

# **Make the Past serve your Future: Glorp and ActiveRecord**

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# A typical episode of 'House'

**First scene:** “Nothing to worry about Mrs Bit-Part. Your baby has a mild case of PolysyllabicMedicalTerm. A short course of ChemoBabble will clear it up in a trice.”

**But soon enough:** “I don’t understand it - the fever is worse.”

**And by half-way through:** “Our diagnosis must be wrong. Phone the lab to test for DeadlyDiseaseSyndrome.”

**And in the lab:** “The baby is dying. We have to find more of the sample fast – enough to run the A.C.R.O.N.Y.M. test.”

**Later in the lab:** “Its EvenDeadlierDiseaseSyndrome! Tell the hospital to Administer 30cc’s of Sesquipedalia immediately!!”

**And finally:** “It’s OK Mrs Bit-Part – the fever is going down now”

**Closing Credits**

# Reality can be more like this than you'd think

- **Genetics Lab:** regional (central lab for many hospitals)
  - Cytogenetics (chromosomes)
  - Molecular DNA analysis
- **Immunophenotyping:** also central lab for many hospitals
  - cell surface markers
  - some molecular DNA analysis
- **Haematology lab:** one in each hospital
  - full blood count
  - morphology on sample
- **Histo-Pathology lab:** one per hospital + central re-referral
  - Morphology in situ (of bone marrow trephine or other biopsy)
  - immuno-histochemistry: cell surface markers in situ

# Blood cancer diagnosis

- **Patient “presents”**: consultant takes sample
  - not an easy or enjoyable procedure; sample may be sparse / poor / ...
    - e.g. haemodilution, a.k.a “I can’t analyse this bloody sample” 😊
  - bone marrow aspirate, bone marrow trephine, full blood count, etc.
- **Sample divided for Labs based on initial diagnosis**
  - labs have no warning (sample can be delayed or misdirected)
- **Each lab enters sample into distinct bespoke system**
  - Genetics’ was sub-sub-contracted to Rumanians
    - Table and column names ‘unintuitive’. Poor fit to domain .
    - “Every time we make a change it breaks!”
  - The other Labs’ systems are in the same state
  - None of these systems can be retired for years
- **Labs analyse: clinician’s diagnosis is right – or not !**

# “or not” can be **time-wasting** or **serious** (1)

## Examples of **time-wasting**:

- **“Myelodysplasia is in the differential – include Genetics.”**
  - Histo-pathology do the morphology: “No, it’s just IDT.”
    - Idiopathic: we have not a clue what is causing it
    - Thrombocytic : it is to do with platelets
    - Purpura: the symptom is a rash
  - Genetics could skip their test - if only they knew the Histo-path result
- **“Acute leukaemia?” – no, just iron deficiency anaemia**
  - would save much time and money if Genetics knew Blood result

## **BUT no connection between Lab systems**

or to path lab reception (sample dispatch) either

**Just wasting lab time can be serious for another patient**

# “or not” can be **time-wasting** or **serious** (2)

## Examples of **serious**:

- (for elderly patient): “Its IDT – skip Genetics.”
  - Blood lab: “No, it’s MDS !”
  - Genetics need to find a Lab with spare sample
- (for infant) **invasive procedure + general anaesthetic, then:**
  - “Its IDT – skip Genetics.” (rarer now – it is so critical)
  - Haemodilution
  - (and then), “No, it could be acute lymphoblastic leukemia !”
    - if so, sample cells die fast - get to spare sample fast !
    - another 2 days to culture, then time to analyse – you have 7 days !

**How is spare sample found? **By random phoning around.****

# Requirement: something old, something new

- **Web app: consultant / path lab reception enter**
  - Sample dispatch data
  - Initial diagnosis
- **App puts sample data in**
  - its RDB
  - Lab-systems' RDBs
- **Labs process sample: more data in lab systems**
- **App presents that data**
  - results and result tracking
  - Multi-disciplinary team use system to create their reports
  - Labs use system for emergencies, time-waste avoidance, etc.

# Process

- **ObjectStudio Mapping Tool**
  - Read the schema (who needs documentation!) and understand it
    - Display tables and relationships
    - Create classes, view data
- **ObjectStudio Modeling Tool**
  - Import classes, show diagram
- **Some Essential Fixes**
  - Rename some classes: doctors do not read Rumanian 😊
  - Consultants subclass: DiagnosingConsultant, ReferringConsultant
    - Be ready for upcoming organisational changes
  - New descriptor: subclass, convert to sibling refactor
    - Generate DB for web app

Write data between new and old DBs (not how real system will do it!)