4.2.3.3 Analysability

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About

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Analysability is defined by the IEEE glossary of Software Engineering as “the ease with which a software system or component can be modified to correct faults, improve performance or other attributes, or adapt to a changes to the environment”.

One way to understand the Analysability of a system or a program is to understand the size of the system or program. As a rule of thumb, the larger a system or a program, the harder it is to successfully modify the software to correct faults, improve performance, or to adapt to changes in the operating environment. This Analysability can be performed any time while using either the Waterfall Model or the Agile Model. During the early stages, analysis and design. As projects mature and use a larger code base, the models can either be based directly on the source code or Unified Modeling Language (UML) models created using reverse engineering. The metrics can also be used during both Greenfield or Brownfield deployments.

Another possibility would be to collect and use similar metrics on Distributed Computing systems. Instead of using classes (i.e., as in Object-Oriented Programming (OOP)) the number of Nodes, the number of Endpoints and the number of messages types could be used. For **Structural Complexity**, the connections between processes can be used.

Table 1: Metrics for Class complexity[1)]

Type of Metrics	Metric definition
Size Metrics	
Number of Classes (NC)	The total number of classes
Number of Attributes (NA)	The total number of attributes
Number of Methods (NM)	The total number of methods
Structural complexity Metrics	
Number of Associations (NAssoc)	The total number of associations
Number of Aggregations (NAgg)	The total number of aggregation relationships within a class diagram (each whole-part pair in an aggregation relationship)
Number of Dependencies (NDep)	The total number of dependency relationships
Number of Generalisations (NGen)	The total number of generalization relationships within a class diagram (each parent-child pair in a generalization relationship)
Number of Generalization hierarchies (NGenH)	The total number of generalization hierarchies in a class diagram

Type of Metrics	Metric definition
Size Metrics	
Maximum DIT (MaxDIT)	It is the maximum DIT value obtained for each class of the class diagram. The DIT value for a class within a generalization hierarchy is the longest path from the class to the root of the hierarchy
Maximum HAgg (MaxHAgg)	It is the maximum HAgg value obtained for each class of the class diagram. The HAgg value for a class within an aggregation hierarchy is the longest path from the class to the leaves

DDS Specifics

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The main way that Data Distribution Service (DDS) can help Analysability of a system or product is through the elimination of a portion of the codebase by outsourcing the functionality to DDS.

1)

Marcela Genero, Mario Piattini and Ronda de Calatrava, Empirical validation of measures for class diagram structural complexity through controlled experiments, Accessed 4 August 2020, https://pdfs.semanticscholar.org/dd52/5d80c1f370258e56cd956bcb903706c216dc.pdf

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