The condition that CS becomes “BUSY”

(KX-UDS/UDT series)

No. 45-003

September 20 , 2012

Ver.1.0

Panasonic Corporation

Abstract about this document

This document describes about the condition that CS becomes “BUSY”

•Revision history

Date	Version	Revision	Firmware version
Sep 20, 2012	Ver. 1.0	Initial Release	All versions

Outline

1. Overview
2. Basic actions
3. BUSY cases (Full DSP)
4. BUSY cases (Full DSP & RTP)
5. BUSY case (Full RTP)
6. BUSY case (Full SIP session)

Overview

A CS has following resources.

- 8 RTP resources
used for transmitting RTP packets

- 4 DSP resources
used for voice processing

- 48 SIP session resources
used for keeping SIP sessions

If the CS uses fully one of above ,
the CS will be “BUSY” state .
The PS which is under “BUSY” CS may be not able to make/ receive a phone call , depending on state of adjacent CS even if the PS is in coverage area of the CS.

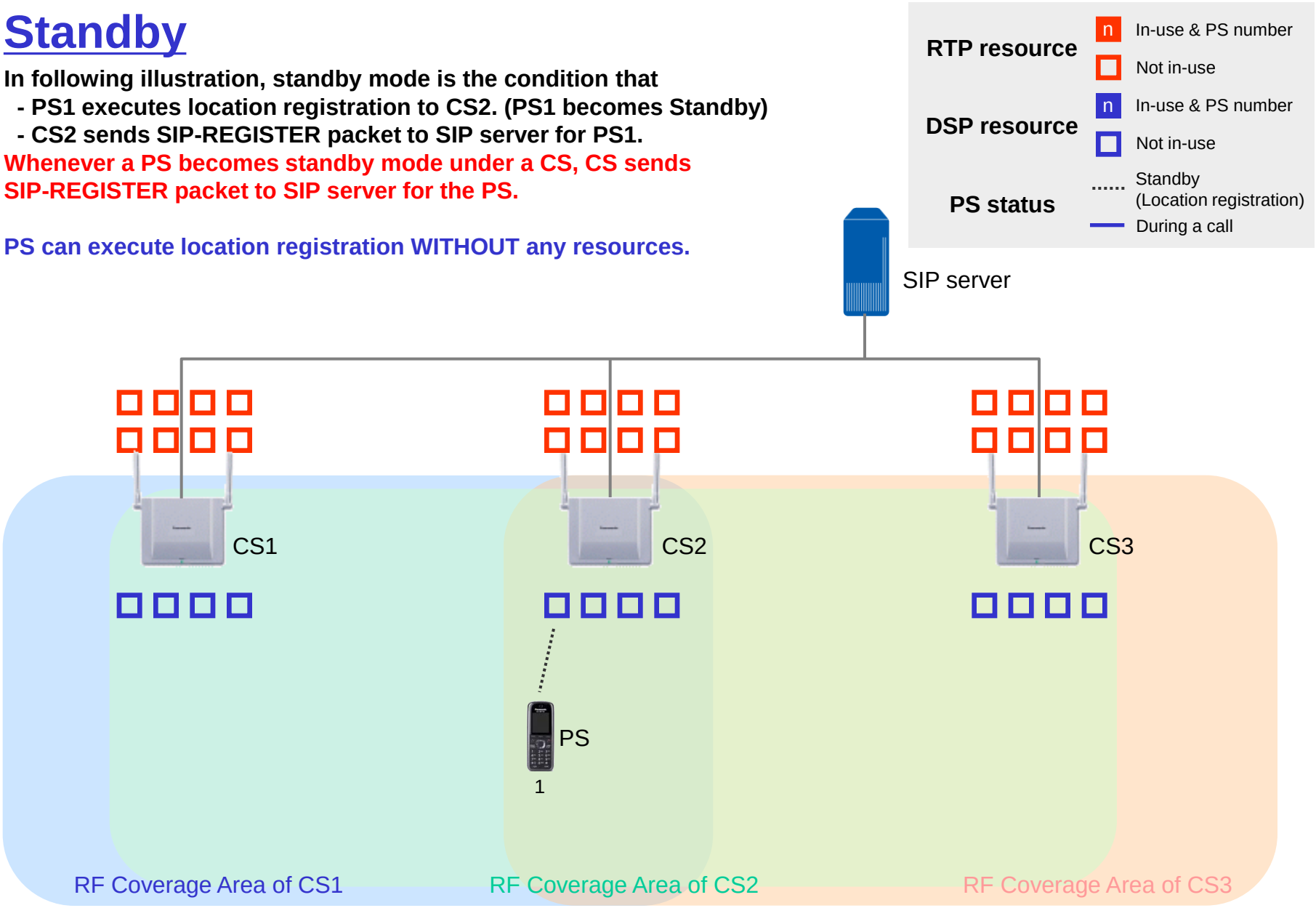
This document describes how the PS uses CS’s resources in several situation.

Standby

In following illustration, standby mode is the condition that
- **PS1 executes location registration to CS2. (PS1 becomes Standby)**
- **CS2 sends SIP-REGISTER packet to SIP server for PS1.**

Whenever a PS becomes standby mode under a CS, CS sends SIP-REGISTER packet to SIP server for the PS.

PS can execute location registration WITHOUT any resources.



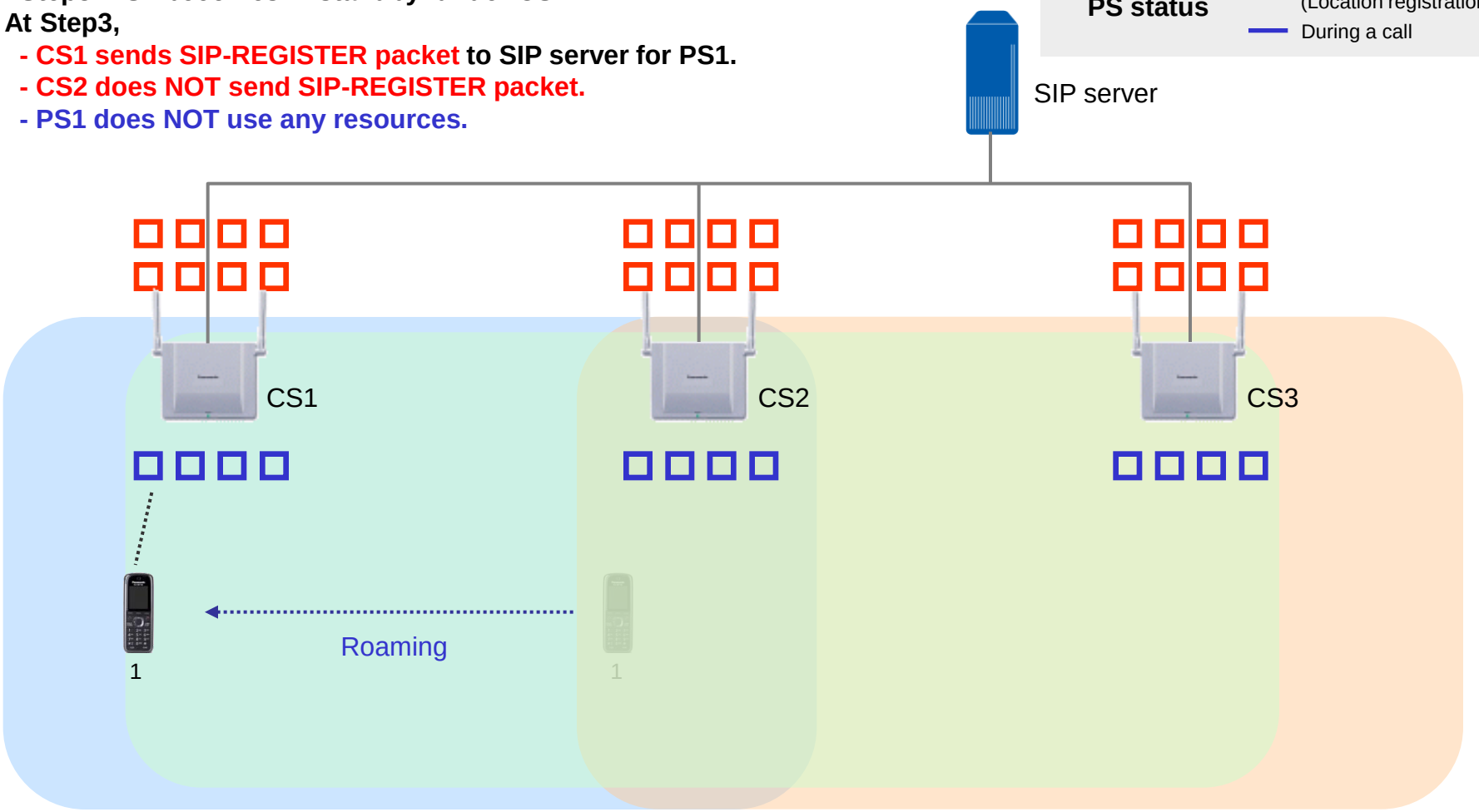
Roaming

Roaming is the action that a PS executes location registration to the others when the PS is in standby mode. In following illustration,

Step1. PS1 is in standby under CS2. (Refer to Page 5)
Step2. PS1 moves to under CS1.
Step3. PS1 becomes in standby under CS1.

At Step3,

- CS1 sends SIP-REGISTER packet to SIP server for PS1.
- CS2 does NOT send SIP-REGISTER packet.
- PS1 does NOT use any resources.



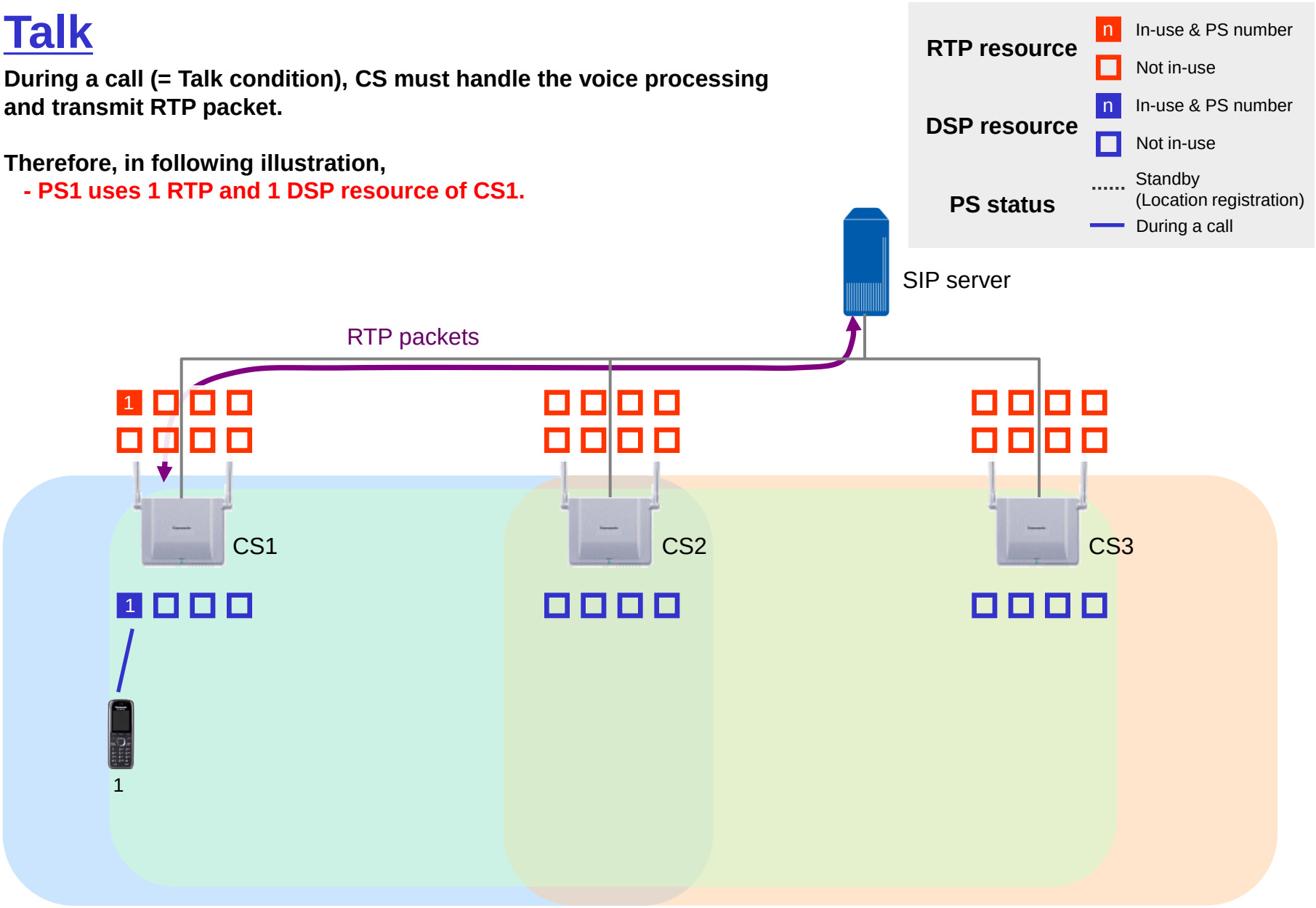
2. Basic actions (The point of RTP&DSP resources)

Talk

During a call (= Talk condition), CS must handle the voice processing and transmit RTP packet.

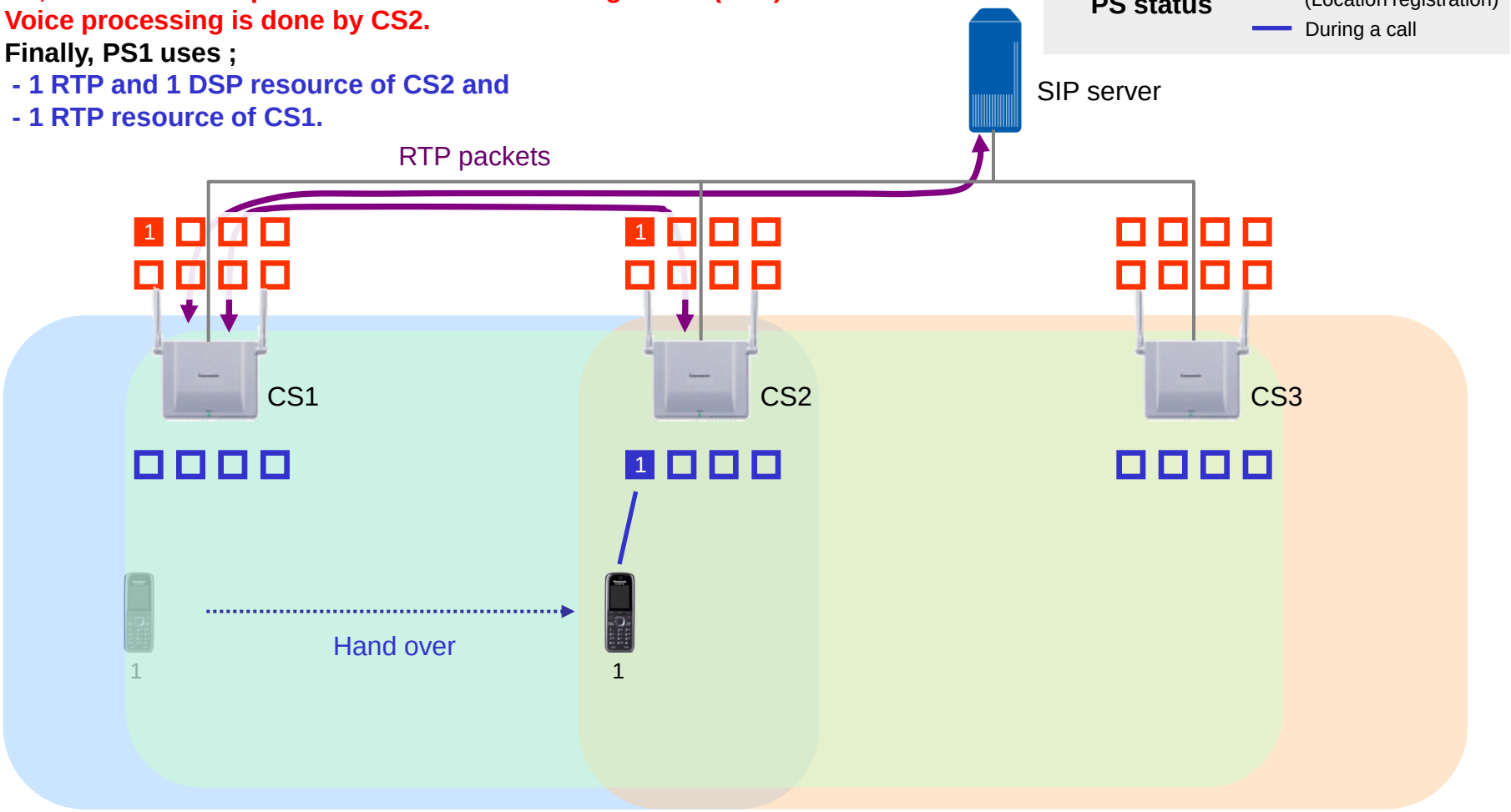
Therefore, in following illustration,

- PS1 uses 1 RTP and 1 DSP resource of CS1.



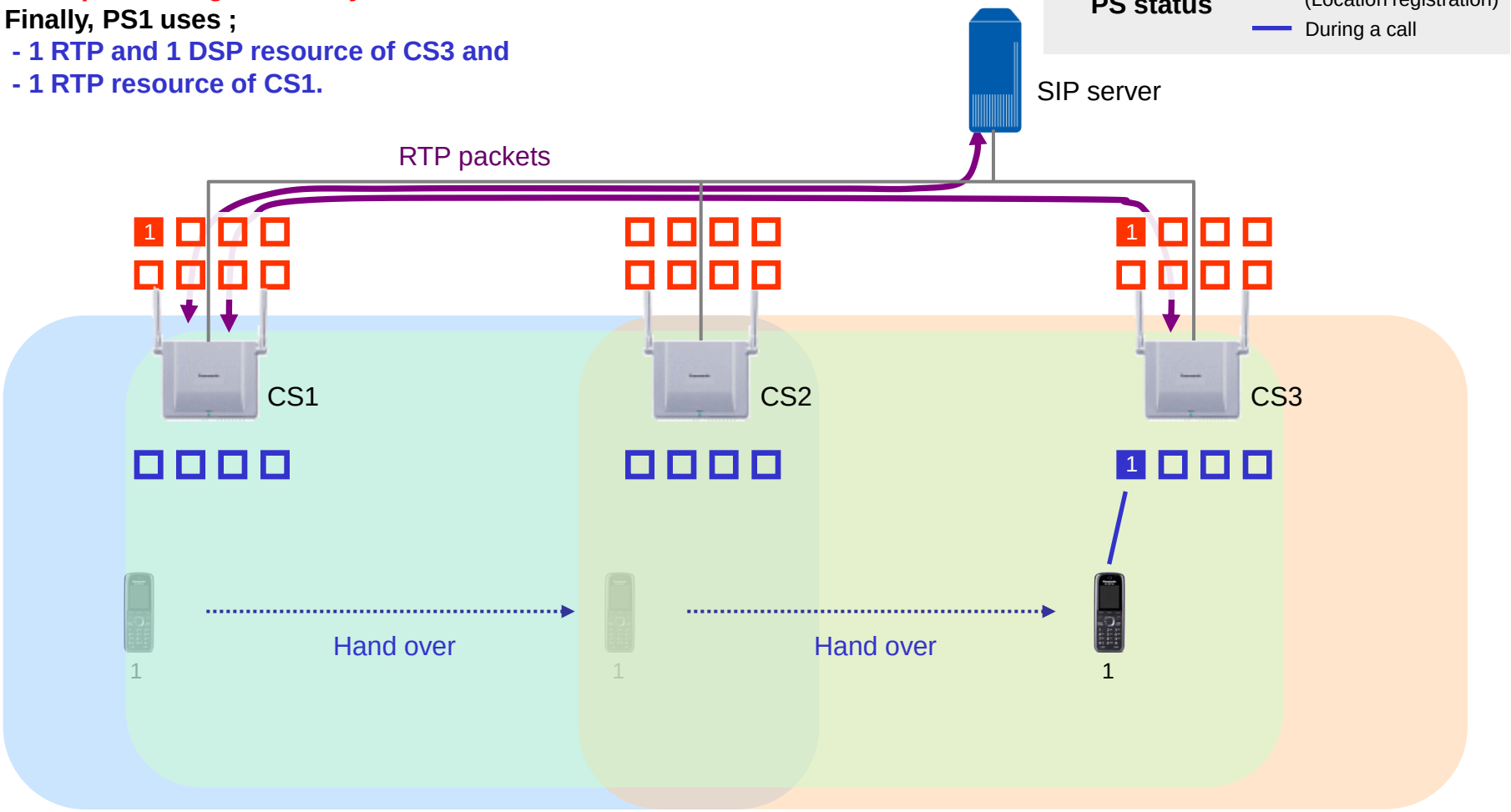
Hand over (H.O.)

Hand over is the action that a PS moves between two CSs during a call.
In following illustration, PS1 moves under CS2 from the condition in page 7
CS1 keeps PS1 registered to SIP server.
(CS2 does NOT send SIP-REGISTER packet.)
So,CS2 sends RTP packets to SIP server via original CS(CS1).
Voice processing is done by CS2.
Finally, PS1 uses ;
- 1 RTP and 1 DSP resource of CS2 and
- 1 RTP resource of CS1.



Hand over (H.O.)

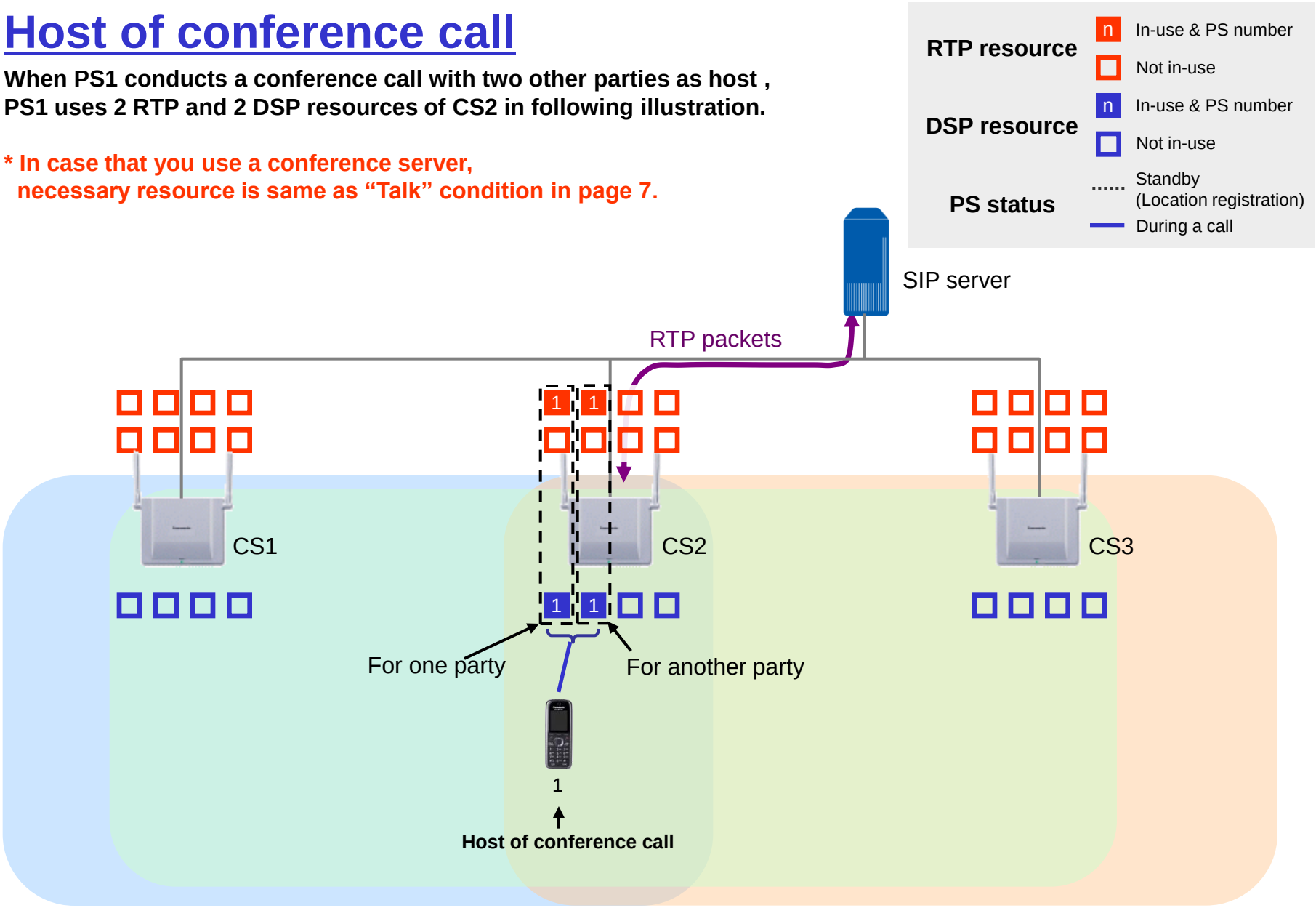
In following illustration, PS1 has moved to CS3 from the condition in page 8.
CS2 releases all resources.
CS3 sends RTP packets to SIP server via CS1 in this time.
CS3 also doesn't send SIP-REGISTER packet.
Voice processing is done by CS3.
Finally, PS1 uses ;
- 1 RTP and 1 DSP resource of CS3 and
- 1 RTP resource of CS1.



Host of conference call

When PS1 conducts a conference call with two other parties as host , PS1 uses 2 RTP and 2 DSP resources of CS2 in following illustration.

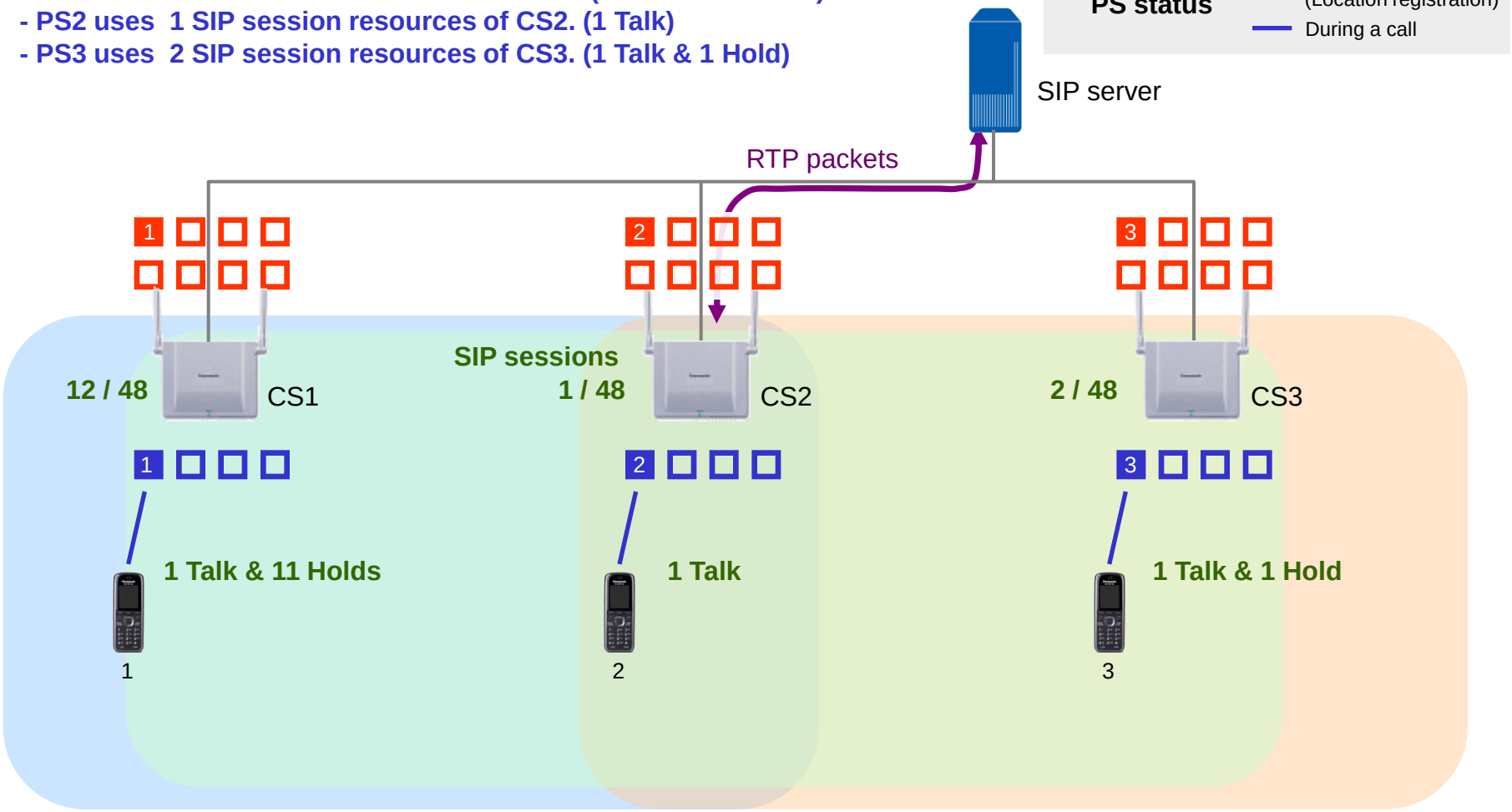
*** In case that you use a conference server, necessary resource is same as "Talk" condition in page 7.**



Talk & Hold

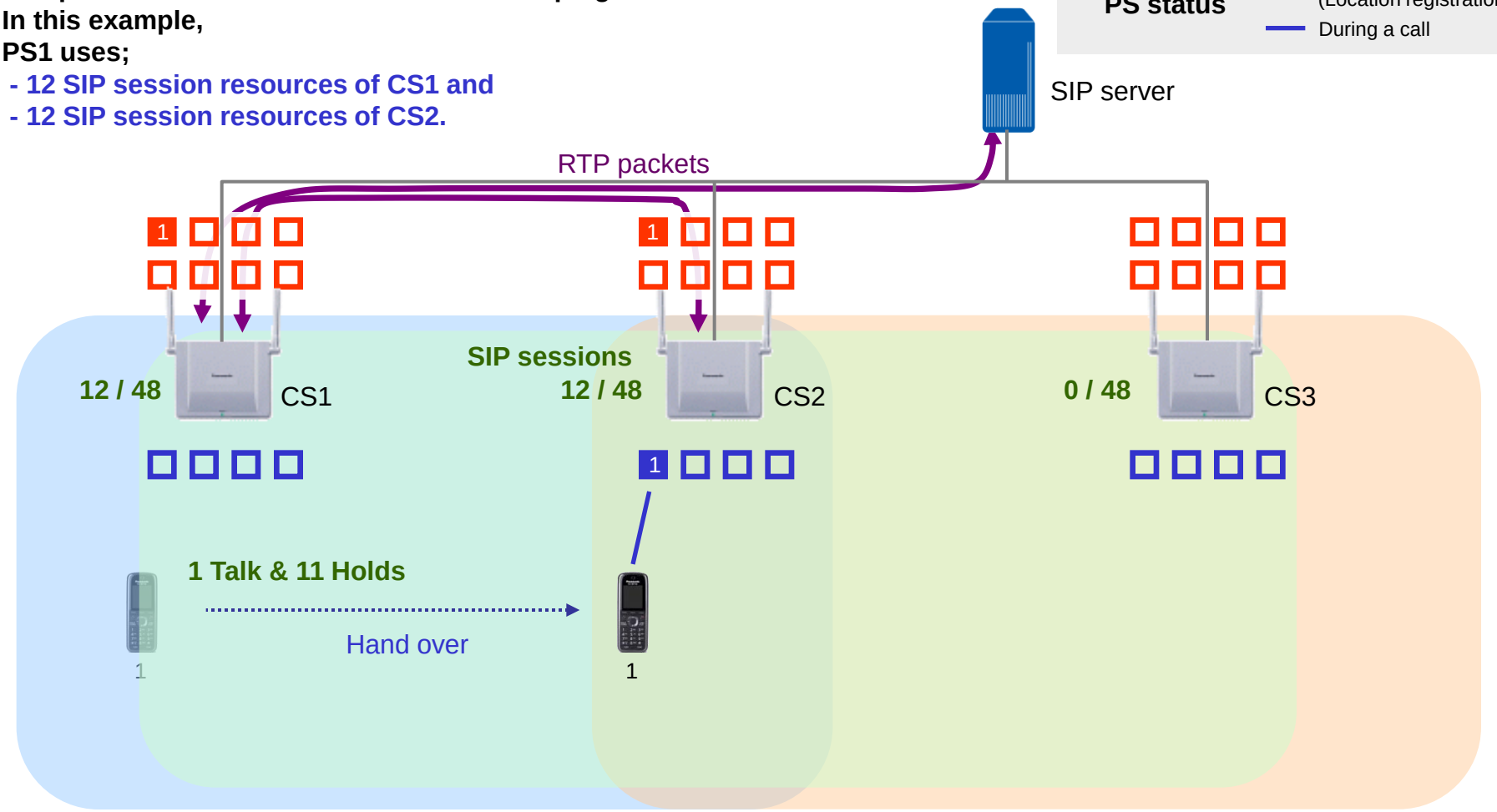
A CS can handle up to 48 SIP sessions simultaneously.
A PS can use up to 12 SIP sessions.
“12” resources means “1 Talk & 11 Holds” .
Some examples are shown in following illustration

- **PS1 uses 12 SIP session resources of CS1. (1 Talk & 11 Holds)**
- **PS2 uses 1 SIP session resources of CS2. (1 Talk)**
- **PS3 uses 2 SIP session resources of CS3. (1 Talk & 1 Hold)**



Talk & Hold & H.O.

In the case of Hand over between 2CSs,
both CS handle not only RTP&DSP resources but also SIP session resources.
The following illustration shows the condition after the procedures bellow,
Step1. PS1 uses 12 SIP session resources under CS1 for 1 Talk and 11 Holds
Step2. PS1 moves from CS1 to CS2 as keeping its status.
In this example,
PS1 uses;
- 12 SIP session resources of CS1 and
- 12 SIP session resources of CS2.



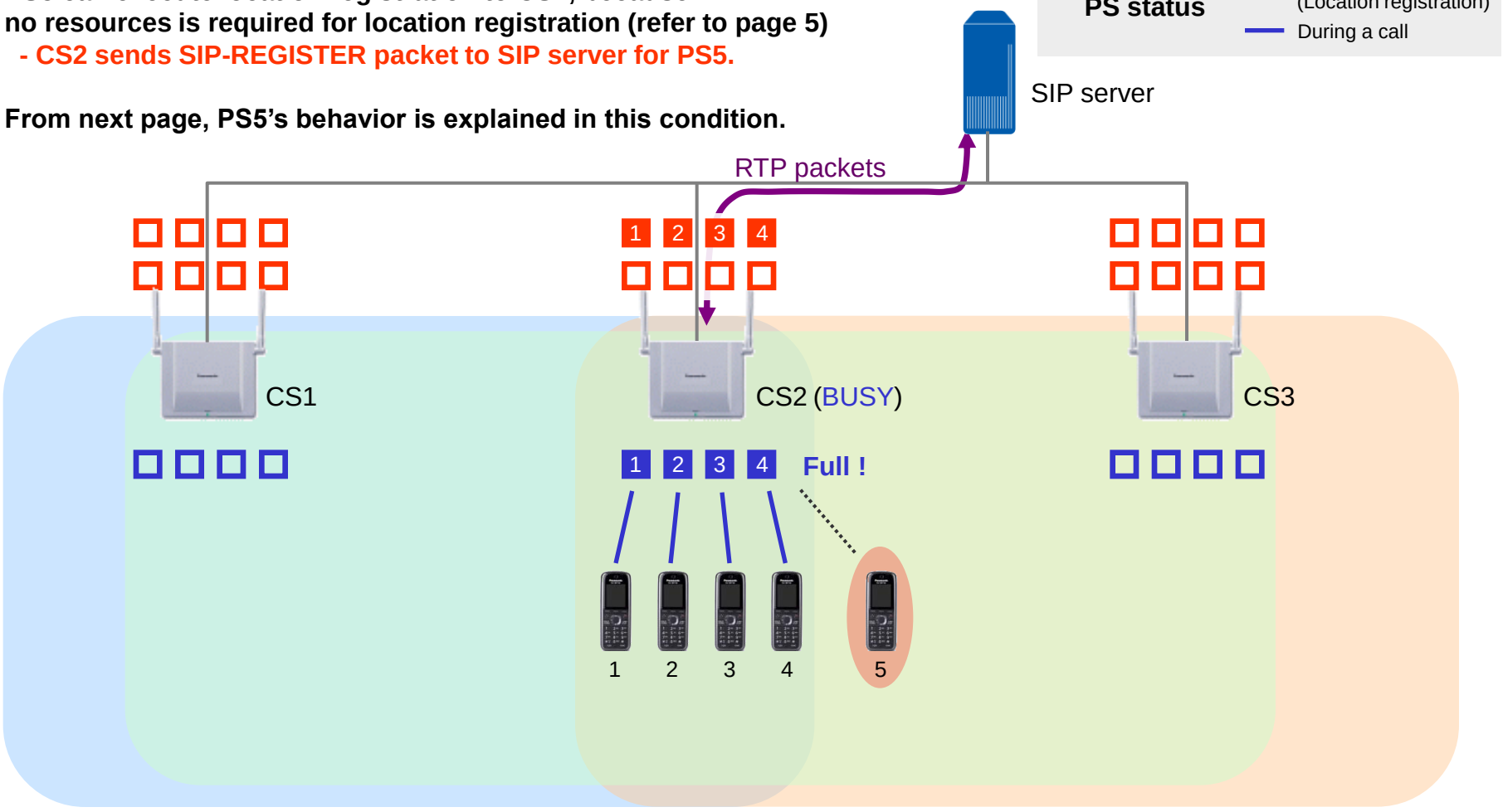
3. BUSY cases (Full DSP)

4 Talks

In following illustration, PS1 to 4 established the calls under CS2.
Therefore,
- CS2 has run out of its DSP resources.

PS5 can execute location registration to CS2, because
no resources is required for location registration (refer to page 5)
- CS2 sends SIP-REGISTER packet to SIP server for PS5.

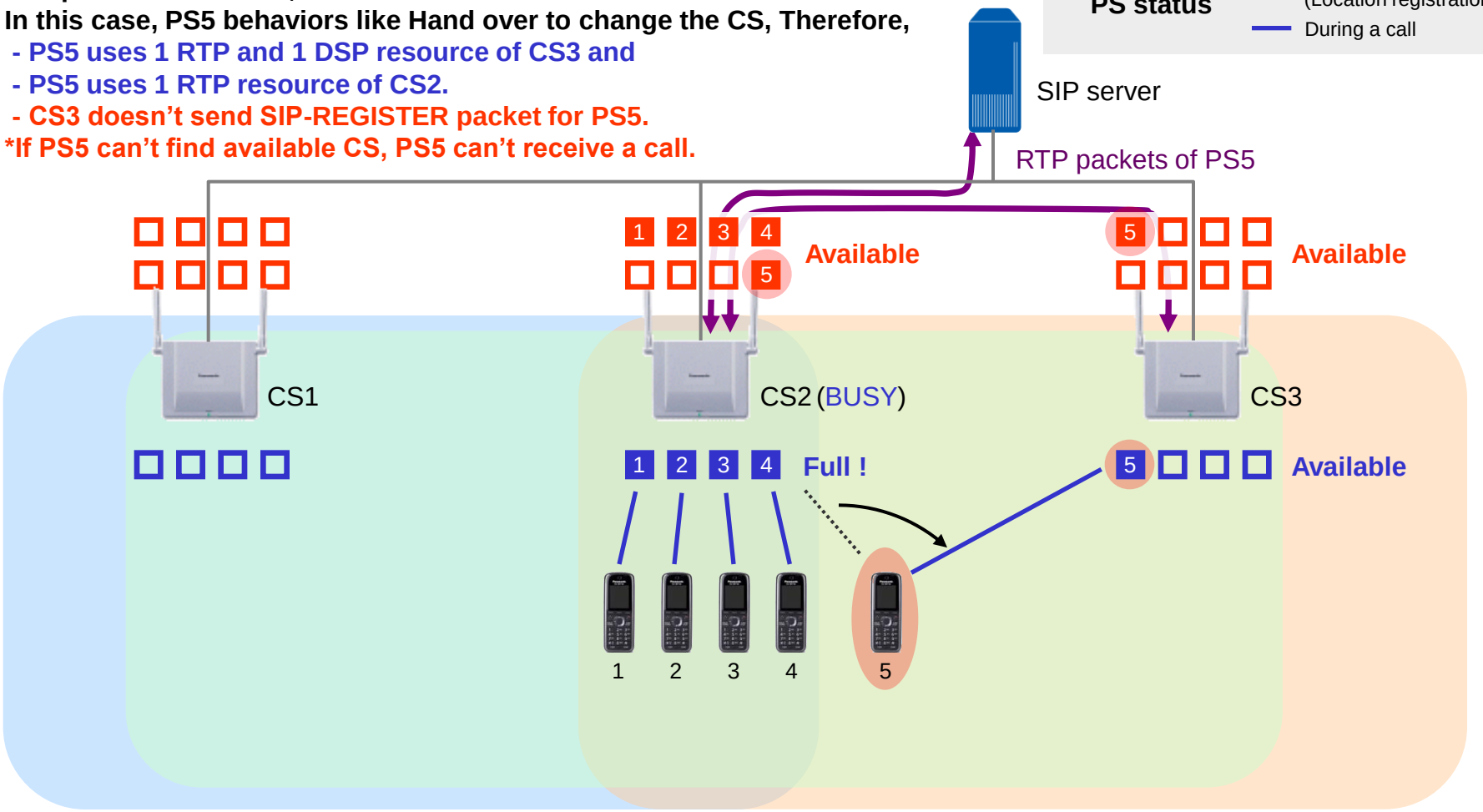
From next page, PS5's behavior is explained in this condition.



3. BUSY cases (Full DSP)

4 Talks & incoming

Following illustration shows an incoming call to PS under BUSY CS.
The procedure for establishment of call is bellow,
Step1. PS5 receives an incoming call information from CS2.
Step2. CS2 is BUSY and PS5 searches other CS.
Step3. PS5 finds CS3, and establishes a call via CS3.
In this case, PS5 behaviors like Hand over to change the CS, Therefore,
- PS5 uses 1 RTP and 1 DSP resource of CS3 and
- PS5 uses 1 RTP resource of CS2.
- CS3 doesn't send SIP-REGISTER packet for PS5.
***If PS5 can't find available CS, PS5 can't receive a call.**

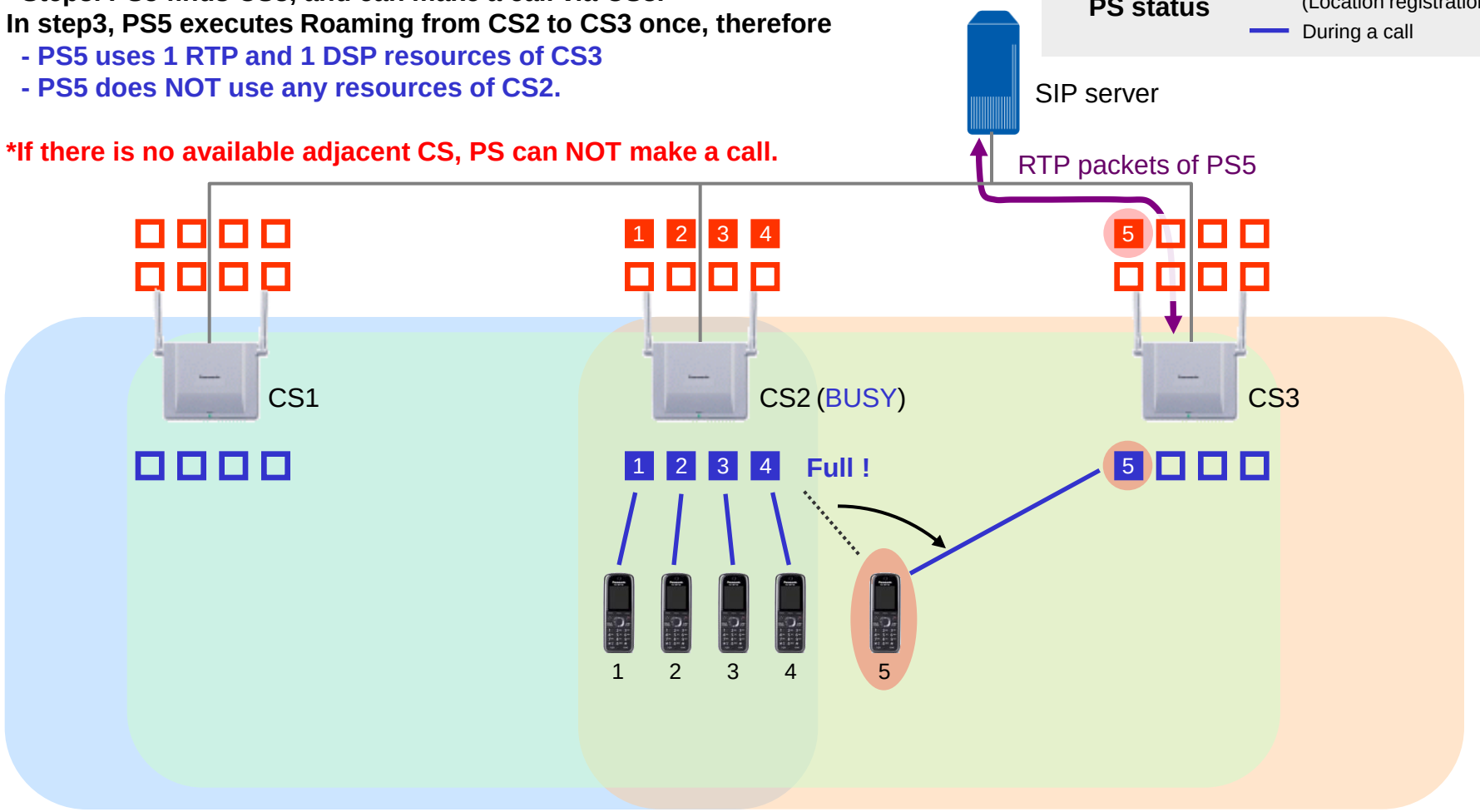


3. BUSY cases (Full DSP)

4 Talks & outgoing

Following illustration shows an outgoing call from the PS under BUSY CS.
The procedure for establishment of call is bellow,
Step1. PS5 tries a outgoing call to CS2.
Step2. CS2 is BUSY, then PS5 searches other CS.
Step3. PS5 finds CS3, and can make a call via CS3.
In step3, PS5 executes Roaming from CS2 to CS3 once, therefore
- PS5 uses 1 RTP and 1 DSP resources of CS3
- PS5 does NOT use any resources of CS2.

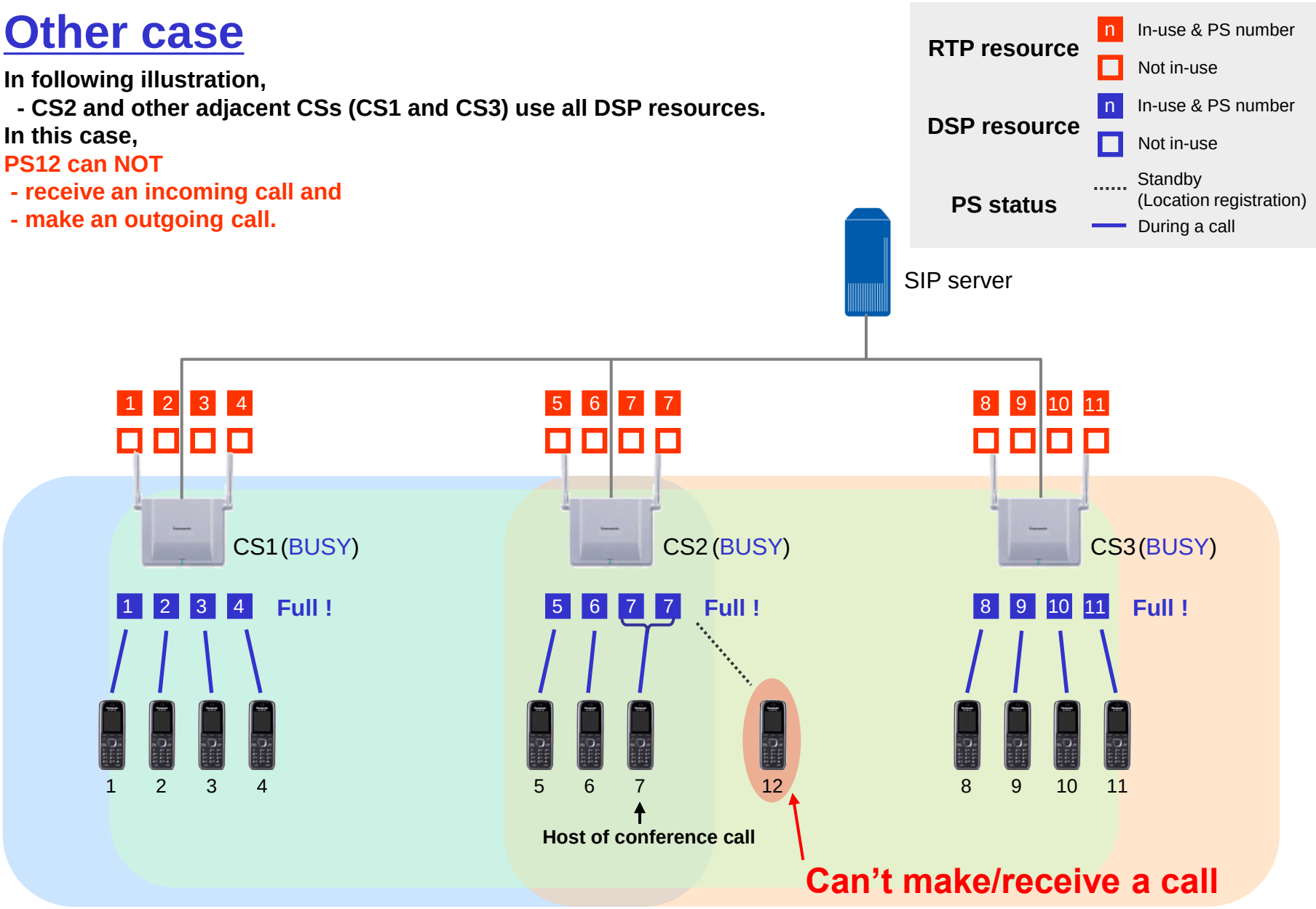
***If there is no available adjacent CS, PS can NOT make a call.**



3. BUSY cases (Full DSP)

Other case

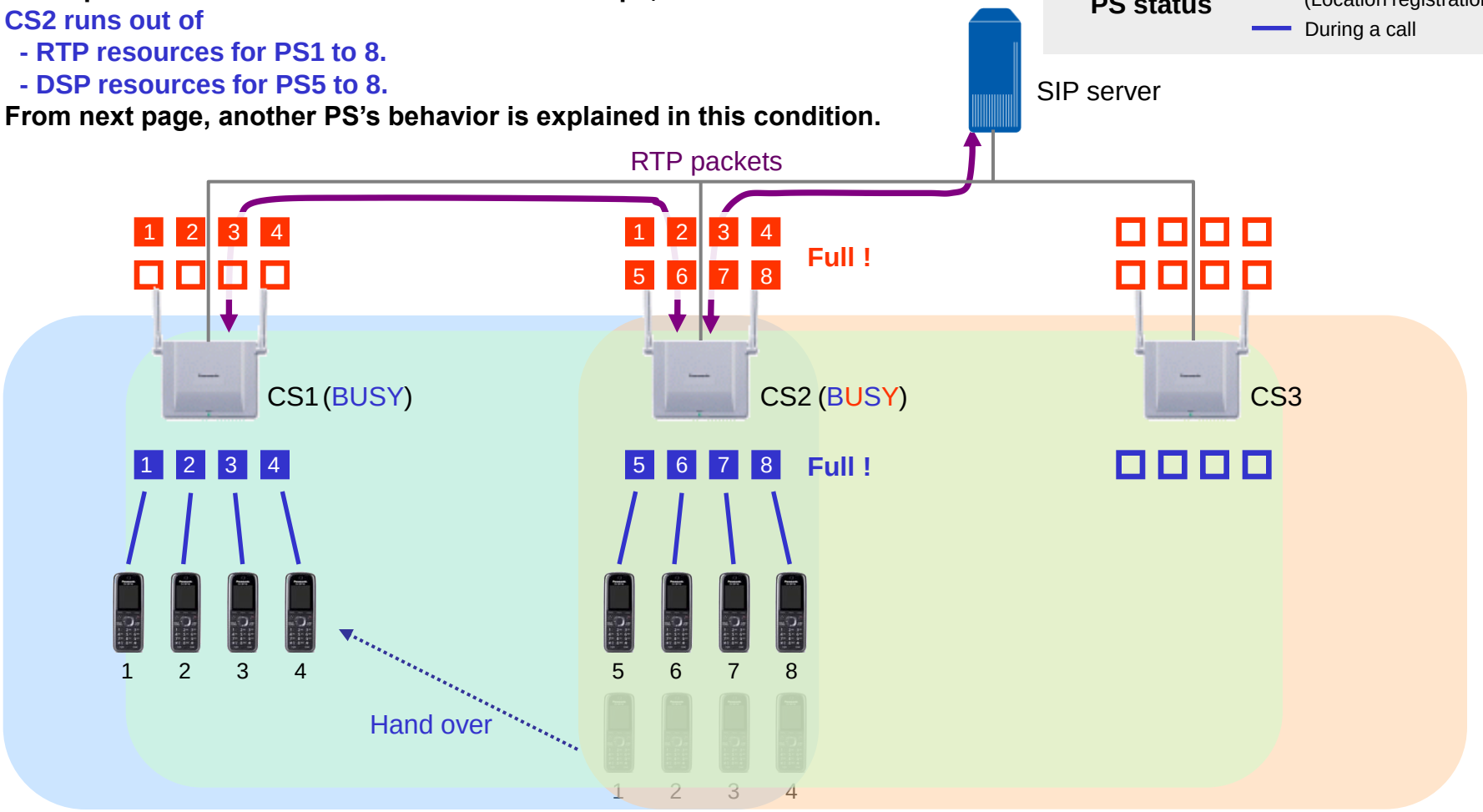
In following illustration,
- CS2 and other adjacent CSs (CS1 and CS3) use all DSP resources.
In this case,
PS12 can NOT
- receive an incoming call and
- make an outgoing call.



4. BUSY cases (Full DSP & RTP)

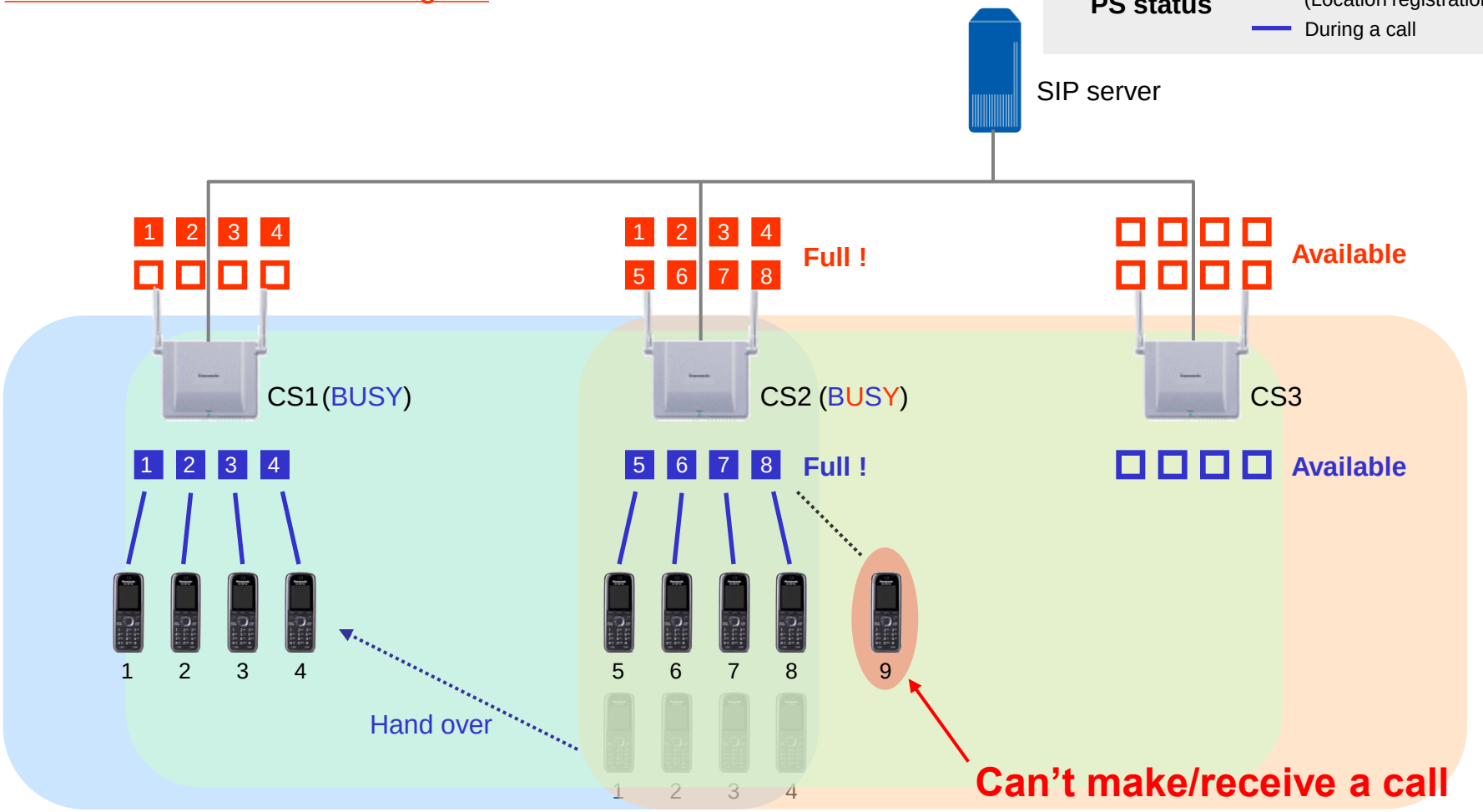
4 Talks & 4 H.O.

The following illustration shows the condition after procedures bellow,
Step1. PS1 to 4 become in “Talk” condition under CS2.
Step2. PS1 to 4 execute Hand over to CS1. (CS2 releases DSP resources)
Step3. PS5 to 8 become in “Talk” condition under CS2.
In the point of RTP&DSP resources in CS2 at step3,
CS2 runs out of
- RTP resources for PS1 to 8.
- DSP resources for PS5 to 8.
From next page, another PS’s behavior is explained in this condition.



4 Talks & 4 H.O. & incoming (impossible)

PS9 has executed location registration to CS2 in following illustration.
If there is an incoming call to PS9,
CS2 don't have available RTP resources.
Therefore, even if there are available resources in CS3,
PS9 can NOT receive an incoming call

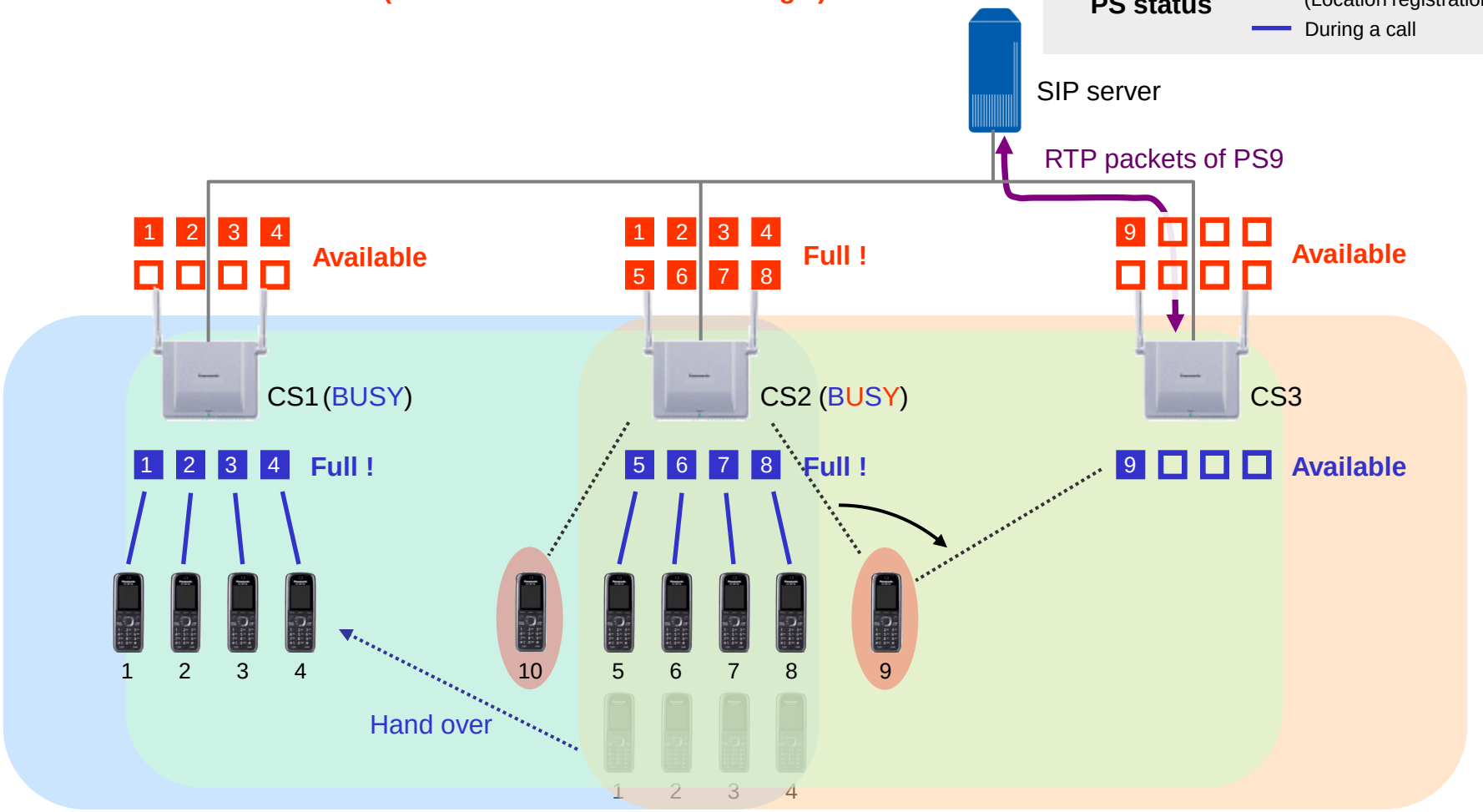


4. BUSY cases (Full DSP & RTP)

4 Talks & 4 H.O. & outgoing

This case is same as “4 Talks & outgoing”. Please refer to page 15.
In following illustration, PS9 and 10 has executed location registration to CS2.
In this case,

- **PS9 can make a call via CS3.**
- **PS10 can NOT make a call. (CS1 is BUSY. CS3 is out of range.)**



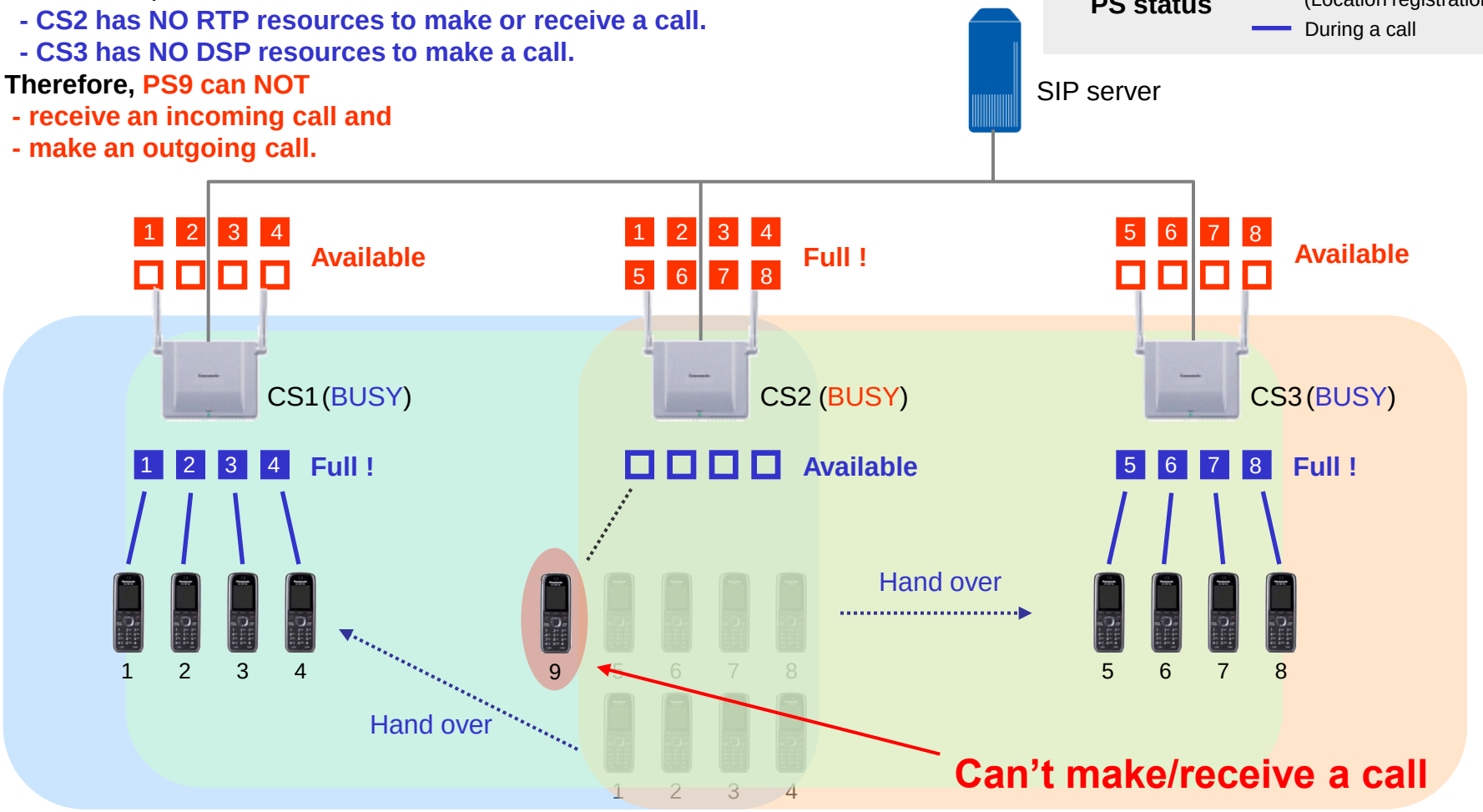
5. BUSY case (Full RTP)

8 H.O.

The following illustration show the condition after the procedures bellow,
Step1. PS1 to 4 becomes “Talk” under CS2, then execute Hand over to CS1.
Step2. PS5 to 8 becomes “Talk” under CS2, then execute Hand over to CS3.
Step3. PS9 executes location registration to CS2.

In this case,
- CS2 has NO RTP resources to make or receive a call.
- CS3 has NO DSP resources to make a call.

Therefore, PS9 can NOT
- receive an incoming call and
- make an outgoing call.



6. BUSY case (Full SIP session)

48 SIP sessions

The following illustration show the condition after the procedures bellow,

Step1. PS1 to 4 becomes “Talk” under CS2, and then hold 11 calls.

(CS2 runs out of 48 SIP sessions)

Step2. PS1 to 3 execute Hand over to CS1.

(CS2 still keeps 48 SIP sessions)

This condition results in following situation as same as “4 Talk & 4 H.O.”. Therefore,

- **PS5 can NOT receive an incoming call and**
- **PS5 can make an outgoing call if there is available adjacent CS.**