

Sequence Chart Studio (SCStudio)

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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Problem: Late discovery of a bug is a problem!

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Why developers don't use formal verification?

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Telecommunication area:

- system description done by natural language and sequence diagrams

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Why developers don't use formal verification?

Telecommunication area:

- system description done by natural language and sequence diagrams
- formal verification on sequence diagrams is possible but not used

Sequence Chart Studio

- supports Message Sequence Chart (MSC) formalism

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- **user-friendly graphical and textual interfaces**

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- user-friendly graphical and textual interfaces
- provides verification and validation algorithms
- **well arranged output**

Message sequence chart is standardized by ITU-T. Standard specifies two equivalent MSC notations (graphical, textual).

Basic MSC diagrams:

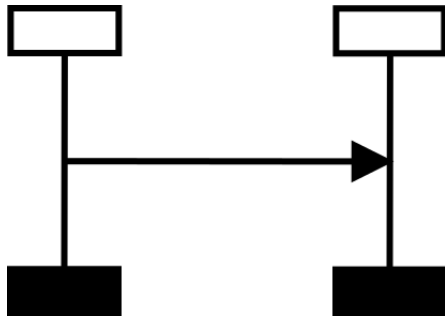
- **instances**



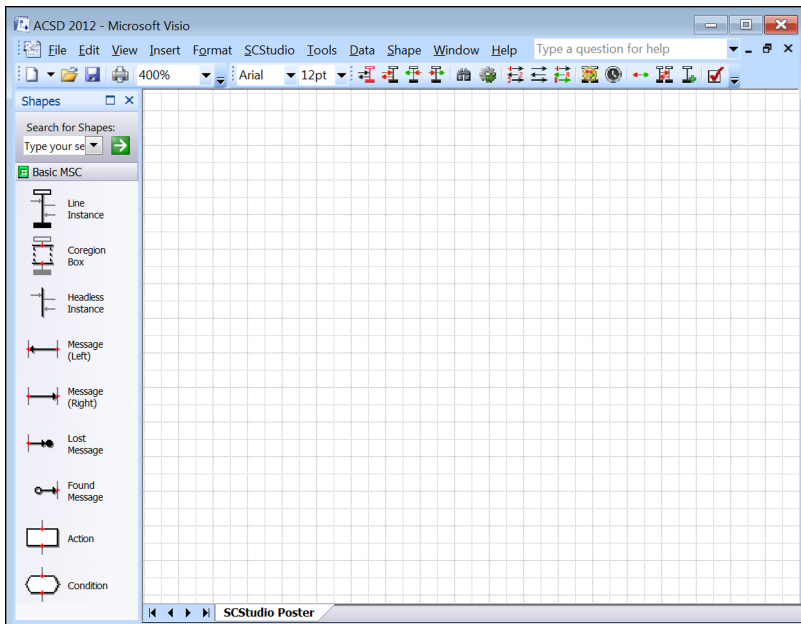
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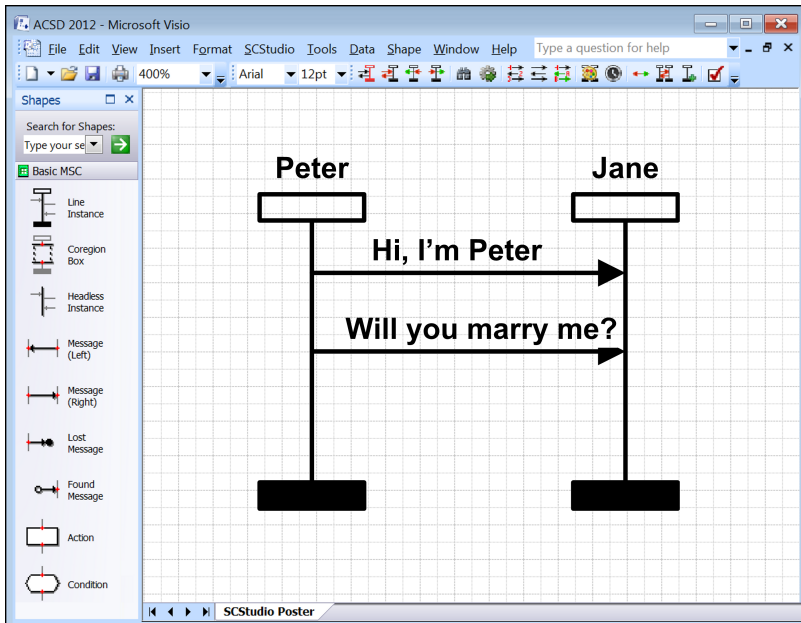
- instances
- **message**



Graphical User Interface



Graphical User Interface

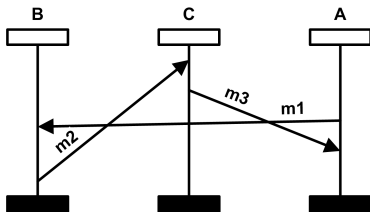


- automatic message/arrow snapping
- automatic drawing
- shortcuts
- drawing transformations, e.g. beautify

Beautify transformer redraws a diagram into well-arranged form.

Beautify Transformer

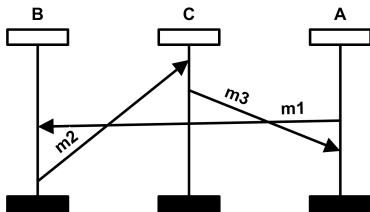
Beautify transformer redraws a diagram into well-arranged form.



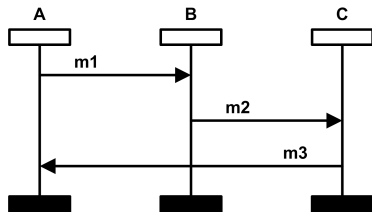
Non-well-arranged diagram

Beautify Transformer

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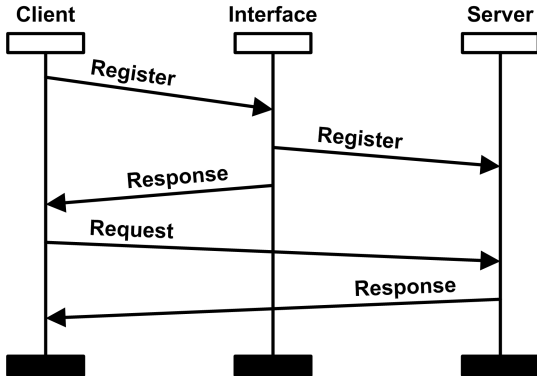


Non-well-arranged diagram



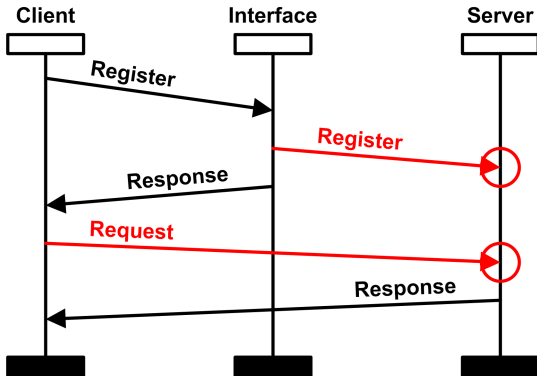
Well-arranged diagram

Designers create a communication protocol:



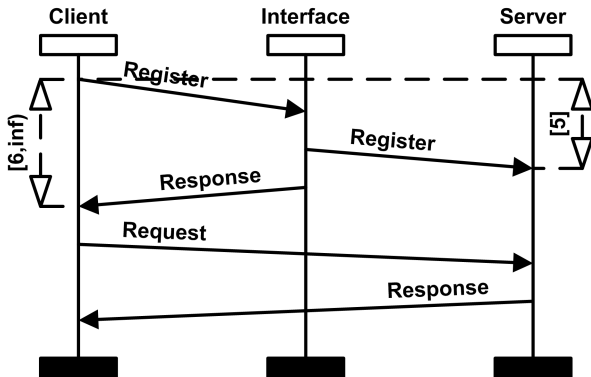
Protocol Verification

Verification tools identify a race condition problem.



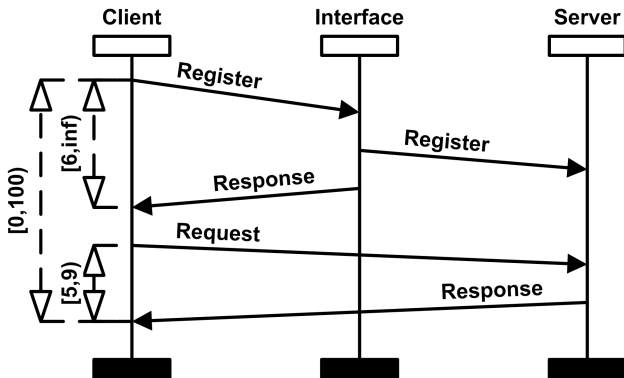
Add Time Intervals

The race condition could be solved by adding time constraints



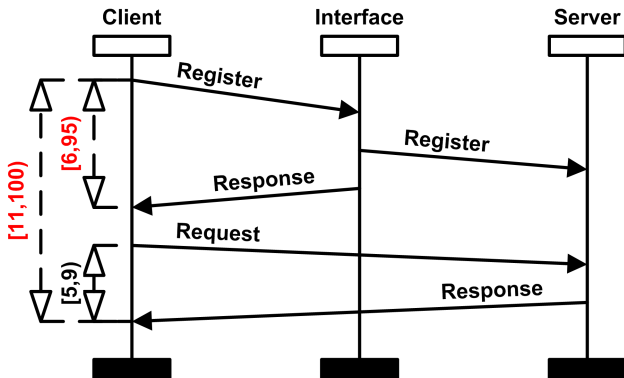
Tighten Time

Tighten Time transformer restricts time intervals to minimal ranges



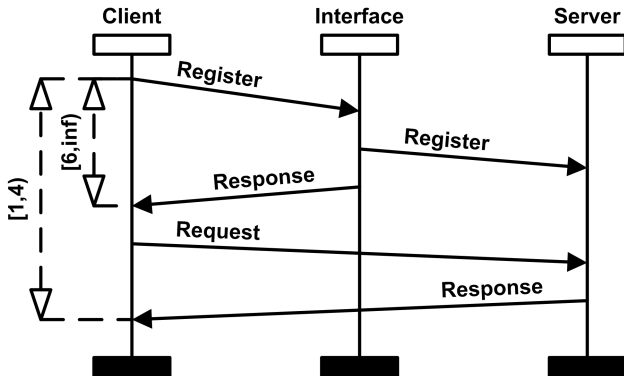
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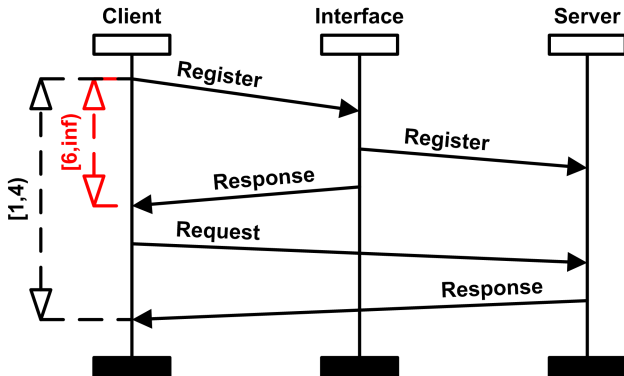
Time Consistency

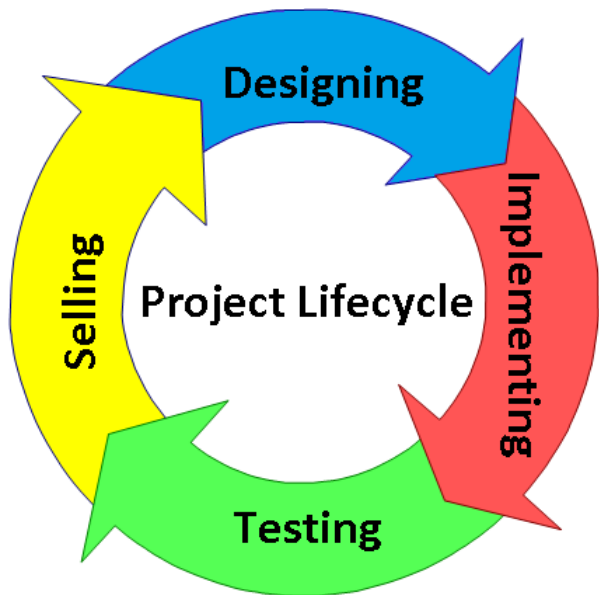
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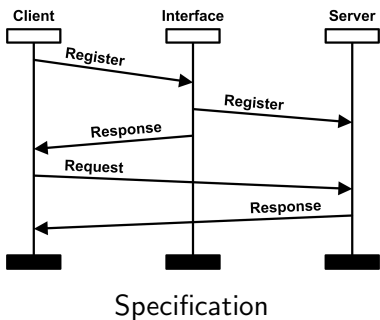
- transform network traffic from pcap files and visualize them as MSC diagrams

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- transform network traffic from pcap files and visualize them as MSC diagrams
- compare traffic flows with diagrams of protocol design

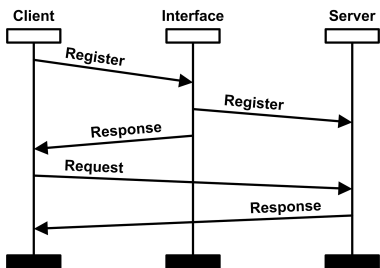
Find Flow

Find Flow function checks whether a basic MSC is contained in another MSC diagram.

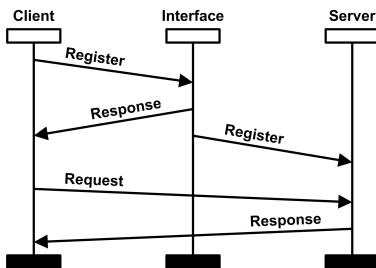


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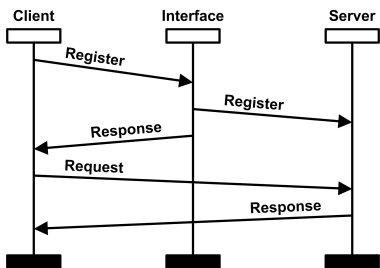
Specification



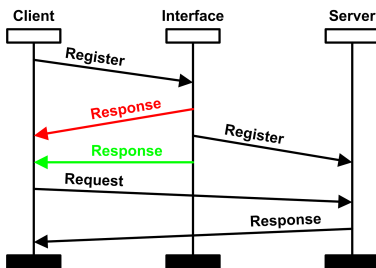
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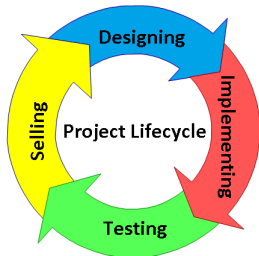
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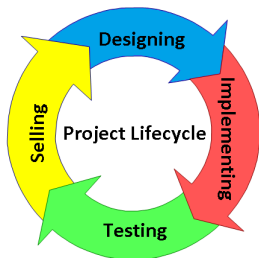
Find Flow result

- **drawing aids**
 - easy and comfortable drawing
 - message flipping, shortcuts, ...
 - transformers Beautify, Tighten Time, ...
- **verification & validation tools**
 - (Time) Race checker
 - Time Consistency checker
 - Strong Realizability checker
- **additional functions**
 - Find Flow
 - Monte Carlo simulation (experimental)

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SCStudio is available on sourceforge.net

Thank you for your attention



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