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Decomposition

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1 BACKGROUND

One of the dimensions described in the ANSA Climbing Frame [1] was called **abstraction**. Various comentators identified this as an area of confusion, and subsequent work [2] identified the issue as being concerned with the **decomposition** of systems into parts, rather than about **abstraction** which is one of the techniques used to assist in the choice of appropriate decomposiations.

This document discusses the **decomposition** of systems into parts, and the relationship of this process to the dimensions within the architectural framework.

2 IS IT A DIMENSION ?

This section discusses the issue of whether decomposition forms a valid basis for the establishment of a dimension within the architectural framework of ANSA.

2.1 Is it useful ?

If decomposition is to be used as the basis of a dimension, it must assist in the establishment of structures within the problem domain that support reasoning about the architecture, that encourage the separation of concerns, and that allow objects to be related to each other. In other words "is it useful?".

It is common when describing architectures of system designs to talk about the 'system', 'subsystem', or 'module' levels (other terms are often used), and to treat each of these levels as containing complete descriptions of the system with different amounts of detail. Associated with these levels are a number of rules which say, for instance, that a module can only be contained within a single subsystem. This ensures that there is a tree of decomposition which enforces clear separation of the parts from each other. It also encourages representations of the system to be limited to describing parts from a single level within one diagram, clearly separating the interactions between peer objects from interactions between objects and their constituent parts.

From this we conclude that **decomposition** is useful in the description and manipulation of architectures.

2.2 Are there differences as a system is decomposed

Since the totality of the system is the same whatever level of decomposition is used to describe it, we have to ask whether the various levels of decomposition really reflect changes in 'the architecture', or merely changes in the representation of it.

2.3 What is the related property

Dimensions must be 1:1 related to a single property of objects.

2.4 What is the metric

How do we measure decomposition, are there fixed points, or do we give rules (>3 and <10 expansion at each step, >3 and <6 steps?) and fix the first 1 or 2 for ANSA leaving the system designer to complete the rest according to his problem ???

2.5 Dimension or not ?

YES

3 THE ROLE OF ABSTRACTION

What we ignore,
what we concentrate on

3.1

4 DECOMPOSITION AND STRUCTURE

4.1

5 RELATED INTERACTIONS

5.1

EG Composed-of
Part-of

6 REFERENCES

- [1] *The ANSA Climbing Frame.* (AO.16.02 3rd September 1986)
- [2] *Abstraction.* (AO.63)