



Harmonised eCall European Pilot



#heero

Numbering for eCall - capacity, efficiency, sustainability

HeERO International Conference

27 November 2014

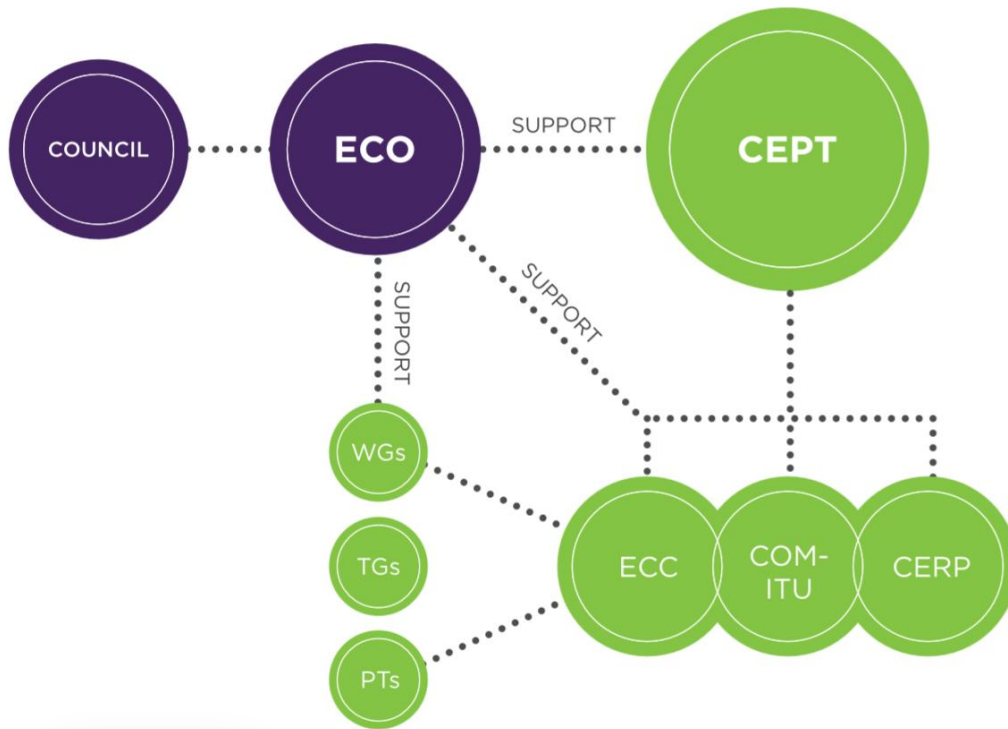
Madrid, Spain



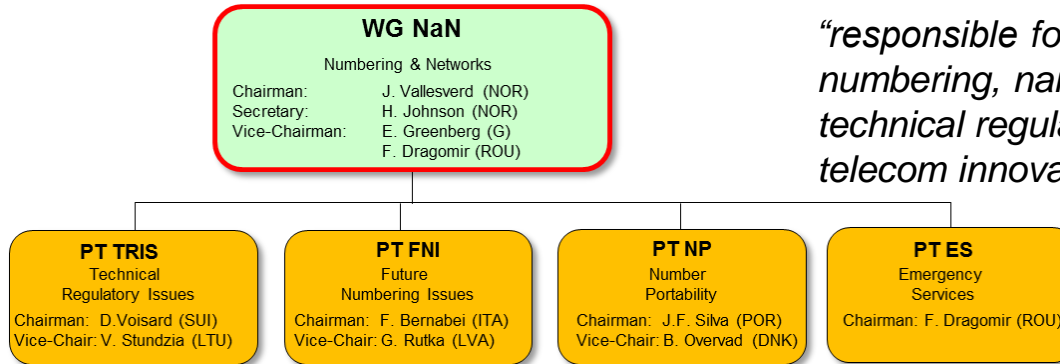
Agenda

- About CEPT/ECC/WG NaN
- Numbering plan management – basic principles
- Numbering for eCall
- E.164 and E.212 defined
- Conclusions and next steps

About CEPT/ECC



About WG NaN



“responsible for developing policies in numbering, naming and addressing and advising on technical regulatory matters to promote and support telecom innovation and competition”

Some Relevant Deliverables

- [CEPT Recommendation TSF/1](#)
 - Long-term standardisation of National Numbering Plans (The Hague, 1972). First effort to harmonise 112 for emergency services
- [ECC Recommendation 11\(03\)](#)
 - Numbering and Addressing for Machine-to-Machine (M2M) communications (Athens, 2011)
- [ECC Report 194](#)
 - Extra-territorial Use of E.164 Numbers (Budapest, 2013)
- [ECC Report 212](#)
 - Evolution in the Use of E.212 Mobile Network Codes (Lisbon, 2014)
- [ECC Report 225](#)
 - Establishing Criteria for the Accuracy & Reliability of Caller Location Information in support of Emergency Services (Oslo, 2014)
- [WG NaN Green Paper](#)
 - Long Term Evolution in Numbering, Naming and Addressing (2012-2022)

Numbering Plan Management

- Numbering a key enabler of communications services
 - Numbering enables competition
(number portability and new numbers for new market entrants)
 - Numbering fosters service innovation
(numbers and short codes for new services – eCall, M2M, Harmonisation)
 - Numbering facilitates consumer protection
(Tariff transparency, CLI, Legal Intercept)
- Balance between providing numbers and mitigating risk of exhaustion.
Number changes are expensive!
- Careful long term planning required - A strategic national resource
- National Numbering resources assigned by numbering plan managers, typically NRA or Ministry
- International Numbering Resources assigned by ITU

Other number resources

International/national numbering and non-ITU resources

- overview



INR assigned to
MS/Administrations
by ITU
MS level

E.164 CC

X.121 DCC

Q.708 SANC

E.118 CC

E.212 MCC

E.218 T(MCC)

National resources assigned
by Administrations
National level

Telephone number (E.164)

ISPC/NSPC (Q.708)

IIN (E.118)

MNC (E.212)

X.400 name (F.401)

DNIC (X.121)

CUG IC (Q.763)

INIC (X.125)

Telex number (F.69)

T(MNC) (ETS 300 392)

INR assigned direct
to operators by ITU

UPT (E.168.1)

UIFN (E.169.1)

UIPRN (E.169.2)

ISCN (E.169.3)

IC (E.164.3)

IND AESA (E.191)

Shared MNC (E.212)

Trials (E.164.2)

Other resources
assigned by ITU

ICC (M.1400)

Terminal (T.35)

Bureaufax (F.170)

OID (X.660)

Non-ITU resources
assigned by other entities
or via
Administrations or other
national entity (e.g. NSO)

IMEI (3GPP TS 23.003)

ERMES (ETS 300 133-3)

Domain name (RFC 1034)

IPv4-address (RFC 791)

IPv6-address (RFC 2460)

MAC (ISO 8802.3)

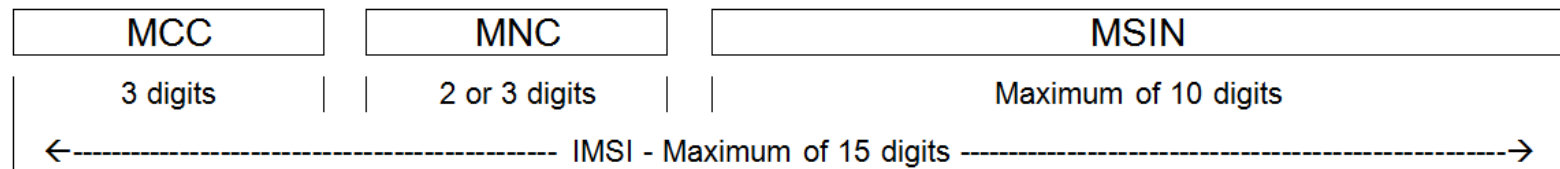
NSAP (ISO 8348)

Numbering for eCall?

- eCall has all the characteristics of a mobile service
 - Solution based on circuit-switched technology using GSM/UMTS networks
 - Ability to roam between networks and across borders is essential
 - E.212 numbering resources needed for SIM card identification and mobile network authentication (even without mobility management)
 - E.164 numbering resources needed to make and receive calls
 - permanent or temporary allocation?

ITU-T Recommendation E.212

- Telecommunication Standardization Sector of the International Telecommunications Union (ITU-T) is the primary international body for fostering cooperative standards for telecommunications equipment and systems.
- E.212. defines the international identification plan for public networks and subscriptions



- 1,000 MCCs
- 100,000 MNCs overall
- 1,000,000,000,000,000 (10^{15} MSINs) A Quadrillion!
- Conclusion:
 - Lots of capacity overall
 - Each MNC assignee has 10 billion IMSIs to assign
 - But there is a bottleneck at the MNC level where there are only 100 resources
 - As demand increases, this may become a problem for NRAs.



E.212 continued

- Situation in Spain (*source: snapshot from wikipedia*)

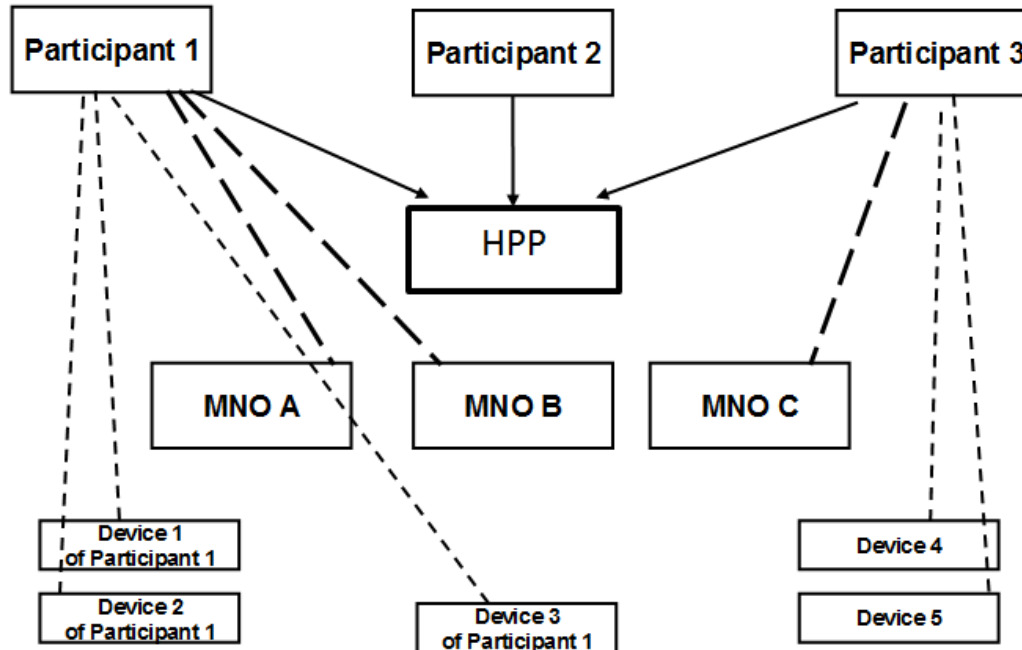
MCC	MNC	Brand	Operator	Status	Bands (MHz)
214	01	Vodafone	Vodafone Spain	Operational	GSM 900 / GSM 1800 / UMTS 2100
214	03	Orange	France Telecom España SA	Operational	GSM 900 / GSM 1800 / UMTS 900 / UMTS 2100
214	04	Yoigo	Xfera Moviles SA	Operational	GSM 1800 / UMTS 2100
214	05	TME	Telefónica Móviles España	Operational	GSM 900 / GSM 1800 / UMTS 2100
214	06	Vodafone	Vodafone Spain	Operational	GSM 900 / GSM 1800 / UMTS 2100
214	07	movistar	Telefónica Móviles España	Operational	GSM 900 / GSM 1800 / UMTS 2100
214	08	Euskaltel		Operational	MVNO
214	09	Orange	France Telecom España SA	Operational	GSM 900 / GSM 1800 / UMTS 2100
214	15	BT	BT Group España Compañía de Servicios Globales de Telecomunicaciones S.A.U.	Operational	MVNO

- MNCs are only to be assigned to and used by “*public networks offering public telecommunication services*”
- The game is changing with services such as M2M stimulating greater demand for MNCs from alternative entities
 - Addressing devices rather than personal subscriptions (households to individuals to machines)
 - Addressing a high volume of devices across different countries

E.212 continued – other issues

- Operator lock-in
 - A subscriber wishing to change service provider can do so quite easily by acquiring a new SIM card
 - Not so easy when you have millions of SIM cards embedded into devices over a wide geographic area.
 - Economically infeasible and logistically impractical
- Potential solutions to resolve lock-in
 - Administrative
 - Assign E.212 resources to large end users so IMSI range independent of underlying MNO (MVNO type approach)
 - Assign MNC from ITU under a shared MCC which is country-agnostic
 - Administrative solutions require action by ITU.
 - Technical
 - Use of SIM card that can be update remotely (OTA) – e.g. Embedded SIM (GSMA)
 - Welcome development. Solution would need to be standardised which may take some time
- For eCall, what are the options?
 - IMSI resource from country where vehicle is manufactured?
 - Different IMSI depending on the destination country?
 - International solution under shared MCC (e.g. 901) or shared national MNC for eCall?

E.212 continued – MNC sharing



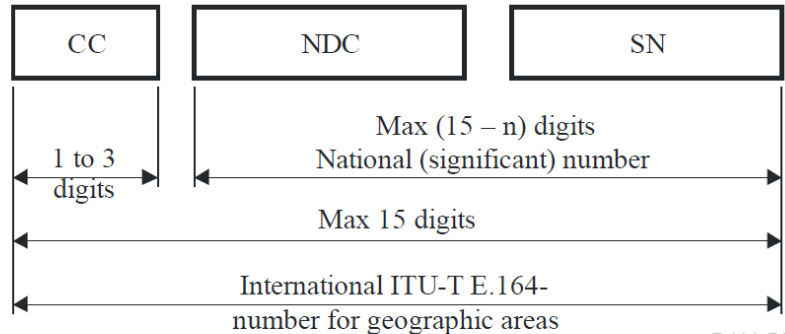
- - - W/S contract for network use
- - - Owner or user of device
- Governance + funding of Central Entity

•Shared MNC Concept

(source: Gedeeld gebruik MNC's voor M2M toepassingen,
Rapport uitgebracht aan het Ministerie van Economische Zaken, Stratix, 2013)

ITU-T Recommendation E.164

- ITU-T Rec. E.164 defines the international public telecommunication numbering plan



CC Country Code for geographic area
NDC National Destination Code
SN Subscriber Number
n Number of digits in the country code

NOTE – National and international prefixes are not part of the international ITU-T E.164-number for geographic areas.



- ITU assigns country code
- NRA/Ministry organises and develops numbering plan behind country code
- Number ranges designated for geographic/fixed, mobile, freephone, short codes etc.
- Efficient management is essential

E.164 numbers for eCall

- Does an eCall device need an E.164 number?
 - Not according to the relevant ETSI standards but used in HeERO trials
 - Calling Line Identification (CLI) is required for allowing the PSAP to callback the eCall UE
 - Question: Could CLI be useful to understand the Country of the caller and to provide better service (i.e. to respond in the language of the Country identified by CLI)?
- How many numbers required?
 - 230 million vehicles – 5% stock renewal each year (11.5 million)

Year	2009	2010	2011	2012	2013	5 year average
New Registrations (000,000)	14	13	13	12	13,5	13

Source (ACEA)

- Demand for 13,000,000 new mobile telephone numbers per annum
- As an example, Ireland has a current total mobile numbering capacity of 70 million. Somewhere between 51% already allocated. (28% Free, 21% Reserved)
 - So eCall could use remaining capacity in Ireland within 2-3 years
 - Extending capacity means costly number changes

E.164 numbers for eCall

- Challenging to implement conservation measures
 - Number recycling
 - Numbers recycled after a period of quarantine (typically 1 year).
 - No significant recycling for at least 15 years (except for accident write-offs)
 - Number Portability (NP)
 - Consumers change service while retaining their number
 - Benefit of NP for eCall not obvious – E.164 number is used for addressing device rather than personal subscription – hidden numbers
- Options
 - **Using national numbers**
 - Mobile numbers (extra-territorial use could be an issue)
 - Relevant national number remotely provisioned when car registered in-country
 - Dedicated numbering ranges specifically for eCall and other M2M type applications
 - Number of digits in these ranges to be set at maximum as recognition not important
 - 7 digit number = 10 million capacity, 8 digit = 100 million, 9 digits = 1 Billion etc.
 - **Using international numbers**
 - Country-agnostic number range from ITU (+88x)

Conclusions and Next Steps

- Numbering resources can be made available for eCall. There is no capacity issue per se
- Collaboration between key stakeholders is necessary to ensure that the most appropriate solution is found
- From a numbering plan management perspective the numbering solution should provide sufficient capacity in the long term and be efficient and sustainable
- WG NaN welcomes recent EeIP announcement on establishment of Task Force "Lifecycle management" in order to address the issues related to the SIM during the vehicle life time
- WG NaN considers that this would be the right forum for discussing the numbering issues and is ready and willing to participate

Thank you for your attention!



Freddie McBride

Numbering &
Networks

European
Communications
Office
Nyropsgade 37, 4
1602 København V
Denmark

Tel: +45 33 89 63 22

Mobile: +45 29 67 30 99

Fax: +45 33 89 63 30

E-mail: freddie.mcbride@eco.cept.org

Home page: www.cept.org/eco



@CEPT_ECC