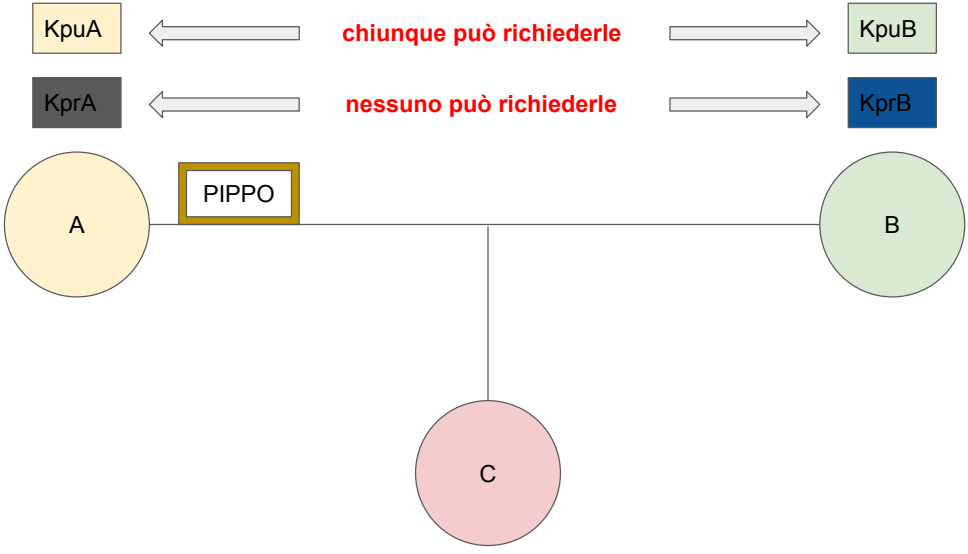
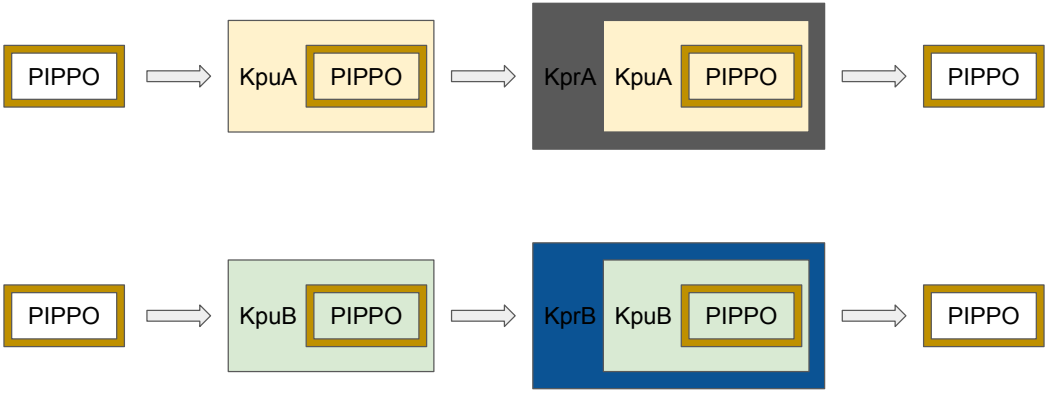
MODELLO RSA

crittografia a chiave asimmetrica


KpuA
chiunque può richiederle
KpuB
KprA
nessuno può richiederle
KprB
A
PIPPO
B
C

CHIAVI

chiavi pubbliche e chiavi private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PIPPO
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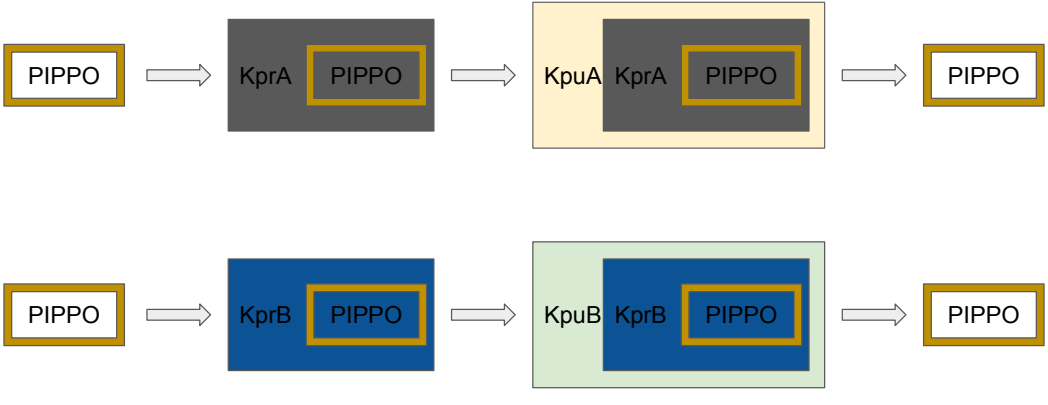
PIPPO
KprB
KpuB
PIPPO
PIPPO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KprA
PIPPO
KpuA
KprA
PIPPO
PIPPO
PIPPO
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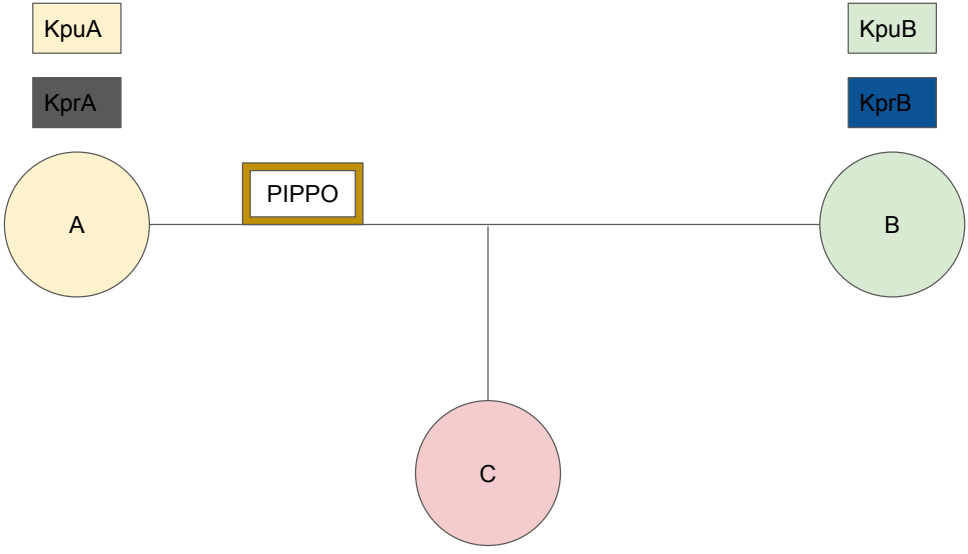
KprB
PIPPO
PIPPO

CONFIDENZIALITÀ

garantire la riservatezza di un messaggio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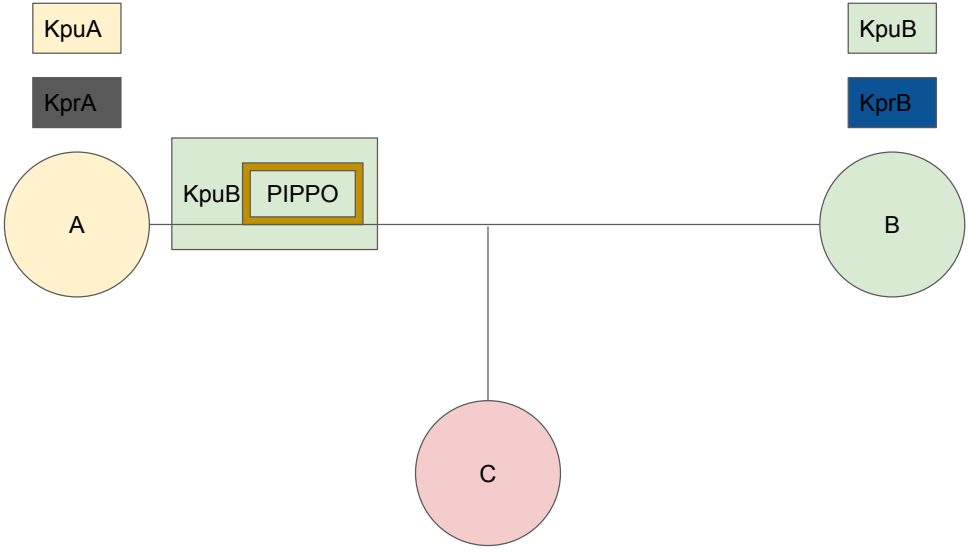
B
C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KpuB
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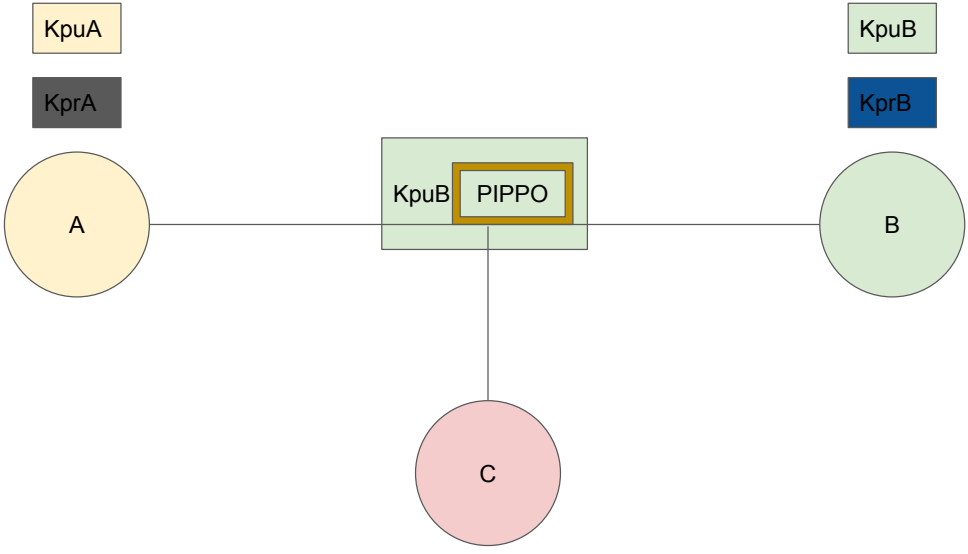
KpuB
PIPPO
B
C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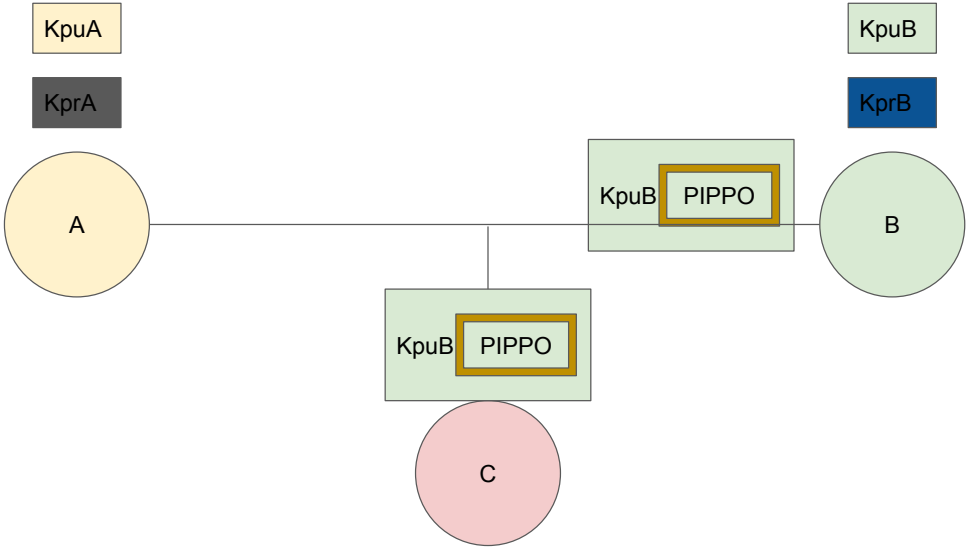
A
B
C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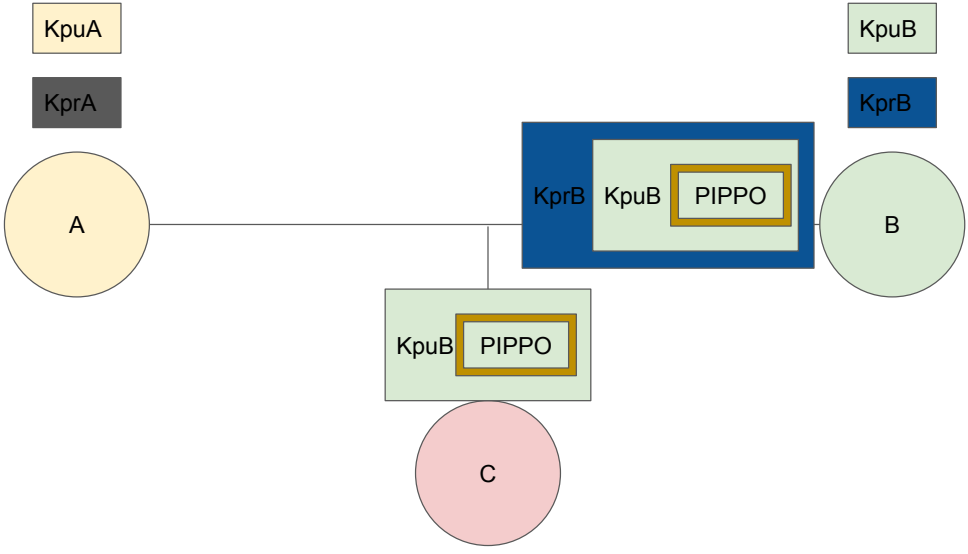
C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B
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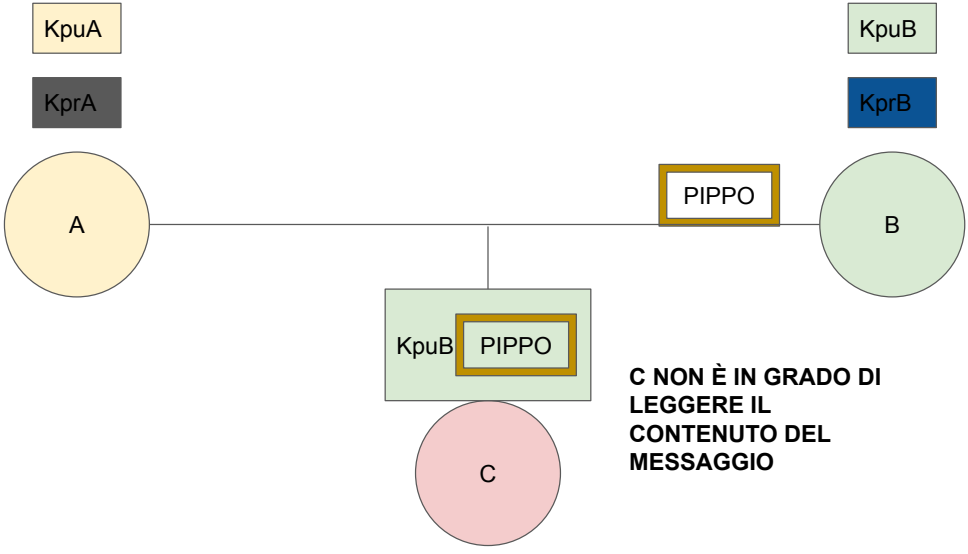
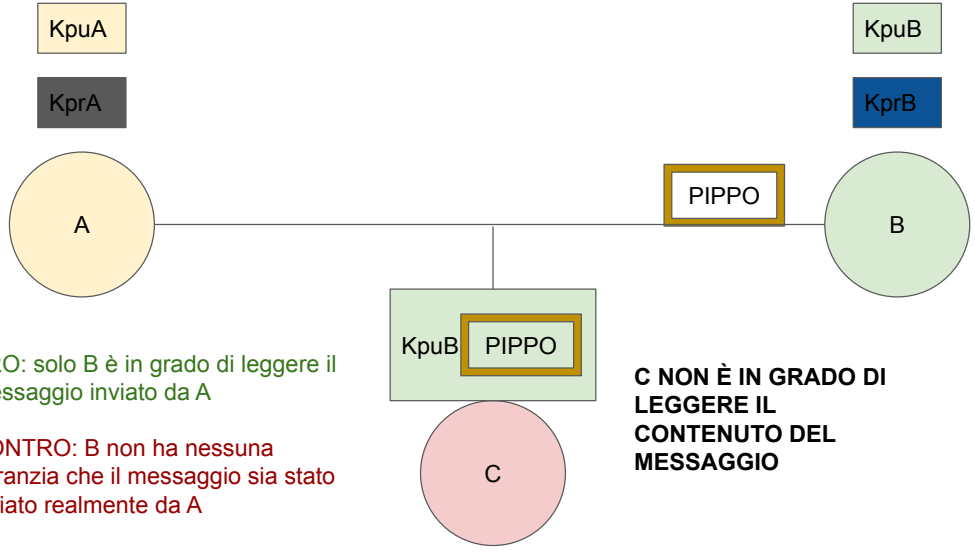
PIPPO
C


KpuA
KprA
KpuB
KprB
A
PIPPO
B
KpuB
PIPPO
C
C NON È IN GRADO DI LEGGERE IL CONTENUTO DEL MESSAGGIO



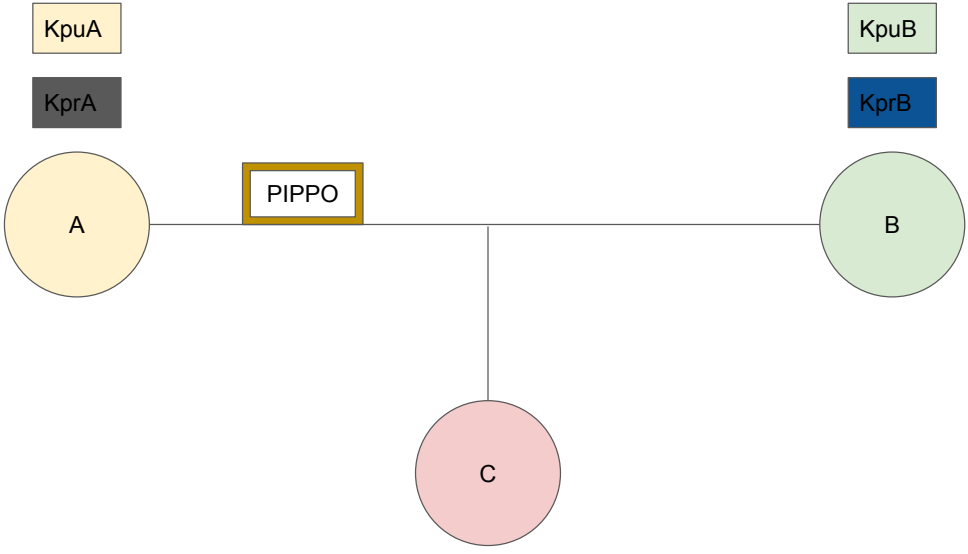
PRO: solo B è in grado di leggere il messaggio inviato da A

CONTRO: B non ha nessuna garanzia che il messaggio sia stato inviato realmente da A

C NON È IN GRADO DI LEGGERE IL CONTENUTO DEL MESSAGGIO

AUTENTICITÀ

firma digitale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KprA
KpuB
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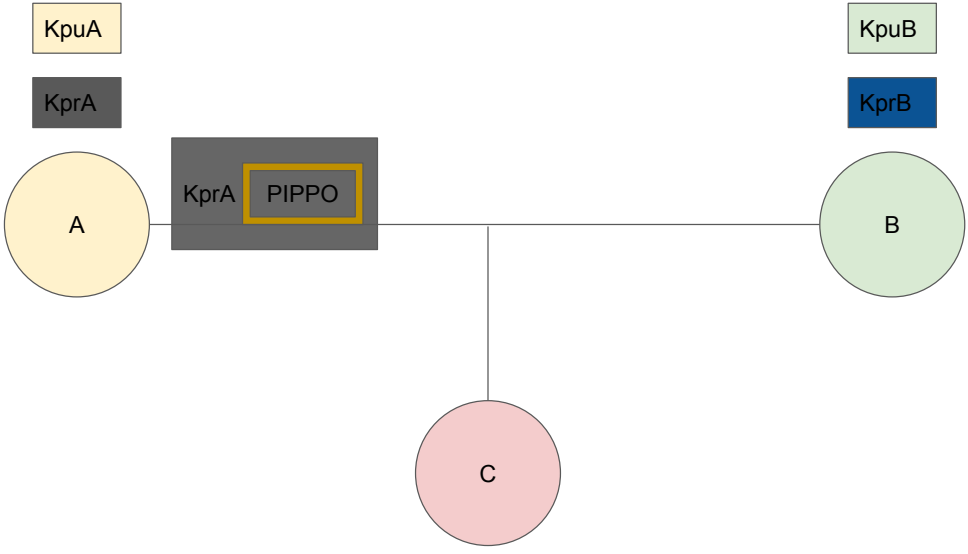
A
PIPPO
B
C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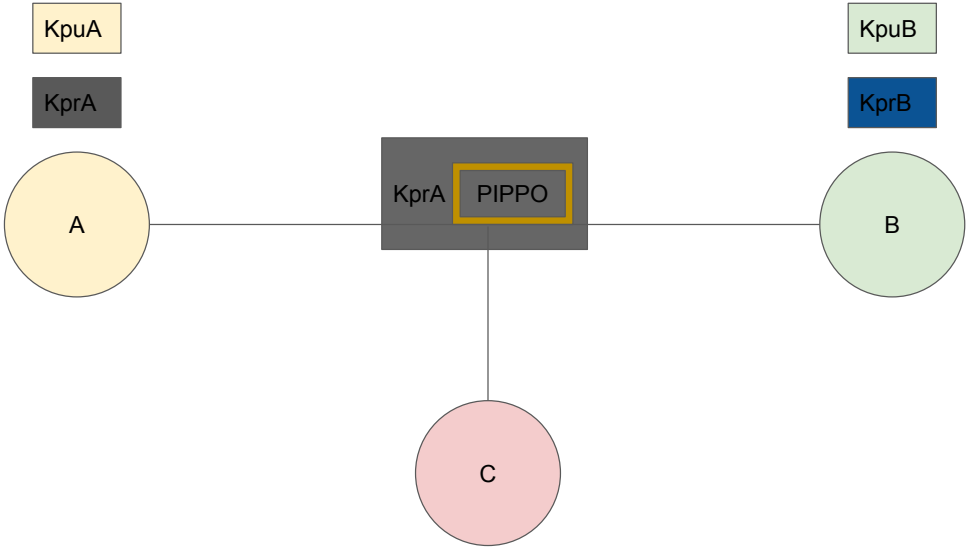
KprA
KprA
PIPPO
A
B
C
KpuB
KprB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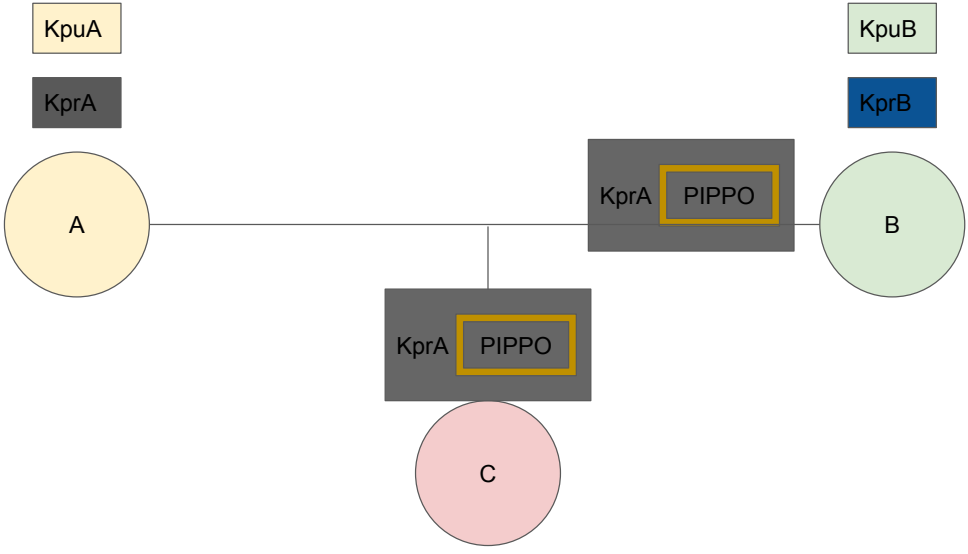
KprA
KprA
PIPPO
KpuB
KprB
A
B
C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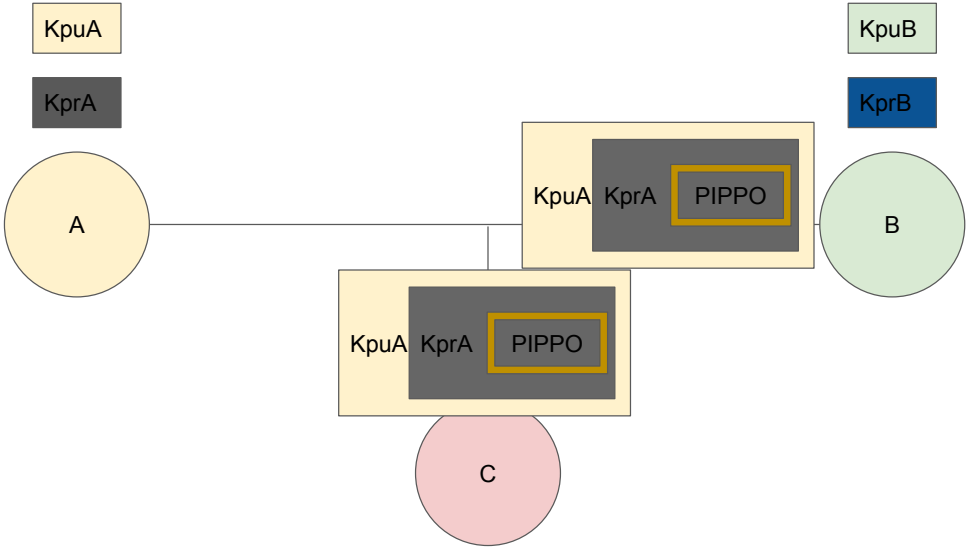
KprA
KpuB
KprB
A
KprA
PIPPO
B
KprA
PIPPO
C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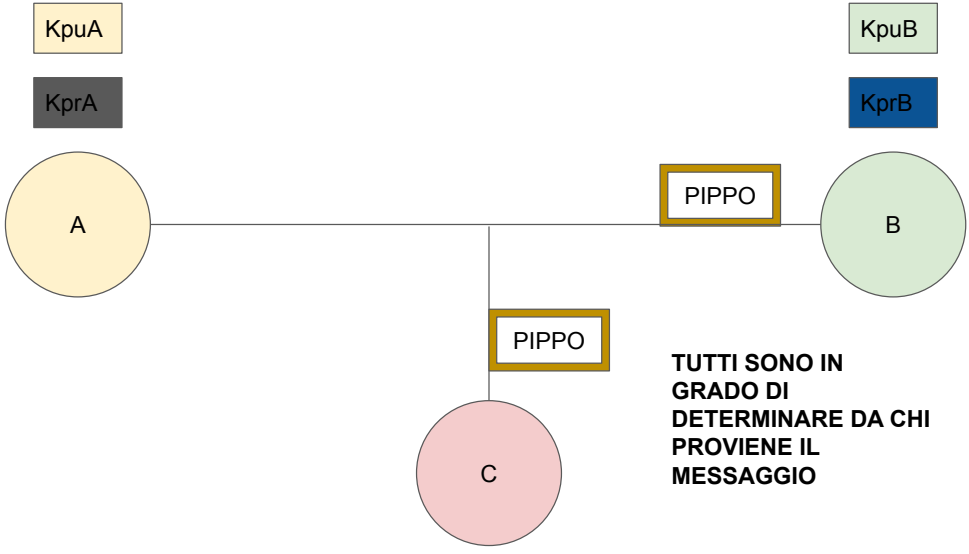
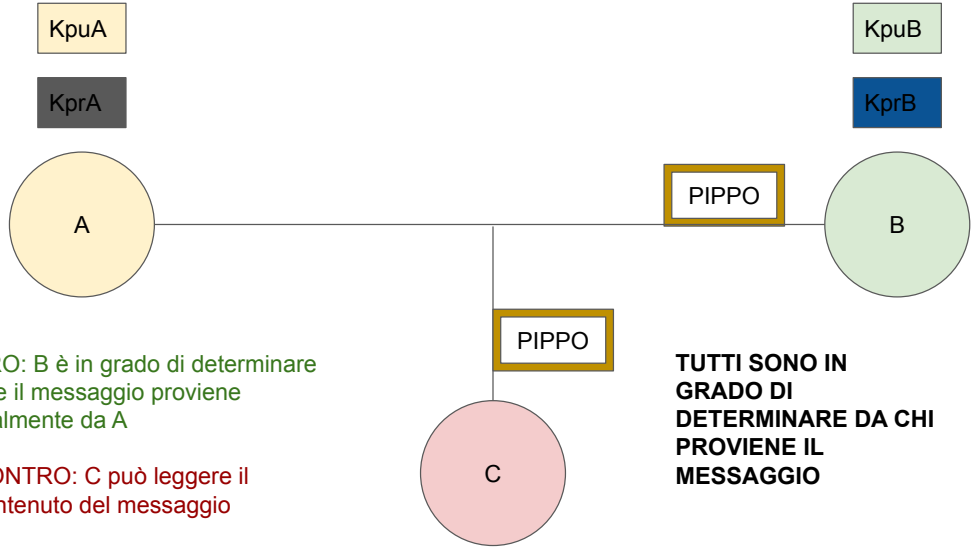
KprA
KpuB
KprB
A
KpuA
KprA
PIPPO
B
KpuA
KprA
PIPPO
C


KpuA
KprA
KpuB
KprB
A
PIPPO
B
PIPPO
C
TUTTI SONO IN GRADO DI DETERMINARE DA CHI PROVIENE IL MESSAGGIO



PRO: B è in grado di determinare che il messaggio proviene realmente da A

CONTRO: C può leggere il contenuto del messaggio

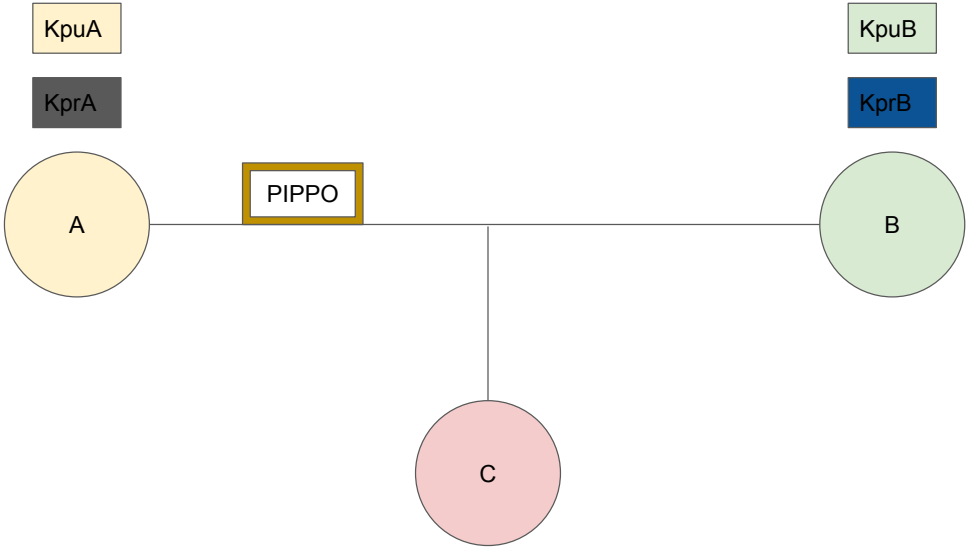
TUTTI SONO IN GRADO DI DETERMINARE DA CHI PROVIENE IL MESSAGGIO

INTEGRITÀ

garantire la non modificabilità di un messaggio

PROBLEMA

possibile attacco all’integrità di un messaggio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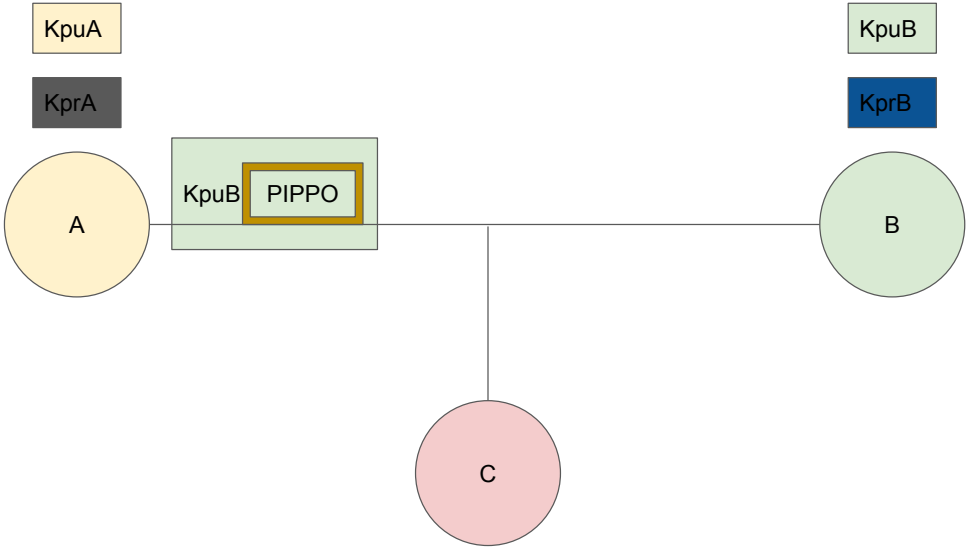
KprA
KpuB
KprB
A
PIPPO
B
C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KprA
KpuB
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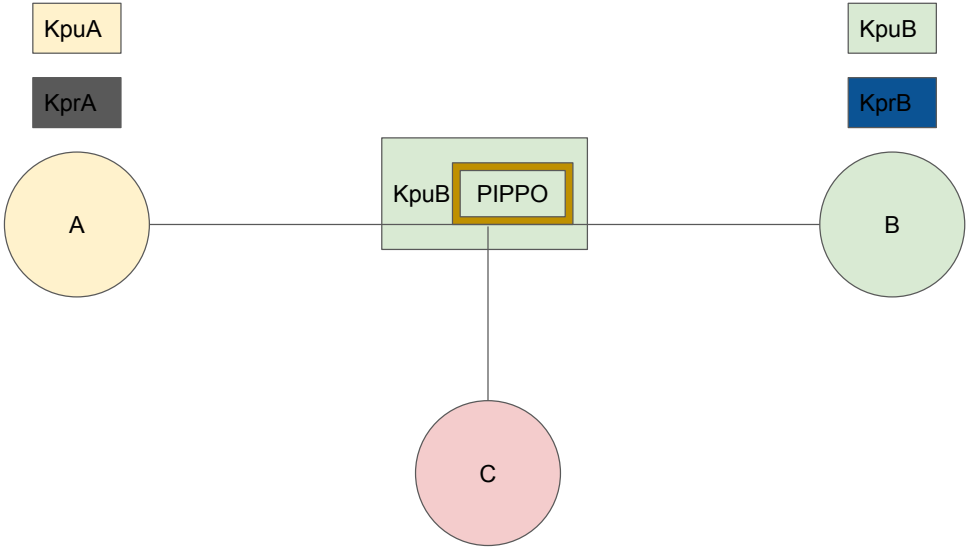
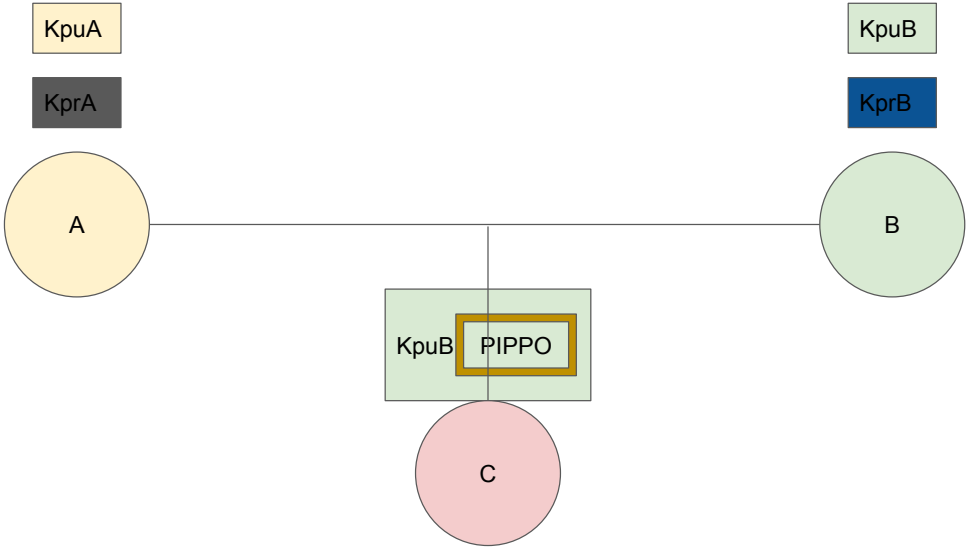
A
KpuB
PIPPO
B
C


KpuA
KprA
KpuB
KprB
KpuB
PIPPO
A
B
C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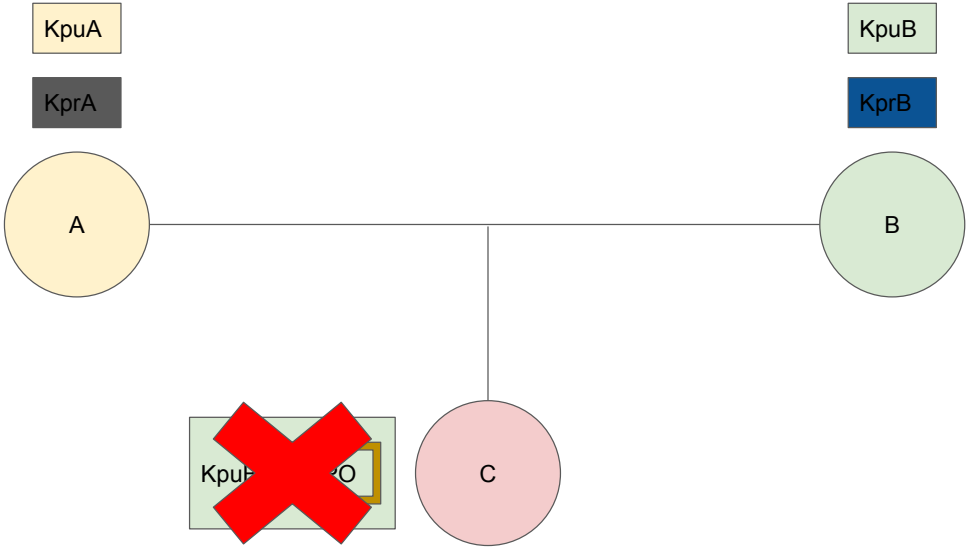
KprA
KpuB
KprB
A
B
KpuB
PIPPO
C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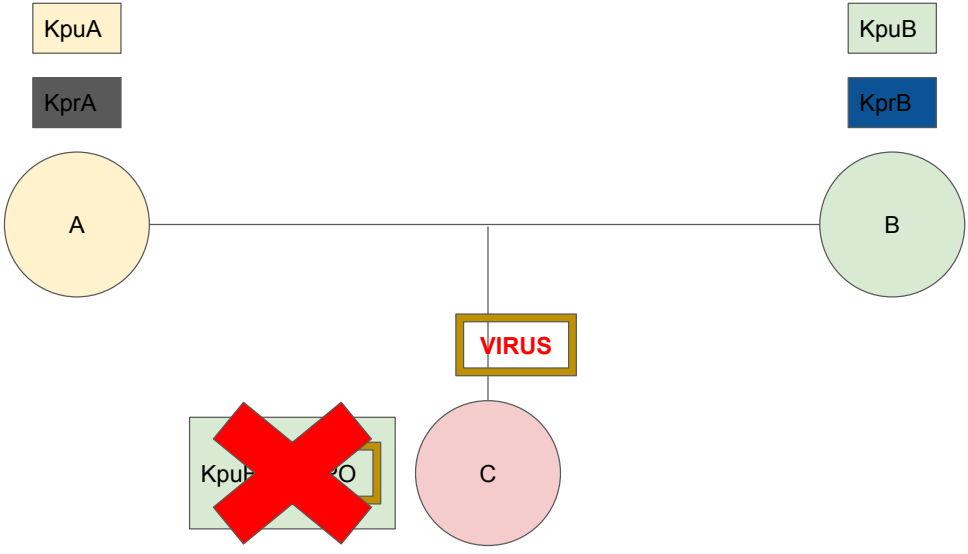
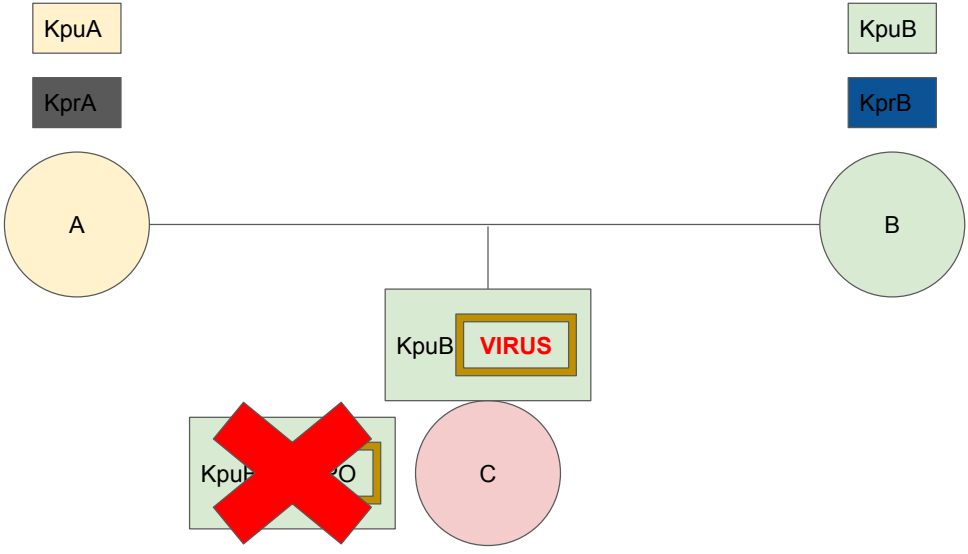
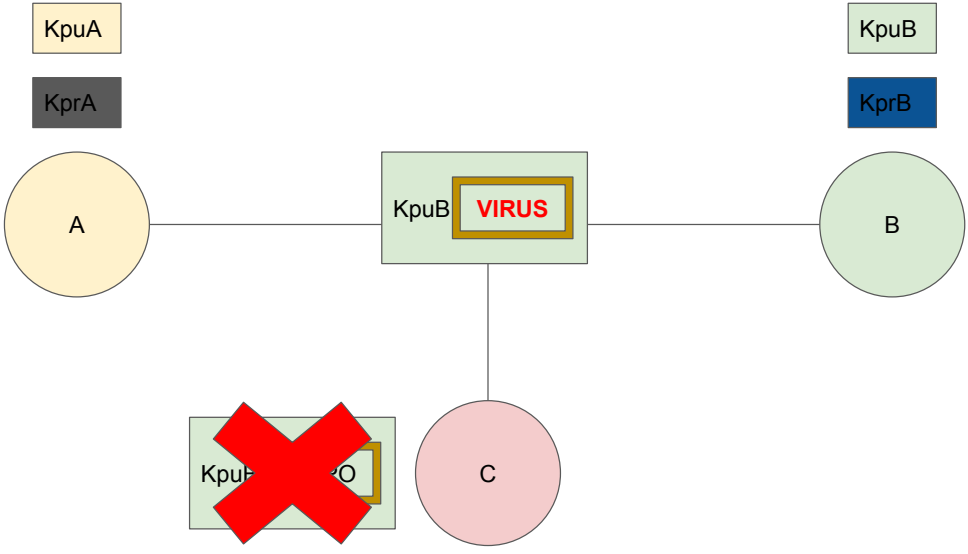
KpuB
KprB
A
B
C


KpuA
KprA
KpuB
KprB
A
B
VIRUS
C


KpuA
KprA
KpuB
KprB
A
B
KpuB
VIRUS
C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KprA
KpuB
KprB
A
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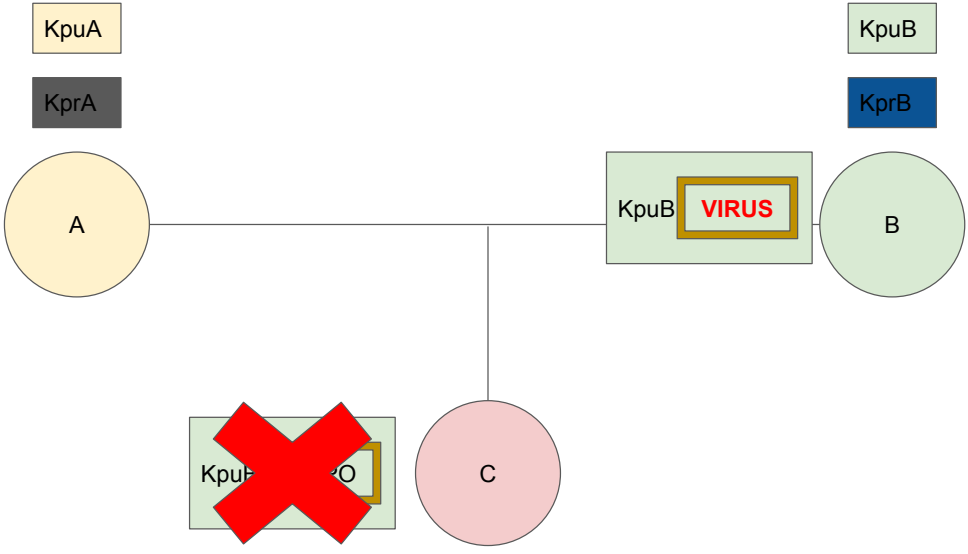
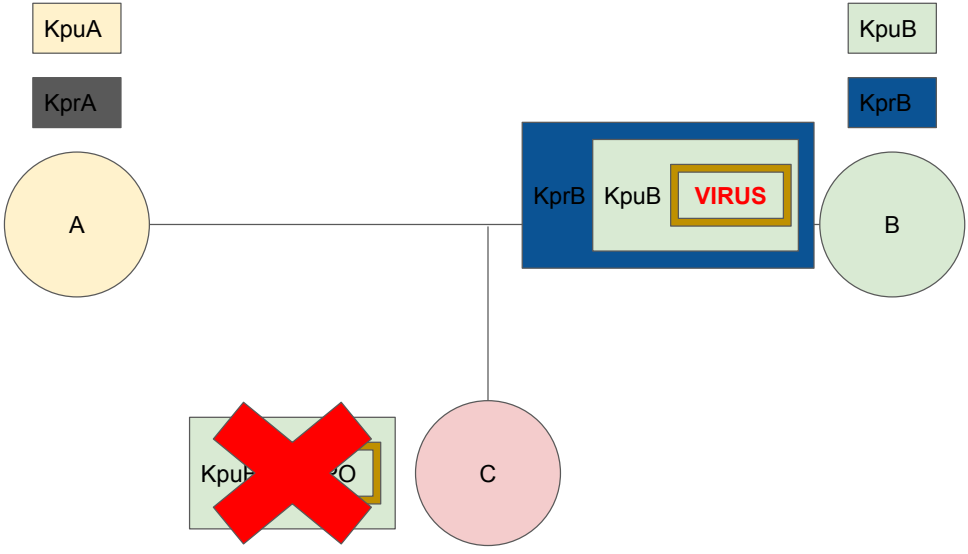
VIRUS
B
C


KpuA
KprA
KpuB
KprB
A
KpuB
VIRUS
B
C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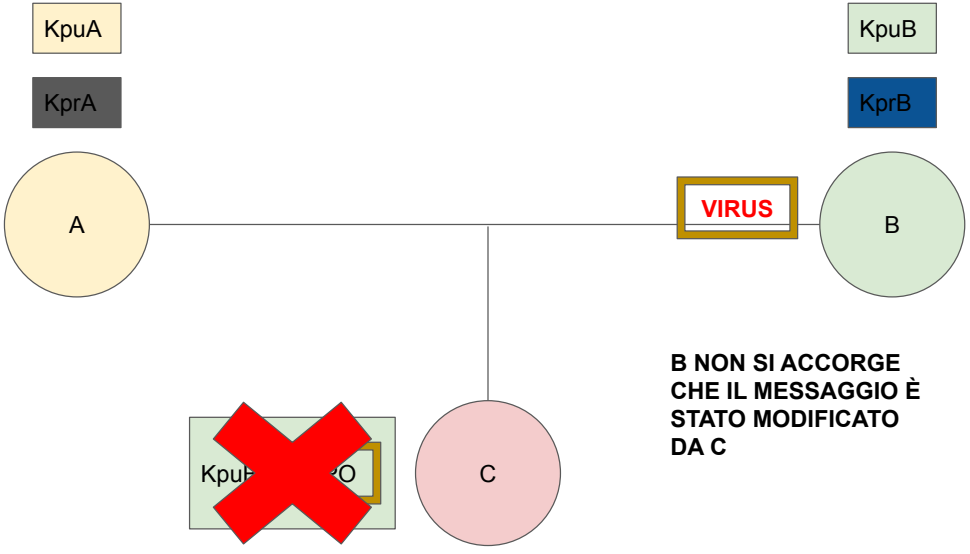
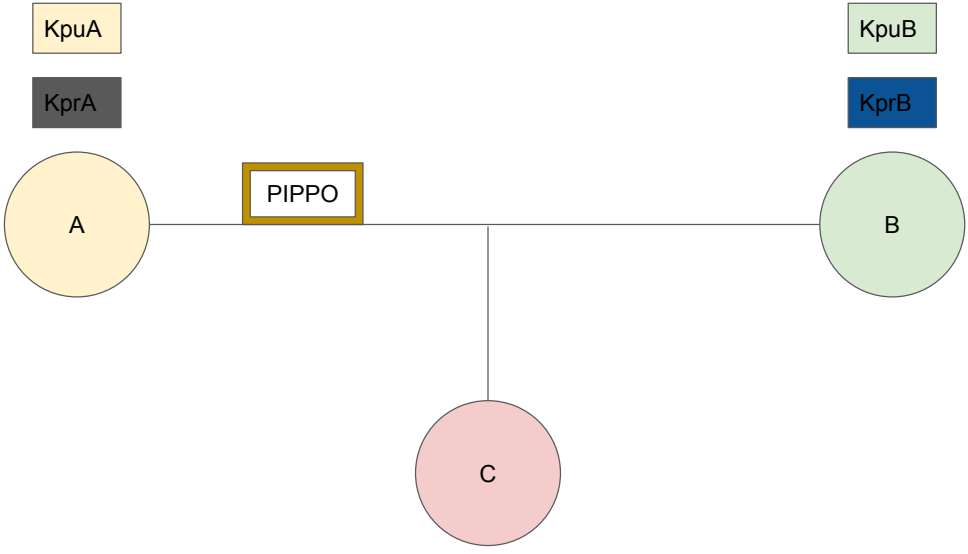
B
C


KpuA
KprA
KpuB
KprB
A
VIRUS
B
C
B NON SI ACCORGE
CHE IL MESSAGGIO È
STATO MODIFICATO
DA C

SOLUZIONE

possibile attacco all’integrità di un messaggio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KprA
KpuB
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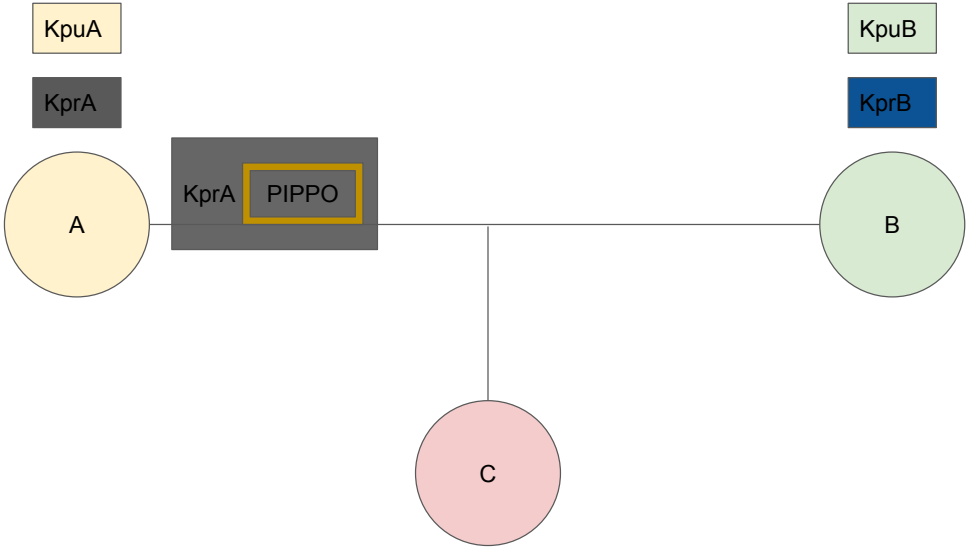
A
PIPPO
B
C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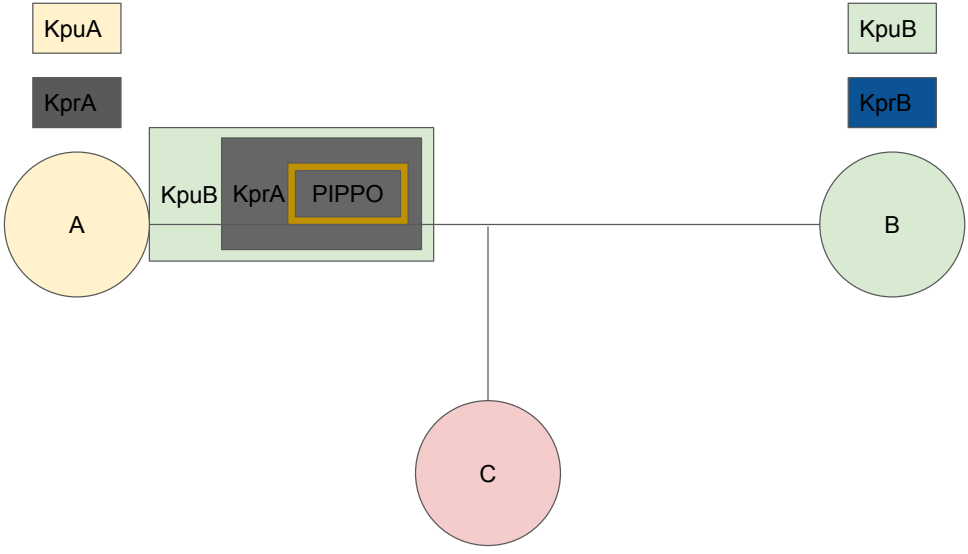
KprA
PIPPO
A
B
C
KpuB
KprB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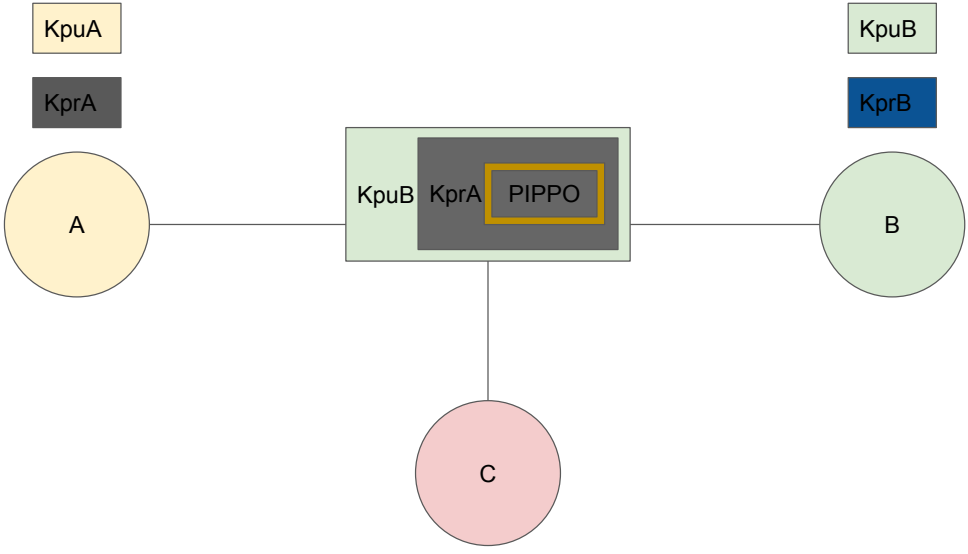
B
C


KpuA
KprA
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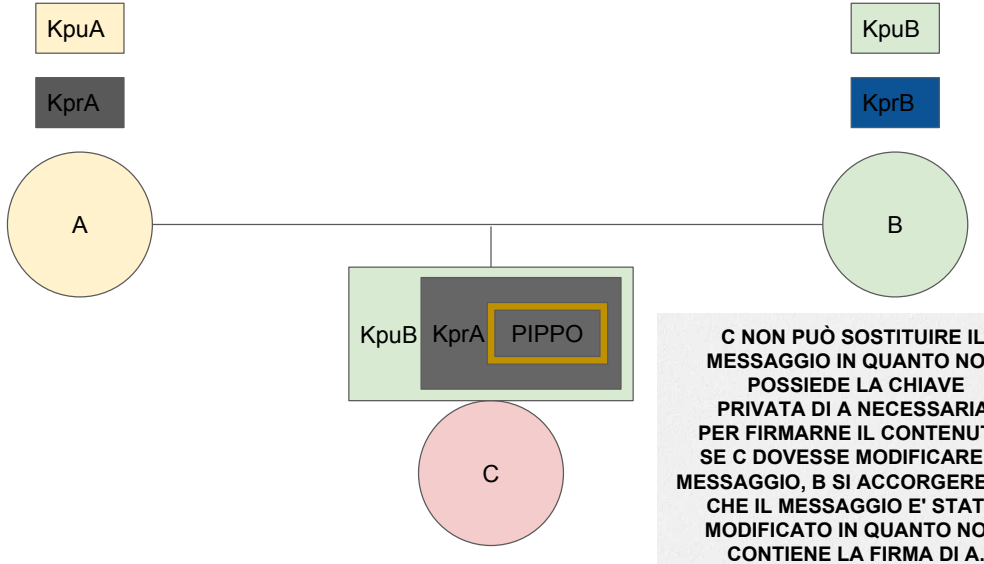
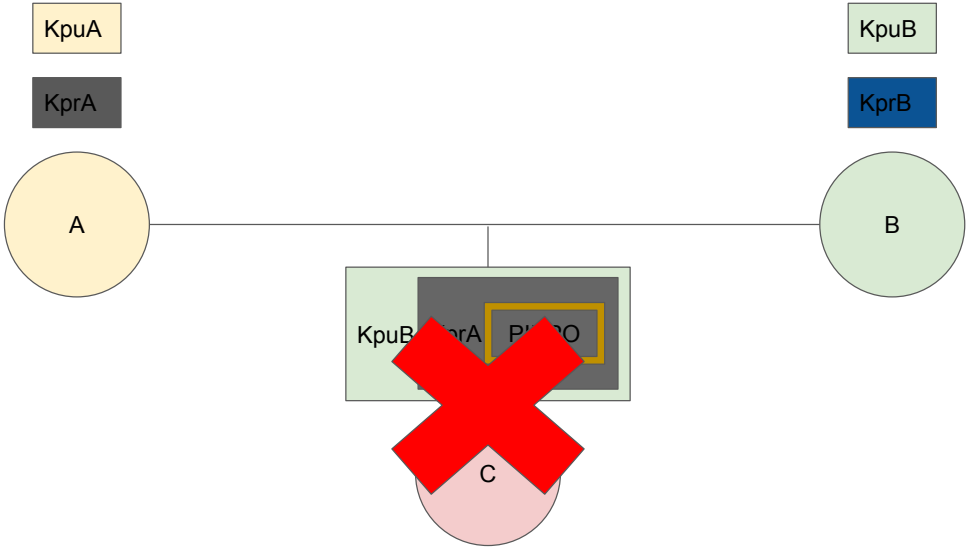
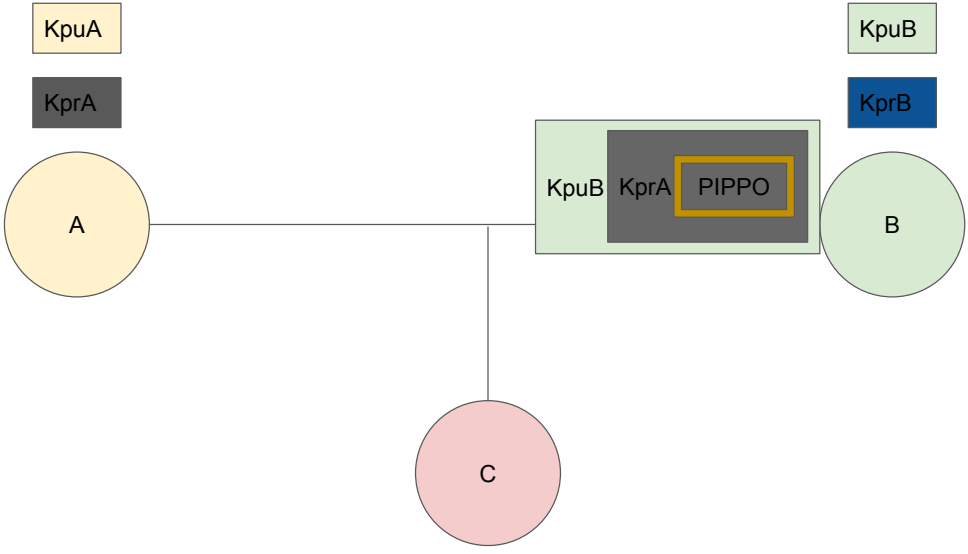
PIPPO
B
C



C NON PUÒ SOSTITUIRE IL MESSAGGIO IN QUANTO NON POSSIEDE LA CHIAVE PRIVATA DI A NECESSARIA PER FIRMARNE IL CONTENUTO. SE C DOVESSE MODIFICARE IL MESSAGGIO, B SI ACCORGEREBBE CHE IL MESSAGGIO E' STATO MODIFICATO IN QUANTO NON CONTIENE LA FIRMA DI A.


KpuA
KprA
KpuB
KprB
A
B
C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KprA
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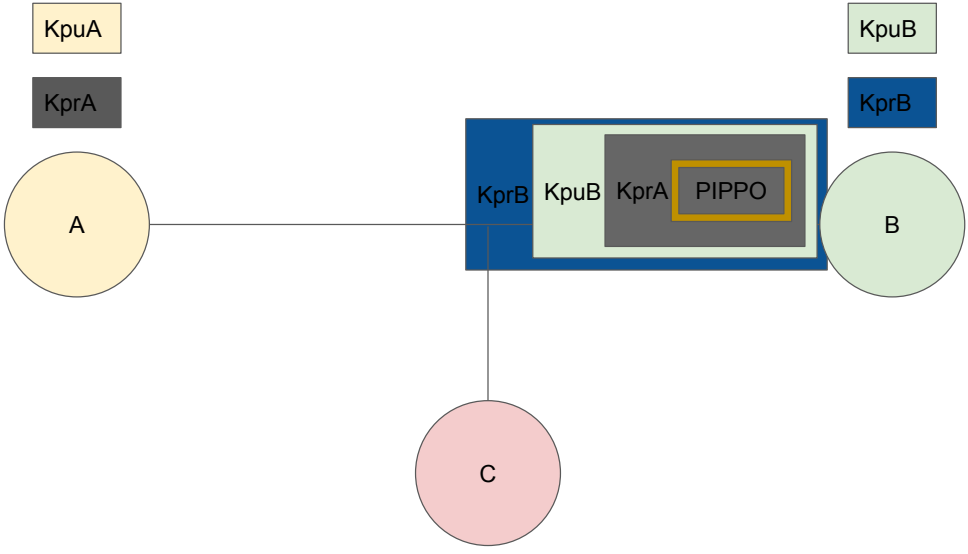
KprB
A
KpuB
KprA
PIPPO
B
C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KprA
KpuB
KprB
A
KprB
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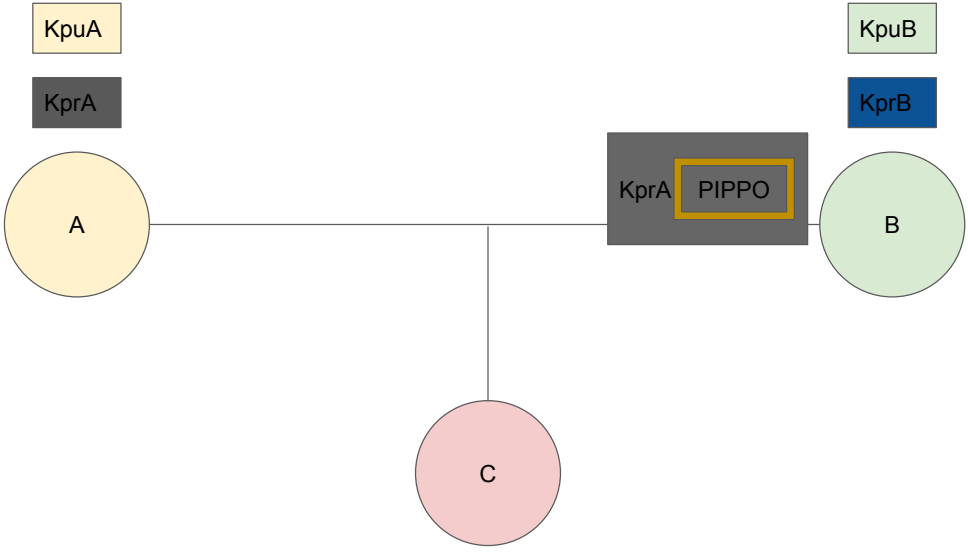
KprA
PIPPO
B
C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A
B
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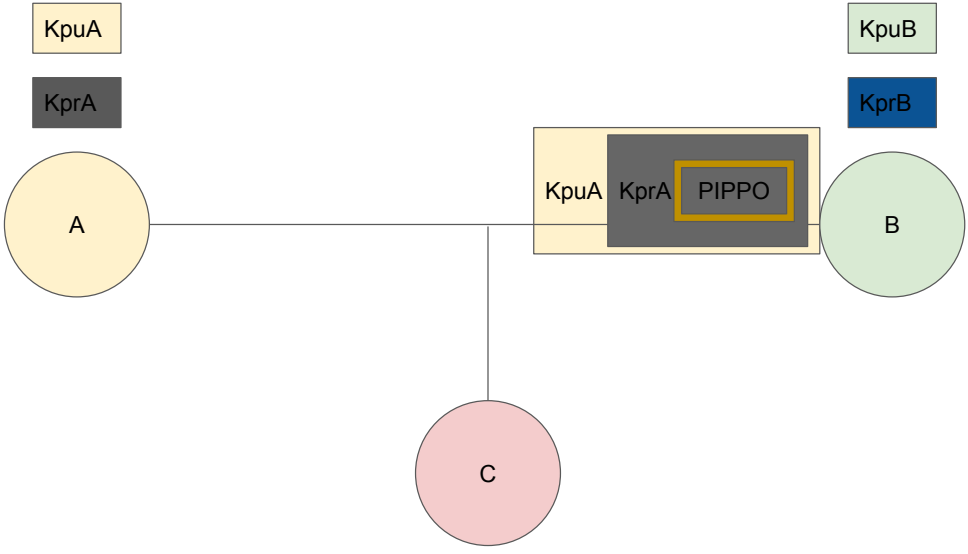
KpuA
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KpuB
KprB
A
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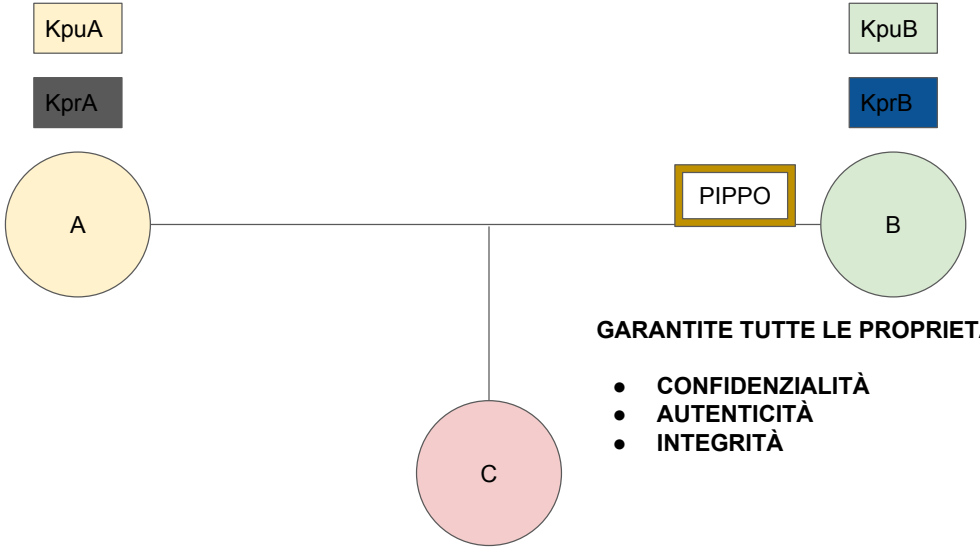
PIPPO
B
C

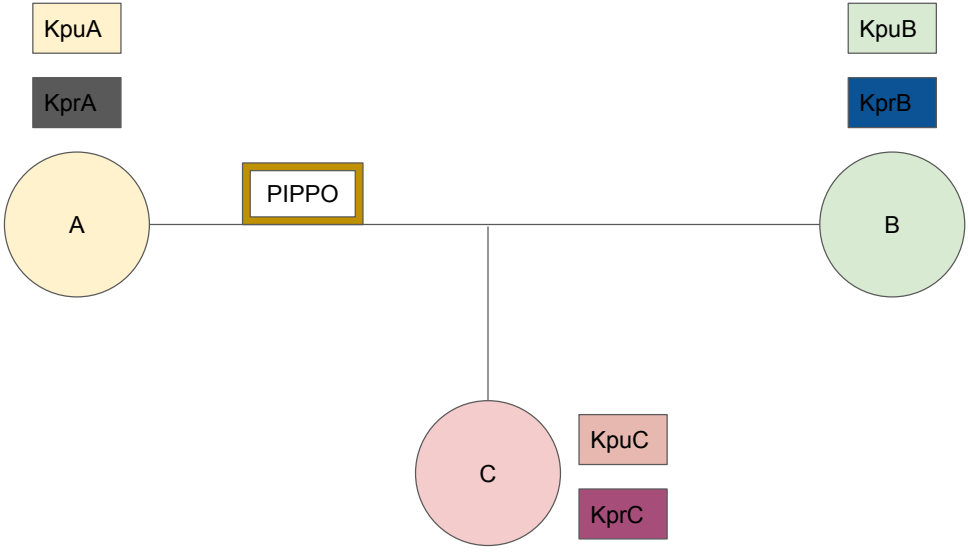


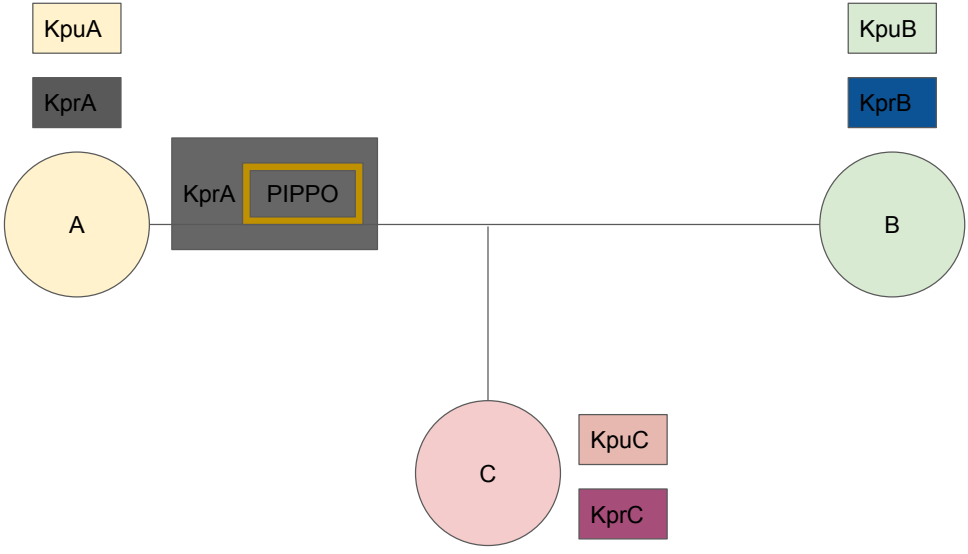
GARANTITE TUTTE LE PROPRIETÀ

- **CONFIDENZIALITÀ**
- **AUTENTICITÀ**
- **INTEGRITÀ**

MAN IN THE MIDDLE

attacco al modello RSA


KpuA
KprA
KpuB
KprB
A
PIPPO
B
C
KpuC
KprC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KprA
A
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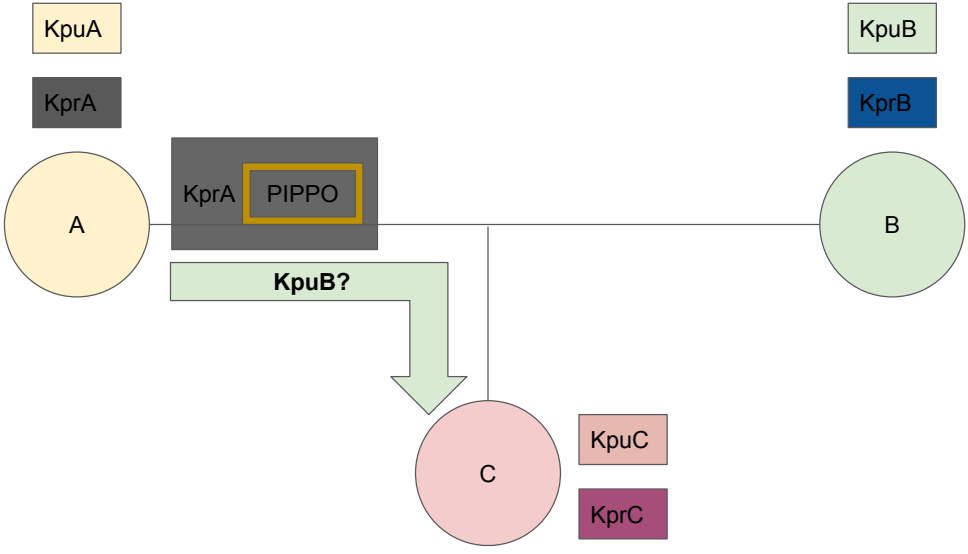
PIPPO
KpuB
KprB
B
C
KpuC
KprC


KpuA
KprA
KprA
PIPPO
A
KpuB
KprB
B
KpuB?
C
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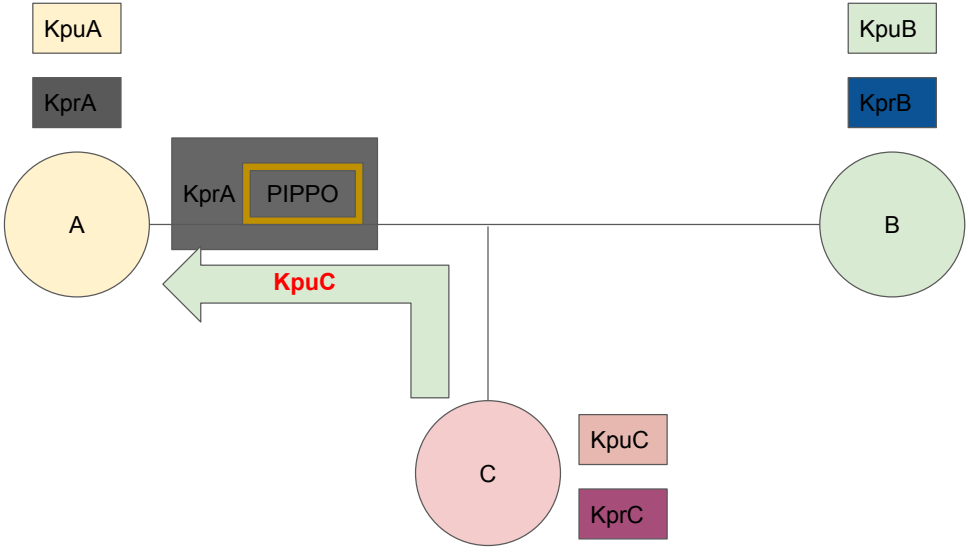
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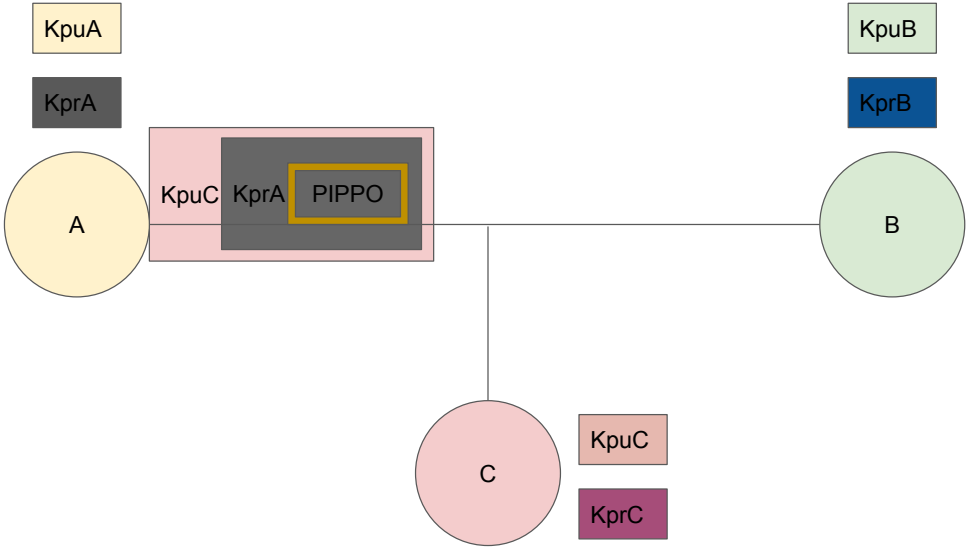
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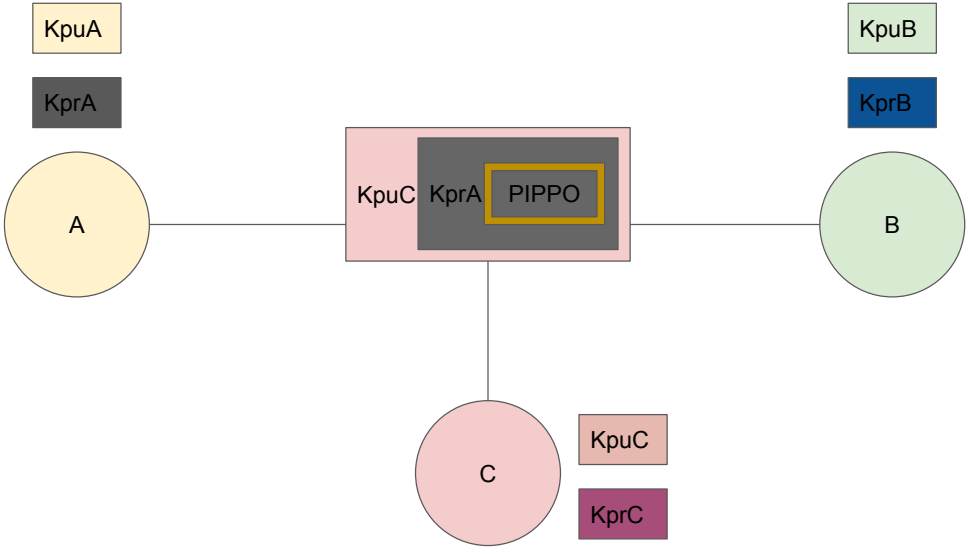
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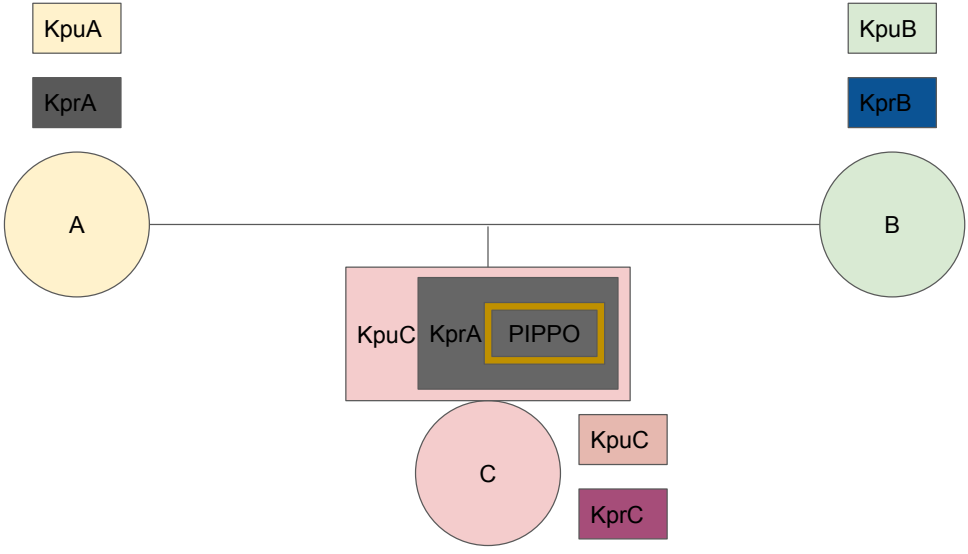
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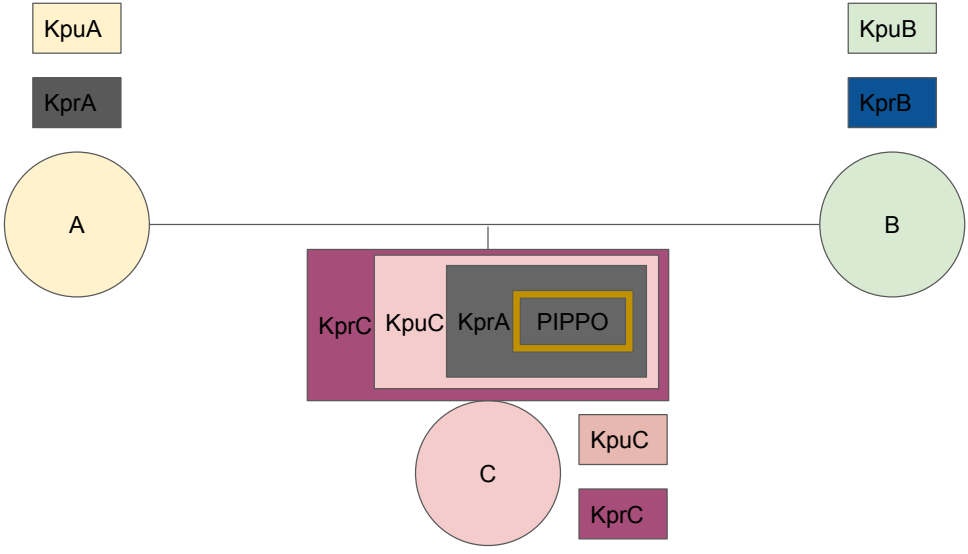
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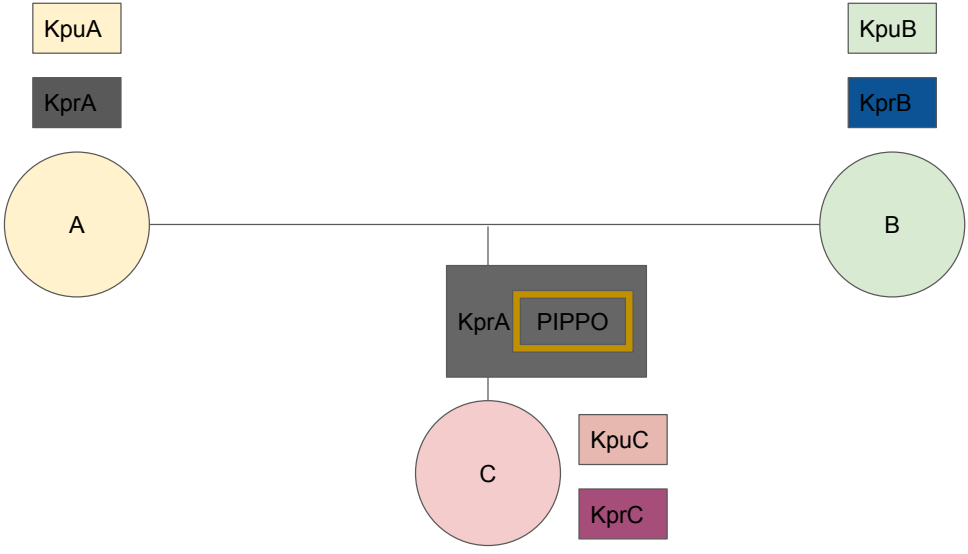
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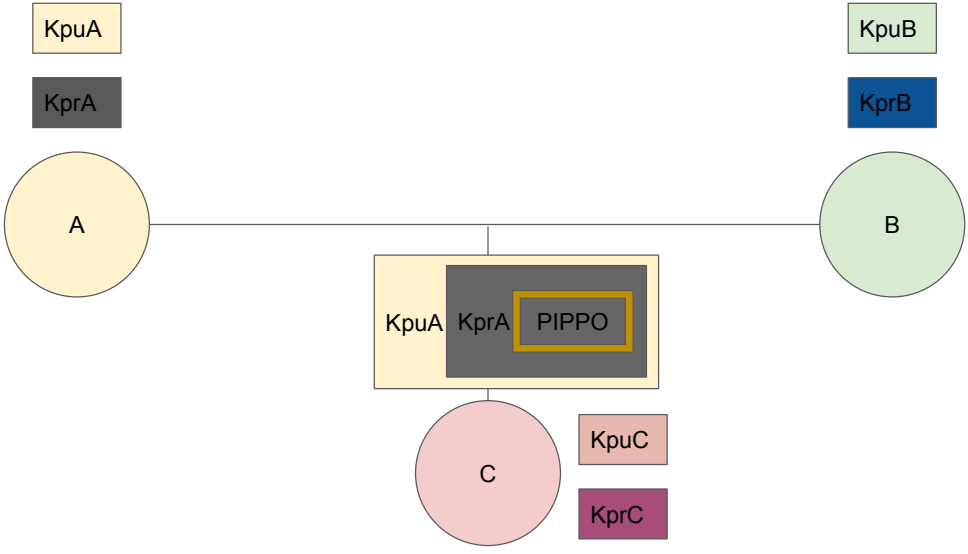
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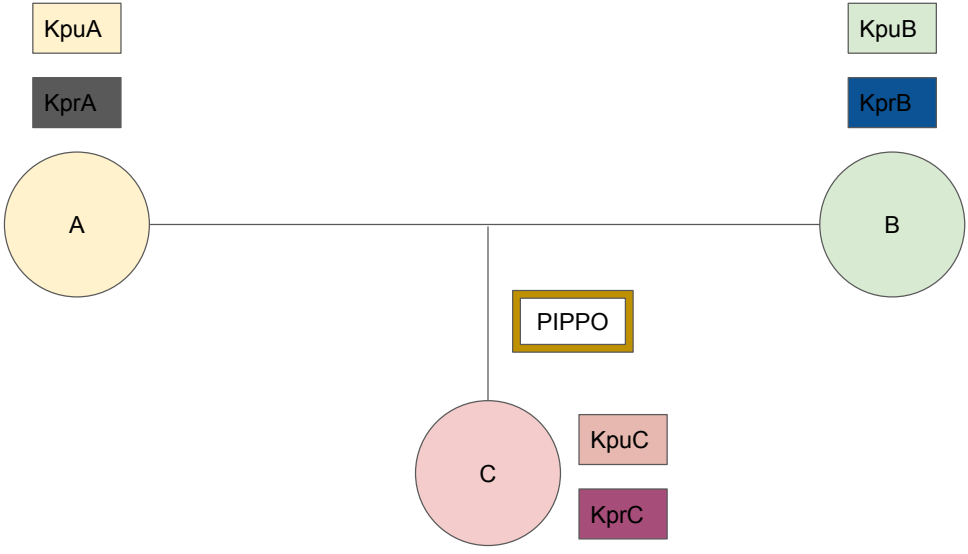
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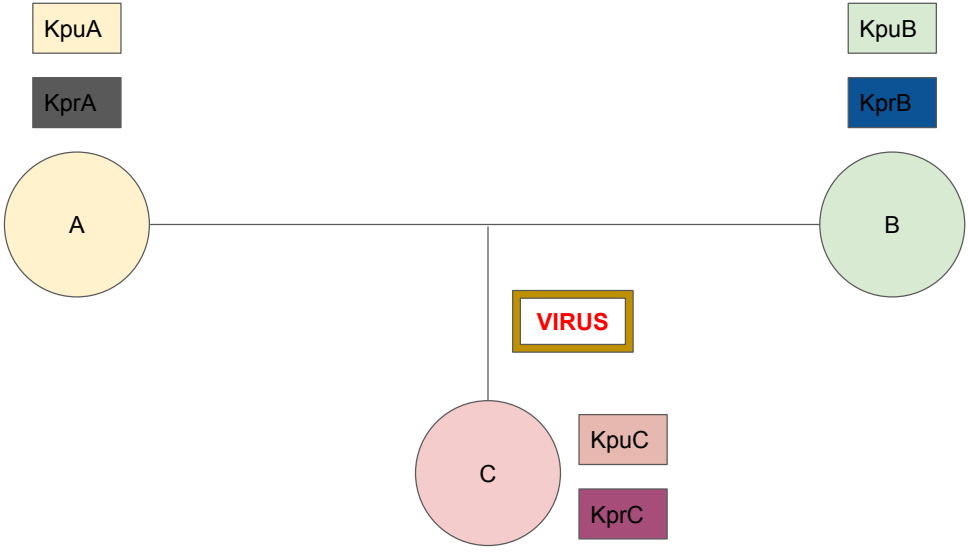
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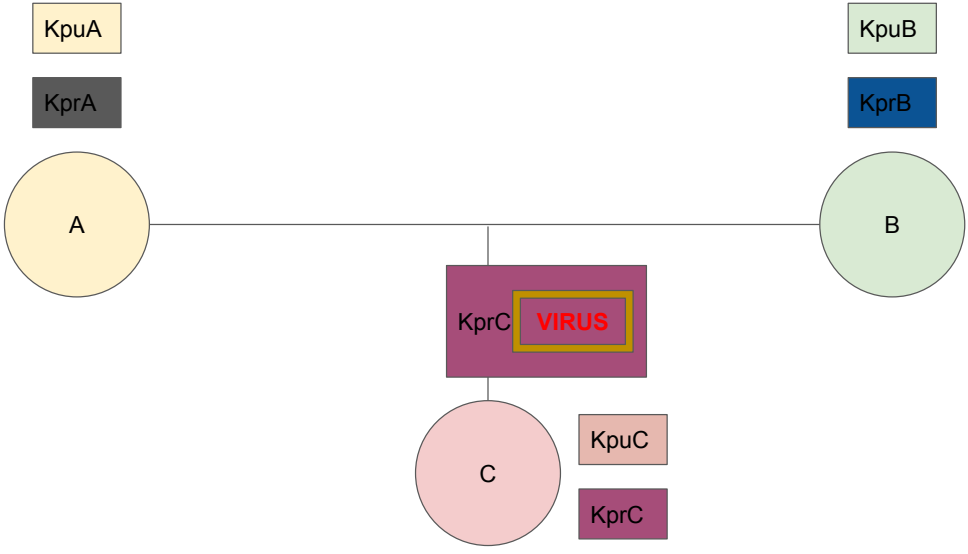
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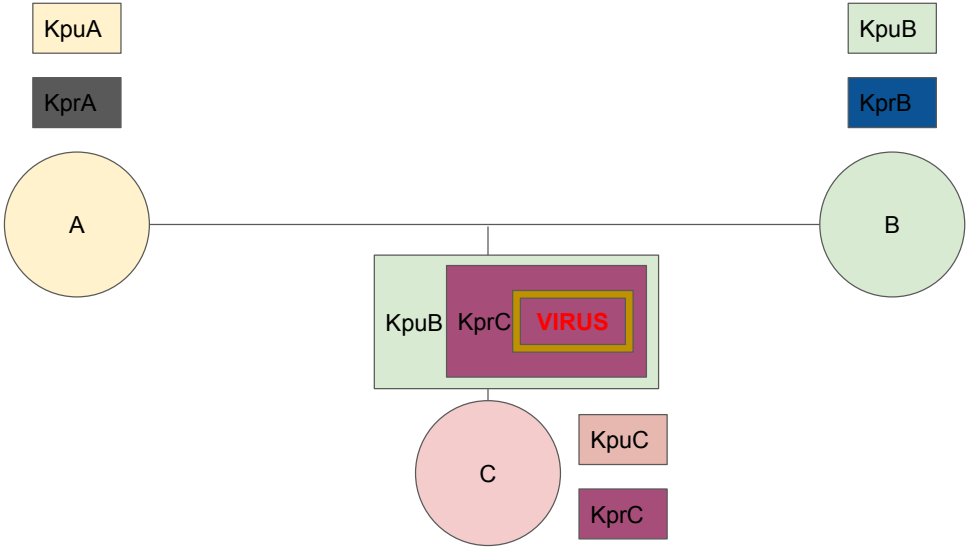
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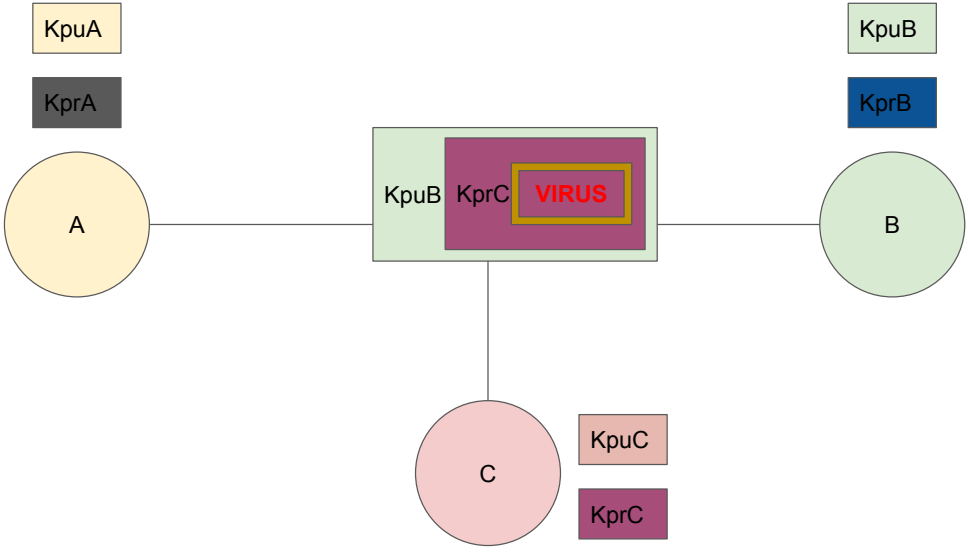
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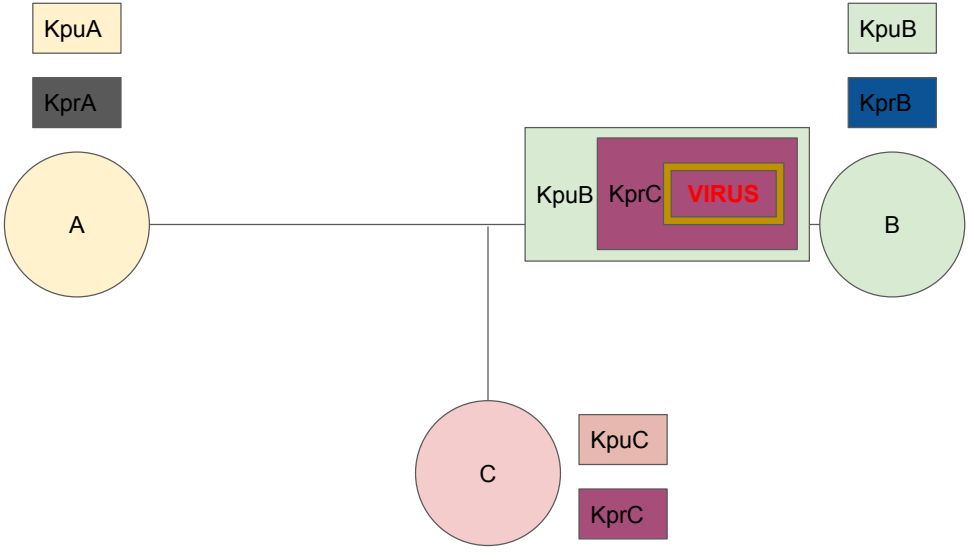
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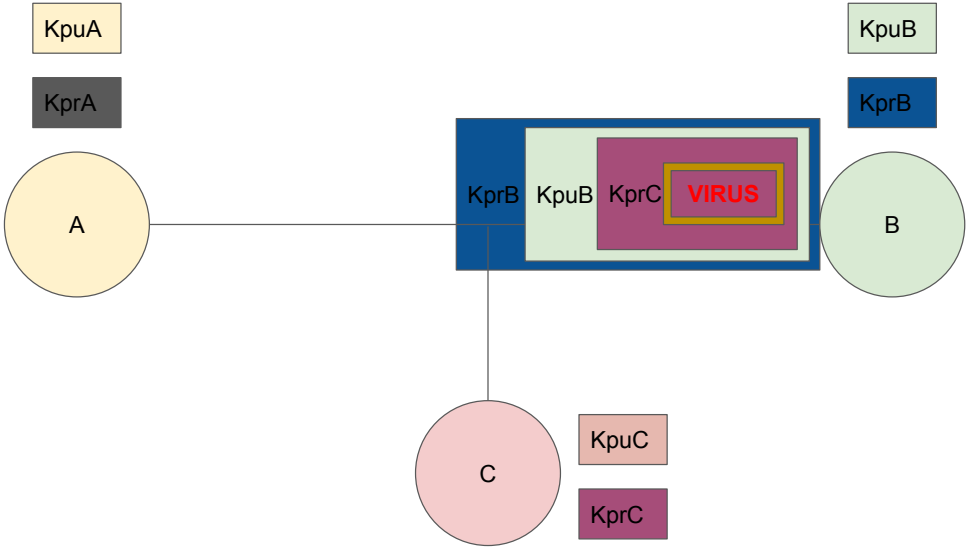
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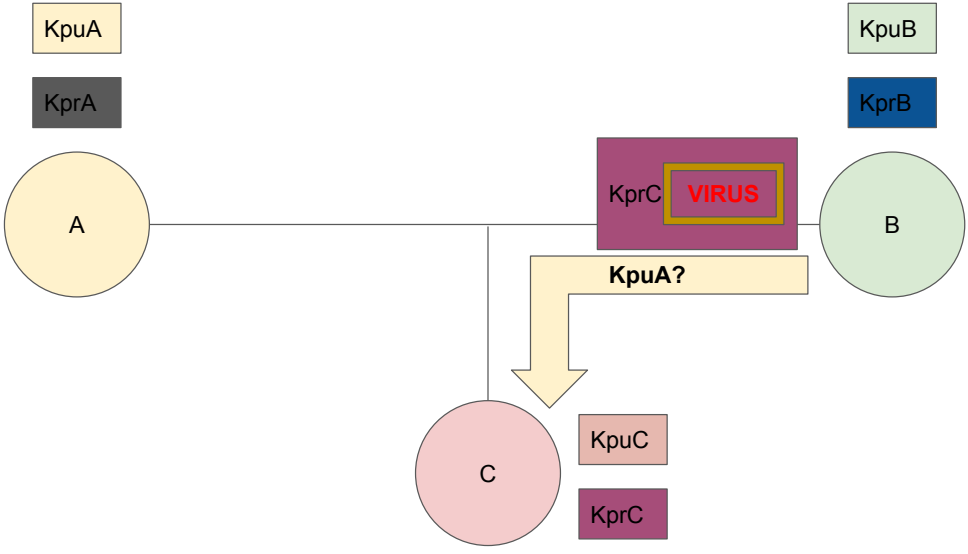
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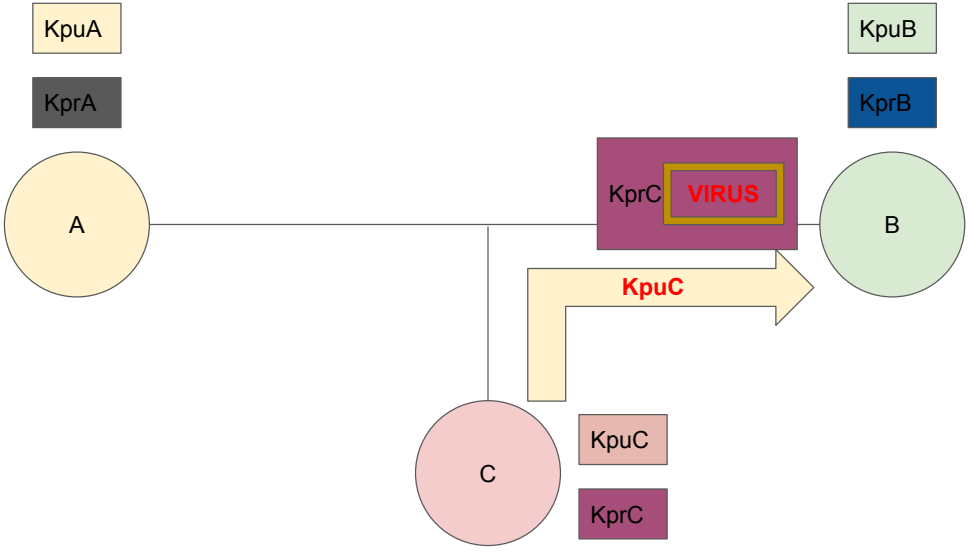
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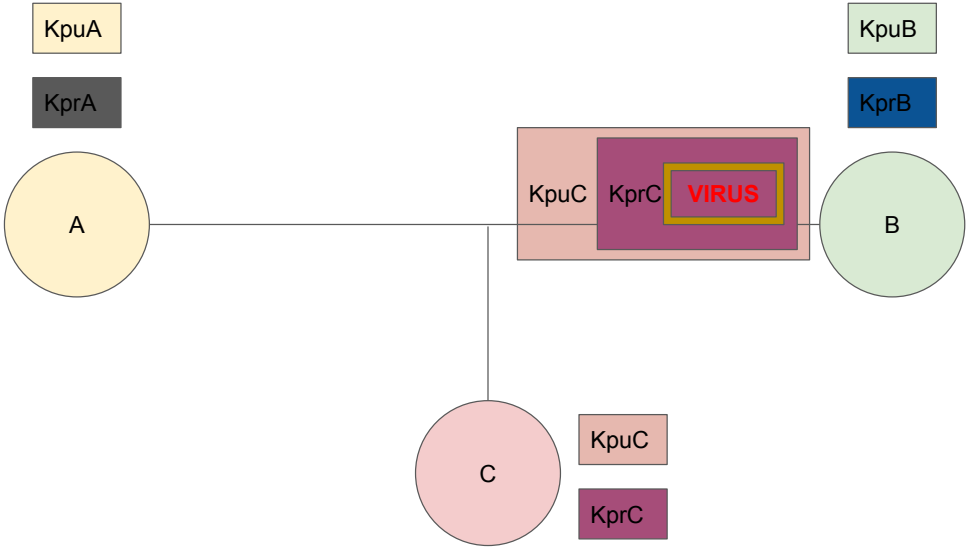
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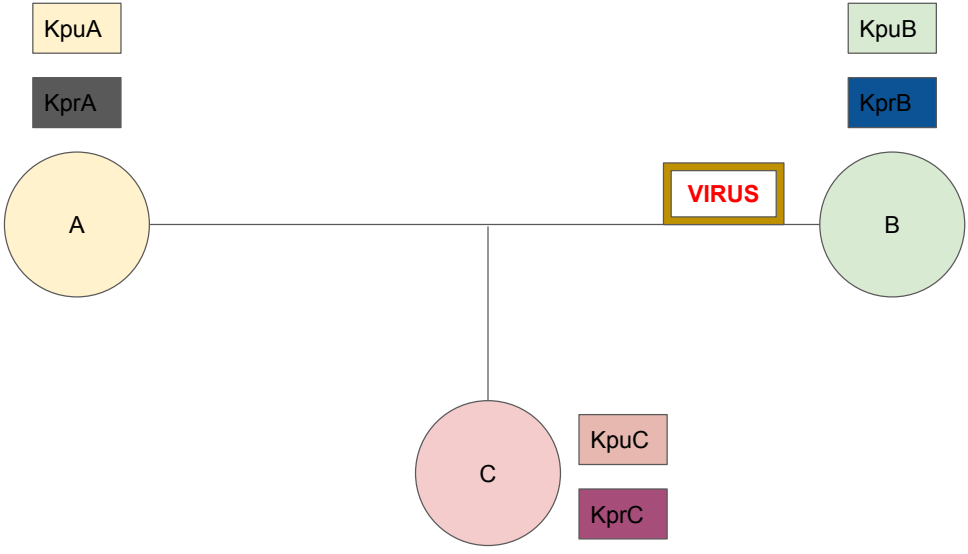
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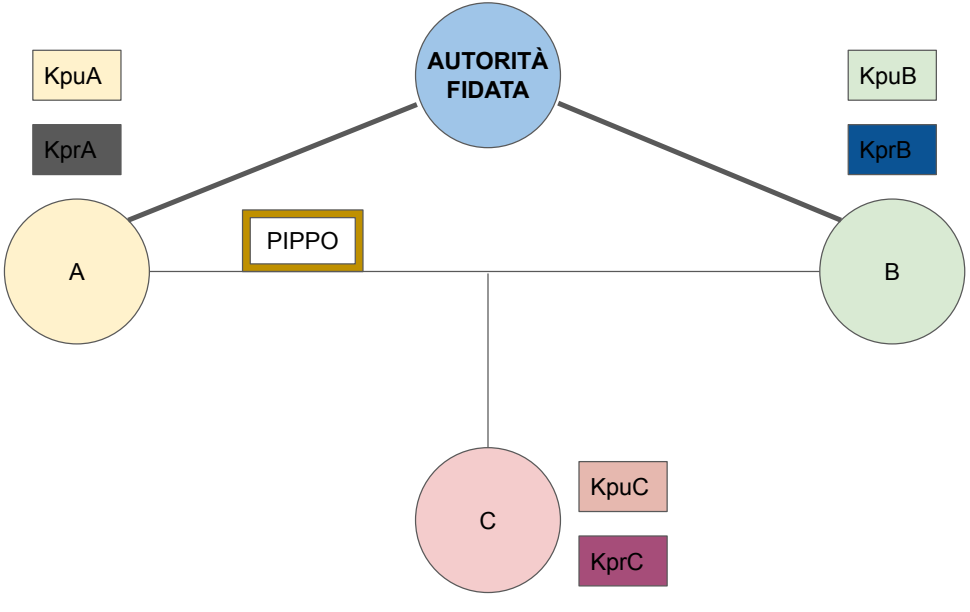
SOLUZIONE

certificato digitale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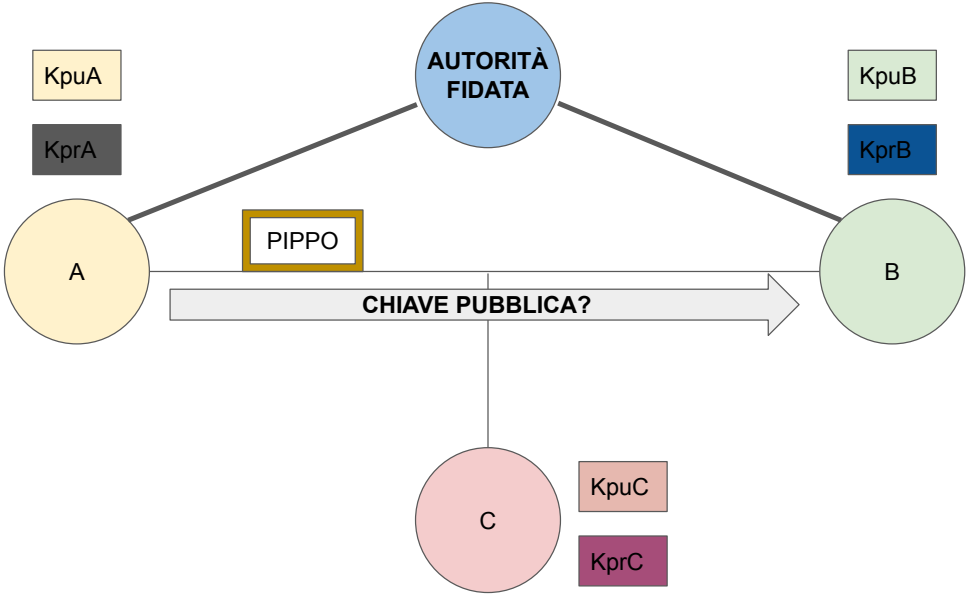
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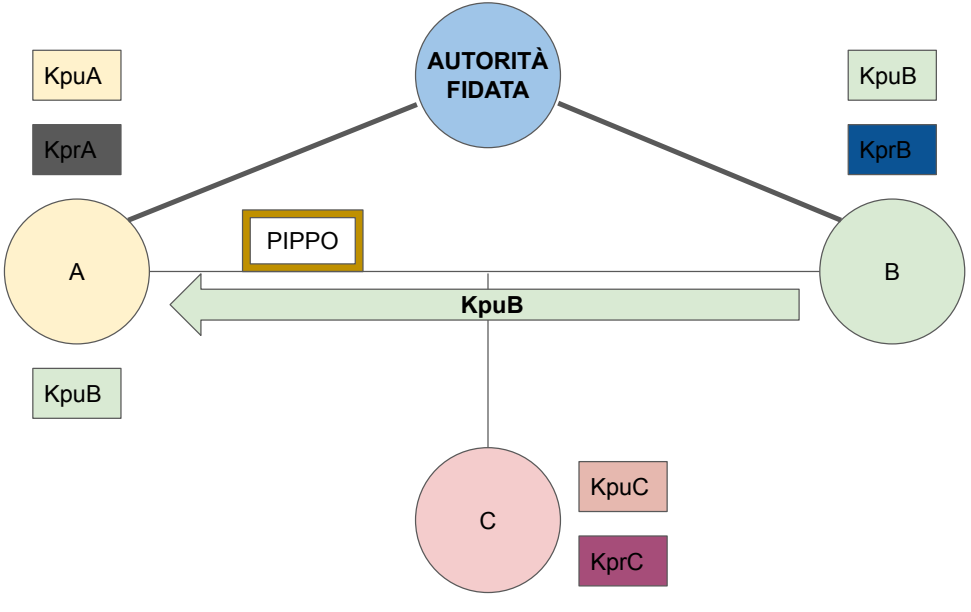
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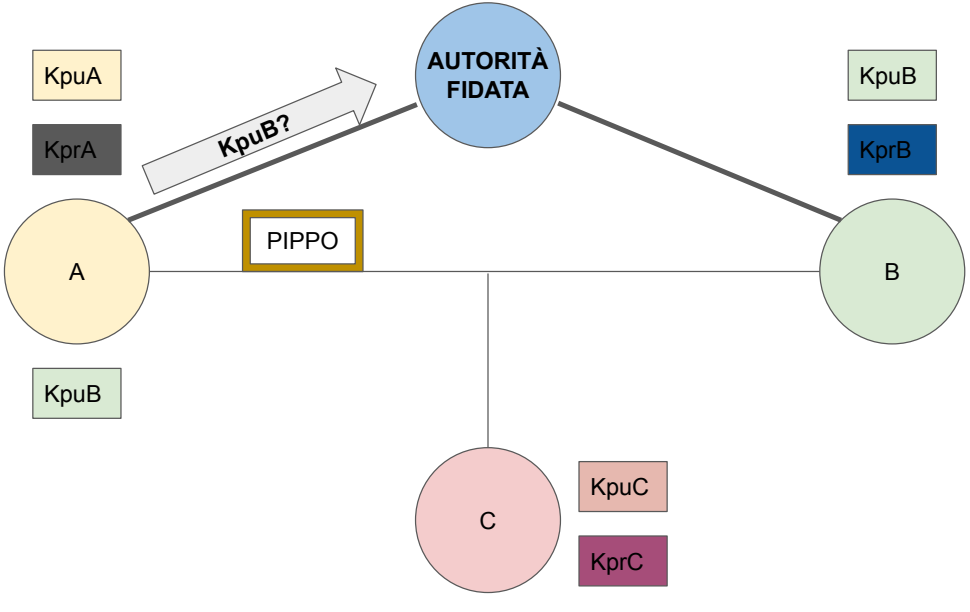
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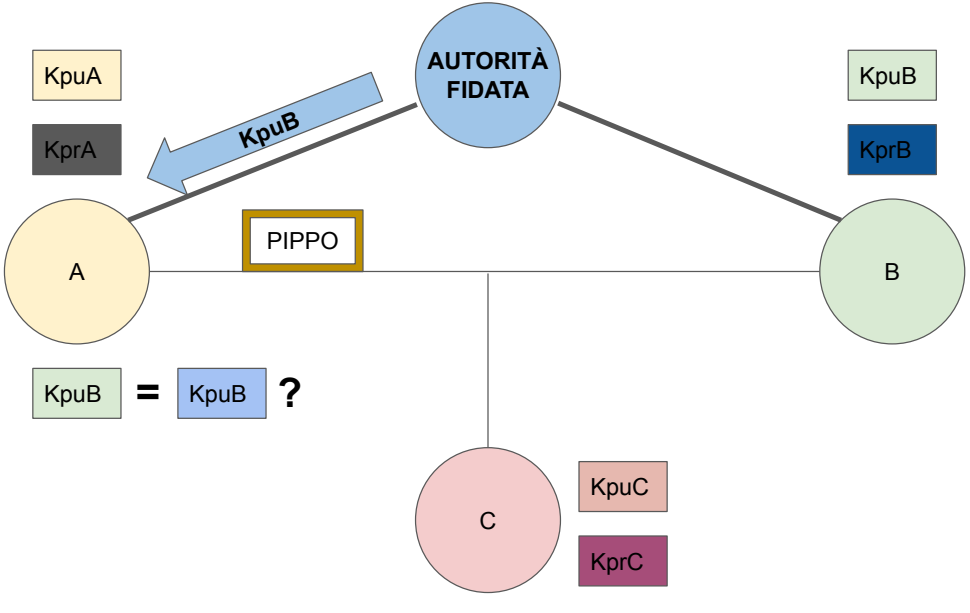
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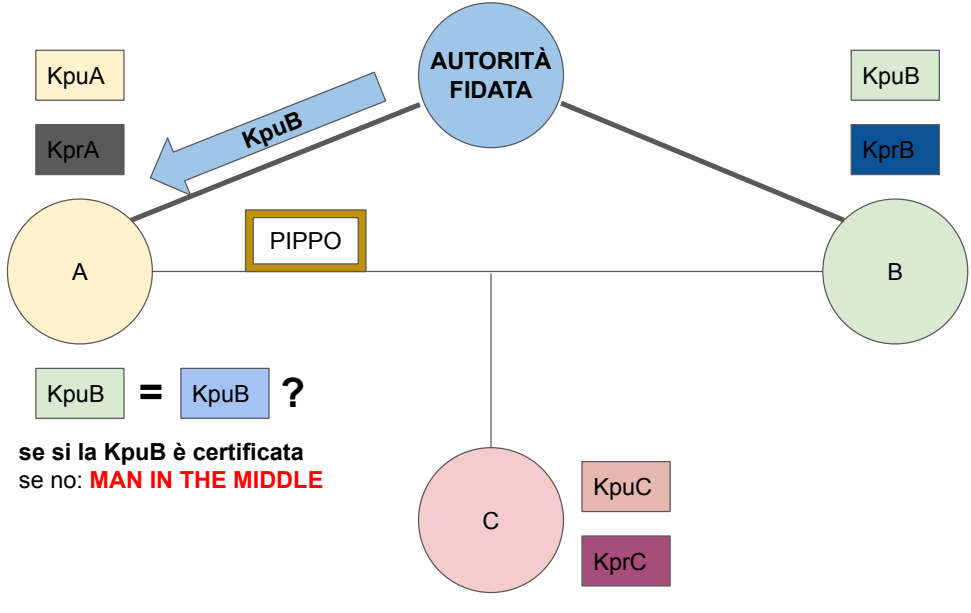
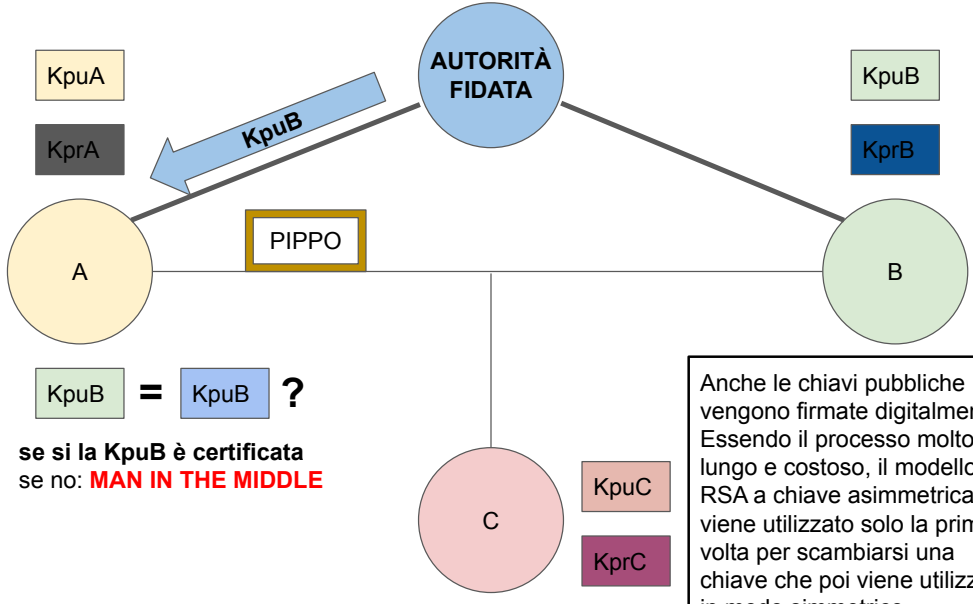


- **se si la KpuB è certificata**
- se no: **MAN IN THE MIDDLE**



- **se si la KpuB è certificata**
- se no: **MAN IN THE MIDDLE**

Anche le chiavi pubbliche vengono firmate digitalmente. Essendo il processo molto lungo e costoso, il modello RSA a chiave asimmetrica viene utilizzato solo la prima volta per scambiarsi una chiave che poi viene utilizzata in modo simmetrico.