

Interstandard Roaming CDMA – GSM

by

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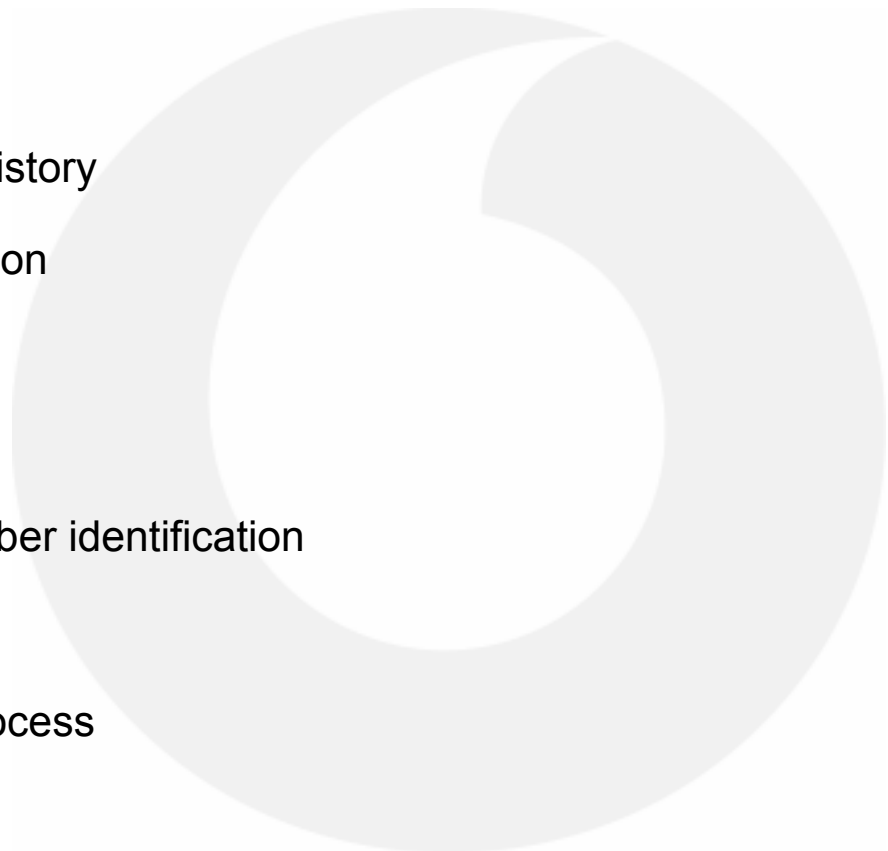
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Contents

- Background and History
- Customer proposition
- Market potential
- World coverage
- Dual mode subscriber identification
- Handsets
- Implementation process
- Future roadmap
- Demonstration



Background

What

- Interstandard roaming is roaming between a GSM and a CDMA network with **one contract**

Why

- Interstandard roaming creates **extra revenues** on top of the existing roaming market
- **Worldwide roaming** (>170 countries) retains valuable business customers

How

- **Signalling** conversion box in between two networks takes care of the interworking of both systems
- **Billing** conversion to CIBER-format
- SIM card integration on **R-UIM** possible

History

Facts and figures

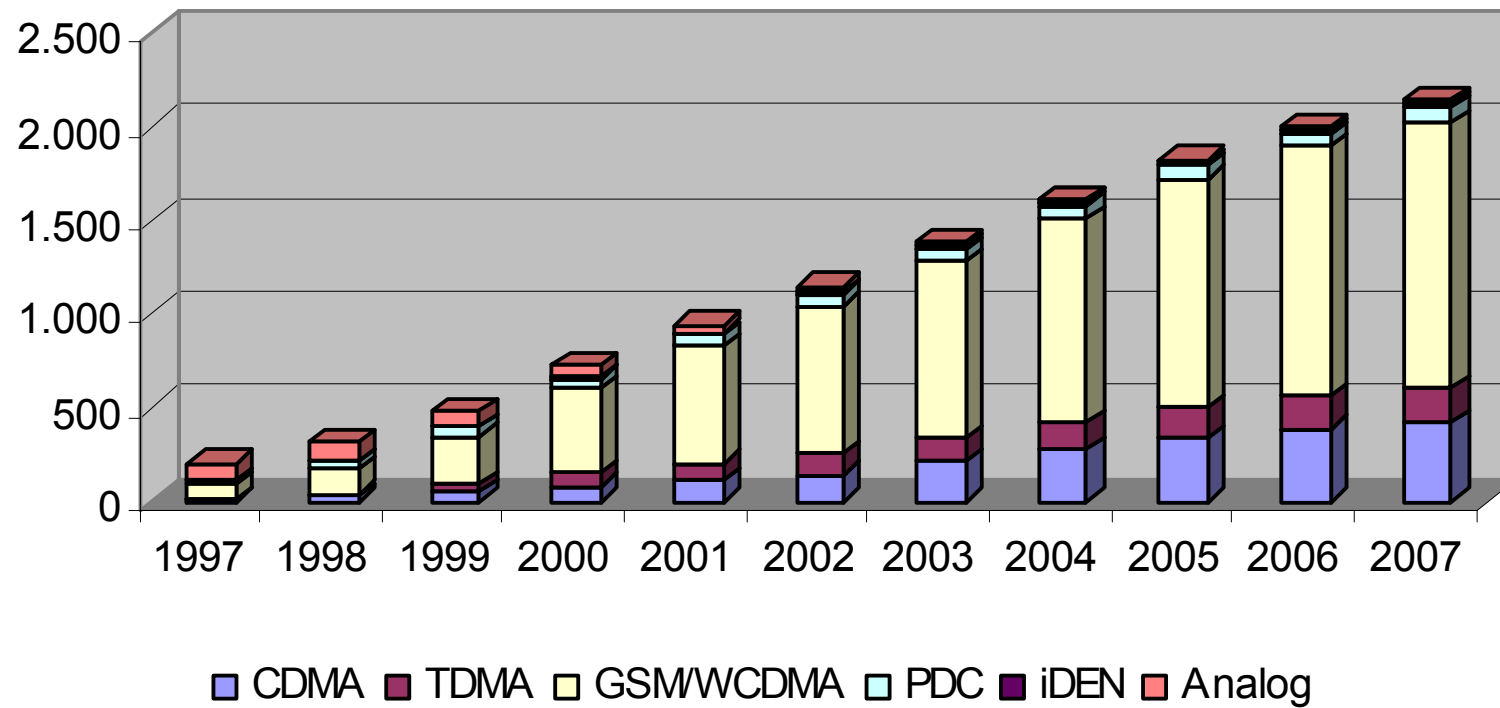
- 1999-2000: Vodafone NL initiated and completed successfully the first interstandard roaming pilot with BellSouth International (Pan American Roaming Consortium – PARC)
- 2000-2002: Vodafone NL is chairman of CDMA/TDMA-GSM Interstandard Roaming Working Group (GGRF-G95) within the GSM Association
- 2002: Vodafone NL has an Interstandard Roaming agreement with CDMA-network in Korea (KT Freetel)
- 2003: Vodafone NL offered commercial Interstandard Roaming service to a large North-American CDMA network
- 2004: Vodafone NL connected 4 more operators to the Interstandard Roaming service (1 in North-America, 3 in Latin America) .

Background - Standards Overview

Technology	Frequency (MHz)	Area / Country
GSM/WCDMA	900/1800/2000	Europe, Africa, Asia, Caribbean, South America
	850/1900/2000	North America & South America
TDMA	800/1900	North & South America
CDMA	450/800/1800/1900	Japan, Korea, Americas, Asia
PDC/PHS	800R/1500	Japan
AMPS	800	North & South America

Background - Market Distribution by Standard

(# subscribers x 1 mio)



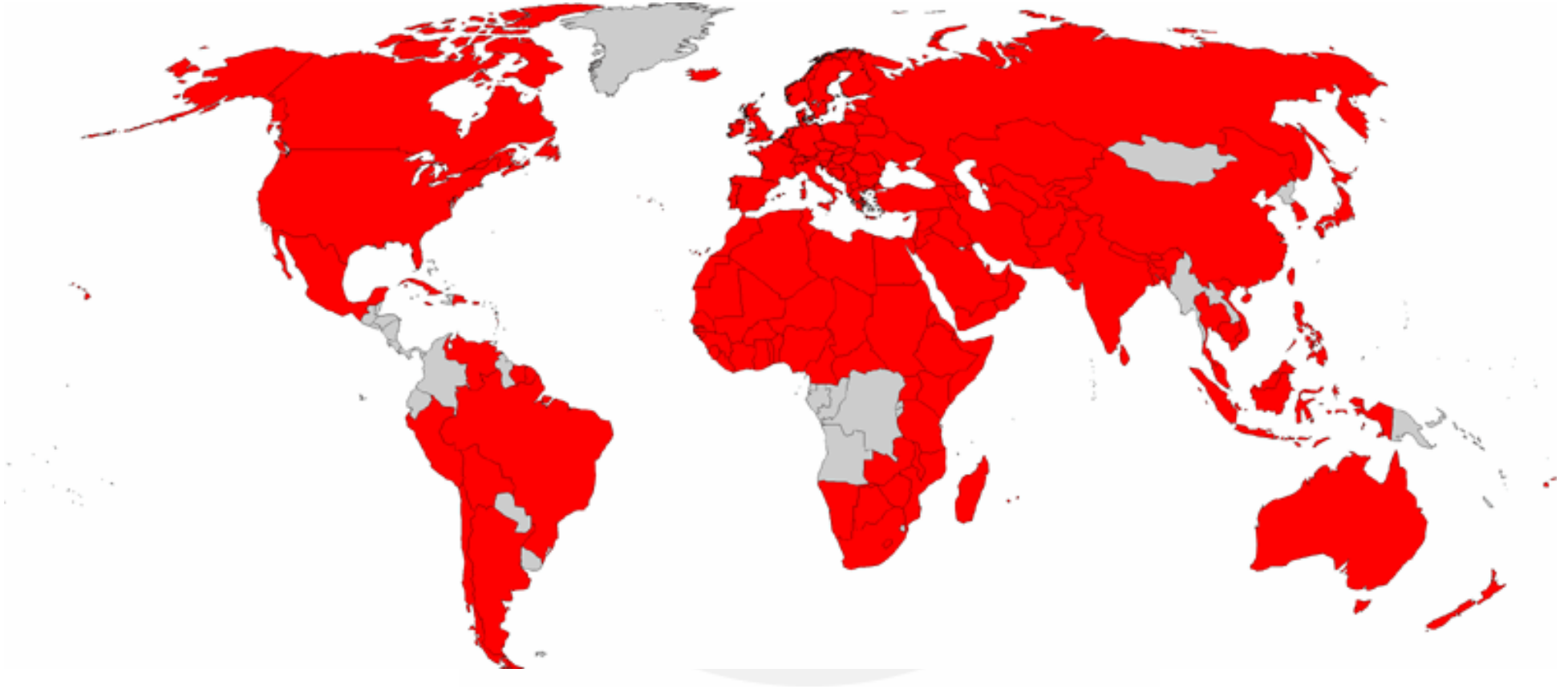
Customer Proposition - Roaming Methods

- **Rental roaming :**
 - different handset
 - different phone number
 - different invoice (payment by credit card)
- **Semi-automatic roaming (Plastic roaming)**
 - different handset / twin handset
 - but same number (using SIM)
 - same invoice as at home
- **Automatic roaming**
 - same handset
 - same number
 - same invoice as at home

Customer proposition - Features

- Automatic roaming to more than 170 countries worldwide
- Keep own number abroad
- Simple flat rate airtime pricing (3 zones)
- Dual Mode handset or twin handset concept
- Customer Service number preprogrammed on the SIM-card
- Buy or rental service
- Integration R-UIM and SIM possible
- Voice Mail, SMS, call waiting/hold/forwarding/barring and data/fax services
- Next phase: data roaming (GPRS and 3G)

World GSM Coverage – Vodafone NL



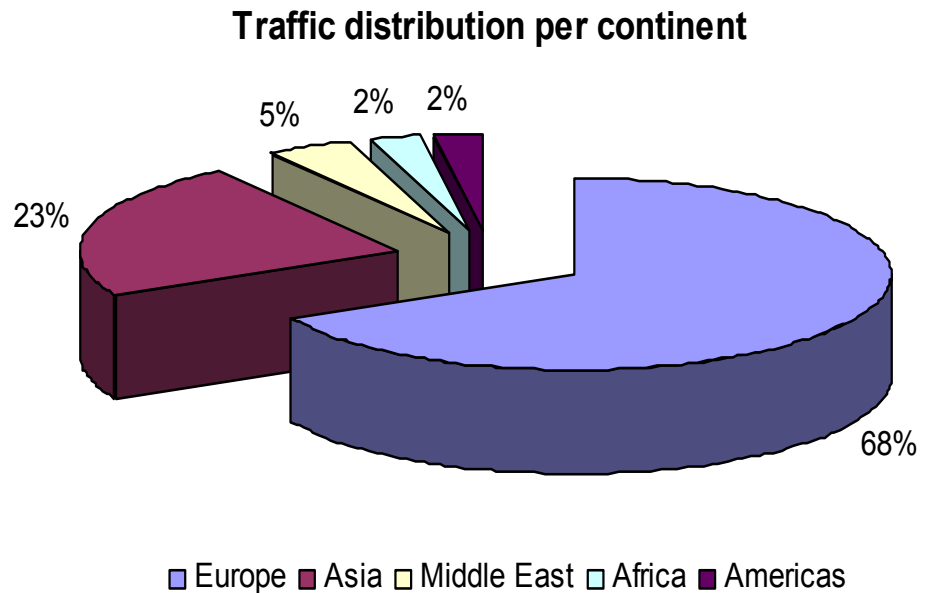
Market potential

□ Average usage

- 150 minutes per month per user
- US\$ 200 per month per user
- 85% back to home country
- 10% within/to Europe

□ Additional service: Data roaming

- SMS capability
- GPRS/3G roaming with PCMCIA card
- GPRS/3G roaming with handset



Dual system subscriber identification (R-UIM/SIM)



Dual Mode R-UIM

- Both CDMA and GSM profile on one card
- Ideal for International Business Travellers
- Easy to change handsets (CDMA and GSM)
- Shared phone book

The key benefits are:

- Enables users to program personal information one time and roam between CDMA and GSM networks with a multimode device
- Eliminates the need for consumers to program phones, PDAs and other wireless devices multiple times with the same personal information
- Provides carriers with state-of-the-art security for applications like mobile banking and commerce

Handsets - Dual Mode for interstandard roaming

Samsung SCH-A790



Specifications

- GSM 2G 900/1800 MHz
- CDMA 1x 800/1900 MHz
- Display (main 176x220 – 260k colors, front 128x96 – 65k colors)
- SMS and MMS (CDMA only)
- WAP 2.0 (GSM), BREW (CDMA)
- Size 87 x 52 x 24,5 mm
- VGA Camera + flash, Camcorder MPEG4
- Available 1H-04



Handsets - Dual Mode for interstandard roaming

Motorola A840



Specifications

- GSM/GPRS 900/1800 MHz
- CDMA 1x 800/1900 MHz
- Display 176x220 - 2,2" screen, 265k colors
- SMS, EMS and MMS
- WAP 2.0 (GSM), BREW (CDMA/GPRS)
- Size 94 x 49 x 23 mm, weight 115 g
- 1.2 Megapixel camera + flash
- Integrated CDMA/GSM picture phonebook
- MP3 player
- Removable memory card
- Available 2H-04



Handsets – Twin concept for interstandard roaming

Nokia 6225 (CDMA) / 6220 (GSM)



**NOKIA
6225**

Specifications

- GSM/GPRS/EDGE 900/1800/1900 MHz
- AMPS/CDMA 1x 800/1900 MHz
- Display 128x128 px – 4096 colors
- SMS, MMS
- WAP 2.0
- Size 107 x 45 x 19 mm
- VGA Camera, FM radio
- Infrared port
- R-UIM compatible



**NOKIA
6220**

Handsets – Twin concept for interstandard roaming

Nokia 3205 (CDMA), 3200 (GSM)



**NOKIA
3205**

Specifications

- GSM/GPRS 900/1800/1900 MHz
- AMPS/CDMA 1x 800/1900 MHz
- Display 128x128 px – 4096 colors
- SMS, MMS
- WAP 2.0
- Size 107.5 x 45 x 21 mm, weight 96 g
- VGA Camera, FM Radio, Handsfree
- Infrared port
- R-UIM compatible



**NOKIA
3200**

Implementation process for CDMA operator (8 weeks)

Commercial agreement

- Service terms and conditions approval:
 - Markets to be served
 - R-UIM/SIM profile and artwork to be used
- Tariff approval by both parties

Technical readiness

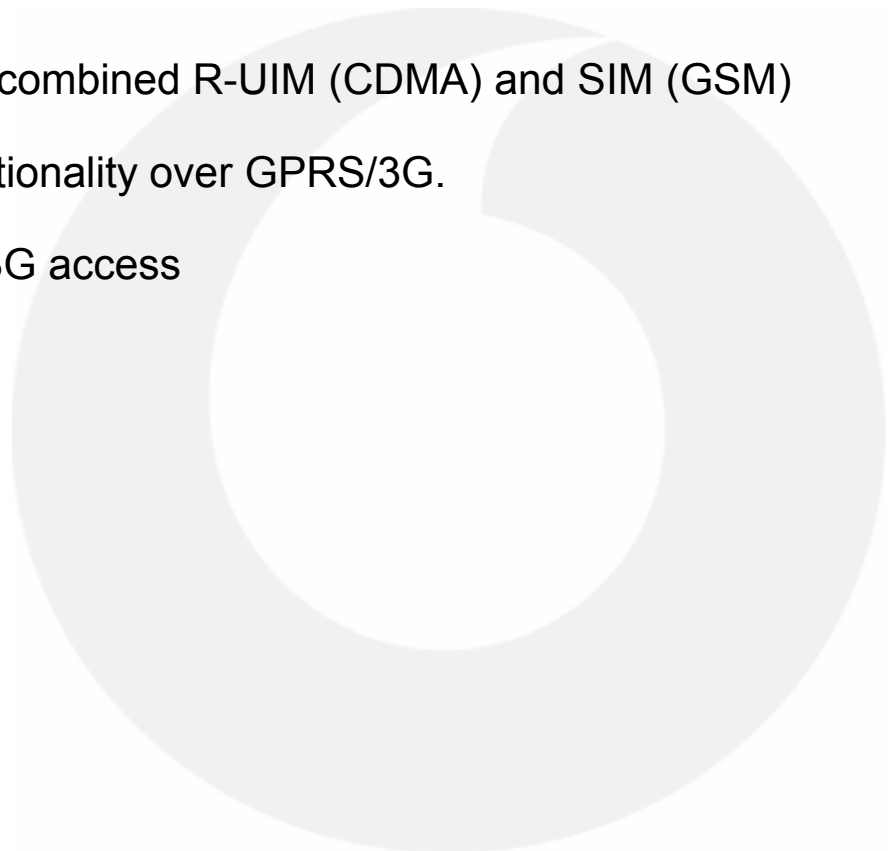
- Preparation
 - R-UIM/SIM production (profile and artwork) and provisioning
 - Signaling connectivity between Vodafone NL, Home OpCo and Syniverse
- Pre-launch tests
 - Functionality test
 - Billing test

Live service

- Monitoring service performance

Future roadmap

- SMS, MMS
- Implementation of combined R-UIM (CDMA) and SIM (GSM)
- Data roaming functionality over GPRS/3G.
- Corporate GPRS/3G access



Thank you

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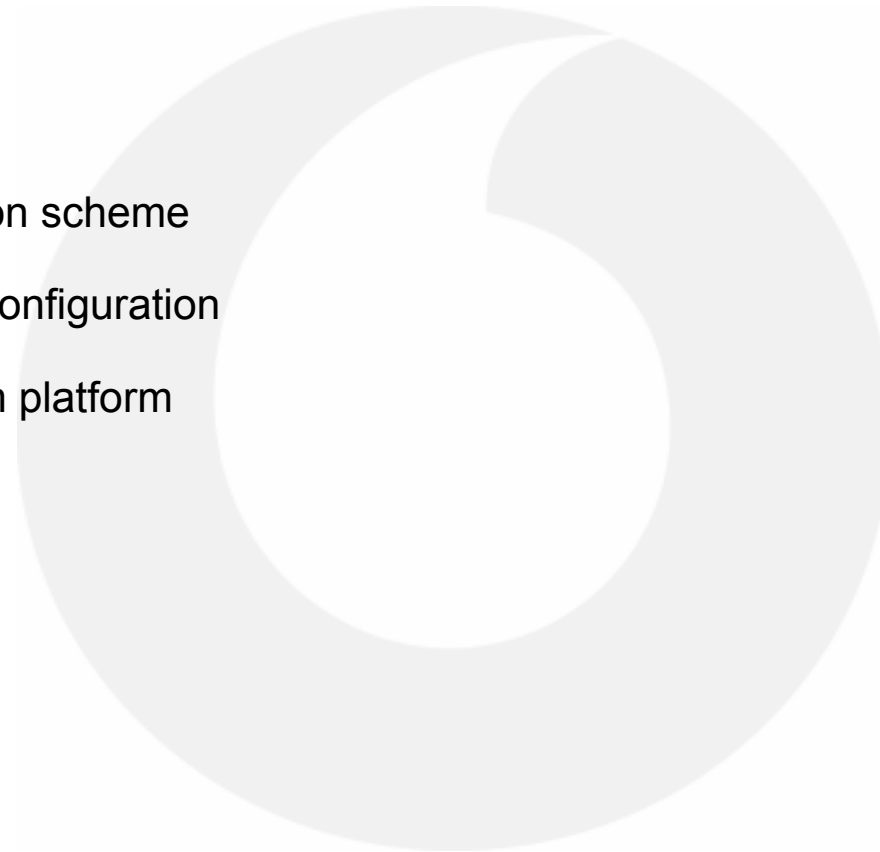
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Technical Service description

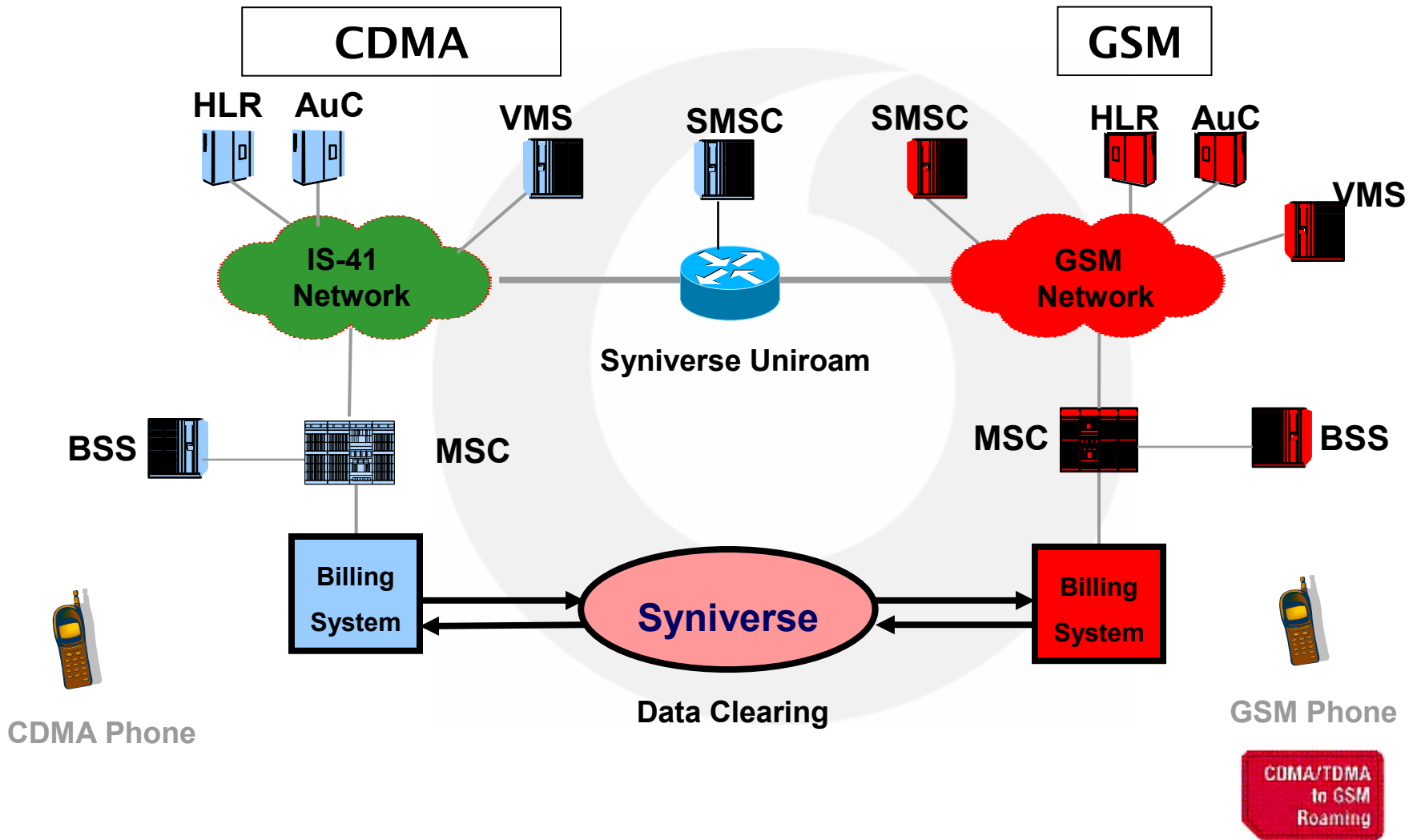


Technical Service Description

- CDMA configuration scheme
- Detailed network configuration
- Syniverse Uniroam platform
- Billing file handling
- Fraud prevention



CDMA-GSM configuration scheme



Syniverse Uniroam platform

Functions:

- IS-41 to MAP protocol convertor (IS-41 is CDMA, MAP is GSM)
- Location register of roamers
- CDMA – GSM roaming profile conversion
- Authentication of roamers

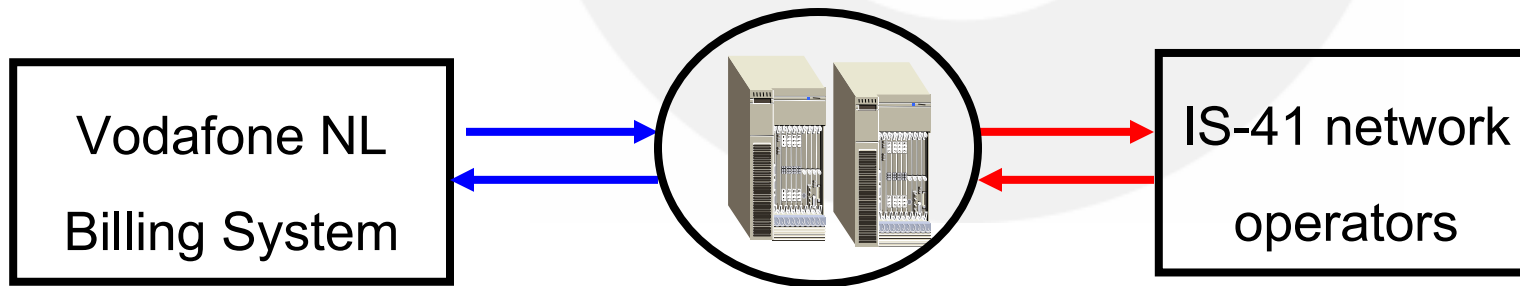
For CDMA roamers this means:

- VLR in the CDMA network
- HLR, SMSC and AuC in GSM network (all GSM-roaming partners should have implemented the Global Title of Syniverse Uniroam platform)

Billing file handling

Billing process

- Vodafone Netherlands produces Service Provider (SP) files
- Syniverse converts SP-files into CIBER files (IS-41 billing standard)
- Syniverse clears the billing data and sends them to IS-41 operator
- IS-41 operator feeds billing system with CIBER files
- Direct settlement between GSM-operator and CDMA-operator



Syniverse - Data Clearing House

Fraud prevention

Fraud is prevented by exchanging High Usage Reports (HUR)

- Process is as follows:
 - ✓ HUR with IMSI's surpassing the limit of a preset value (120 Euros) is sent by each roaming partner to VF NL within 36 hours after the first call that caused the excess of the threshold.
 - ✓ VF NL will create after each daily billing run a HUR with the IMSI's for all on-net calls exceeding a threshold on a preset value (120 Euros)
 - ✓ VF NL will send both reports to Syniverse within 6 hours after reception of the HUR's.
 - ✓ Syniverse will translate the IMSI's into MIN's and send these modified reports to the related Interstandard operators within 6 hours
- Interstandard customer is ultimately responsible for the decision to bar a customer for roaming because of suspected fraud (article in Annex C.7 in the contract)
- No VF NL MSISDN's has been set up for possible misuse