

Disrupt and Interrupt in MSC: Possibilities and Problems

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- Extending the language
- Disrupt and Interrupt: Syntax
- Disrupt and Interrupt: Choices
- Disrupt and Interrupt: Semantics
- Conclusions

General problems with extensions

- Semantics unclear
- Tool builders cannot keep up
- Users using distinct subsets
- Unexpected behaviour through feature interaction

Of course this does not mean that we should not extend, just that we should be careful.

Disrupt and Interrupt

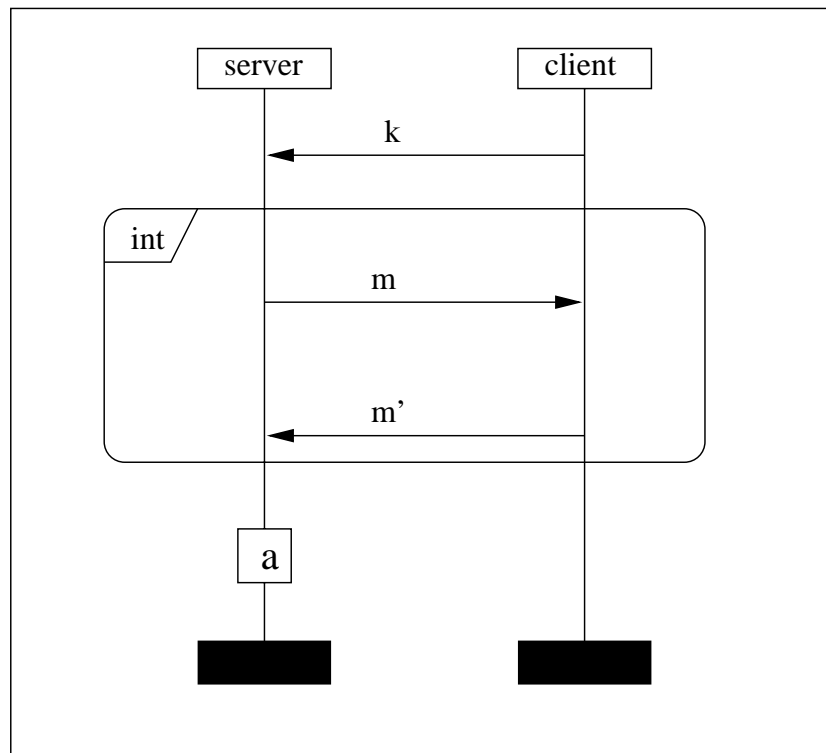
Intuition: Do something, stop it to do something else, (I: then return to doing the first thing)

But: This can be implemented in different ways
- which one to choose?

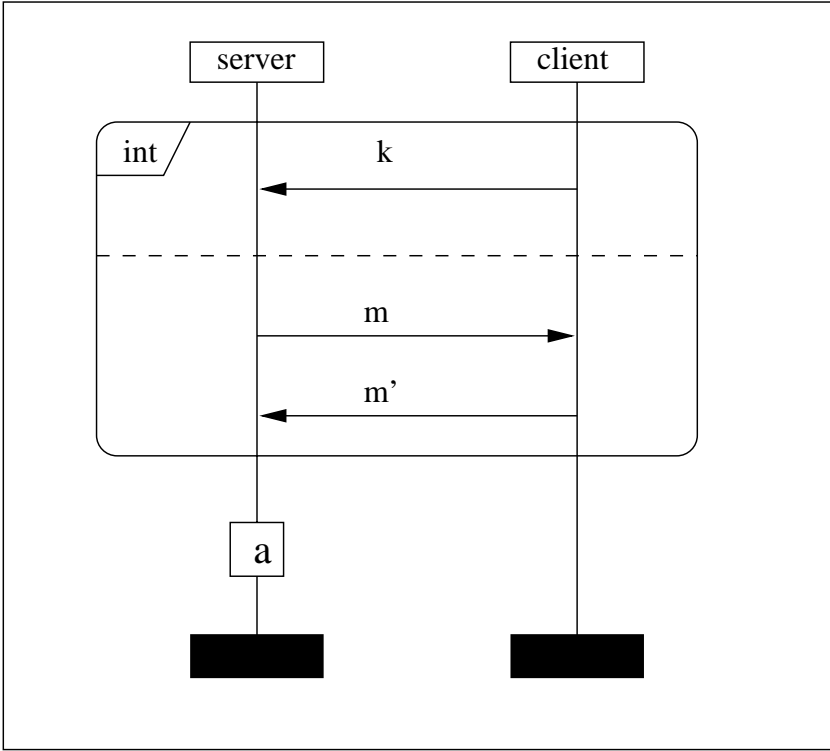
Syntax

First choice: local or global disrupt/interrupt?

That is, interrupt at one moment or one period?



Proposed syntax for local interrupt

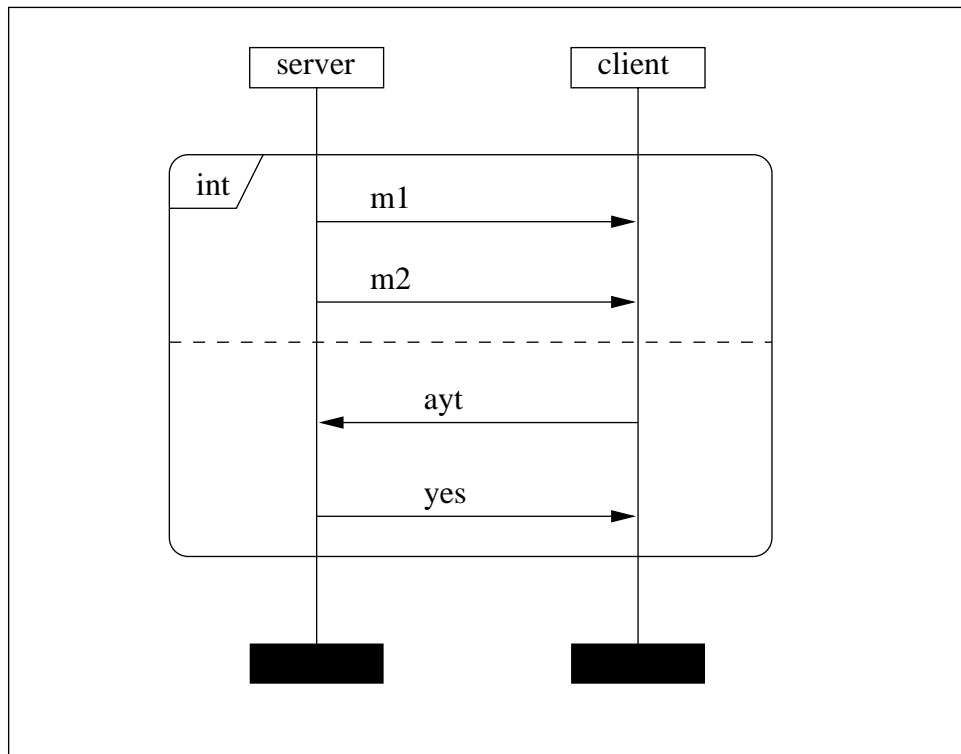


Proposed syntax for global interrupt

Semantic choices

1. Can an interrupt take place once, or any number of times?
2. Is more than one interrupt between any two actions possible?
3. Can one interrupt interrupt another?
4. Can an interrupt/disrupt take place before the first action of what is interrupted?
5. Are all instances disrupted/interrupted at the same time?

Example: A telnet-protocol



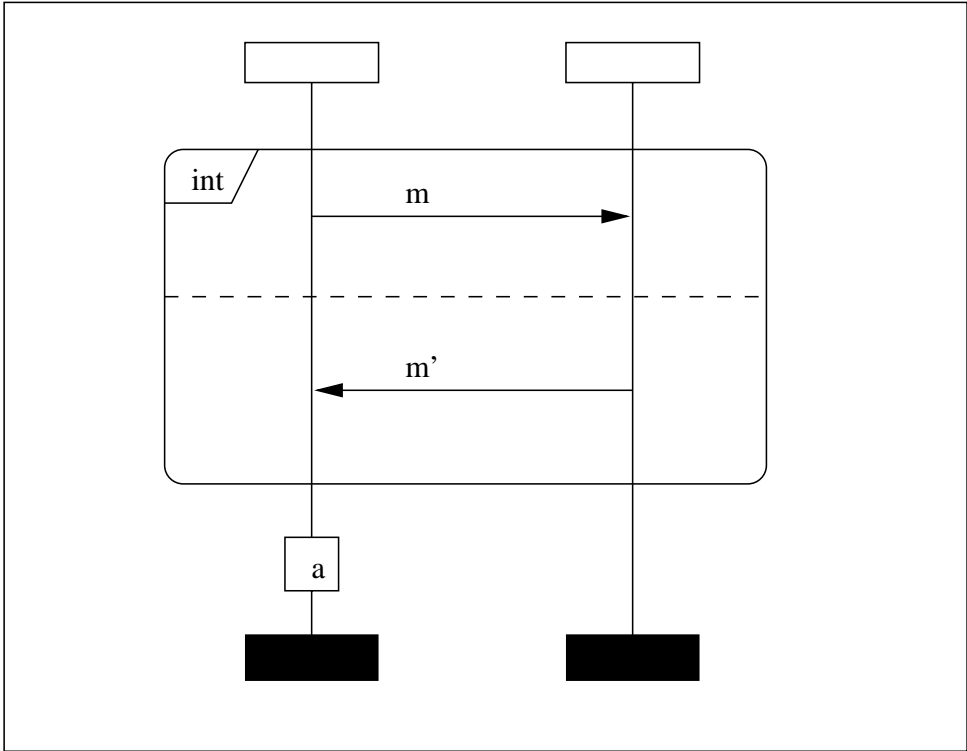
We define \blacktriangleright and \triangleright to describe Disrupt and Interrupt in Process Algebra ($x \blacktriangleright y$ is ' x disrupted by y ').

For giving the semantics we also use the 'Forced Disrupt' and 'Forced Interrupt' $| \blacktriangleright^S$ and $| \triangleright^S$. $x | \blacktriangleright^S y$ is ' x , which must be disrupted by y , where the instances in S have already been disrupted'.

$$\frac{
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 \frac{
 x \xrightarrow{a} x', y \not\xrightarrow{a}
 }{
 x \blacktriangleright y \xrightarrow{a} x' \blacktriangleright y
 }
 }{
 y \xrightarrow{a} y', x \not\xrightarrow{a}
 }
 }{
 x \blacktriangleright y \xrightarrow{a} x | \blacktriangleright \{I(a)\} y'
 }
 }{
 x \xrightarrow{a} x', y \xrightarrow{a} y'
 }
 }{
 x \blacktriangleright y \xrightarrow{a} x' \blacktriangleright y \mp x | \blacktriangleright \{I(a)\} y'
 }$$

$$\frac{
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 x \xrightarrow{a} x', y \not\xrightarrow{a}, I(a) \notin S
 }{
 x | \blacktriangleright^S y \xrightarrow{a} x' | \blacktriangleright^S y
 }
 }{
 y \xrightarrow{a} y', x \not\xrightarrow{a}
 }
 }{
 x \blacktriangleright y \xrightarrow{a} x | \blacktriangleright^{S \cup \{I(a)\}} y'
 }
 }{
 x \xrightarrow{a} x', y \xrightarrow{a} y', I(a) \notin S
 }
 }{
 x | \blacktriangleright^S y \xrightarrow{a} x' | \blacktriangleright^S y \mp x | \blacktriangleright^{S \cup \{I(a)\}} y'
 }
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 \frac{
 x \xrightarrow{a}, y \xrightarrow{a} y', I(a) \in S
 }{
 x | \blacktriangleright^S y \xrightarrow{a} x | \blacktriangleright^S y'
 }
 }$$

A problem



Unexpected non-local choice

Conclusions

- Which disrupt/interrupt do we want?
- Local disrupt/interrupt: No real addition
- Not everything should be disrupted/interrupted at the same time
- Semantics are possible (but not easy)
- Ultimately, the users should decide