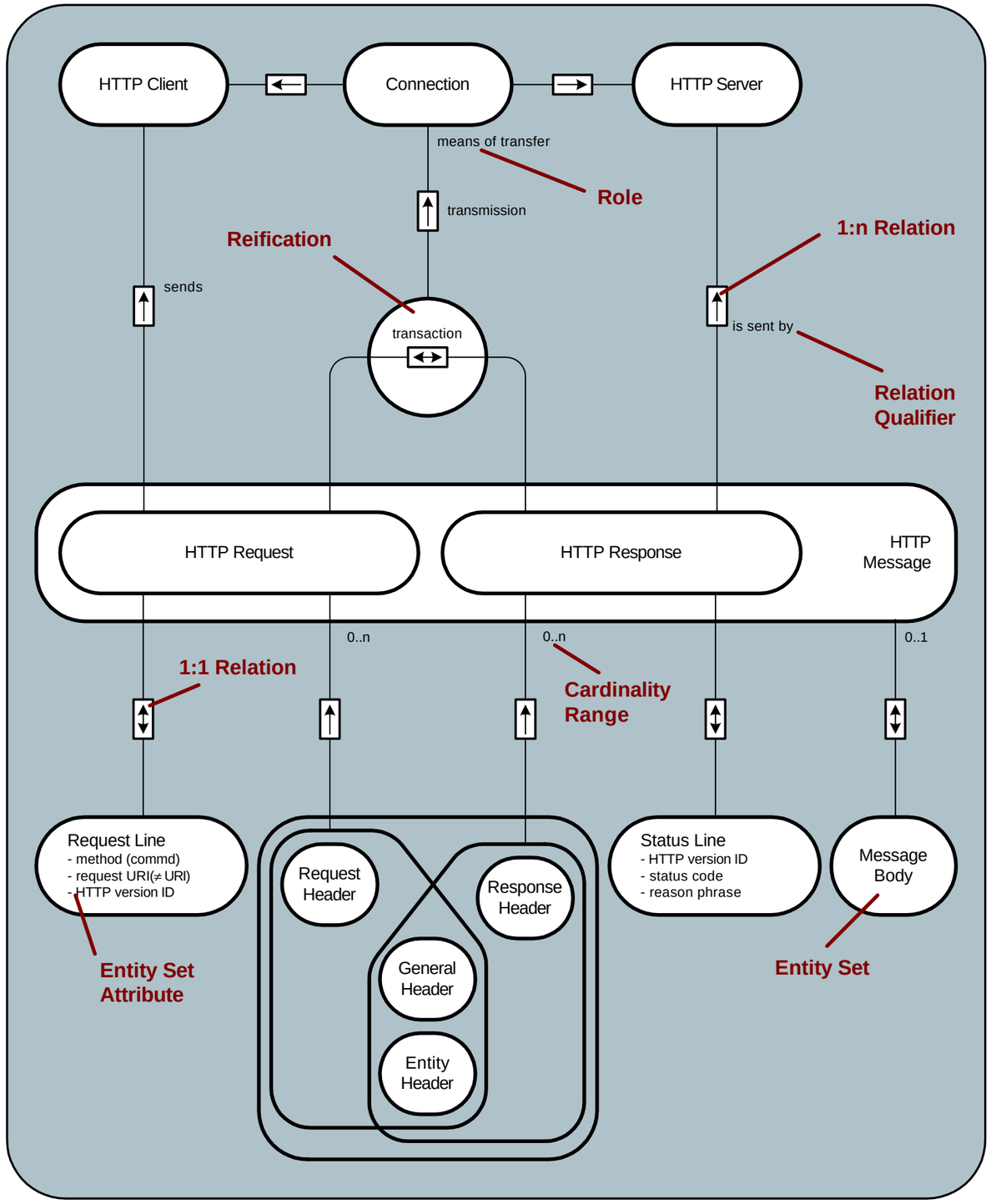
FMC

Value Range Structures

Entity Relationship Diagrams - Reference Sheet

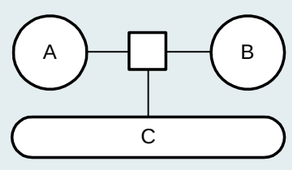


FMC Entity Relationship Diagrams are used to depict value range structures or topics as mathematical structures.

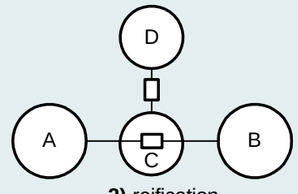
Value range structures describe observable values at locations within the system whereas topic diagrams allow a much wider usage in order to cover all correlation between interesting points.

basic elements		
E - A1 - ...	entity set	Consists of classified entities. Sets of entities participate in relations. Furthermore attributes (A1 ... An) might be specified. (Note: singular nouns should be used for identifier "E")
[R] [R] [R]	relation (n:m, 1:n, 1:1)	Is a subset of the cross product of all entities from the participating entity sets. If the relation qualifier "R" is aligned with one of the entity set symbols it should be read from this direction (a sentence can be build up like: aligned entity set identifier + relation identifier + entity set identifier.). If the relation qualifier "R" is aligned in the middle of the relation symbol there is no reading direction (usually nouns are used in this case).
[cardinality range] [role]	arc	Connects a relation and an entity set. A cardinality range may specify the minimum and maximum number of participation of all entities from the respective entity set in the relation just like the (*min,max)*-notation. Furthermore a role might clarify the kind of participation of an entity in the relation. (Note: singular nouns should be used for identifier "role")
further elements		
	orthogonal partitioning	Additional partitioning of an entity set which is independent from any previous partitioning.
	structure entity set	Is used to create an entity set from a structure (entity sets and relations).
common structures		
E1 — i .. n — j .. m — E2	n:m relation	Each element of E1 occurs i to n times in the relation with E2 while each element of E2 occurs j to m times in the relation.
E1 — (1) — (1..n) — E2	1:n relation	Is like an unique function f(x∈ E1)=y∈ E2. Each element of E1 is associated with exactly one element of E2. (Note: the cardinality ranges should be omitted due to the arrow symbol inside the relation. Deviant cardinality ranges must be mentioned explicitly.)
E1 — (1) — (1) — E2	1:1 relation	Is like an one-to-one function. One element of E1 is associated to exactly one element of E2 and vice versa. (Note: the cardinality ranges should be omitted due to the arrow symbol inside the relation. Deviant cardinality ranges must be mentioned explicitly.)

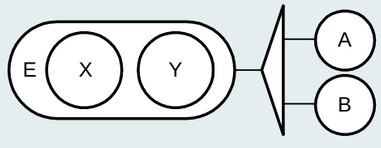
advanced



1) n ary relation (e.g., ternary)



2) reification



3) orthogonal partitioning

1) Sometimes it is necessary to correlate more than two entity sets to each other via n ary relations. The example shows a ternary relation.

2) Elements of a relation constitute the elements of a new entity set, which in turn can participate in other relations. The example shows the relation C being reificated.

3) Partitioning of entity set E into the entity sets X, Y and additional independent partitioning of entity set E into the entity sets A, B. E.g. let entity set E be "Human Being" then entity set X may stand for "Man", Y for "Woman" and thereof independently entity sets A and B could mean "European" and "Non-European".