

WP18

Family Architecture

Design of Software Architectures

Dr. Vadim Zaytsev aka @grammarware, 13 October 2022

What is a system family?

- Collection of systems
 - with common properties
- Collection of “genes”
 - to create systems
 - with the same properties

(give examples)



System family



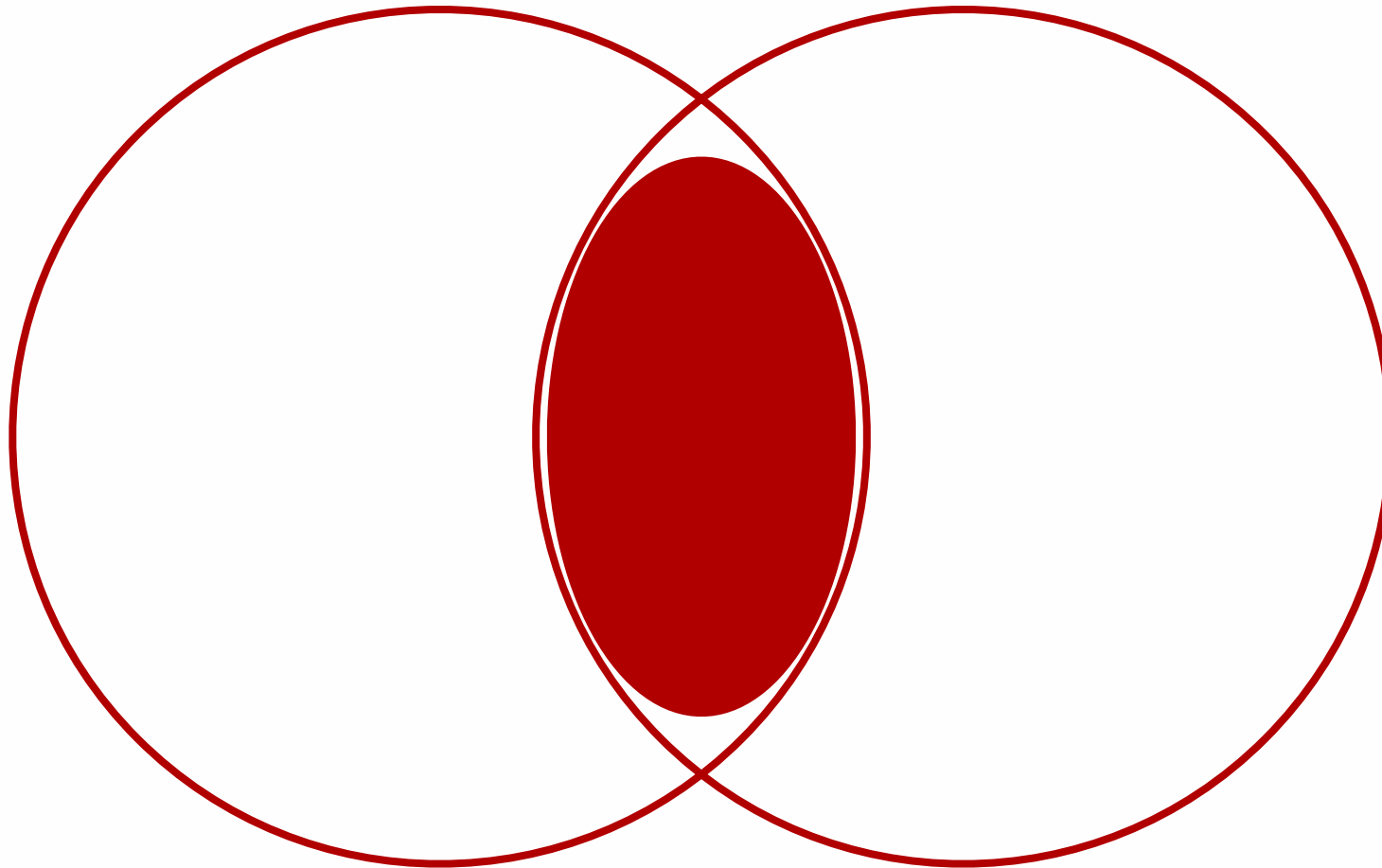
<https://www.brouwerijjeanske.nl/onze-bieren/>



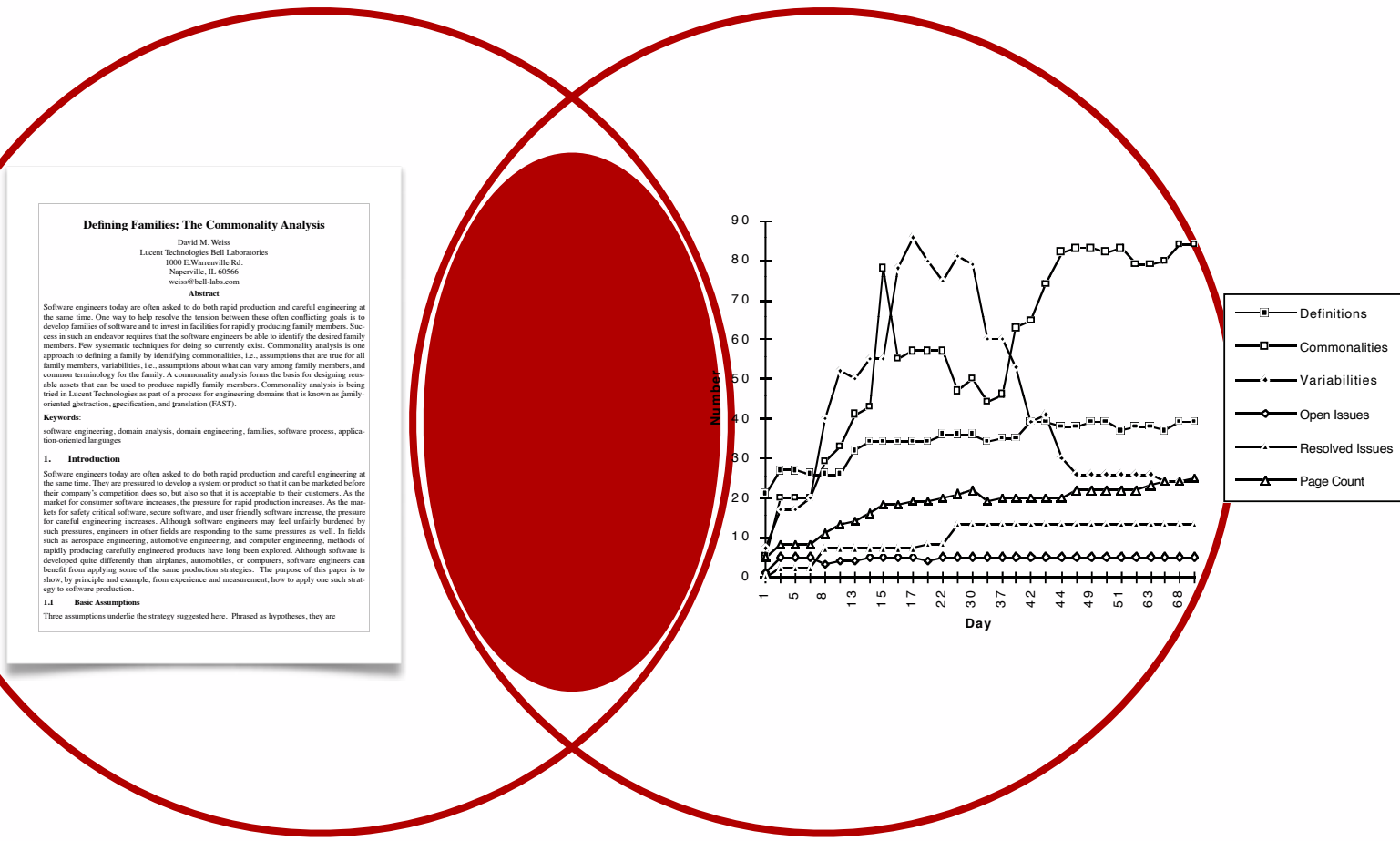
Advantages of a family approach

- One **solution** per development **problem**
 - lower development costs per system
 - lower development time per system
- **Homogeneous** systems
 - lower management/maintenance costs
 - predictability for quality/behaviour/...
- Solution **validation** in **multiple** systems
 - faster insight if solution works
 - bugs detected earlier

Commonalities & variabilities



Commonalities & variabilities



Set up a family

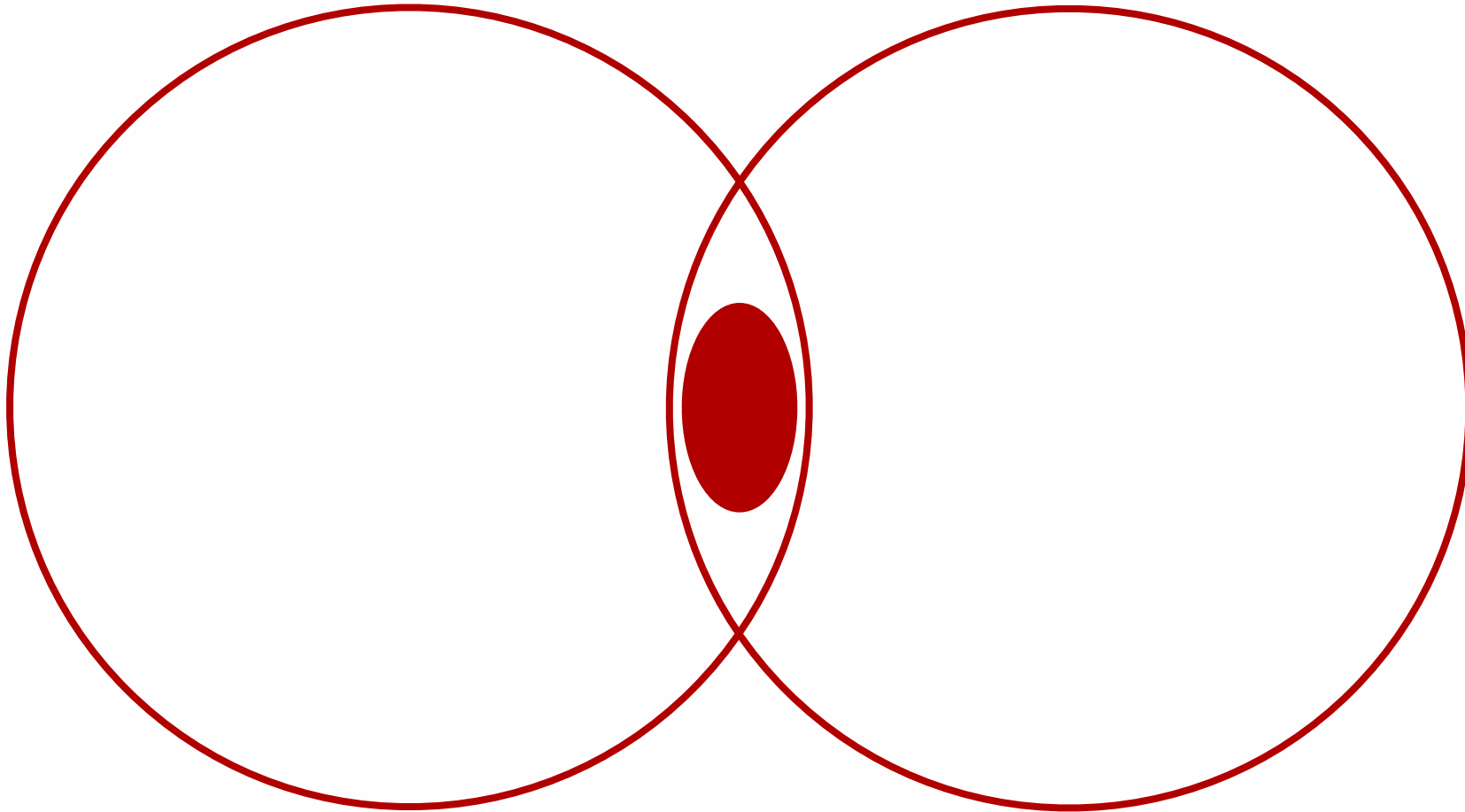
- **Scope/goal**: identify possible members
- Establish **common architecture**
- Describe **realisation** of **reusable elements**
 - common database, **ESB/DAL**, **GUI**, DPs, libraries, **API**,...
- Plan **realisation** of a **new member**
- Ensure **family reqs** for **all** members
 - **security**, **performance**, **availability**
- **In practice**: add **reference implementations**

Achieve commonality

- **Fix** functional reqs
 - later: **in house**, **outsource**, **buy**, ...
- **Prescribe** design elements:
 - **design patterns**
 - **software components**
 - **platform**
- **Standardise** dev't process/organisation
 - **test** approach, **coding** standards, **guidelines**, ...
 - **deliverables** and **templates** with consistency rules
 - **roles** and **knowledge** of people



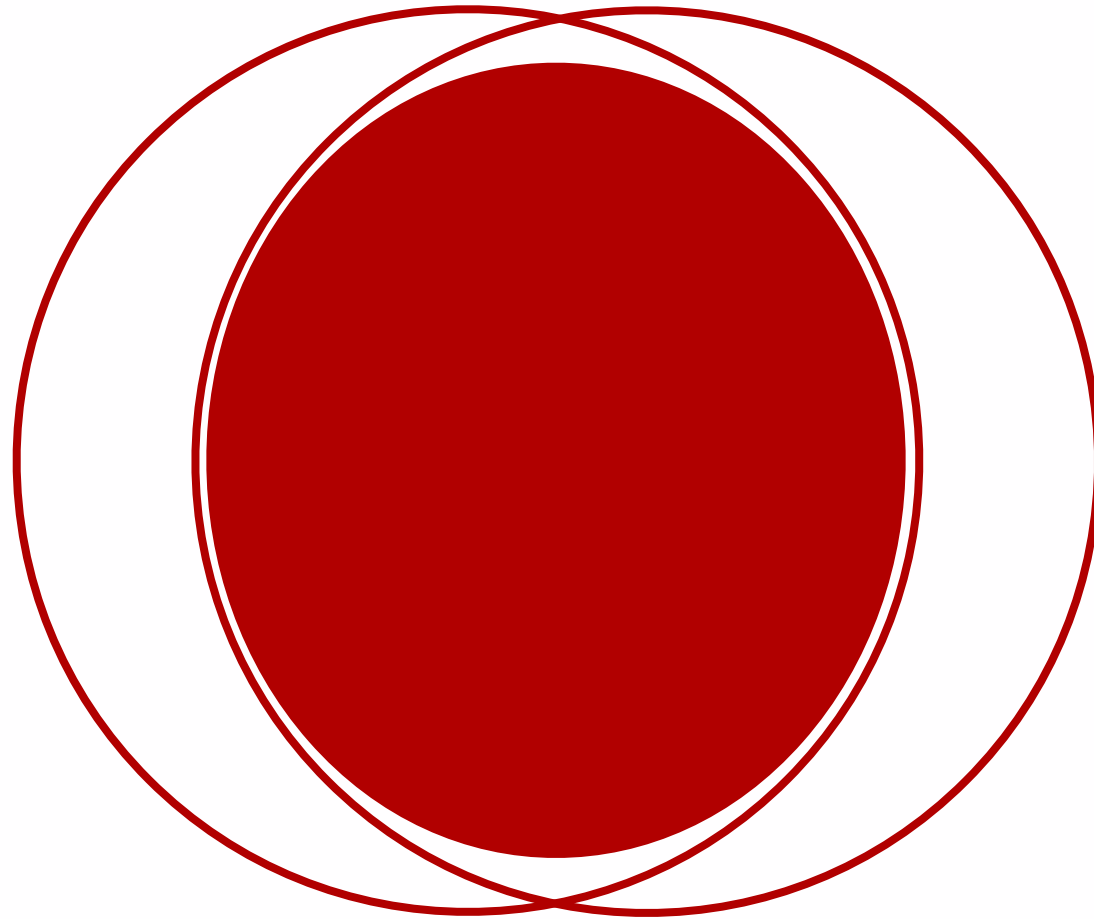
Too little in common



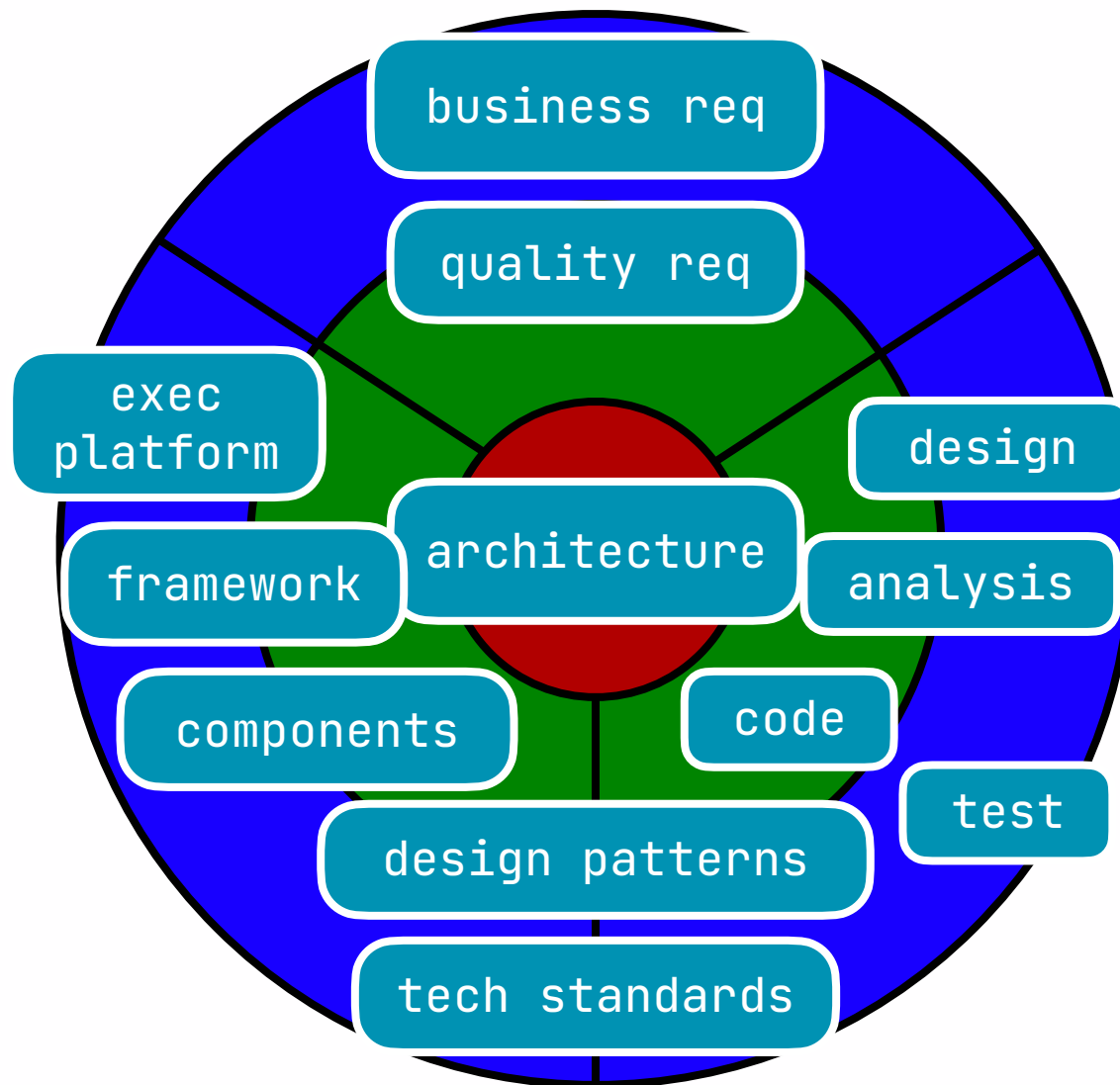
Achieve variability

- Configurability
- Software components
- Plugin infrastructure
- Instantiation
- Inheritance / specialisation
- Generation
- . . .

Too much in common



Family approach



Apply the family approach

- **Identify families** in the context of your system
 - could be the system or components
 - cf. [WP12]
- **Think** about:
 - commonalities
 - variabilities
- **Describe**:
 - family name/definition
 - what's common/variable
 - mechanisms to achieve c/v
 - show an example

