



Development of OTA service based on Adaptive AUTOSAR

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Attention

Before creating a PowerPoint presentation, please have a look into the AUTOSAR Guideline to ensure a consistent look & feel through all AUTOSAR presentations

https://svn.autosar.org/repos/work/02_ProjectOrganization/06_Templates/AUTOSAR_TMPL_Presentation_Guideline.pptx

Agenda

- > Adaptive AUTOSAR(AP) development process
- > OTA service development
- > Summary
- > Q&A

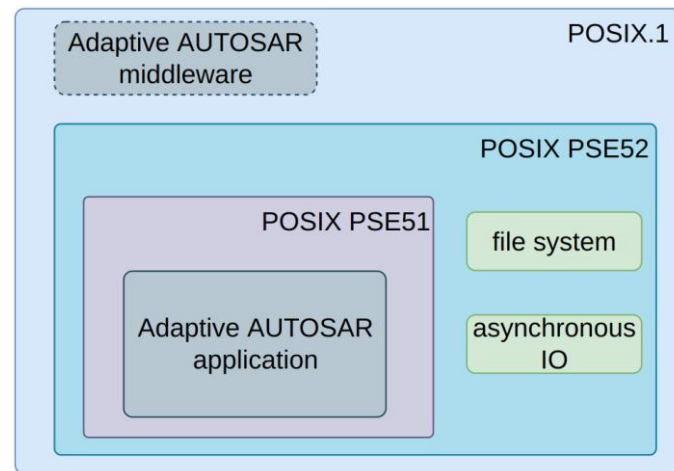
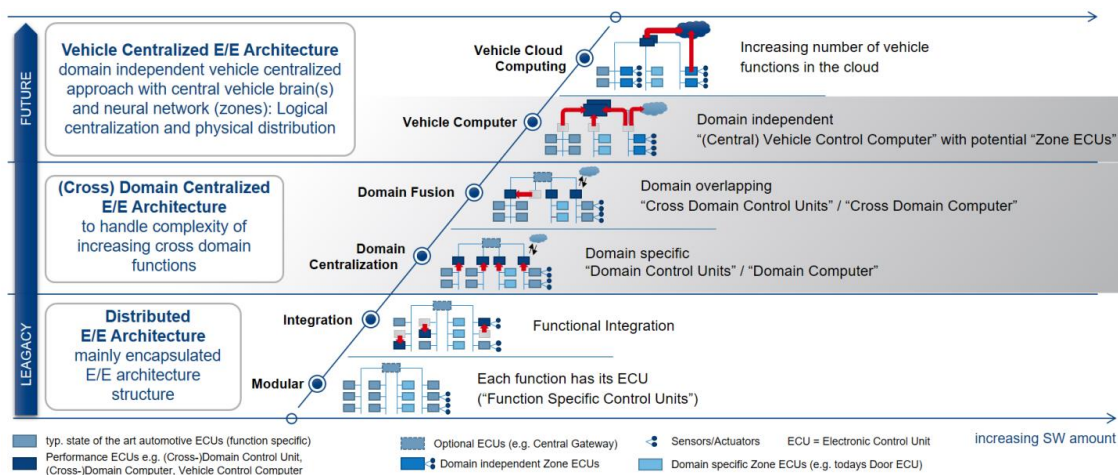
Agenda

- > Adaptive AUTOSAR (AP) development process
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1. Adaptive AUTOSAR development process

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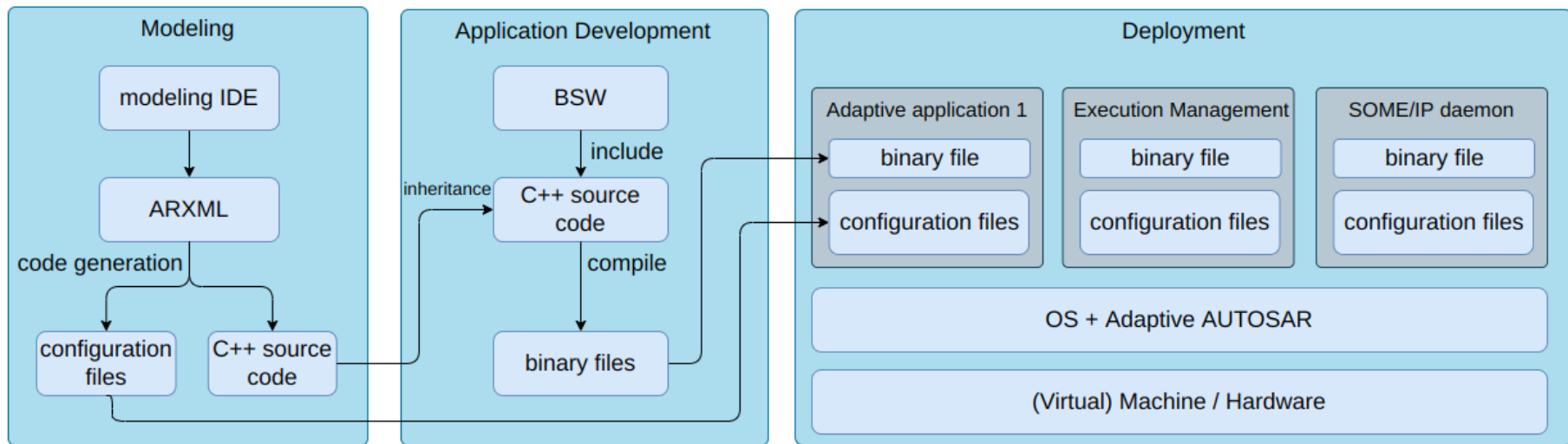
New requirements lead to new architecture— —Adaptive AUTOSAR



1. Adaptive AUTOSAR development process

AP development process

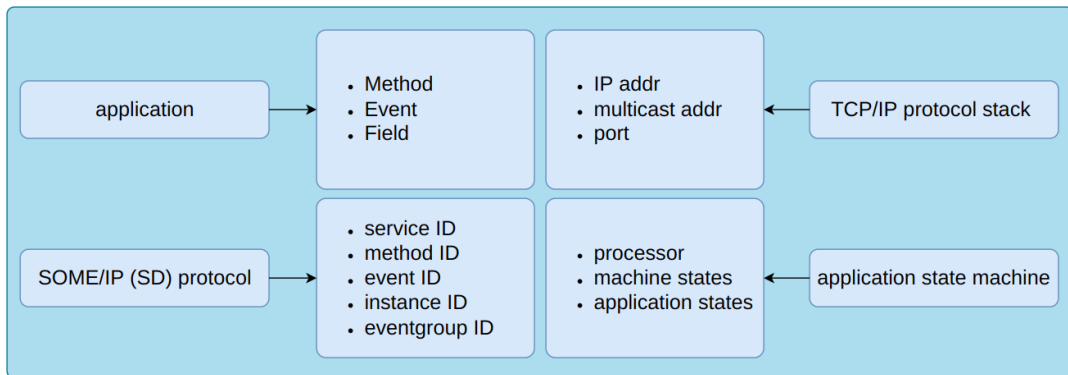
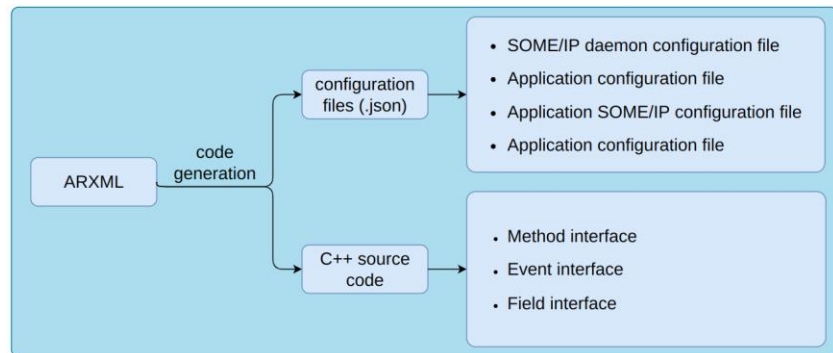
- Modeling -> Coding -> Deployment



1. Adaptive AUTOSAR development process

AP development process

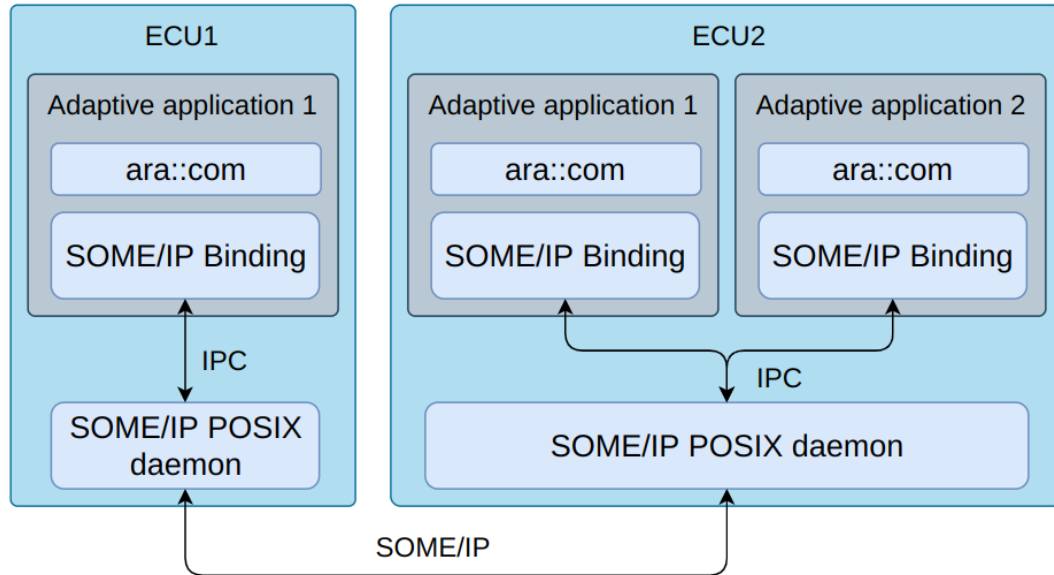
- Modeling
 - How to modeling
 - What generated



1. Adaptive AUTOSAR development process

AP development process

- ARA communication architecture



Agenda

> Adaptive AUTOSAR (AP) development process

> OTA service development

> Summary

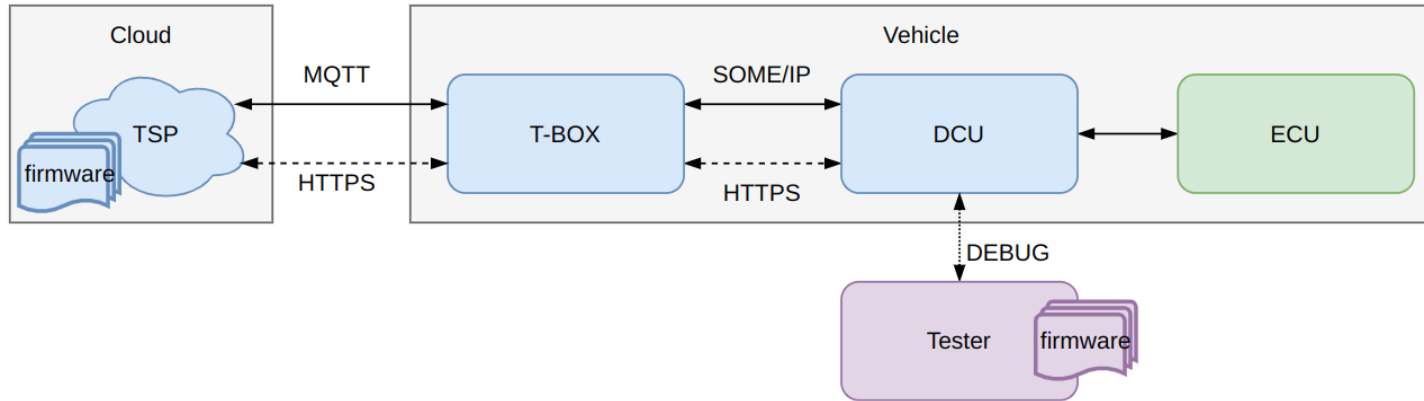
> Q&A

2. OTA service development

2. OTA service development

Architecture

- Development of vehicle OTA service based on AP
- Vehicle-Cloud communication based on MQTT^[1] and HTTPS
 - Level 3 (Arial, 14)

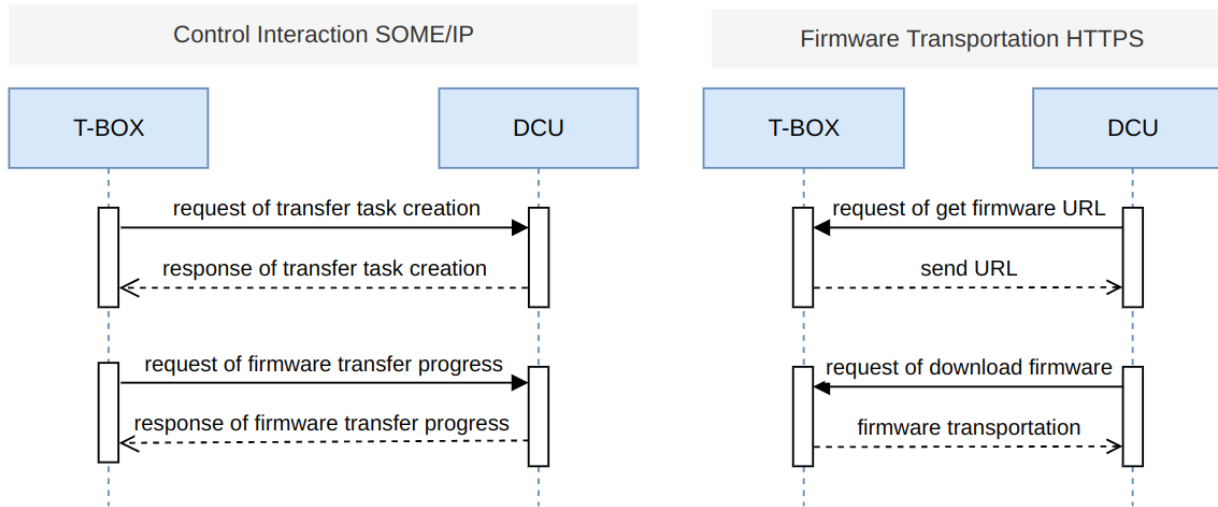


[1] MQTT(Message Queuing Telemetry Transport)

2. OTA service development

Development of vehicle OTA service based on AP

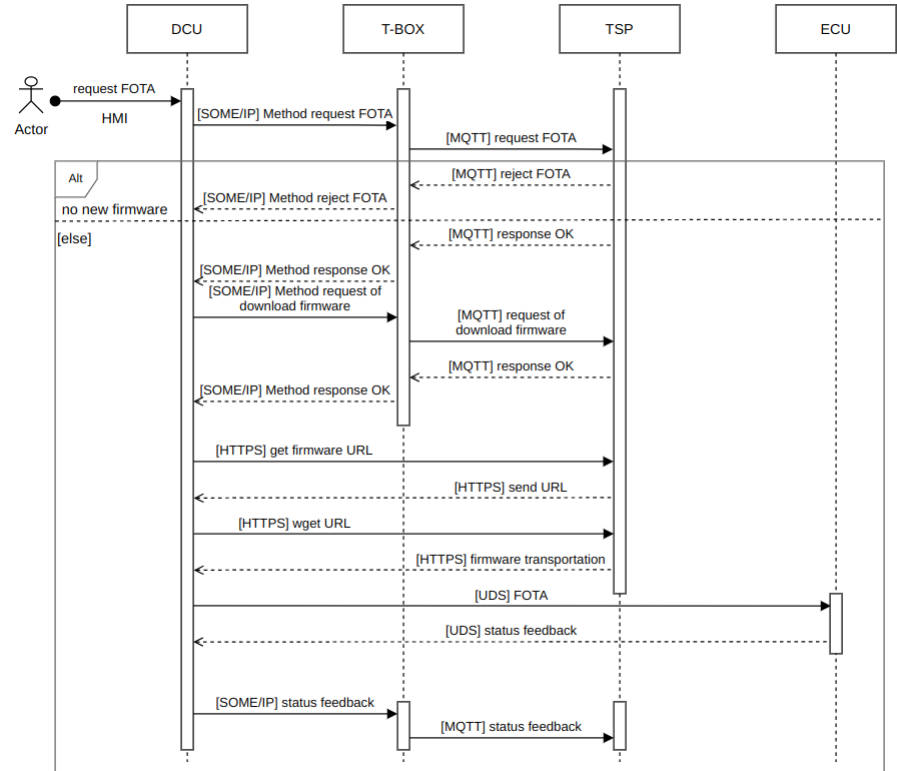
- Control interaction -> SOME/IP protocol
- Firmware transportation -> HTTPS protocol



2. OTA service development

Vehicle OTA service development

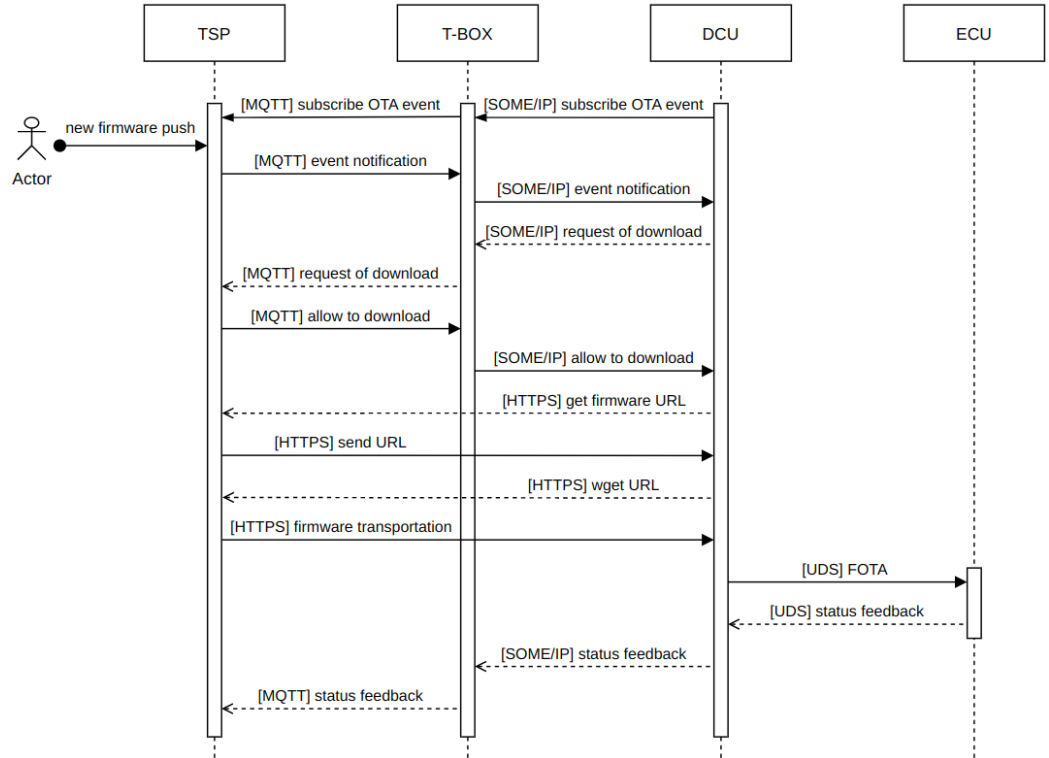
- Request OTA on vehicle
- Request / Response



2. OTA service development

Vehicle OTA service development

- New firmware push on cloud
 - subscribe / publish
 - event driven



2. OTA service development

Vehicle OTA service development

- Modeling
 - Request / Response
 - SOME/IP Method
 - subscribe / publish
 - SOME/IP Event
 - SOME/IP Field

```
ARPackage ServiceInterface {
  descZH : "OTA服务接口"
  ServiceInterface OTApp_ServiceInterface {
    namespace : "OTApp::cm::service"
    methods [
      Method OTAppMethodRequestUpdate {
        arguments [
          OutArgument /AUTOSAR/StdTypes/bool OutputIsNeedUpdate {}
        ]
      }
      Method OTAppMethodRequestDownload {
        arguments [
          OutArgument /AUTOSAR/StdTypes/bool OutputIsAllowDownload {}
        ]
      }
      Method OTAppMethodUpdateResult {}
        arguments [
          InArgument /AUTOSAR/StdTypes/bool InputIsUpdateSuccess {}
          OutArgument /AUTOSAR/StdTypes/bool OutputIsUpdateSuccess {}
        ]
      }
    ]
  }
  fields [
    Field /AUTOSAR/StdTypes/bool OTAppFieldOTAUpdate {
      hasNotifier : true
    }
  ]
}
```


2. OTA service development

Development of vehicle OTA service based on AP

- HTTPS server: httpd daemon
- HTTPS client: OTApp_cm_client
- OTA Master: ECU FOTA



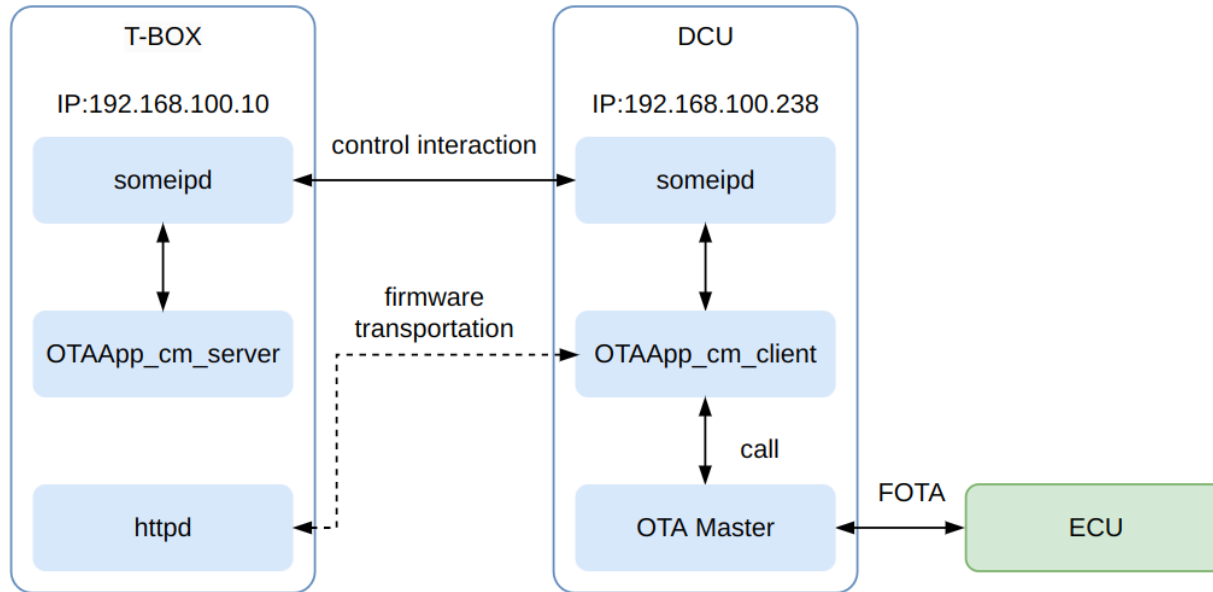
The screenshot shows a web browser window with the address bar displaying "192.168.100.10:8080/downloads/firmwares/". The browser's navigation bar includes back, forward, and refresh icons, along with a "Not secure" warning. Below the address bar, there are several folder icons labeled "CodeSheep", "操作系统", "程序语言", "计算机基础", "软件&工具", and "汽车". The main content area displays the title "Index of /downloads/firmwares/" and a table with three columns: "Name", "Date", and "Size". The table contains one entry with a file icon, a name that is blurred, a date of "2023-01-04 09:35:56", and a size of "1.6M".

Name	Date	Size
 	2023-01-04 09:35:56	1.6M

2. OTA service development

Development of vehicle OTA service based on AP

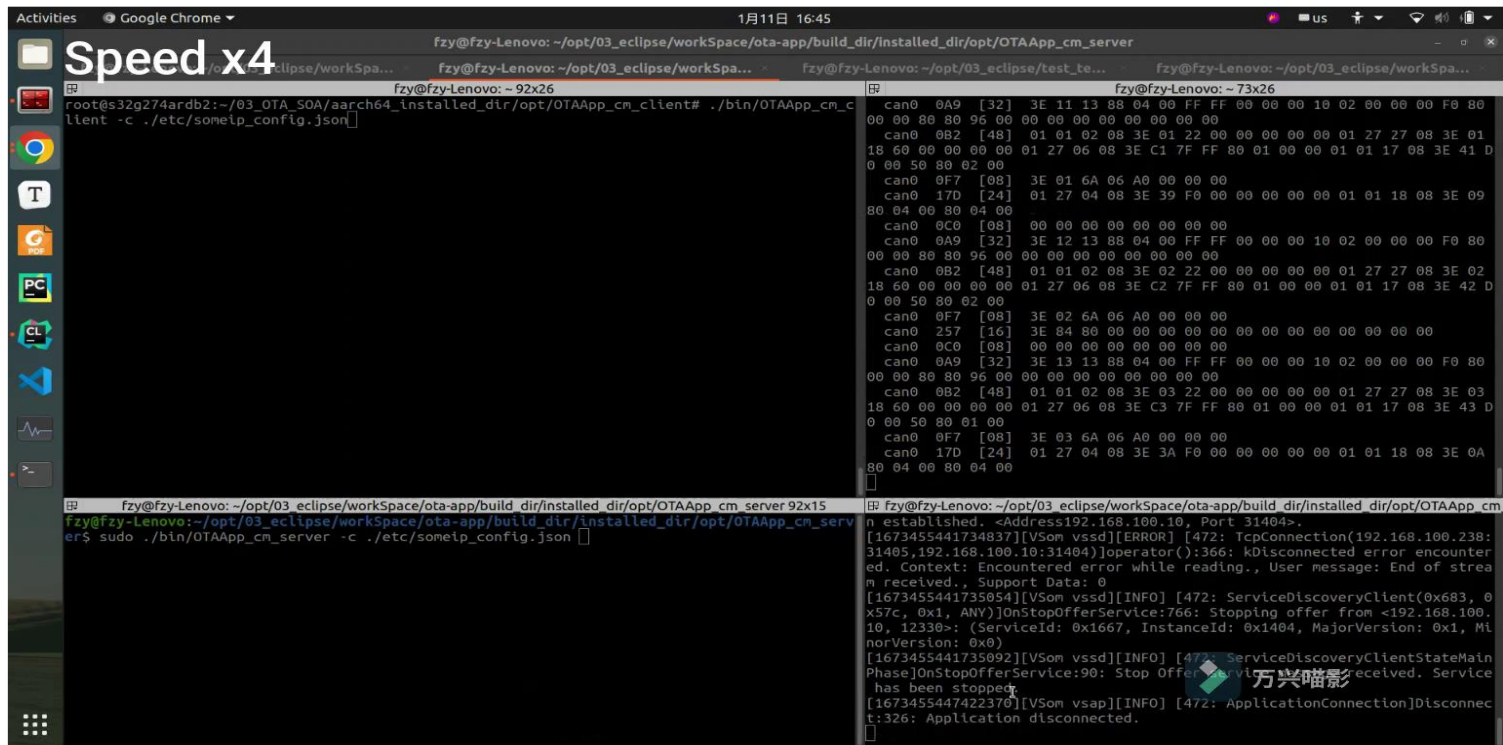
- Deployment



2. OTA service development

DCU backend OTA master	DCU-Client	DCU-candump
<pre>安全验证:成功 读取物流数据:成功 请求下载中,请等待片刻 固件读取成功,格式转换中... 固件读取:成功 请求下载:成功 开始传输数据... 传输数据:1898block [01:55, 9.53block/s] 数据传输:成功 请求退出数据传输:成功 执行刷写后检查... 刷新完整性检查:成功 刷新相关性检查:成功 写入电控单元零件号:成功 写入电控单元刷新流程文件号:成功 ECU复位:成功 OTA固件升级:成功 [1673455669562643][SAC1 CTX1][INFO] DEBUG:进入 OTAAppUploadStatus 函数 [1673455669562718][SAC1 CTX1][INFO] DEBUG:进入 service_client_ [1673455669564160][SAC1 CTX1][INFO] [Service] [Method] update status upload success! [1673455669564196][SAC1 CTX1][INFO] DEBUG: OTAAppActiveRequestUpdateWorkFlow 结束</pre>		<pre>can0 0A9 [32] 3E 12 13 88 04 00 FF F 00 00 85 80 96 00 00 00 00 00 00 00 00 can0 0B2 [48] 01 01 02 08 3E 02 22 0 18 60 00 00 00 00 01 27 06 08 3E C2 7F FF 80 31 00 00 01 01 17 08 3E 42 D 4 85 50 80 3A 00 can0 0F7 [08] 3E 02 6A 06 A0 00 00 00 can0 17D [24] 01 27 04 08 3E 32 F0 00 00 00 00 00 01 01 18 08 3E 02 80 04 00 80 04 00 can0 257 [16] 3E 87 80 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 can0 374 [08] 3E 84 01 00 00 00 00 00 can0 394 [08] 15 00 00 00 00 00 00 00 can0 3B8 [08] 04 00 0C 00 00 14 00 00 can0 3BD [08] 00 60 00 00 00 37 01 80 can0 3CB [08] 3E ED FF 00 00 48 FF 00 can0 3D7 [08] 00 03 00 00 00 00 00 00 can0 0C0 [08] 00 00 07 25 00 00 00 00 can0 0A9 [32] 3E 13 13 88 04 00 FF FF 00 00 00 10 02 00 00 00 50 80 00 00 85 80 96 00 00 00 00 00 00 00 00 can0 0B2 [48] 01 01 02 08 3E 03 22 00 00 00 00 01 27 27 08 3E 03 18 60 00 00 00 01 27 06 08 3E C3 7F FF 80 39 00 00 01 01 17 08 3E 43 D 0 00 50 80 41 00 can0 0F7 [08] 3E 03 6A 06 A0 00 00 00 can0 0C0 [08] 00 00 01 8D 00 00 00 00 can0 0A9 [32] 3E 14 13 88 04 00 FF FF 00 00 00 10 02 00 00 00 50 80 00 00 85 80 96 00 00 00 00 00 00 00 00</pre>
T-BOX backend someipd + httpd	T-BOX-Server	DCU-someipd
<pre>fzy@fzy-Lenovo: ~/opt/03 eclipse/workSpace/ota-app/build_dir/installed_dir/opt/OTAApp cm server 92x15 ... state from pid: 50514. Error ... error: [1673426736966588][SAS1 CTX1][ERROR] OTAAppCnServer could not report the Application state k Running. [1673426736966614][SAS1 CTX1][INFO] OTAAppCnServer is running... [1673426736966695][SAS1 CSS1][INFO] [Service] Offer OTAAppCnServerService. [1673426738726611][SAS1 CSS1][INFO] DEBUG: 进入 OTAAppMethodRequestUpdate 函数, 响应更新请 求! [1673426738727711][SAS1 CSS1][INFO] DEBUG: 进入 OTAAppMethodRequestDownload 函数, 响应下载 请求! [1673426982930531][SAS1 CSS1][INFO] DEBUG: 进入 OTAAppMethodRequestDownload 函数, 响应状态 上传请求!</pre>	<pre>fzy@fzy-Lenovo: ~/opt/03 eclipse/workSpace/ota-app/build_dir/installed_dir/opt/OTAApp cm server 92x15 ... state from pid: 50514. Error ... error: [1673455441735092][VSom vssd][INFO] [472: Phase]OnStopOfferService:90: Stop Offer s has been stopped. [1673455447422370][VSom vsap][INFO] [472: ApplicationConnection]OnConnect t:326: Application disconnected. [1673455503707224][VSom vssd][INFO] [472: ServiceDiscoveryClient(0x683, 0 x57c, 0x1, ANV)]OnOfferService:705: Accepted offer from <192.168.100.10, 123330>: (ServiceId: 0x1667, InstanceId: 0x1404, MajorVersion: 0x1, MinorV ersion: 0x0) [1673455505361434][VSom vsap][INFO] [472: ApplicationManager]OnAccept:338 : New application has been connected. [1673455505362223][VSom vssd][INFO] [472: TcpConnection(192.168.100.238:3 1405,192.168.100.10:31404)]HandleWrite:397: Active TCP connection has bee n established. <Address192.168.100.10, Port 31404>.</pre>	

2. OTA service development



The screenshot shows a Linux terminal window with a dark theme. The title bar indicates the date and time as '1月11日 16:45'. The terminal is divided into several panes. The top pane shows a terminal window titled 'Speed x4' with the command 'root@32g274ardb2:~/03_OTA_SOA/aarch64_installed_dir/opt/OTAApp_cn_client# ./bin/OTAApp_cn_client -c ./etc/someip_config.json'. The middle pane shows a terminal window titled 'fzy@fzy-Lenovo: ~-92x26' displaying network traffic data in hexadecimal and ASCII format, including source and destination MAC addresses and IP addresses. The bottom pane shows a terminal window titled 'fzy@fzy-Lenovo: ~-73x26' displaying logs for the 'OTAApp_cn_server' service, including error messages and information about service discovery and connection management. A watermark '万兴喵影' is visible in the bottom right corner of the terminal output.

```
fzy@fzy-Lenovo: ~-92x26
can0 0A9 [32] 3E 11 13 88 04 00 FF FF 00 00 00 10 02 00 00 00 F0 80
00 00 80 80 96 00 00 00 00 00 00 00 00 00 00 00
can0 0B2 [48] 01 01 02 08 3E 01 22 00 00 00 00 00 01 27 27 08 3E 01
18 60 00 00 00 00 01 27 06 08 3E C1 7F FF 80 01 00 00 01 01 17 08 3E 41 D
0 00 50 80 02 00
can0 0F7 [08] 3E 01 6A 06 A0 00 00 00
can0 17D [24] 01 27 04 08 3E 39 F0 00 00 00 00 00 01 01 18 08 3E 09
80 04 00 80 04 00
can0 0C0 [08] 00 00 00 00 00 00 00 00
can0 0A9 [32] 3E 12 13 88 04 00 FF FF 00 00 00 10 02 00 00 00 F0 80
00 00 80 80 96 00 00 00 00 00 00 00 00
can0 0B2 [48] 01 01 02 08 3E 02 22 00 00 00 00 00 01 27 27 08 3E 02
18 60 00 00 00 00 01 27 06 08 3E C2 7F FF 80 01 00 00 01 01 17 08 3E 42 D
0 00 50 80 02 00
can0 0F7 [08] 3E 02 6A 06 A0 00 00 00
can0 257 [16] 3E 84 80 00 00 00 00 00 00 00 00 00 00 00 00 00
can0 0C0 [08] 00 00 00 00 00 00 00 00
can0 0A9 [32] 3E 13 13 88 04 00 FF FF 00 00 00 10 02 00 00 00 F0 80
00 00 80 80 96 00 00 00 00 00 00 00 00
can0 0B2 [48] 01 01 02 08 3E 03 22 00 00 00 00 00 01 27 27 08 3E 03
18 60 00 00 00 00 01 27 06 08 3E C3 7F FF 80 01 00 00 01 01 17 08 3E 43 D
0 00 50 80 01 00
can0 0F7 [08] 3E 03 6A 06 A0 00 00 00
can0 17D [24] 01 27 04 08 3E 3A F0 00 00 00 00 00 01 01 18 08 3E 0A
80 04 00 80 04 00
fzy@fzy-Lenovo: ~-73x26
fzy@fzy-Lenovo: ~-opt/03_eclipse/workSpace/ota-app/build_dir/installed_dir/opt/OTAApp_cn_server
fzy@fzy-Lenovo: ~-opt/03_eclipse/workSpace/ota-app/build_dir/installed_dir/opt/OTAApp_cn_server
er$ sudo ./bin/OTAApp_cn_server -c ./etc/someip_config.json
[1673455441734837][V$on vssd][ERROR] [472: TcpConnection(192.168.100.238:
31405,192.168.100.10:31404)]operator():366: kdIsconnected error encounter
ed. Context: Encountered error while reading., User message: End of strea
m received., Support Data: 0
[1673455441735054][V$on vssd][INFO] [472: ServiceDiscoveryClient(0x683, 0
x57c, 0x1, ANY)]OnStopOfferService:766: Stopping offer from <192.168.100.
10, 12330>; (ServiceId: 0x1667, InstanceId: 0x1404, MajorVersion: 0x1, Mi
norVersion: 0x0)
[1673455441735092][V$on vssd][INFO] [472: ServiceDiscoveryClientStateMain
Phase]OnStopOfferService:90: Stop Offer Service received. Service
has been stopped.
[1673455447422370][V$on vsap][INFO] [472: ApplicationConnection]Disconnec
t:326: Application disconnected.
```

Agenda

> Adaptive AUTOSAR (AP) development process

> OTA service development

> Summary

> Q&A

3. Summary

3. Summary

- Briefly describe the AP application development process
- Taking OTA service development as a case, briefly describe how to develop AP applications

Agenda

> Adaptive AUTOSAR (AP) development process

> OTA service development

> Summary

> Q&A

4. Q&A

Info



Action

Headline

Level 1 (Arial, 16)

- Level 2 (Arial, 14)
 - Level 3 (Arial, 14)

Please do NOT use font sizes smaller than 14 points for continuous text!

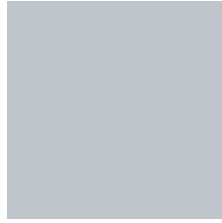
Color palette



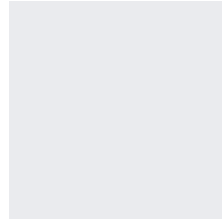
R: 46
G: 63
B: 85



R: 150
G: 159
B: 170



R: 192
G: 197
B: 204



R: 234
G: 235
B: 238



R: 236
G: 28
B: 35



R: 252
G: 71
B: 14



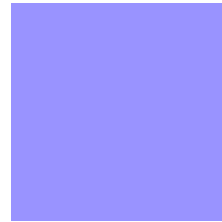
R: 250
G: 146
B: 0



R: 135
G: 136
B: 137



R: 135
G: 174
B: 218



R: 153
G: 147
B: 255



R: 32
G: 207
B: 153



R: 252
G: 119
B: 128