스마트폰 <-> 차량의 시스템 시간 변경에 따른 S21 로그 분석

2024.06.28(금)

모바일시스템공학과 20학번 조민혁

INDEX

01 로그 데이터 추출 과정

로그 데이터 추출 과정

❖ 블루투스 관련 로그 위치

```
o1s:/ $ ls ./data/log
```

* "ls ./data/log 명령어를 통한 확인"

=> "./data/log/bt" 에 있는 것으로 확인

로그 데이터 추출 과정

❖ 문제점

```
o1s:/data/log $ cd ./bt
/system/bin/sh: cd: /data/log/bt: Permission denied
```

```
2|o1s:/data/log $ cat ./bt
cat: ./bt: Permission denied
```

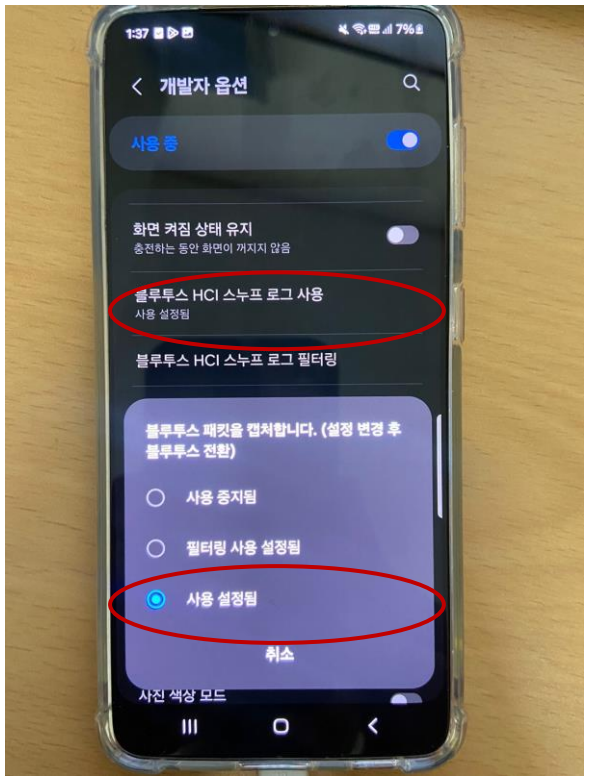
=> 루트 권한이 없어서 접근이 되지 않음

로그 데이터 추출 과정

❖ 해결책

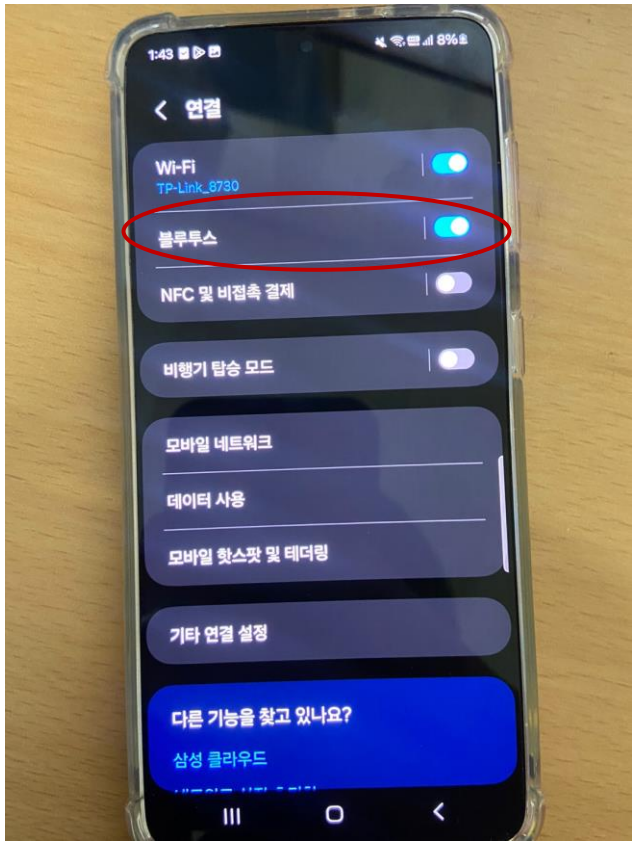
Step1) S21의 **“개발자 옵션 -> 블루투스 HCI 스누프 로그 사용 활성화”**

-> **“AirPods Pro”**를 통한 사전 테스트



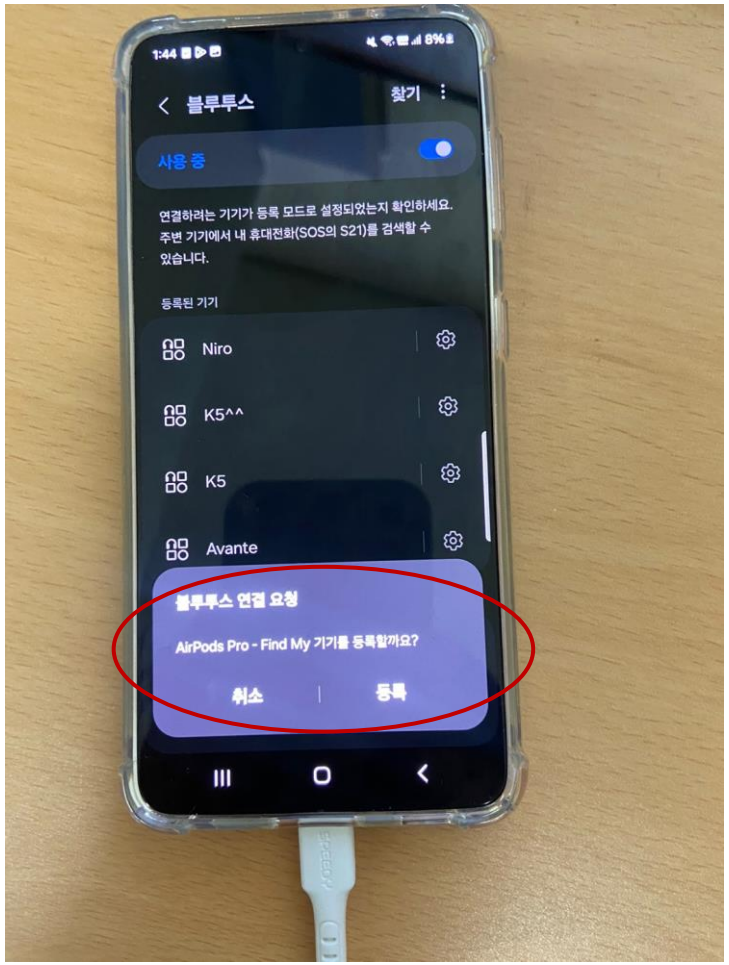
로그 데이터 추출 과정

❖ Step2) 블루투스를 껐다가 다시 켜줌



로그 데이터 추출 과정

❖ Step3) 이후 기기 연결



로그 데이터 추출 과정

❖ Step4) AirPods Pro와 S21 사이의 이벤트 발생을 통한 로그 데이터 누적

❖ 이벤트 7가지 발생 시킴

EVENT 1) 기기 연결을 함

EVENT 2) 노이즈 캔슬링 껐다가 다시 켜봄

EVENT 3) 음악 재생 (노이즈 캔슬링 꺼보기 켜기)

EVENT 4) 음악 멈추기 (멈추고 다시 재생)

EVENT 5) 뒤로 재생 앞으로 재생

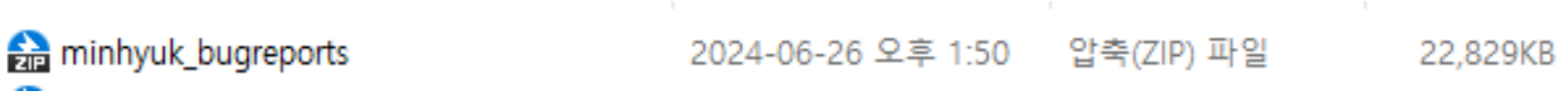
EVENT 6) 통화해보기 (노이즈 캔슬링 껐다가 켜보기, 에어팟 버튼으로 통화 끊기)

EVENT 7) 연결 해제

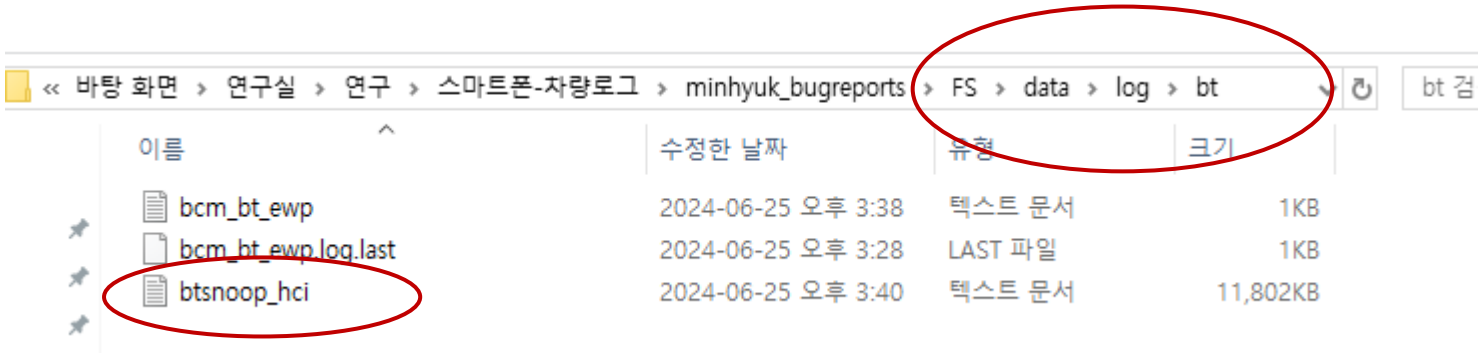
로그 데이터 추출 과정

❖ Step5) **"adb bugreport 파일명.zip"**을 통한 로그 압축 파일 추출

```
PS C:\Users\cgumg> adb bugreport minhyuk_bugreports.zip
/data/user_de/0/com.android.shell/files/bugreports/dumpstate-2024-06-26...-25.zip: 1 file pulled, 0 skipped. 39.1 MB/s (23376141 bytes in 0.570s)
Bug report copied to minhyuk_bugreports.zip
```

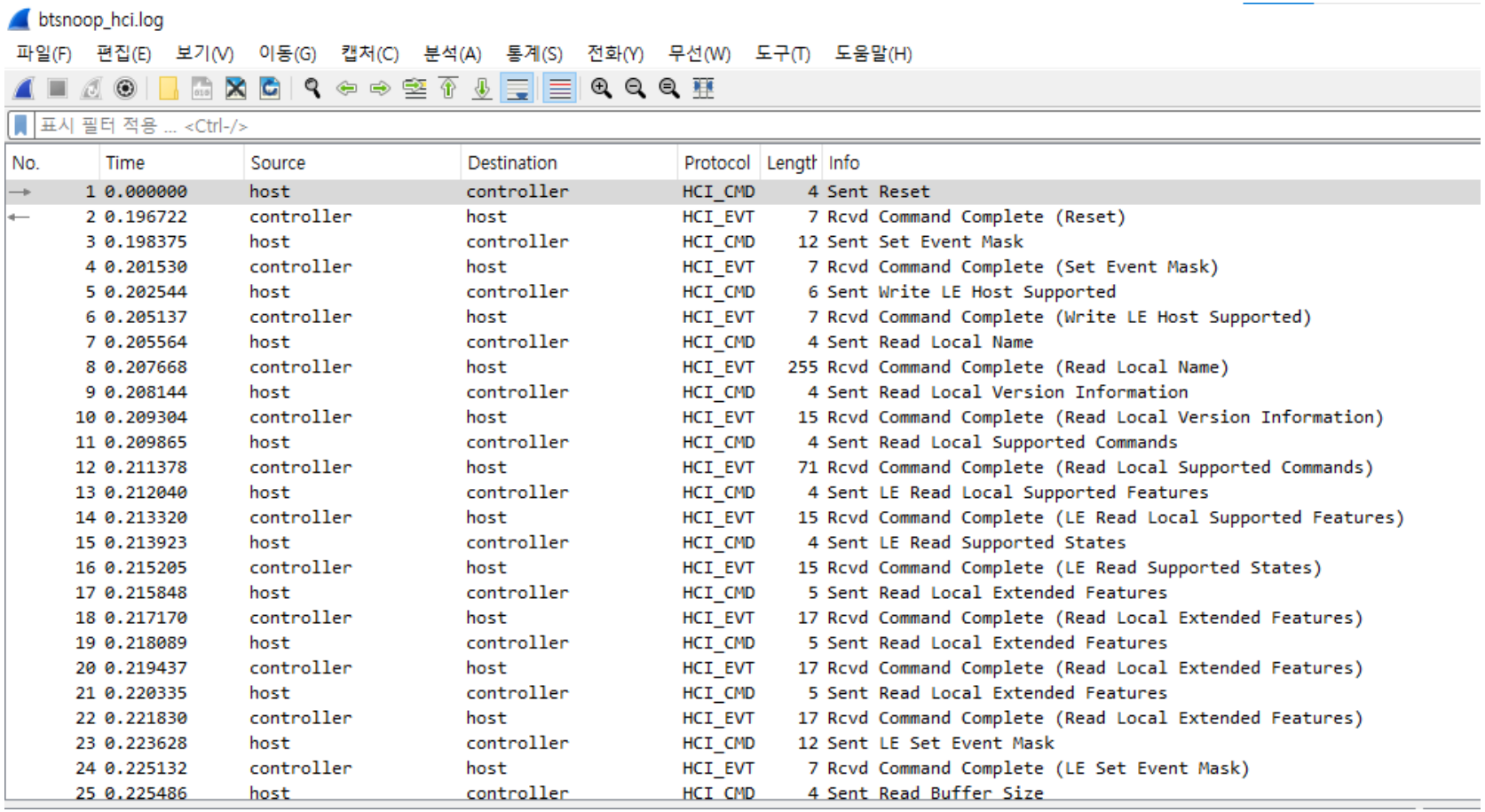


* /data/log/bt 경로에 btsnoop_hci.txt 파일 있는 것 확인 가능



로그 데이터 추출 과정

❖ Step6) WireShark를 통한 로그 데이터 분석



No.	Time	Source	Destination	Protocol	Length	Info
1	0.000000	host	controller	HCI_CMD	4	Sent Reset
2	0.196722	controller	host	HCI_EVT	7	Rcvd Command Complete (Reset)
3	0.198375	host	controller	HCI_CMD	12	Sent Set Event Mask
4	0.201530	controller	host	HCI_EVT	7	Rcvd Command Complete (Set Event Mask)
5	0.202544	host	controller	HCI_CMD	6	Sent Write LE Host Supported
6	0.205137	controller	host	HCI_EVT	7	Rcvd Command Complete (Write LE Host Supported)
7	0.205564	host	controller	HCI_CMD	4	Sent Read Local Name
8	0.207668	controller	host	HCI_EVT	255	Rcvd Command Complete (Read Local Name)
9	0.208144	host	controller	HCI_CMD	4	Sent Read Local Version Information
10	0.209304	controller	host	HCI_EVT	15	Rcvd Command Complete (Read Local Version Information)
11	0.209865	host	controller	HCI_CMD	4	Sent Read Local Supported Commands
12	0.211378	controller	host	HCI_EVT	71	Rcvd Command Complete (Read Local Supported Commands)
13	0.212040	host	controller	HCI_CMD	4	Sent LE Read Local Supported Features
14	0.213320	controller	host	HCI_EVT	15	Rcvd Command Complete (LE Read Local Supported Features)
15	0.213923	host	controller	HCI_CMD	4	Sent LE Read Supported States
16	0.215205	controller	host	HCI_EVT	15	Rcvd Command Complete (LE Read Supported States)
17	0.215848	host	controller	HCI_CMD	5	Sent Read Local Extended Features
18	0.217170	controller	host	HCI_EVT	17	Rcvd Command Complete (Read Local Extended Features)
19	0.218089	host	controller	HCI_CMD	5	Sent Read Local Extended Features
20	0.219437	controller	host	HCI_EVT	17	Rcvd Command Complete (Read Local Extended Features)
21	0.220335	host	controller	HCI_CMD	5	Sent Read Local Extended Features
22	0.221830	controller	host	HCI_EVT	17	Rcvd Command Complete (Read Local Extended Features)
23	0.223628	host	controller	HCI_CMD	12	Sent LE Set Event Mask
24	0.225132	controller	host	HCI_EVT	7	Rcvd Command Complete (LE Set Event Mask)
25	0.225486	host	controller	HCI_CMD	4	Sent Read Buffer Size

로그 데이터 추출 과정

❖ 각 이벤트에 대한 로그 데이터

❖ Event1 : 기기 연결 에 대한 로그

```
## 로그 분석 ##

# Event 1(기기 연결을 함)에 대한 로그 #
  312   1.952437 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e ()    L2CAP   15      Sent Information Request (Extended Features Mask)
  334   1.975409 Apple_84:9f:1e ()    SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   21      Rcvd Information Response (Extended Features Mask, Success)
  335   1.976081 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e ()    L2CAP   15      Sent Information Request (Fixed Channels Supported)
  337   1.979122 Apple_84:9f:1e ()    SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   15      Rcvd Information Request (Extended Features Mask)
  338   1.979888 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e ()    L2CAP   21      Sent Information Response (Extended Features Mask, Success)
  341   1.984035 Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   25      Rcvd Information Response (Fixed Channels Supported, Success)
  342   1.986767 Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   15      Rcvd Information Request (Fixed Channels Supported)
  343   1.987401 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e (AirPods Pro) L2CAP   25      Sent Information Response (Fixed Channels Supported, Success)
  345   1.996094 Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   17      Rcvd Connection Request (SDP, SCID: 0x0604)
  346   1.996780 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e (AirPods Pro) L2CAP   21      Sent Connection Response - Success (SCID: 0x0604, DCID: 0x0040)
  347   1.997243 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e (AirPods Pro) L2CAP   21      Sent Configure Request (DCID: 0x0604)
  350   2.004623 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e (AirPods Pro) L2CAP   19      Sent Configure Response - Success (SCID: 0x0604)
  349   2.004060 Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   21      Rcvd Configure Request (DCID: 0x0040)
  351   2.005271 Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)          L2CAP   23      Rcvd Configure Response - Success (SCID: 0x0040)
  487   8.523685 SamsungElect_85:e7:b7 (SOS��  S21)          Apple_84:9f:1e (AirPods Pro - Find My)       L2CAP   15      Sent Information Request (Extended Features Mask)
```

로그 데이터 추출 과정

❖ Event3,4 (음악 재생, 노이즈 캔슬링으로 켰다 꺼보기), 음악 멈추기 에 대한 로그

EVENT 3,4) 음악 재생 (노이즈 캔슬링 꺼보기 켜기), 음악 멈추기 ## 로그

749	11.292130	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS��● S21)	AVDTP	17	Rcvd ResponseAccept - Discover - items: 3
750	11.295602	SamsungElect_85:e7:b7 (SOS��● S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	12	Sent Command - GetAllCapabilities - ACP SEID [1 - Audio Sink]
751	11.304027	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS��● S21)	AVDTP	23	Rcvd ResponseAccept - GetAllCapabilities - Audio SBC (44100 48000 | Mono DualChannel Stereo JointS
752	11.306650	SamsungElect_85:e7:b7 (SOS��● S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	12	Sent Command - GetAllCapabilities - ACP SEID [2 - Audio Sink]
754	11.331706	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS��● S21)	AVDTP	25	Rcvd ResponseAccept - GetAllCapabilities - Audio MPEG-2,4 AAC
755	11.333792	SamsungElect_85:e7:b7 (SOS��● S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	12	Sent Command - GetAllCapabilities - ACP SEID [3 - Audio Sink]
756	11.341359	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS��● S21)	AVDTP	33	Rcvd ResponseAccept - GetAllCapabilities - Audio non-A2DP
757	11.344718	SamsungElect_85:e7:b7 (SOS��● S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	27	Sent Command - SetConfiguration - ACP SEID [2 - Audio Sink] - INT SEID [2 - Audio Sink] - Audio MPE(
759	11.351593	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS��● S21)	AVDTP	11	Rcvd ResponseAccept - SetConfiguration
760	11.352174	SamsungElect_85:e7:b7 (SOS��● S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	12	Sent Command - Open - ACP SEID [2 - Audio Sink]
761	11.352802	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS��● S21)	AVDTP	14	Rcvd Command - DelayReport(150.0 ms) - ACP SEID [2 - Audio Sink]
762	11.353582	SamsungElect_85:e7:b7 (SOS��● S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	11	Sent ResponseAccept - DelayReport

* 오디오 데이터 전송을 위한 준비하는 것 확인 가능

로그 데이터 추출 과정

❖ Event6 : 통화에 대한 로그

```
## EVENT 6) 통화 ## 로그

33640   579.325757   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   24   Sent   +VGS: 4
33626   577.533716   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   24   Sent   +VGS: 6
33604   573.804670   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   25   Sent   +VGS: 11
33592   573.283705   Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)   HFP   22   Rcvd   AT+BCS=2
33589   573.270115   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   27   Sent   +CIEV: 2,2
33590   573.273716   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   24   Sent   +BCS: 2
33618   574.403239   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   27   Sent   +CIEV: 2,3
33632   578.066216   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   24   Sent   +VGS: 5
33650   581.725103   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   27   Sent   +CIEV: 1,1
33651   581.725565   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   27   Sent   +CIEV: 2,0
33716   607.130960   SamsungElect_85:e7:b7 (SOS��  S21)   Apple_84:9f:1e (AirPods Pro) HFP   27   Sent   +CIEV: 1,0

33698   605.699556   Apple_84:9f:1e (AirPods Pro) SamsungElect_85:e7:b7 (SOS��  S21)   HFP   21   Rcvd   AT+CHUP
```

* 각 프로토콜과 메시지를 주고받으며 통화, 통화 끊기 하고 있음

로그 데이터 추출 과정

❖ Event7: 연결 해제에 대한 로그

EVENT 7) 연결 해제 ## 로그

33765	624.313513	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	L2CAP	17	Sent Disconnection Request (SCID: 0x004c, DCID: 0x1507, PSM: 0x0017, Service: A/V Remote Control)
33766	624.314122	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	AVDTP	12	Sent Command - Close - ACP SEID [2 - Audio Sink]
33767	624.314565	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	RFCOMM	13	Sent DISC Channel=7
33828	624.678825	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	L2CAP	17	Rcvd Disconnection Response (SCID: 0x004c, DCID: 0x1507, PSM: 0x0017, Service: A/V Remote Control)
33829	624.680106	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	AVDTP	11	Rcvd ResponseAccept - Close
33830	624.681119	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	L2CAP	17	Sent Disconnection Request (SCID: 0x0048, DCID: 0x1106, PSM: 0x0019, Service: Audio Sink)
33831	624.681774	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	L2CAP	17	Sent Disconnection Request (SCID: 0x0047, DCID: 0x1005, PSM: 0x0019, Service: Audio Sink)
33833	624.691790	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	RFCOMM	13	Rcvd UA Channel=7
33837	624.692835	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	L2CAP	17	Rcvd Disconnection Response (SCID: 0x0048, DCID: 0x1106, PSM: 0x0019, Service: Audio Sink)
33838	624.693155	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	L2CAP	17	Rcvd Disconnection Response (SCID: 0x0047, DCID: 0x1005, PSM: 0x0019, Service: Audio Sink)
33839	624.693315	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	RFCOMM	13	Sent DISC Channel=0
33844	624.698743	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	RFCOMM	13	Rcvd UA Channel=0
33845	624.699674	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	Apple_84:9f:1e (AirPods Pro)	L2CAP	17	Sent Disconnection Request (SCID: 0x0044, DCID: 0x0d04, PSM: 0x0003, Service: RFCOMM)
33846	624.705160	Apple_84:9f:1e (AirPods Pro)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	L2CAP	17	Rcvd Disconnection Response (SCID: 0x0044, DCID: 0x0d04, PSM: 0x0003, Service: RFCOMM)

* 연결 해제 로그 메시지를 확인할 수 있음

⇒ 이러한 아이디어를 바탕으로 리빙랩 실험

⇒ 이후 S21에 누적되는 블루투스 로그 데이터 분석

02 실험 내용

실험 내용

❖ 실험 시작일 : 2024/06/26, 14:20

❖ 전제 : 차량의 시스템 시간이 알 수 없는 이유로 2033/10/24, 18:49로 맞춰져 있는 상태

❖ 시나리오

Scenario 1) S21 -> 시스템 시간 따르게함(24/06/26, 14:25)

차량 -> 시간 조작 (33/10/24, 18:49 -> 24/06/26, 14:25)

==========

Scenario 2) S21 -> 시간 조작(24/06/26, 14:25 -> 20/08/02, 05:00), 현재 -> 과거

차량 -> 시스템 시간(33/10/24, 18:49)

==========

Scenario 3) S21 -> 시간 조작(24/06/26, 14:25 -> 34/08/30, 22:00), 현재 -> 미래

차량 -> 시스템 시간(33/10/24, 18:49)

실험 내용

❖ 각 시나리오에 대한 EVENT 발생

- Scenario 1에 대한 EVENT

- 음악 : 음악 재생, 음악 멈추기, 볼륨 조절, 10초 뒤로 넘기기, 10초 앞으로 넘기기

- 통화 : 통화 걸기, 통화 받기, 통화 안받기 (양 기기에서 모두 진행)

- Scenario 2에 대한 EVENT (시스템 시간을 따르지 않으니 음악을 실행하기 위한 어플 실행 불가)

- 통화 : 통화 걸기, 통화 받기, 통화 안받기 (양 기기에서 모두 진행)

- Scenario 3에 대한 EVENT

- 통화 : 통화 걸기, 통화 받기, 통화 안받기 (양 기기에서 모두 진행)

03 블루투스 로그 데이터 분석

Scenario 1에 대한 로그 데이터 분석

Scenario 1) S21 -> 시스템 시간 따르게함(24/06/26, 14:25)

차량 -> 시간 조작 (33/10/24, 18:49 -> 24/06/26, 14:25)

=> **딱히 특별한 내용 없음**

Scenario 2에 대한 로그 데이터 분석

Scenario 2) S21 -> 시간 조작(24/06/26, 14:25 -> 20/08/02, 05:00), 현재 -> 과거

차량 -> 시스템 시간(33/10/24, 18:49)

*** 첫 번째 이상한점 -> 분명 05:00로 시간을 조작했는데 로그에서는 23:45에 설정되고 있음**

31830	2024-06-26 23:45:32.04/042	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
31831	2024-06-26 23:45:32.048408	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
31832	2024-06-26 23:45:32.124344	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
31833	2024-06-26 23:45:32.126162	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
31834	2020-08-02 23:45:33.882920	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
31835	2020-08-02 23:45:33.883165	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
31836	2020-08-02 23:45:34.041266	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
31837	2020-08-02 23:45:34.041617	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)

Scenario 2에 대한 로그 데이터 분석

- 두 번째 이상한 점 -> 음악 실행이 되지 않았는데 음악 실행을 시도하고 있음

	31858 2020-08-02 23:45:35.054122	LGInnotek_8c:11:84 (Avante)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	AVRCP	27 Rcvd Vendor dependent: Notify - RegisterNotification - Pla
	31859 2020-08-02 23:45:35.054497	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	AVRCP	24 Sent Vendor dependent: Interim - RegisterNotification - Pl
•	31860 2020-08-02 23:45:35.063425	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	RTP	63 PT=MPEG Audio, SSRC=0x2, Seq=347, Time=0, Mark
	31861 2020-08-02 23:45:35.080417	controller	host	HCI_EVT	8 Rcvd Number of Completed Packets
	31862 2020-08-02 23:45:35.083432	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	RTP	63 PT=MPEG Audio, SSRC=0x2, Seq=348, Time=1024, Mark
	31863 2020-08-02 23:45:35.085715	controller	host	HCI_EVT_BROADCOM	11 Rcvd Broadcom Vendor-Specific
•	31864 2020-08-02 23:45:35.103950	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	RTP	63 PT=MPEG Audio, SSRC=0x2, Seq=349, Time=2048, Mark
	31865 2020-08-02 23:45:35.109193	LGInnotek_8c:11:84 (Avante)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	AVRCP	22 Rcvd Vendor dependent: Status - GetPlayStatus
	31866 2020-08-02 23:45:35.109536	controller	host	HCI_EVT	8 Rcvd Number of Completed Packets

- 세 번째 이상한점 -> 음악이 제목 없는 상태로 실행되려함

33021 2020-08-02 14:01:39.676377	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
33022 2020-08-02 14:01:39.958899	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	AVRCP	31 Sent Vendor dependent: Changed - RegisterNotification - TrackChanged - 0x0000000000000000 (SELECTED)
33023 2020-08-02 14:01:40.365478	controller	host	HCI_EVT	8 Rcvd Number of Completed Packets
33024 2020-08-02 14:01:40.684484	LGInnotek_8c:11:84 (Avante)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	AVRCP	27 Rcvd Vendor dependent: Notify - RegisterNotification - TrackChanged
33025 2020-08-02 14:01:40.687146	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	AVRCP	31 Sent Vendor dependent: Interim - RegisterNotification - TrackChanged - 0x0000000000000000 (SELECTED)
33026 2020-08-02 14:01:40.734454	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
33027 2020-08-02 14:01:40.734947	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
33028 2020-08-02 14:01:41.365678	controller	host	HCI_EVT	8 Rcvd Number of Completed Packets
33029 2020-08-02 14:01:41.598059	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
33030 2020-08-02 14:01:41.599316	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
33031 2020-08-02 14:01:41.681823	LGInnotek_8c:11:84 (Avante)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	AVRCP	55 Rcvd Vendor dependent: Status - GetElementAttributes - 0x0000000000000000 (PLAYING)
33032 2020-08-02 14:01:41.684936	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	AVRCP	64 Sent Vendor dependent: Stable - GetElementAttributes - Title: ""
33033 2020-08-02 14:01:42.366101	controller	host	HCI_EVT	8 Rcvd Number of Completed Packets

Scenario 3에 대한 로그 데이터 분석

Scenario 3) S21 -> 시간 조작(24/06/26, 14:25 -> 34/08/30, 22:00), 현재 -> 미래

차량 -> 시스템 시간(33/10/24, 18:49)

* **첫 번째 이상한 점 -> 시간을 22:00으로 설정했는데 23:55로 설정되고 갑자기 07:00 으로 건너뛰어짐**

35315	2034-08-30 23:55:58.995295	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
35316	2034-08-30 23:55:58.996342	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
35317	2034-08-31 07:00:00.240588	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)
35318	2034-08-31 07:00:00.240817	controller	host	HCI_EVT	60 Rcvd LE Meta (LE Extended Advertising Report)
35319	2034-08-31 07:00:01.017532	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)

Scenario 3에 대한 로그 데이터 분석

* 두 번째 이상한 점 -> 음악 재생을 분명하지 않았는데, “Jimmy Brown”이라는 제목으로 실행되려함

35695 2034-08-31 07:00:25.843171	LGInnotek_8c:11:84 (Avante)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	L2CAP	13 Rcvd [S] Receiver Ready
35696 2034-08-31 07:00:25.844251	LGInnotek_8c:11:84 (Avante)	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	AVRCP	55 Rcvd Vendor dependent: Status - GetElementAttributes - 0x0000000000000000 (PLAYING)
35697 2034-08-31 07:00:25.896582	SamsungElect_85:e7:b7 (SOS◆◆◆ S21)	LGInnotek_8c:11:84 (Avante)	AVRCP	112 Sent Vendor dependent: Stable - GetElementAttributes - Title: "◆◆◆◆◆◆◆◆◆"
35698 2034-08-31 07:00:26.108464	controller	host	HCI_EVT	8 Rcvd Number of Completed Packets
35699 2034-08-31 07:00:26.163610	controller	host	HCI_EVT	29 Rcvd LE Meta (LE Extended Advertising Report)

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0000  02 0b 00 6b 00 67 00 4a  00 02 11 0e 0c 48 00 00   ···k·g·J ·····H··
0010  19 58 20 00 00 5a 06 00  00 00 01 00 6a 00 09 ec   ·X ··Z·· ····j···
0020  95 88 ec 95 84 ec a4 98  00 00 00 02 00 6a 00 0b   ········ ·····j··
0030  4a 69 6d 6d 79 20 42 72  6f 77 6e 00 00 00 03 00   Jimmy Br own·····
0040  6a 00 09 ec 95 88 ec 95  84 ec a4 98 00 00 00 06   j·······  ········
0050  00 6a 00 00 00 00 00 07  00 6a 00 05 36 30 30 30   ·j······ ·j··6000
0060  33 00 00 00 08 00 6a 00  07 30 30 30 30 30 30 32   3·····j·  ·0000002
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04 향후 연구 계획 및 방학 공부 계획

향후 연구 계획

1) 위에서 발견한 로그들에 대한 원인 파악

2) 차량 로그와 비교/대조를 통한 실험 내용 구체화

방학 공부 계획

1. **시스템 해킹 공부** – 시스템 해킹과 보안 by 한빛아카데미

2. **리버싱 공부** – 리버싱 핵심 원리 by 인사이트

3. **코딩테스트 준비(C++)** – 매주 일요일마다 2시간 정도 스터디

+ **운영체제**에 대한 공부

감사합니다