

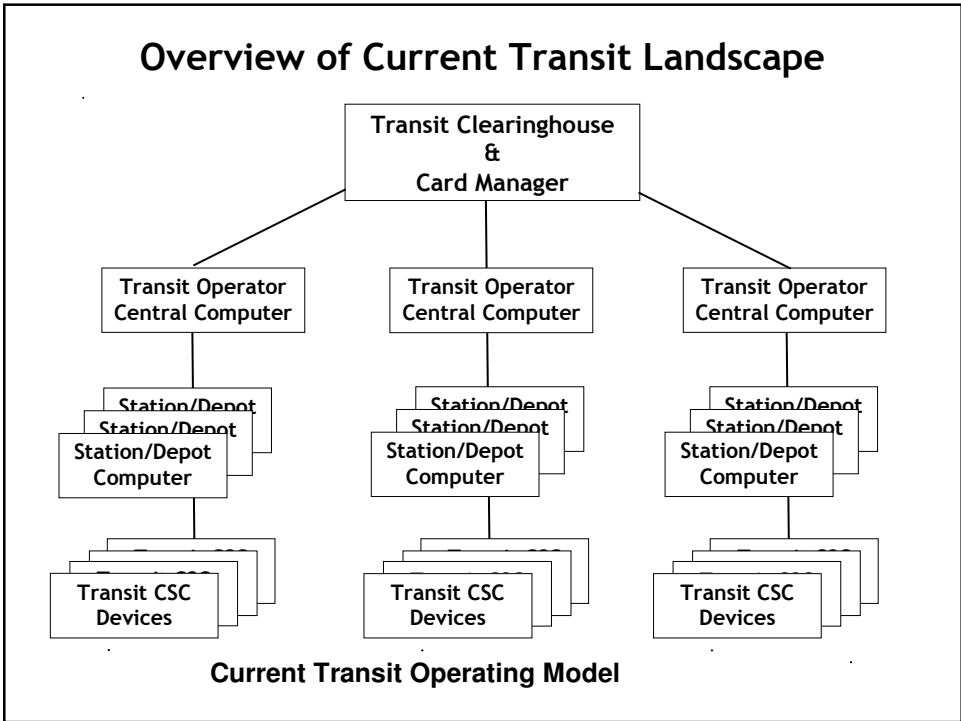
# **CEPAS**

***A standard for Unifying Transit  
& ePayment***

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21 April 2007***

**Details of CEPAS can be found in  
SS518 obtainable from Spring  
(standards body)**

- a number of countries have developed standards for their stored value card system such as CD97 in France
- Singapore is unique as have 2 major card managers with non-interoperable cards
- an evident need for a common standard



- Normally part of large infrastructure project and costs not transparent
- or funded from Public Funds
- numerous ticketing schemes some politically driven and can't fit easily to stored value systems (bee keeper ticket)
- sometimes benefit of smart cards not realised
- purely convenience for the commuter

## **Cost Benefits of Fare Collection Technology**

- cash to magnetic
  - mainly operational
  - about 7%
  - still an open system
- Magnetic to contactless
  - fare leakage (3% to 5%)
  - maintenance (10%)

## **First Transit System in the World**

- accept both Type B and C cards
- a complete contactless card environment
- entry/exit processing for buses
- 4% single trip and 10% cash on buses

**Note : ridership has been constant at about 4m rides per day**

## **Constraint of the Current Transit Payment Landscape**

- Transit operators bear the infrastructure costs of a full end-to-end payment system
- Deposit collection is a significant infrastructure overhead
- Security not compatible (non-repudiation) with banking requirements
- Lack of interoperability & multi-vendor support
- Support for Multi-Applications is limited and constrained by limitations of the card ( 1 to 2k)
- Sharing & apportionment of liability among participants within the system a major exercise
- Contactless smartcard systems largely proprietary

## **Key Cost Drivers for MPSVC**

- **Regulatory Requirements  
(Payment Systems Oversight Act)**
- **though regulator never admits there is cost to regulation (determined by float size)**
- **Top-Up**
- **Acquisition**
- **Clearing**
- **Cards - borne by commuter (can be bundled with other products)**

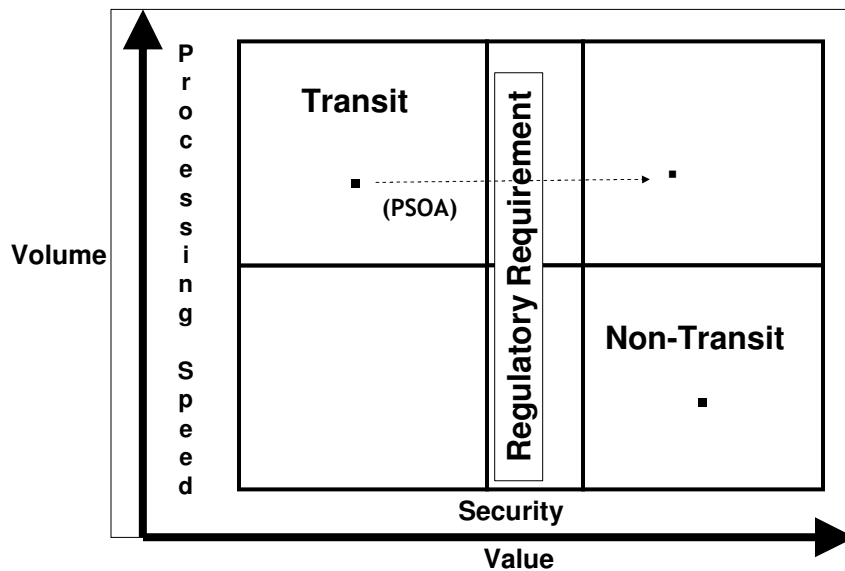
## **Top-up at Ticketing Machine**

- **Commuters with ATM cards - 90%**
- **Top-up with ATM card - 34%**
- **When cash option is turned off about 70% use their ATM cards**
- **demonstrate cash is the preferred mode of payment even with large card base**
- **Cost of cash handling is about 2 to 3 times of bank card**

## Top-Up Cost

- is significant but often overlooked (quite often transit operators do not keep track of this cost)
- has to be Balanced with Need for Top Up Channels
- Target Cap at 0.5% Revenue to be viable for stored value system compared with credit card fees

## Transit vs Non-Transit



## **Challenges in Non-Transit**

- **Cost of secure terminals**
- **Breaking new ground with Financial Institutions (better accountability)**
- **Cash**
  - while cost of handling cash is about 10% in the economy but never identified

## **New Relevant Developments**

- **SSID and e-Passport - Type A & B card will be proliferated more widely**
- **Provide secure authentication at lower cost (Singapore e-passport 72k memory, full biometric processing about 2 second)**
- **Electronic Money Institutions (Account based systems)**

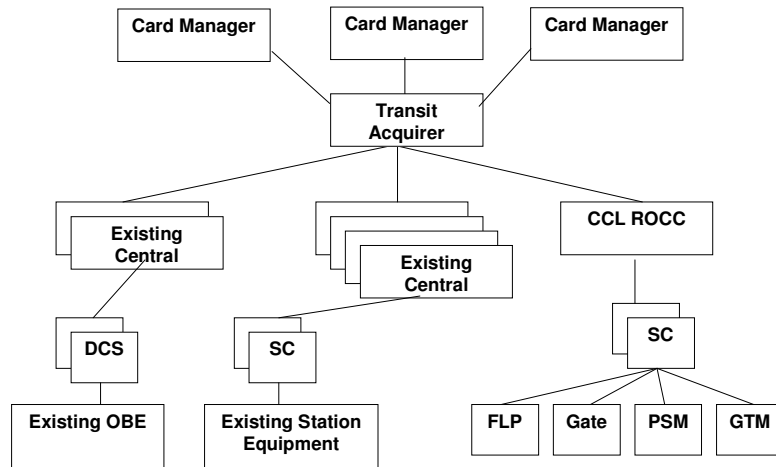
## **Federal Reserve Bank Paper**

- **Micropayments : The final Frontier for Electronic Consumer Payments  
June 2006**
- **predicts a turning point for micropayments (<US\$5)**
- **In Singapore small payments (<\$20) is assessed to be S\$20b**

## **The Evolution for Transit Payments**

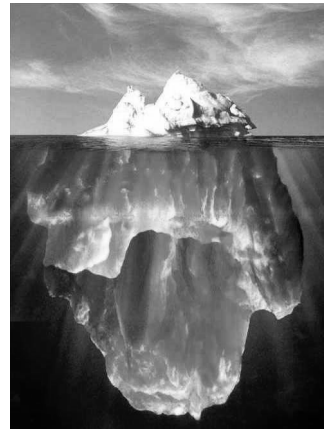
- **Transit to become part of a multi-application smartcard framework**
- **Banking sector to play a key role in the issuance of cards for various applications (including transit)**
- **Convergence of banking sector with other applications (transit, road pricing, retail payment etc.) will bring greater value & convenience to users**
- **National e-Purse standard will facilitate the participation of multiple suppliers, issuers, providers and acquirers in a common payment environment**
- **Credit cards & Bank cards to be enabled with CEPAS (e-Purse) for use in transit and other applications**

## Overview of Future Transit Landscape



## Migration to CEPAS in Transit

- Developing a suitable CEPAS card for transit needs is a relatively small effort
- Most of the effort is required to make the transit system CEPAS compliant and support multiple issuers
- Complexity increases because there is an existing legacy system that needs to be supported and operations cannot be disrupted



## **New Processes**

- **New backend processing systems and security systems need to be developed for transit to support CEPAS**
- **New business rules for operational procedures for handling cards from different issuers need to be established and developed**
- **New backed settlement processes need to be developed to handle multiple issuers**
- **A significant cost absorbed within an infrastructure project**

## **CEPAS in Electronic Road Pricing**

- **A New IU for vehicles is being developed which will accept CEPAS contactless and combi-cards**
- **Upgrades to outstations in the form of a new CEPAS cryptographic unit will be deployed**
- **Security model for Electronic Road Pricing now changes**
  - **Card Keys are stored in a secure IU, while the outstation stores comms keys in a secure environment**

## **Electronic Road Pricing - New IU - Secure Terminal**

- **The New IU is designed and certified to meet FIPS 140-2 Security Level 3 requirements**
- **Tamper Resistant and Tamper-Evident construction**
- **The New IU supports contact cards based on Cashcard as well as contactless and combi-cards based on CEPAS v2.0**
- **A Secure Terminal at low cost**

## **Electronic Parking System**

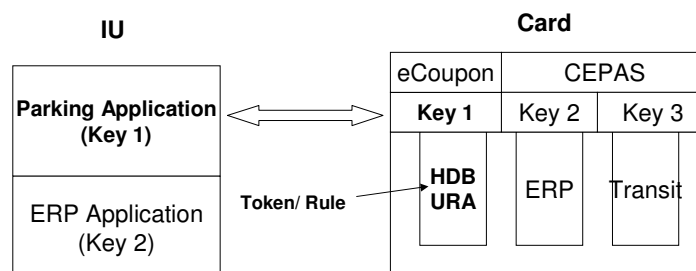
- **Deducts directly from store value card in IU**
- **Has become very popular inspite of high cost (one operator claim to have recovered cost in 6 months)**
- **Likely to be comparable in value to Public Transport by 2010**

## Car Park Application

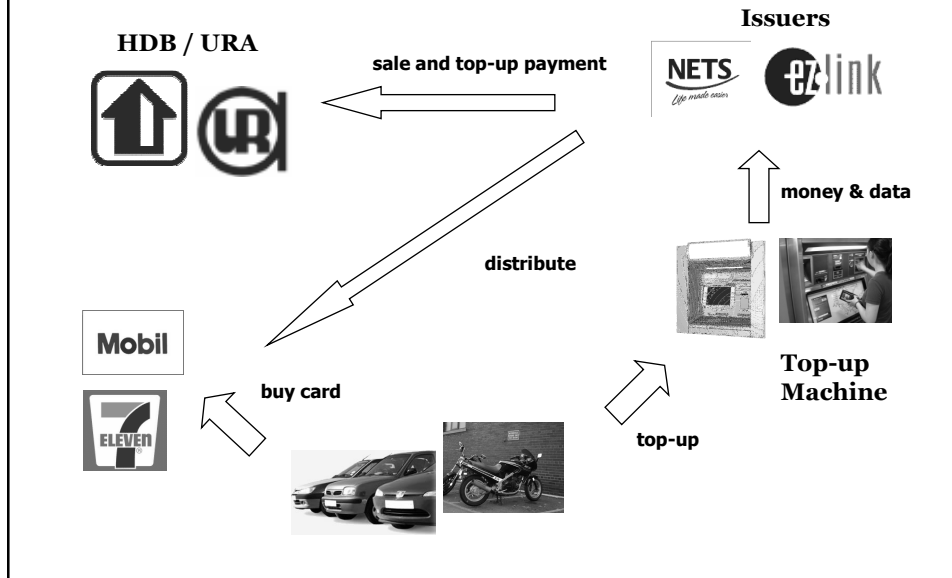
- Use of the new IU in new car parking schemes utilising CEPAS for barrier-free parking (eg. roadside parking)
- New Handheld devices for interrogating the new IU in vehicles in Roadside Parking
- eCoupon Loading infrastructure for purchase of eCoupons from CEPAS purse for use in Roadside Parking

## Potential Development CarParking - Roadside Parking with New IU

- The CEPAS card will allow a Service Provider Area to be configured for 'HDB/URA' parking which can only be accessed via Secured 'HDB/URA' key



## Roadside Parking - Sale & TopUp



## Roadside Parking - Features

- Operator collects revenue upfront from sale and top-up. No need for uploading of transaction or usage data
- Pay only for what you park (block deduction based on duration of card in IU)
- End time based on card removal. No worry for excess or under payment.
- Periodic flashing and alarm to alert motorist during parking mode
- Allow selection/payment of different parking schemes (50cts per ½hr, \$1 per ½hr etc) using one card

## **Roadside Parking - Handheld Inspection Gadget**

- **Interrogate the parking session or card via the RF Link**
- **Issue parking fine notice**
- **Upload the fine notice to central database**

## **Conclusion**

- **The next reduction in revenue collection cost likely to come from acceptance of Multi-Application Card**
- **CEPAS offers a common platform for transit and financial transactions**
- **It is card independent and can be implemented in A, B and C microprocessor cards**
- **Transit Operators and card managers need to be nimble to adopt new technology and business models (as businesses are impatient for solutions)**