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Session 5
Security and Regulatory issues: Network Aspects of Identification Systems (NID)

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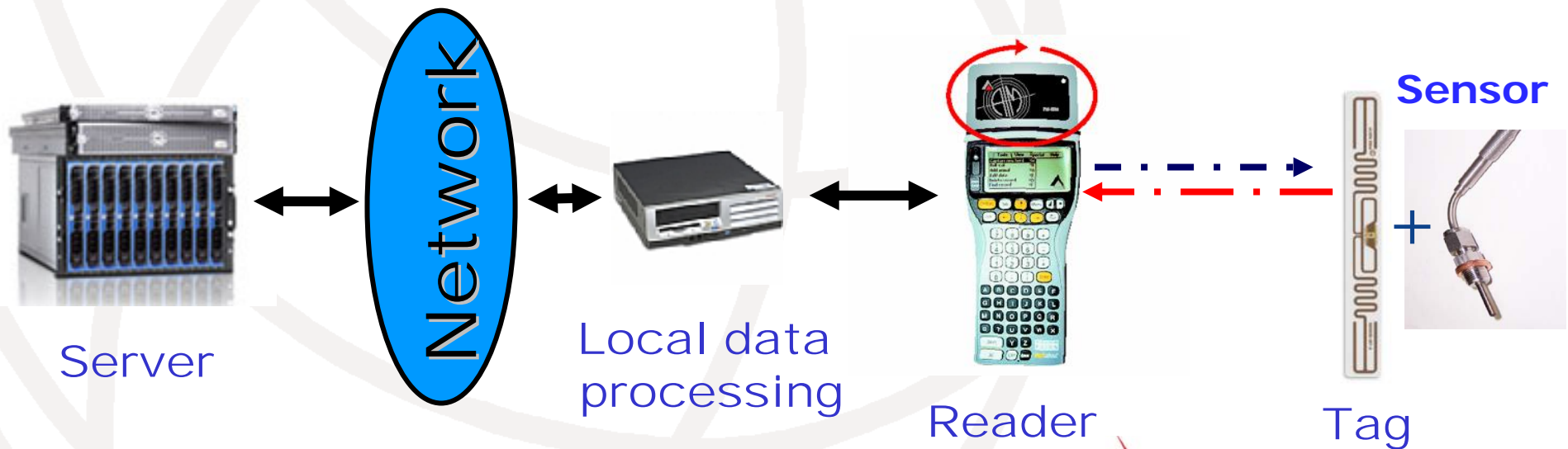
Network Aspects of Identification Systems (NID)

Content:

- NID Scope

- NID Applications and Trends

- Impact on telecom networks and telco business models

- NID Standardization

- NID in ITU-T
  - JCA-NID
  - Study Groups

- Conclusions

Network Aspects of Identification Systems (NID)

NID Scope:

→ **NID** = network aspects of identification systems (including RFID)

→ **RFID** = System using Radio Waves to identify objects

→ **NID Components:** Tag (+ Sensor), Reader, Data processing system (local system, network, server, ..) and middleware

Server

Network

Local data processing

Reader

Sensor

Tag

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Types of RFID-Tags:

- **Active**
  - Tag transmits radio signal
  - Internally powered memory, radio & circuitry
  - High Read Range (max 300 m)
- **Passive**
  - Tag reflects radio signal from reader
  - Reader powered
  - Shorter Read Range (max 20 m)
- **Semi-passive**
  - Battery to run the microchip
  - Wake-up mode

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NID(RFID) - Applications: a few exemples [1]

Field	Application	Category
Transport	Toll control	B2C
Logistics	Baggage tag	B2B/B2C
Security	Entrance check	B2B/B2C/G2B/G2C
Supply chain	Supermarkets	B2B/B2C
Medical	Patient records	
	Blood supply	
	Drug ID	B2B/B2C
Manufacture	Assembly line	B2B
Agriculture	Meat/Plant tracking	B2B/B2C
E-government	Driver's license	G2C
	Bank note	G2C
Defense	Passport	G2C
Library	Loan & return	G2C
Personal Safety	Children tracking	B2C
Shopping	e-wallet	B2C
Sports	Ski lifts	B2C
Leisure	Sight seeing info	B2C/G2C
Welfare	Location-Aware info	G2C/B2C
...	...	

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NID(RFID) Trends (1/2):

- Applications related trends:
  - B2C, G2B, G2C in addition to B2B
  - Access and distribution of Multimedia Content (data, video, graphic, etc..)
  - More intelligence in the tags (combination with sensors and other sources of information)
  - Tags and readers as parts of MM-Terminals (Mobile phones)
  - Applications need global service and network capabilities
  - Unlimited number of potential applications
  - Privacy and security aspects are very important
  - ...

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NID(RFID) Trends (2/2):

- Technology drivers:
  - Smart tags (more intelligence)
  - RFID tags with Sensors (position, environment, status,..)
  - Multi-frequency band tags
  - Combination with Nanotechnology
  - Smaller size ("smart dust")
  - Reduction of production costs
  - ...

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Impact on telecommunication networks:

- RFID is a specific wireless access technology:
  - → allocation of frequency bands
  - → part of the home network

- NID(RFID) is an enabler of ubiquitous services and applications (Any devices, Anywhere, Anytime, Any services):
  - → RFID to be considered as part of X-Internet (Internet of things)

- NID(RFID) systems need global service and network capabilities for machine-machine (B2B) and human-machine communication (B2C):
  - → Interworking/Interoperability is becoming a key issue

- NID(RFID) based applications have a great potential for future development:
  - → need for a network platform with a high level of flexibility to support future applications (NGN concept)

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NID(RFID) standardization (1/2):

- ### Major objectives:
  - Interoperability and interworking
  - Economy of scale

- ### What should be addressed?
  - ➡ NID based on RFID
  - ➡ Ubiquitous Sensors Networks (USN)
  - ➡ Business models and Architecture
  - ➡ MM service/network requirements and capabilities to support present and future applications (B2B, B2C, C2C,..)
  - ➡ Protocols at the service and network layers
  - ➡ ...

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NID(RFID) standardization (2/2):

- ➡ Security capabilities (confidentiality, privacy, cryptography, etc..) and profiles
- ➡ Data format
- ➡ ID system
- ➡ Content management (DRM) and negotiation
- ➡ Quality of Service and performance
- ➡ Radio frequency aspects (spectrum allocation, intra/extra RFID systems compatibility
- ➡ Terminology and definition
- ➡ ...

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Key players in the field of NID standardization:

- ITU: ITU-T, ITU-R, ITU-D
- ISO/IEC JTC1: SC6, SC17, SC27, SC31
- ISO: TC104, TC122, TC 204
- SDOs: ETSI, IEEE, …
- Forums and Consortiums: EPCglobal, NFC, OASIS, OMA, W3C, ZigBee Alliance,…
- Regional and national organizations

Network Aspects of Identification Systems (NID)

NID in ITU-T:History

- **First contributions** to ITU-T: 2005
- Creation of a **Correspondence Group** (CG) on RFID in TSAG (March 2005)
- **First Reports** of the CG discussed in TSAG (Nov. 2005) and extension of the scope of the study to cover the broader issue of Network aspect of Identification Systems (including RFID)
- **ITU-T Workshop** on "Networked RFID: Systems and Services" (February 2006)
- **CG on RFID has** produced in July 2006 four reports [1]
- TSAG decided to establish a **Joint Coordination Activity** on Network Aspects of Identification Systems (including RFID) in July 2006 (JCA-NID)

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Network Aspects of Identification Systems (NID)

NID in ITU-T - Status of the work: JCA-NID (1/2)

- **JCA-NID:**
- main task is high-level coordination
- platform to discuss and exchange information, involving representatives of groups working on relevant standardization bodies on network aspects of identification systems (NID).

- **JCA-NID is active in four areas:**

  ➡ **Generic architectural model:** generic model (functional groupings, interfaces) that covers all kind of ID based network systems, including USN
  → Present version available under [2]

  ➡ **High Level Requirements (HLR):** list of common requirements to all NID applications and services
  → Work in progress in a correspondence group [2]

  ➡ **Standardization Roadmap:** living list of NID relevant standards developed in and outside ITU-T
  → Present version available under [2]

  ➡ **Terms and Definition document**: collection of terms and definitions used in ITU-T Recs and other relevant documents
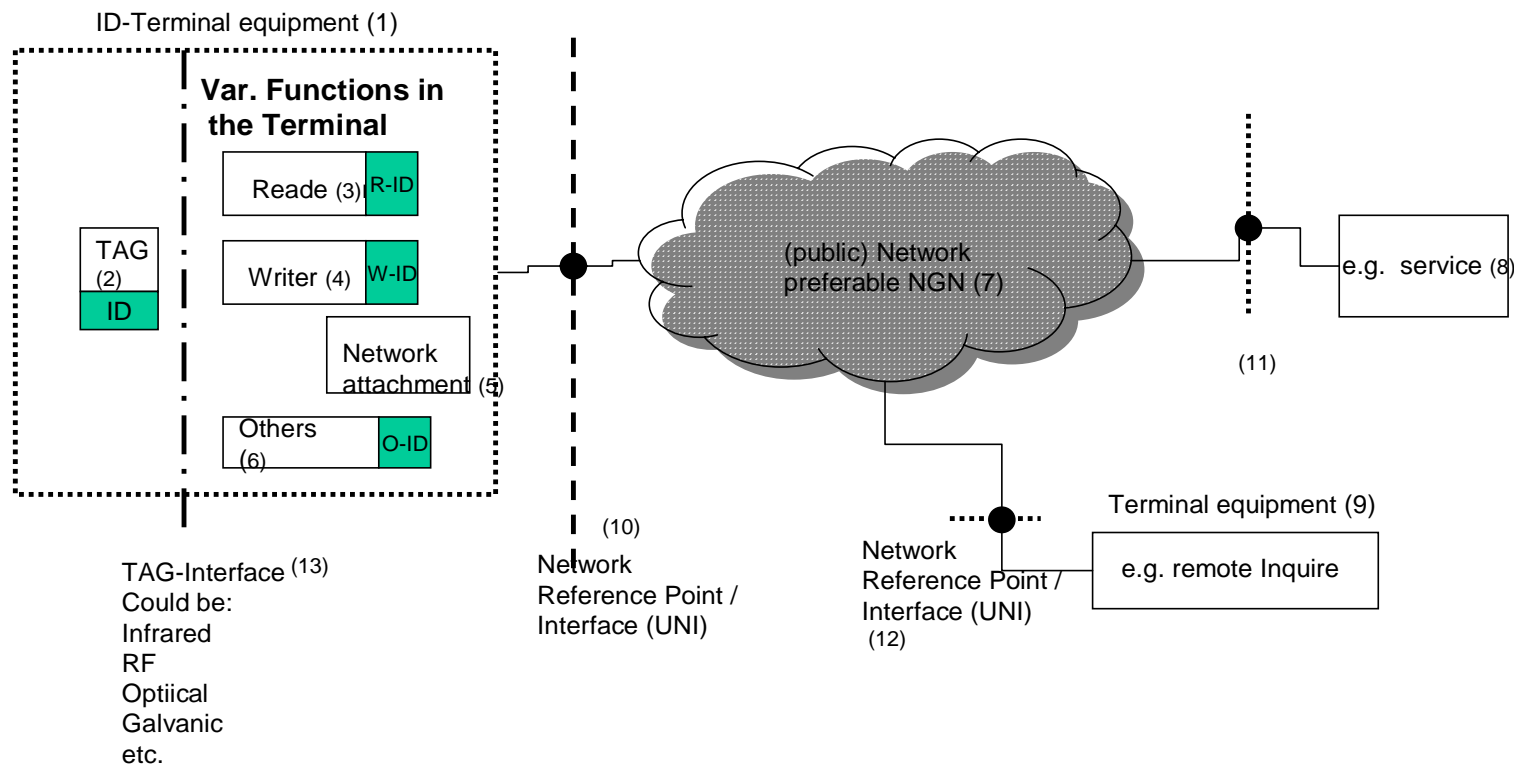 → Work in progress in a correspondence group [2]

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NID in ITU-T - Status of the work: JCA-NID (2/2)

JCA-NID High Level Ref. Architecture

[2]

ID-Terminal equipment (1)

Var. Functions in the Terminal

Reade (3) | R-ID

TAG (2)
ID

Writer (4) | W-ID

Network attachment (5)

Others (6) | O-ID

(public) Network preferable NGN (7)

e.g. service (8)

(11)

Terminal equipment (9)

e.g. remote Inquire

(10)
Network Reference Point / Interface (UNI)

Network Reference Point / Interface (UNI)
(12)

TAG-Interface (13)
Could be:
Infrared
RF
Optiical
Galvanic
etc.

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NID in ITU-T - Status of the work: ITU-T Study Groups (1/4)

- **SG2:**
    - **Draft New Rec E.101** "Definitions of terms used for identifiers (names, numbers, addresses and other identifiers) for public telecommunications services and networks in the E-series of Recommendations"
        → Determination (TAP) at the last meeting of SG2 (15 May 2008)

- **SG11:**
    - **Draft New Rec Q.NRFID-att.sig** "Signalling Requirements and Protocol for networked RFID system"
        → Work in progress

- **SG13:**
    - **Draft New Rec Y.Idserv-reqts** "NGN Service requirements and capabilities for networked aspects of identification based applications and services"
        → Consent in May 2008

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NID in ITU-T - Status of the work: ITU-T Study Groups (2/4)

- **SG13:**
  - **Draft New Rec Y.Idserv-arch** "Functional requirements and architecture of the NGN for ID-based applications and services"
    → Consent in May 2008
  - **Draft New Rec Y.USN-reqts** "Requirements for support of USN applications and services in NGN environment"
    → work in progress
  - ...
- **SG16:**
  - **Draft New Rec F.771 "**Service description and requirements for multimedia information access triggered by tag-based identification"
    → under AAP/LC
  - **Draft New Rec H.621 "**Tag-based ID triggered multimedia information access system architecture"
    → under AAP/LC

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NID in ITU-T - Status of the work: **ITU-T Study Groups (3/4)**

- **SG17:**
  - **Draft new Rec X.668** "Information technology - Open Systems Interconnection - Procedures for the operation of OSI Registration Authorities: Registration of object identifier arcs for ID-based applications and services"
    → AAP/LC

  - **Draft new Rec X.1171** "Framework for Protection of Personally Identifiable Information in Networked ID Services"
    → AAP/LC

  - **Draft new Rec X.rfpq** "Privacy Guidelines for RFID"

  - **Draft new Rec X.rfidsec "**Privacy protection framework for networked RFID services"

  - **Draft new Rec X.usnsec "**Security framework for ubiquitous sensor network"

  - ...

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NID in ITU-T - Status of the work: ITU-T Study Groups (4/4)

Evolution of RFID and Sensors towards Ubiquitous Sensor Networks [3]:

- Sensors combined with RFID tags open new possibilities to monitor and transmit various parameters like temperature, humidity, pressure, acceleration, position, sound level, E/H-field,...

- Ubiquitous Sensor Networks can support a large number of applications (evolution towards a service infrastructure)

- USN functionalities include: sensing, transmitting, processing and provisioning of data

- USN is an important element of the ITU-T initiative "ICT and climate change"

- ITU-T Study Groups have already started to develop USN relevant standards: SG13, SG16, SG17

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Conclusions

- RFID are evolving to intelligent devices which need networking capabilities for a large number of present and future applications (e.g. USN and WSN)

- RFID will speed up the evolution of telecommunications towards the Internet of things (AAAA)

- NID will have a major impact on telecommunications networks

- NID opens also new business opportunities for telco and service providers

- NID should be considered together with the present ITU-T effort on Identity Management (IdM)

- Global standards are needed to achieve economy of scale and interworking

- ITU-T has decided to play a leading role in the development of global standards and many SGs have already produced a first set of NID related standards (SG2, SG11, SG13, SG16, SG17)

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References:

[1] Reports of the Correspondence Group of TSAG on RFID (July 2006):
- Collection of Terms and Definitions [TD317 TSAG]
- Business models and service scenarios for NID [TD314 TSAG]
- Review of standardization issues on NID [TD 315 TSAG]
- Proposed ITU-T strategy for standardization issues on NID with harmonized standardization cooperation [TD316 TSAG]

[2] JCA-NID Documents:
http://www.itu.int/ITU-T/jca/nid/index.html

- Generic Reference Model Architecture (Deliverable #1)
- High Level Requirements (HLR) (Input Document I-078r3)
- NID Standards Roadmap (Deliverable #2)
- Terms and Definitions (Input Document I-103r2)

[3] ITU-T Technology Watch Briefing Report
No.4 "Ubiquitous Sensor Networks (USN)" (February 2008)

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- For further information on JCA-NID, subscribe to the email list and gain access to documentation see:

  http://itu.int/ITU-T/jca/nid

- or contact JCA-NID Secretariat:

  tsbjcanid@itu.int

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