

Från meddelandeutväxling till semantisk interoperabilitet

Vitalis 2015

Oskar Thunman

@oskthu

Om mig

- Medicinsk informatiker
- Informationsarkitekt på Callista Enterprise
- Regionala, nationella och internationella projekt
- IHE och CDA

Innehåll

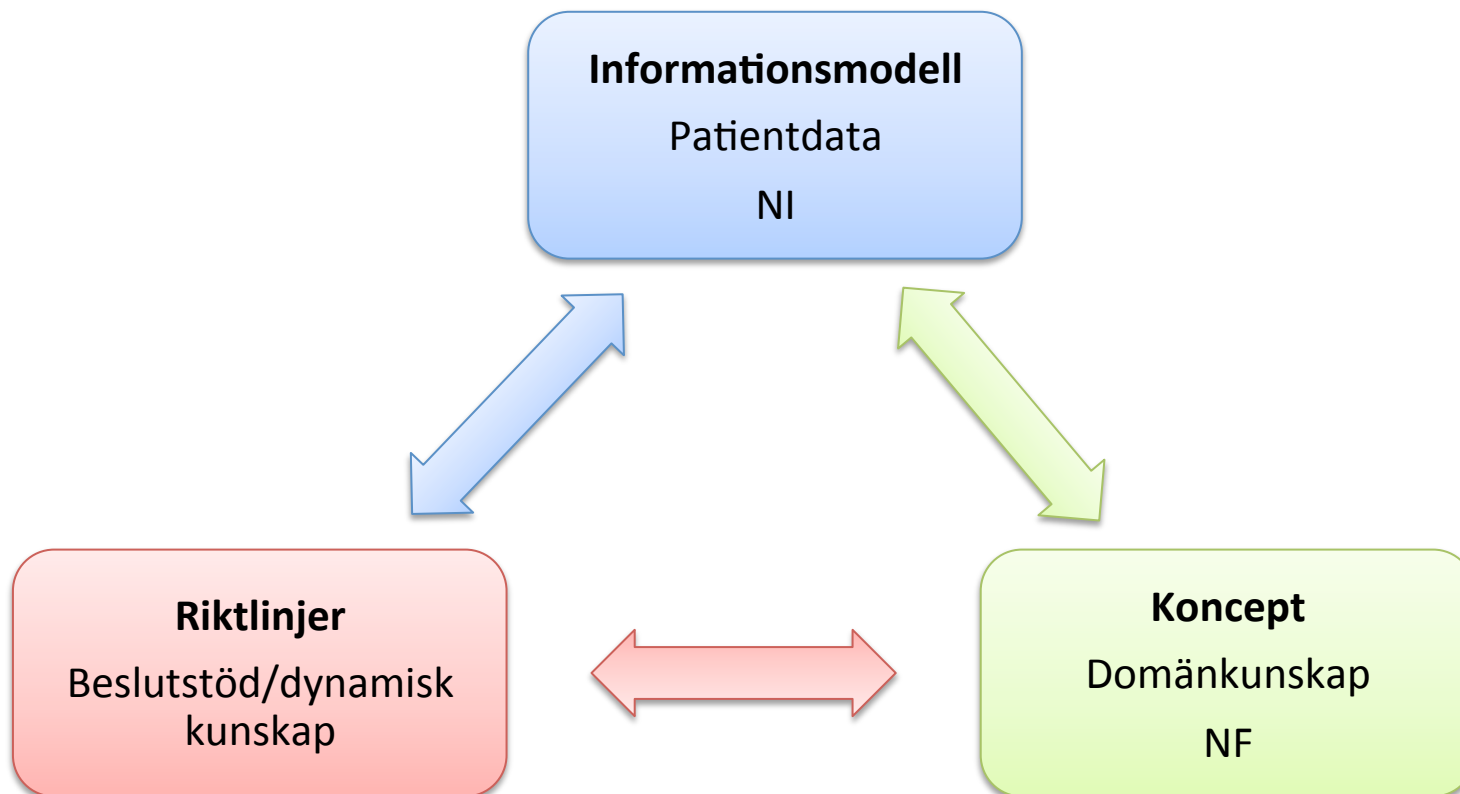
- Semantisk interoperabilitet
- Bakgrund
- Nuläge
- Framtidens smarta plattformar för vården

Semantisk interoperabilitet

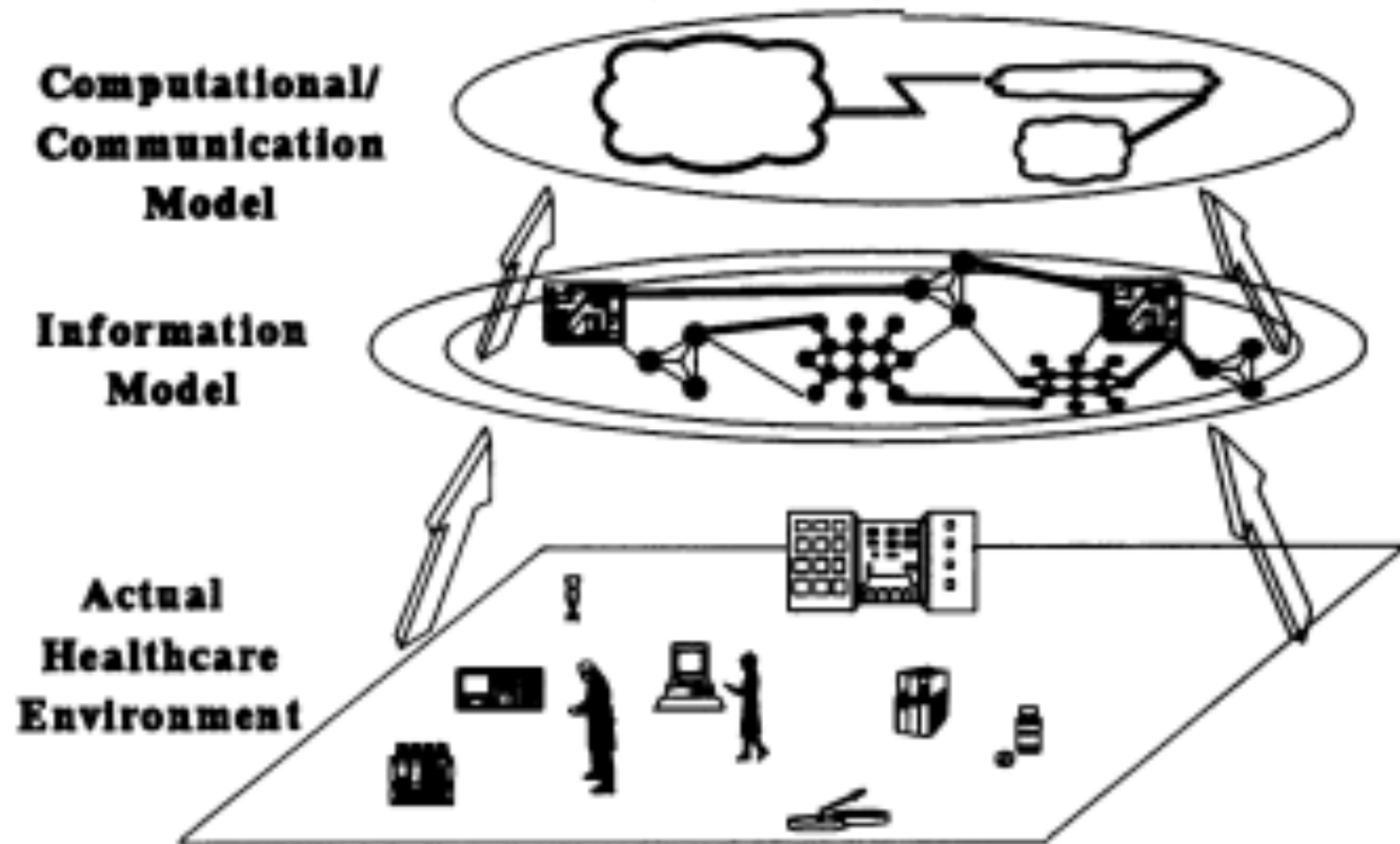
Semantisk interoperabilitet handlar om hur man bäst kodar, överför och använder... inte data utan information och kunskap

- Från medborgare/patienter, medicinsk vetenskap och andra kunskapskällor
- Mellan språkmässigt och kulturells skilda professioner, patienter, myndigheter och andra aktörer
- Över system- och organisationsgränser.

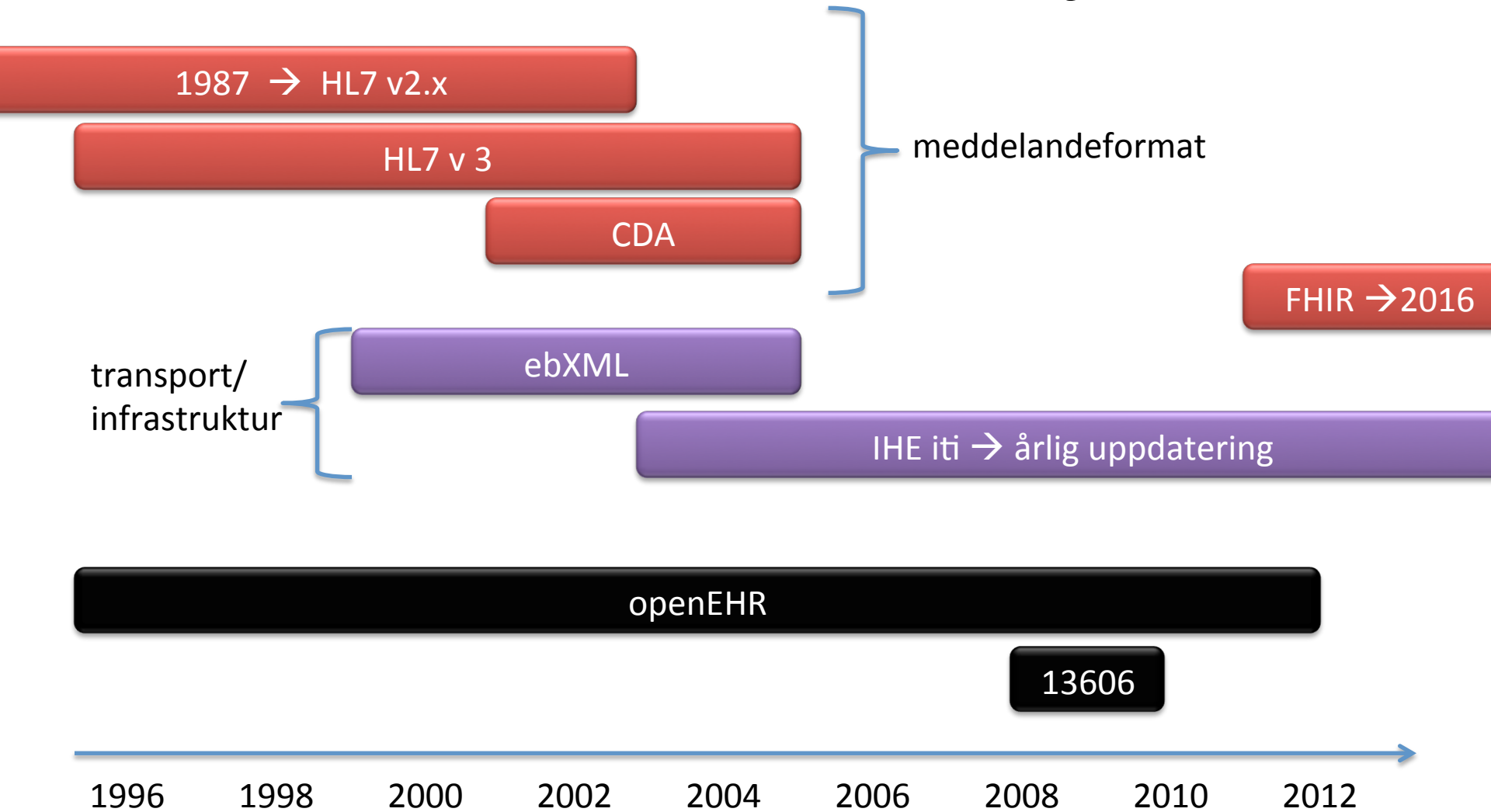
Vad består vårdens informationssystem av?



Framväxten av informatikområdet

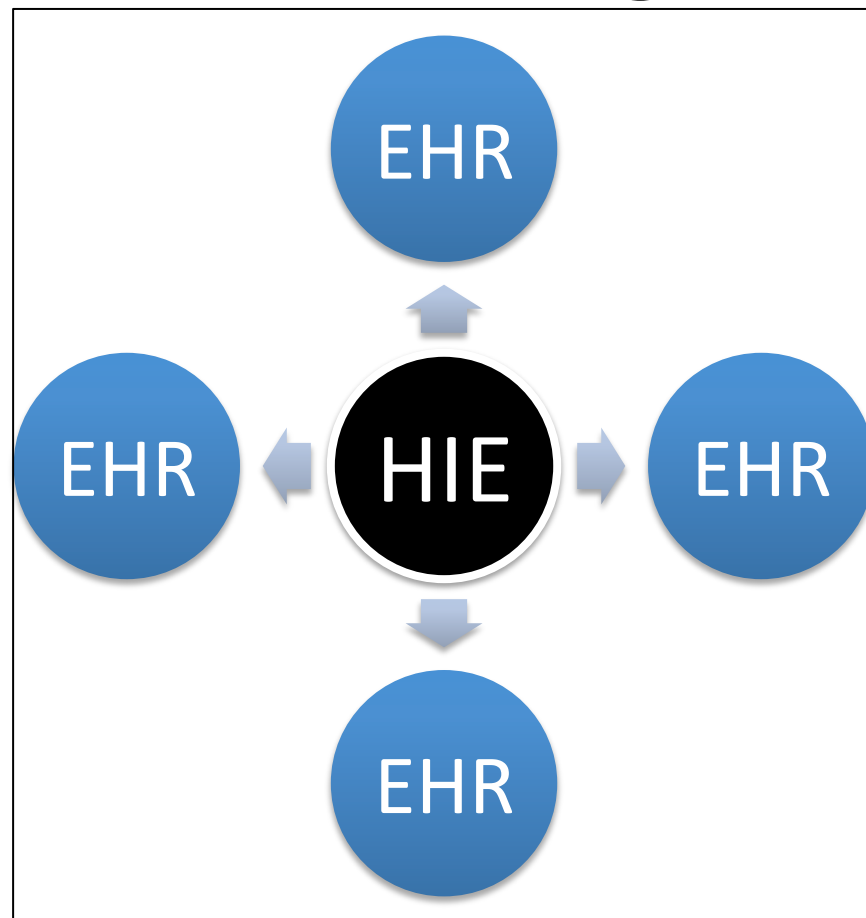
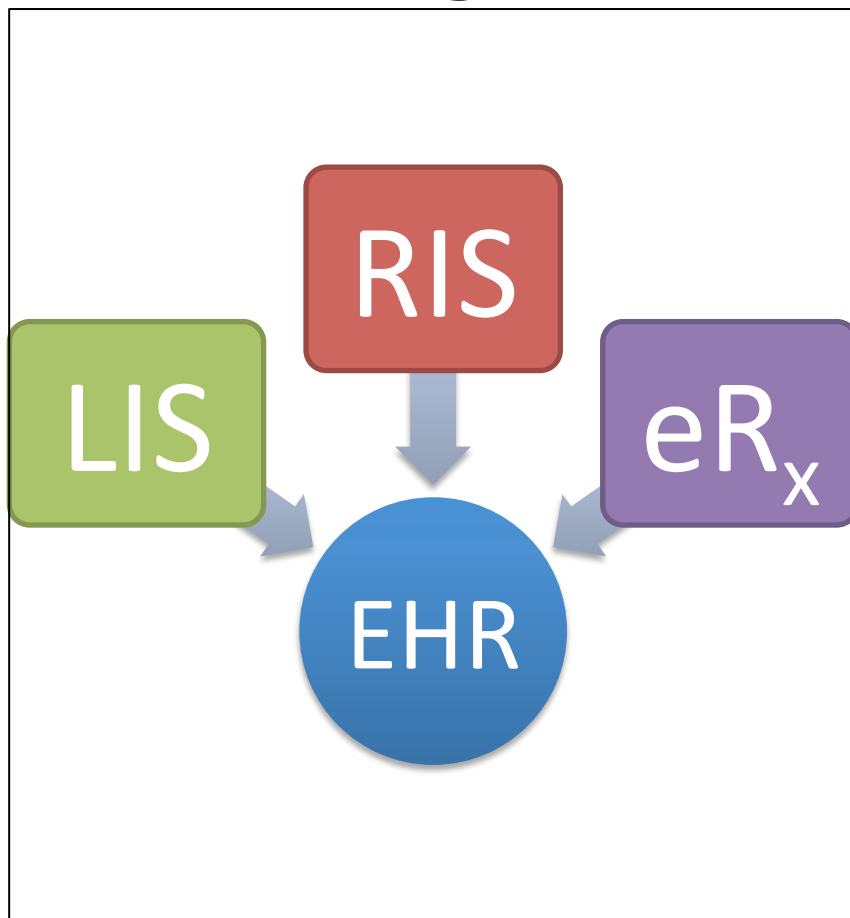


Standarder i Hälso- och sjukvård

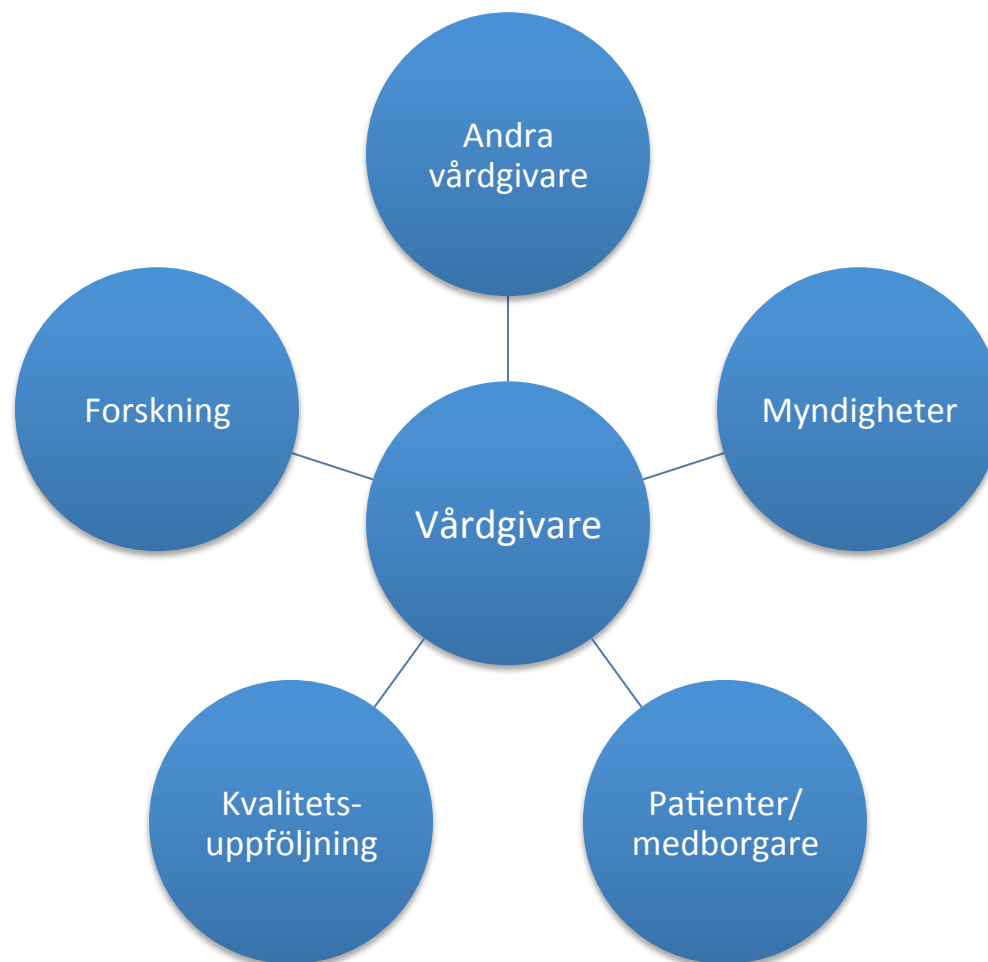


Vad är det man vill lösa?

Intraorganisatoriska kontra interorganisatoriska utmaningar



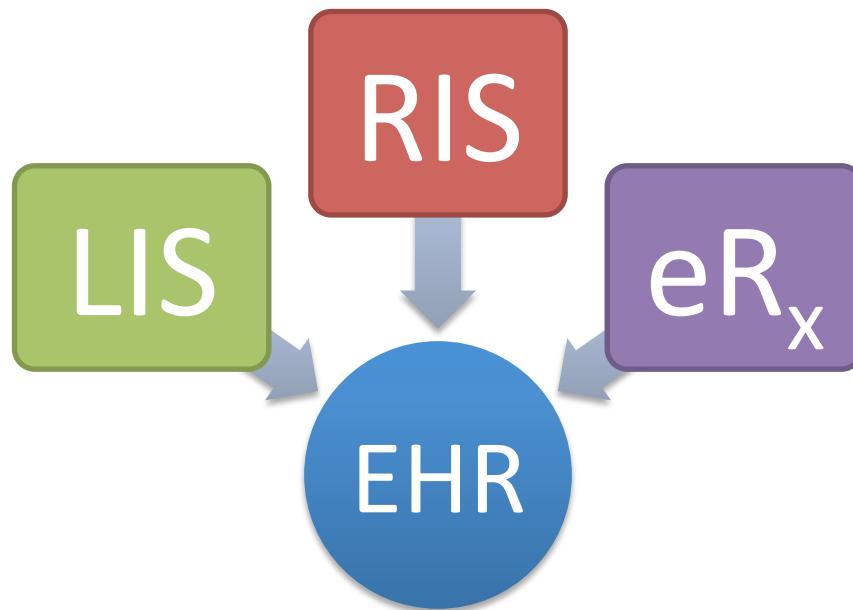
Fast informationsförsörjningen är lite mer komplex än så...



Meddelanden

```
MSH|^~\&|MyHospital|MyHospital^543876^CMS|LocalPharmacy|||ORM^001^RDO_001|00015|P|2.3.1
PID|||1234321^^^MyHospital^MR||Able^Michael^D^^^^LAL1|1|DA|^Penicillin
ORC|NW|0889475^MyHospital|||||20011001084135|A99887^Gilbert^Mary^^^^MyHospital|1234567^Welby^M^J^Jr
RXO|1^Once|0026-8562^CiprofloxacinInj^NDC|200||mg^milligram^ISO+|^Injection ...
RXR|IV^Intravenous^HL70162
```

HL7 v2



- Bra inom en organisation
- Ett hundratal användningsfall stöds
- Skalar ej för interorganisatoriskt utbyte
- (För) stor valfrihet gällande terminologi
- Saknar RIM

```

<substanceAdministration classCode='SBADM' moodCode='INT|EVN'>
  <templateId root='2.16.840.1.113883.10.20.1.24' />
  <templateId root='1.3.6.1.4.1.19376.1.5.3.1.4.7' />
  <templateId root='' />
  <id root='' extension='' />
  <code code='' codeSystem='' displayName='' codeSystemName='' />
  <text><reference value='#med-1' /></text>
  <statusCode code='completed' />
  <effectiveTime xsi:type='IVL_TS'>
    <low value='' />
    <high value='' />
  </effectiveTime>
  <effectiveTime operator='A' xsi:type='TS|PIVL_TS|EIVL_TS|PIVL_PPD_TS|SXPRTS'>
    :
  </effectiveTime>
  <routeCode code='' codeSystem='' displayName='' codeSystemName='' />
  <doseQuantity value='' unit='' />
  <approachSiteCode code='' codeSystem='' displayName='' codeSystemName='' />
  <rateQuantity value='' unit='' />
  <consumable>
    :
  </consumable>
  <!-- 0..* entries describing the components -->
  <entryRelationship typeCode='COMP'>
    <sequenceNumber value='' />
  </entryRelationship>
  <!-- An optional entry relationship that indicates the the reason for use -->
  <entryRelationship typeCode='RSON'>
    <act classCode='ACT' moodCode='EVN'>
      <templateId root='1.3.6.1.4.1.19376.1.5.3.1.4.4.1' />
      <id root='' extension='' />
    </act>
  </entryRelationship>
  <!-- An optional entry relationship that provides prescription activity -->
  <entryRelationship typeCode='REFR'>
    <templateId root='1.3.6.1.4.1.19376.1.5.3.1.4.7.3' />
    :
  </entryRelationship>
  <precondition>
    <criterion>
      <text><reference value=''></text>
    </criterion>
  </precondition>
</substanceAdministration>

```

```

teId root='2.16.840.1.113883.10.20.1.8' />
teId root='1.3.6.1.4.1.19376.1.5.3.1.3.19' />
t=' ' extension='' />
ode='10160-0' displayName='HISTORY OF MEDICATION USE'
ystem='2.16.840.1.113883.6.1' codeSystemName='LOINC' />

```

as described above

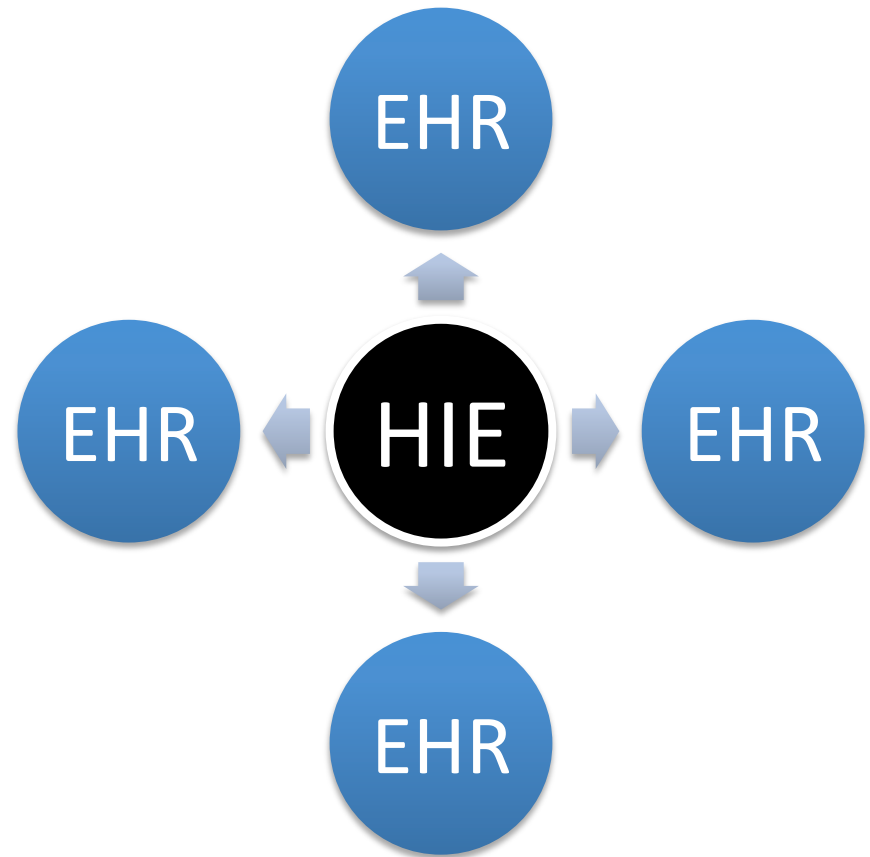
```

Required Medications element -->
mplateId root='1.3.6.1.4.1.19376.1.5.3.1.4.7' />
>
>
>
.3.1.3.8' />
ection content -->

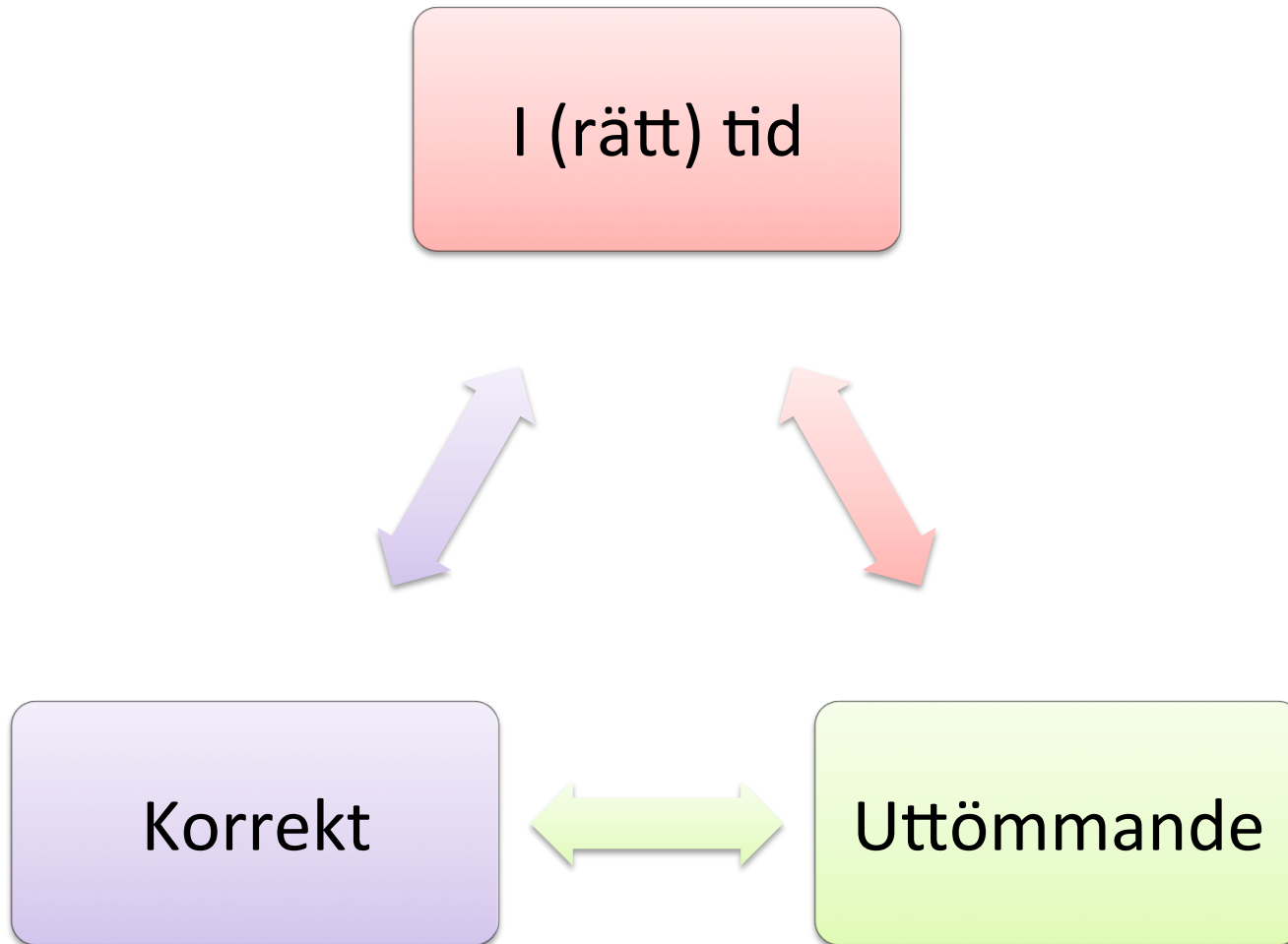
```

HL7 v3, CDA

- Pappersanalogi – dokumentbaserat, mänskligt läsbart, titel och rubriker
- Passar metodiken för många till många-kontrakt, stor valfrihet.
- Stor overhead, ej fingranulärt
- All verksamhetslogik i specen
- Implicit SOAP
 - Version 1 tar tid
 - Svårt att versionera
 - Krångligt bygga workflow



Standardiseringens dilemma



FHIR

Fast Healthcare Interoperability Resources

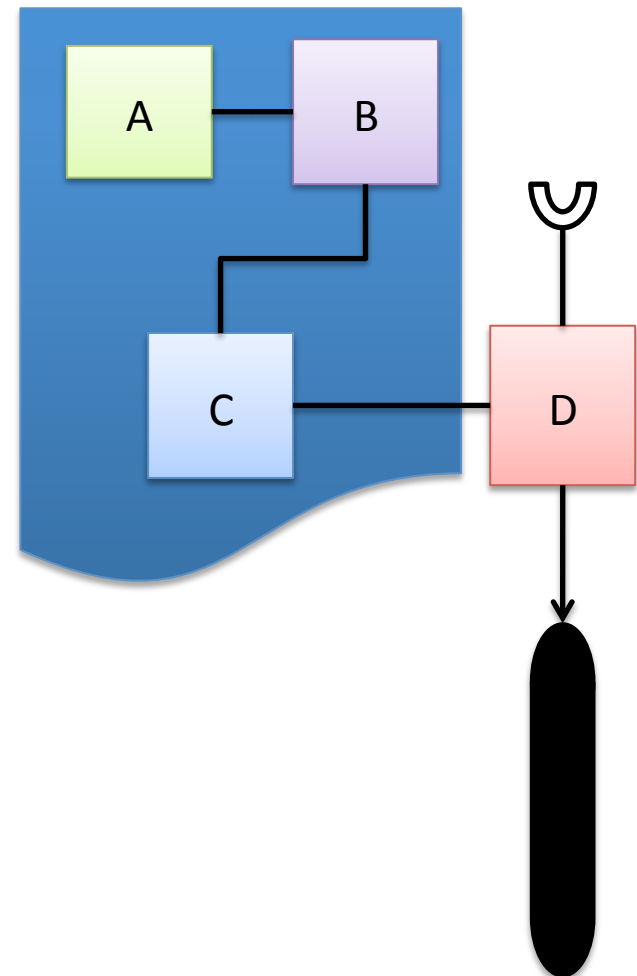
- "Recept" på API:er att tillhandahålla istället för specar på dokument att producera.
- Första HL7 standard under öppen licens
- REST
 - XML och JSON
 - Oauth
 - Atom-liknande stöd för prenumeration
- Både infrastruktur och kliniska data
- Förenar det intraorganisatoriska med det interorganisatoriska
- Mobilvänligt, utvecklarvänligt

Exempel FHIR

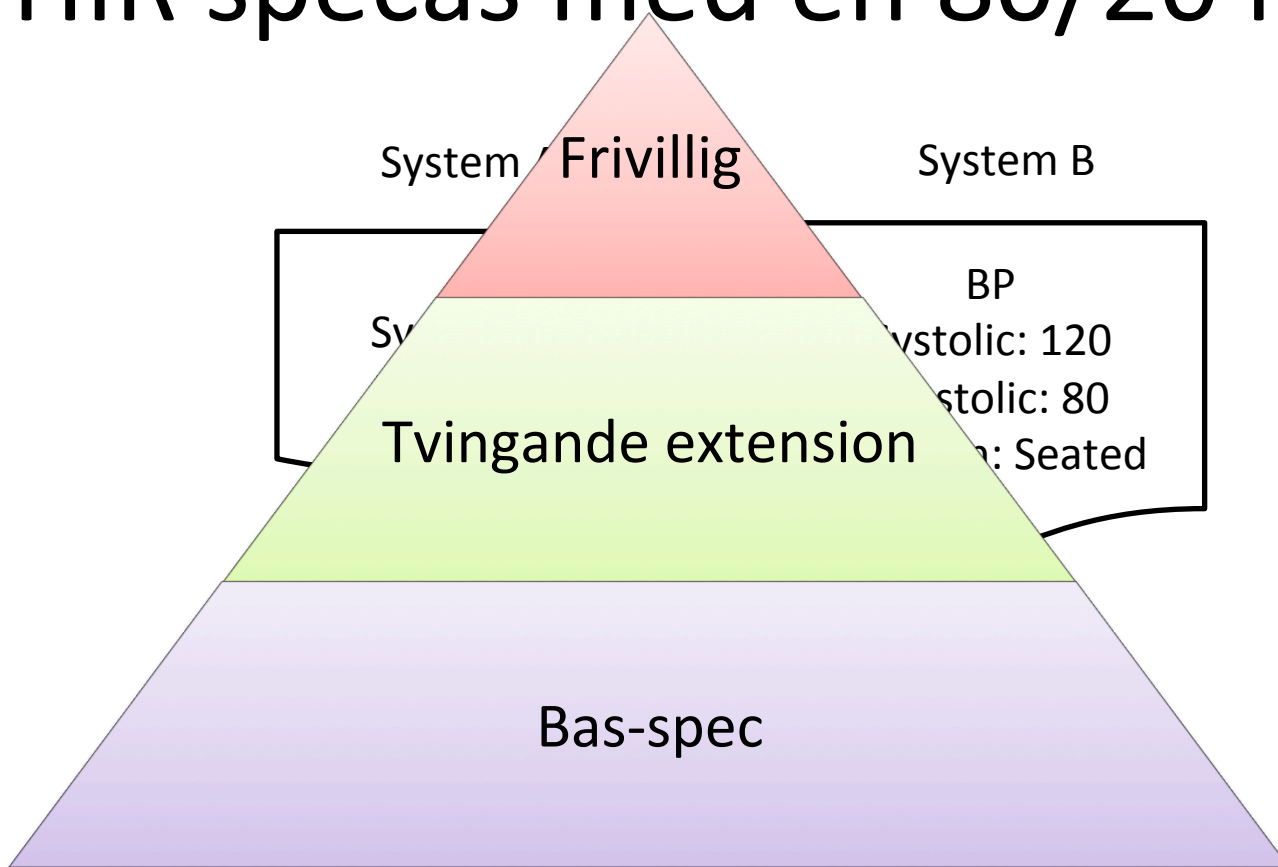
```
<?xml version="1.0" encoding="UTF-8"?>
<MedicationAdministration xmlns="http://hl7.org/fhir">
  <identifier> http://myapplication.com/medicationAdministration/1 </identifier>
  <status value="InProgress"/>
  <patient> http://myapplication.com/patient/7 </patient>
  <practitioner> http://myapplication.com/practitioner/1234 </practitioner>
  <encounter> http://myapplication.com/encounter/4734982359 </encounter>
  <prescription> http://myapplication.com/prescription/23092509725 </prescription>
  <whenGiven>201401010</whenGiven>
  <medication> http://myapplication.com/medication/24095092 </medication>
  <device> http://myapplication.com/device/2 </device>
  <dosage> <!-- 0..* Medicine administration instructions to the patient/carer -->
    <timing[x]><!-- 0..1 dateTime|Period When dose(s) were given --></timing[x]>
    <asNeeded[x]><!-- 0..1 boolean|CodeableConcept Take "as needed" f(or) x --></asNeeded[x]>
    <site><!-- 0..1 CodeableConcept Body site administered to --></site>
    <route><!-- 0..1 CodeableConcept Path of substance into body --></route>
    <method><!-- 0..1 CodeableConcept How drug was administered --></method>
    <quantity><!-- 0..1 Quantity Amount administered in one dose --></quantity>
    <rate><!-- 0..1 Ratio Dose quantity per unit of time --></rate>
    <maxDosePerPeriod><!-- 0..1 Ratio Total dose that was consumed per unit of time --></
maxDosePerPeriod>
  </dosage>
</MedicationAdministration>
```

Stödjer flera arkitektoriella stilar

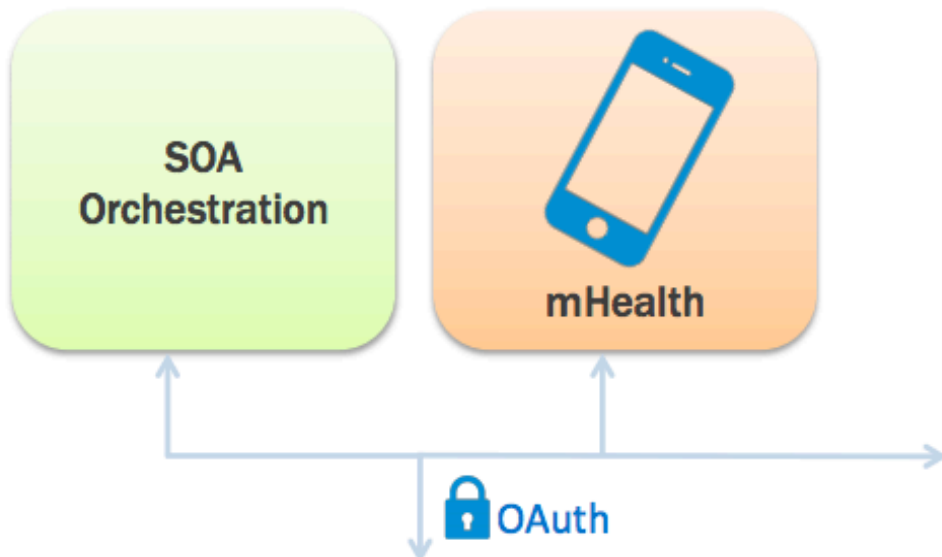
- REST
- Document
- Message
- Service



FHIR specas med en 80/20 regel



SMART on FHIR[®] – Open Platform Architecture



FHIR[®] REST API

Clinical Element Models & FHIR Data Profiles

Exhibiting Health IT Systems

Cerner
Booth# 6965

Intermountain[®] Healthcare
Booth# 3903

HARRIS
Booth# 1164

hp
Booth# 1949

SMART[™] Web Apps

Children's Hospital Boston

Intermountain[®] Healthcare

visualdx

“polyglot”
Health Through Understanding[™]

HARVARD MEDICAL SCHOOL

Trusted App Registry

PT-FIVE XTESTHIMSS sex: Male dob: 06 Apr 2002 age: 11y 10m 15d

Hour Specific Bilirubin Risk Chart for Term & Near-Term Infants with NO Additional Risk Factors

Date/Time	Result
04/06/2002 08:00	4.5
04/07/2002 08:00	12.5
04/07/2002 12:00	12.0
04/07/2002 12:00	12.8
04/08/2002 11:20:00	11
04/19/2002 09:8	20:00

<http://smartplatforms.org/smart-on-fhir/>

RDF och framtiden

The Yosemite Manifesto

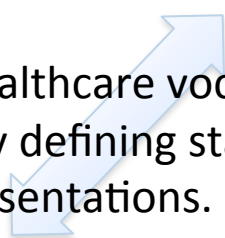
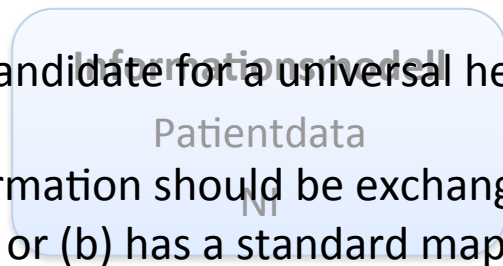
1. RDF is the best available candidate for a universal healthcare exchange language.

2. Electronic healthcare information should be exchanged in a format that either:
(a) is an RDF format directly; or (b) has a standard mapping to RDF.

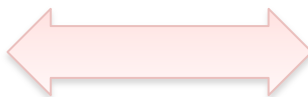
3. Existing standard healthcare vocabularies, data models and exchange languages should be leveraged by defining standard mappings to RDF, and any new standards should have RDF representations.

4. Government agencies should mandate or incentivize the use of RDF as a universal healthcare exchange language.

5. Exchanged healthcare information should be self-describing, using Linked Data principles, so that each concept URI is de-referenceable to its free and open definition.



RDF



Tack!