

Un protocollo di comunicazione

esempio tratto dal testo “Reactive Systems, Modelling, Specification and Verification”

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esempio tratto dal testo "Reactive Systems, Modelling, Specification and Verification"

$$\text{Spec} = \text{acc} . \text{del_to} . \text{Spec}$$

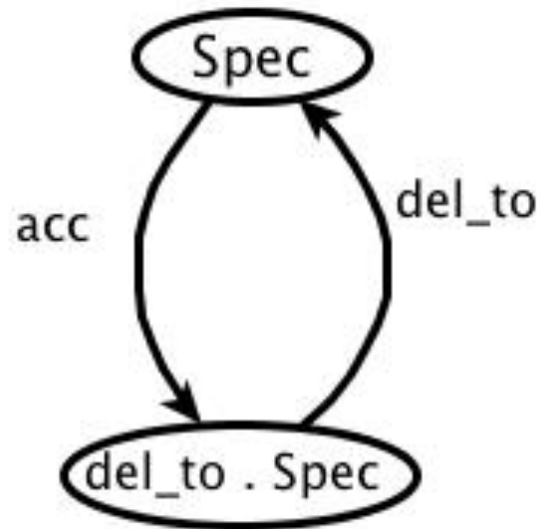
$$\text{Impl} \stackrel{\text{def}}{=} (\text{Send} \mid \text{Med} \mid \text{Rec}) \setminus \{\text{send}, \text{trans}, \text{ack}, \text{error}\}$$

Impl e Spec sono Bisimili (debolmente) ?

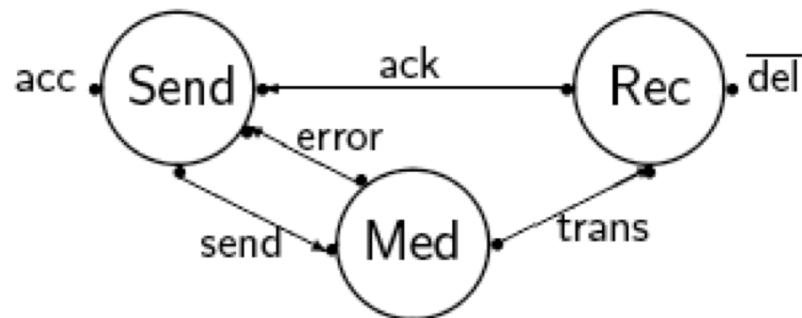
Costruire i due sistemi di transizioni e verificarlo.

Protocollo - specifica

Spec = acc . del_to . Spec



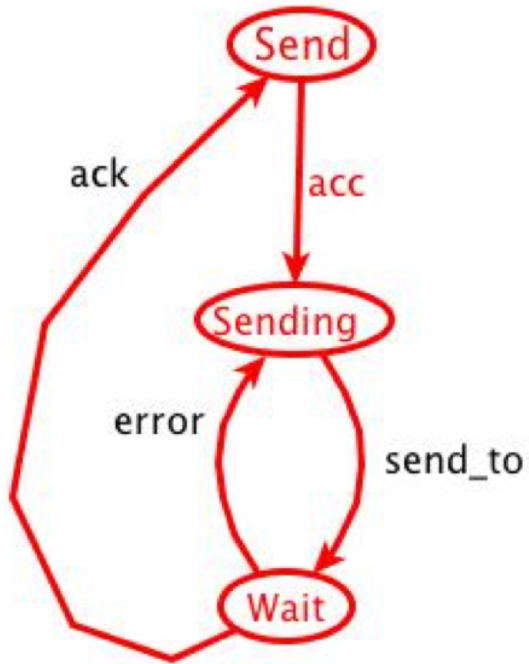
Case Study: Communication Protocol



Send	$\stackrel{\text{def}}{=}$	acc.Sending	Rec	$\stackrel{\text{def}}{=}$	trans.Del
Sending	$\stackrel{\text{def}}{=}$	$\overline{\text{send}}$.Wait	Del	$\stackrel{\text{def}}{=}$	$\overline{\text{del}}$.Ack
Wait	$\stackrel{\text{def}}{=}$	ack.Send + error.Sending	Ack	$\stackrel{\text{def}}{=}$	$\overline{\text{ack}}$.Rec
		Med	$\stackrel{\text{def}}{=}$	send.Med'	
		Med'	$\stackrel{\text{def}}{=}$	τ .Err + $\overline{\text{trans}}$.Med	
		Err	$\stackrel{\text{def}}{=}$	$\overline{\text{error}}$.Med	

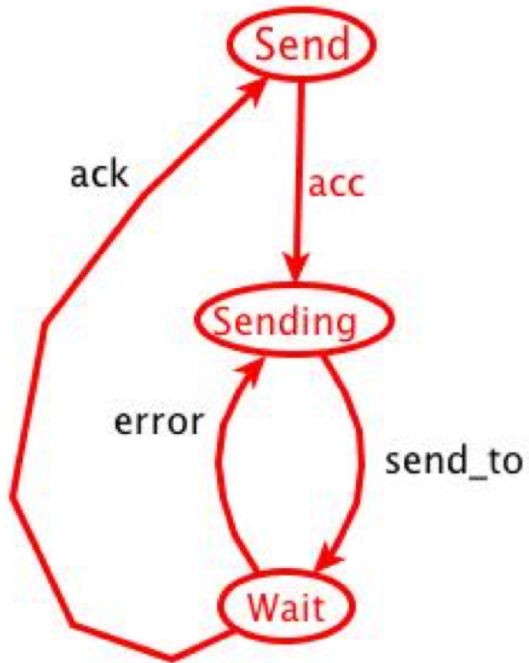
Impl $\stackrel{\text{def}}{=}$ (Send | Med | Rec) \setminus {send, trans, ack, error}

protocollo di comunicazione: implementazione – i componenti

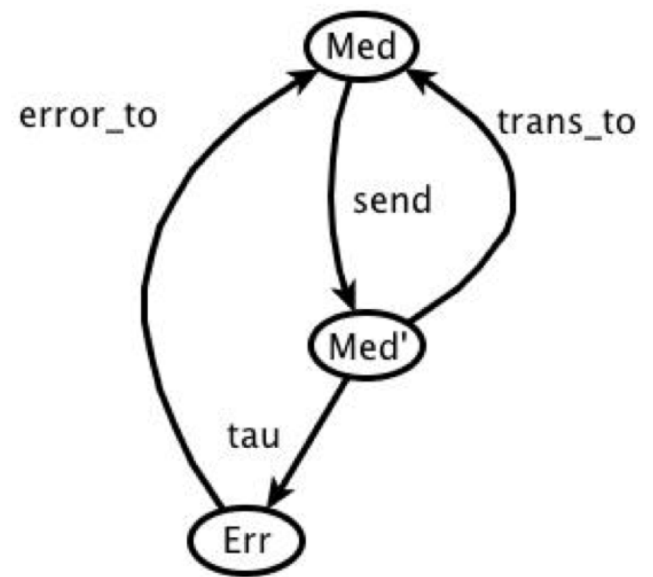


Send	$\stackrel{\text{def}}{=} acc.Sending$
Sending	$\stackrel{\text{def}}{=} \overline{send}.Wait$
Wait	$\stackrel{\text{def}}{=} ack.Send + error.Sending$

protocollo di comunicazione: implementazione – i componenti

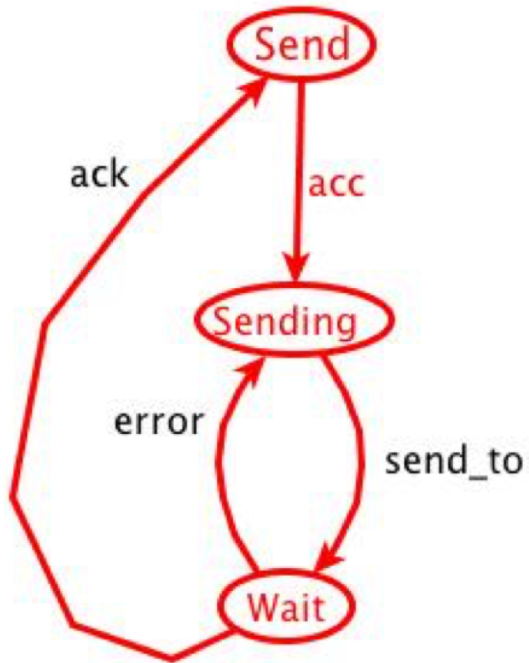


Send	$\stackrel{\text{def}}{=}$	acc.Sending
Sending	$\stackrel{\text{def}}{=}$	$\overline{\text{send}}$.Wait
Wait	$\stackrel{\text{def}}{=}$	ack.Send + error.Sending

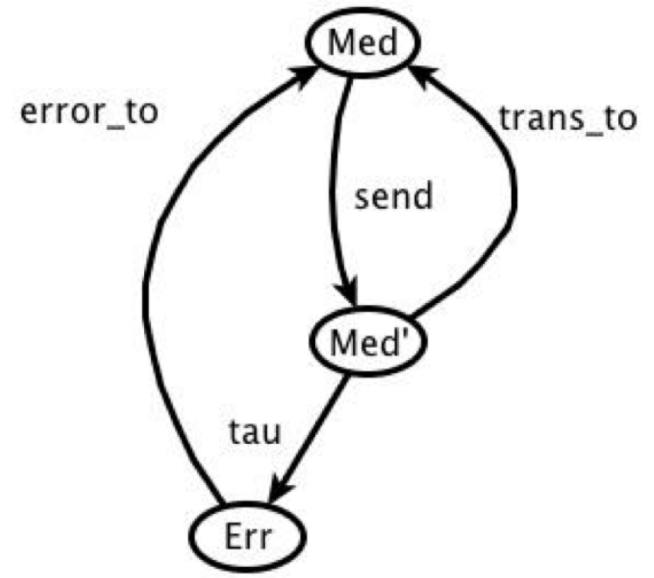


Med	$\stackrel{\text{def}}{=}$	send.Med'
Med'	$\stackrel{\text{def}}{=}$	τ .Err + $\overline{\text{trans}}$.Med
Err	$\stackrel{\text{def}}{=}$	$\overline{\text{error}}$.Med

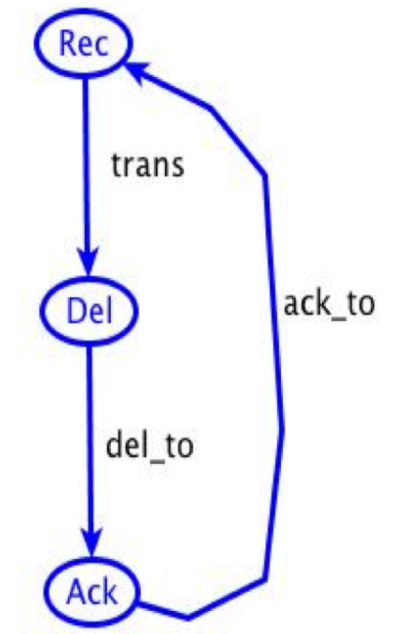
protocollo di comunicazione: implementazione – i componenti



$\text{Send} \stackrel{\text{def}}{=} \text{acc.Sending}$
 $\text{Sending} \stackrel{\text{def}}{=} \overline{\text{send.Wait}}$
 $\text{Wait} \stackrel{\text{def}}{=} \text{ack.Send} + \text{error.Sending}$



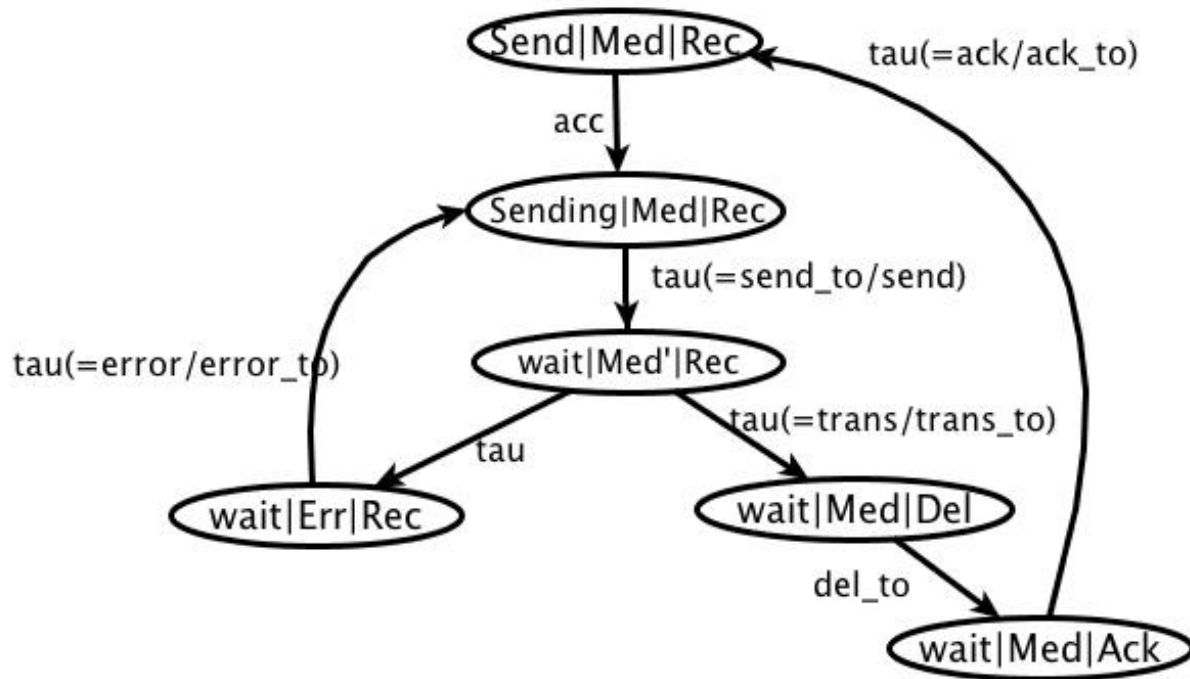
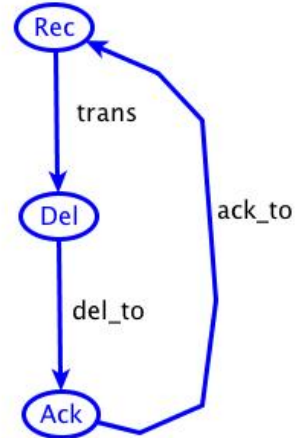
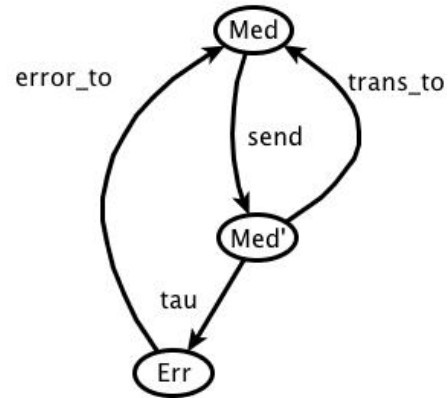
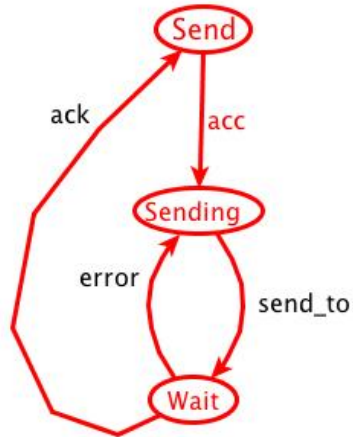
$\text{Med} \stackrel{\text{def}}{=} \text{send.Med'}$
 $\text{Med'} \stackrel{\text{def}}{=} \tau.\text{Err} + \overline{\text{trans.Med}}$
 $\text{Err} \stackrel{\text{def}}{=} \overline{\text{error.Med}}$



$\text{Rec} \stackrel{\text{def}}{=} \text{trans.Del}$
 $\text{Del} \stackrel{\text{def}}{=} \overline{\text{del.Ack}}$
 $\text{Ack} \stackrel{\text{def}}{=} \overline{\text{ack.Rec}}$

Protocollo : implementazione

$\text{Impl} \stackrel{\text{def}}{=} (\text{Send} \mid \text{Med} \mid \text{Rec}) \setminus \{\text{send}, \text{trans}, \text{ack}, \text{error}\}$



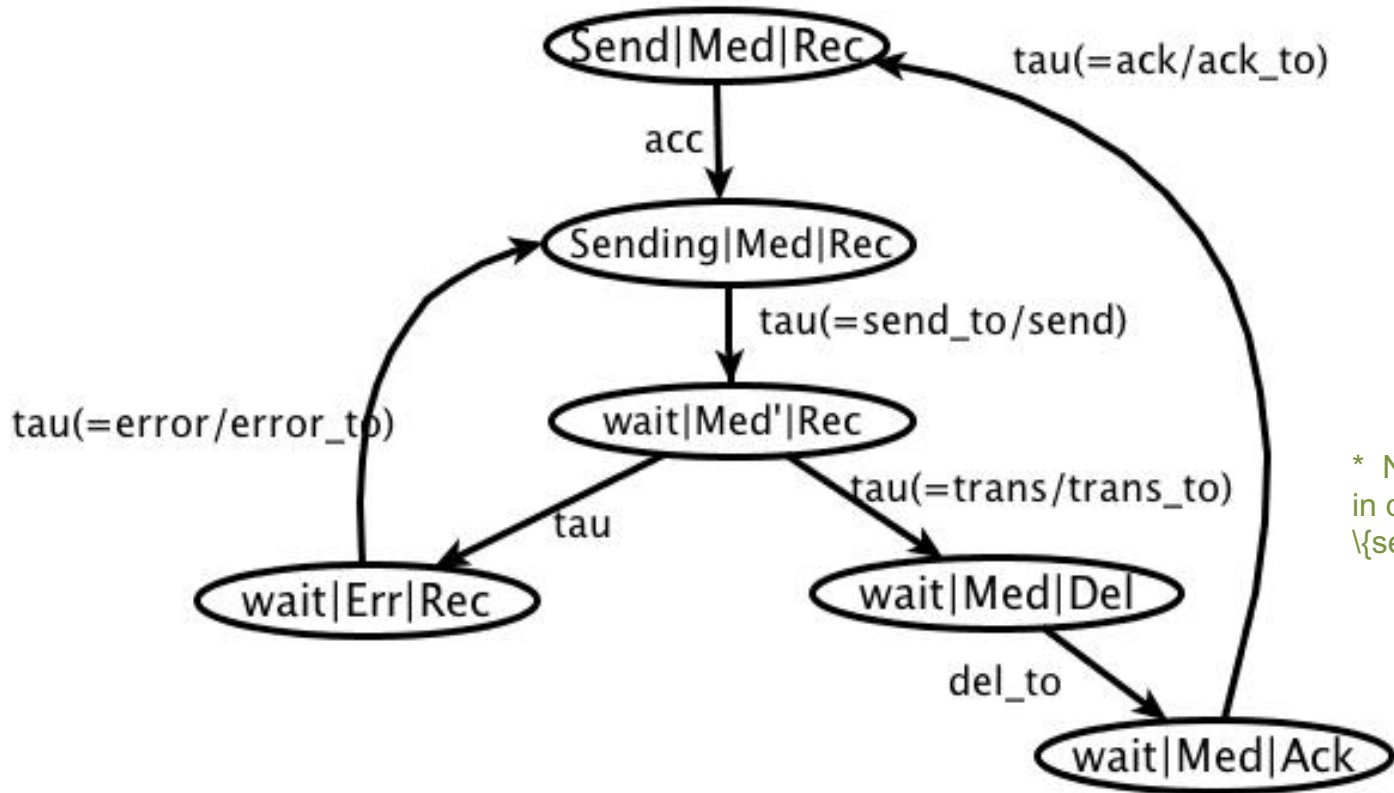
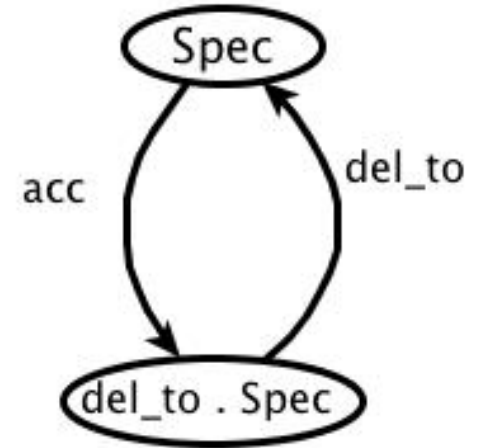
NOTA
in questo LTS la restrizione
{send, error, trans, ack} è omessa

Protocollo: specifica e implementazione

Spec = acc . del_to . Spec

Impl $\stackrel{\text{def}}{=} (\text{Send} \mid \text{Med} \mid \text{Rec}) \setminus \{\text{send}, \text{trans}, \text{ack}, \text{error}\}$

Spec e Impl sono ? debolmente Bisimili



* NOTA
in questa slide la restrizione
{send, error, trans, ack} è omessa

Protocollo: specifica e implementazione

Sì Spec e Impl sono debolmente Bisimili

Spec R Send|Med|Rec \setminus {send,error,trans,ack} *

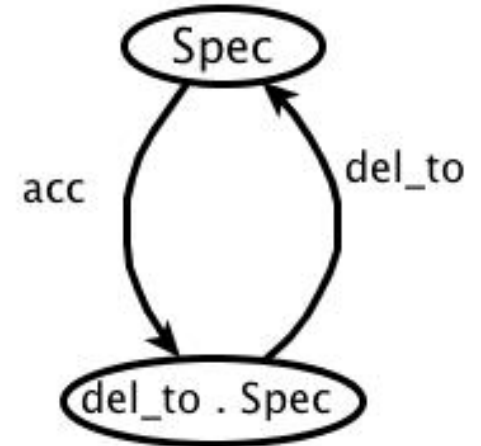
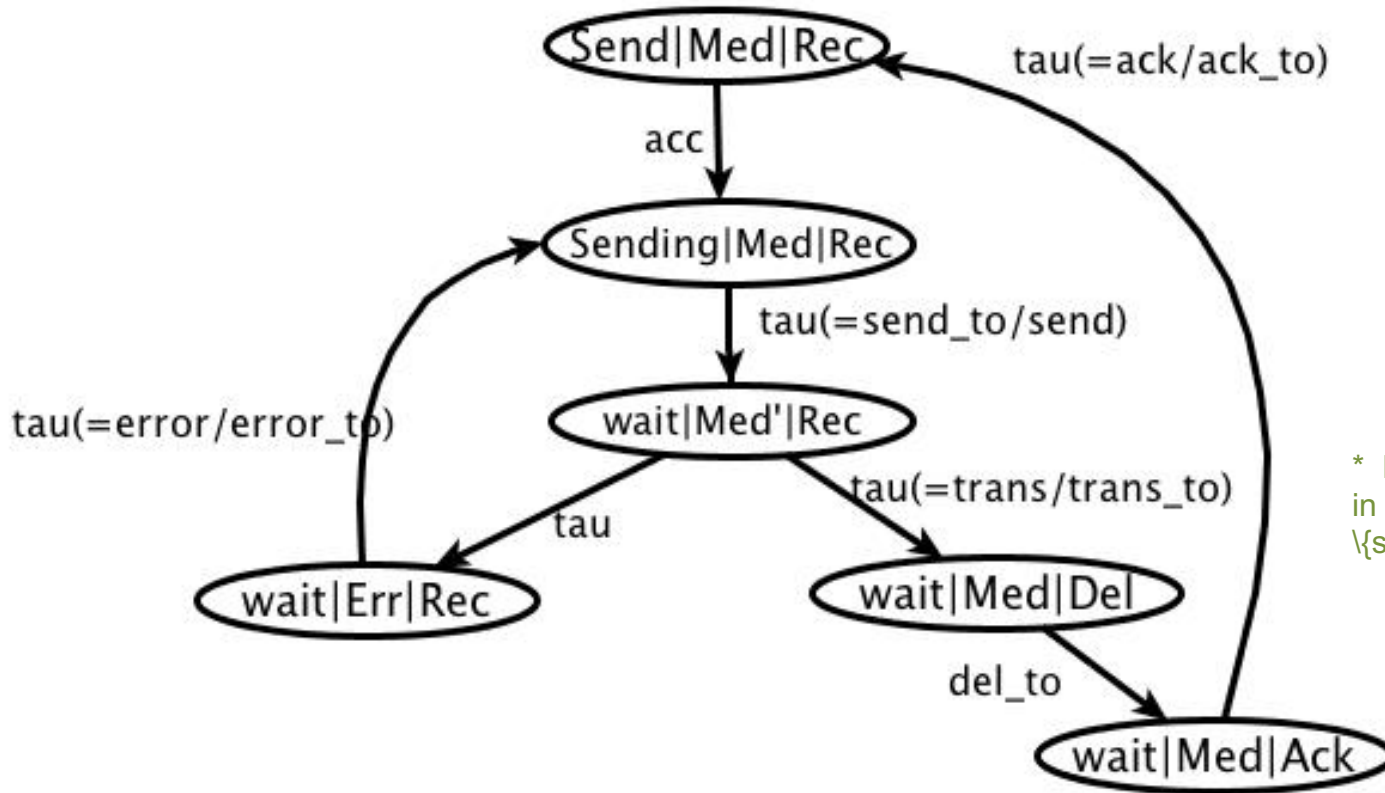
Spec R wait|Med|Ack

del_to.Spec R Sending|Med|Rec

del_to.Spec R wait|Med'|Rec

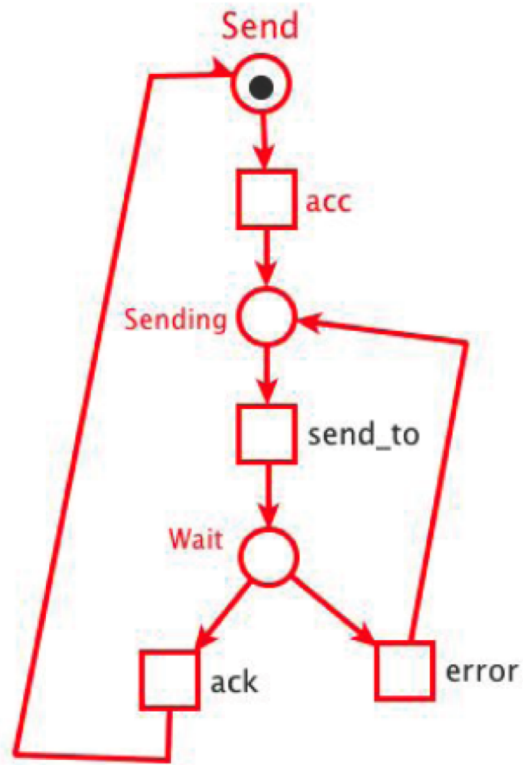
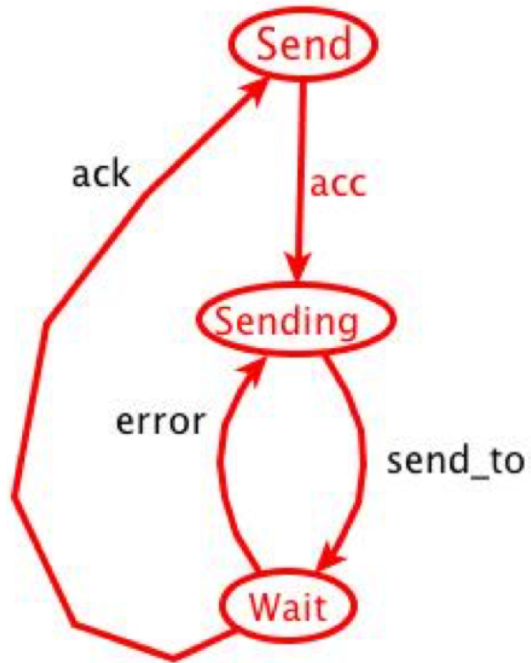
del_to.Spec R wait|Err|Rec

del_to.Spec R wait|Med|Del



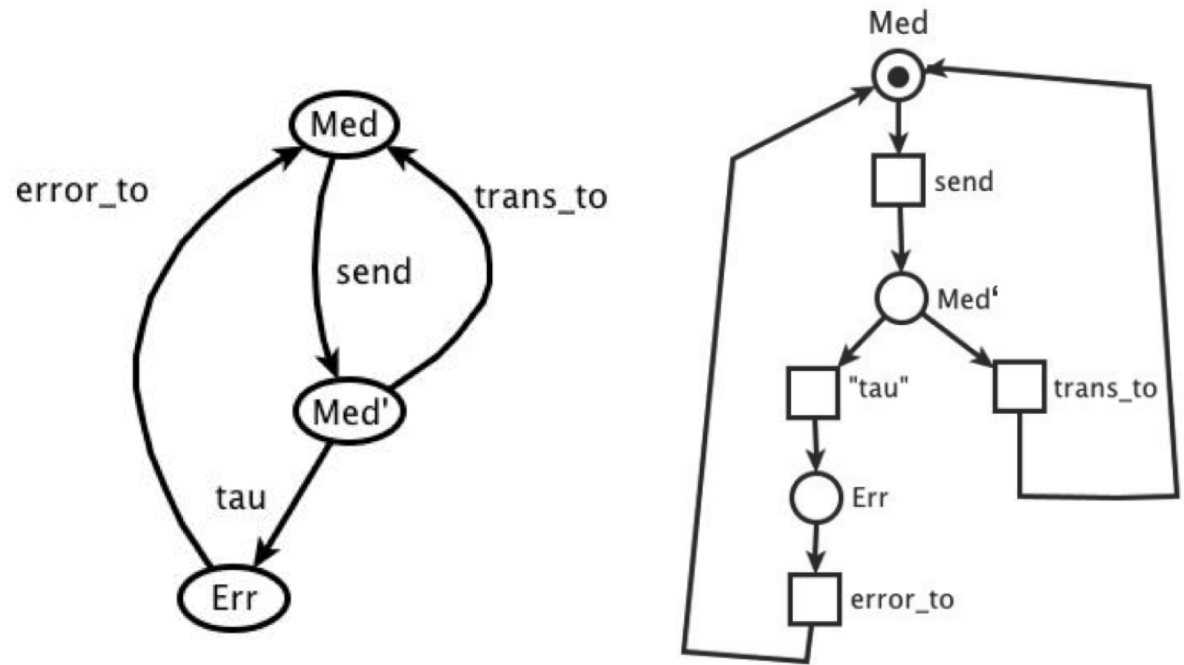
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in questa slide la restrizione
{send, error, trans, ack} è omessa

Il protocollo di comunicazione modellato con le reti di Petri



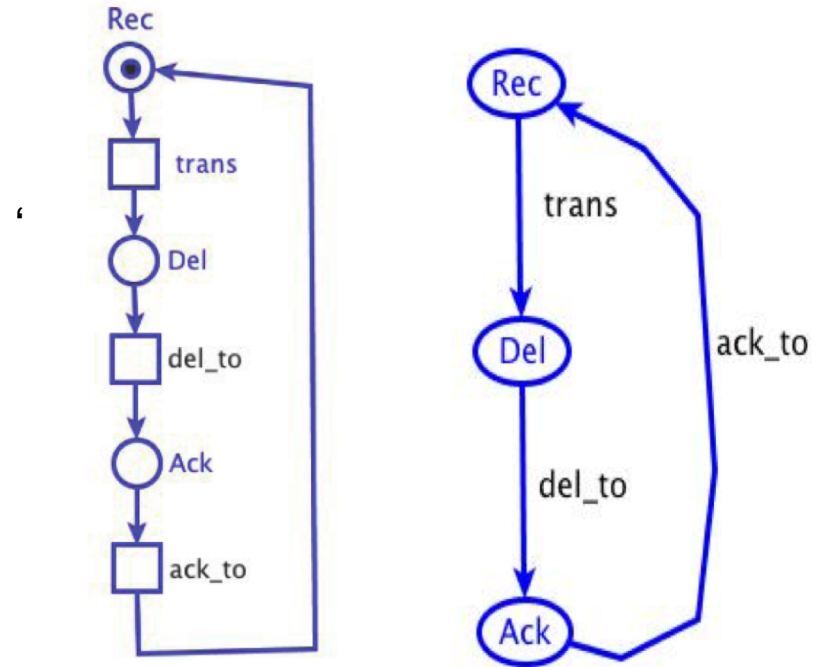
Send	$\stackrel{\text{def}}{=} acc.Sending$
Sending	$\stackrel{\text{def}}{=} \overline{send}.Wait$
Wait	$\stackrel{\text{def}}{=} ack.Send + error.Sending$

Il protocollo di comunicazione modellato con le reti di Petri



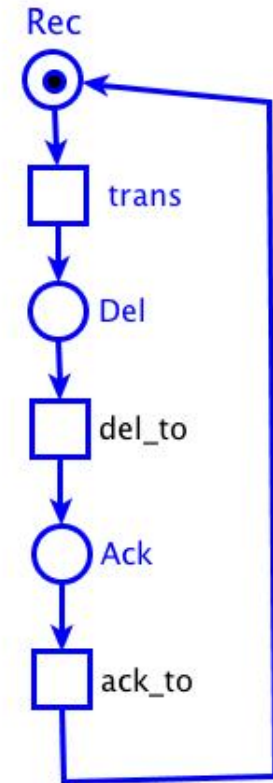
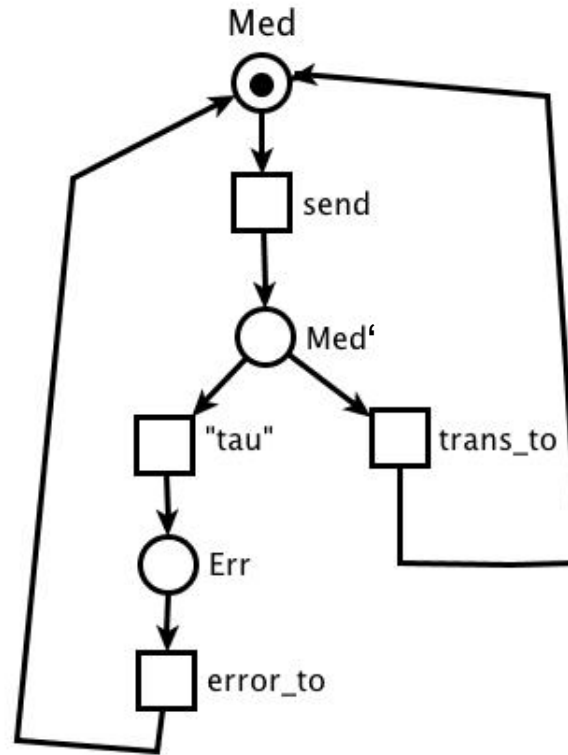
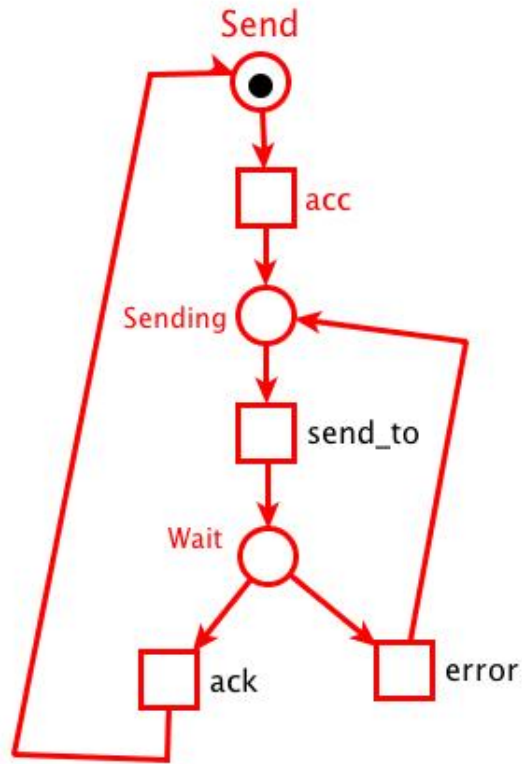
$$\begin{aligned} \text{Med} &\stackrel{\text{def}}{=} \text{send.Med}' \\ \text{Med}' &\stackrel{\text{def}}{=} \tau.\text{Err} + \overline{\text{trans}}.\text{Med} \\ \text{Err} &\stackrel{\text{def}}{=} \overline{\text{error}}.\text{Med} \end{aligned}$$

Il protocollo di comunicazione modellato con le reti di Petri



Rec	$\stackrel{\text{def}}{=} \text{trans} \cdot \text{Del}$
Del	$\stackrel{\text{def}}{=} \overline{\text{del}} \cdot \text{Ack}$
Ack	$\stackrel{\text{def}}{=} \overline{\text{ack}} \cdot \text{Rec}$

Il protocollo di comunicazione modellato con le reti di Petri



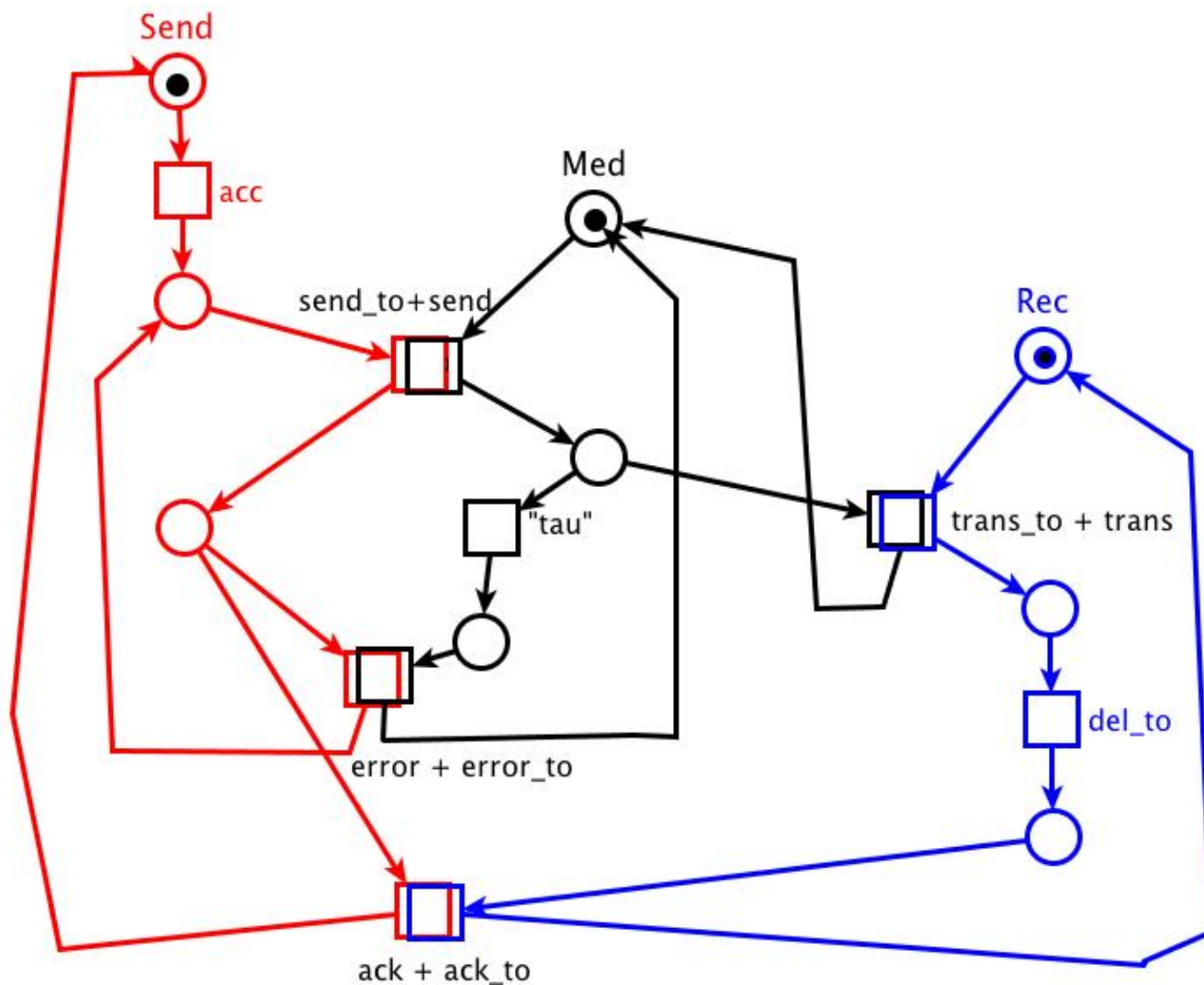
$\text{Send} \stackrel{\text{def}}{=} \text{acc}.\text{Sending}$
 $\text{Sending} \stackrel{\text{def}}{=} \overline{\text{send}}.\text{Wait}$
 $\text{Wait} \stackrel{\text{def}}{=} \text{ack}.\text{Send} + \text{error}.\text{Sending}$

$\text{Med} \stackrel{\text{def}}{=} \text{send}.\text{Med}'$
 $\text{Med}' \stackrel{\text{def}}{=} \tau.\text{Err} + \overline{\text{trans}}.\text{Med}$
 $\text{Err} \stackrel{\text{def}}{=} \overline{\text{error}}.\text{Med}$

$\text{Rec} \stackrel{\text{def}}{=} \text{trans}.\text{Del}$
 $\text{Del} \stackrel{\text{def}}{=} \overline{\text{del}}.\text{Ack}$
 $\text{Ack} \stackrel{\text{def}}{=} \overline{\text{ack}}.\text{Rec}$

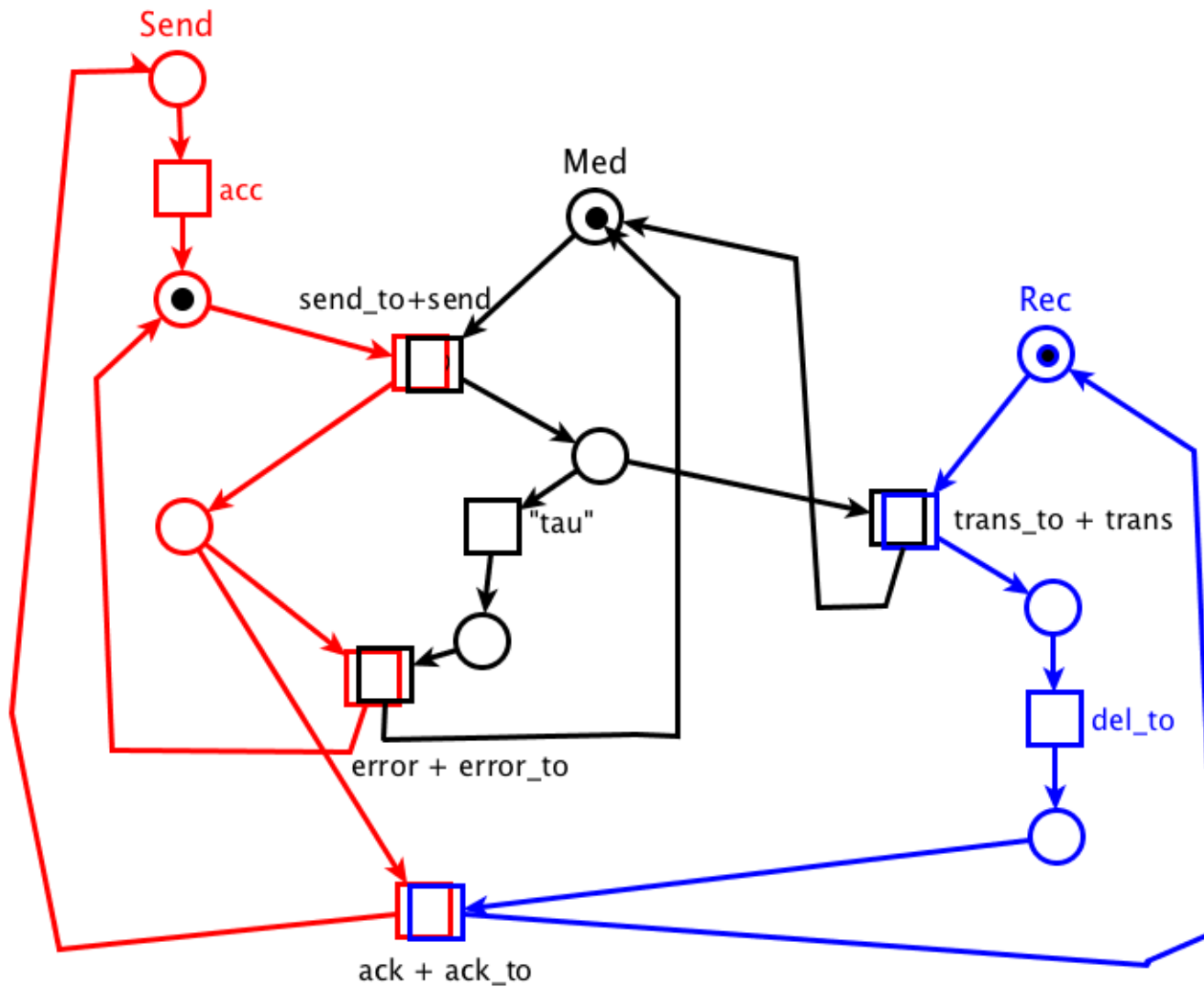
Protocollo: il sistema composto

$\text{Impl} \stackrel{\text{def}}{=} (\text{Send} \mid \text{Med} \mid \text{Rec}) \setminus \{\text{send}, \text{trans}, \text{ack}, \text{error}\}$



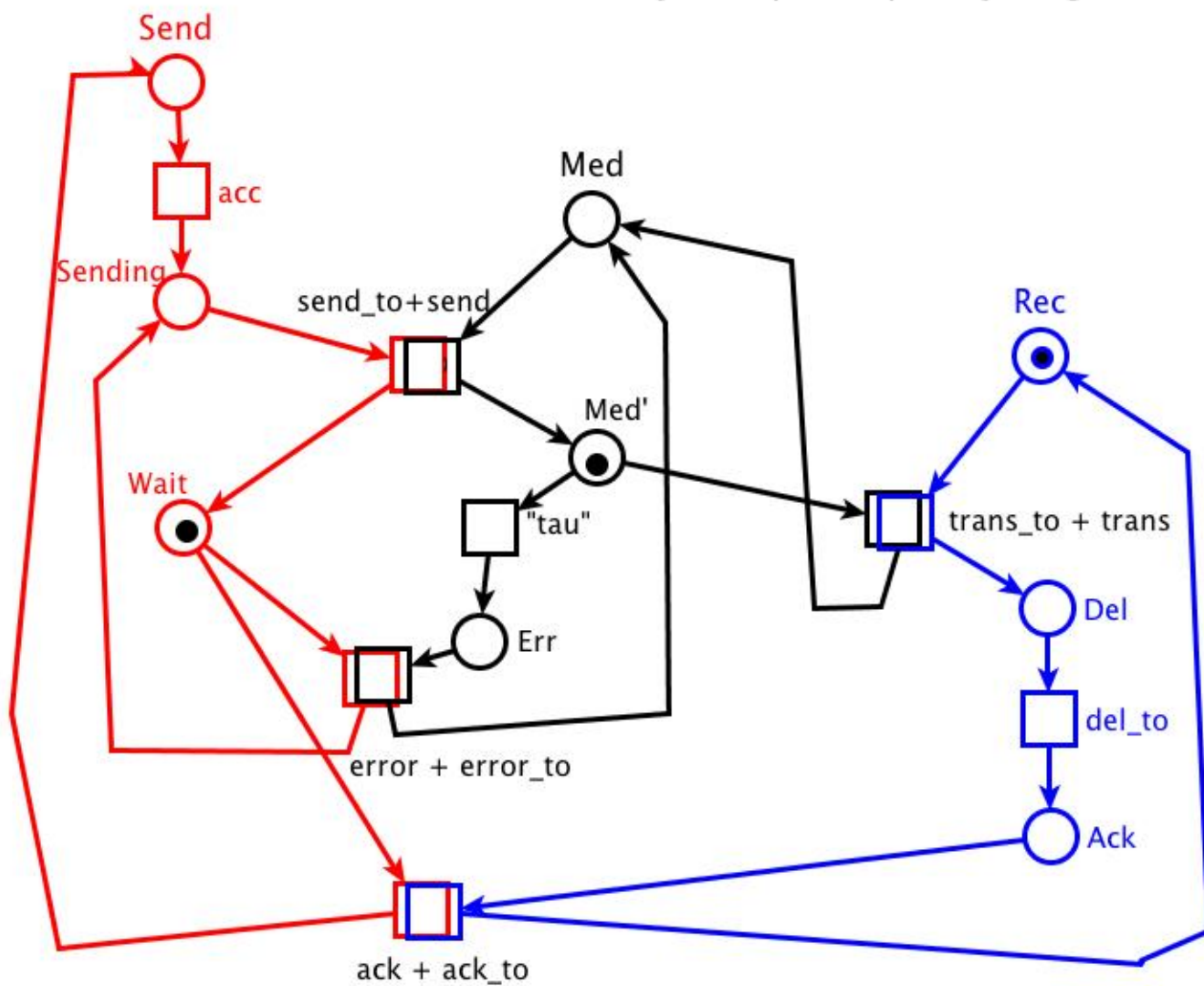
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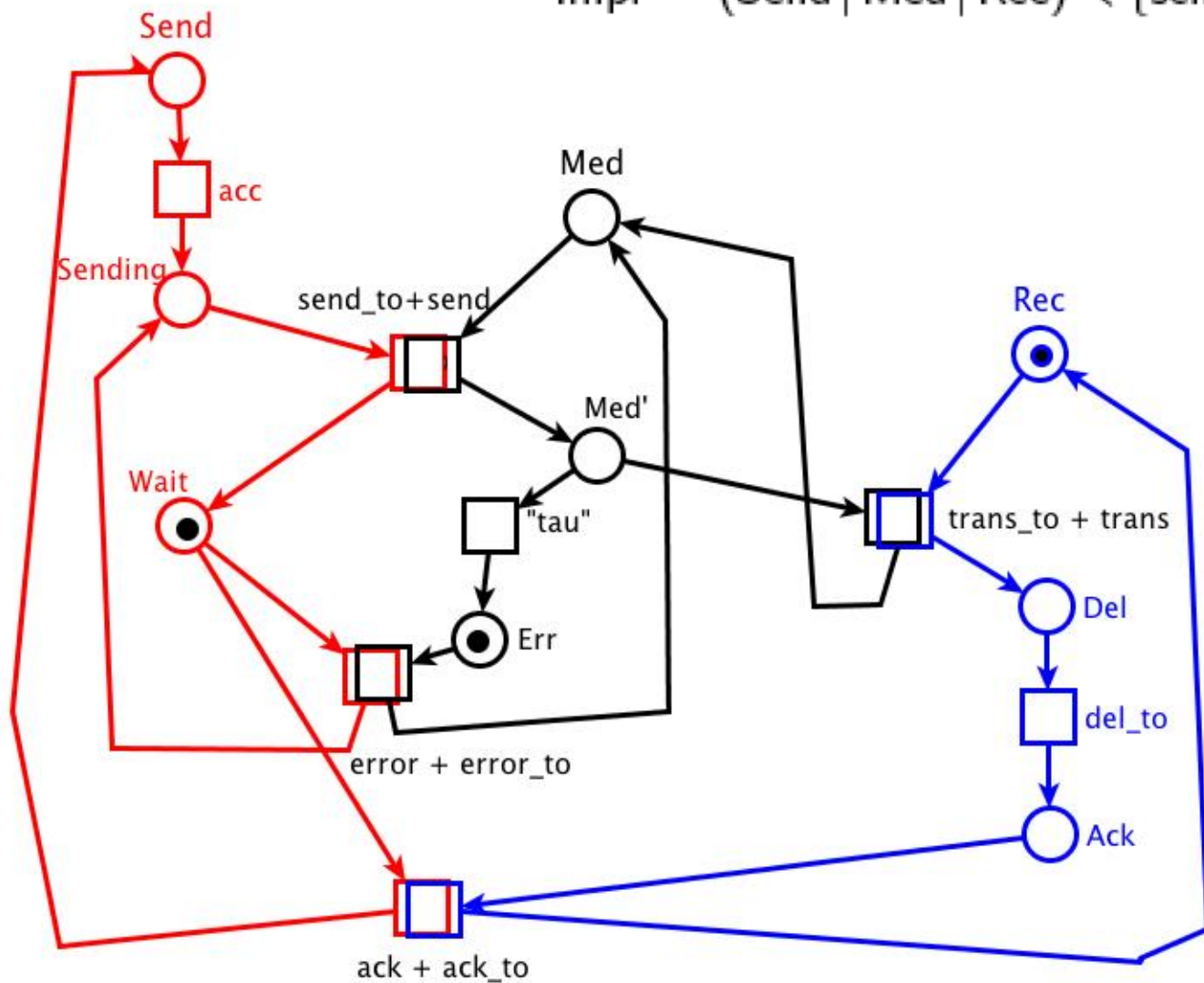
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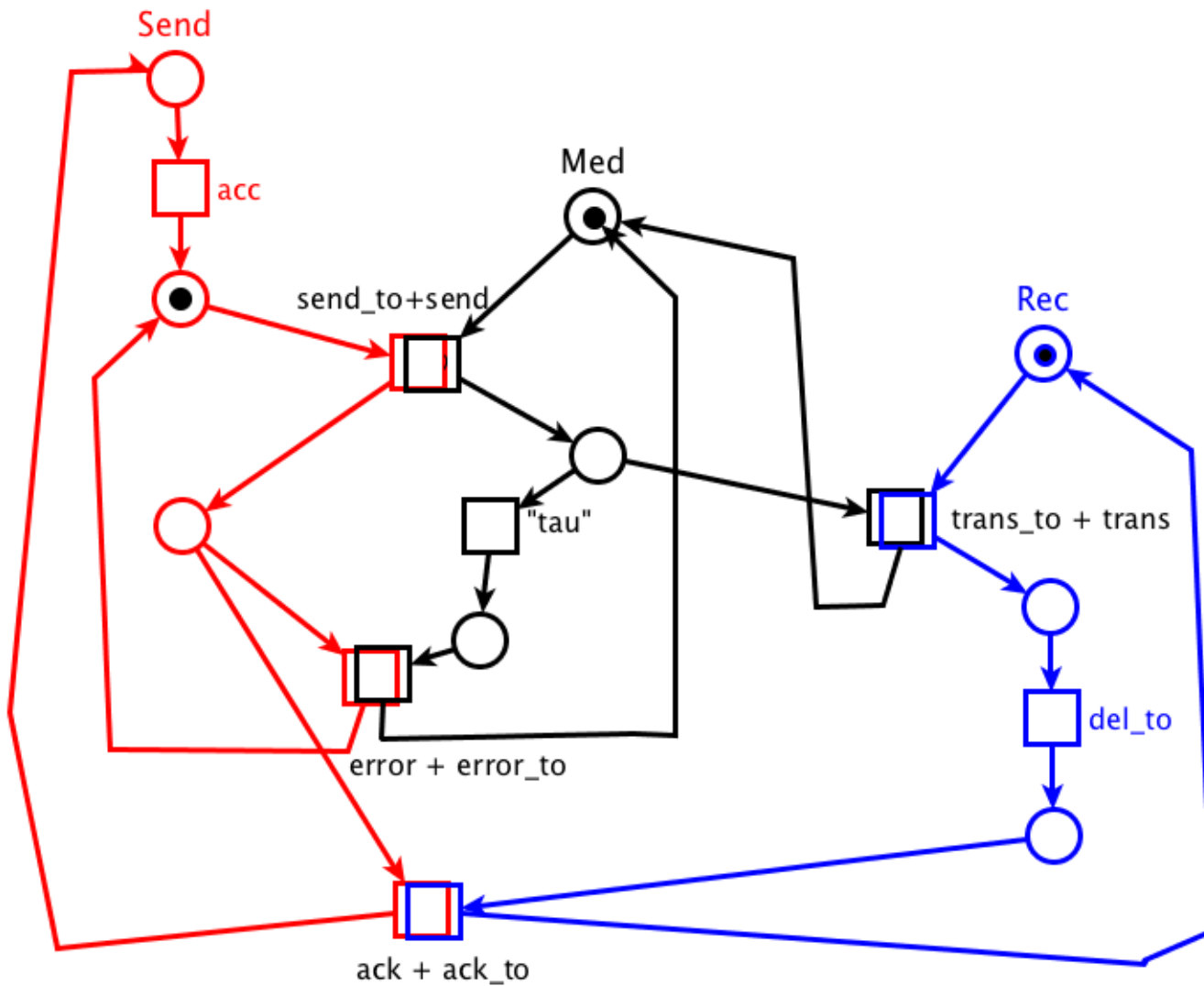
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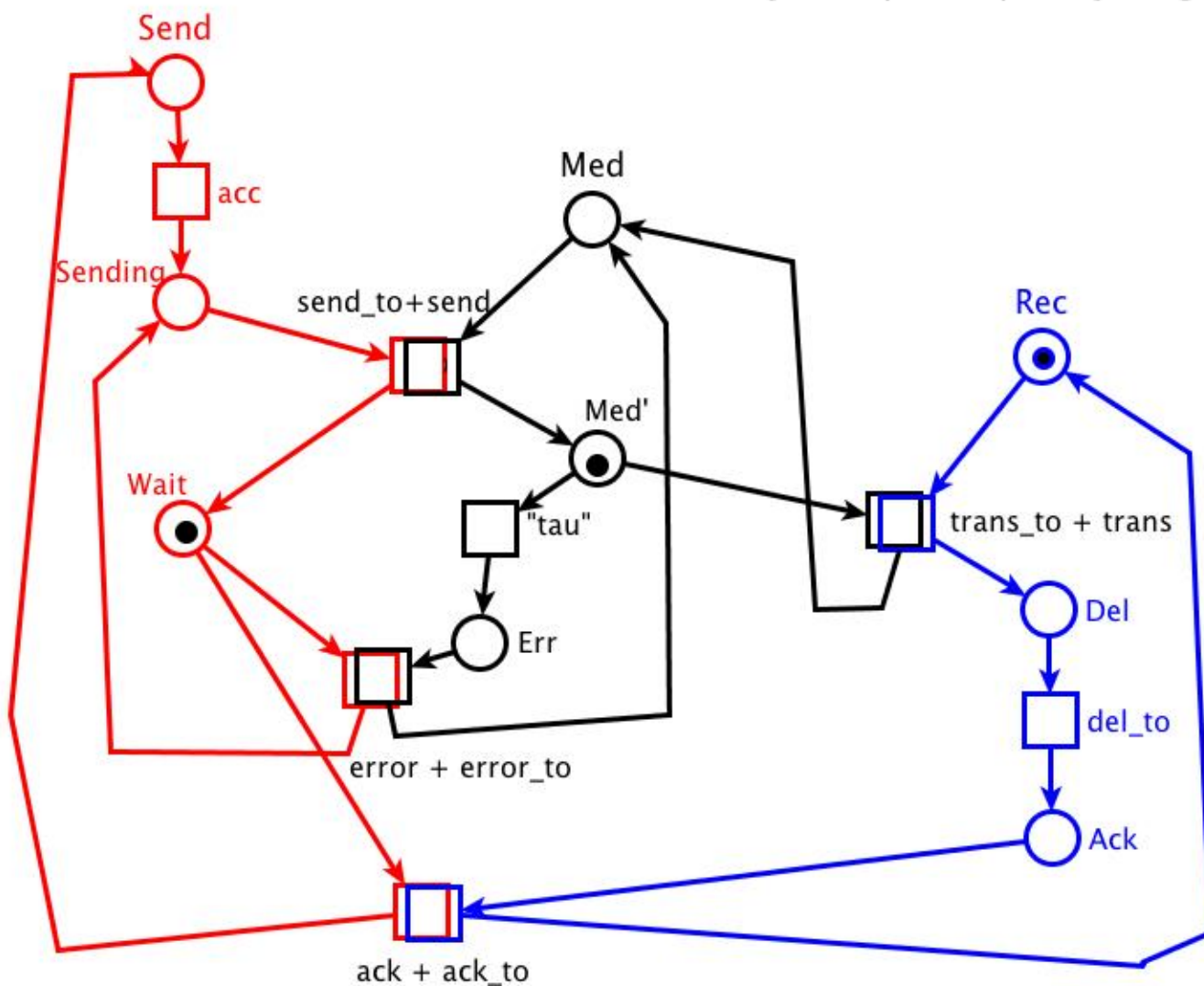
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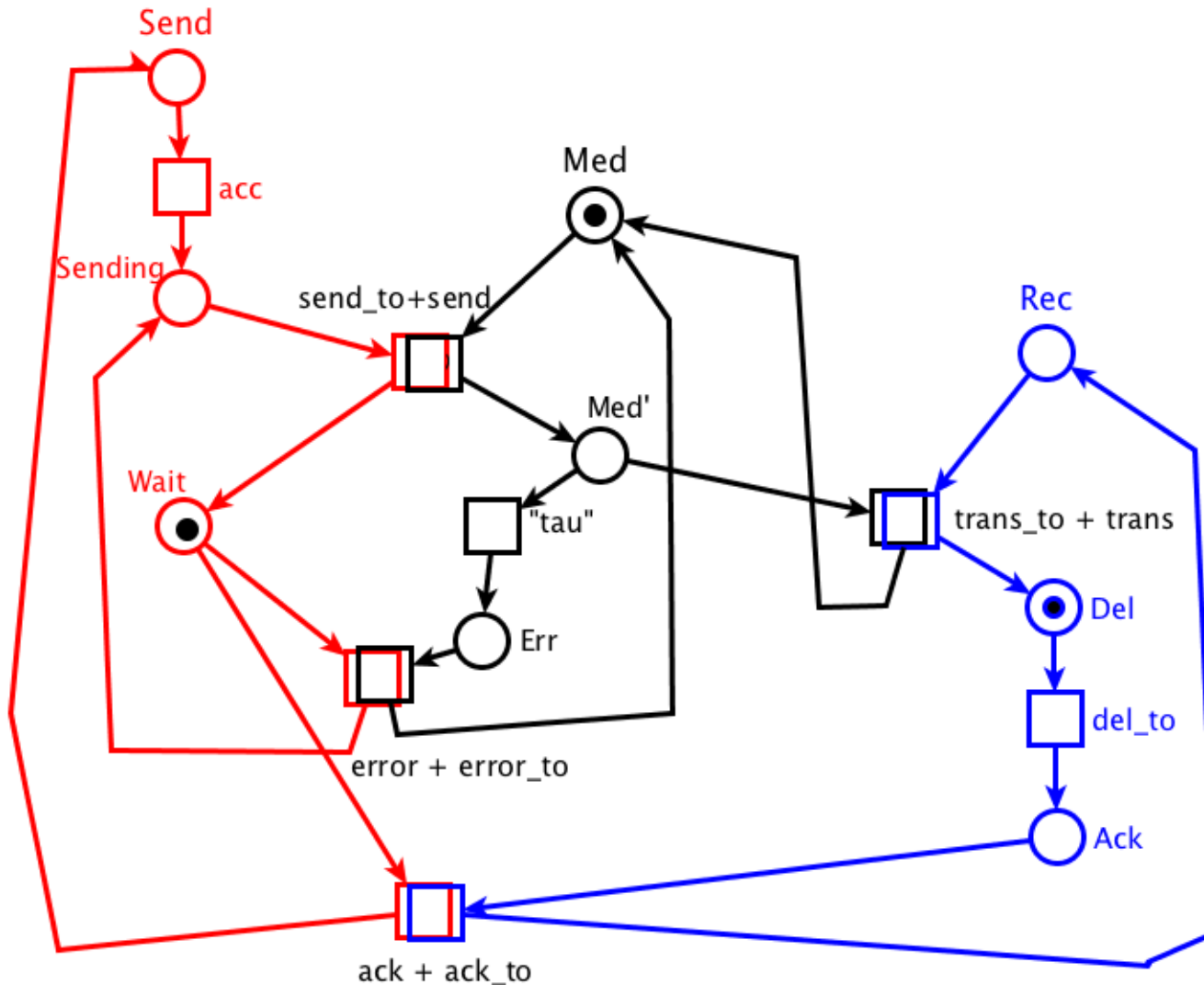
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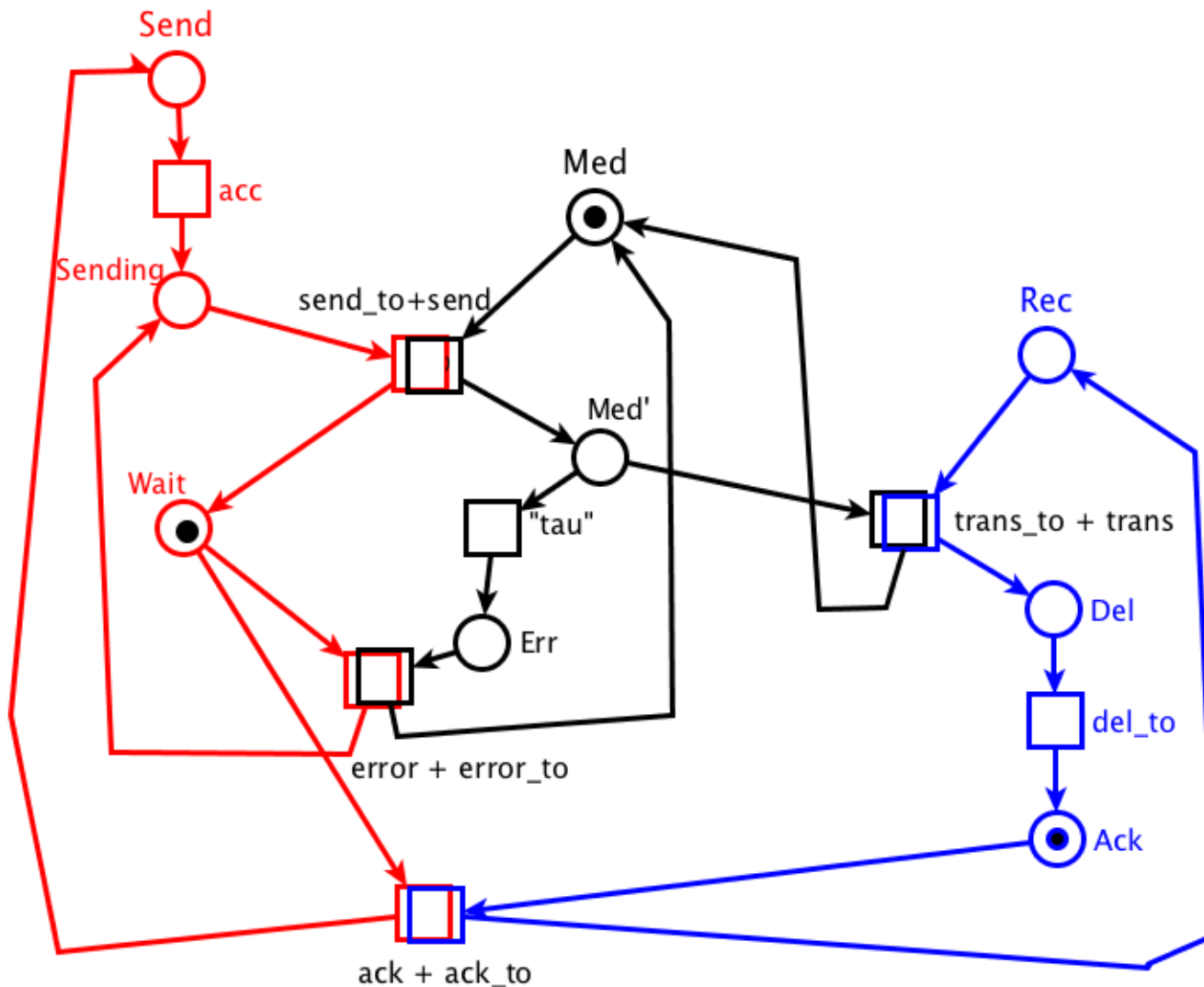
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Protocollo: il sistema composto

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