Telehealth:
Communication in Health Care

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Telehealth: Communication in Health Care

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Contents:

- Introduction
- Telehealth
  - Teleradiology
  - Teleneurology
  - Telemonitoring
  - Health Telematics Infrastructure
- Other Tele<x> services
- Summary

Health Care Services in Germany

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care services:

- persons receiving care	~ 2500000
- institutional care	~ 35%
- in private homes	~ 65%
care service providers	~ 12500 companies

out-patient services:

- general practitioneers and medical specialists	~ 100000 practises
- dendists	~ 30000 practises
- pharmacies	~ 22000

in-patient services:

- hospitals	~ 2000 hospitals
beds / average stay duration	~ 500000 beds / ~ 7,5 days
- rehabilitation clinics	~ 1200 clinics
beds / average stay duration	~ 170000 beds / ~ 25 days

80 million population, health care costs 290 billion € (11,6% of GDP)

Health Care Services in Germany: challanges and objectives

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- three separate sectors providing health care services
  - (home) care services
  - out-patient services
  - in-patient services

- demography, aging population, mobility, limited family support

- costs reduction
  - moving from in-patient to out-patient services
  - moving from out-patient to home care services

- foster collaboration
  - within sectors
  - accross sectors

} patient ←→ professional
professional ←→ professional

- patient empowerment
  - active contribution to her/his health
  - getting and controlling access to personal health data

➔ telehealth projects and initiatives, health telematics legislation

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Telehealth: Teleradiology

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scenarios:
- second opinion
- emergency consultation
- remotely controlled radiological examination

particpants:
- radiologists in practises, hospitals

structure:
- bilateral
- centre with satellites (satellite → centre)
- network (satellite → satellite)

implementation:
- transport: SSL, VPN, DICOM Email
- application: DICOM services (e.g. C-Send)
- integration:
  - data level: PACS, DICOM-Viewer
  - reports: manual transmission (email, fax, …)
  - order entry: mainly manually, if at all

sustainability:
- limited for most of the projects
- but business case for organisations involved (e.g. night / weekend shift, external expertise)

Telehealth: Teleradiology
TeleRad-MV – regional network

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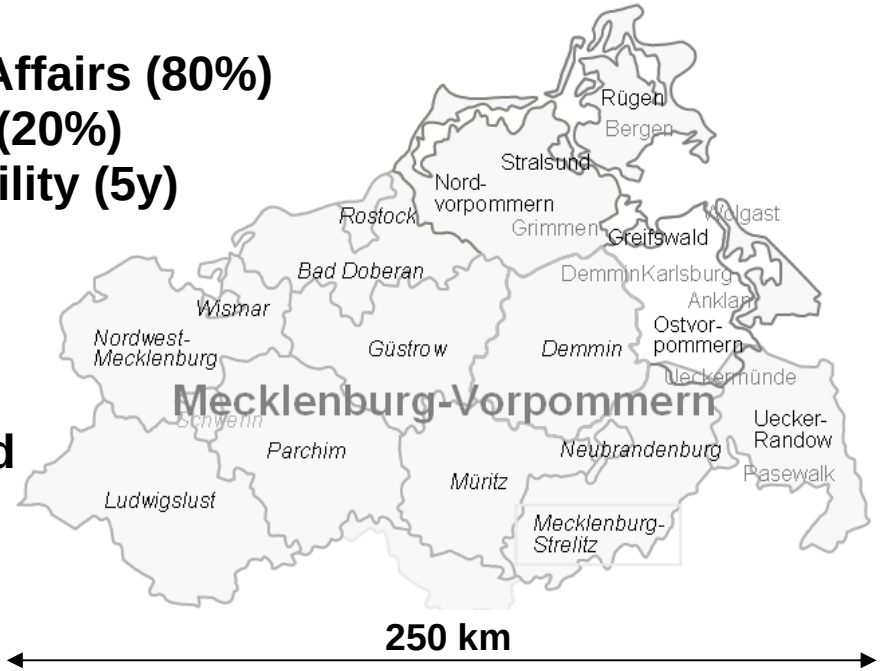
region:
- federal state Mecklenburg-Vorpommern, in the north east of Germany
- 1,6 Mill. citiziens, area 23200 km², 70 citiziens / km²
- ca. 30 hospitals

grant:
- Ministry of Social Affairs (80%)
- regional hospitals (20%)
- enforced sustainibility (5y)

scenarios:
- second opinion
- emergency consultation
- remotely controlled radiological examination



structure:
- centralized infrastruture
- satellite ←→ satellite

Telehealth: Teleradiology
TeleRad-MV – regional network

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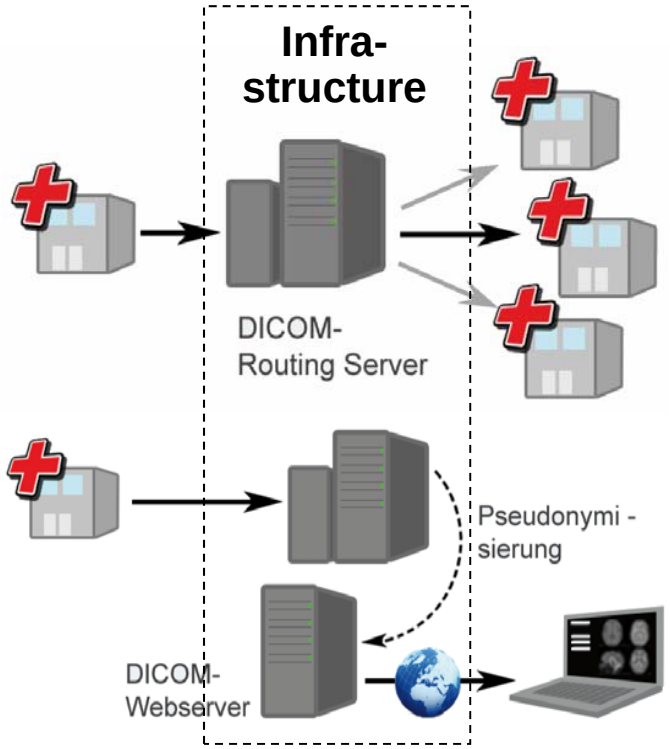

- centralized infrastructure
  - DICOM Routing Server for unrestricted communication
  - DICOM Webserver with pseudo-nymisation for remote access via unsecure communication lines
  - scalibility
  - easy adminstration
- availibility
  - HW redundancy
  - virtualisation
- compliance
  - data protection / privacy legislation
  - Medical Device Directive
  - DIN 6868-159 teleradiology

Telehealth: Teleradiology
TeleRad-MV – regional network

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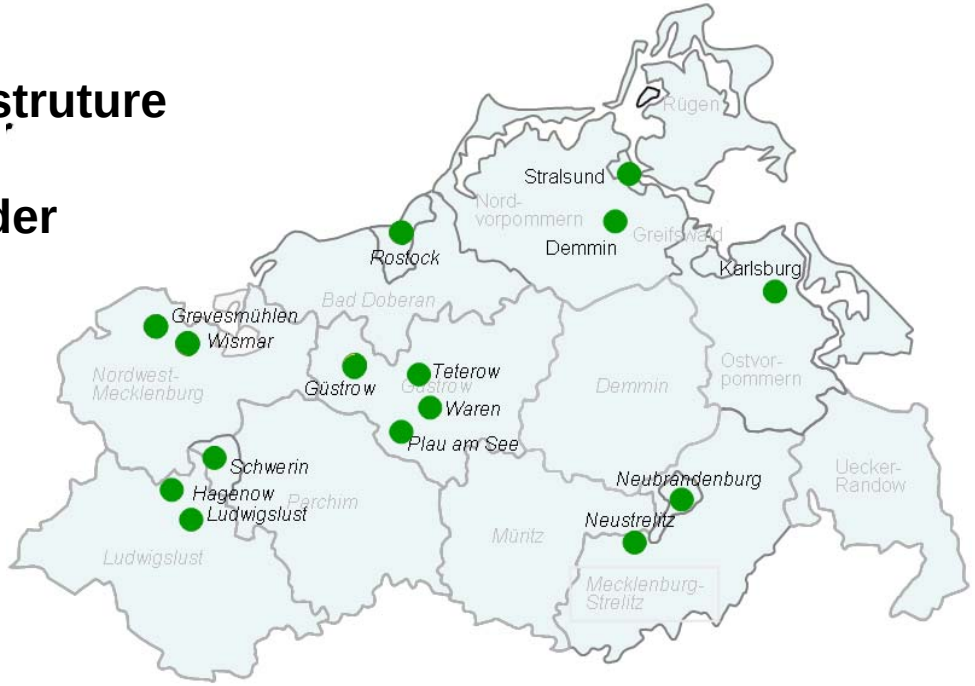
- **implementation:**
  - **colocation provider for infrastruture**
  - **more than 99,9 % availibility**
  - **operation by a service provider**

- **TeleRad-MV partners**
  - **15 hospitals**
  - **2 radiology pratices**

  solely sustained by financial contribution of partners



- **usage statistics (6 months, July 2012 – December 2012)**
  - **8777 examinations**
  - **406836 images**
  - **376,4 GB data transfer volume**

Telehealth: Teleradiology

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status 2013

teleradiology widely used

- dedicated communication	2 partners
- many small regional networks	up to 10 partners
- few larger regional regional	up to 50 partners
- few larger corporate networks	hospital trust
- very few national networks	more than 50 partners

scenarios

- mostly second opinion, emergency consultation
- remote reading (within networks, commercial offers)
- remote controlled examination (requires verification by local authorities and compliance to DIN 6868-159)

sustainibility

- no specific reimbursement by health insurance
- based on win-win situation in cooperation
- operated by mostly by hospitals or service providers

Telehealth: Teleneurology

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scenarios:
- **stroke emergency consultation**
- **stroke follow up by remote neurologist**

TEMPiS project: telemedicine for integrated management of stroke (www.tempis.de)

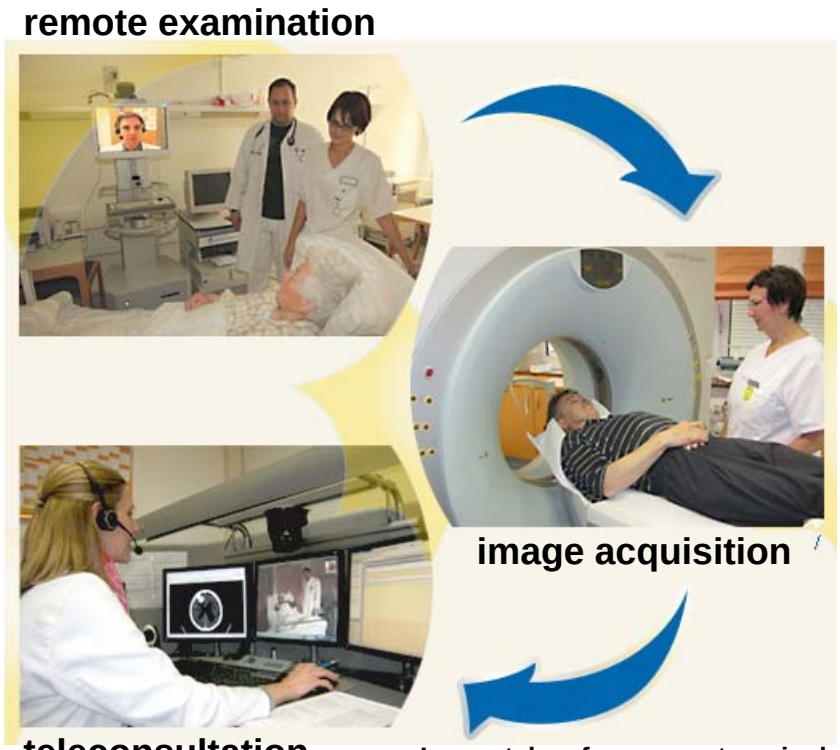

Image taken from www.tempis.de

Telehealth: Teleneurology

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results:

- expert advice and consultation from stroke unit
- decision on further treatment → better prognosis
  - conservative
  - fibronolysis
  - recanalisation
- remote assessment of patient status
  - neurological / motor function tests
  - videoconference patient ←→ neurologist
- quality improvement
  - better workflow and outcome
  - implicit education provided by stroke unit

status:

- reimbursement by health insurance (DRG 8-98b)
- rollout to further federal states
- commercial products available

Telehealth: Telemonitoring

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scenarios:	**- patient health status monitoring** **- improving patient compliance** **- support for patient convalescence** **- patient consultation („peace of mind“, emergencies)** **- medical device monitoring (ICD – cardiodifibrillators)**
participants:	**- telemedicine service centers, medical professionals** **patient relatives**
information:	**- vital signs** **- activity** **- surveillance**
implementation:	**- proprietory medical devices** **- company specific services** **- lack in use of (available) standards or profiles** **- limited integration with other care provider systems**

Telehealth: Telemonitoring
CHA approach validation

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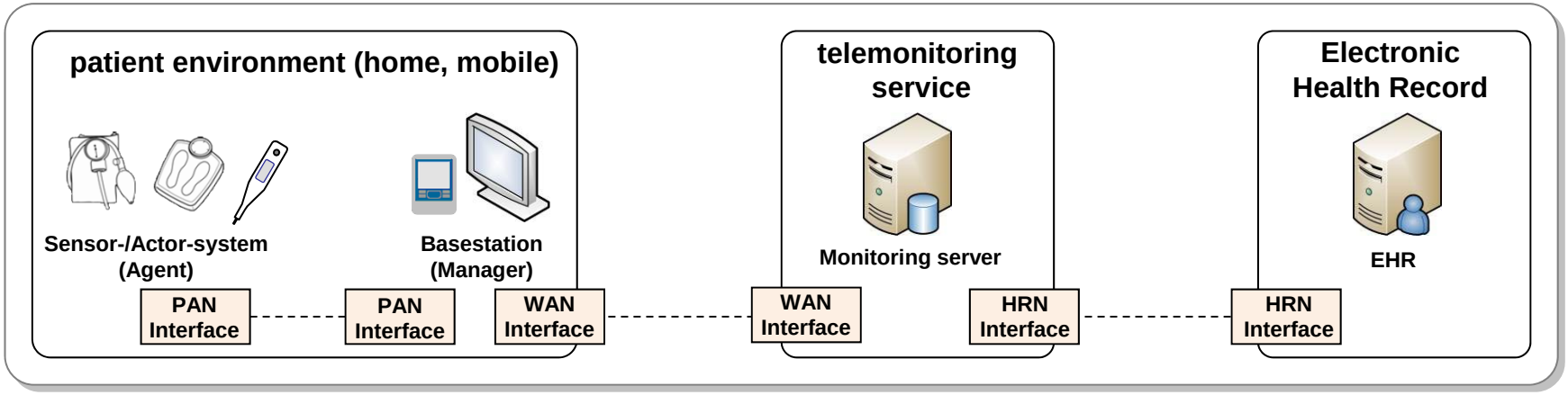
Continua HEALTH ALLIANCE

Continua Health Alliance (CHA)

- **mission*:** „Continua is dedicated to establishing a system of interoperable personal connected health solutions with the knowledge that extending those solutions into the home fosters independence, empowers individuals and provides the opportunity for truly personalized health and wellness management.“

- **approach:**
  - reference architecture for PHM and AAL
  - interface specification, plug & play, based on standards
  - from sensors … to electronic health records



*www.continuaalliance.org

Telehealth: Telemonitoring
CHA approach validation

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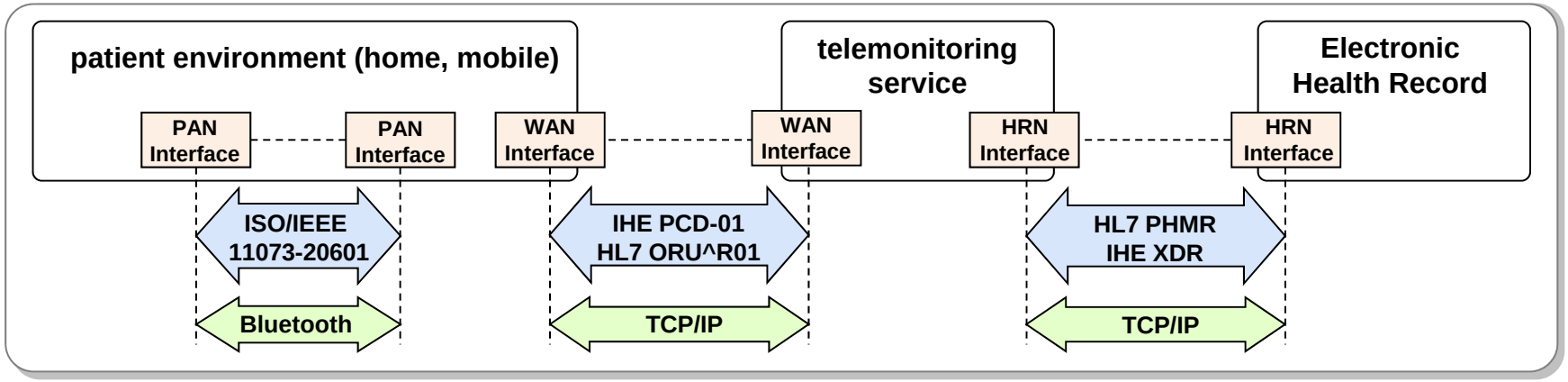

validation results:
- plug & play at PAN interface operational
- standard compliant communication sensor → EHR
- semantic annotation of sensor data (domain model)
- amendment of context information at each level

open issues:
- bi-directional communication with sensor
- pairing sensor system – user identifiction
- domain model limitations for event (e.g. fall)

➔ **CHA well suited to establish cross-vendor interoperability**

Telehealth: Telemonitoring

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medical device monitoring (e.g. ICDs)

- well established, costs covered by health insurance
- reduction of visits to cardiological out-patient sevices

patient health status monitoring

- multiple projects by health insurance companies to assess and provide evidence for monitoring, coaching, adherance, and surveillance programmes
- some service and infrastructure providers
- may be contracted by patients/citiziens at own costs
- no reimbursement by health insurances

but

- on-going check (till April 2013) for medical service provision using telehealth approaches

status 2013:

- sensors, communication, services available
- limited interoperability
- lack of evidence for specific medical scenarios
- missing reimbursement for wider use

Telehealth: Health Telematics Services

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since 2004: **law on nationwide Health Telematics Services**

compulsory:

- **smart card for patients**

  (identity, access control, proof of being insured)
- **smart card for medical professionals (identity, qualified electronic signature)**

- **electronic prescription**

optional for patients:

- **emergency data**
- **medication history**
- **case report**
- **health care record**

implementation:

- **scheduled for 2006 by law – proved unrealistic**
- **much more complex than expected, slow progress**
- **limited acceptance (privacy, transparency)**
- **focus: administrative versus medical services**
- **extensive infrastructure requirements**

Telehealth: Health Telematics Services infrastructure

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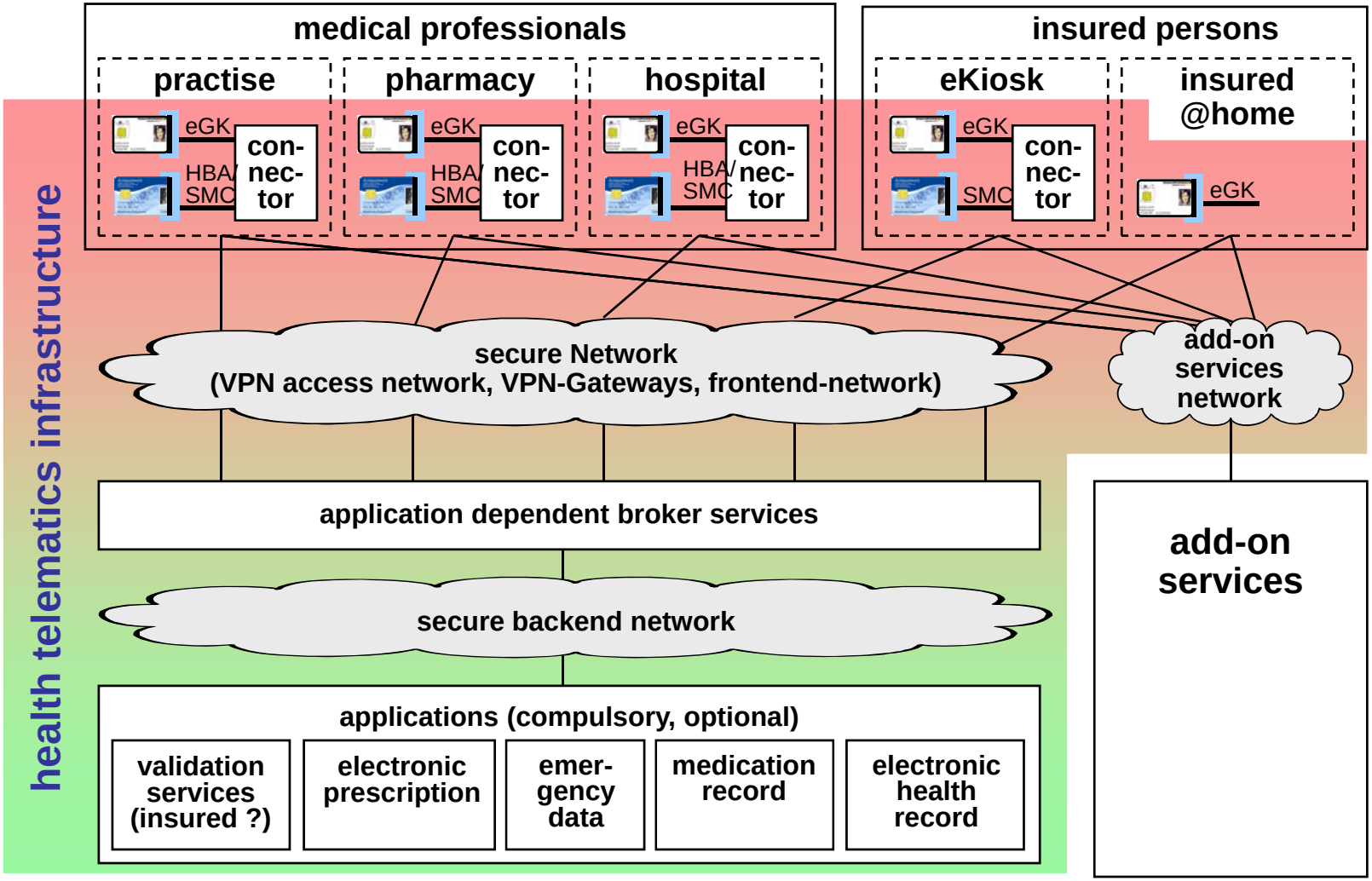

Telehealth: Health Telematics Services

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infrastructure:

- frontend – middleware – backend
- security, privacy, availibility, scalibility
- registry and repository services

status 2013:

- > 70% of citizien have received their smart card
- connection of all practises, hospitals, pharmacies to a nationwide, secure health telematics network
- preliminary services specified
  - online check and update of insurance status
  - secured communication between health care professionals (mail, document, report)
  - emergency data
  - case based electronic record
  - architecture of the infrastructure
    → call for tender issued and being negotiated

➔ long term development and implementation expected
➔ integration with existing clinical information systems needed

Telehealth: other Tele<x> Services

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Telepathology	**- some small networks** **- limited regulatory and legal basis** **- will profit from virtual microscopy (slide scanners)**
Teleopthalmology	**- assessment of macular degeneration** **- tonometry**
Telecardiology	**- ECG → telemonitoring** **- angiography for cardiological interventions**
Emergency ambulance	**- vital signs for immediate assessment / routing** **- available in several regions**
Teledermatology **Telepsychiatry** **Telelogopaedics**	**quite limited, low request**
Links medical to other	**- Ambient Assisted Living (AAL)** **- facility management** **but different regulatory basis**

Telehealth: Summary

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Teleradiology -neurology	**- in routine use - financing / reimbursement established**
Telemonitoring	**- in routine use for medical devices / implants - limited use in personal health status monitoring - todo: - provide more evidence - clarify reimbursement**
National Health Telematics Service	**- rollout smart cards on-going - nationwide communication platform - services specified - needs time for implementation**
todo	**- workflow integration with existing information systems / electronic health records - clarification of privacy and liability issues - patient empowerment**

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thanks for your attention

? questions ?