National Interoperability through Standards and Specifications

17 May 2011
Ian Liebenberg, Toll Technology Manager
South African National Roads Agency LTD
Who is SANRAL?

Interoperability in South Africa
- Interoperability Roadmap
- Central Clearing as Interoperability Model in SA
- Entity Interface Diagram to identify Interface Standards
- The Selection of Standards for National Interoperability

Using Existing Standards
- Financial Payment Product

Migrating of Standards
Agency of the Ministry of Transport

Manages national road network
- 10,000 miles
- 81% non-toll roads
- 19% toll

32 Mainline Toll Plazas
39 Ramp Toll Plazas
1 Open Road Toll Project (42 Toll Gantries)
SANRAL Roads
Total 10 000 miles

- Toll Roads  1900 miles
- Non Toll Roads  8100 miles

Major Bridges and Culverts = 8 000
## Interoperability Roadmap

<table>
<thead>
<tr>
<th>Year</th>
<th>Description</th>
<th>Responsible Party</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>1st Electronic Toll Collection</td>
<td>BAKWENA (40 000 Tags)</td>
</tr>
<tr>
<td>2005</td>
<td>Interoperability Study</td>
<td>Transportation Innovation Inc</td>
</tr>
<tr>
<td>2006</td>
<td>Interoperability Framework (Model, Policies)</td>
<td>Transportation Innovation Inc</td>
</tr>
<tr>
<td>2008</td>
<td>Design of Transaction Clearing House</td>
<td>SANRAL, Tolplan, Toll Infrastructure Services, Transportation Innovation Inc</td>
</tr>
<tr>
<td>2008</td>
<td>part of Gauteng Open Road Tolling Project</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>Award Contract to ETC JV</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>Implementation of Transaction Clearing House</td>
<td></td>
</tr>
</tbody>
</table>
Interoperability Design

Select Interoperability Model
- Roaming vs Central

Identify Entities & Interfaces

Select Standards
Interoperability Models

**Separate Account**
- 1 Tag, Many Account/Invoices
- Only Tag Standard
- TA Own Customer

**Roaming Model**
- 1 Tag, 1 Account, Many Inter-Agency Agreements
- Tag Standard, Inter-Agency interface Specification (Many)
- TA Own Customer

**Central Model**
- 1 Tag, 1 Account, Single TA-TCH Agreement
- Tag Standard, TA-TCH Interface Standard
- TCH Own Customer
- Additional Interoperable Applications
Identify Entities (Central Model)

Road User
- Uses Tag or other identifier at Toll Plaza

Toll Authority (TA)
- Entity Collecting Toll

Transaction Clearing House (TCH)
- Entity hosting User Account

Bank
- Representing National Payment System
Selecting Standards

Why Standards
- Tried and Tested
- Known Outcomes
- Existing Testing Methods

Dangers
- Over Specify – Increase cost with small benefit
- Barriers to entry
- Commercial Driven

Start with Entity Interface Diagram
TA – Road User

• Existing Standards
  - TAG - EN15509
  - Vehicle Licence Number – SANS Standard
  - Customer ID Card – EFC Standard (Same as Credit Card)

• Vehicle Class – SANRAL Regulated
  - Axle Based – Conventional Toll
  - Volumetric Based – Open Road Tolling
Standards (Toll Authority)

**TA – TCH** (Transaction Clearing House)

- **Interoperability Framework**
  - Commitment to Interoperability
  - Central Clearing Principles

- **Transaction Interface to TCH**
  - TCH Specification – Base on EFC, using PAN
  - Possibility to process other EFC Transactions
    - Credit Card, Customer ID, Any PAN base transaction

- **Business Rules**
  - Payment Agreements between TA and TCH
  - Based on Banking Merchant Agreement
    - Timeliness
    - Payment Guarantees
    - Hot-listing of TAGs
Standards (Transaction Clearing House)

**TCH – Road User**

- User Account (Pre-paid / Post-Paid)
- Call Centre
  - Off-the-Shelf Product
  - Out-Source / In-Source
- Online user interface
  - Web-Based interface (Browser Independent)
- Point-Of-Presence
  - Kiosks / Customer Service Centres / Satellite Centres
  - Mobile Service Centres
  - Mobile Payment Stations
  - Retail Stores (Web Interface / Bank Interface)
Standards (Transaction Clearing House)

TCH – BANK (National Payment System)

- Gov Regulated
- Interface Defined by Banking Industry in SA
- TCH Financial Settlement
  - CASH
  - EFT (Electronic Funds Transfer) – Banking Standards
  - Credit Card Clearing
  - Debit Orders
- User pay account
  - Point-of-Presence
  - National Payment System
Existing Standards

**Payment Products**

- Cash (Point-of-Presence)
- EFT (Online Banking)
- Debit Order
- Credit Card (Master-Visa)
- Mobile / Cell phone Banking
- ATM Payment (Automatic Teller Machine)
Standard Migration

Updating of Standards

- From CEN278 to EN15509
- New EN15509
  - Multiple Suppliers
  - Move from Standard to Standard
  - Limited Risk (40 000 vs 2 000 000)
  - Additional Applications (Parking, Access Control, ITS)
- USER-TA interface
  - TA must read both CEN and EN TAGS
  - Phasing out of old TAGS
- Testing
  - 2 RSS interfaces