Trench Talk

Models and friends

by Yves Reynhout
About me

- Experience: 20+ years, mainly building products
- Domains:
  - Patient logistics, Real estate, Manufacturing,
  - Construction, Transportation, Oil & gas
- Passion: (D)DDD, CQRS & ES, Messaging
- One of the founding fathers of DDDBE (Belgium)
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Agenda

- Terminology
- Models
  - Birth
  - Visualization
  - Experience
Domain-Driven Design

Strategic

Bounded

Domain

Language

Model

Context

Design
How do models come into existence?
The environment models are born into matters ...
Models

Receptive or hostile?
Models

Team size?
Models

Problem or solution?
Models

Product or project?
Models

Greenfield or brownfield?
Models

Which slice in the strategic pie?
Birthing models requires effective modeling ...
Effective modeling means

- access to domain expertise
- analysis & design
- communicating & interviewing
- brainstorming & experimenting
- knowledge crunching

... continuously
Effective modeling means

- binding the model and the implementation
- cultivating a language based on the model
- developing & distilling a knowledge-rich model

... continuously
Models

![Whirlpool Diagram](https://www.domainlanguage.com/ddd/whirlpool)

- **Model Exploration**
  - Code Probe
- **Scenario**
  - Tell us a story.
  - Flesh it out.
  - Refocus on hard part.
  - Refocus on core domain
- **Model**
  - Challenge model with new scenario
  - Propose a model
  - Walkthrough states
  - Walkthrough solutions
  - Explore language
  - Make mistakes
- **Harvest & Document**
  - Reference Scenarios
  - Bits of model with rationale
  - Leave most ideas behind

[www.domainlanguage.com/ddd/whirlpool](http://www.domainlanguage.com/ddd/whirlpool)
How can models be visualized?
Models

Behind every modeler ...
Models

Physical tooling
Models

Good old *UML*
Models

Realtime Board

creately

web sequence diagrams

fast easy fun

SKETCH.IO

Digital tools
Models

Context map
Models

Eventstorming (kudos to @ziobrando)
Models

User Interface
When your problem domain has a space dimension ...
Models

Patient Logistics
Models

Oil & Gas
Models

Warehousing
Models

Stowage
When your problem domain has a time dimension ...
Models

Use a timeline ...
Models

and play with it,
even if it means making it tangible,
Models

even if it's not conventional
When your problem domain has a people dimension ...
Models

Collaboration
Models

- MembershipRequestor
- MembershipRequest
- NetworkOwner
- Membership
- MembershipRequestConversion

[when no reasons to decline]
- ApproveMembershipRequest
- MembershipRequestApproved
- MembershipRequestApproved
- InitializeMembership
- MembershipInitialized

[when reasons to decline]
- DeclineMembershipRequest
- MembershipRequestDeclined

[upon changing his mind]
- CancelMembershipRequest
- MembershipRequestCancelled
Working together
Types of people
When the *real* world doesn't neatly fit those dimensions ...
Models
Visualization is a communication tool that complements language and helps bind the model to scenarios.
Experience

A story from the trenches on what it's like to build models
An appointment *rules engine* for hospitals
Scheduling

Goal: to schedule appointments
How we perceive appointments in our daily life
Naive model
Dr. Jones

- performs give or take 20 appointments / day
- works 200 days / year => 4,000 appointments per year
- been working for 10 years => 40,000 appointments

oh dear, someone please suggest lazy loading or snapshotting ...
What are we missing?

The most obvious things are often in plain sight ...
Revised Model
To bee or not to bee?
Revised Model

Schedule Day Aggregate

Schedule Day <<root entity>>

Appointment <<value object>>

0..1

1..*

Appointment Aggregate

Appointment <<root entity>>
07:00  |  07:00  |  07:00
08:00  |  08:00  |  08:00
09:00  |  09:00  |  09:00
10:00  |  10:00  |  10:00
11:00  |  11:00  |  11:00
12:00  |  12:00  |  12:00

Mr. Myagi
Coronary artery bypass

Mr. Myagi
Coronary artery bypass

Mr. Myagi
30'
Coronary artery bypass

Dr. Jones - Cardiologist
Today

Operating Room 1 - Today

Dr. Matthews - Anesthesiologist
Today
Revised Model

Schedule Day Aggregate

Schedule Day <<root entity>> 0..1 1..* Appointment <<value object>>

Single Resource Appointment Aggregate

Single Resource Appointment <<root entity>>

Multi Resource Appointment Aggregate

Multi Resource Appointment <<root entity>> 0..1

Master Appointment <<entity>> 1..*

Slave Appointment <<entity>>
Revised Model
But ... where do schedule days come from?
Bringing the hospital into the software
But ... how do we know what can be booked on a schedule day?
Every Monday, Every other week, As of 08/01/2016, Until ...

Morning Session
08:00 - 12:00
Max Fill 100%
St. Joseph Consultation Rooms 1-10

Consultations Program
08:00 - 10:00
Max Fill 150%
Fixed Slots 15'

Minor Surgery Program
10:00 - 12:00
Max Fill 100%
Sliding Slots

Afternoon Session
14:00 - 20:00
Max Fill 100%
St. Joseph Operating Theatre

Major Surgery Program
10:00 - 12:00
Max Fill 110%
Sliding Slots
Every Monday, Every week, As of 08/01/2016, Until ...

Morning Session
08:00 - 12:00
Max Fill 100%
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Consultation Rooms 1-10

Consultations Program
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14:00 - 20:00
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St. Joseph
Operating Theatre

Major Surgery Program
10:00 - 12:00
Max Fill 110%
Sliding Slots
But ... more questions here
Search

Goal: to find the optimal slot
06:00
07:00
08:00  Mr. Myagi 60'  Follow-up Consultation
09:00  Mr. Macchio 60'  Post-op Consultation
10:00
11:00  Mr. Sylvester 1h30'  Total Hip Prosthesis
12:00  Blocked because ...
13:00  Mr. Martins 60'  Follow-up Consultation
14:00  Mr. Erikson 60'  Follow-up Consultation
15:00
16:00
17:00
18:00
19:00
20:00
### Scheduling Model

**Commands**
- BookSlot, Rework, ...

**Objects**
- Schedule Day

**Events**
- BookedSlot, Reworked, ...

**Actor**

### Search Model

**Documents**
- Schedule Day Document

**Objects**
- Schedule Day

**Projections**
But ... why build a separate model for that?
Retrospective
Q & A