



*Overall **S**ystem **M**odelling*

OSMoSE

*For **S**pace System **E**ngineering*

MBSE-2021 – Space System Ontology Workshop

Conceptualizing MBSE

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GORILLAIT



*Overall **S**ystem **M**odelling*

OSMoSE

*For **S**pace System **E**ngineering*

Consortium

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DEFENCE & SPACE

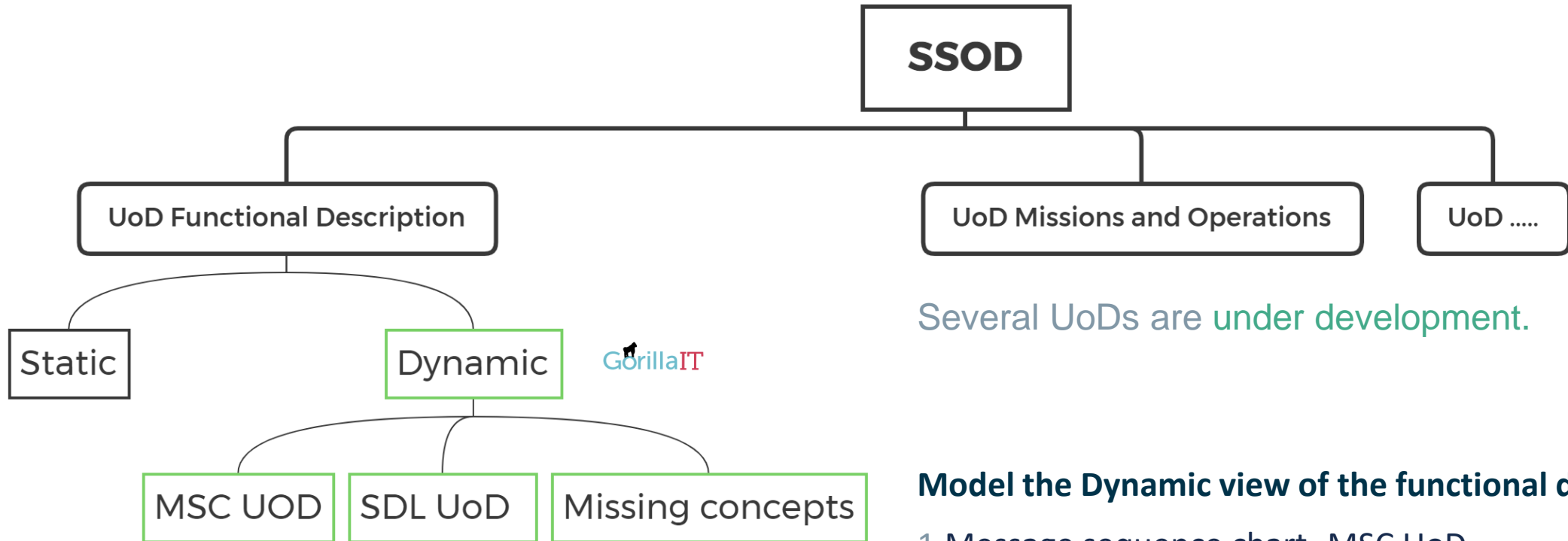
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ThalesAlenia
a Thales / Leonardo company *Space*

Carla Arauco & Elton Manoku

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Our assignment

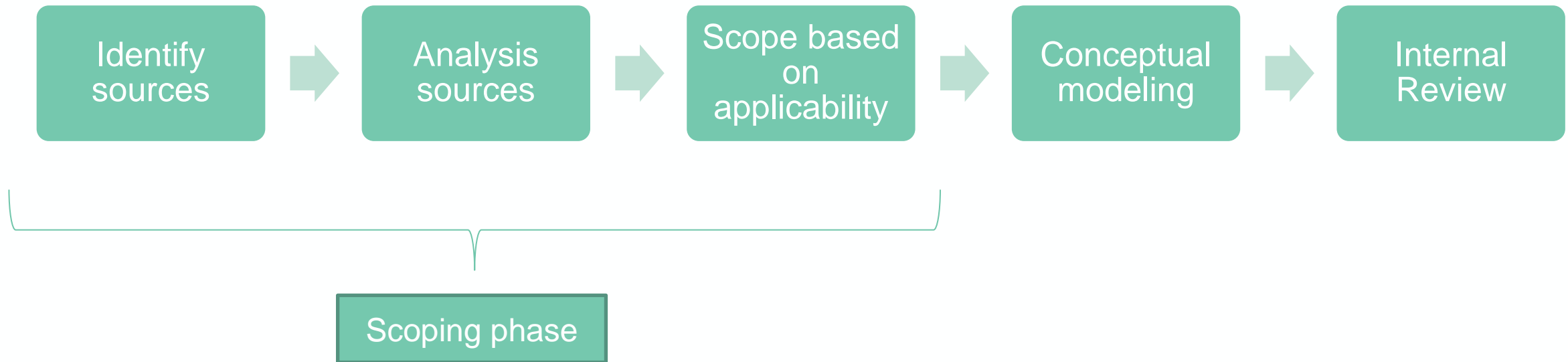


Several UoDs are under development.

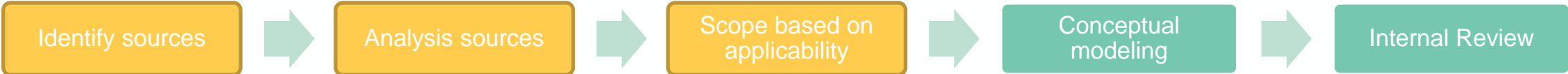
Model the Dynamic view of the functional description:

1. Message sequence chart- MSC UoD
2. Specification and description languages-SDL UoD
3. Dynamic view of the functional description

Approach overview



Definition , analysis of sources & scoping

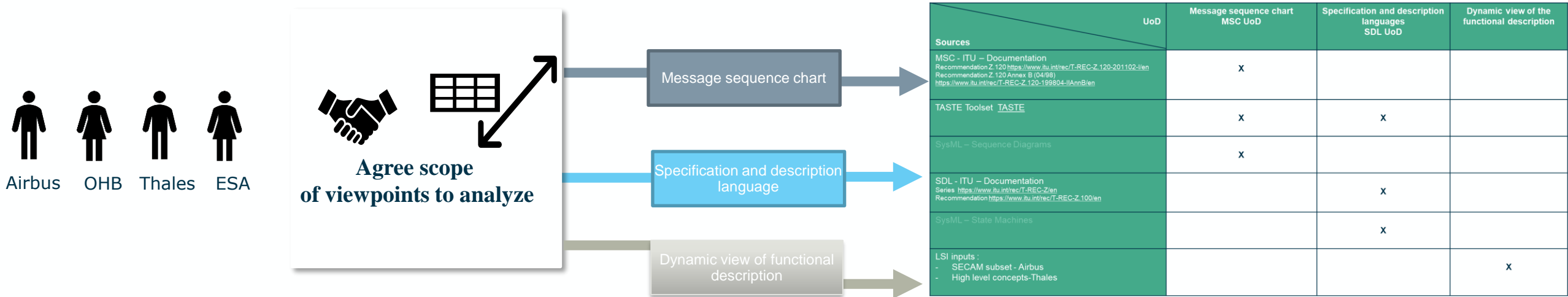


Stakeholders

Mutual agreement

UoD's

Agreed
Scoped sources



Result of scoping the sources

The assignment considers the following official sources per UoD:

UoD Sources	Message sequence chart MSC UoD	Specification and description languages SDL UoD	Dynamic view of the functional description
MSC - ITU – Documentation Recommendation Z.120 https://www.itu.int/rec/T-REC-Z.120-201102-I/en Recommendation Z.120 Annex B (04/98) https://www.itu.int/rec/T-REC-Z.120-199804-I!AnnB/en	X		
TASTE Toolset TASTE	X	X	
SysML – Sequence Diagrams	X		
SDL - ITU – Documentation Series https://www.itu.int/rec/T-REC-Z/en Recommendation https://www.itu.int/rec/T-REC-Z.100/en		X	
SysML – State Machines		X	
LSI inputs : - SECAM subset - Airbus - High level concepts-Thales			X

Conceptual modelling UoD MSC → Under Development

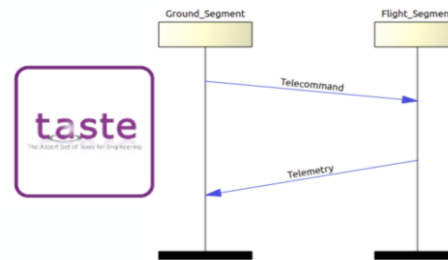
Scoped sources

Message Sequence Chart of ITU
International Telecommunication Union

TASTE
Tool chain used by ESA

Analyse

By using TASTE

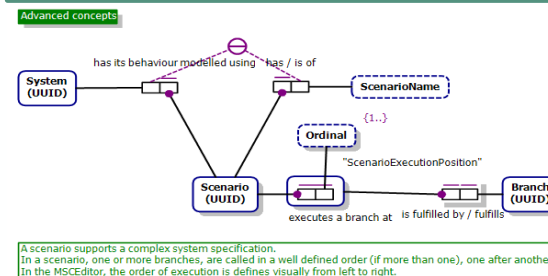


Identify concepts & relationships

- Review documentation
- Create examples
- Install the tool
- Learning & Understanding

Model

By using NORMA - Pro



Internal review

- Create visuals & examples to facilitate the learning and understanding process
- Individual sessions for clarification with each LSI
- Gathering feedback of the internal review

Identify sources

Analysis sources

Scope based on applicability

Conceptual modeling

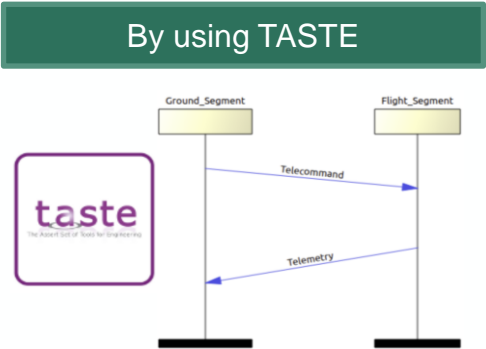
Internal Review

Example of concepts of interest → Under Development

Message Sequence Chart – ITU specifications – Toolset TASTE subset

Sources	UoD	Message sequence chart MSC UoD
MSC - ITU – Documentation Recommendation Z.120 https://www.itu.int/rec/T-REC-Z.120-201102-I/en Recommendation Z.120 Annex B (04/98) https://www.itu.int/rec/T-REC-Z.120-199804-IIAnnB/en		X
TASTE Toolset TASTE		X

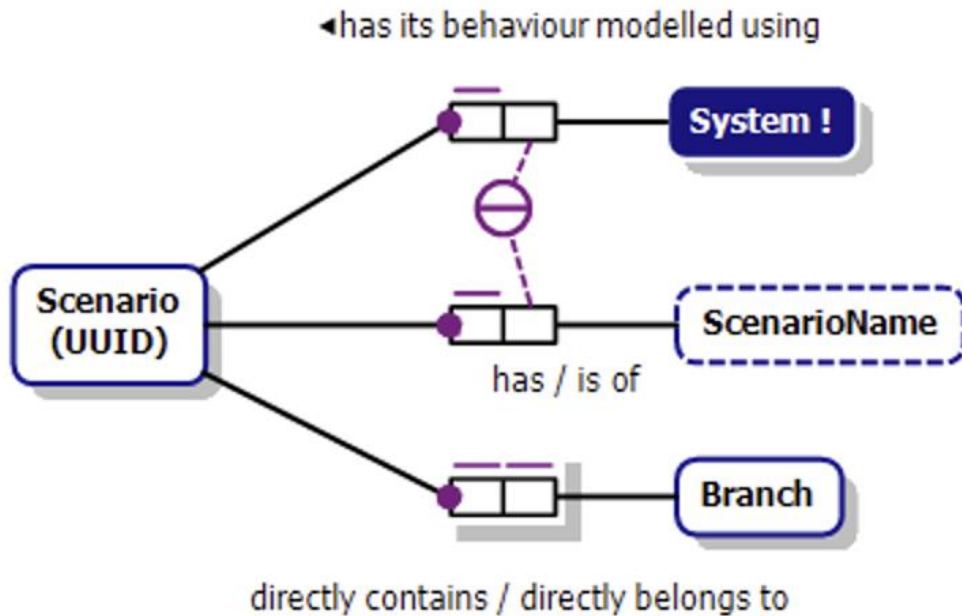
Basic MSC	Data concepts	Time concepts	Structural concepts
<ul style="list-style-type: none">• Message Sequence Chart document• Comment• Message Sequence Chart Instance• Message• Control Flow• Environment and gates• General ordering• Condition• Timer• Action• Instance creation• Instance stop	<ul style="list-style-type: none">• Declaring data• Static data• Dynamic data• Bindings• Data in message and timer parameters• Data in instance creation parameters• Data in action boxes• Required data types	<ul style="list-style-type: none">• Timed semantics• Relative timing• Absolute timing• Time domain• Static and dynamic time variables• Time offset• Time points, measurements, and intervals• Time points• Measurements• Time interval	<ul style="list-style-type: none">• Coregion• Inline expression• MSC reference• Instance decomposition• High-level MSC (HMSC) (IN TASTE is used another kind of diagram but for the same purpose)



In BOLD what it is used in TASTE by ESA

Examples-> Scenario → Under Development

Advanced concepts

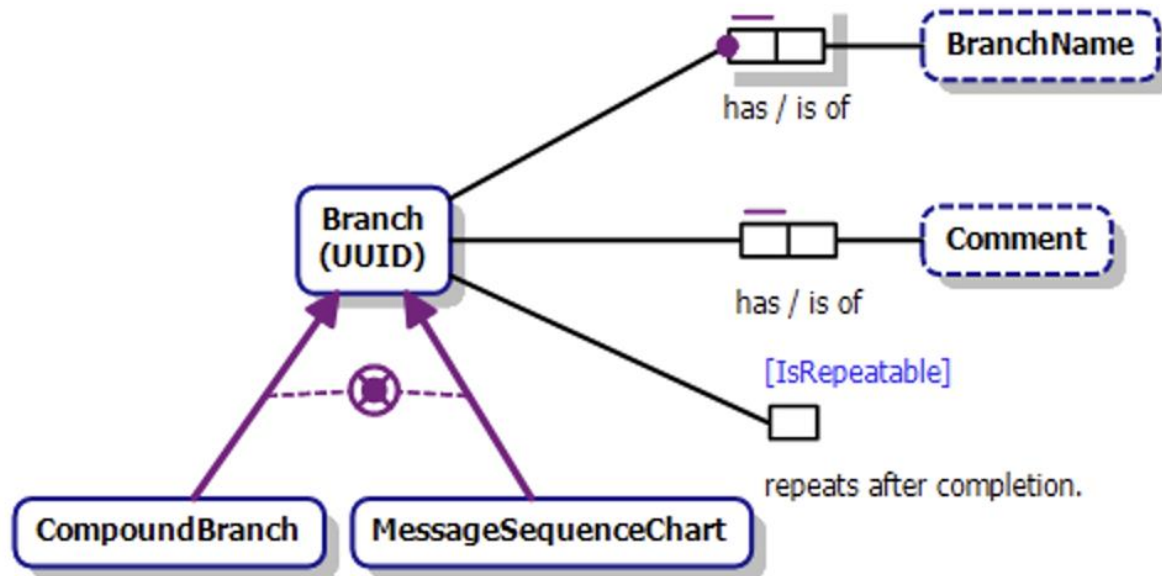


A scenario supports the modelling of the behaviour of a system.
A scenario starts always with a branch which is the basic building block.

Examples

Branch → Under Development

Advanced concepts

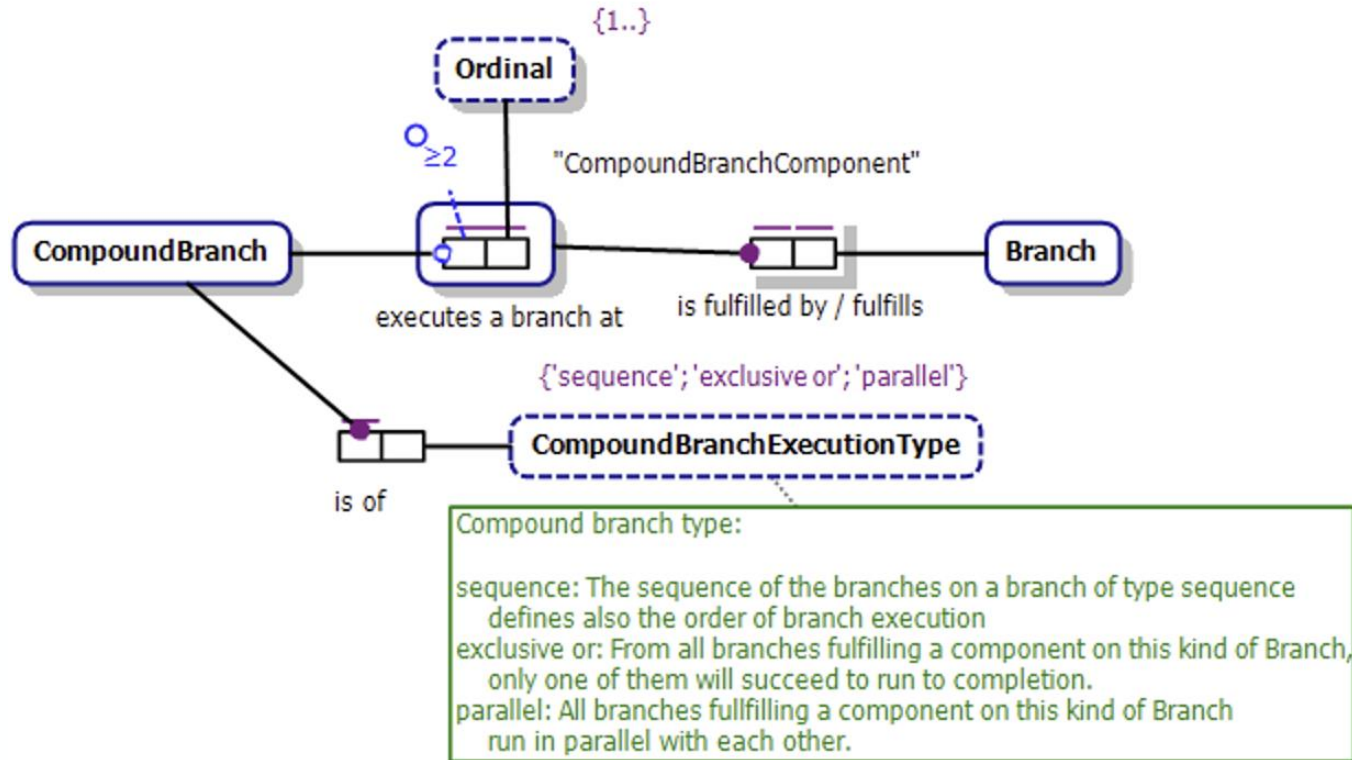


The branch is the building block in the design of a scenario.
It is a compound branch (containing other branches) or a message sequence chart.

Example

Branch: CompoundBranch → Under Development

Advanced concepts

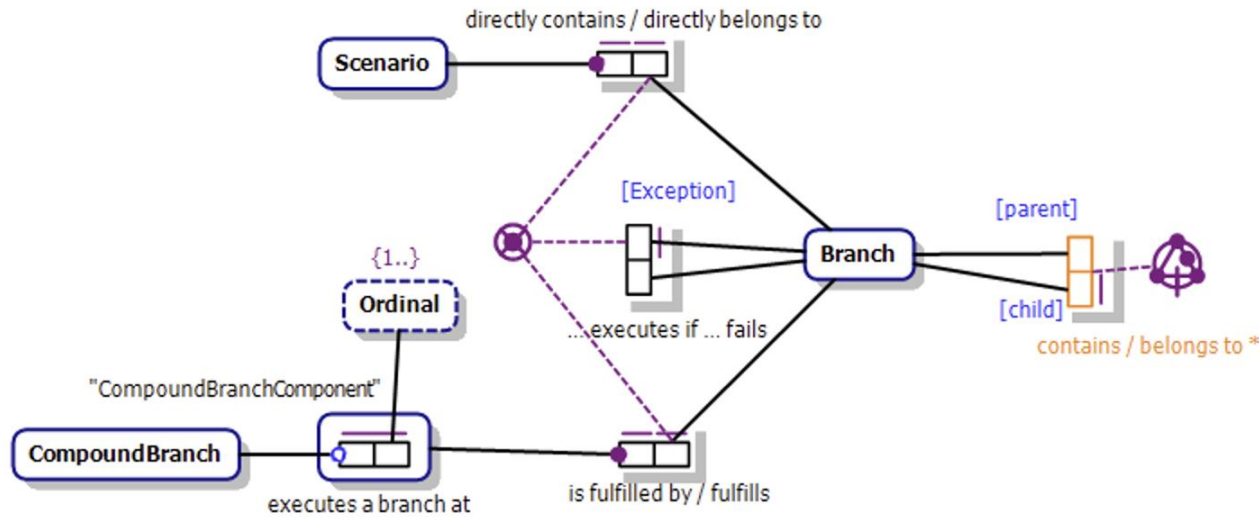


Compound branch has components that are fulfilled by other branches.
For each component is known what the position in the branch is.

Example

Branch: participation → Under Development

Advanced concepts



A branch must:

- participate only once in another branch
- xor being directly part of a scenario
- xor playing the role of the exception.

No branch may cycle back to itself via one or more traversals through branch contains branch.

If branch1 contains some branch2
then it is not true that branch1 is indirectly related to branch2 by repeatedly applying this fact type.

*Branch1 contains branch2 if and only if
that branch1 is some compound branch that is involved in some compound branch component that is fulfilled by that branch2
or that branch1 contains some branch3 that contains that branch2.



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Q&A

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