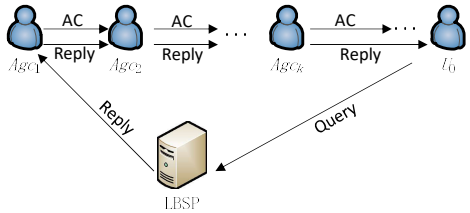
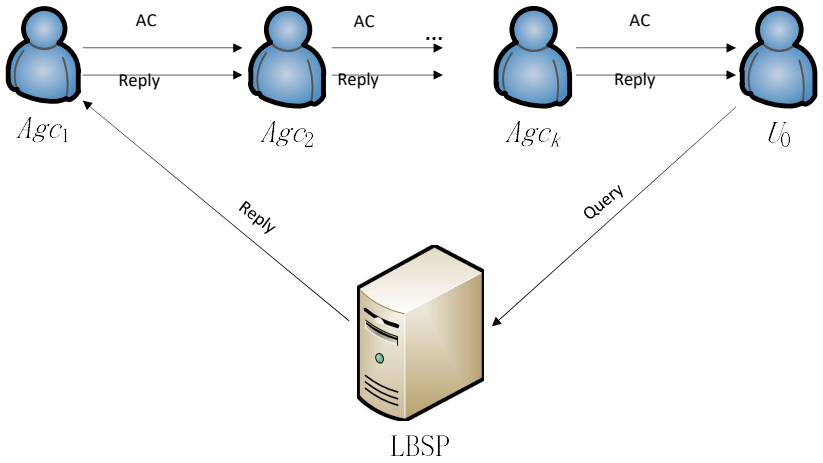

AC
Reply
AC
Reply
AC
Reply
Agc_1
Agc_2
Agc_k
U_0
Reply
Query
LBSP


AC
Reply
AC
Reply
AC
Reply
Agc_1
Agc_2
Agc_k
U_0
Reply
Query
LBSP

Ag

$\boldsymbol{AC^{\beta}_{a,a}}$	
Cid	a
$Capt$	$capt^{\beta}_{a}$
Aid	a
$Aapt$	$aapt^{a(\beta)}_{a}$
EQL	1

$\boldsymbol{AC^{\beta}_{a,b}}$	
Cid	a
$Capt$	$capt^{\beta}_{a}$
Aid	b
$Aapt$	$aapt^{a(\beta)}_{b}$
EQL	2

$\boldsymbol{AC^{\beta}_{a,c}}$	
Cid	a
$Capt$	$capt^{\beta}_{a}$
Aid	c
$Aapt$	$aapt^{a(\beta)}_{c}$
EQL	3

$\boldsymbol{Query_d^{a(\beta)}}$	
$Sender$	a
$Receiver$	$LBS\ provider$
$Capt$	$capt_a^{\beta}$

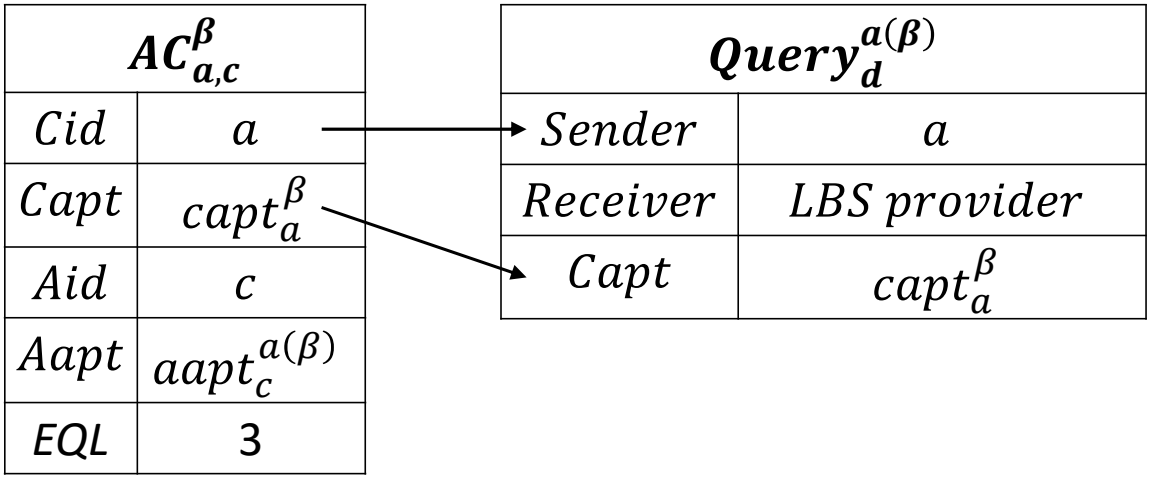
$\boldsymbol{Reply_{LBS}^{a(\beta)}}$	
$Sender$	$LBS\ provider$
$Receiver$	a
AN	$capt_a^{\beta}$

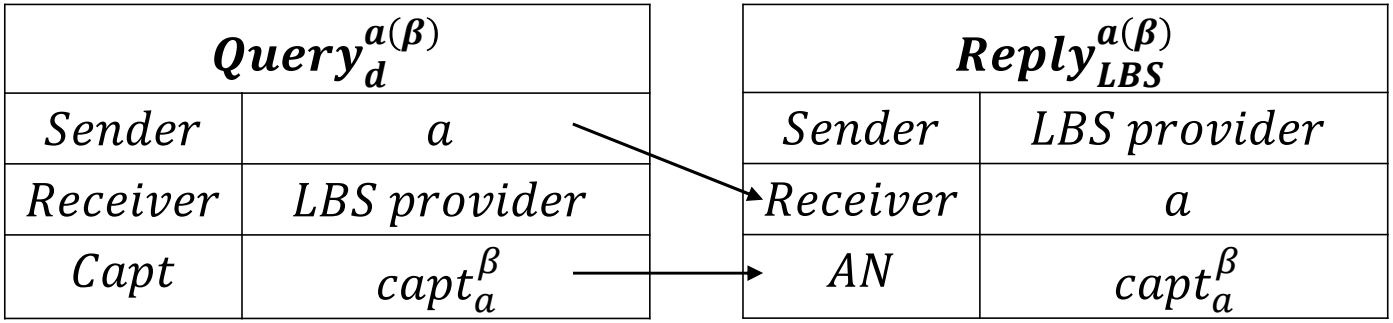
$\boldsymbol{Reply_{a}^{a(\beta)}}$	
$Sender$	a
$Receiver$	b
AN	$aapt_a^{a(\beta)}$

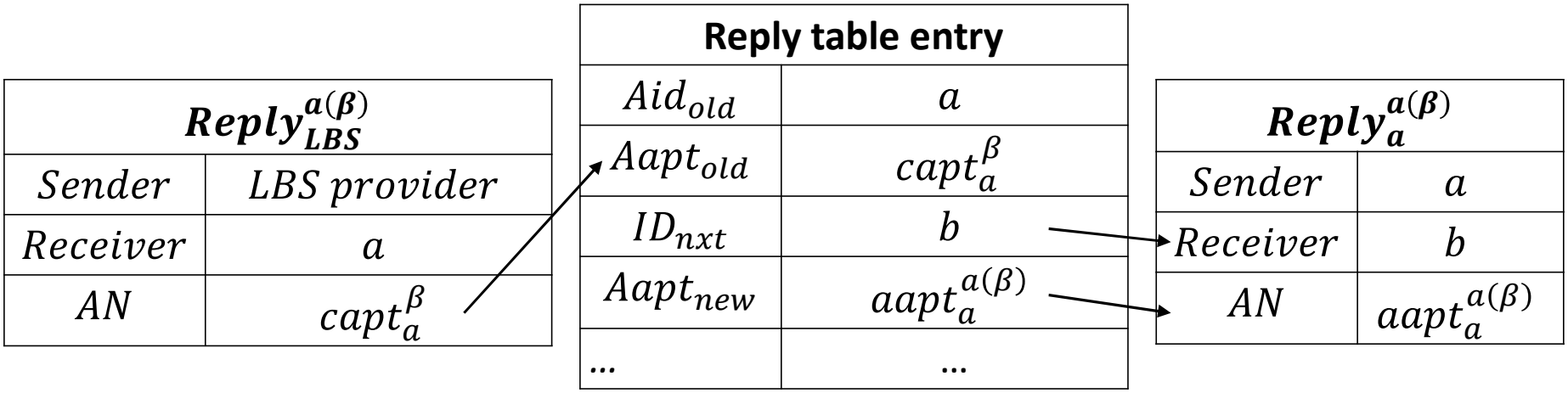
$\boldsymbol{Reply_{c}^{a(\beta)}}$	
$Sender$	c
$Receiver$	$pseudo\left(c, aapt_c^{a(\beta)}\right)$
AN	$aapt_c^{a(\beta)}$

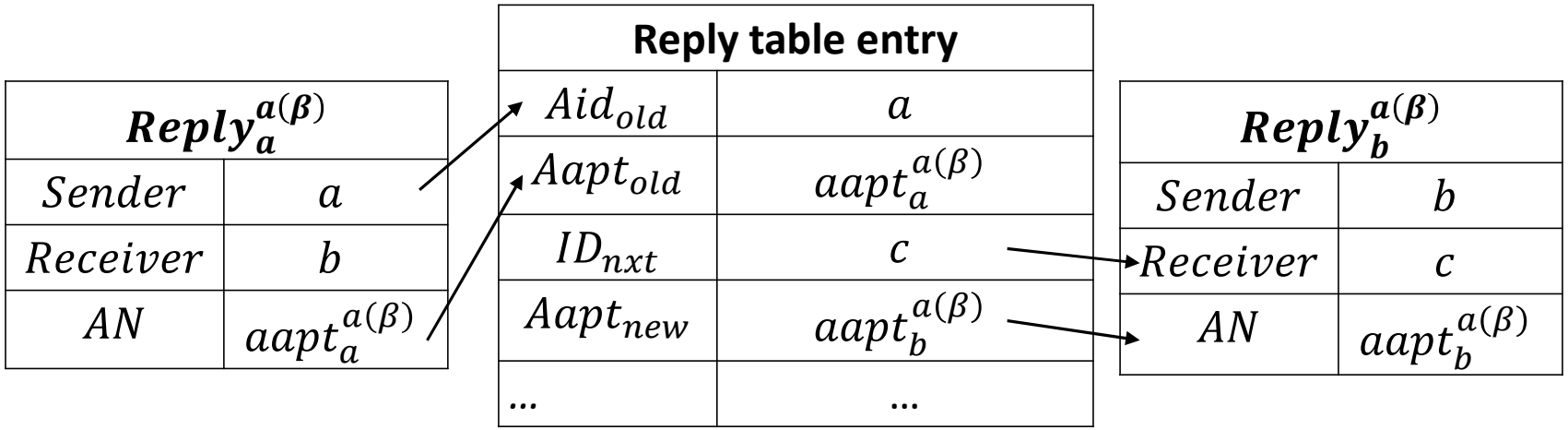
$\boldsymbol{Reply_{b}^{a(\beta)}}$	
$Sender$	b
$Receiver$	c
AN	$aapt_b^{a(\beta)}$

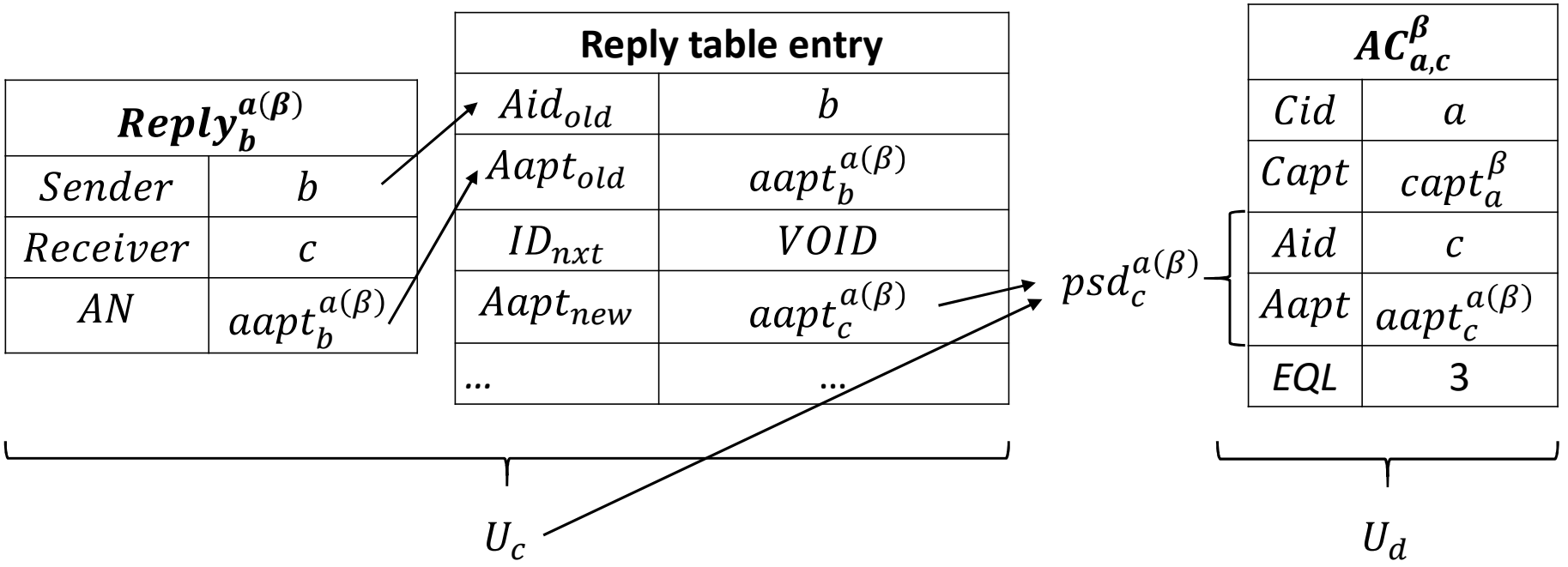
$pseudo\left(c, aapt_c^{a(\beta)}\right)$

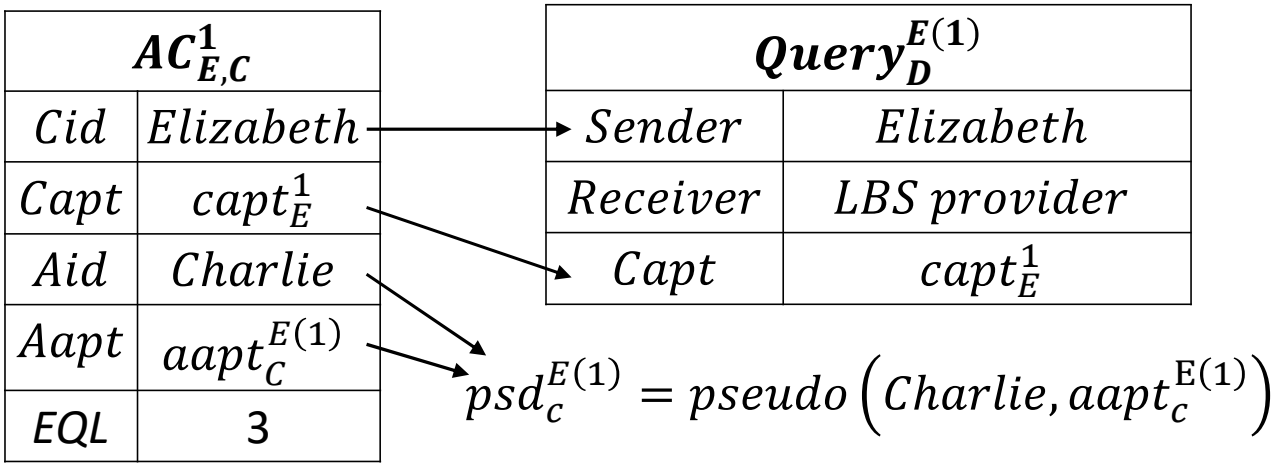

$AC_{a,c}^{\beta}$
Cid
a
$Capt$
$capt_a^{\beta}$
Aid
c
$Aapt$
$aapt_c^{a(\beta)}$
EQL
3
$Query_d^{a(\beta)}$
$Sender$
a
$Receiver$
$LBS\ provider$
$Capt$
$capt_a^{\beta}$

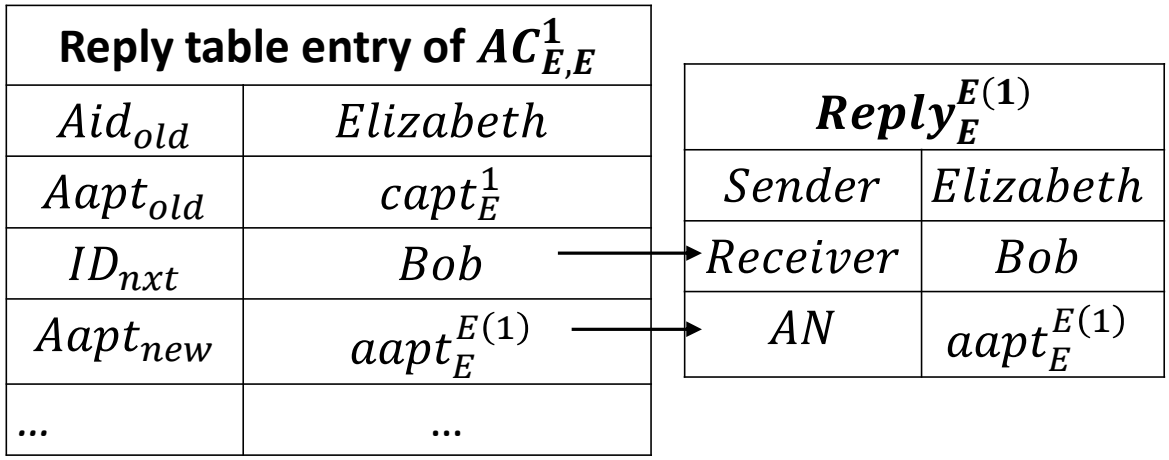

$Query_d^{a(\beta)}$
Sender
a
Receiver
LBS provider
Capt
$capt_a^{\beta}$
$Reply_{LBS}^{a(\beta)}$
Sender
LBS provider
Receiver
a
AN
$capt_a^{\beta}$

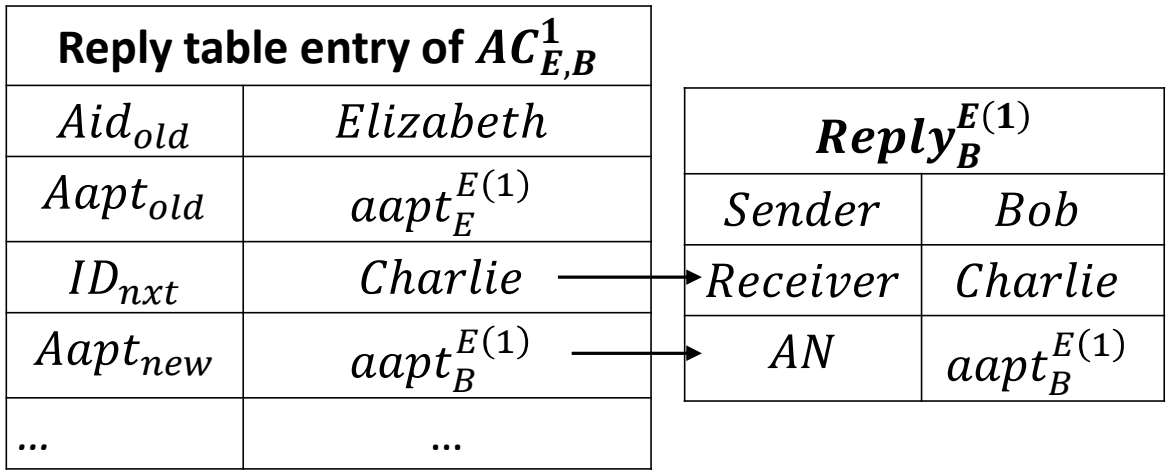

$\boldsymbol{Reply_{LBS}^{a(\beta)}}$
$Sender$
$LBS\ provider$
$Receiver$
a
AN
$capt_a^{\beta}$
Reply table entry
Aid_{old}
a
$Aapt_{old}$
$capt_a^{\beta}$
ID_{nxt}
b
$Aapt_{new}$
$aapt_a^{a(\beta)}$
...
...
$\boldsymbol{Reply_a^{a(\beta)}}$
$Sender$
a
$Receiver$
b
AN
$aapt_a^{a(\beta)}$

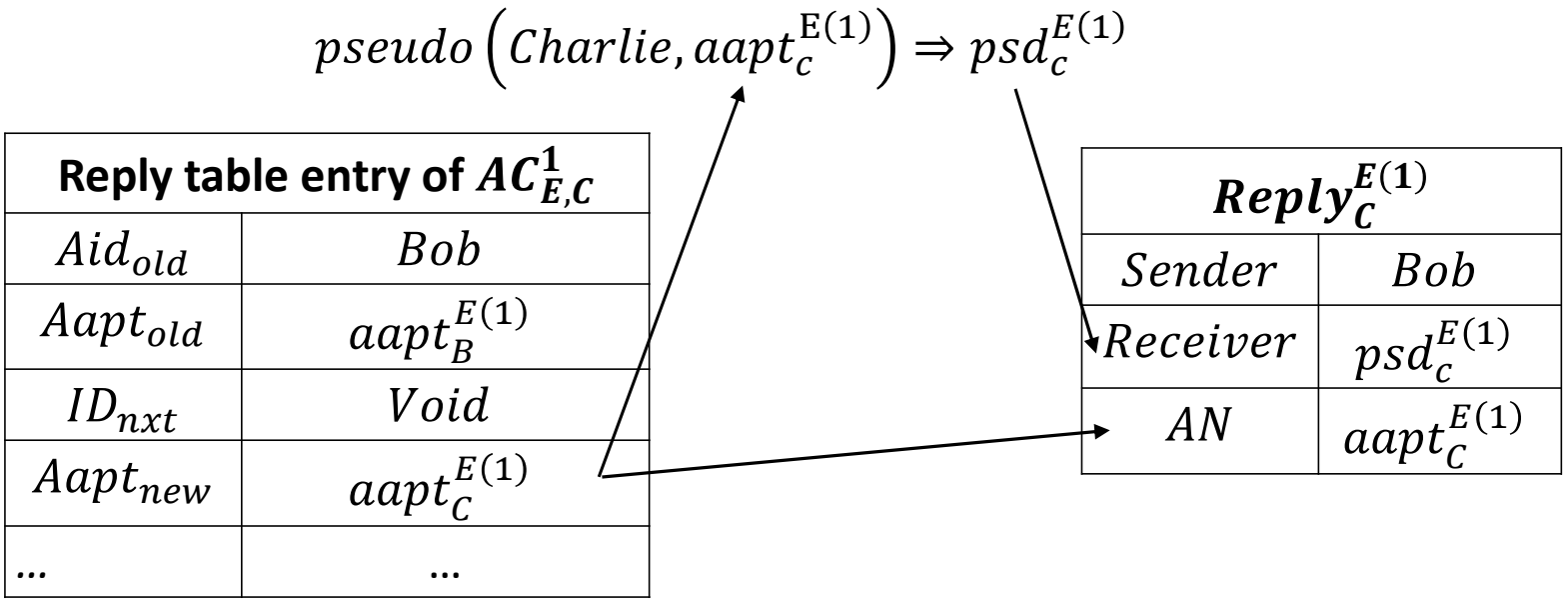

Reply table entry
Aid_{old}
a
$Aapt_{old}$
$aapt_a^{a(\beta)}$
ID_{nxt}
c
$Aapt_{new}$
$aapt_b^{a(\beta)}$
...
...
$\boldsymbol{Reply_a^{a(\beta)}}$
$Sender$
a
$Receiver$
b
AN
$aapt_a^{a(\beta)}$
$\boldsymbol{Reply_b^{a(\beta)}}$
$Sender$
b
$Receiver$
c
AN
$aapt_b^{a(\beta)}$

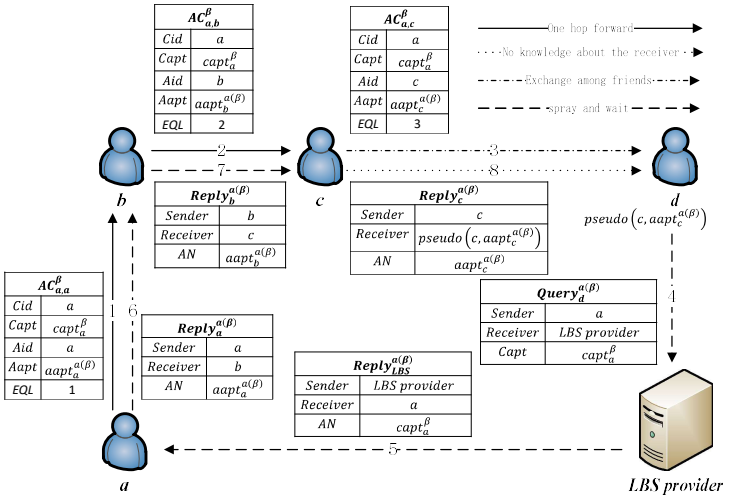

$\boldsymbol{Reply_b^{a(\beta)}}$
$Sender$ b
$Receiver$ c
AN $aapt_b^{a(\beta)}$
Reply table entry
Aid_{old} b
$Aapt_{old}$ $aapt_b^{a(\beta)}$
ID_{nxt} $VOID$
$Aapt_{new}$ $aapt_c^{a(\beta)}$
... ...
$psd_c^{a(\beta)}$
$\boldsymbol{AC_{a,c}^{\beta}}$
Cid a
$Capt$ $capt_a^{\beta}$
Aid c
$Aapt$ $aapt_c^{a(\beta)}$
EQL 3
U_c
U_d

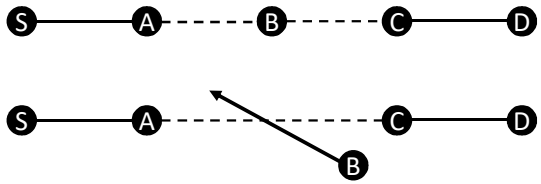

$AC^{1}_{E,C}$
Cid
Elizabeth
Capt
$capt^{1}_{E}$
Aid
Charlie
Aapt
$aapt^{E(1)}_{C}$
EQL
3
$Query^{E(1)}_{D}$
Sender
Elizabeth
Receiver
LBS provider
Capt
$capt^{1}_{E}$
$psd^{E(1)}_{c} = pseudo\left(Charlie, aapt^{E(1)}_{c}\right)$

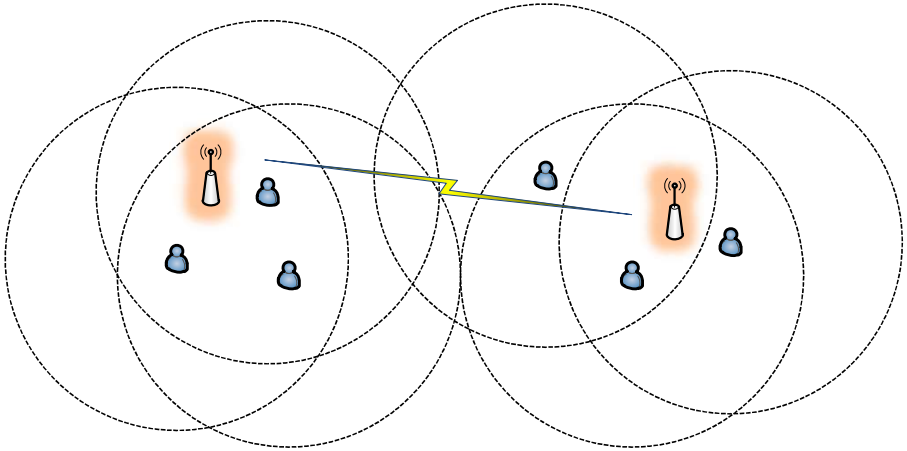

Reply table entry of $AC^{1}_{E,E}$
Aid_{old}
$Elizabeth$
$Aapt_{old}$
$capt^{1}_{E}$
ID_{nxt}
Bob
$Aapt_{new}$
$aapt^{E(1)}_{E}$
...
...
$\boldsymbol{Reply^{E(1)}_{E}}$
$Sender$
$Elizabeth$
$Receiver$
Bob
AN
$aapt^{E(1)}_{E}$

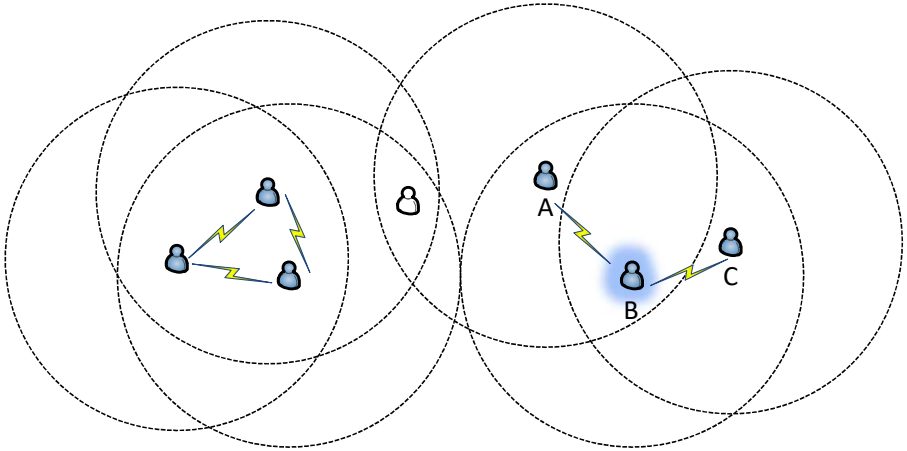

Reply table entry of $AC^{1}_{E,B}$
Aid_{old}
$Elizabeth$
$Aapt_{old}$
$aapt_{E}^{E(1)}$
ID_{nxt}
$Charlie$
$Aapt_{new}$
$aapt_{B}^{E(1)}$
...
...
$\boldsymbol{Reply_{B}^{E(1)}}$
$Sender$
Bob
$Receiver$
$Charlie$
AN
$aapt_{B}^{E(1)}$

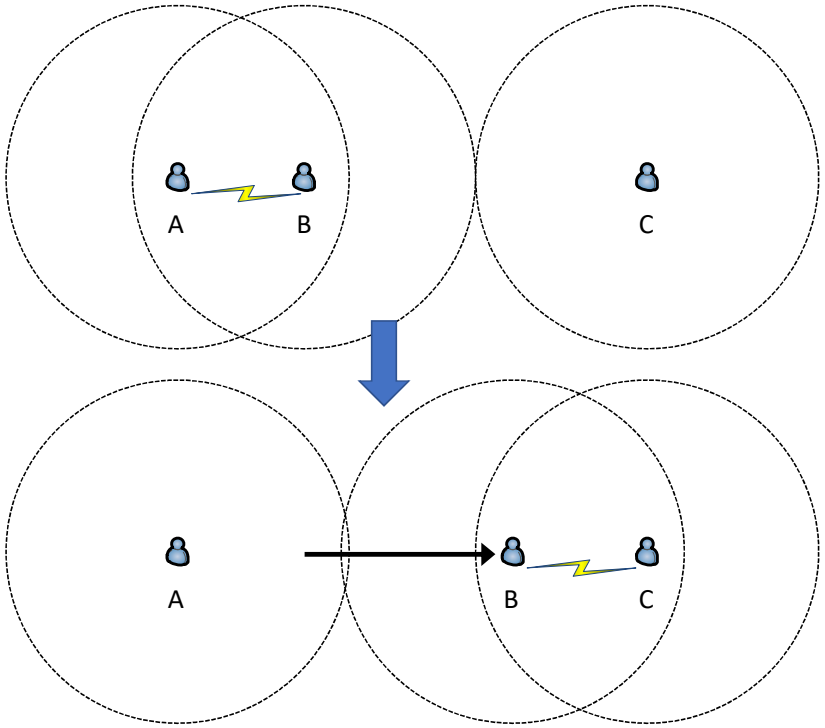

$pseudo\left(Charlie, aapt_c^{\mathrm{E}(1)}\right) \Rightarrow psd_c^{E(1)}$
Reply table entry of $AC_{E,C}^{1}$
Aid_{old}
Bob
$Aapt_{old}$
$aapt_B^{E(1)}$
ID_{nxt}
$Void$
$Aapt_{new}$
$aapt_C^{E(1)}$
…
…
$Reply_C^{E(1)}$
$Sender$
Bob
$Receiver$
$psd_c^{E(1)}$
AN
$aapt_C^{E(1)}$


$AC_{a,b}^{\beta}$
Cid | a
Capt | $capt_a^{\beta}$
Aid | b
Aapt | $aapt_b^{a(\beta)}$
EQL | 2
$AC_{a,c}^{\beta}$
Cid | a
Capt | $capt_a^{\beta}$
Aid | c
Aapt | $aapt_c^{a(\beta)}$
EQL | 3
One hop forward
No knowledge about the receiver
Exchange among friends
Spray and wait
b
c
d
2
3
7
8
$Reply_b^{a(\beta)}$
Sender | b
Receiver | c
AN | $aapt_b^{a(\beta)}$
$Reply_c^{a(\beta)}$
Sender | c
Receiver | $pseudo\left(c, aapt_c^{a(\beta)}\right)$
AN | $aapt_c^{a(\beta)}$
$pseudo\left(c, aapt_c^{a(\beta)}\right)$
$AC_{a,a}^{\beta}$
Cid | a
Capt | $capt_a^{\beta}$
Aid | a
Aapt | $aapt_a^{a(\beta)}$
EQL | 1
6
$Reply_a^{a(\beta)}$
Sender | a
Receiver | b
AN | $aapt_a^{a(\beta)}$
$Reply_{LBS}^{a(\beta)}$
Sender | LBS provider
Receiver | a
AN | $capt_a^{\beta}$
$Query_d^{a(\beta)}$
Sender | a
Receiver | LBS provider
Capt | $capt_a^{\beta}$
4
5
a
LBS provider


S
A
B
C
D
S
A
C
D
B




A
B
C


A
B
C
A
B
C