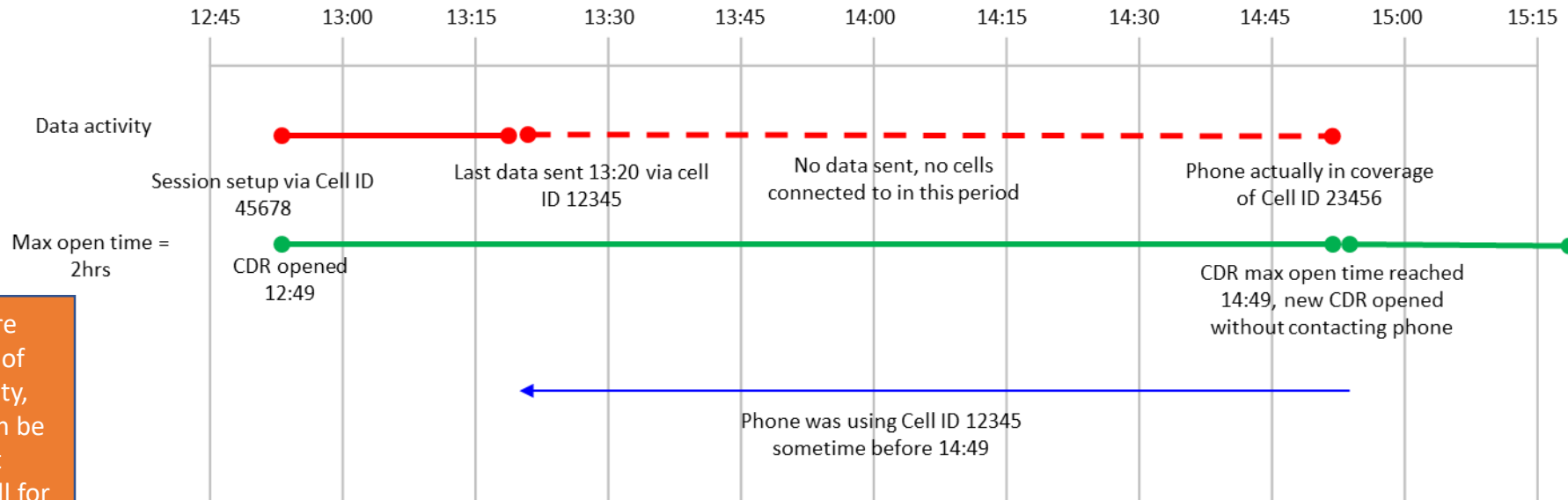# GPRS/Mobile Data Conclusions

What it's safe to say about mobile data evidence

Read in conjunction with our comprehensive guidance paper

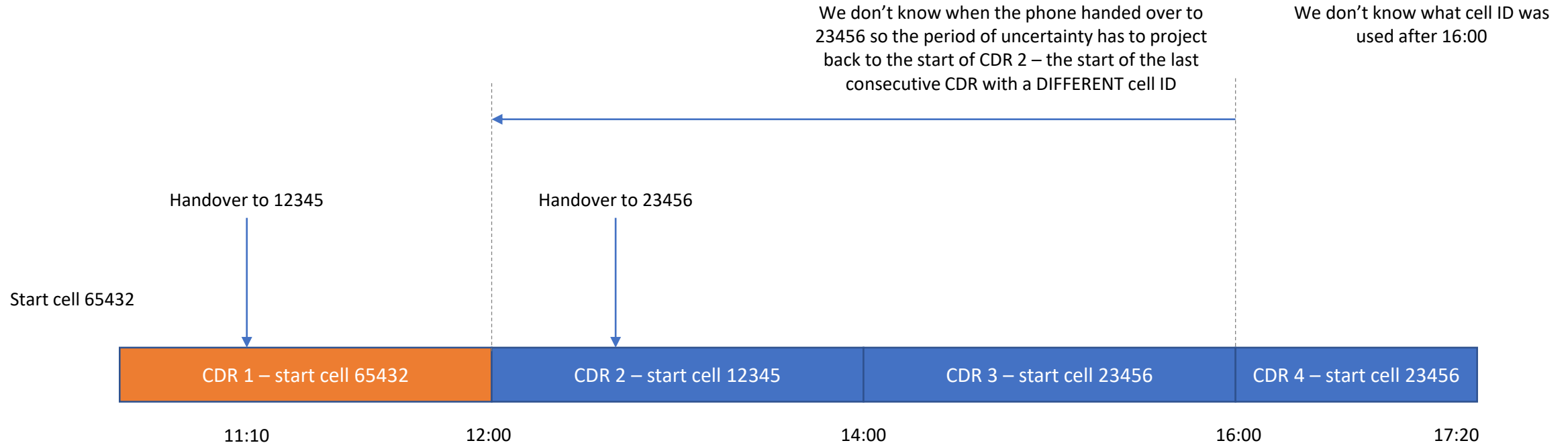*0058-BRF GPRS Billing*

GPRS Billing

Due to the more periodic nature of GPRS connectivity, where phones can be active but not connected to a cell for long periods of time, it becomes more difficult to assign locations to phones based on GPRS billing records.

The UK College of Policing recommends using a form of words that includes the phrase 'at or before the start time' when attempting to draw conclusions from GPRS data.

Date	Time	Duration	Calling Number	APN	Start Cell ID
12/01/2017	12:49:01	02:00:00	447700900123	Internet	45678
12/01/2017	14:49:01	00:20:00	447700900123	Internet	12345

'Start Cell ID' for new session at 14:49 is really the 'last used cell' by the phone

In relation to the record at 14:49, we can't say that the phone was definitely under the cover of Cell ID 12345 **AT** 14:49, we can only say that it was under the cover of that cell '**AT OR BEFORE**' 14:49
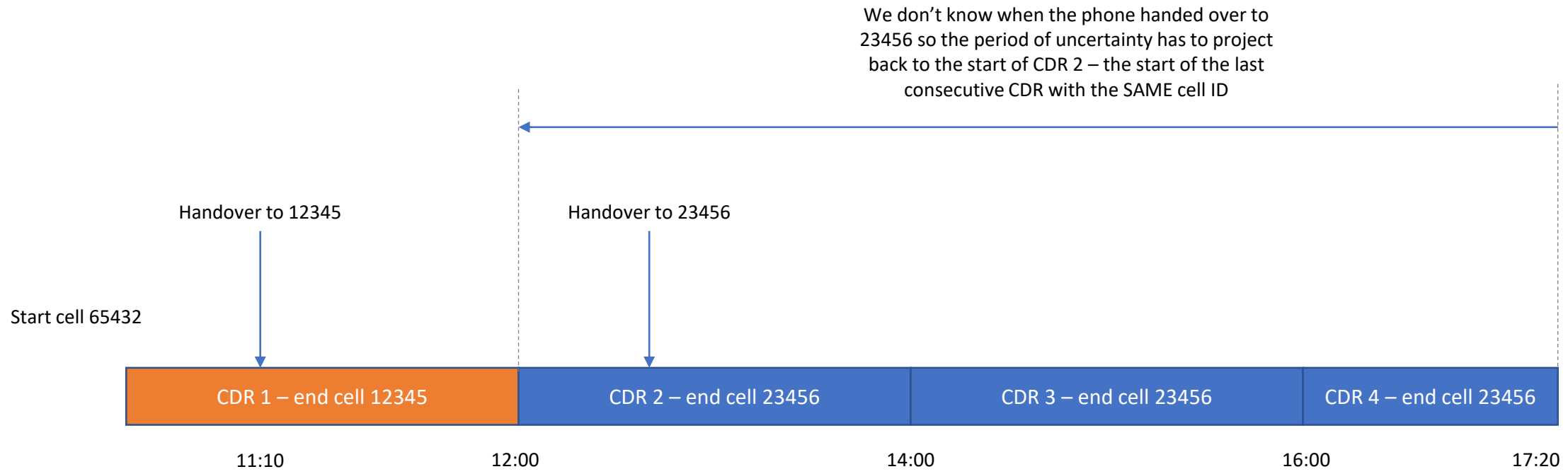
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Communications Data Experts

'At or before' - EE, VF

We don't know when the phone handed over to 23456 so the period of uncertainty has to project back to the start of CDR 2 – the start of the last consecutive CDR with a DIFFERENT cell ID

We don't know what cell ID was used after 16:00

Handover to 12345

Handover to 23456

Start cell 65432

CDR 1 – start cell 65432	CDR 2 – start cell 12345	CDR 3 – start cell 23456	CDR 4 – start cell 23456

11:10   12:00   14:00   16:00   17:20

Cell ID 23456 was used at or before the start time (16:00) of the record (CDR 4) and after the start of the last consecutive CDR (CDR 2) with a different start cell ID (12:00)
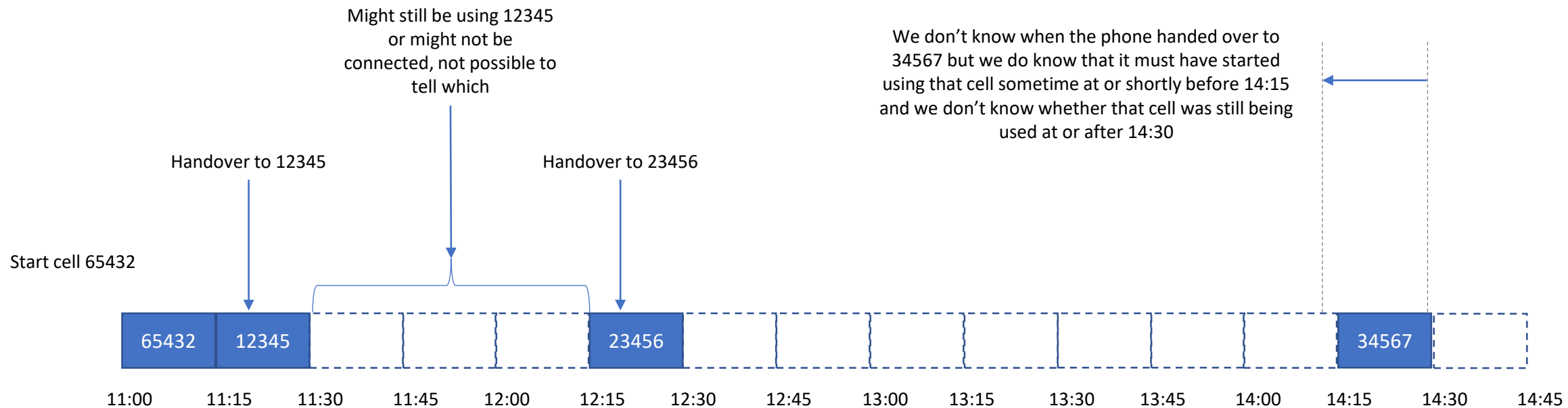
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'At or before' – O2

We don't know when the phone handed over to 23456 so the period of uncertainty has to project back to the start of CDR 2 – the start of the last consecutive CDR with the SAME cell ID

Handover to 12345

Handover to 23456

Start cell 65432

| CDR 1 – end cell 12345 | CDR 2 – end cell 23456 | CDR 3 – end cell 23456 | CDR 4 – end cell 23456 |

11:10   12:00   14:00   16:00   17:20

Cell ID 23456 was used at or before the end time (17:20) of the record (CDR 4) and after the start of the last consecutive CDR (CDR 2) with the same end cell ID (12:00)

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H3 IP Locations (or 3G Locations)

Might still be using 12345 or might not be connected, not possible to tell which

We don't know when the phone handed over to 34567 but we do know that it must have started using that cell sometime at or shortly before 14:15 and we don't know whether that cell was still being used at or after 14:30

Handover to 12345

Handover to 23456

Start cell 65432

| 65432 | 12345 | | | | 23456 | | | | | | | | 34567 | |

11:00　11:15　11:30　11:45　12:00　12:15　12:30　12:45　13:00　13:15　13:30　13:45　14:00　14:15　14:30　14:45
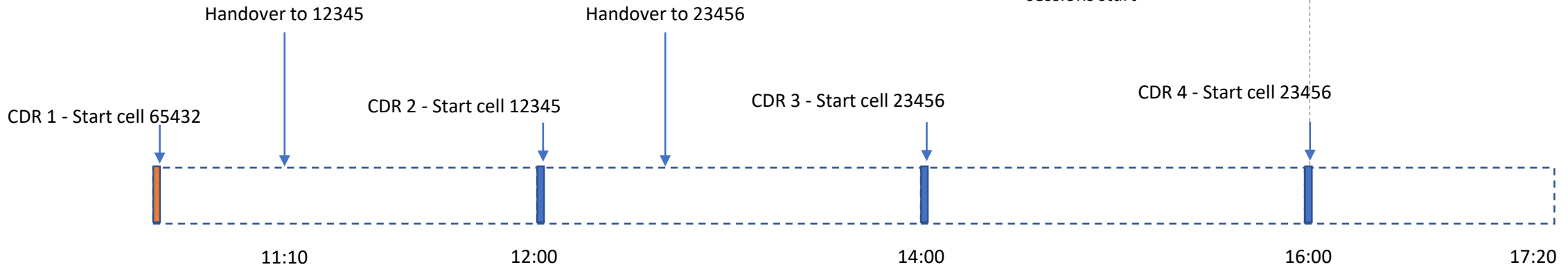
The IP Locations data doesn't include records for periods where the phone continues to use the same cell as was used in the previous 15 minute period

Cell ID 23456 was used at some time between the start (or slightly before the start) and the end of the record

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H3 LTE Locations (or 4G Locations)

We don't know when the phone handed over to 23456 only that it happened sometime before the start of CDR 4. We can't project the time backwards because the H3 LTE records don't show duration, so it's not possible to know if the preceding CDRs were consecutive or not. It's also not possible to know if a record can be trusted as we don't know when new sessions start

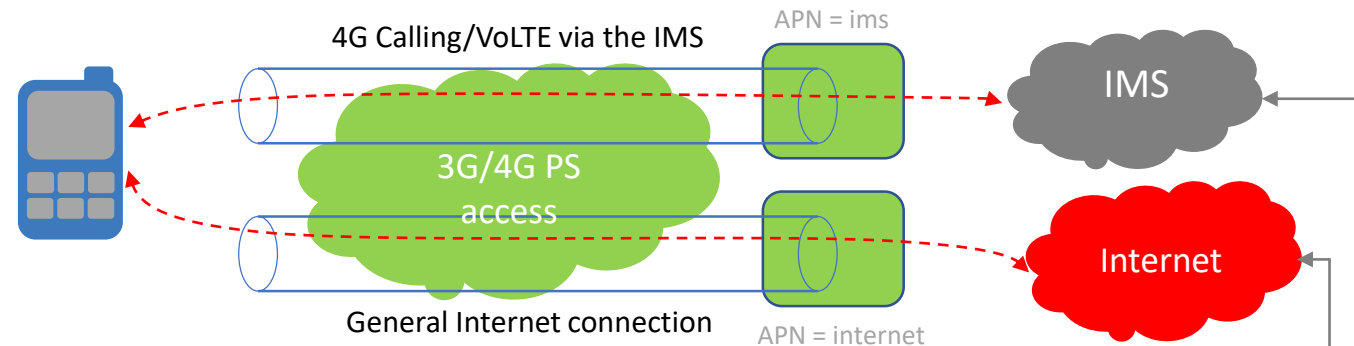We don't know what cell ID was used after 16:00

Handover to 12345

Handover to 23456

CDR 1 - Start cell 65432

CDR 2 - Start cell 12345

CDR 3 - Start cell 23456

CDR 4 - Start cell 23456

11:10   12:00   14:00   16:00   17:20

Cell ID 23456 was used at or before the start time (16:00) of the record (CDR 4)

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Concurrent Sessions

GPRS/mobile data sessions connect to network elements known as APNs. Each APN connects to a specific external network or service – most networks will have an 'internet' APN (although most don't call it that) and an 'ims' APN (for 4G voice calling)

Mobile devices are only permitted to have one active data connection to a given APN at any one time – *but they are permitted to connected to multiple different APNs concurrently if they need to*

4G Calling/VoLTE via the IMS

APN = ims

IMS

3G/4G PS access

Internet

General Internet connection

APN = internet

12/02/2017	13:58:07	447700900566	IP Session	00:27:39	100.127.124.57		131.22	678.33	everywhere
12/02/2017	14:26:06	447700900566	IP Session	00:00:24	100.127.124.57		0	0	everywhere
12/02/2017	14:26:06	447700900566	IP Session	00:00:04		2A01:04C8:C104:EB61:0001:0002:4D6B:1A4E	4.89	7.16	ims
12/02/2017	14:26:30	447700900566	IP Session	00:44:48	100.127.124.57		33.78	92.57	everywhere
12/02/2017	15:11:18	447700900566	IP Session	00:00:03		2A01:04C8:C305:481C:0001:0002:9382:84FC	4.43	6.98	ims
12/02/2017	15:11:18	447700900566	IP Session	00:00:43	100.127.124.57		0	0	everywhere

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GPRS Conclusions Summary

EE: "The cell shown was connected to at or before the start time of the record and after the start time of the earliest previous contiguous record with a different cell ID"

Vodafone: "The cell shown was connected to at or before the start time of the record and after the start time of the earliest previous contiguous record with a different cell ID"

O2: "The cell shown was connected to at or before the end time of the record and after the start time of the earliest previous contiguous record with the same cell ID"

H3 IP Locations: "The cell shown was connected to at or before the start time and before the end time of the record"

H3 LTE Locations: "The cell shown was connected to at or before the start time of the record"

[Note: the wording of these suggested conclusions has been edited by us to reflect recent re-evaluation of the wording for O2 and H3 records and the following does not exactly match College guidance]

Taken from our guide '0058-BRF Briefing Paper- GPRS Billing v3.1.pdf' available from the CSAS Support website

Feel free to cut out & keep!

Any questions or clarifications, please contact CSAS Support

0800 158 3830 or support@forensicanalytics.co.uk

Or download our comprehensive guidance paper

0058-BRF GPRS Billing

From the CSAS Support site – csas.support