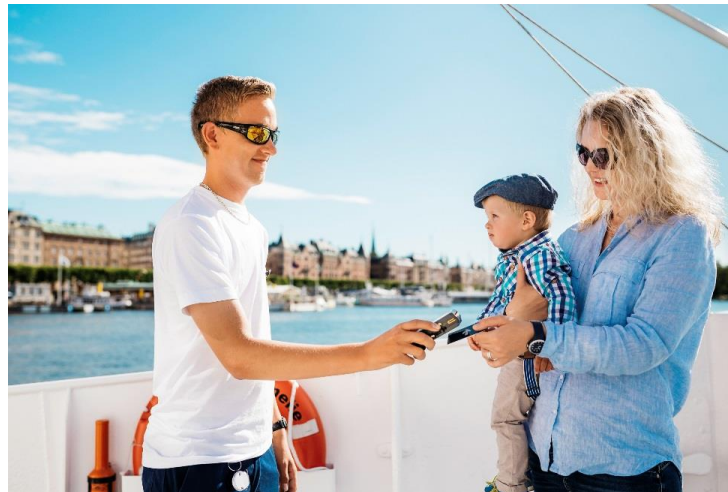ITS Finland

6th Oct 2021   Torbjörn Henrysson

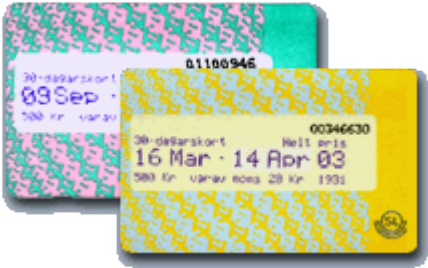MODUL SYSTEM SWEDEN

Part of

Semel ◆

KGK

- Hammarbacken 12, Häggvik, Sollentuna, 20km north of Stockholm
- 2019 part of Semel Group
- €25M turnover Semel Group
- 45 employees
- IS0 9001 ISO14001
- PCI certified

IQNet
THE INTERNATIONAL CERTIFICATION NETWORK

PCi Security Standards Council ™

TransQ

AAA Högsta kreditvärdighet

Microsoft Partner Silver

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Ticketing in mass transit

"Closed loop"

Paper tickets/coupon   Magnetic tickets   Contactless cards (Mifare etc)   SMS ticket   Mobile ticket QR/Aztec code

"Open loop"

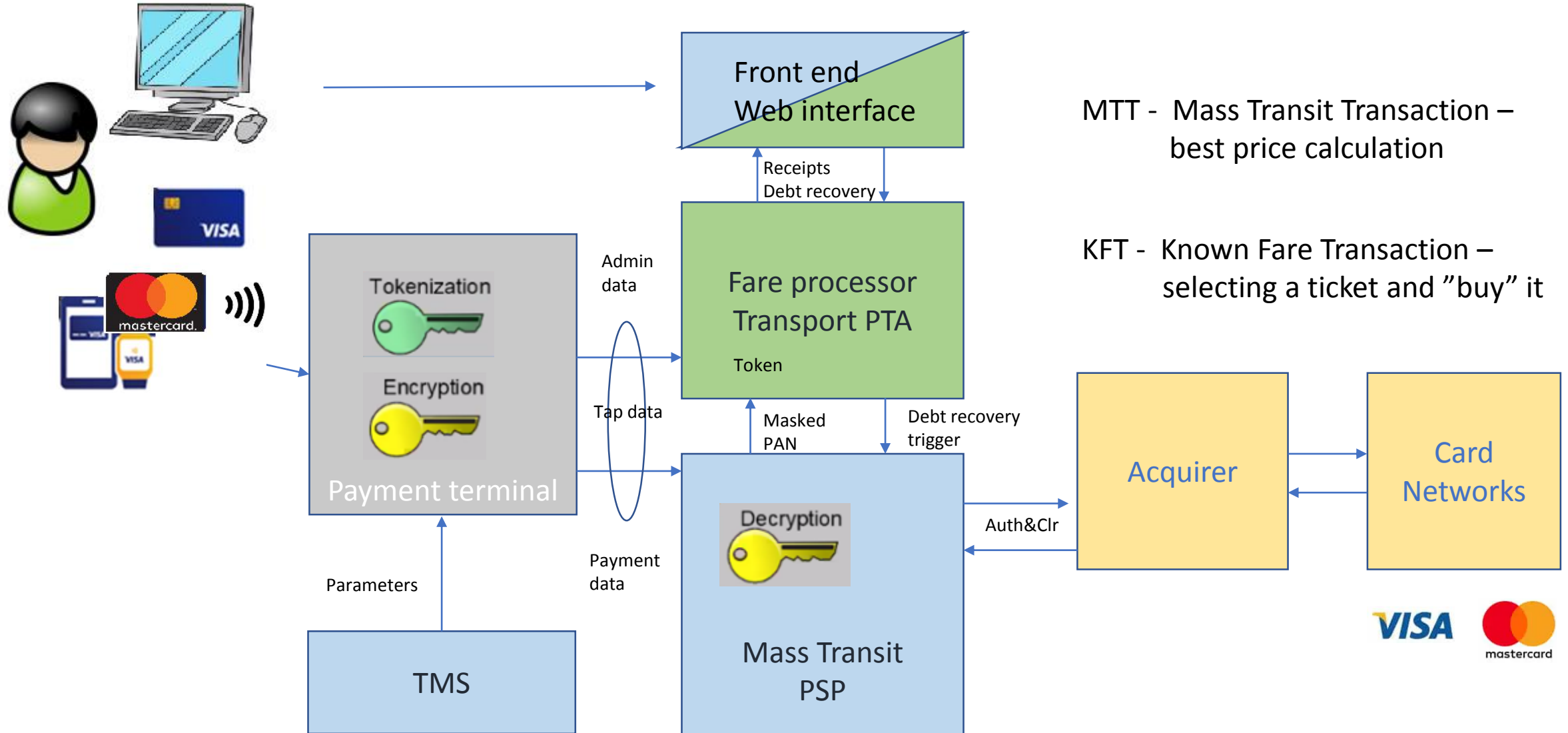Embossing   Magnetic stripe   Contact card EMV   Contactless EMV   ApplePay / SamsungPay etc
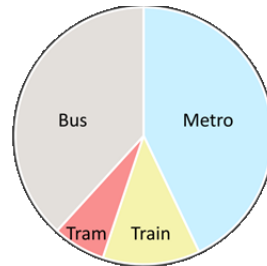
Open loop payment system for Mass Transit - principle

MTT - Mass Transit Transaction – best price calculation

KFT - Known Fare Transaction – selecting a ticket and "buy" it

Front end Web interface

Receipts
Debt recovery

Admin data

Fare processor Transport PTA

Token

Payment terminal

Tokenization

Encryption

Tap data

Masked PAN

Debt recovery trigger

Decryption

Mass Transit PSP

Parameters

Payment data

TMS

Auth&Clr

Acquirer

Card Networks

VISA mastercard

MODUL**SYSTEM** SWEDEN

Public Transport Authority - Region Stockholm

Region Stockholm
Trafikförvaltningen

SL

WAXHOLMSBOLAGET

Spårvägsmuseet

FÄRDTJÄNSTEN

850,000 people make 2,9M trips 80% in rush hour

45% tax financed
55% ticket financed

Bus | Metro | Tram | Train

- **Purpose of project was to introduce bank card payment in all of SL types of traffic, i.e underground, commuter trains, buses, local trains and trams, boats**
- Project was initiated in 2017 with a total budget of about €10M
- SL had changed tariff system to just 1 zone (from 3) which simplified introduction (no need for Check in/Out).
- SL formed their own IT dept to develop the new system from scratch
- Modulsystem involved early in 2019 with the project involving handheld and platform validators. This project called OpenPay
- We supplied a payment application for MTT in this project (also called OpenPay)
- System was live already in June 2020 but officiallly launched in Feb 2021

—VAL100—
Access-IS
Fixed mounted for gates
In subway and commute
c.a. 850 st

— VAL100 —
Access-IS
Fixed mounted on buses
and ticket booths.
c.a. 2350 st

— BKU v3 —
Modulsystem
Handheld conductor unit
c.a. 700 st

— "FX900" —
Modulsystem
Fixed mounted outdoor on platforms
c.a. 300 st

TAP
TRAVELING AUTHORIZATION PLATFORM

Authorizations

Ticketing system

Deny list

Parameters

Authorizations

Clearing

Parameters

PSP

Bank

Kort-utgivare

White list

Look-up

—Zebra—
Optodev
Ticket Inspection
c.a. 70 st

Sensitive card data read by certified units
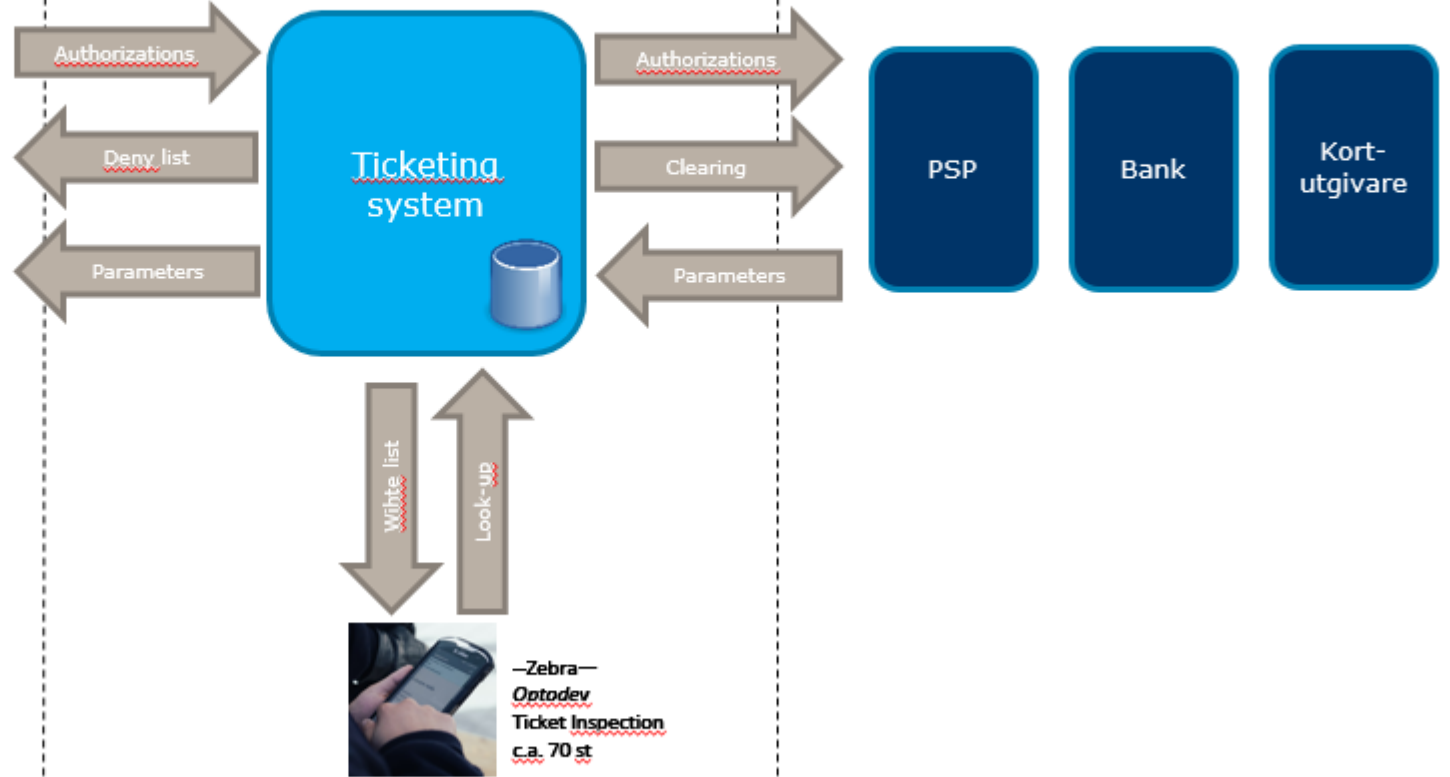
Safe zone where no sensitive data are handled

Sensitive card data can be read and managed in secure environments

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openPay

"MS part of TAP"

Android | Tetra

Fx205

LINK/2500

OPEN/1500

famoco

ingenico
a Worldline brand

WORLDLINE

Android environment used for non payment i.e. main GUI, closed loop

Ingenico Telium Tetra environment used for payment application

OpenPay payment application same in Tetra HW

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BKU handheld equipment

1. SL Access (closed loop – Mifare)   (Fx205 – Android environment)
2. MBS   (Fx205 – Android environment)
3. MTT Open loop   (Link/2500 – Tetra environment)

BKU = Bärbar Konduktörs Utrustning = Portable Conductors Equipment

Modulsystem supply handheld equipment (ca 800pcs)
Modulsystem responsible for field service and maintenance of this equipment together with other support services

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BKU Platform validator

1. GUI   (Fx205 – Android environment)
2. MTT Open loop   (Open/1500 – Tetra environment)

BKU Platform validator
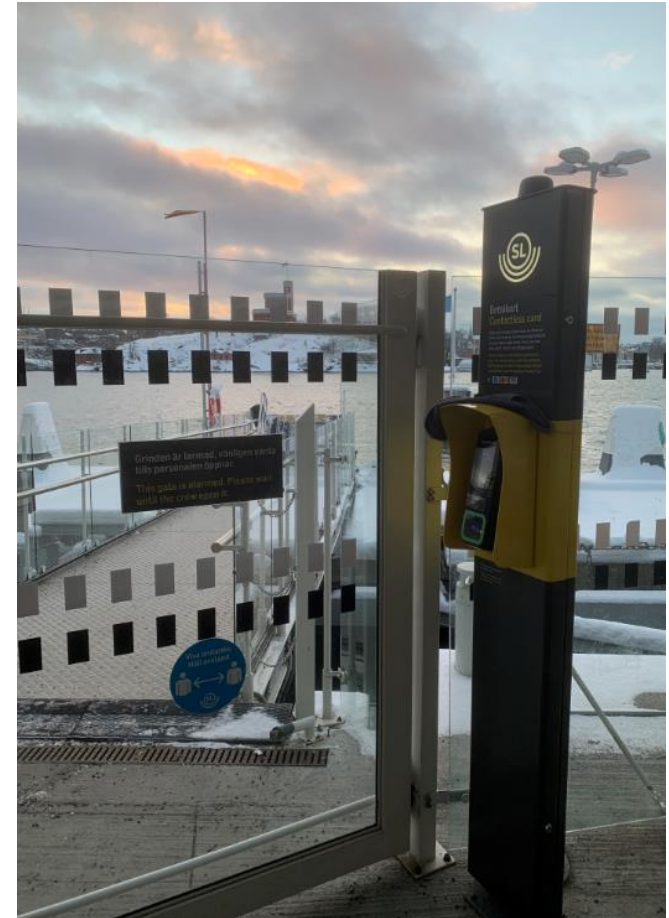
Contactless validator live Feb 2021

Some examples of how it looks

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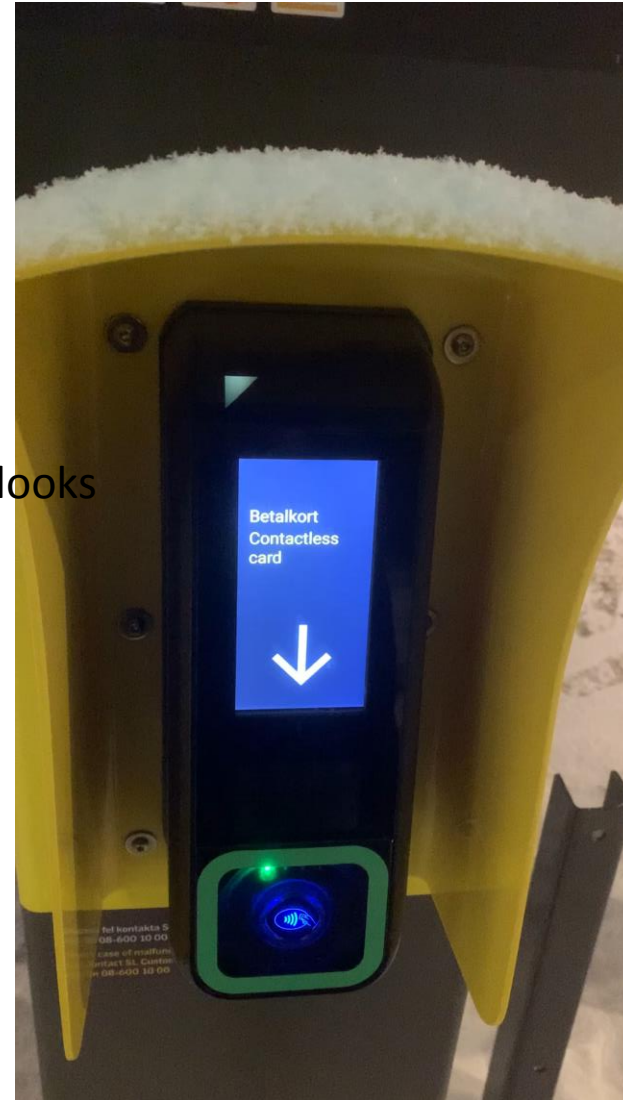
Contactless validators in Stockholm

Platform for Tram,
Local trains

Commuter Boat

Bus

Gate – Underground
Commuter trains

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Stockholm system - backend

Dina resor med betalkort

Här kan du se hur många resor du har gjort under dagen, det totala belopp som kommer att dras från ditt kortkonto, eventuell skuld samt hur mycket tid som är kvar på din biljett. Du kan också ta ut kvitto på din resa.

Klicka på den blå knappen nedan, fyll i dina uppgifter och klicka på Bekräfta.

See your journeys with Contactless pay as you go
Click the blue button below and enter your card details to see how much time you have left on your ticket, how many journeys you have made during the day and the day's total amount due. You can also print a receipt.

Dagens resor och biljetter

Här ser du dagens biljetter, pris och totalsumman som kommer att debiteras ditt kortkonto under natten. Beloppet syns i normalfallet på ditt kortkonto dagen efter du rest.

Status	Köptid	Biljettyp	Pris
ⓘ Utgick 07:05	05:50	Enkelbiljett, vuxen	38 kr

Beloppet debiteras kortkontot tidigast dagen efter resan	Totalt: 38 kr

https://sl.se/res-med-betalkort

Receipts:

Kvitton för betalda biljetter

Här kan du ladda ner kvitton för dina resor med betalkort. Du kan endast ta ut kvitto för de resor som är betalda, vilket innebär att du först dagen efter du rest kan se dina kvitton här.

5 dagar valda		⬇ Ladda ner kvitto

	Resedatum	Totalpris per dag	
☑	2020-11-27	10 kr	⌄
☑	2020-11-11	10 kr	⌄
☑	2020-09-30	20 kr	⌄
☑	2020-09-10	10 kr	⌄
☑	2020-08-10	10 kr	⌄

SL | SL:s Kundtjänst | Datum
08-600 10 00 sl.se | 2021-02-02

KVITTO
Res med betalkort

Kvittonummer: 3490

Datum för resor: 2020-08-10
Datum för debitering: 2020-08-11

Säljare:
AB Storstockholms Lokaltrafik
Moms reg nr: SE556013068301
Postadress: 105 73 Stockholm

Antal	Biljettyp	Pris	Kortnummer
1	Enkelbiljett, vuxen	10,00 kr	521358******6838
	Totalt inklusive moms:	10,00 kr	

Moms %	Moms	Netto	Brutto
6%	0,57 kr	9,43 kr	10,00 kr

Tap intiated debt recovery:

Obetalda resor

Om det inte fanns tillräckligt med pengar på ditt kortkonto när vi försökte debitera kostnaden för dina tidigare resor så har ditt betalkort registrerats på SL:s spärrlista. Du kan inte göra fler resor med SL förrän skulden är betald. Här nedan ser du din totala skuld.

✓ Du har inga obetalda biljetter

Betala skuld och komma bort från spärrlistan

För att komma bort från spärrlistan, gör så här:

①	②	③	④
Sätt in pengar som motsvarar din skuld på ditt kortkonto	När du ska resa – blippa på läsaren en gång	Läsaren lyser rött när vi reserverar ditt skuldbelopp och tar bort kortet från SL:s spärrlista	Därefter kan du blippa igen, det lyser grönt och spärren eller chauffören låter dig passera

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Result after about 8 months in use of the bank card:
- On average **35000** individual tickets per day with peaks up to 60k - number is growing
- Around **€20M** income since introduction 8 months ago
- Total investment ~**€10M**
- No issues!

Certification

Manufacture	EmvCo	PCI SSC	Card Schemes		Acquirer
	EmvCo L1				
	EmvCo L2	PCI-PTS			

- Certification is tedious but pays off!
- OpenPay product is fully PA-DSS certified and certified to the relevant card schemes (brand tests etc)

PTS DEVICE DEPENDENCIES	EXPIRY DATE
Ingenico, Link/2500 (4-30230)	30 Apr 2023
Ingenico, OPEN1500, OPEN2500 (4-30349)	30 Apr 2026

Description Provided by Vendor: A solution for mass transit payment terminals (MTT)

OpenPay Payment Service

Version #: 01.01.xx
App Type: POS Specialized
Target Market: Sweden (transport authority)
Reference #: 20-06.01062.002.aaa
Tested Platforms/Operating Systems:
Ingenico Telium Tetra SDK
Service Pack/Build/Version:
11.20.0.04

Validated According to PA-DSS (PA-DSS v3.2) — Acceptable for New Deployments — 25 Jun 2022 — 28 Oct 2022 — Foregenix Ltd.

MODULSYSTEM SWEDEN

Further development of SL ticketing system

13th Sep: Reduced category introduced for bank card

User register their bank card on SL web site which will then calculate the reduced fare (€2,4 instead of €3,2)

Future: Fare capping per day, week etc

New SL card will replace the closed loop card (SL Access)

This is based on white label EMV technology

All tickets are "in the cloud" i.e ABT system.
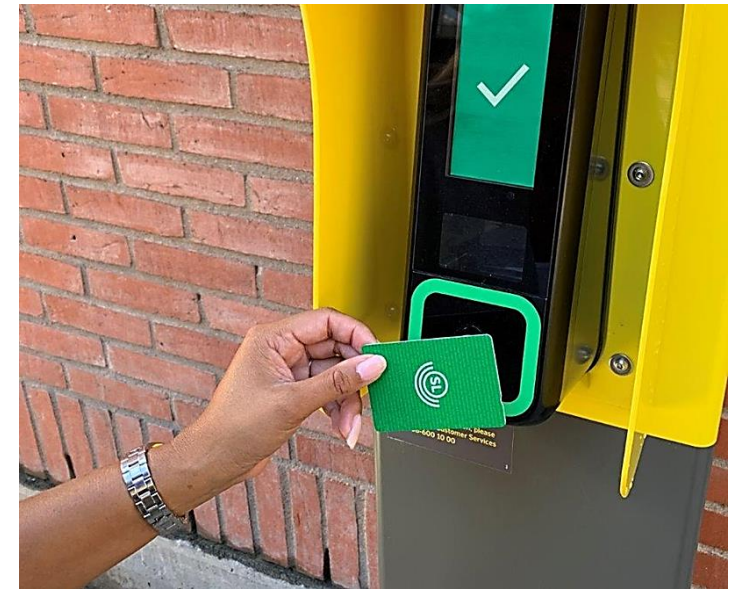

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New SL card – white label EMV

The new green SL card is based on white label EMV technology

All tickets are "in the cloud" i.e ABT system. New ticket types can easily be introduced from the backend.

White label EMV. WISE is an implementation of an open industry standard in the White Label Alliance.

SL are well adapted to welcome back all passengers and on the ticketing front a lot has happened during the pandemic!

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Bank cards in mass transit are here to stay!

Thank you!

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Stockholm SL Open Pay project – Contactless Validators
ITS seminar Helsinki   6th Oct 2021

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