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Domain Driven Design with Clojure

Clojure/West 2013
Portland, OR

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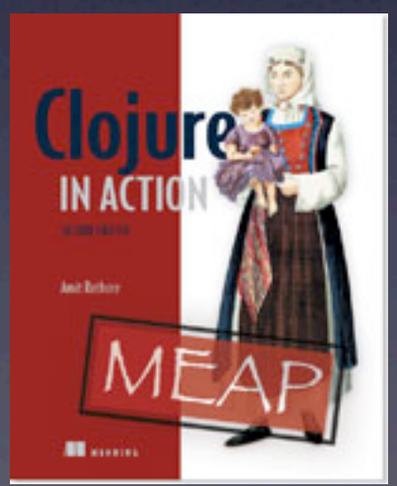

2e

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our first product

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our first product
your digital assistant

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our first product
your digital assistant
helps with professional networking and relationships

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your digital assistant
helps with professional networking and relationships
(and personal ones too!)

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DDD

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not **really** going to talk about DDD

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context map
bounded contexts
shared kernel
...

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read the book

(eric evans)

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today's talk

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how to organize larger applications

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modularity, maintainability, **agility**

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way of thinking

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business domain is the focus

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I. Domain

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1. Domain
2. Driven

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1. Domain
2. Driven
3. Design

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I. Domain

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layers

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Presentation

Transport

Domain

Persistence

Data storage

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other stuff

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APIs
various clients
batch-processing
real-time processing
“offline” mode
...

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Presentation

Transport

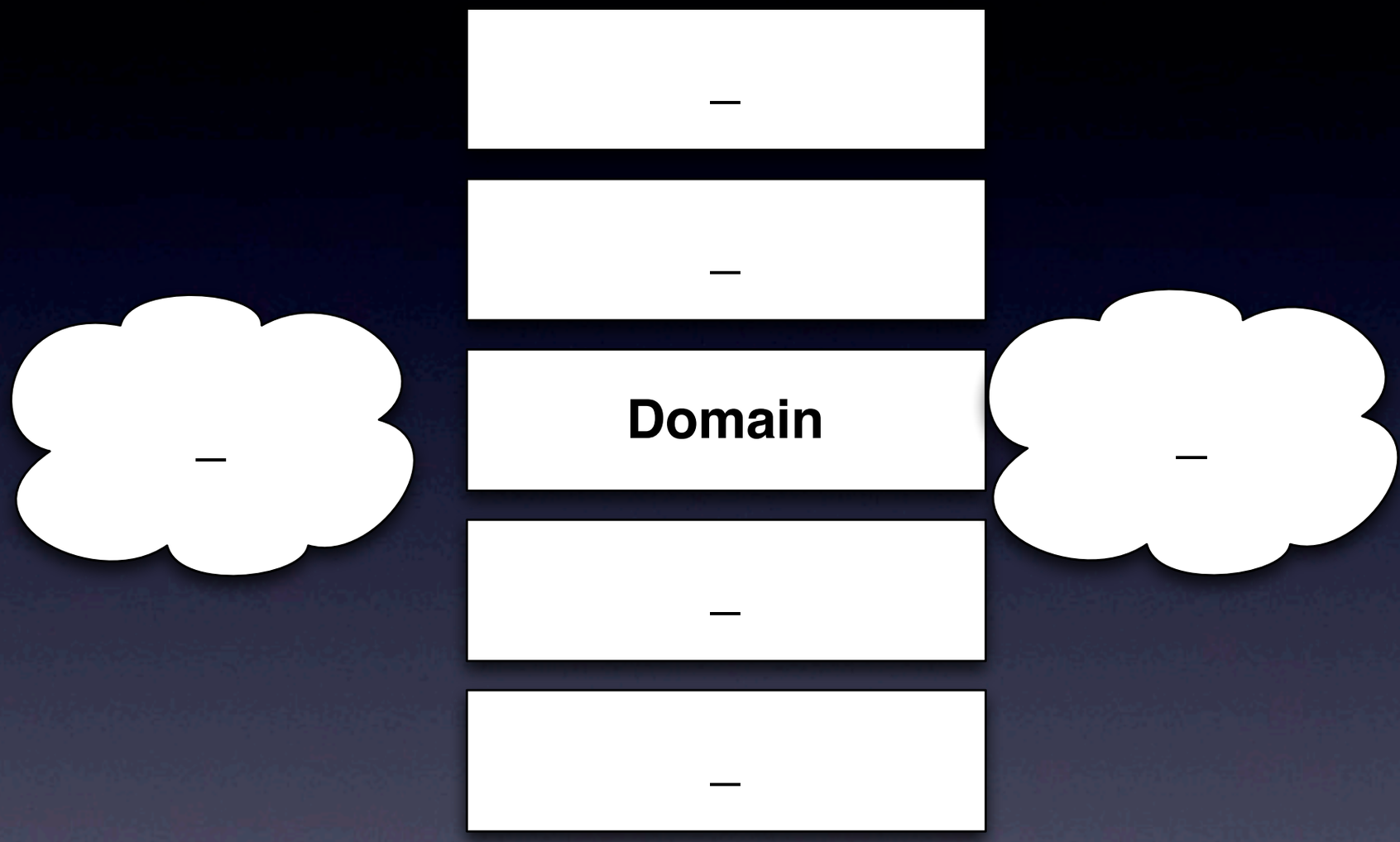
Other

Domain

stuff

Persistence

Data storage


Domain

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domain

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subject area

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differentiation

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expertise

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domain model

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model

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conceptualization

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limited simulation of the real world

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selected abstractions

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basis

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solve particular problems

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business logic

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quality of the model

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determines success

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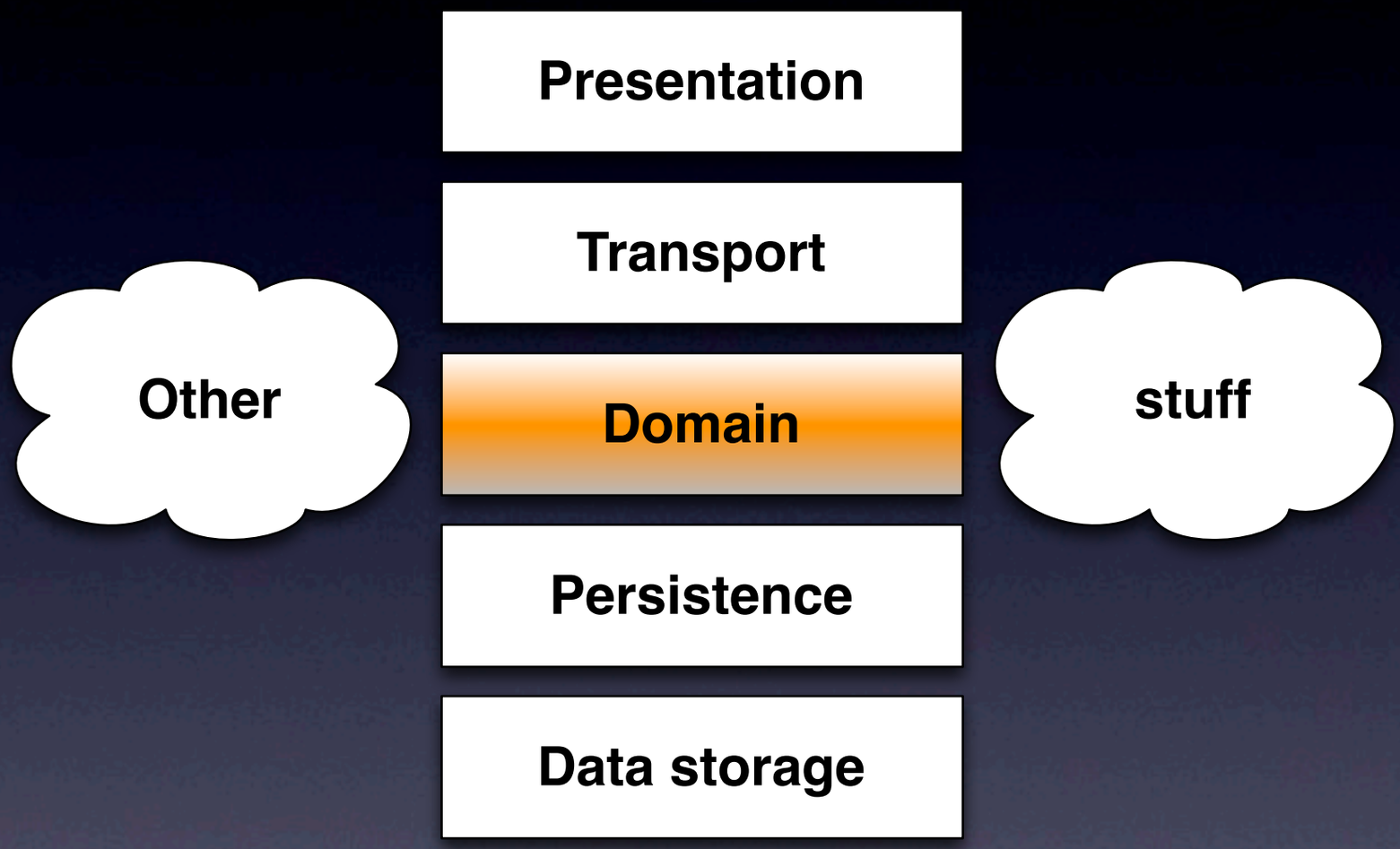
Presentation
Transport
Other
Domain
stuff
Persistence
Data storage

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what does it look like?

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OO world

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nouns

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processes are owned by nouns

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designing the domain model

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the right nouns own the right processes

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nouns = classes

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processes = methods

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and of course, OOP has issues

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Actually I made up the term "object-oriented",
and I can tell you I did **not** have C++ in **mind**.

Alan Kay

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"dude, not everything is an object"

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dude, not everything is an object

(the kingdom of nouns)

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OOP has a real modeling handicap

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Clojure

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functional programming

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verbs

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equal prominence

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verbs = functions

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nouns = data

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verbs transform nouns

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verbs transform nouns

functions transform data

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domain model = functions that transform data

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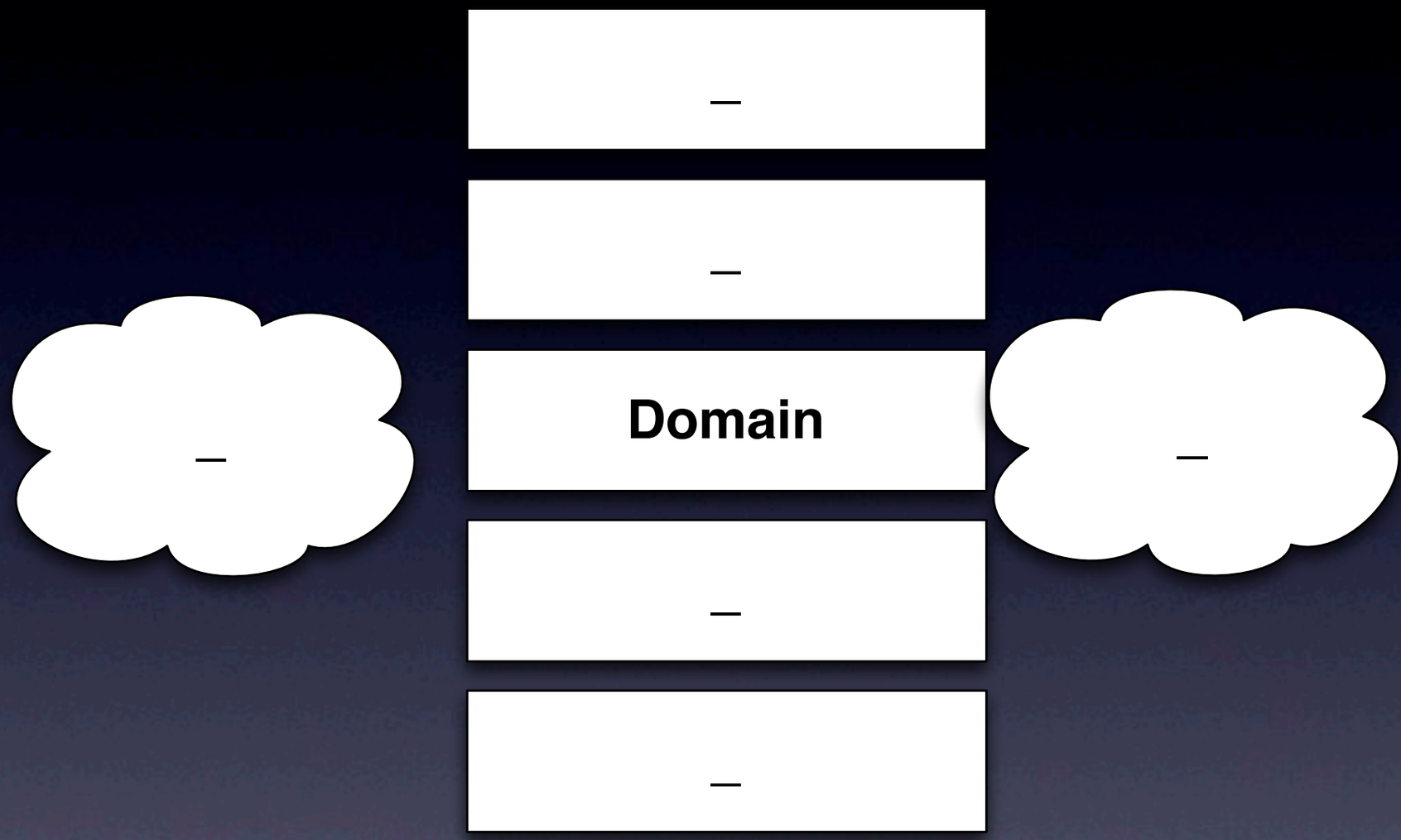
specifically, those that live...



... here

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purity matters

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no side-effects

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no dependency on data storage

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no dependency on external services

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in other words...

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straight Clojure functions and data-structures

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clean data passed to domain functions

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validate outside the boundary

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simple conditional code

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missing data elements...

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... or checking basic types of data elements

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more complex validations...

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validateur, bouncer, clj-schema

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canonical data

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domain model deals with canonical representation

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domain-specific, semantic checks

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thin layer, inside domain model

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invalid or illegal states...

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throw RuntimeException

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slingshot, ex-info

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uniform error handling, outside the domain layer

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Data instantiation

Generic validation

Domain-Specific Validation

Domain Model

Domain

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all these functions...

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organized as collections of namespaces

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zolo.domain.*

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zolo.domain.user
zolo.domain.contact
zolo.domain.message
zolo.domain.interaction
zolo.domain.score
...

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hmmm...

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look a lot like Class names...

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zolo.gateway.*

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zolo.gateway.facebook
zolo.gateway.linkedin
zolo.gateway.twitter
zolo.gateway.email
...

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other namespace collections...

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zolo.api.*

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zolo.api.user
zolo.api.contact
zolo.api.stats
zolo.api.recommendations
zolo.api.reminders
...

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zolo.service.*

zolo.demonic.*

(datomic)

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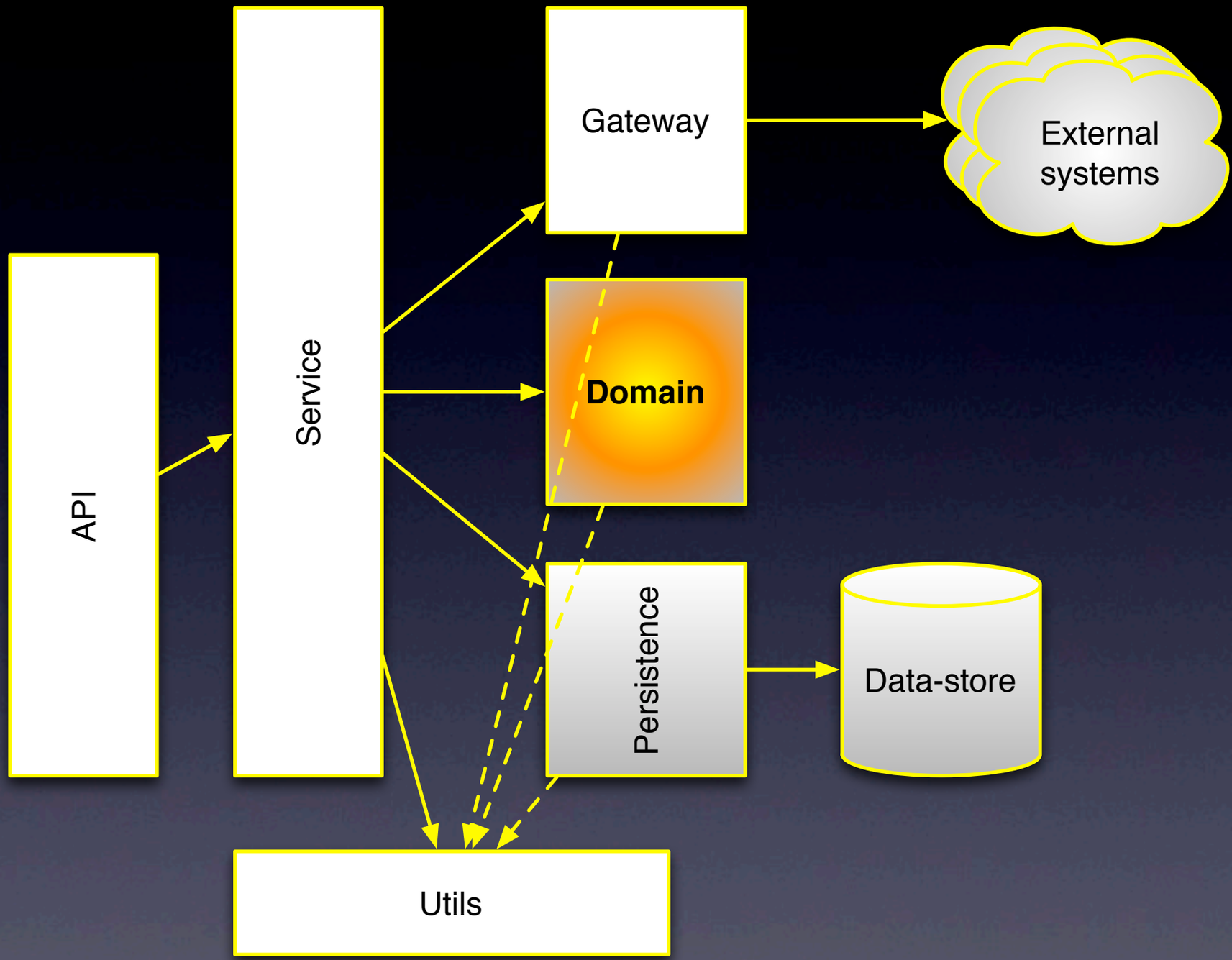
how things fit


API
Service
Gateway
External systems
Domain
Persistence
Data-store
Utils

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utils

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zolo.utils.calendar
zolo.utils.string
zolo.utils.maps
...

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service

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verbs that don't belong in the domain, per se

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verbs that don't belong in the domain, per se

GRASP - service pattern

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zolo.service.user-service
zolo.service.contact-service
zolo.service.reminder-service
...

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api

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fns for RESTful access

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domain

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examples of domain functions

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score relationship strength

merge contact's social identities

remind user to follow up

suggest contacts to connect with

...

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hmm...

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<verb> ... <noun>*

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reminds you of OOAD?

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a little bit?

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a lot of that thinking transfers over

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around organizing code

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namespaces' names = nouns

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namespaces' names = nouns

(or verbs)

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related functions belong in a namespace

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a few public functions

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a bunch of private (helper) functions

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main namespace called core

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main namespace called core

(thanks emacs)

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inline code? or a function?

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err on the side of many functions

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function names are documentation

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another reason for creating functions

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"I've seen that before"

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DRY

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Don't **R**epeat **Y**ourself

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which namespace to put it in?

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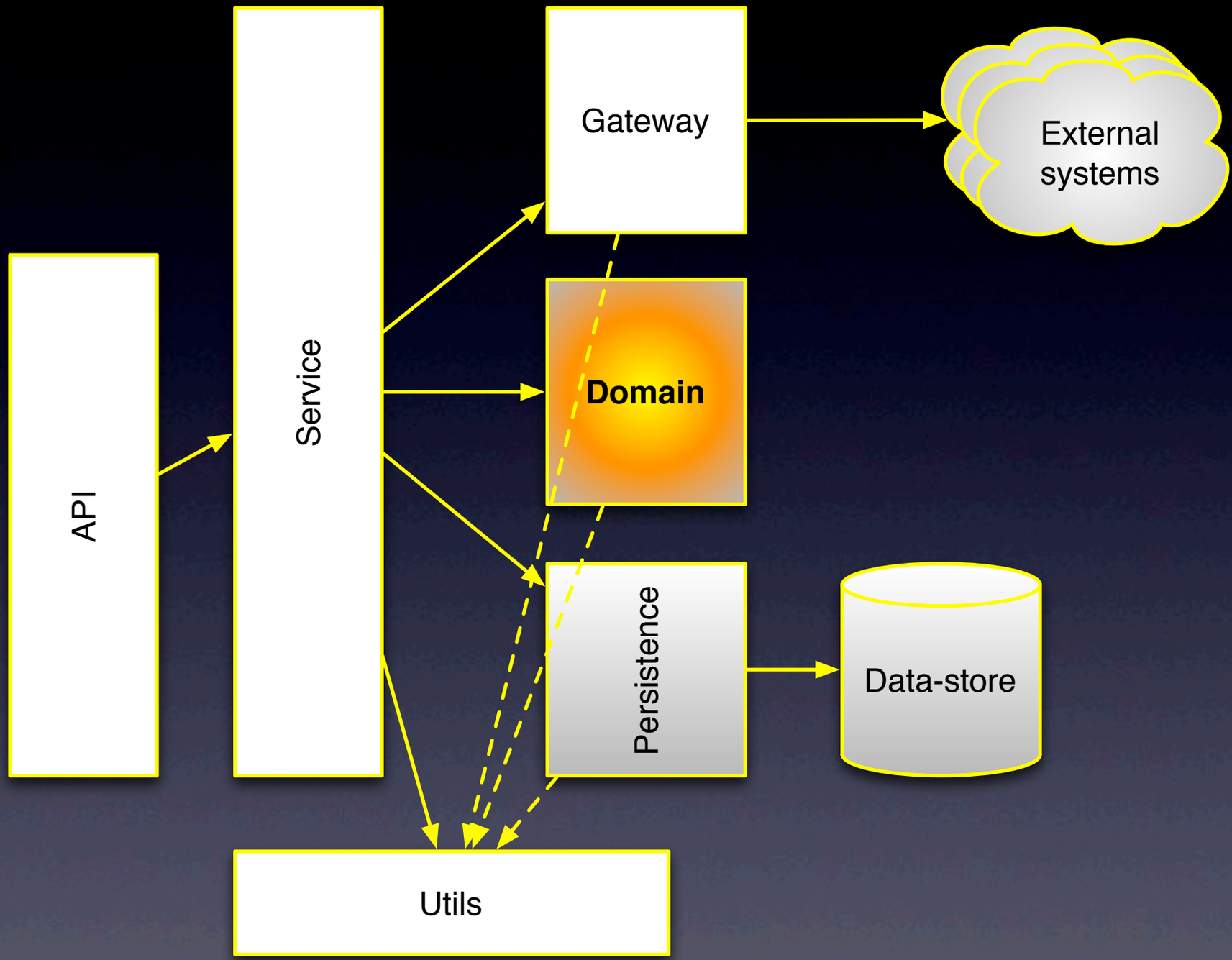

zolo.*

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if business folks care, put it in domain...

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otherwise, elsewhere

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test fns in “mirror” test namespaces

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domain model = core of your app

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bottom up

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manage complexity through simplicity

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express complex concepts (functions)

express complex concepts (functions)

by building upon simpler, lower level concepts (functions)

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I. Domain

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2. Driven

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start with domain functions

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thin slices around the domain model

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build the app as series of these slices

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puts the business in control

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testing

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domain = pure functions

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unit-testing

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test-driven development

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stubbing/mocking rarely needed at this level

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mocking/stubbing useful to test higher levels

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binding, atticus, conjure

...

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a few more thoughts

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single responsibility

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a function should do only one thing

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unix-like philosophy to functions

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small functions

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small functions

(LOC)

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8-9 lines in Java

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8-9 lines in Java

4-5 lines in Ruby

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8-9 lines in Java

4-5 lines in Ruby

3-4 lines in Clojure

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8-9 lines in Java

4-5 lines in Ruby

3-4 lines in Clojure

(0 lines in Haskell)

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optimize for readability

OH:

“I can’t understand it, it must be advanced FP”

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nope

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nope

(it's just clever code)

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if you don't understand, demand simplification

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or just change it yourself

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or just change it yourself

(now)

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collective code ownership

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collective code ownership

Seriously.

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domain model is collectively owned

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domain model is collectively owned

(scale the team)

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1. Domain

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1. Domain

2. Driven

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3. Design

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DDD - design in the large

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and the small

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desired goal = higher flexibility

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ubiquitous language

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common vocabulary

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developers, business folks

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good, flexible domain model

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basis for solving problems

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basis for a DSL runtime

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domain specific languages

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script the domain model

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solve class of problems

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Data instantiation

DSL scripts

Generic validation

DSL runtime

Domain-Specific Validation

Domain Model

Domain

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iterative approach

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domain model evolves

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fns move around

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temporary namespaces...

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eventually collapse into domain, service, etc.

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zolo.stats.* -> zolo.domain.*

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explicit temporary location

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zolo.homeless

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final thoughts

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manage complexity from the domain

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remove incidental complexity

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as simple as possible, no simpler

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YAGNI

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you **a**ren't **g**oing to **n**eed **i**t

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domain model
small functions
DRY
testing
basis of DSL runtime
ubiquitous language
YAGNI

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DDD = agility

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especially good for startups

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and for non-startups

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thanks!

amit@zololabs.com
@amitrathore

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