

Key Aspects for Sustainable Product Development

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The Quest for
Continuous Improvement

Azure
Research Lake

Demon of
Possessive
Ownership

Goat of
Hopelessness

Poisonous Octopus

Eastern
Dragon of Trust

Flaming
Mountain

Lake of
Sorrow

Starting point

- If, like me, you observed that...
 - Customers needs are too fuzzy... and/or their needs feel to be a solution
 - Communication between technical silos is difficult
 - How to assert that all technical points of view are coherent?
 - Lack of trust in software development (i.e. difficult to respect costs, schedule, quality)
 - Software does not scale easily
 - Some systems feel simple while others feel too complex without reason
 - Reuse is a challenge
 - Difficulties in mastering complexityand the list goes on...

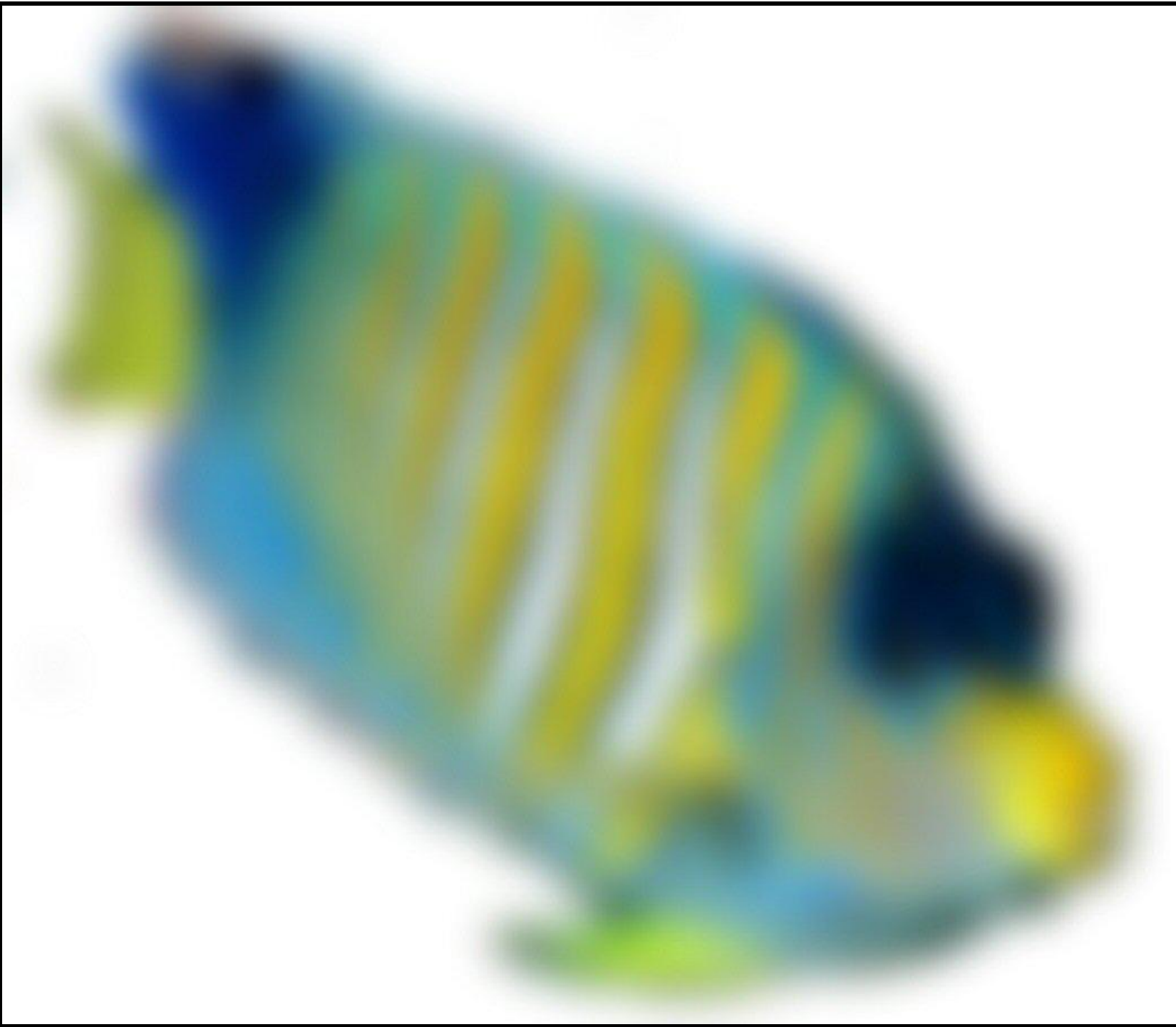
- I want to share with you some important findings I have found on how to fix such kinds of problems.
- I have worked for 25 years in technical systems development with many industries in several domains, now mainly delivering consulting.

- Let us make a first experience...

The fish's experience





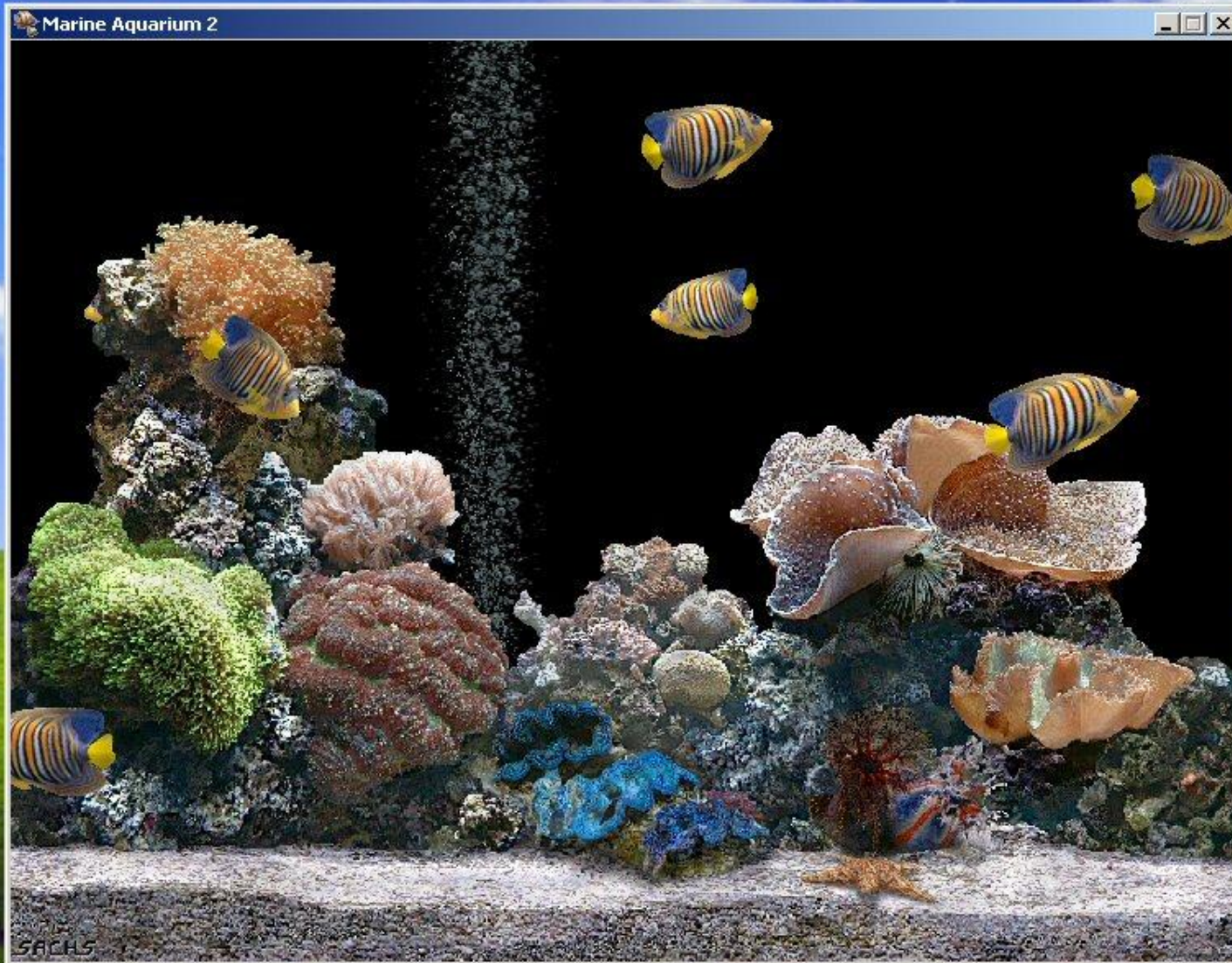




Recycle Bin



My Bluetooth Places



What is this?



Fish



Fish



Fish

However, they are very different but using the same name... Scrambling...
What do I miss?



The real fish

- Exists in the real world - visible with my eyes
- Is a kind of (real) object (i.e. existing by itself)
- Has a behaviour

The Real World

- I am living in it
- Seems there is only one
- Time is always now!
- Contains only objects and fields of physics (electric, magnetic...)
- Limited by reality (i.e. physic, chemistry, biology...)
- Symbolic colour: **Black** = strong reality...
- Easy to manage Energies
- Difficult to manage Information

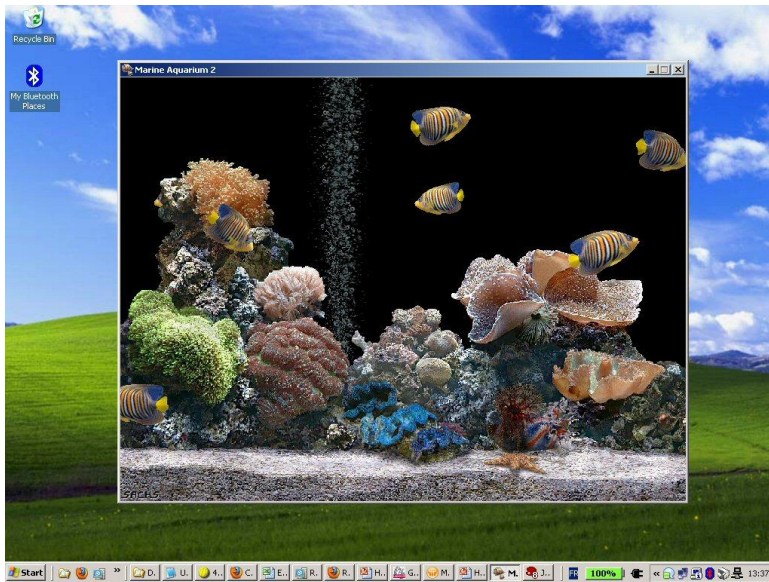


The ideal fish

- Exists in my brain – could be visualized closing my eyes
- Is a kind of (virtual) object (i.e. existing without any context)
- Has a behaviour

The Ideal World

- It is living within me
- Seems there is one by (living) people
- Based on Plato's Theory of Ideas
 - Ideal does not mean perfect, just means "made of ideas"
- Time is an idea, among others
- Contains ideas
 - Seems that ideal object is one good concept, with some others
- No limit...
- Symbolic colour: **Green**, hope...



The virtual fish

- Exists in running Serene Screen's Marine Aquarium program executed by my computer - visible with my eyes looking at my computer's display
- Is a kind of (virtual) object (i.e. existing by itself)
- Has a behaviour

The Virtual World

- It is living in a "computer", made existing by a computer executing a program
- It seems there could be many!
 - If one computer is executing multiple programs
 - Ex: My laptop executing text editors, web browsers...
 - If multiple connected computers executing multiple programs
 - Ex: World Wide Web
- Time is data, among others
- Contains ? (occupying memory)
 - Seem virtual object is one good concept, with some others
- No limit...
- Symbolic colour: **Red**, passion... ;-)
- Impossible to manage Energies
- Easy to manage Information

So what?

- Seems interesting but how to use it?
- Let us make another experience...

“To go on Mars” - project experience

“To go on Mars” Project

1. I try to understand customer's needs from his/her point of view.
2. I imagine a principle solution containing new and existing elements.
3. For each element of this solution, I have to find, create, discover or reuse technical solutions (mechanic, electric, electronic, thermic... and software) then I have to choose the best one.
4. When chosen, I have to put all these technical solutions together to build the technical system.

Ideal World

Ideal World

?

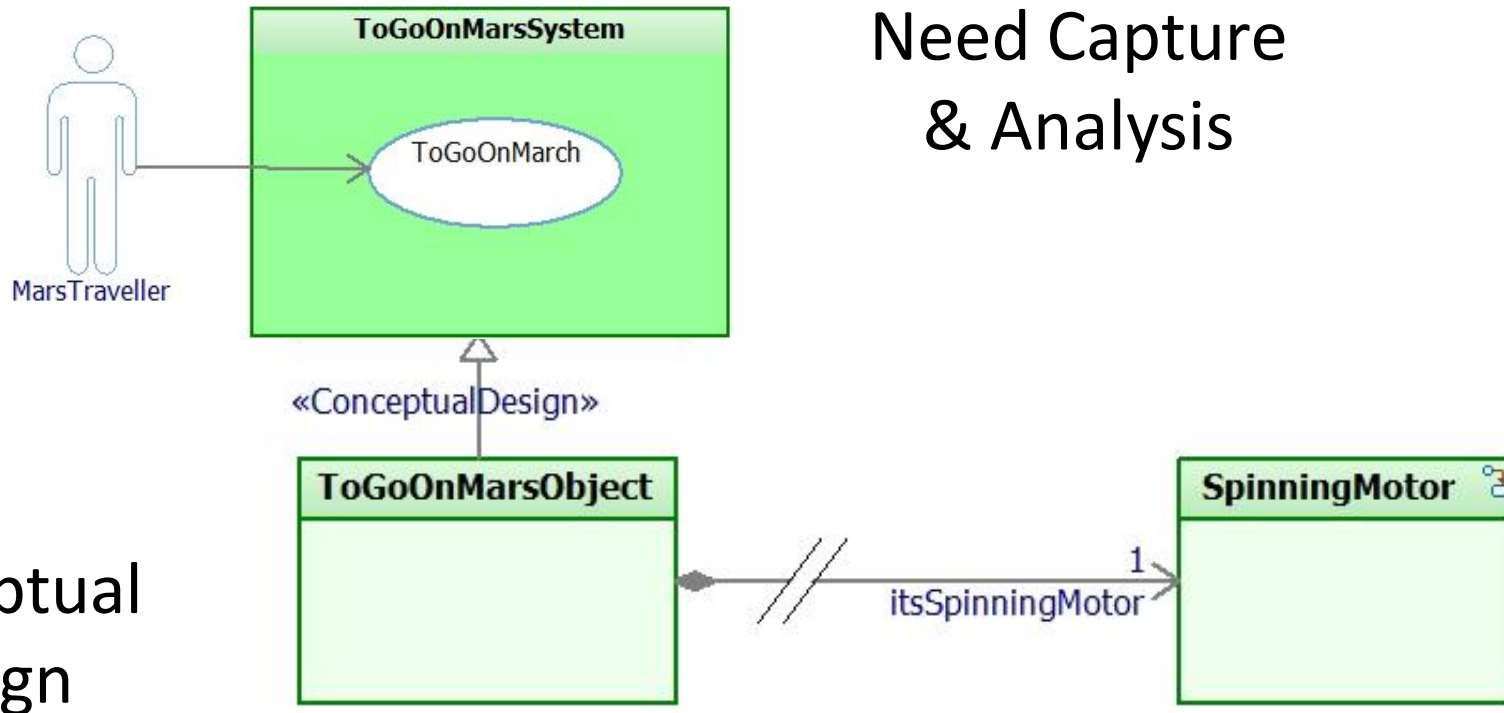
Virtual World

Real World

Intuitive Development Process

- This process does not feel new
- Illuminated by the “3” worlds makes it clearer and simpler
- Let's look at it as a model

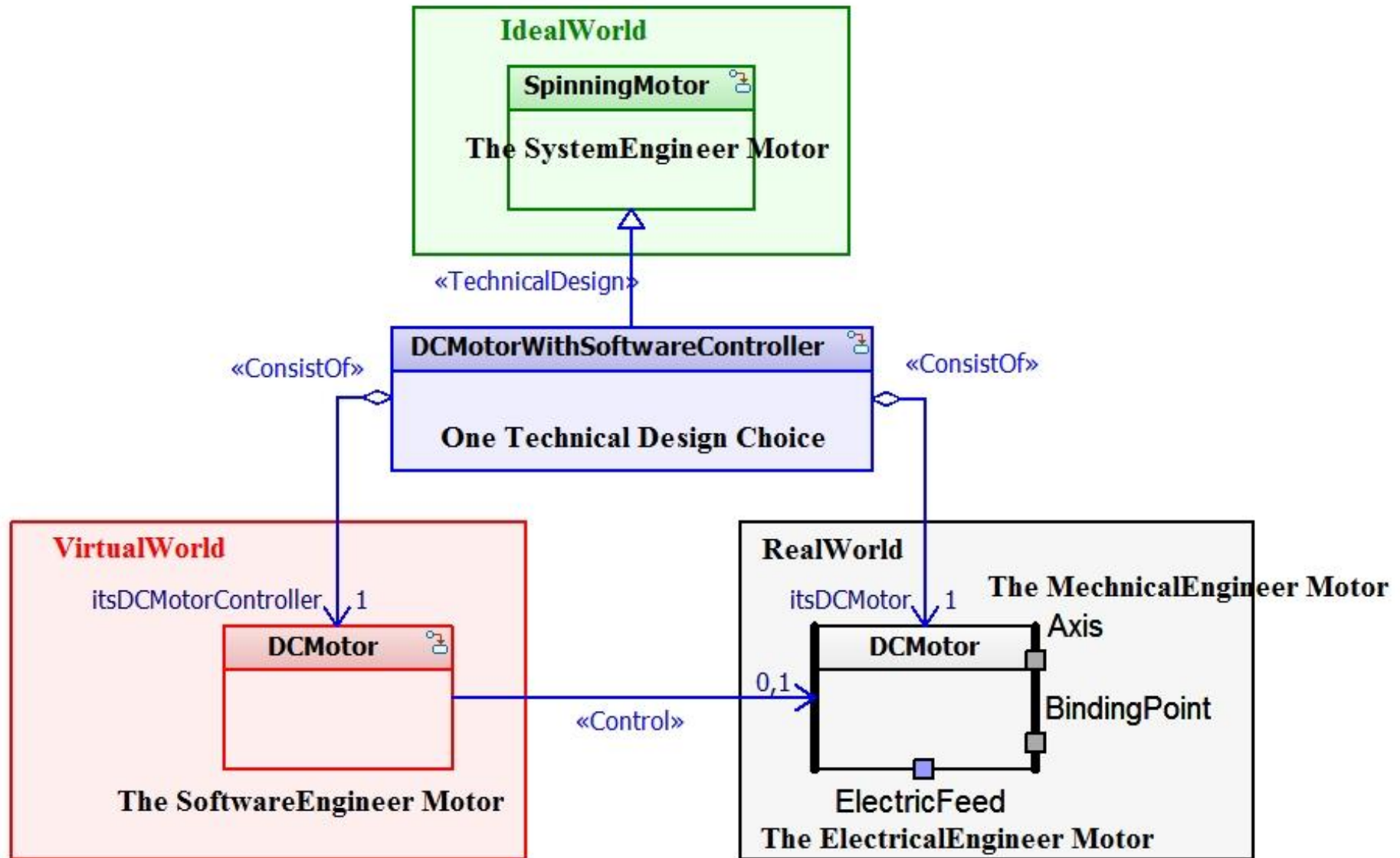
In a Model...



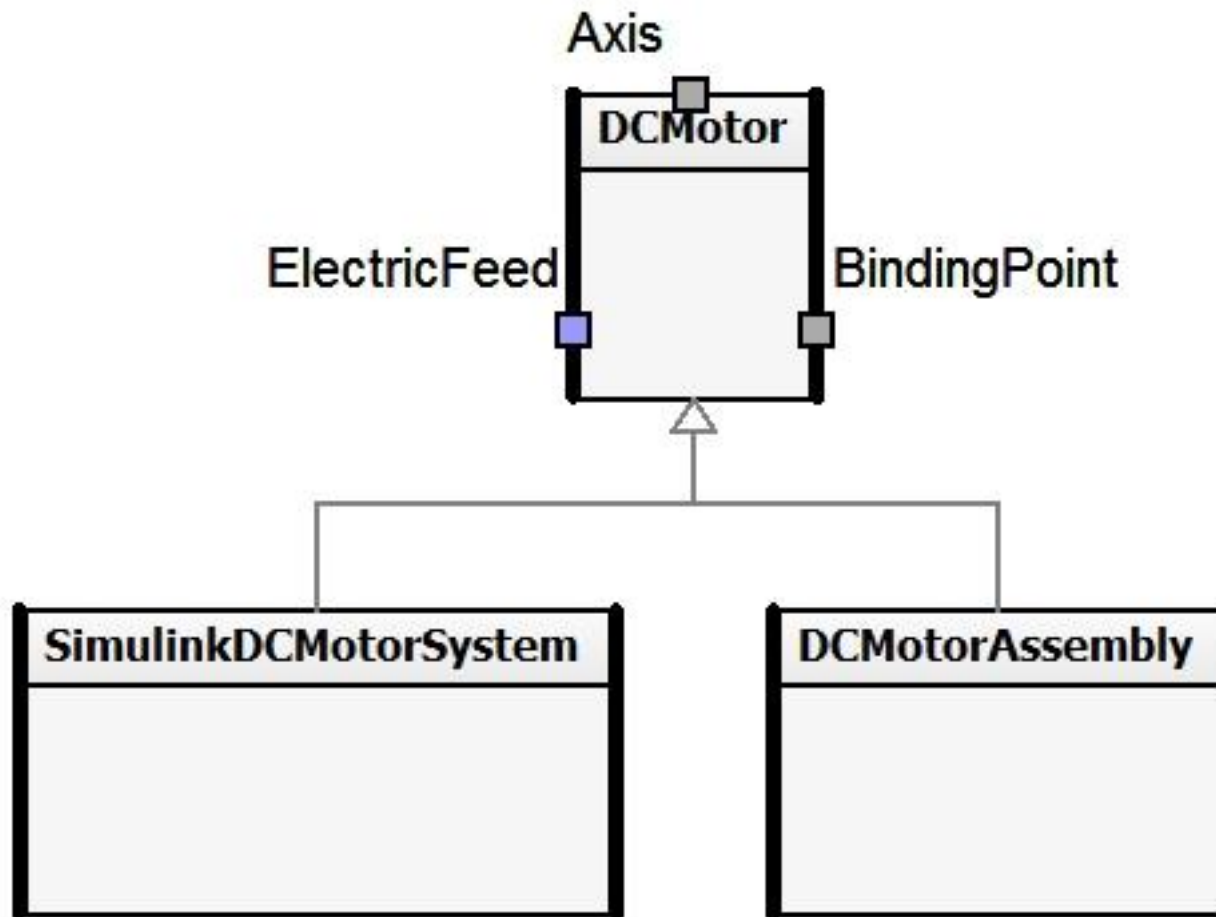
Need Capture
& Analysis

Conceptual
Design

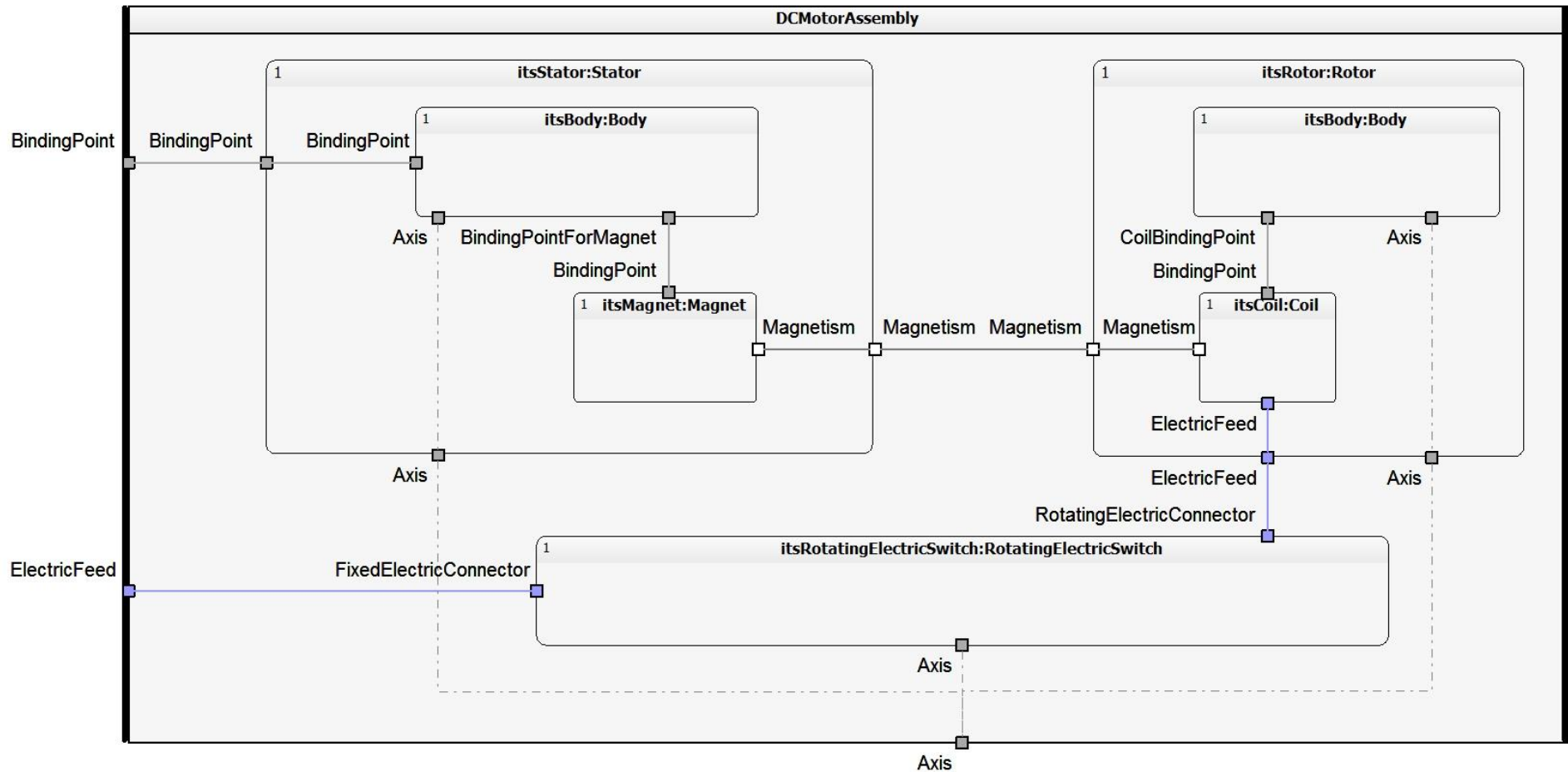
Technical Design



« Real » Design

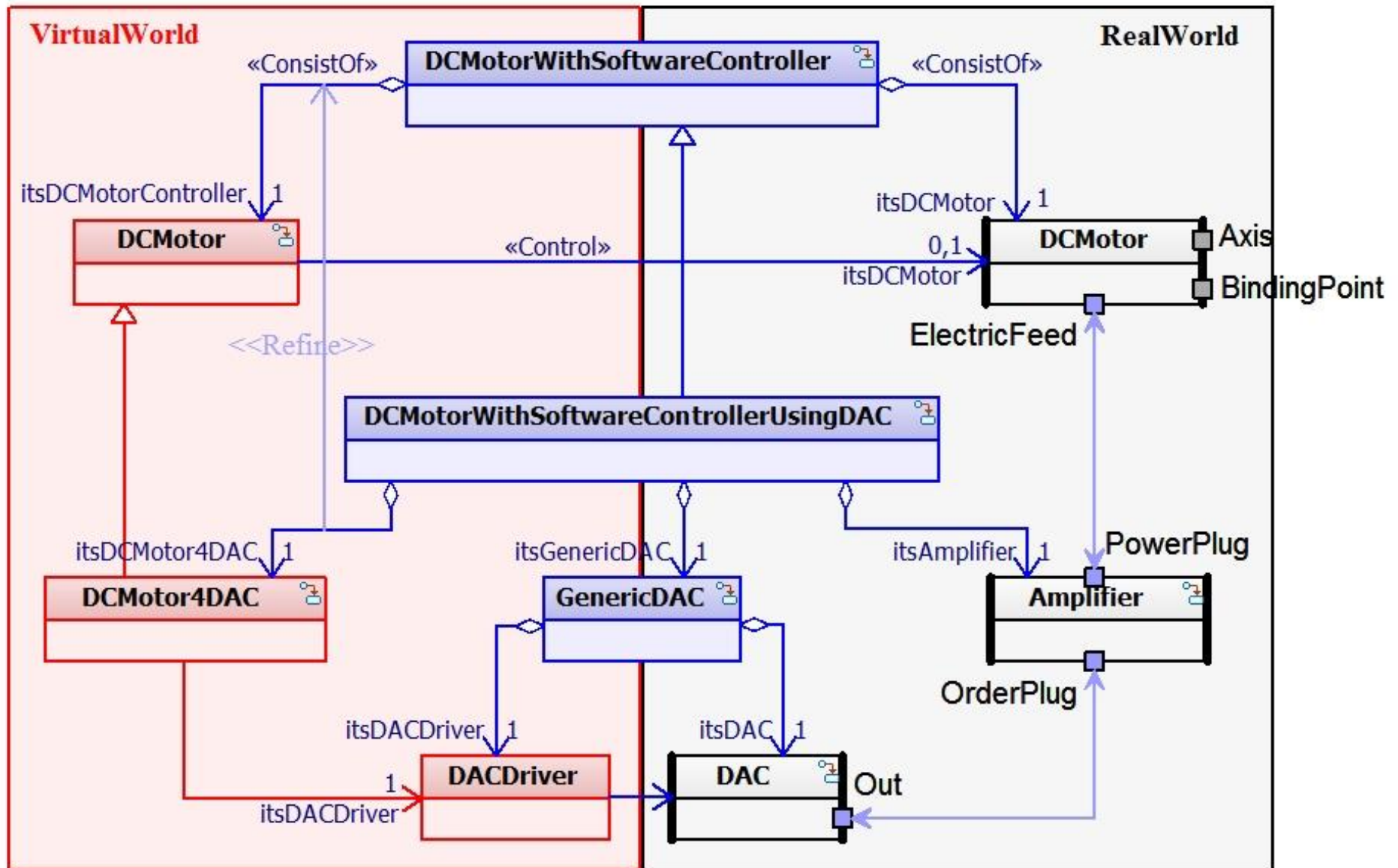


« Real » Design

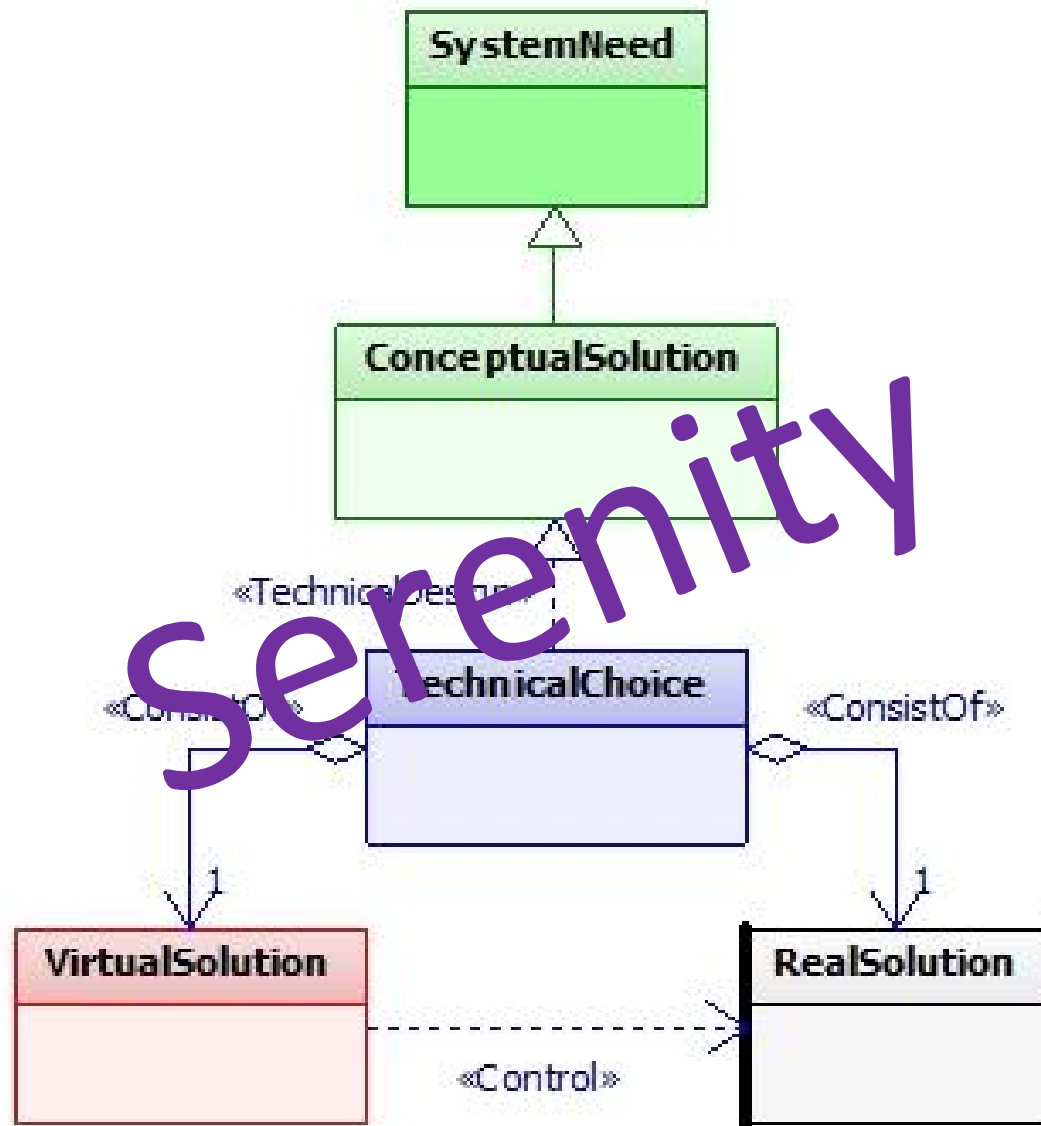


Legend
 Mechanic —
 Electric —
 Magnetic —

« Virtual » Design + Digital Electronic Design



Synthesis



In equations

- System Need is an equivalence class of Conceptual Solution:

$$\text{System Need} \subseteq \text{Conceptual Solution}$$

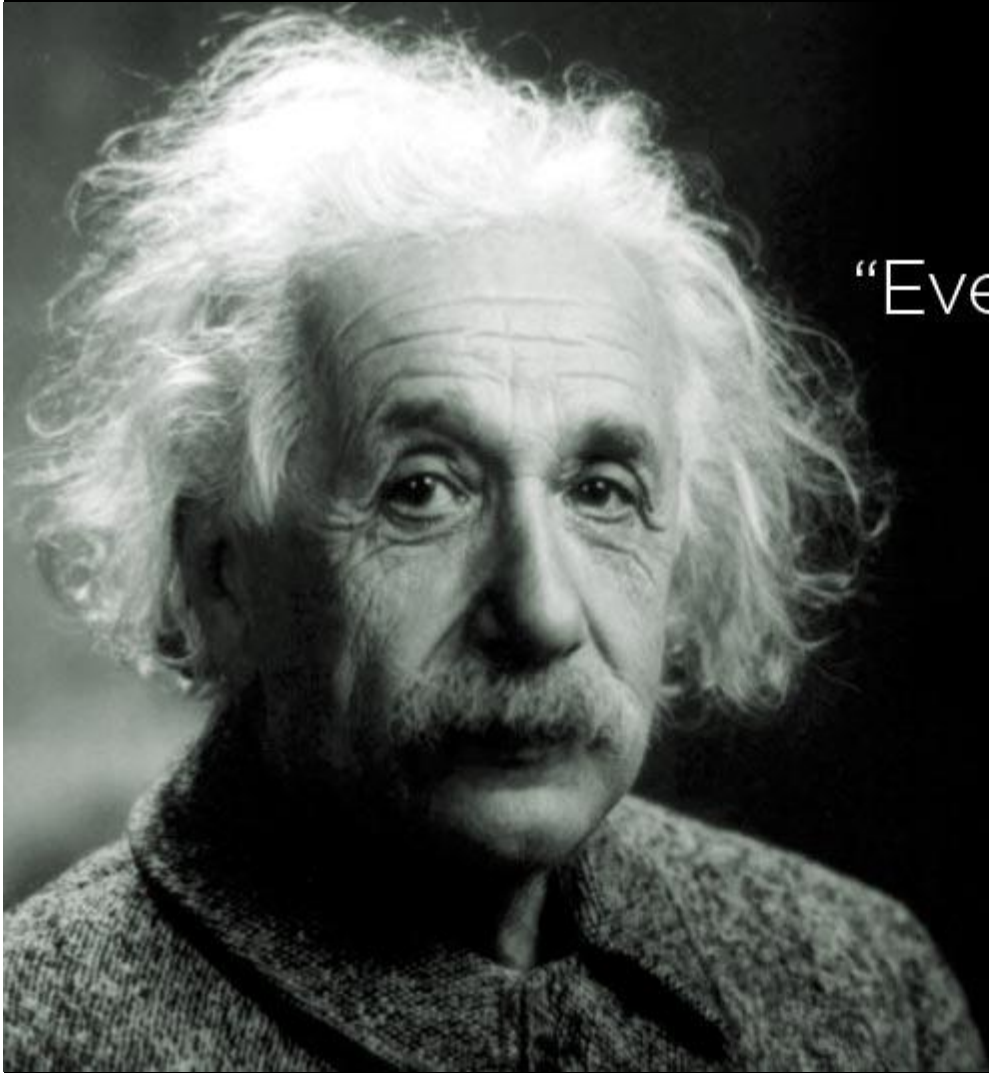
- Technical choice aims at that whole technical solution equals Conceptual Solution:

$$\text{Conceptual Solution} = \text{Virtual Solution} + \text{Real Solution}$$

- As, with real world we do what we can, and as with virtual world all is possible, the effective equation becomes:

$$\text{Virtual Solution} = \text{Conceptual Solution} - \text{Real Solution}$$

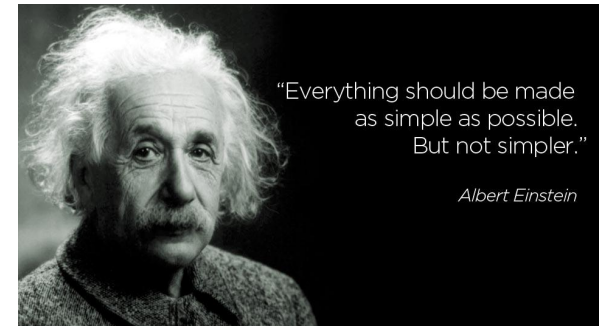
CONCLUSION



“Everything should be made
as simple as possible.
But not simpler.”

Albert Einstein

Conclusion - Good News!



- Rules that makes things as simple as possible exist!
Among others:
 - Think in the “right” world and avoid to mix them.
 - Use the intuitive design process:
 - Need understanding
 - Conceptual solution design
 - Technical solution design (incl. trade-off studies)
 - Real parts (i.e. mechanic, electric, electronic (A&D)...))
 - Virtual parts (i.e. software...)
 - Use objects
 - Easy to understand and to validate (no “side effect”)
 - Allows high reuse ratio
- Simpler => Reduction of Costs and Delay, Increase of Quality, Increase of satisfaction for Professionals, Customers and Finance
- Already used by many customers in diverse industries

THANK YOU

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Serenity

