Systematica™

Do more with less

Abbreviated Systematica™ 4.0 Glossary—Ordered by Concept

Generic

Term	Definition
Terms for Systems	
System	A collection of interacting Components.
Component	A part of a system, capable of interacting with other components.
Interact	Two components are said to interact if one impacts the state of the other.
Sub-system	A Component of a system, which is itself a system.
Subject System	A System that is being specified or is the focus of attention.
Environment	The total system which is external to a Subject System and which has interactions with it of interest.
Actor	A component of the Environment of a Subject System that directly interacts with the Subject System.
Logical System	A system identified solely by its externally viewable behavior or responsibility.
Physical System	A system identified solely by its physical identity or make-up. Physical Systems are design components that fulfill Functional Roles allocated to them.
Terms for System Behavior	
Functional Interaction	An interaction of Systems, expressed as an external (outcome) relationship in which at least one system affects the state of another system. In some disciplines, also called Contract, Interaction, or Collaboration.
Functional Role	The behavioral description (and therefore a Logical System) of a part played by a System in a Functional Interaction's relationship.
Sub-Interaction	A Functional Interaction that is a part of (decomposes) a larger Functional Interaction.
Feature	A collection of Functional Interactions that has stakeholder value or provides a valuable service. See also Service.
Service	Same as Feature, but with further implications of consumed value and levels of service performance.
Input-Output	That which is externally exchanged between interacting systems. Abbreviated as I-O. Typically flow Energy, Force, Mass, or Information.
Architectural Relationship	A relationship that summarizes the architectural significance of a set of interactions between systems.
System of Access	A System providing the means of access for interactions between other Systems.
Interface	The association of a System with a set of its Functional Interaction(s), Input-Output(s), Architectural Relationship(s), and System(s) of Access.

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Term	Definition
Terms for Modeling System States or Modes	
State	The condition of a system that determines its interactive behavior, viewed externally from the system. A situation.
Use Case	A State (situation) of an Environment of a System which implies that certain Functional Interactions be performed by the Subject System.
Sub-state	A state (situation) that occurs during, but not necessarily throughout, another state (situation).
Event	Describes an occurrence that triggers a transition from one modeled state to another.
Embedded Intelligence (EI) Pattern: Terms for Modeling Management of Systems (By Human or Automated Managers)	
MDS	Managed System—A System that provides services to a System of Users, and that is managed by a Management System.
SOU	System of Users—A System that consumes services from a Managed System or a Management System.
MTS	Management System—A System that manages the Performance, Faults, Configuration, Security, or Accounting of a Managed System.
SOA	A System providing the means of access for interactions between other Systems.
SMFA	System Management Functional Area—All system management functions fall into these five SMFAs: Fault Management, Performance Management, Security Management, Configuration Management, and Accounting Management.
Terms for Modeling Hierarchies, Relationships, and Attributes of Classes	
Class	A set of things that are considered "similar" to each other by virtue of their membership in the class.
Superclass, Subclass	A class is a superclass of another class (called a subclass) if the latter is a special case of the former. Viewed as sets, a subclass is a subset of a superclass.
Relationship	A statement about several classes that may be true or false. If true, the classes are said to be in that relationship with each other.
Hierarchy	A sequence of classes, related to each other sequentially by the same type of relationship.
Class Hierarchy	A General-Special hierarchy, in which each progressive layer is a more specialized case of the layer above it. ("Is a type of")
Containment Hierarchy	A Whole-Part hierarchy, in which each progressive layer is a part of the layer above it. ("Is a part of")
Metaclass	One of the Systematica foundation classes used to formally describe systems and system related information. Metaclasses include System, Functional Interaction, State, Feature, Interface, Input-Output, etc.
Attribute	A property or characteristic of a class, capable of taking on values to describe instances of the class.

Term	Definition
Terms for Managing and Applying System Patterns	
Pattern	A collection of related metaclasses (System, Feature, State, Service, etc.) that may be re-used in different system configurations.
Gestalt Rules™	Rules that tell us whether a pattern is a special case conforming to a more general pattern.
Configuration	Configuration is a highly constrained operation on a pattern that produces a configured result. A configuration of a pattern is the result of only populating (or depopulating) the items described by the pattern, and setting values of attributes described by the pattern—no other operations allowed. (No changes to names, definitions, or attributes, except for their values.) The items populated may be any metaclasses (Systems, Features, States, Services, etc.) found in the pattern. A configured system conforms to the pattern that describes its family.
Specialization	Specialization is similar to configuration, but less restrictive. A specialization of a pattern is the result of making some of the items described by the pattern more specific, including the option to specialize names and definitions of items in the pattern, and adding attributes to those items in addition to those in the pattern. The items populated may be any metaclasses (Systems, Features, States, Services, etc.) found in the pattern. A specialized system conforms to the pattern that describes its family.
Configuration Rule	A rule that restricts an engineer's choice of attribute values and population/de-population options.
Attribute Coupling	A description of how attribute values impact each other and the appropriate strategy in satisfying the web of dependencies.
Use (as a noun)	A configured application of a class or pattern of classes. (More than one of these of the same type are re-uses of the same assets.) Note that a Use is a class, not an instance (member) of the class. Strictly speaking, a use is a subclass of its parent pattern class.
Terms for Modeling System Requirements and Designs	
Requirements	What a Subject System must be or do as seen by its environment, without regard to how this is accomplished internal to the System. The sum of all the Functional Interactions required of the System, including the attributes of these interactions (e.g., capacity, speed, cost, reliability, etc.).
High Level Requirements Model	The combination of a Domain Model, Feature Framework, State Model, Functional Interaction Model, and Logical Architectural Model that determines the overall framework with which detailed requirements analysis can be performed and managed.
Domain Model	The combination of a Domain Diagram and the definitions of the Systems, Interfaces, Input-Outputs, and Architectural Relationships that appear on it.
Feature Framework	A set of views that link Stakeholders, Advocates, and Needs to the appropriate Features and Feature Attributes. The definitions for each Stakeholder, Advocate, Feature, and Feature Attribute as well as the Feature Attribute values for the Subject System and its configurations are also included.
Stakeholder	A Person or Organization most directly impacted by the change or benefit a Need requests upon a System.

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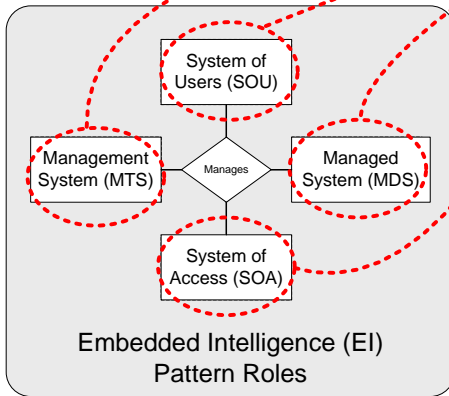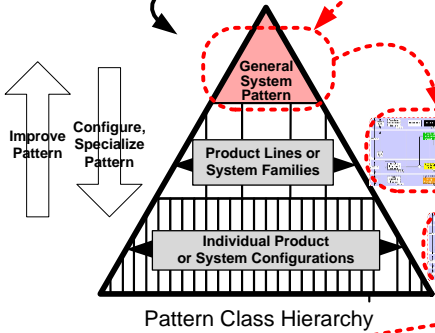
Generic

Term	Definition
Need	A Need is a statement (either in formal or informal language) that implies formally modeled requirements or design constraints upon a system.
Advocate	An Advocate represents a Stakeholder during the elicitation of Needs and in the Validation of the Requirements and the System.
State Model	The combination of a system's State Transition Diagram, the definitions of each State and Event, and a list of defined functional interactions that are required during each State.
Functional Interaction Model	A list of defined Functional Interactions with a list of which Features each supports and States during which each is required.
Logical Architecture Model	The combination of a Logical Architecture Diagram and the definitions of the Systems, Interfaces, Input-Outputs, and Architectural Relationships that appear on it.
Detail Level Requirements Model	The set of Interaction Diagrams; Input-Output Definitions and Relationships; Functional Role Definitions, Requirement Statements, and Relationships; Role Attribute Definitions, Values, and Configuration Rules; and Functional Role Attribute Couplings to Feature Attributes for each identified Functional Interaction.
Requirement Statement	A behavioral description relating a Functional Role's Inputs, Outputs, and Attributes, against which a System will be verified.
Design	The plan of how a set of Requirements will be met or accomplished by the internal physical components and relationships of a Subject System.
High Level Design Model	The combination of a Physical Architecture Diagram, an Allocation Table, Attribute Couplings between Physical System Attributes and Functional Role Attributes, and definitions of each Physical System.
Design Component	A Physical System that is within a Subject System's Physical System Containment Hierarchy and to which is allocated Functional Roles.
Validation	The process of ascertaining that stated candidate (specified) Requirements for a System correctly state the needs of the buyer, owner, acquirer, market, or other authority with respect to the System—this is Requirements Validation. Also used to refer to System Validation--the process of ascertaining that a candidate System conforms to the *actual* needs of such a system authority (as opposed to meeting the *specified* Requirements—see Verification).
Verification	The process of ascertaining that the specified Requirements have been successfully met by a candidate System design.
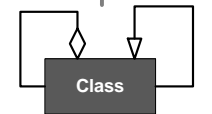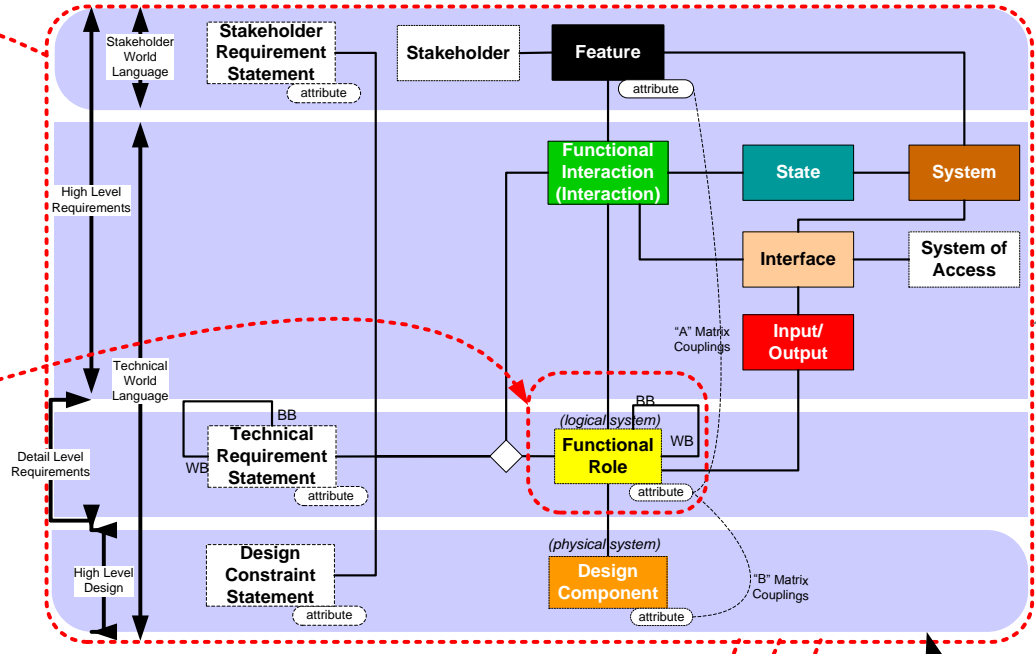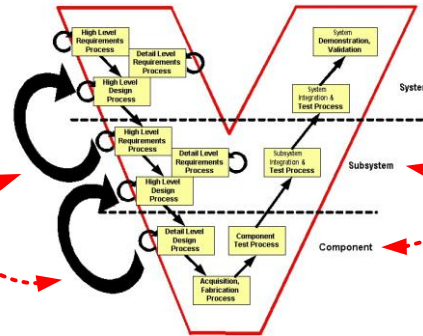
Figure 1: Systematica MBSE Metamodel (informal summary form), Embedded in PBSE and IBSE Frameworks
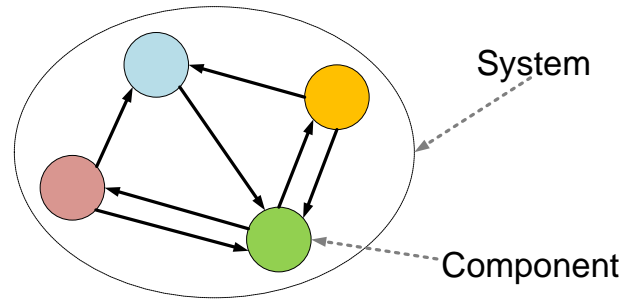
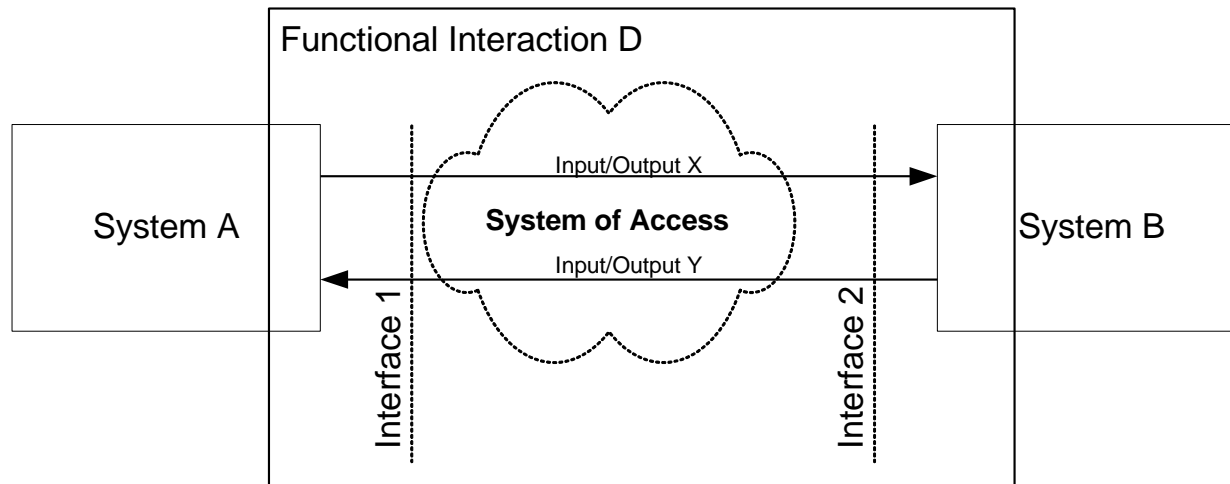**Figure 2: The System Perspective**

Figure 3: System Interactions, Systems of Access, Interfaces

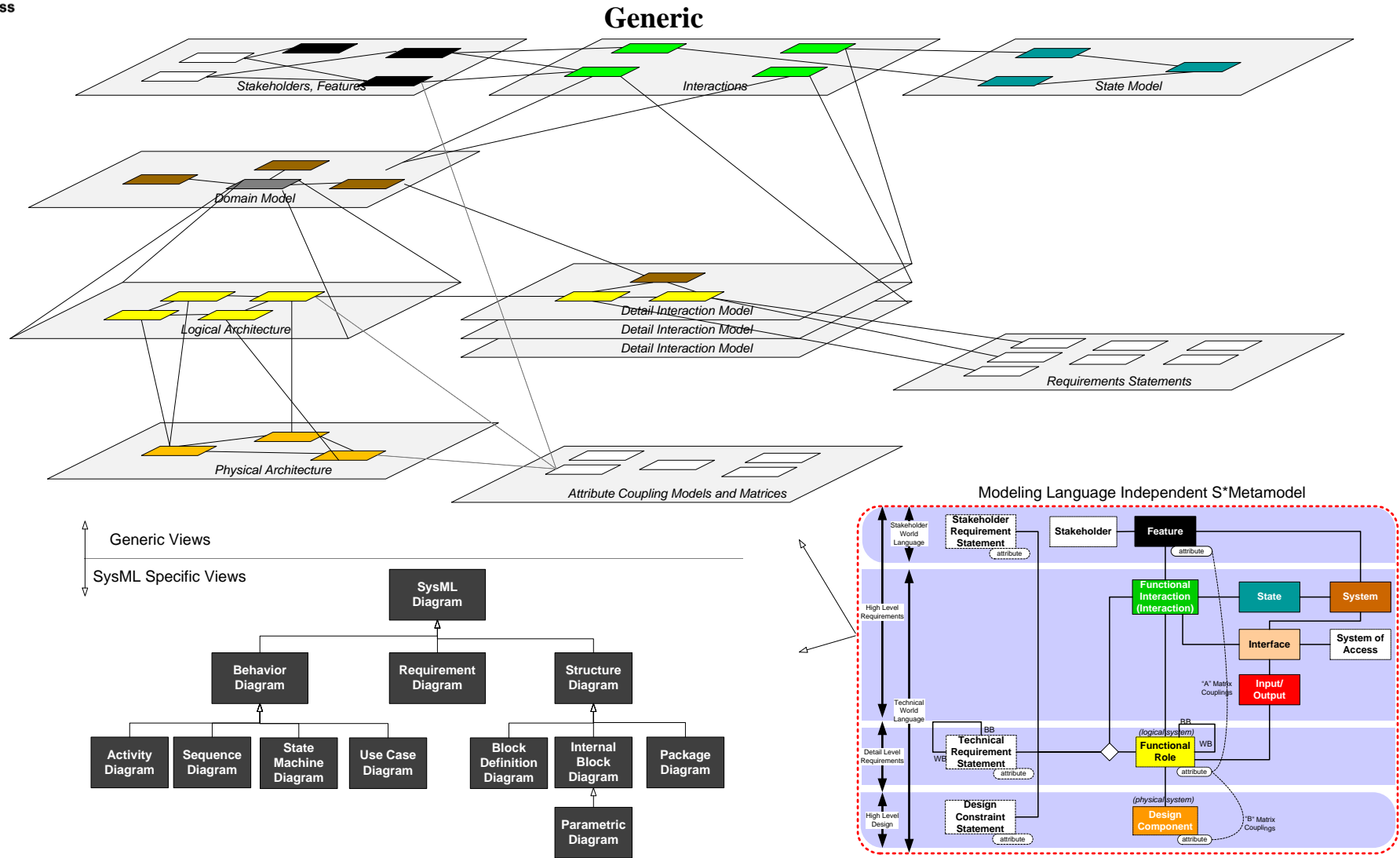# Abbreviated Systematica™ 4.0 Glossary—Ordered by Concept

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Figure 4: Views of Models

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