

Service Action Relationship Types

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The following table lists the concepts of the Service_relationship.type_cd attribute. A Service_relationship class is a recursive associative class with two associations to a Service class, one named “source” the other named “target”. Consider every Service_relationship instance an arrow with a point (headed to the target) and a butt (coming from the source.) For individual relationship type codes, the roles of source and target are specified in the table. In principle the assignment of roles to each side is completely arbitrary. However, to facilitate easy orientation we assumed a particular convention, which is to have the arrow point from the bigger to the smaller, the later to the earlier, the higher to the lower, etc. New entries to that table should adhere to this convention.

Note that some of the Service_relationship type codes rely on particular information model elements and structures that may or may not presently be supported by the RIM.

Name	Definition	Roles	
		source	target
set	Unordered collection of any kind.	set	element
battery : set	Unordered collection of services (set.) Services may be performed in parallel. A join attribute (wait, discontinue, leave-alone) determines whether the target service should be rejoined with the source either by waiting for the target to complete, by discontinuing the target, or whether target and source would not rejoin at all.	set	element
species : set	Generalization relationship (is-a) that can be used to express categorical knowledge about services. (e.g., Amilorid, Triamterene, and Spironolactone medications are potassium sparing diuretics.	genus	species
ingredient : set	Allows to express composition of medications from ingredients. Both, source (composite) and target (ingredients) are medications, where the ingredients need not necessarily be commonly ordered medications. (Open issue: it seems as if a class “material subject” with subclass “pharmaceutical substance” would be a more natural way to model this.)	composite	ingredient
list	Ordered collection of any kind, e.g. a prioritized worklist. The item_nmb attribute must be filled.	list	element
sequence : list	Ordered collection of services (list.) Services are executed one after the other. The item_nmb attribute must be filled sequentially.	sequence	step
pre-condition	A precondition for a service. The target can be any service (e.g., to indicate a status post.) For multiple pre-condition a conjunction attribute (and, or, and-not, or-not) is applicable.	action	pre-condition
trigger : pre-condition	A pre-condition that, if true would permit, suggest, or demand the source service (action) to be executed. The target is in infinitive (trigger) mood. An interval may be specified to indicate a delay between the trigger and the triggered action.	action	trigger
trigger match : pre-condition	A trigger-match links an actual service (e.g., an observation or procedure that took place) with a trigger that this service matched. For example if the trigger is “observation of pain” and pain is actually observed, and if that pain-observation caused the trigger to fire, that pain-observation can be linked with the trigger.	matching service	trigger
reason : pre-condition	The reason or rationale for a service. A reason link is weaker than a trigger, it only suggests that some service may be or might	action	reason

have been a reason for some action, but not that this reason requires/required the action to be taken. Also, as opposed to the trigger, there is no strong timely relation between the reason and the action.

contraindication : pre-condition	A contraindication is just a negation of a pre-condition, i.e. it gives a condition under which the action is not to be done. Both, source and target can be any kind of service, target service is in infinitive mood. How the strength of a contraindication is expressed (e.g., relative, absolute) is left as an open issue. A priority number field could be used that could be merged with the item_nmb field used for list relationships.	action	contra- indication
post-condition	An observation to be true after an action. Target must be an observation in infinitive mood. For multiple post-conditions a conjunction attribute (and, or, and-not, or-not) is applicable.	action	post-condition
goal : post- condition	A post-condition that a service aims to meet. Target must be an observation in infinitive (goal) mood.	action	goal
goal evaluation : post-condition	A goal-evaluation links an observation (intent or actual) to a goal to indicate that the observation evaluates the goal. Given the goal and the observation, a "goal distance" (e.g., goal – observation) can be "calculated." A special attribute should indicate whether the observation value is an absolute value or a goal distance.	evaluation	goal
support	Used to indicate that an existing services is suggesting evidence for a new observation. The assumption of support is attributed to the same actor who asserts the observation. Source must be an observation, target may be any service (e.g., to indicate a status post.)	observation	supporting evidence
cause : support	An assertion that a new observation was assumed to be the cause for another existing observation. The assumption is attributed to the same actor who asserts the observation. This is stronger and more specific than the support link. For example, a growth of Staphylococcus aureus may be considered the cause of an abscess. The source (cause) is typically an observation, but may be any service, while the target must be an observation.	cause	effect
manifestation : support	An assertion that a new observation may be the manifestation of another existing observation or action (condition.) This assumption is attributed to the same actor who asserts the observation. This is stronger and more specific than the support link. For example, an agitated appearance can be asserted to be the manifestation (effect) of a known hyperthyroxia. This expresses that one might not have realized a symptom if it would not be a common manifestation of a known condition. The target (cause) may be any service, while the source (manifestation) must be an observation.	manifestation	cause
derivation : support	A derivation link serves to explicitly associate a derived observation with it's input parameters. Both, source and target must be observations, typically numerical observation. E.g., an anion-gap observation can be associated as being derived from given sodium-, (potassium-,) chloride-, and bicarbonate-observations.	input parameter	output parameter
interpretation range : support, trigger	The interpretation captures the traditional "normal" ranges. Normal ranges are essentially descriptors of a class of result values assumed to be "normal", "abnormal", or "critical." Those can vary by sex, age, or any other criterion. Source and target are observations, the target is in infinitive mood. The interpretation range is both a support link and a trigger, in case of alarms being triggered by critical results.	observation	range
name	Used to assign a "name" to a condition thread. Source is a condition node, target can be any service.	condition thread	name
revision	A service description that is a modification of another service description. This includes revisions of protocols and orders.	revision	prior version
amendment :	A service that amends a previously stated service. This is used,	amendment	prior version

revision	e.g., for corrections of reported observations.		
condition thread : revision	A condition thread relationship specifically links condition nodes together to form a condition thread. The source is the new condition node and the target links to the most recent node of the existing condition thread.	new head of thread	old head of thread
instantiation	Used to capture the link between a potential service ("master" or plan) and an actual service, where the actual service instantiates the potential service. The instantiation may override the master's defaults.	instance	master
fulfillment	A service that was done in fulfillment of an ordered service description. A fulfilled service may differ from an ordered (or planned) service description.	fulfillment	order
generic	A special link between pharmaceuticals indicating that the source is a generic for the target.	generic	brand

This table is not necessarily complete. The purpose of this table is to be as specific as possible but also to classify similar relationship types into categories. Some may miss an unspecific relationship type "pertains-to." This "pertinence" was not included in the above table, because, it is just a more polite way to say "relationship, not otherwise specified" or "other." The problem is that "other" terms have no specified meaning, but are merely the complement of all the currently existing relationship types. As new relationship types will be defined in the future, "other" will change its meaning rather drastically. When other relationship types are discovered, they should be communicated to the Order/Results or Patient/Care Technical Committees and should be standardized before use. In addition the HL7 Code Value (CV) data type allows one to express that a given concept is not-codeable with the applicable code system.

A note about the use of the term "mood" confer to item 2 in Webster's dictionary:

Main Entry: ²mood

Function: *noun*

Etymology: alteration of ¹mode

Date: 1569

1 : the form of a syllogism as determined by the quantity and quality of its constituent propositions

2 : distinction of form or a particular set of inflectional forms of a verb to express whether the action or state it denotes is conceived as fact or in some other manner (as command, possibility, or wish)

3 : MODE 1b

The infinitive mood of a Service is used for describing potential services that can have actual services associated with them. Common use of the infinitive mood is for dictionary entries (so called "master service") and all "knowledge" links (e.g., possible reason, cause, manifestation, etc.) Other special infinitives are goal and trigger mood. A goal describes a wish for a certain outcome (typically an observation) to be achieved in the future. An observation in goal mood is not actually made, thus is an infinitive. Goals are evaluated later. Triggers are service descriptions that can match actual services (like a query.) When a trigger matches, it enables, suggests, or demands the associated action to be performed. Triggers are most often used to fully describe PRN medication orders, but can serve to build reminder systems too.