The Capital Region of Denmark

REGION

The adoption and use of standards in the Capital Region of Denmark

Frederik Endsleff
Teamleder, M.Sc.(Eng.), MD
KIT, Unit for Strategy and Development (S&U)

The Capital Region of Denmark

The Capital Region of Denmark (RegionH)

- Formed 1 January 2007
  - Together with the four other Danish Regions (structural reform)
  - From a.o the three counties in and around Copenhagen
- 1.6 million citizens
- Some 35.000 employees
- Responsible for:
  - Healthcare
  - Regional development
  - Environment
  - Coordinating transportation

The Capital Region of Denmark

The IT organisation

- The central IT department (KIT)
  - About 185 employees
  - Responsible for all IT operations and the IT infrastructure
- IT departments at hospitals
  - Responsible for service/support
  - Local implementation
  - Councelling

- The number of IT systems in the region is some 800 systems…

The Capital Region of Denmark

IT-strategy and the overall picture

The national level

- A national unit responsible for a common (overall) strategy for electronic healthcare records (EHR) was formed 1/1-2007
- No deadline for implementing EHR nationally
- Close collaboration with the Regions

RegionH

- IT-strategy politically approved -07
- Consolidation, consolidation, conso….
- At least for the next couple of years
- But also room for some innovative approaches

The Capital Region of Denmark

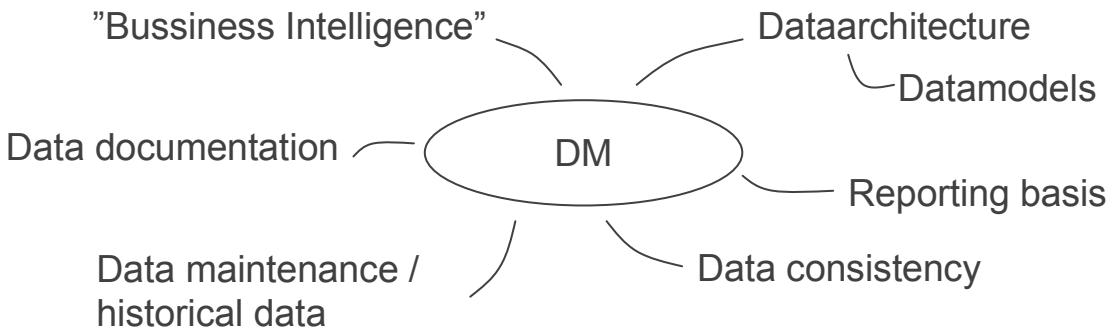
Unit for Strategy and Development

Four teams

- Datamanagement
- IT Services
- IT Functionality
- Strategy and Architecture

The Capital Region of Denmark

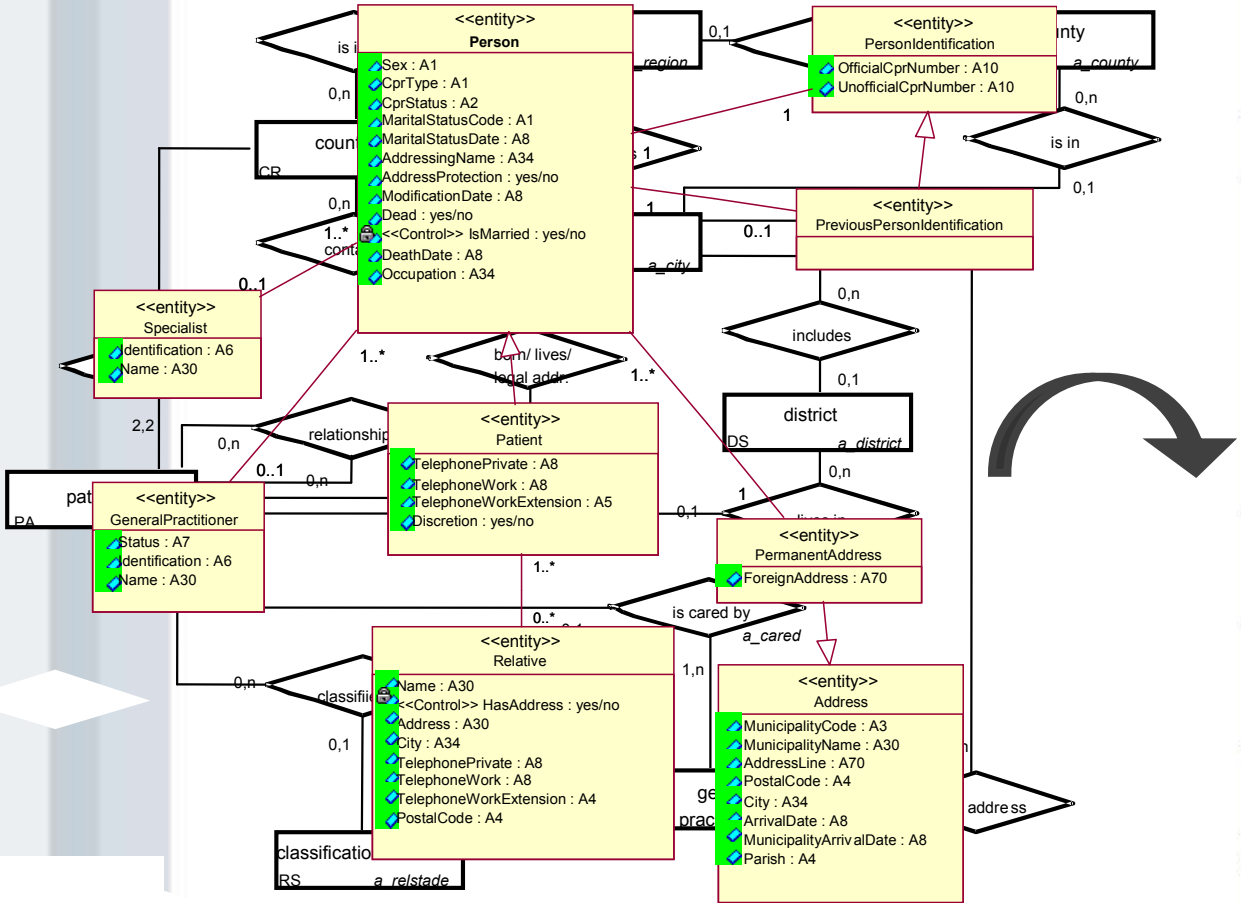
The Datamanagement (DM) area



The Capital Region of Denmark

Datamodels and mappings

Mapping

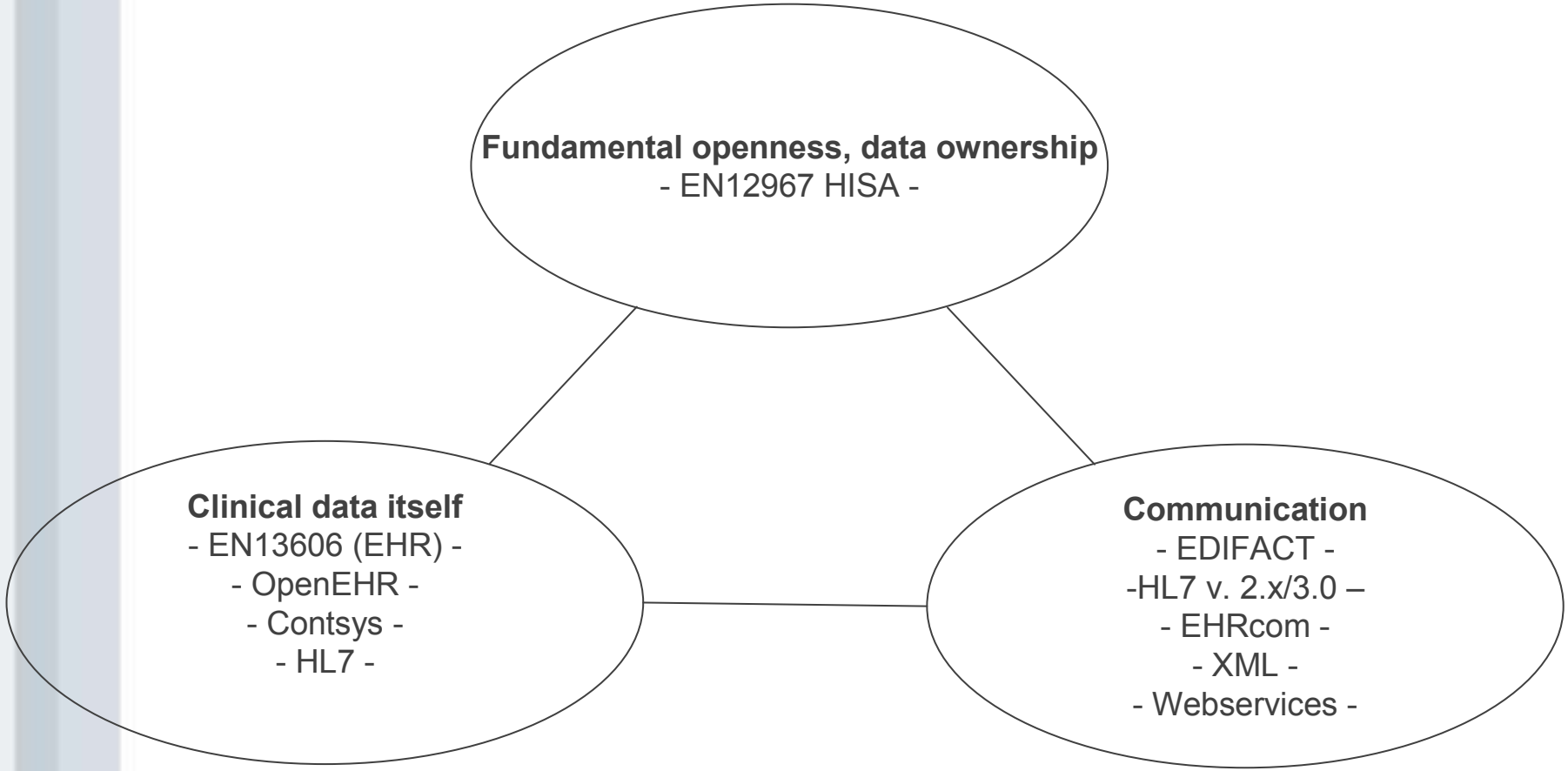


GS Item	Type	Description	DHE-item	Type	Comments
Permanent Address			**A_PATIENT**		
MunicipalityCode	A3	Code of municipality.	pa_icnt1	STSCOD	Refers to the internal codes of A_CITY entity identified by cy_icity. There are about 225 in DK. These are grouped into the 14/15 Counties.
MunicipalityName	A30	Name of municipality.	cy_cname	LN_NAME	Cy_cname of the municipality with the internal code pa_icnt1 *)
AddressLine	A70	Road and building information. Format: Road name, building number, floor, side door identification.	pa_addr1,	SH_NOTE,	It is not possible to split split according to the specified format, thus it is stored in one single field.(
PostalCode	A4	Postal code of the address.	pa_zipc1	ZIP	This GS field refers to a textual description of the postal code.
City	A34	Official city name.	pa_cty1		
ArrivalDate	A8	Date of arrival to the address.	xdata	GS_DATE	XML formatted extended data attached to the A_PATIENT. Attribute name: MPD_P_ARRIDATE
MunicipalityArrival Date	A8	Date of arrival to the municipality.	xdata	GS_DATE	XML formatted extended data attached to the A_PATIENT. MPD_P_MARRDATE
ForeignAddress	A70	Address abroad. If present, no other address information except municipality code and municipality name will be present.	pa_addr3	SH_NOTE	
Parish	A4	The parish of the person.	pa_dist1	STSCODE	Refers to the internal code of one A_DISTRICT entry identified by dt_ucode.

KIT, Unit for Strategy and Development

The Capital Region of Denmark

Main Health IT standard areas



The Capital Region of Denmark

The DHE background 1999-2002

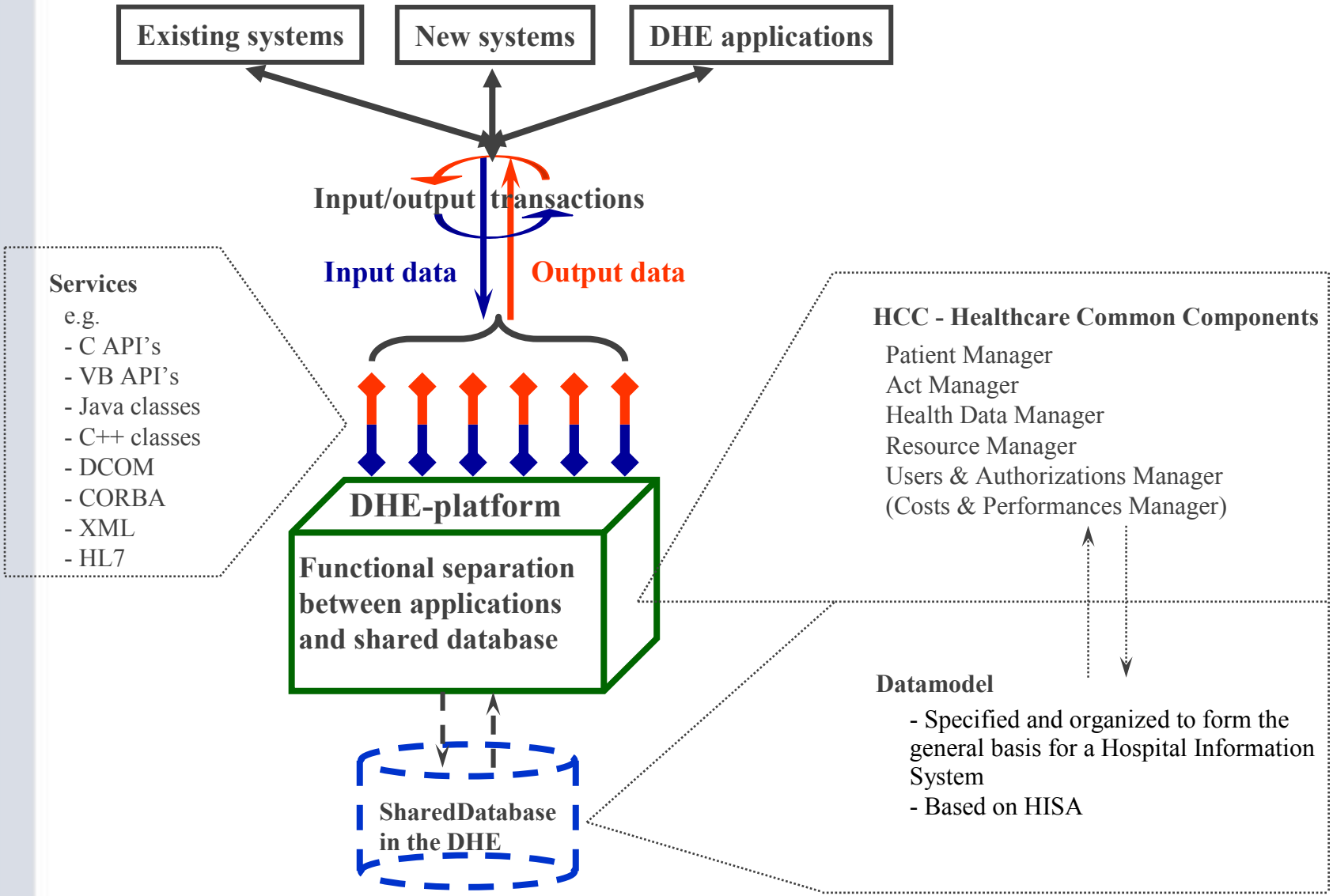
1999/2000	The DHE chosen as a HISA based dataholding Integration-platform through the design contest (by the Copenhagen Hospital Corporation, H:S, and the Copenhagen County, KA)
- 2002	The DHE adopted and implemented in H:S, as a platform for both dataintegration and application development through 1½ year
- 2002	Multivendor environment established regarding the DHE
- 2002	H:S strategy encompassing the DHE and componentbased/modular EHR's in the application domain
2002	Tender for a HISA based dataholding platform completed.
2002	Contractual delivery of the DHE

The technical vision of H:S 2002

- Technical and semantical integration based on a common information model and repository
- Healthcare Information System/Service Architecture standard, HISA
- Decoupling of the architectural layers
- Stepwise implementation of modular applications from different vendors
- Architectural “ownership”

The Capital Region of Denmark

Common information based on the DHE/HISA



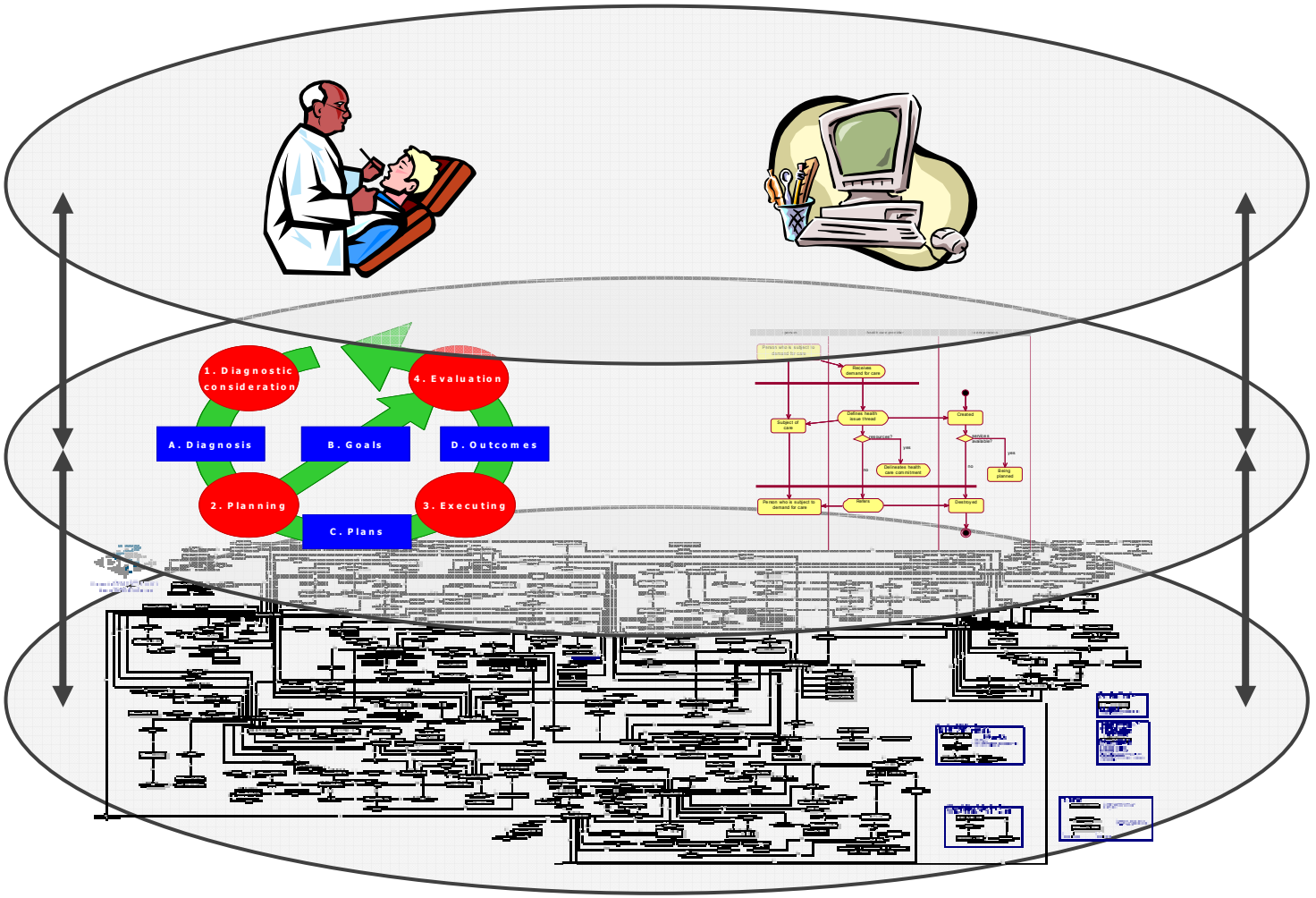
The Capital Region of Denmark

The DHE
- a system/platform model

Clinical Workstation

Business Proces Model

DHE Datamodel Repository



The Capital Region of Denmark

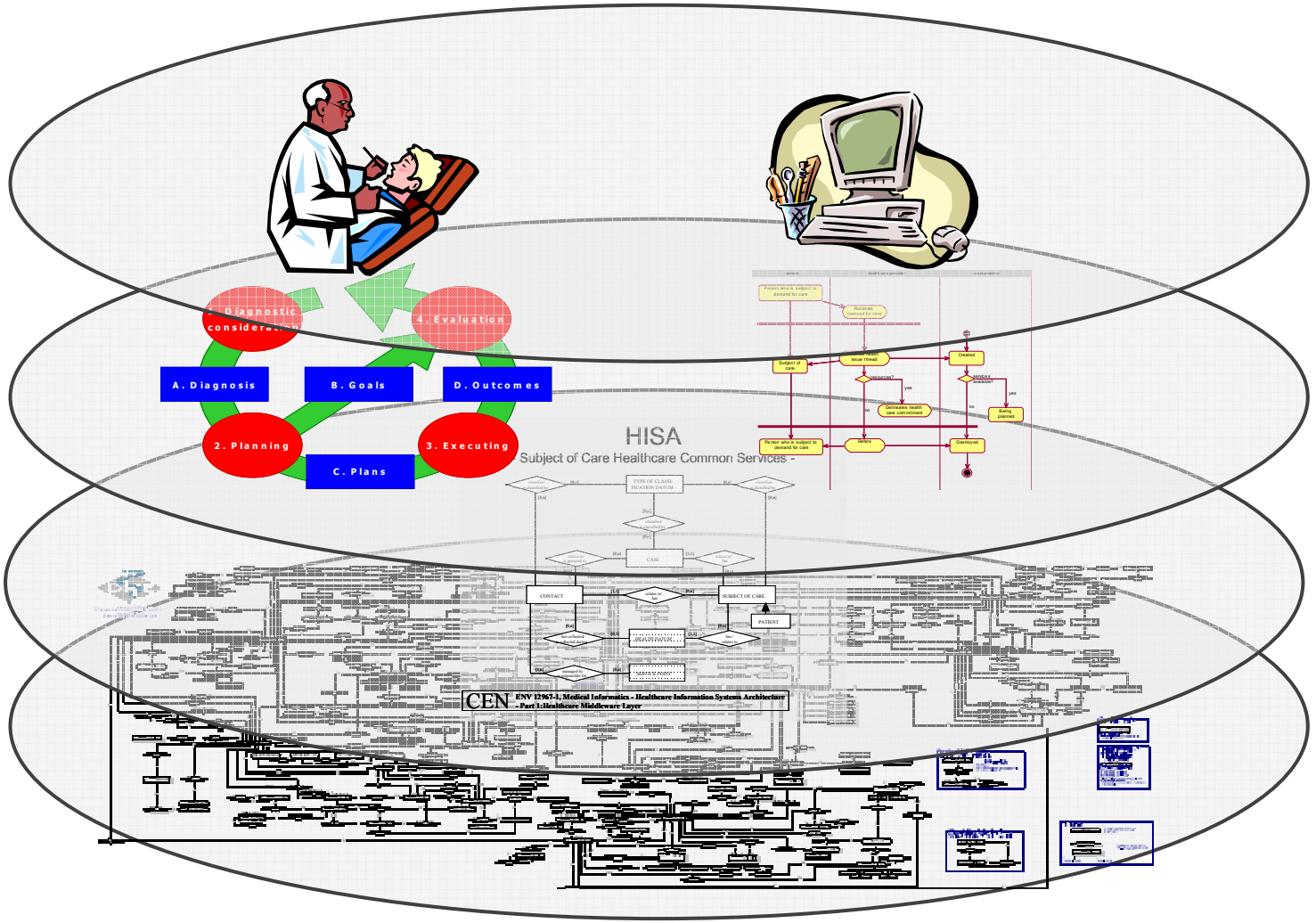
HISA and the DHE

Clinical Workstation

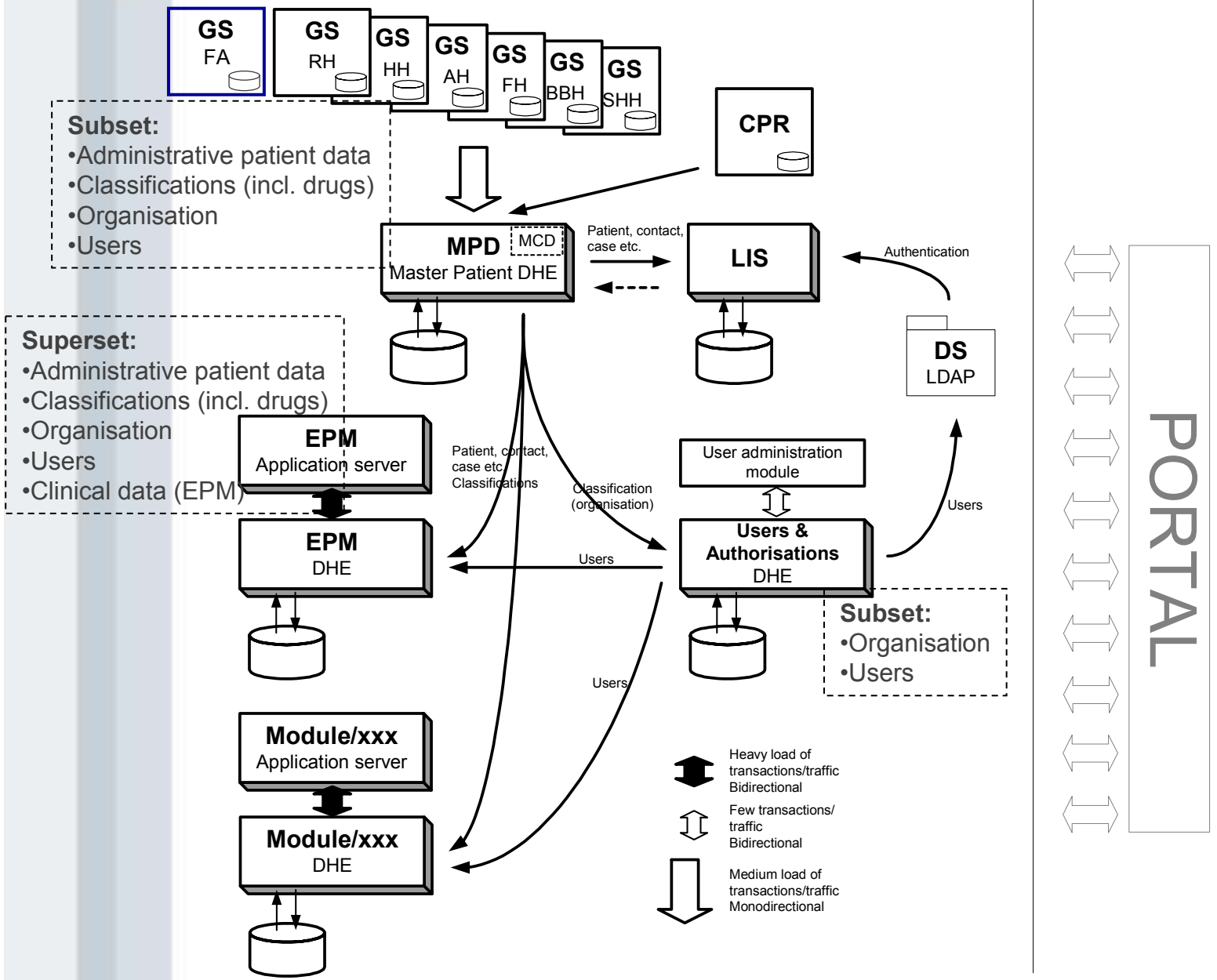
Business Proces Models

HISA →

Datamodel Repository



The DHE topology - today



The Capital Region of Denmark

The Master Patient DHE (MPD)

- The connection to the GS'

- Message Broker based interfaces to the GS'
- Internal message format GS for GSclassic (H:S), and Edifact messages for GSopen (FA)
- Uses IBM Websphere MQ as broker
  - Structured queue mechanism
    - High data transport security
    - Secure storage underways, low risk of dataloss during e.g. system breakdown
    - Asynchronous, but fast transferral

The Capital Region of Denmark

The Master Patient DHE (MPD)

- GS data

- Traditional patient administrative data
- Person-, contact-, period-of-care- and diagnosis-data
- About 45.000 messages per day (H:S + FA)
- Person-, contact-, period-of-care-data initially loaded from all GS' (H:S)
  - All historical data in the GS'
  - Extensive amounts of data
    - Over 13 million contacts

The Capital Region of Denmark

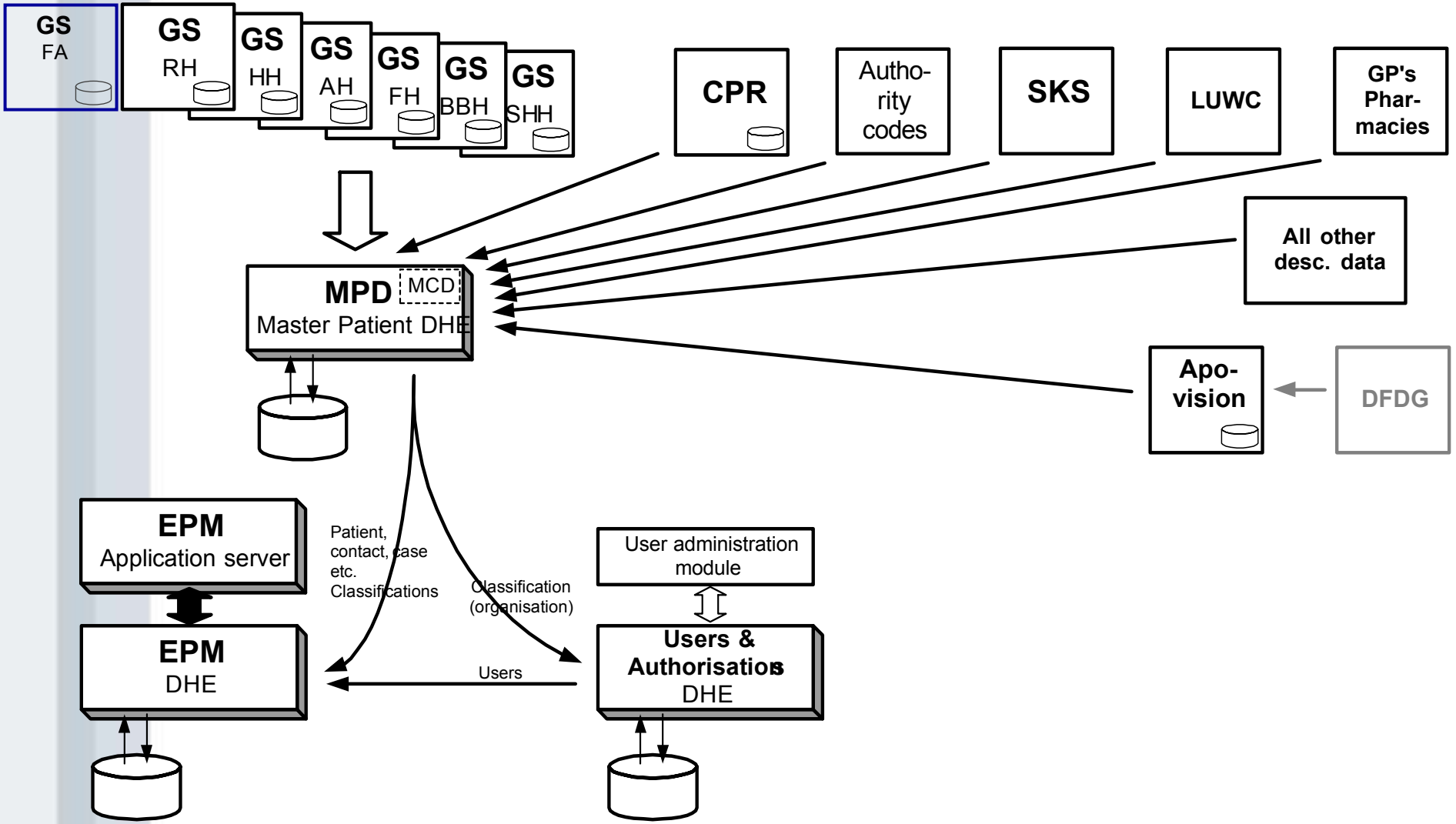
The Master Patient DHE (MPD)

- CPR data

- Initially loaded for Eastern Denmark, with subsequent subscription
- 3,5 mio. CPR numbers
- The whole country is expected

EPM

- Feeding systems -



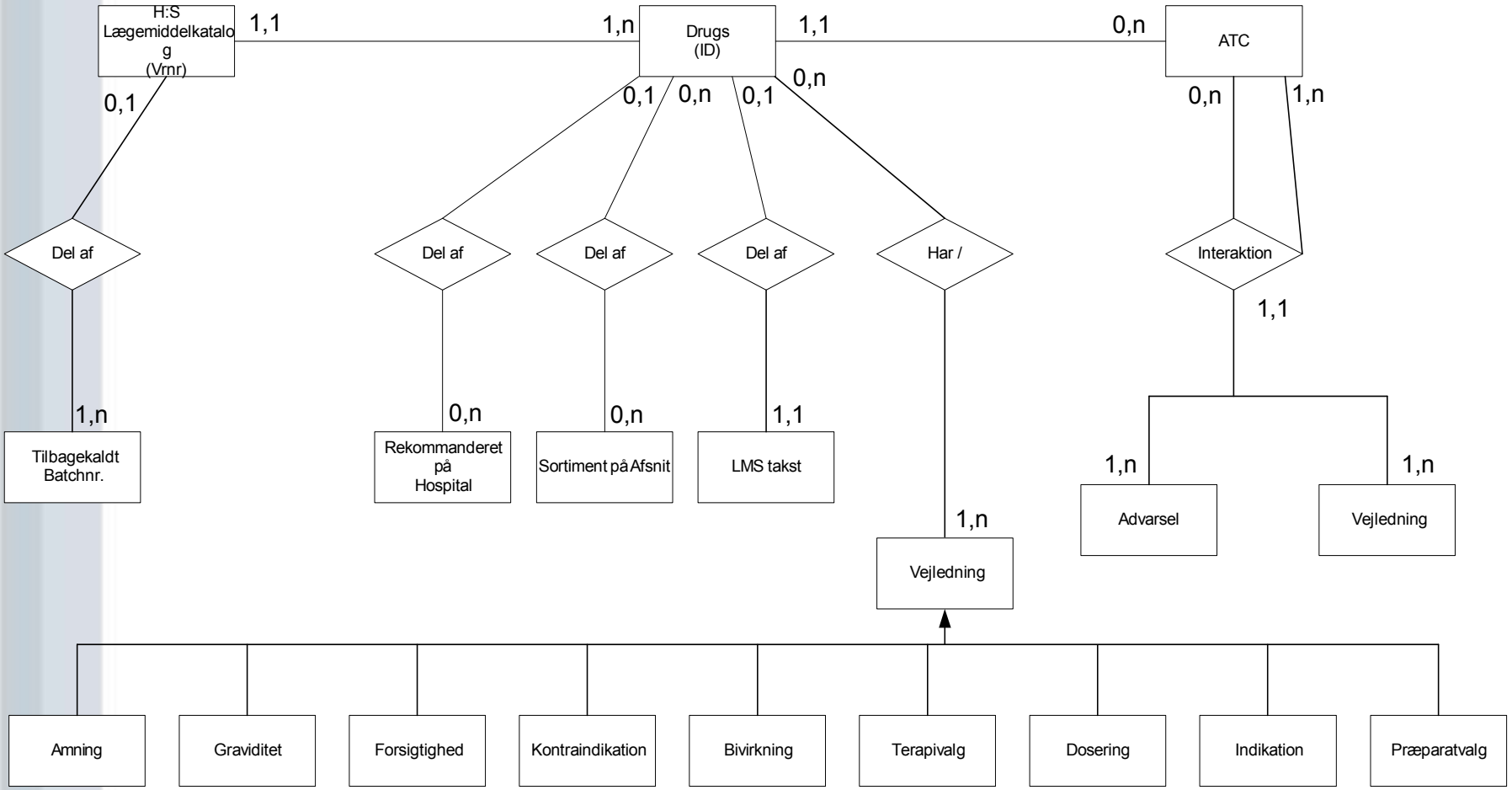
The Capital Region of Denmark

SKS

- About 80.000 records
  - Hospitals
  - Units (Departments)
  - Diagnoses (ICD10)
  - ATC
  - Procedures
  -
  -
- Updates from the National Board of Health once a month
- Full history and versioning on all codes

The Capital Region of Denmark

ApoVision



Apovision

- Integration of order/entry system to the DHE
  - DFDG (the common data foundation, Lægemiddelstyrelsen)
  - Drug-id's
  - About 7700
  - Packages
  - About 11600
  - H:S catalogue
  - Recommendations
  - Assortments (Wards)
  - ATC relations
  - Interactions
  - Transferral via HL7 files from ApoVision to the MCD

Other descriptive data

- Descriptive data and classifications in the DHE
  - Generally many ways of classification in the DHE
  - A_STADEMO
    - General type of classification, e.g. for the CPR types
  - A_STVAL
    - The individual values/codes under each type, e.g. 1 for official CPR, 3 for temporary CPR
  -

The Capital Region of Denmark

The EPM DHE
- Basis

- Same machine-, operative-system- and DBMS-configuration as MPD
  - Clustered SUN machines, SAN, Solaris, Oracle DBMS
- Works as datastorage for the EPM module
- Integrated with the MPD (and the MCD), plus BAM (authorisation and user rights)
- 2nd level 'support & maintenance agreement' as part of the Integration platform contract with the consortium GESI/TEHC
  - guaranteed availability 99.5% of the time
  - guaranteed response times
  - reaction time on 2 hours
- Run (1st level 'support and maintenance') by DL

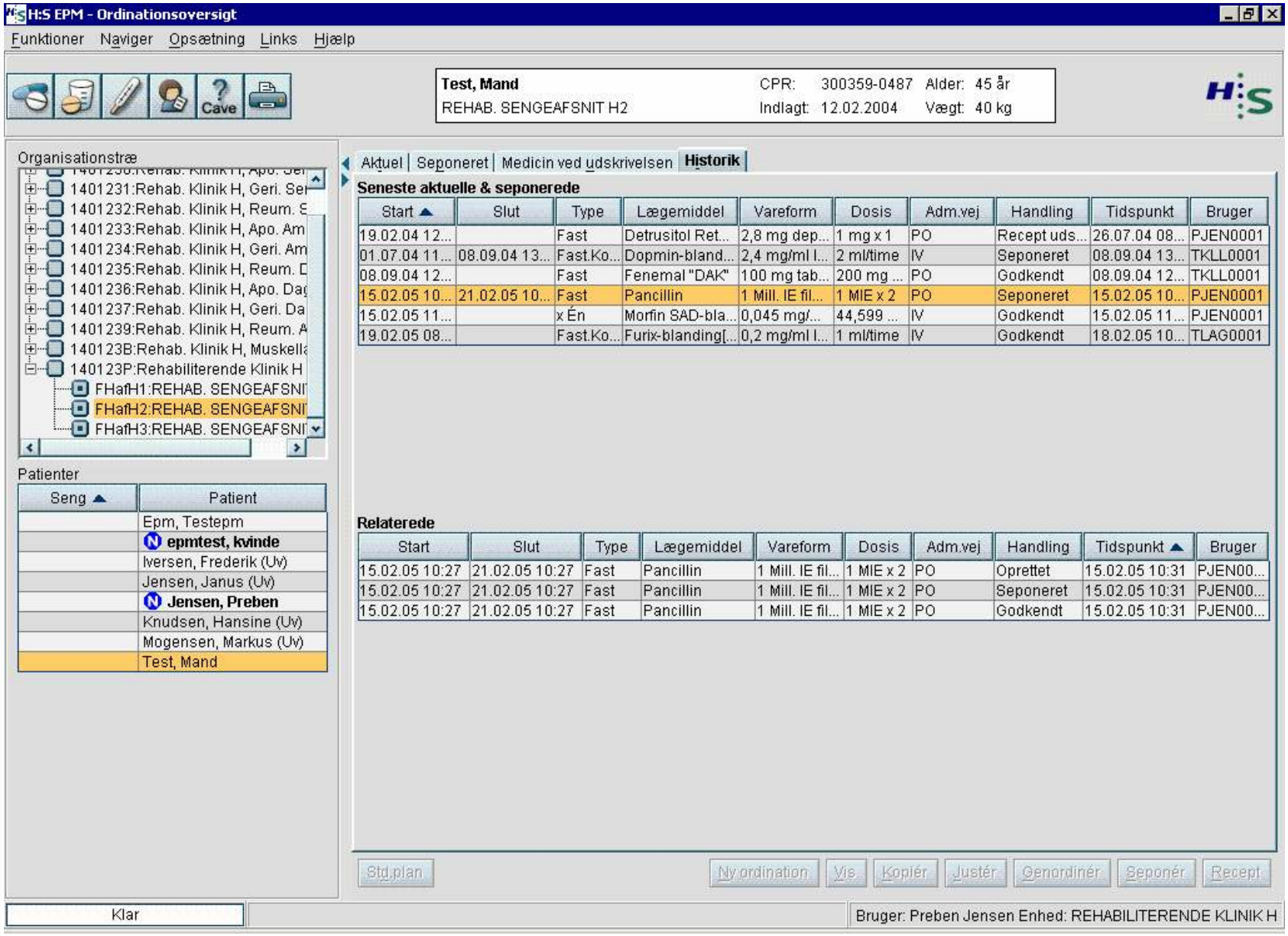
The Capital Region of Denmark

EPM DHE

- Function

- EPM uses the DHE for
  - Storage of all attributes
  - Access to all patient administrative data (from the MPD)
  - Access to all authorisations for the users (from the BAM)
  - Access to all classifications and descriptive data (from the MCD/MPD)
    - SKS
    - Apovision – all drugs, on package and substance level
    - Interactions between the drugs
    - A good deal of other descriptive data
  - 'Logistics' in general, in regard to beds, rooms, groups, drug assortments on units/wards etc.

The Capital Region of Denmark



The Capital Region of Denmark

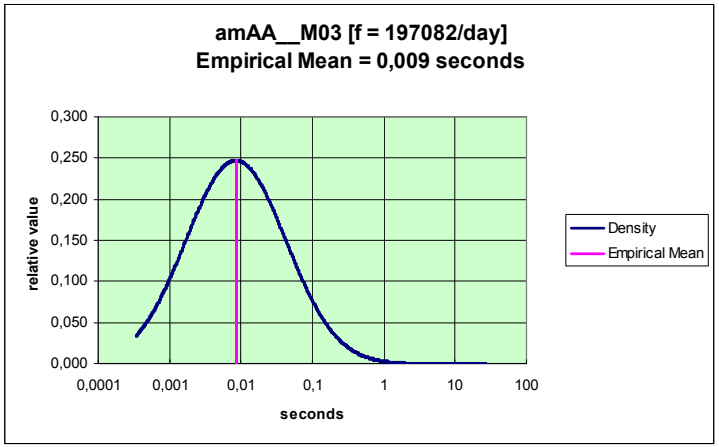
EPM application performance

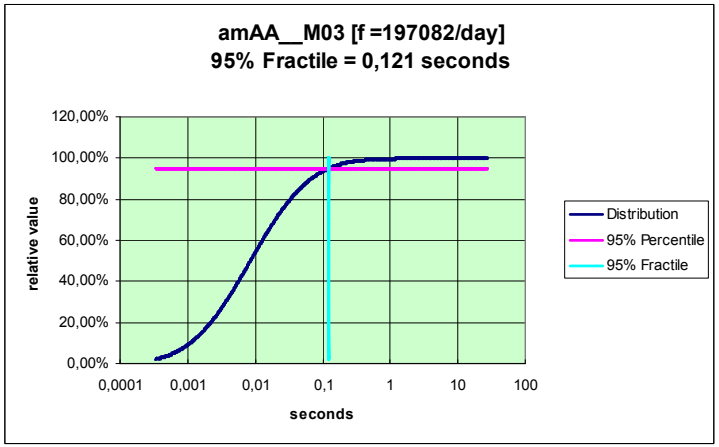
Operation	Week 20, 2007 Working days
Number of users (pr. day)	About 3300
Number of medications (prescriptions)	About 5500
Responsetime, medications	About 0,8 second
Number of dispensations	About 25000
Responsetime, dispensations	About 0,8 second
Number of administrations	About 17000
Responsetime, administrations	About 0,3 second
Number of dispensation overviews	About 25000
Responsetime, dispensation overviews	About 2,2 second
Number of medication overviews	About 25000
Responsetime, medication overviews	About 1,5 second

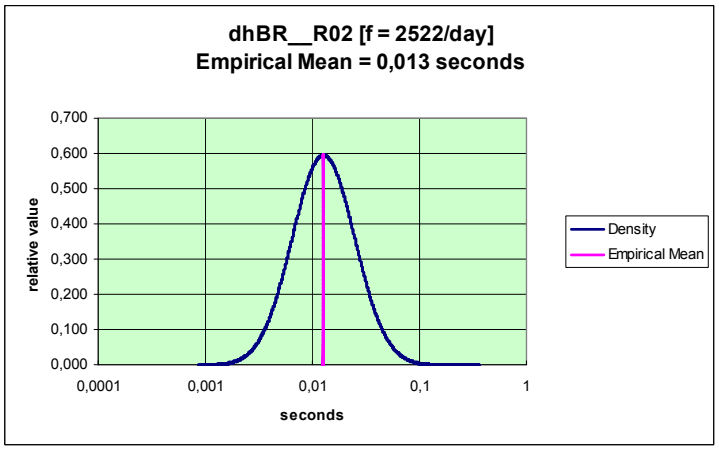
The Capital Region of Denmark

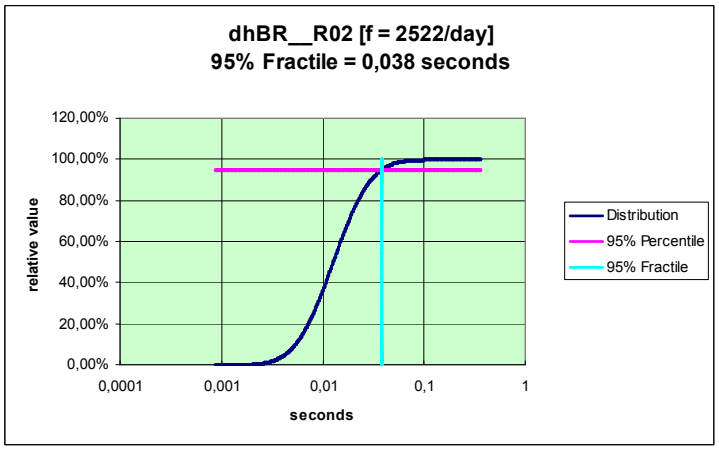
EPM DHE

- Responsetime examples





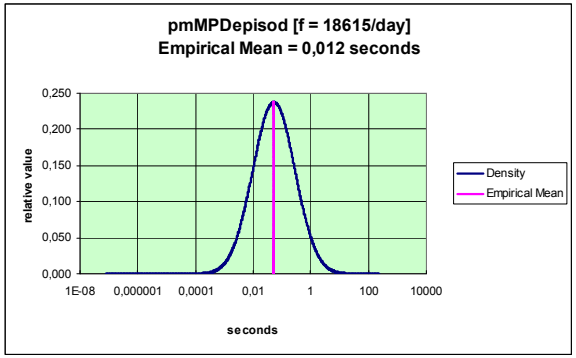


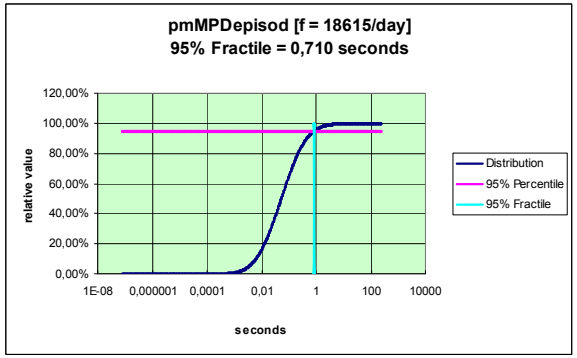


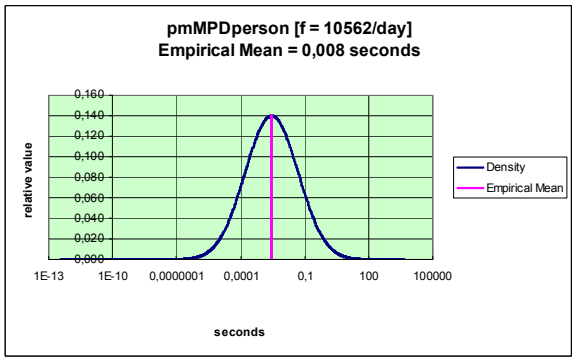
The Capital Region of Denmark

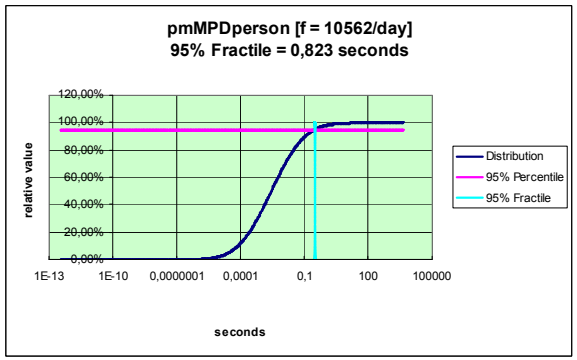
MPD

- Responsetime examples









The Capital Region of Denmark

In all

- Master Patient DHE in operational running since 23/9-03
  - Master Classification DHE has been run since 2001, now run closely together with the MPD
- Electronic Patient Medication system based on the DHE running since December 2003
  - Publish of data from the MPD, near real time
  - Full roll-out in H:S (4000 beds) and well on the way in FA (about 1200 beds), with about 15.000 users
- Common User Administration Module based on the DHE running since December 2003
  - Full roll-out in H:S and well on the way in FA
  - Publish to the EPM DHE

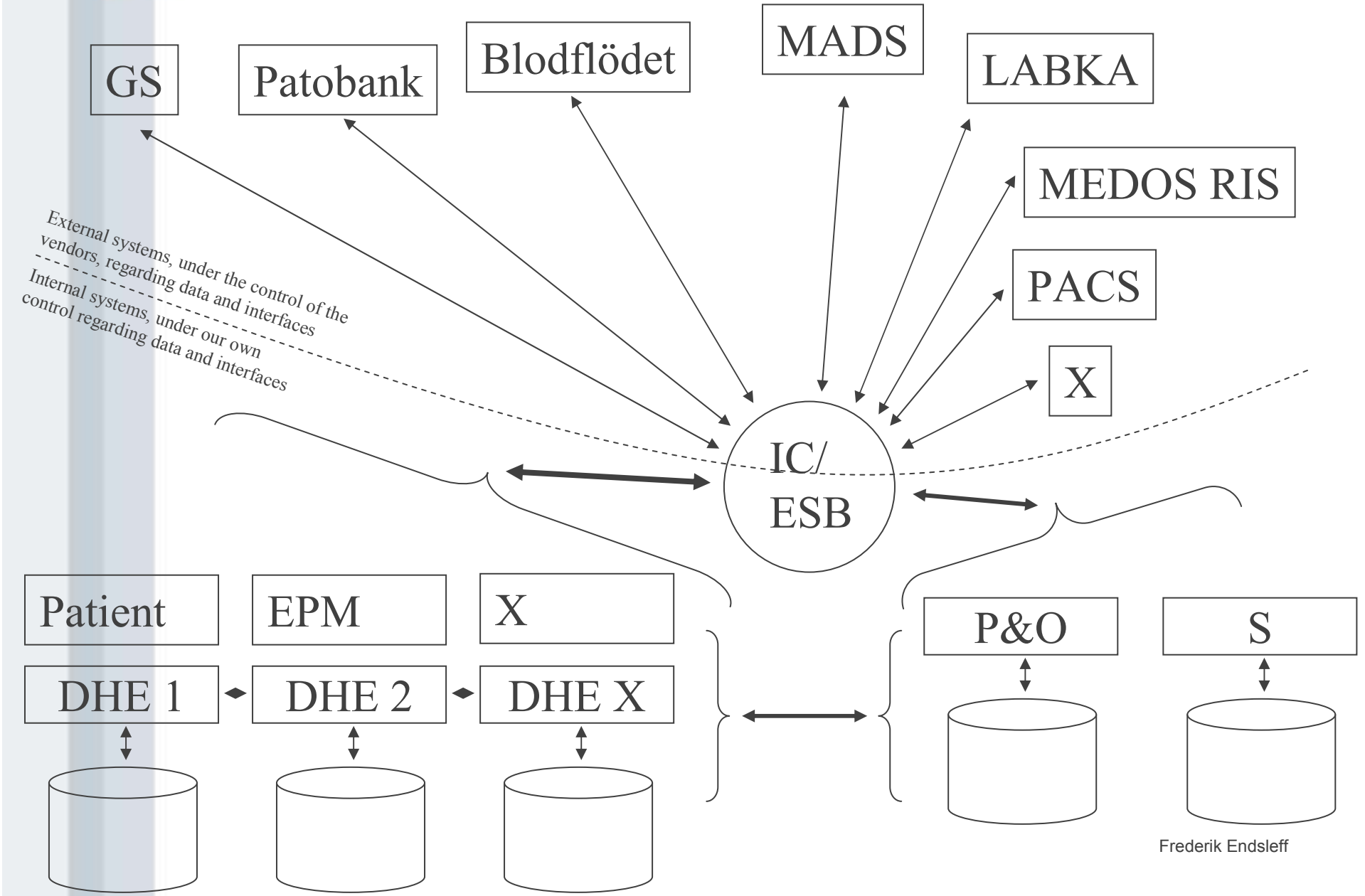
The Capital Region of Denmark

KIT and the DHE, the short term way ahead

- The GS data (person, contact, period of care) from the third former county, KA (about 2500 beds), will be integrated to and consolidated on the MPD, planned for the autumn
  - Covering the whole Region as the basis for patient administrative and demographic data
- DHE 5.1 upgrade finalised
  - DHE connection pooling
  - Bind variables
  - Jproxy
  - Other optimisations, incl. Publisher

The Capital Region of Denmark

The DHE and everything else:
A helicopter perspective of data in different systems



Frederik Endsleff

The challenge: Towards the EHR

- In a heterogenous reality, with
  - Proprietary legacy systems
    - More or less closed
  - Open systems and platforms
    - With ownership to all data
  - Coming new/existing systems, as a short term benefit
    - Partly adressing the EHR, more or less open
- Using standards
  - *Now not least* for clinical data
    - 13606, OpenEHR, Archetypes
      - > But also: Acquiring more practical experience based on implementation and usage by the clinicians
        - » Using their expertise, in the implementation and followed by production

The Capital Region of Denmark

The further strategy

- Stepwise and business driven definition of EHR basis data
  - Replication of central data from different systems
  - Indexing to data only in other systems
  - Using the DHE for
    - Supporting the tightly interconnected datamodel around the clinical core processes
    - Independent DHE dataservices, to assure the ability to store data from different sources, maintaining integrity and consistency
    - Creating coherence from a federation of many older and newer systems
- Taking direct advantage of the EHR basis data through the Regional portal
- Supporting “SFI” by the DHE

The Capital Region of Denmark

The further strategy

- "SFI" = "the actual health content"
  - Based on extensive amounts of narrative textual description of procedures, guidelines, standard plans and results, made by experienced clinicians, following (standard) word processing software based templates
  - Using existing standards/drafts, evolving existing models and incrementally transforming the material into "structured" (model based) data
  - Incrementally implementing end evolving (keep it simple), experimental examples in practice
  - Need for making the results generally (vendor independently) usable and further standardisable
- Related to 13606/archetypes and standardplans/activities

The Capital Region of Denmark

Frederik Endsleff
Teamleader, M.Sc.(Eng.), MD
The Capital Region of Denmark, KIT
Strategy & Development
Borgervænget 7, third floor
2100 Copenhagen
Denmark
Phone 4511 0062
E-mail: frederik.endsleff@regionh.dk