VANDERLANDE

Platforms @Vanderlande

variability and configurability

SASG June 2022

Bruno van Wijngaarden, 17-06-2022

MOVING YOUR BUSINESS FORWARD

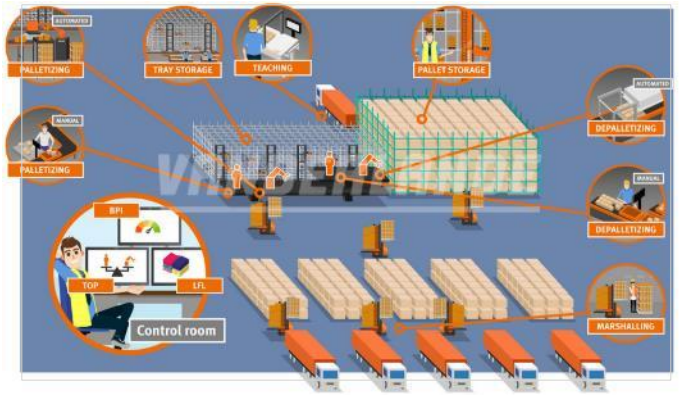
VANDERLANDE

- Vanderlande systems (of systems)
- Engineer to order
- Platform vision and challenges
- Platform as a concept
- Platform tenets
- Discussion

VANDERLANDE

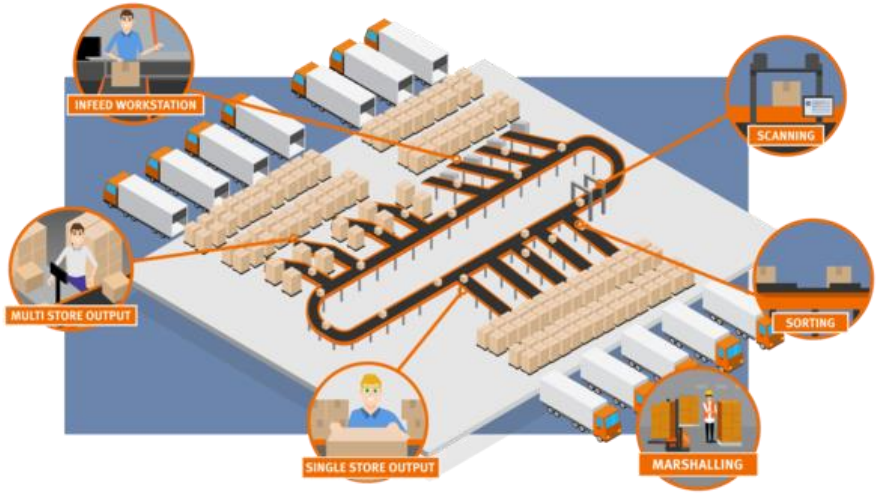
Vanderlande Systems-of-Systems

Warehouse Solutions

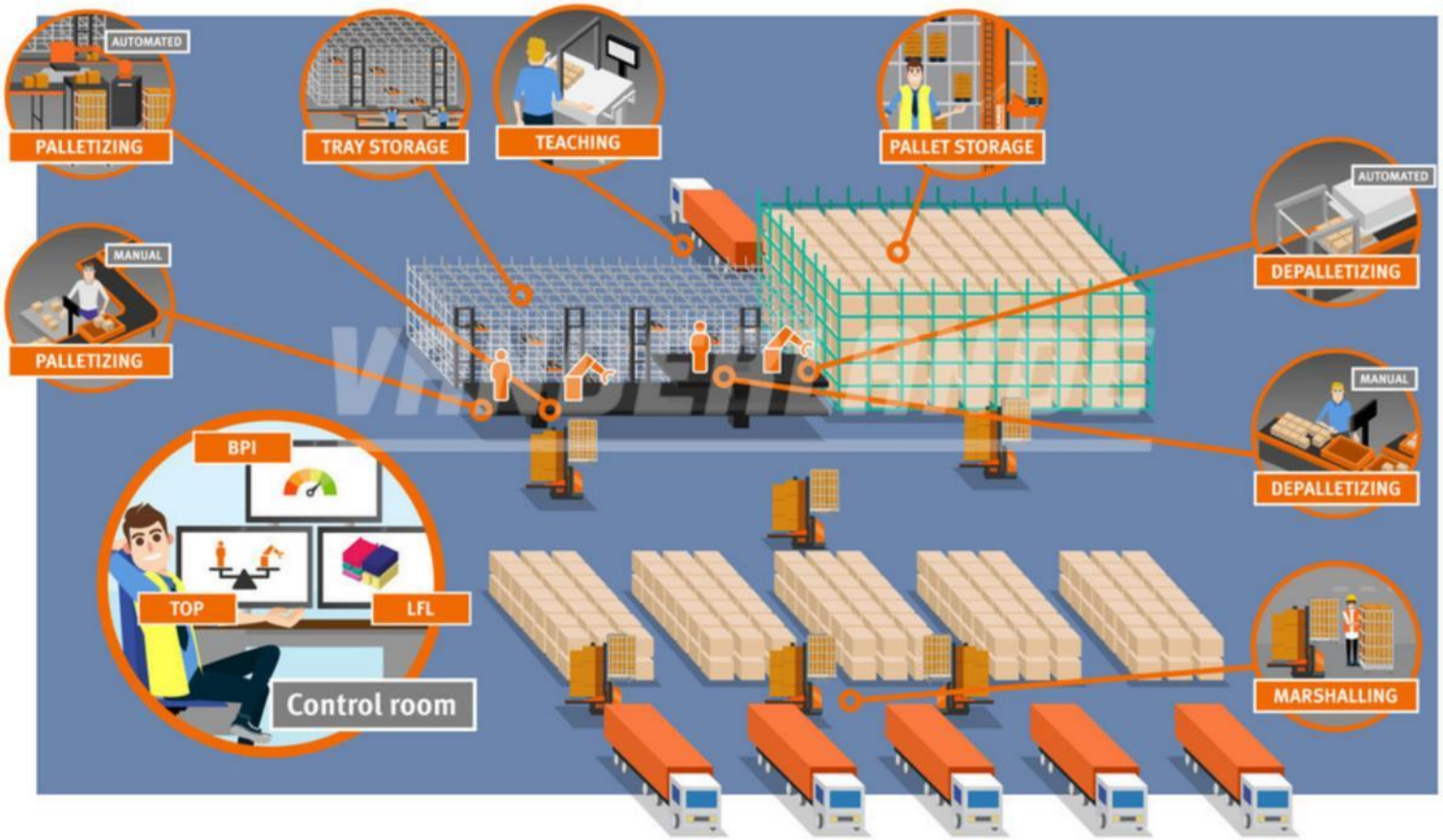


Airport Solutions

Post & Parcel Solutions

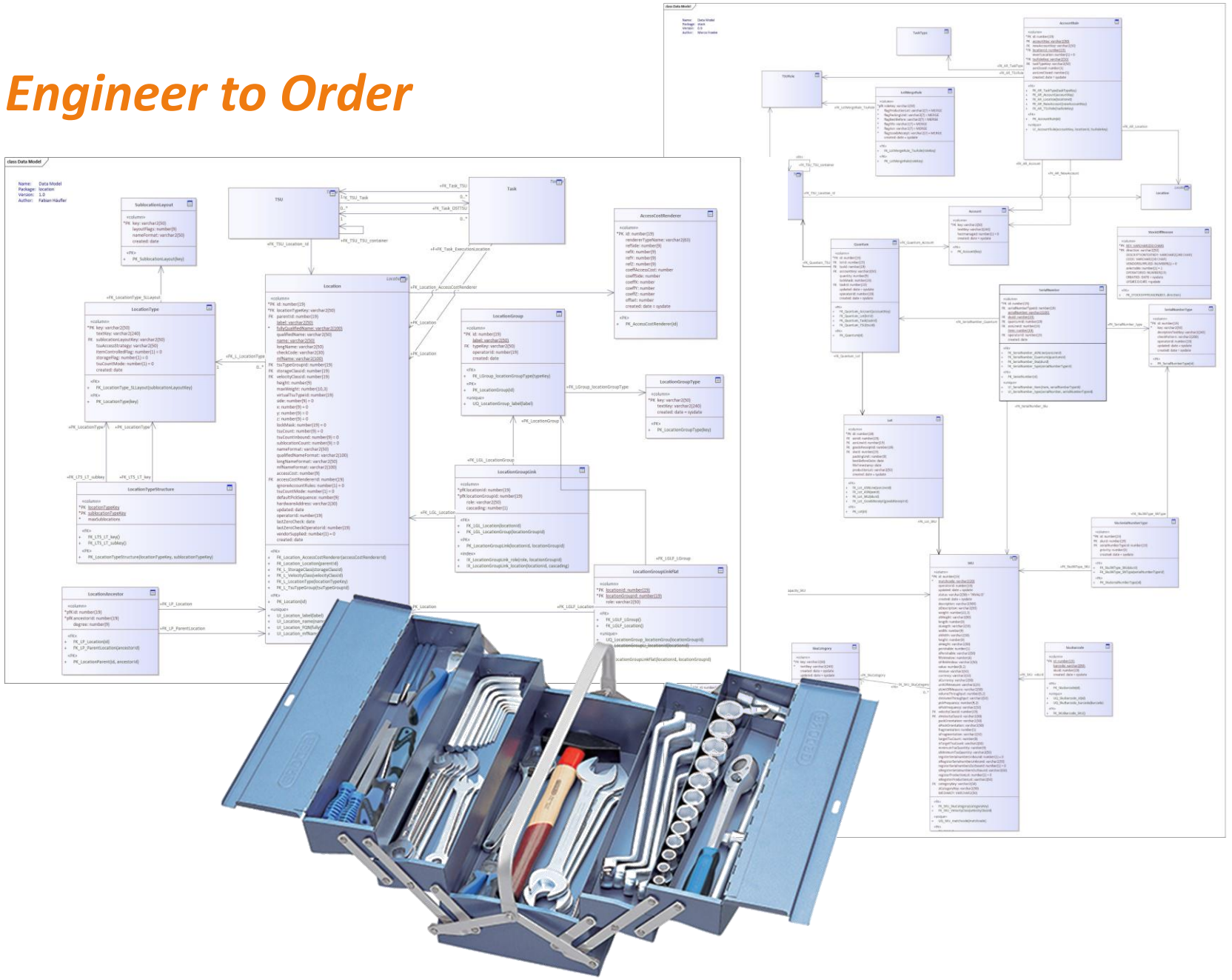


Warehousing systems



- Retail and e-commerce order fulfilment
- Customer-specific processes and layouts
- Many processes running in parallel
- Highly automated and complex
- Various types of material handling equipment: transport and sortation, storage and retrieval, manipulation

Engineer to Order



- **Packed with domain knowledge**
- **Highly customisable**

Served us very well for many years!

But limited scalability

- Performance: contention on database tables
- Engineering: steep learning curve

VANDERLANDE

Engineer to Order: limitations

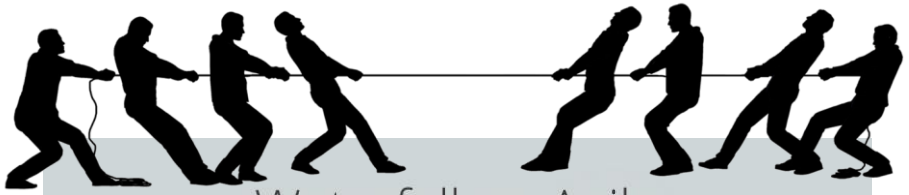
Complexity

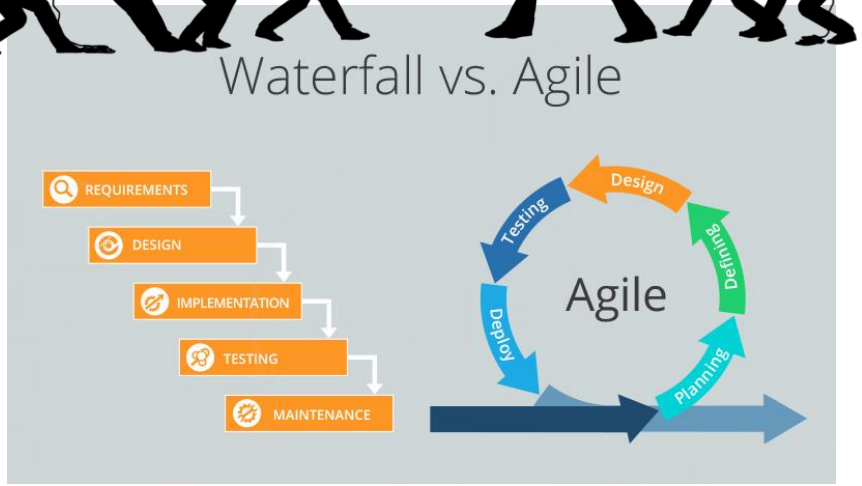
Inefficiency

Risk

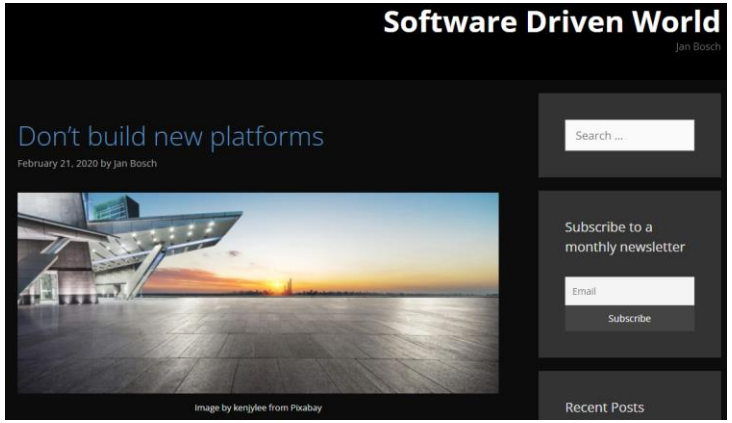
Scalability

Challenges

Project  Platform



New Platforms



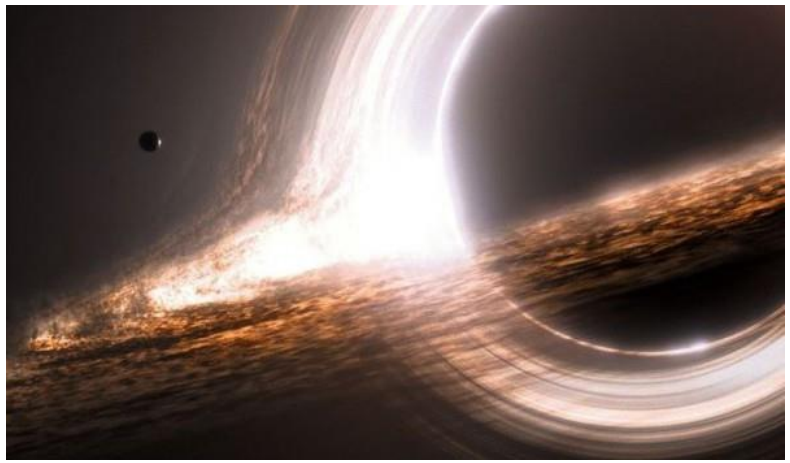
https://janbosch.com/blog/index.php/2020/02/21/dont-build-new-platforms/

Digitalisation

Platform tenets

- Modularity
- Data modeling vs process/ business rule modeling
- Consistency: Atomic/strong vs eventual
- Configuration: parameterization vs composition
- Customization
- Reuse: “the story of Equest”
- “It’s easier to merge than it is to split”.

Modularity



One single massive object
more consistency across business rules
more contention

Many objects
less contention
less consistency across business rules

Data modeling vs process (business rule) modeling

Pocket loading

Entity: "Pocket"
Attributes:
- PocketID

- Content (SKU,qty)
- Loading status (empty/loaded)
- Quality status (ok, suspect)

- Location

- RFID

Aggregate: "PocketContent"
Attributes:
- PocketID
- Content (SKU,qty)
- Loading status (empty/loaded)
- Quality status (ok, suspect)

Aggregate: "PocketTag"
Attributes:
- PocketID
- RFID

Aggregate: "PocketLocation"
Attributes:
- PocketID
- Location

start pocket loading

pocket loading has started

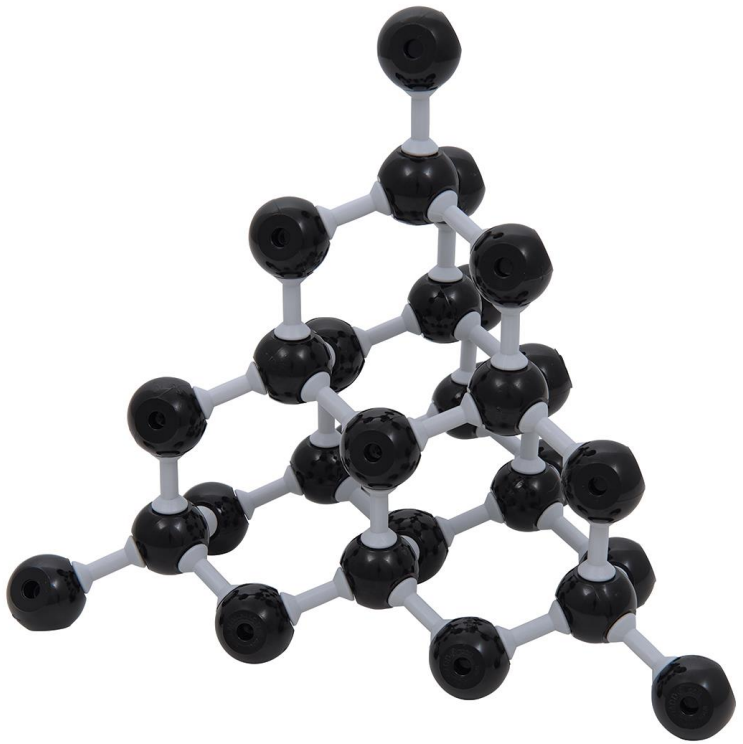
load StockItem in pocket

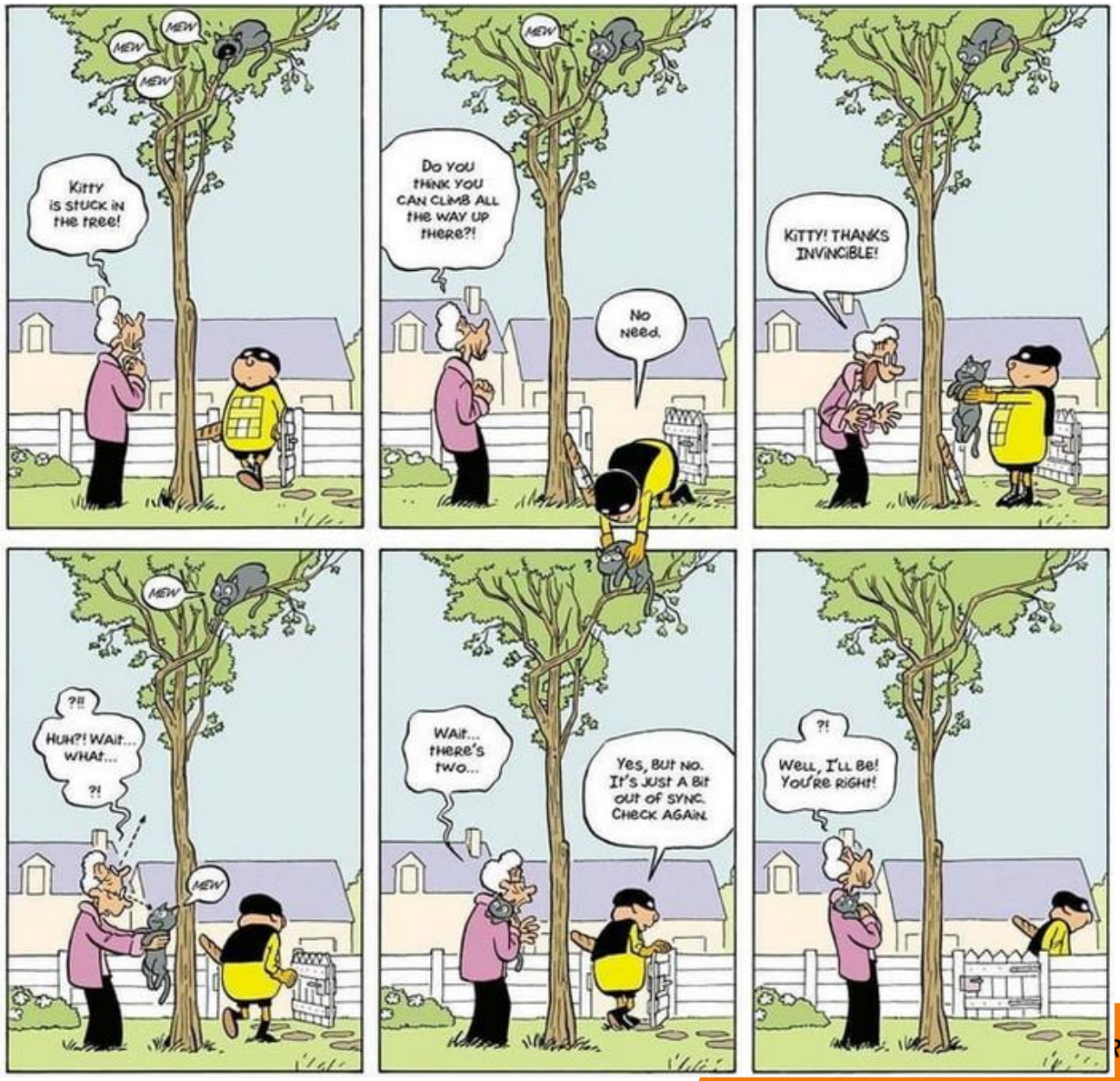
StockItem loaded into pocket

load unknown item in pocket

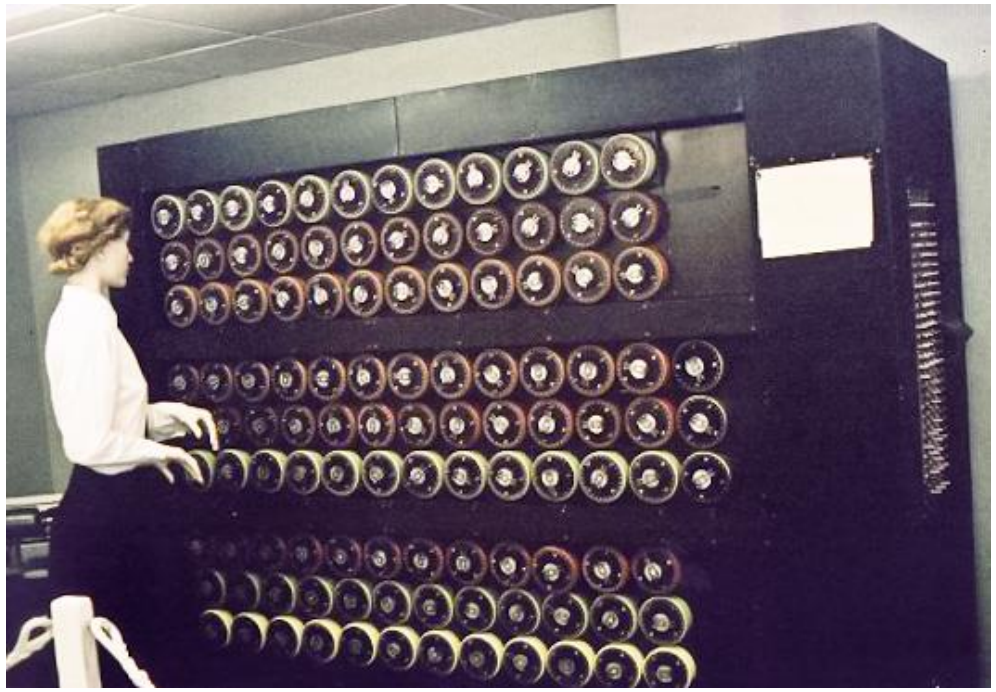
unknown item loaded in pocket

Consistency: Atomic AKA Strong vs Eventual



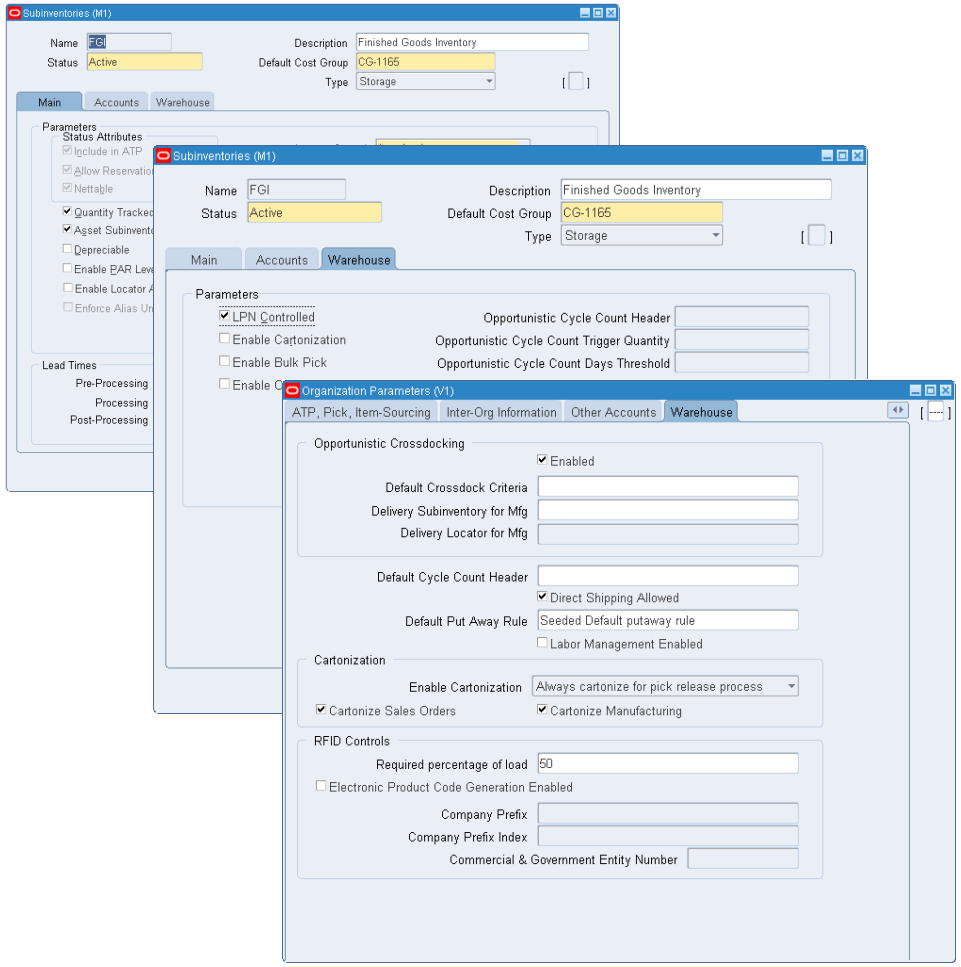


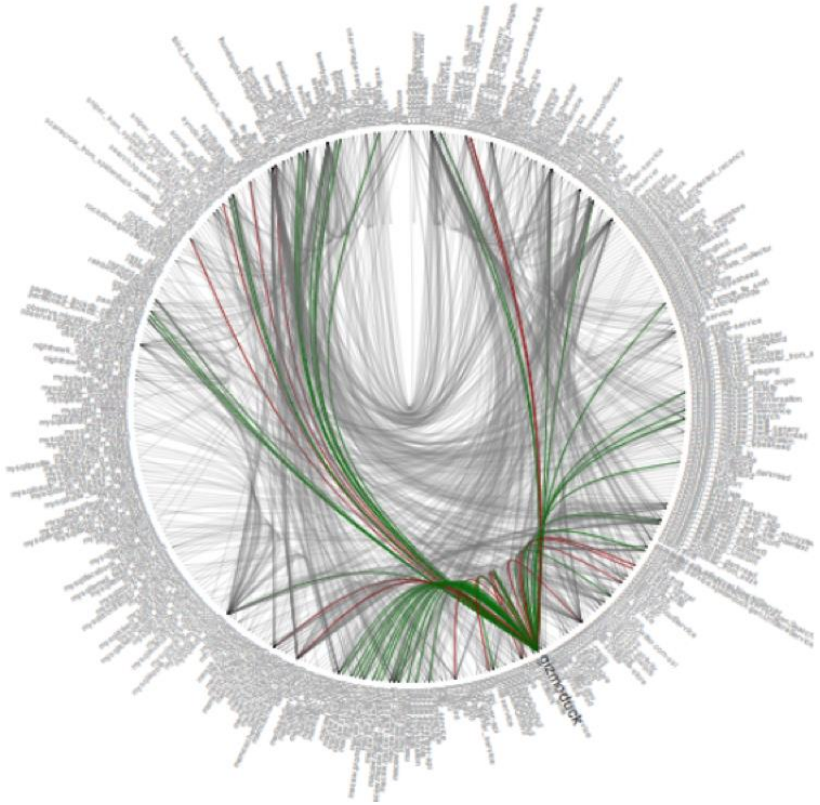
Configuration: parameterization vs composition



VANDERLANDE

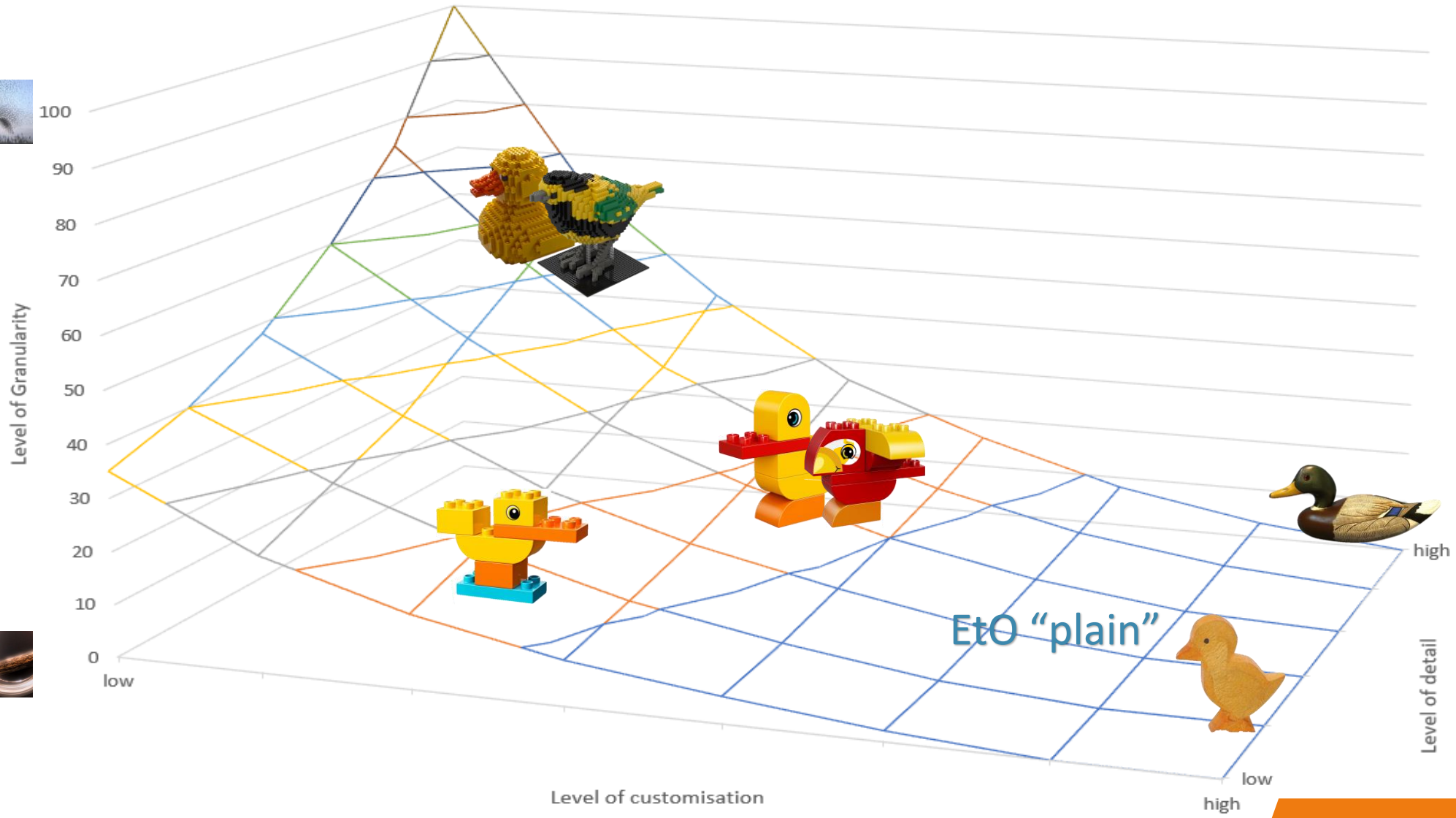
System configuration: parameterization vs composition





Customisation

CtO “summit”



Re-use

Dutch: “hergebruik”

Re-use materials, that have lost their function, for realizing another function

Software re-use

Re-use code, that has lost its function, for realizing another function?

Software re-use actually is shared use

“The story of Equest”

"It's easier to merge than it is to split"

One single massive object
more consistency across business rules
more contention

Many objects
less contention
less consistency across business rules

"Sweet spot"

- Modularity
- Consistency: Atomic/strong vs eventual
- Configuration: parameterization vs composition
- Customization

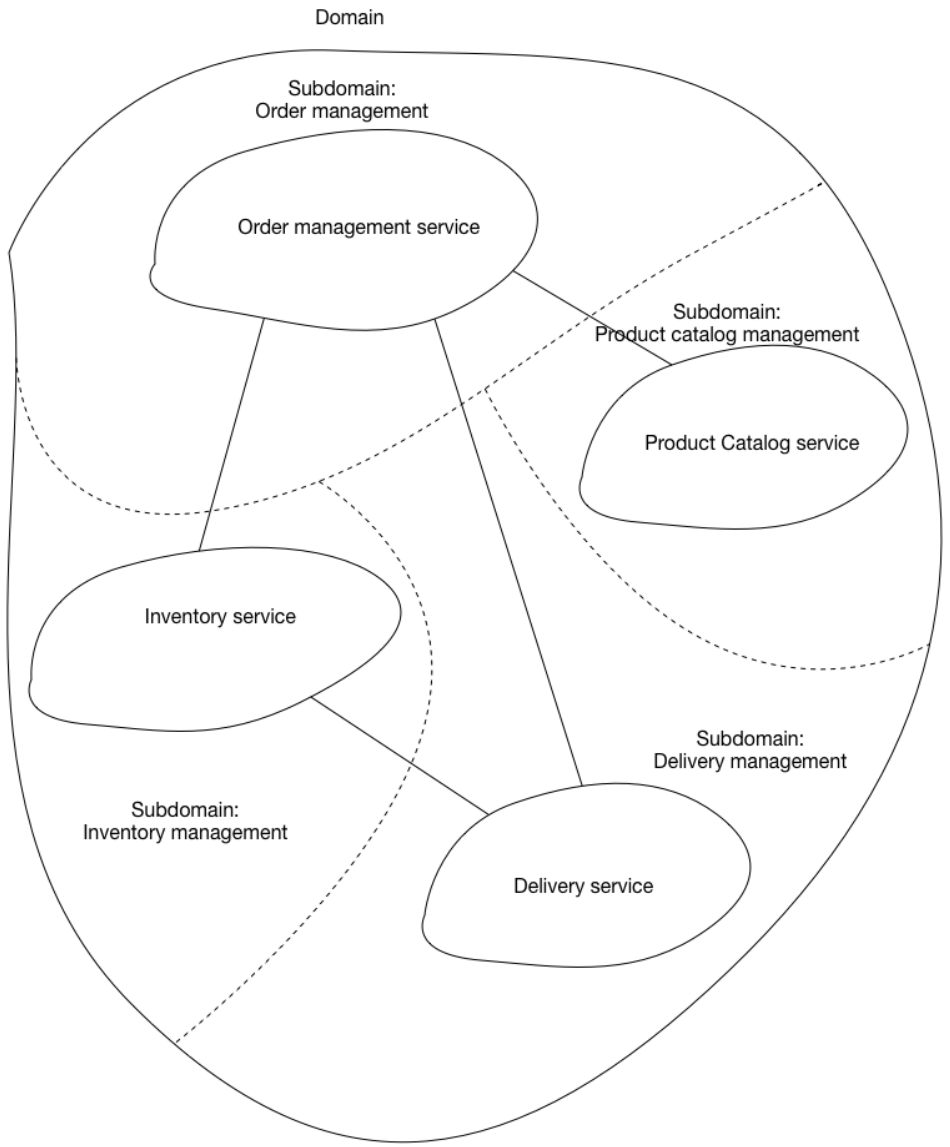
"It's easier to merge than it is to split"

But:

The entire process is too big/too complex
to analyse as a whole…
-> identify the domains - with "just enough architecture".

A Domain is a combination of :

- Knowledge
- Influence
- Activity

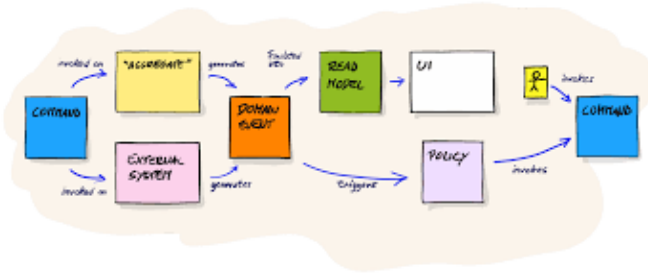


“It’s easier to merge than it is to split”

One single massive object
more consistency across business rules
more contention

Many objects
less contention
less consistency across business rules

Domains
Business rule consistency: loosely coupled
Contention: reduced



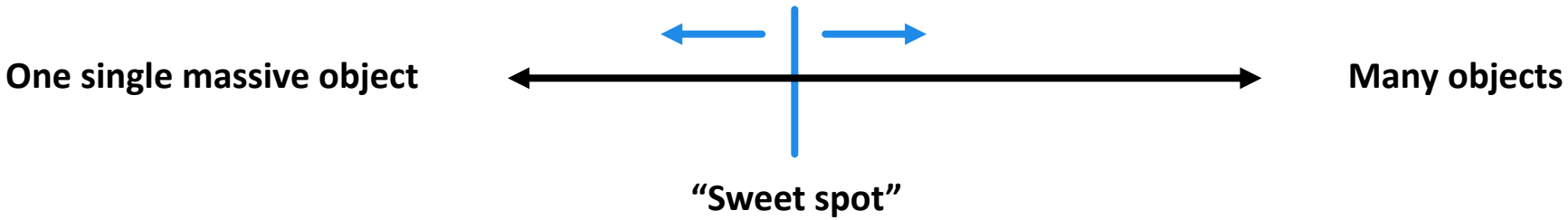
Domain
Business rule consistency: loosely coupled
Contention: reduced

Many objects
less contention
less consistency across business rules

“Sweet spot”

Discussion

- **What type of systems do we expect (have) to be where on the scale?**
  - Software only systems
  - Embedded software systems. Or should we view these as embedded hardware (EHI ☺)?
  - Level of embeddedness (of the software)?



VANDERLANDE

MOVING YOUR BUSINESS FORWARD