

# AUTOSAR AP 예제

## - PER 01 -

Junho Kwak

Architecture and Compiler for Embedded System LAB.

School of Electronics Engineering, KNU, KOREA

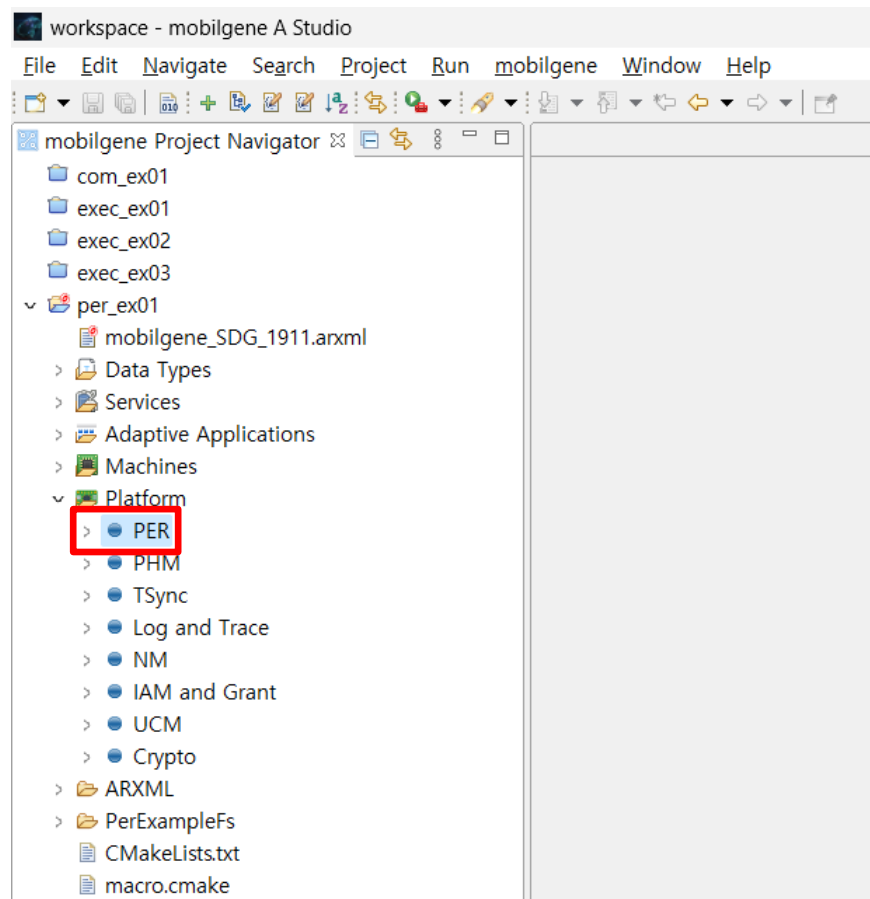
2024-07-07



# PER: Platform (PER) 설정

## ■ PER Editor 활성화

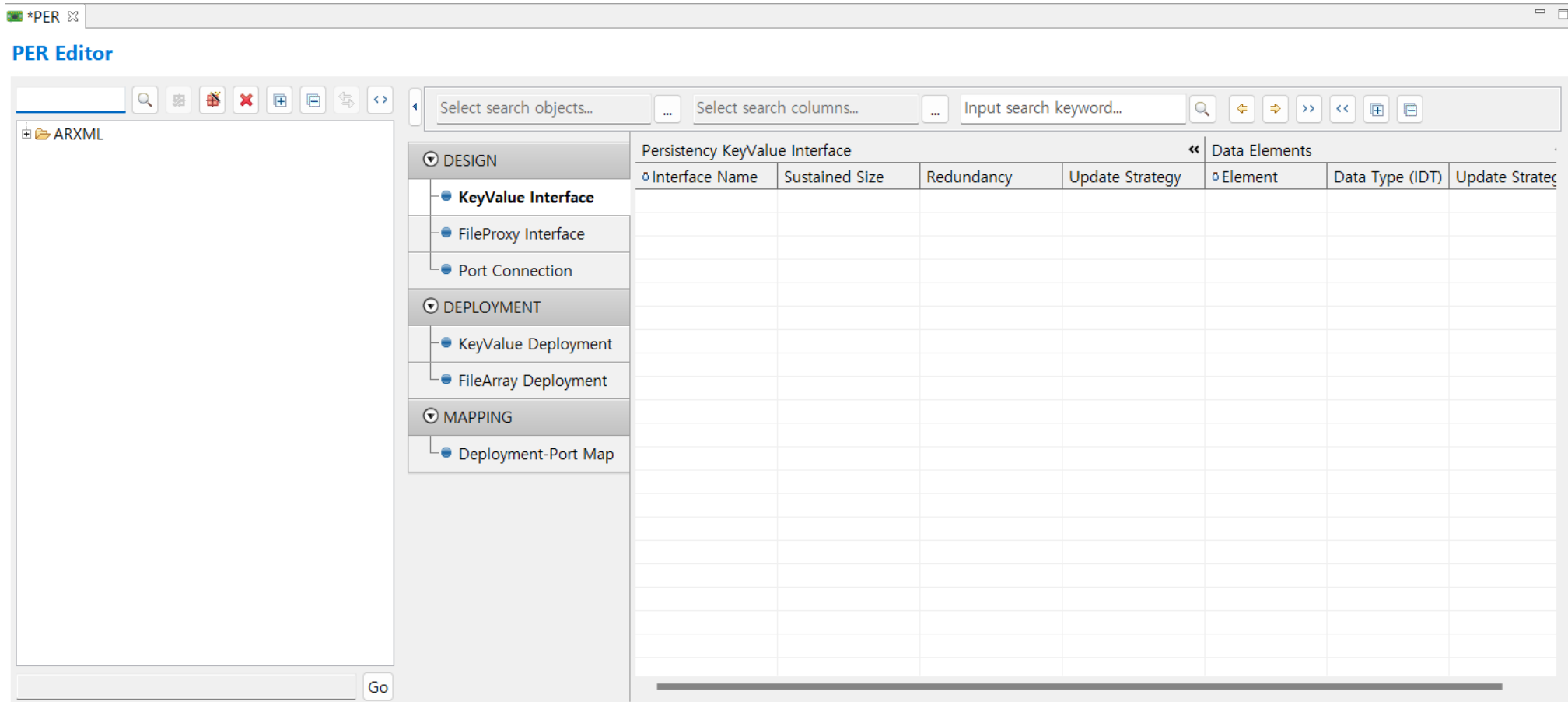
- ✓ 왼쪽의 'mobilgene Project Navigator' 창에서 해당 Project의 'Platform' - 'PER'를 더블 클릭함



# PER: Platform (PER) 설정

- **PER Editor 활성화 확인**

- ✓ 활성화 된 PER Editor를 확인함

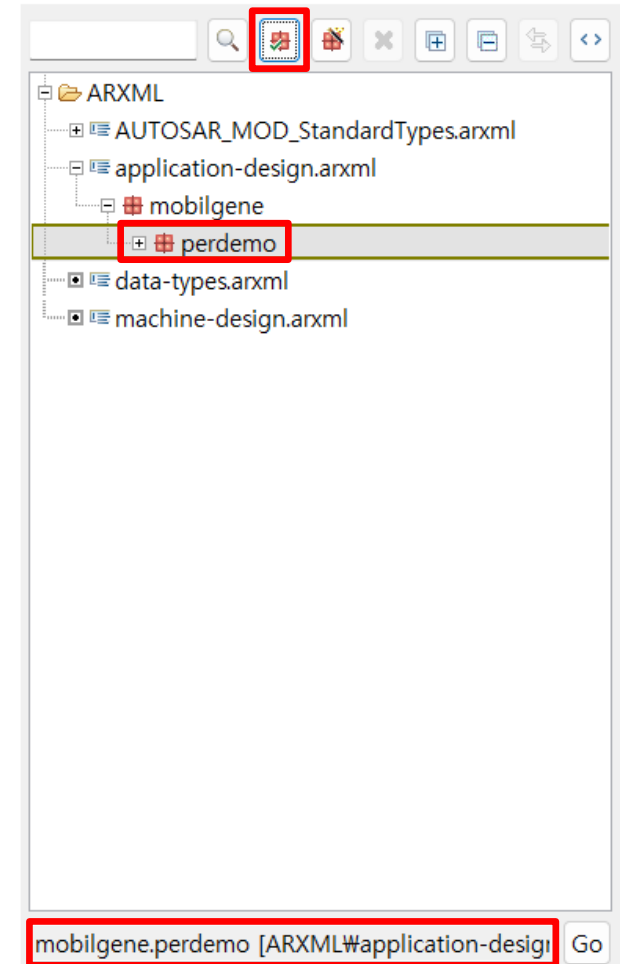


# PER: Platform (PER) 설정

## ▪ Default Package 설정

- ✓ 설정이 저장될 Default Package를 설정함
  - ✓ Default Package로 설정할 'perdemo' Package를 선택함
  - ✓ 우측 상단의 'Set Default Package' 버튼을 클릭함
  - ✓ 하단에 설정된 Default Package를 확인함

PER Editor



# PER: Platform (PER) 설정

- **File Proxy Interface 추가**

- ✓ File Proxy Interface 추가를 위해 좌측의 'FileProxy Interface' 탭으로 이동함
- ✓ 빈 곳에서 우클릭을 하여 'Create FileProxy Interface'를 클릭함

## PER Editor

Select search objects...

Select search columns...

Input search keyword...

DESIGN

KeyValue Interface

**FileProxy Interface**

Port Connection

DEPLOYMENT

KeyValue Deployment

FileArray Deployment

MAPPING

Deployment-Port Map

Persistency FileProxy Interface

Interface Name

Category

Encoding

Sustained Size

Redundancy

Update Strategy

Max. # Files

File Proxy

File Name

Create FileProxy Interface

Delete FileProxy Interface

Add New FileProxy

Delete FileProxy

# PER: Platform (PER) 설정

## ■ File Proxy Interface 추가 확인 및 설정

- ✓ 생성된 새로운 File Proxy Interface를 확인하고 다음과 같이 수정함
  - ✓ Sustained Size : '400'
  - ✓ Redundancy : 'REDUNDANT'
  - ✓ Max. # Files : '3'

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing 'DESIGN' (with sub-items 'KeyValue Interface', 'FileProxy Interface', and 'Port Connection'), 'DEPLOYMENT' (with 'KeyValue Deployment' and 'FileArray Deployment'), and 'MAPPING' (with 'Deployment-Port Map'). The main area is titled 'Persistence FileProxy Interface' and contains a table. The table has columns: 'Interface Name', 'Category', 'Encoding', 'Sustained Size', 'Redundancy', 'Update Strategy', 'Max. # Files', 'File Proxy', and 'File Name'. The first row, 'FileProxyInterface\_1', is highlighted with a red border and contains the values: 'TEXT\_FILE', 'UTF-8', '400', 'REDUNDANT', 'DELETE', and '3'. Above the table is a search bar with fields for 'Select search objects...', 'Select search columns...', and 'Input search keyword...'. On the right side of the table, there is a tab labeled 'Interface: File Proxies'.

Interface Name	Category	Encoding	Sustained Size	Redundancy	Update Strategy	Max. # Files	File Proxy	File Name
FileProxyInterface_1	TEXT_FILE	UTF-8	400	REDUNDANT	DELETE	3		

# PER: Platform (PER) 설정

## ■ File Proxy 추가

- ✓ File Proxy Interface에서 우클릭을 하여 'Add New FileProxy'을 클릭함

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing 'DESIGN', 'DEPLOYMENT', and 'MAPPING' sections. The 'DESIGN' section is expanded, showing 'KeyValue Interface', 'FileProxy Interface', and 'Port Connection'. The 'FileProxy Interface' is selected. The main area displays a table titled 'Persistence FileProxy Interface'. The table has columns: 'Interface Name', 'Category', 'Encoding', 'Sustained Size', 'Redundancy', 'Update Strategy', 'Max. # Files', 'File Proxy', and 'File Name'. A context menu is open over the 'FileProxyInterface' row, with options: 'Create FileProxy Interface', 'Delete FileProxy Interface', 'Add New FileProxy', and 'Delete FileProxy'. The 'Add New FileProxy' option is highlighted with a red rectangle. The table data shows one entry with 'Sustained Size' of 400, 'Redundancy' of REDUNDANT, and 'Update Strategy' of DELETE.

Interface Name	Category	Encoding	Sustained Size	Redundancy	Update Strategy	Max. # Files	File Proxy	File Name
FileProxyInterface			400	REDUNDANT	DELETE	3		

# PER: Platform (PER) 설정

## ■ File Proxy 추가 확인

- ✓ 생성된 새로운 File Proxy를 확인함

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing the following items:

- DESIGN
  - KeyValue Interface
  - FileProxy Interface**
  - Port Connection
- DEPLOYMENT
  - KeyValue Deployment
  - FileArray Deployment
- MAPPING
  - Deployment-Port Map

The main area displays a table titled "Persistence FileProxy Interface". The table has the following columns: Interface Name, Category, Encoding, Sustained Size, Redundancy, Update Strategy, Max. # Files, File Proxy, File Name, Content Uri, and Update Strategy. The first row of data is:

Interface Name	Category	Encoding	Sustained Size	Redundancy	Update Strategy	Max. # Files	File Proxy	File Name	Content Uri	Update Strategy
FileProxyInterface_1	TEXT_FILE	UTF-8	400	REDUNDANT	DELETE	3	<b>FileProxy_1</b>			DELETE

The "FileProxy\_1" entry in the "File Proxy" column is highlighted with a red box. Above the table, there is a search bar with the text "Select search objects...", "Select search columns...", and "Input search keyword...".



# PER: Platform (PER) 설정

## ■ File Proxy 설정

- ✓ 생성된 File Proxy를 다음과 같이 수정함
  - ✓ File Name : 'ReadOnlyFile1.txt'
  - ✓ Content Uri : 'files/MobilgeneMofNFP/ReadOnlyFile1.txt'

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing 'DESIGN' (with sub-items 'KeyValue Interface', 'FileProxy Interface', and 'Port Connection'), 'DEPLOYMENT' (with 'KeyValue Deployment' and 'FileArray Deployment'), and 'MAPPING' (with 'Deployment-Port Map'). The main area displays a table titled 'Interface:: File Proxies'. The table has columns: Encoding, Sustained Size, Redundancy, Update Strategy, Max. # Files, File Proxy, File Name, Content Uri, and Update Strategy. A single row is visible for 'FileProxy\_1', with 'ReadOnlyFile1.txt' in the File Name column and 'files/MobilgeneMofNFP/ReadOnlyFile1.txt' in the Content Uri column. These two cells are highlighted with a red rectangle. The table also shows values for Encoding (UTF-8), Sustained Size (400), Redundancy (REDUNDANT), Update Strategy (DELETE), and Max. # Files (3).

Encoding	Sustained Size	Redundancy	Update Strategy	Max. # Files	File Proxy	File Name	Content Uri	Update Strategy
UTF-8	400	REDUNDANT	DELETE	3	FileProxy_1	ReadOnlyFile1.txt	files/MobilgeneMofNFP/ReadOnlyFile1.txt	DELETE

# PER: Platform (PER) 설정

## ■ File Proxy 추가 설정

- ✓ 동일한 과정을 통해 2개의 File Proxy를 추가하고, 다음과 같이 수정함

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing 'DESIGN' (with sub-items: KeyValue Interface, FileProxy Interface, Port Connection), 'DEPLOYMENT' (with sub-items: KeyValue Deployment, FileArray Deployment), and 'MAPPING' (with sub-item: Deployment-Port Map). The 'FileProxy Interface' is selected. The main area displays a table titled 'Interface: File Proxies'. The table has columns: Encoding, Sustained Size, Redundancy, Update Strategy, Max. # Files, File Proxy, File Name, Content Uri, and Update Strategy. The first row shows 'FileProxy\_1' with 'ReadOnlyFile1.txt' and 'files/MobilgeneMofNFP/ReadOnlyFile1.txt'. The next two rows, 'FileProxy\_2' and 'FileProxy\_3', are highlighted with a red box. 'FileProxy\_2' has 'WriteOnlyFile1.txt' and 'files/MobilgeneMofNFP/WriteOnlyFile1.txt'. 'FileProxy\_3' has 'ReadWriteFile1.txt' and 'files/MobilgeneMofNFP/ReadWriteFile1.txt'. All three rows have 'DELETE' as the update strategy.

Encoding	Sustained Size	Redundancy	Update Strategy	Max. # Files	File Proxy	File Name	Content Uri	Update Strategy
UTF-8	400	REDUNDANT	DELETE	3	FileProxy_1	ReadOnlyFile1.txt	files/MobilgeneMofNFP/ReadOnlyFile1.txt	DELETE
					FileProxy_2	WriteOnlyFile1.txt	files/MobilgeneMofNFP/WriteOnlyFile1.txt	DELETE
					FileProxy_3	ReadWriteFile1.txt	files/MobilgeneMofNFP/ReadWriteFile1.txt	DELETE

# PER: Platform (PER) 설정

## ■ Port Prototype 추가

- ✓ Port Prototype 추가를 위해 좌측의 'Port Connection' 탭으로 이동함
- ✓ File Proxy Interface에서 우클릭을 하여 'Add New Provided & Required PortPrototype'을 클릭함

### PER Editor

The screenshot shows the PER Editor interface. On the left sidebar, the 'DESIGN' tab is active, and 'Port Connection' is selected. The main design area shows a tree view with 'FileProxyInterface\_1' selected. A context menu is open over this component, displaying options: 'Add New Provided PortPrototype', 'Add New Required PortPrototype', 'Add New Provided & Required PortPrototype' (highlighted with a red box), 'Delete PortPrototype', 'Get All Data Elements from the Persistence Interface', and 'Delete Data Element'. The top of the editor has search bars and navigation icons. The main table area is empty.

Sw Component	Port	Role	Element	Data Type	Init Value
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## PER: Platform (PER) 설정

- **Port Prototype 추가 확인 및 설정**

- ✓ 생성된 새로운 Port Prototype을 확인하고 다음과 같이 수정함
  - ✓ Sw Component : 'SwComponent\_PerExampleFs'
  - ✓ Port : 'MobilgeneMofNFP'

**PER Editor**

Select search objects... Select search columns... Input search keyword...

	PortProtoType	Port	Role	PortPrototype:: ComSpec
	Sw Component			Element Data Type Init Value
Persistence Interface				
FileProxyInterface_1	SwComponent_PerExampleFs	MobilgeneMofNFP	RDWR	

- DESIGN
  - KeyValue Interface
  - FileProxy Interface
  - Port Connection**
- DEPLOYMENT
  - KeyValue Deployment
  - FileArray Deployment
- MAPPING
  - Deployment-Port Map

# PER: Platform (PER) 설정

## ■ File Array 추가

- ✓ File Array 추가를 위해 좌측의 'FileArray Deployment' 탭으로 이동함
- ✓ 빈 곳에서 우클릭을 하여 'Create File Array'를 클릭함

### PER Editor

The screenshot shows the PER Editor interface. On the left sidebar, the 'DEPLOYMENT' section is expanded, and 'FileArray Deployment' is selected. The main area displays a table titled 'File Array' with columns: File Array Name, Related Port [Interface], On Process, URI, Update Strategy, Max. Size, Min. Size, Use Data Encryption, and Crypto A. A right-click context menu is open over the table, showing options: 'Create File Array' (highlighted with a red box), 'Delete File Array', 'Add New CRC Redundancy Handling', 'Add New M-out-of-N Redundancy Handling', 'Delete Redundancy Handling', 'Generate Files from File-Proxy Interface', 'Add New File', and 'Delete File'.

# PER: Platform (PER) 설정

## ■ File Array 추가 확인 및 설정

- ✓ 생성된 새로운 File Array를 확인하고 다음과 같이 수정함

### PER Editor

Select search objects... Select search columns... Input search keyword...									
File Array									
DESIGN	File Array Name	Related Port (Interface)	On Process	URI	Update Strategy	Max. Size	Min. Size	Use Data Encryption	Crypto Algorithm
• KeyValue Interface	FileArray_1	MobilgeneMofNFP [FileProx...	PerExampleFs	var/MobilgeneMofNFP	DELETE	12000	400	No	
• FileProxy Interface									
• Port Connection									
DEPLOYMENT									
• KeyValue Deployment									
• FileArray Deployment									
MAPPING									
• Deployment-Port Map									

# PER: Platform (PER) 설정

## ▪ M-out-of-N Redundancy 추가

- ✓ File Array에서 우클릭하여 'Add New M-out-of-N Redundancy Handling'을 클릭함

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing three main sections: DESIGN (with sub-items: KeyValue Interface, FileProxy Interface, Port Connection), DEPLOYMENT (with sub-items: KeyValue Deployment, FileArray Deployment), and MAPPING (with sub-item: Deployment-Port Map). The 'FileArray Deployment' item is selected. The main area displays a table titled 'File Array'. The table has columns: File Array Name, Related Port [Interface], On Process, URI, Update Strategy, Max. Size, Min. Size, Use Data Encryption, and Crypto Algorithm. The first row shows 'FileArray\_1' in the 'File Array Name' column, 'r/MobilgeneMofNFP' in the 'URI' column, and 'DELETE' in the 'Update Strategy' column. A right-click context menu is open over the 'FileArray\_1' cell. The menu items are: Create File Array, Delete File Array, Add New CRC Redundancy Handling, Add New M-out-of-N Redundancy Handling (highlighted with a red box), Delete Redundancy Handling, Generate Files from File-Proxy Interface, Add New File, and Delete File. At the top of the editor, there are search bars: 'Select search objects...', 'Select search columns...', and 'Input search keyword...'.

File Array Name	Related Port [Interface]	On Process	URI	Update Strategy	Max. Size	Min. Size	Use Data Encryption	Crypto Algorithm
FileArray_1			r/MobilgeneMofNFP	DELETE	12000	400	No	

# PER: Platform (PER) 설정

- **M-out-of-N Redundancy 추가 확인**

- ✓ 생성된 새로운 M-out-of-N Redundancy를 확인함

## PER Editor

Select search objects...

Select search columns...

Input search keyword...

DESIGN

KeyValue Interface

FileProxy Interface

Port Connection

DEPLOYMENT

KeyValue Deployment

FileArray Deployment

MAPPING

Deployment-Port Map

File Array									File Array:: Redundancy				+ M-out-of-N		
File Array Name	Related Port [Interface]	On Process	URI	Update S	Max. Size	Min. Size	Use C	Cl	Redundancy Har	Scope	A	M	N		
FileArray_1	MobilgeneMofNFP [F...	PerExampleFs	var/MobilgeneMofNFP	DELETE	12000	400	No		MOutOfN	FILE		3	5		



# PER: Platform (PER) 설정

## ■ File Array 내 Files 생성

- ✓ File Array에서 우클릭하여 'Generate Files from File-Proxy Interface'를 클릭함

### PER Editor

The screenshot shows the PER Editor interface. On the left is a sidebar with a tree view containing 'DESIGN' (with sub-items: KeyValue Interface, FileProxy Interface, Port Connection), 'DEPLOYMENT' (with sub-items: KeyValue Deployment, FileArray Deployment), and 'MAPPING' (with sub-item: Deployment-Port Map). The 'FileArray Deployment' item is selected. The main area displays a table titled 'File Array'. The table has columns: File Array Name, Related Port [Interface], On Process, URI, Update S, Max. Size, Min. Size, Use C, Redundancy Har, Scope, A, M, and N. A row is visible with 'FileArray\_1' in the 'File Array Name' column. A right-click context menu is open over the 'FileArray\_1' row. The menu items are: 'Create File Array', 'Delete File Array', 'Add New CRC Redundancy Handling', 'Add New M-out-of-N Redundancy Handling', 'Delete Redundancy Handling', 'Generate Files from File-Proxy Interface' (highlighted with a red rectangle), 'Add New File', and 'Delete File'. The table also shows a 'File Array: Redundancy' section with a '+ M-out-of-N' button and a table with columns A, M, and N, containing values 3 and 5.

File Array Name	Related Port [Interface]	On Process	URI	Update S	Max. Size	Min. Size	Use C	Redundancy Har	Scope	A	M	N
FileArray_1	MobileProxyInterface	On Process	ExampleUri	DELETE	12000	400	No	MOutOfN	FILE	3	5	

# PER: Platform (PER) 설정

## ▪ File Array 내 Files 생성 확인

- ✓ File Proxy Interface 설정을 바탕으로 Files가 생성된 것을 확인함

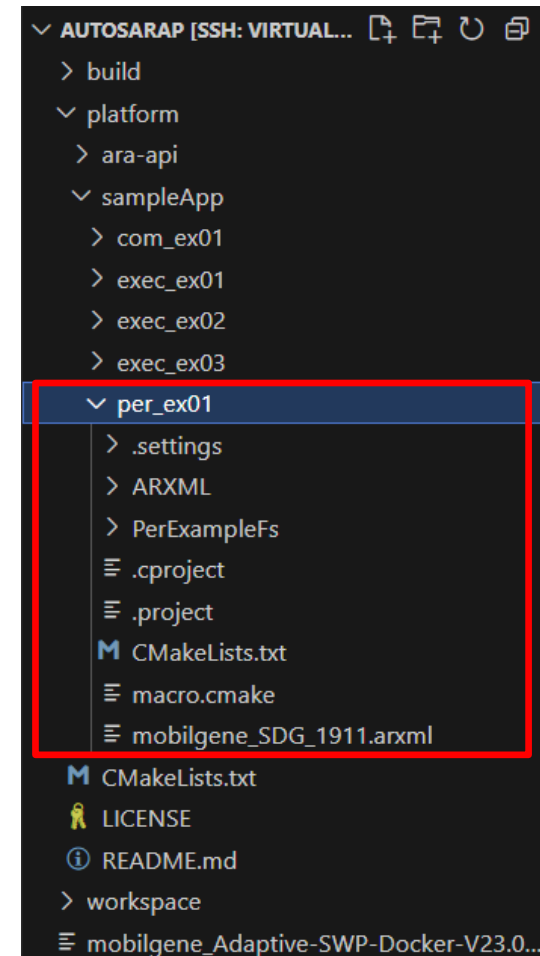
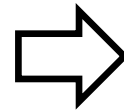
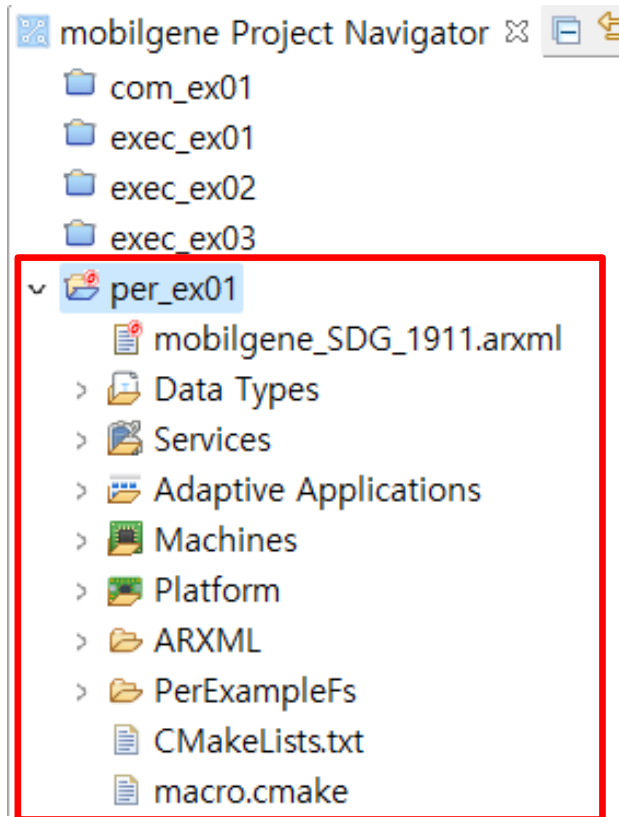
### PER Editor

The screenshot displays the PER Editor interface. On the left, a sidebar contains a tree view with the following sections: DESIGN (containing KeyValue Interface, FileProxy Interface, and Port Connection), DEPLOYMENT (containing KeyValue Deployment and FileArray Deployment), and MAPPING (containing Deployment-Port Map). The main workspace shows a configuration table for 'File Array: Files'. The table has columns: n, Size, Use, C, Redundancy, Har, Scope, A, M, N, File, File Name, Content URI, and Update Strategy. The 'File Array: Files' section is expanded, showing three entries: FileProxy\_1, FileProxy\_2, and FileProxy\_3. These entries are highlighted with a red box. The 'FileProxy\_1' entry shows 'ReadOnlyFile1.txt' as the File Name and 'files/MobilgeneMofNFP/ReadOnlyFile1.txt' as the Content URI. The 'FileProxy\_2' entry shows 'WriteOnlyFile1.txt' as the File Name and 'files/MobilgeneMofNFP/WriteOnlyFile1.txt' as the Content URI. The 'FileProxy\_3' entry shows 'ReadWriteFile1.txt' as the File Name and 'files/MobilgeneMofNFP/ReadWriteFile1.txt' as the Content URI. All three entries have an 'Update Strategy' of 'DELETE'.

n	Size	Use	C	Redundancy	Har	Scope	A	M	N	File	File Name	Content URI	Update Strategy
0		No		MOutOfN		FILE		3	5	FileProxy_1	ReadOnlyFile1.txt	files/MobilgeneMofNFP/ReadOnlyFile1.txt	DELETE
										FileProxy_2	WriteOnlyFile1.txt	files/MobilgeneMofNFP/WriteOnlyFile1.txt	DELETE
										FileProxy_3	ReadWriteFile1.txt	files/MobilgeneMofNFP/ReadWriteFile1.txt	DELETE

# PER: Build

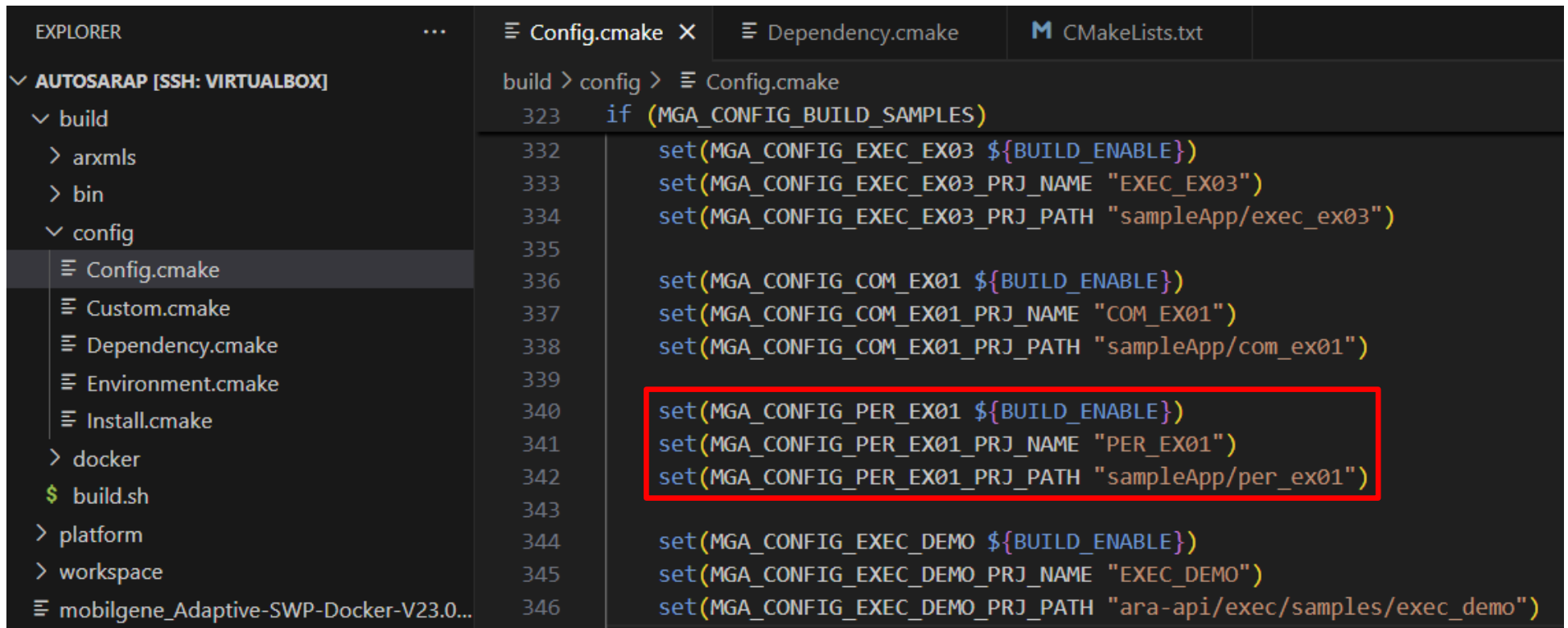
- 개발 내용 빌드 환경으로 복사
  - ✓ mobilgene A Studio에서 개발한 Adaptive Application을 빌드 환경으로 복사



# PER: Build

- Adaptive Application 관련 매크로 설정 추가

- ✓ 'build' - 'config' - 'Config.cmake'에 추가하고자 하는 Adaptive Application 관련 매크로 설정 추가



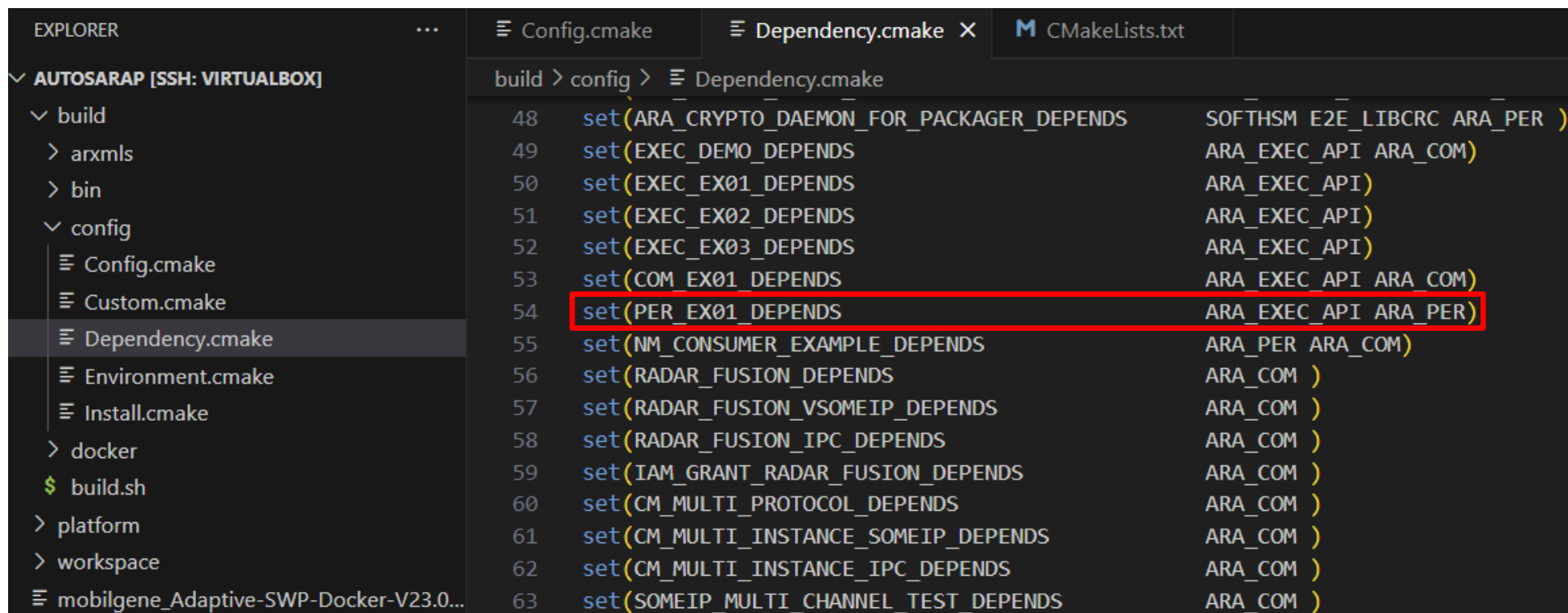
```
EXPLORER
...
AUTOSARAP [SSH: VIRTUALBOX]
  build
    arxmls
    bin
    config
      Config.cmake
      Custom.cmake
      Dependency.cmake
      Environment.cmake
      Install.cmake
    docker
    $ build.sh
    platform
    workspace
    mobilgene_Adaptive-SWP-Docker-V23.0...

Config.cmake
323 if (MGA_CONFIG_BUILD_SAMPLES)
332   set(MGA_CONFIG_EXEC_EX03 ${BUILD_ENABLE})
333   set(MGA_CONFIG_EXEC_EX03_PRJ_NAME "EXEC_EX03")
334   set(MGA_CONFIG_EXEC_EX03_PRJ_PATH "sampleApp/exec_ex03")
335
336   set(MGA_CONFIG_COM_EX01 ${BUILD_ENABLE})
337   set(MGA_CONFIG_COM_EX01_PRJ_NAME "COM_EX01")
338   set(MGA_CONFIG_COM_EX01_PRJ_PATH "sampleApp/com_ex01")
339
340   set(MGA_CONFIG_PER_EX01 ${BUILD_ENABLE})
341   set(MGA_CONFIG_PER_EX01_PRJ_NAME "PER_EX01")
342   set(MGA_CONFIG_PER_EX01_PRJ_PATH "sampleApp/per_ex01")
343
344   set(MGA_CONFIG_EXEC_DEMO ${BUILD_ENABLE})
345   set(MGA_CONFIG_EXEC_DEMO_PRJ_NAME "EXEC_DEMO")
346   set(MGA_CONFIG_EXEC_DEMO_PRJ_PATH "ara-api/exec/samples/exec_demo")
```

# PER: Build

## ▪ Adaptive Application 관련 의존성 설정 추가

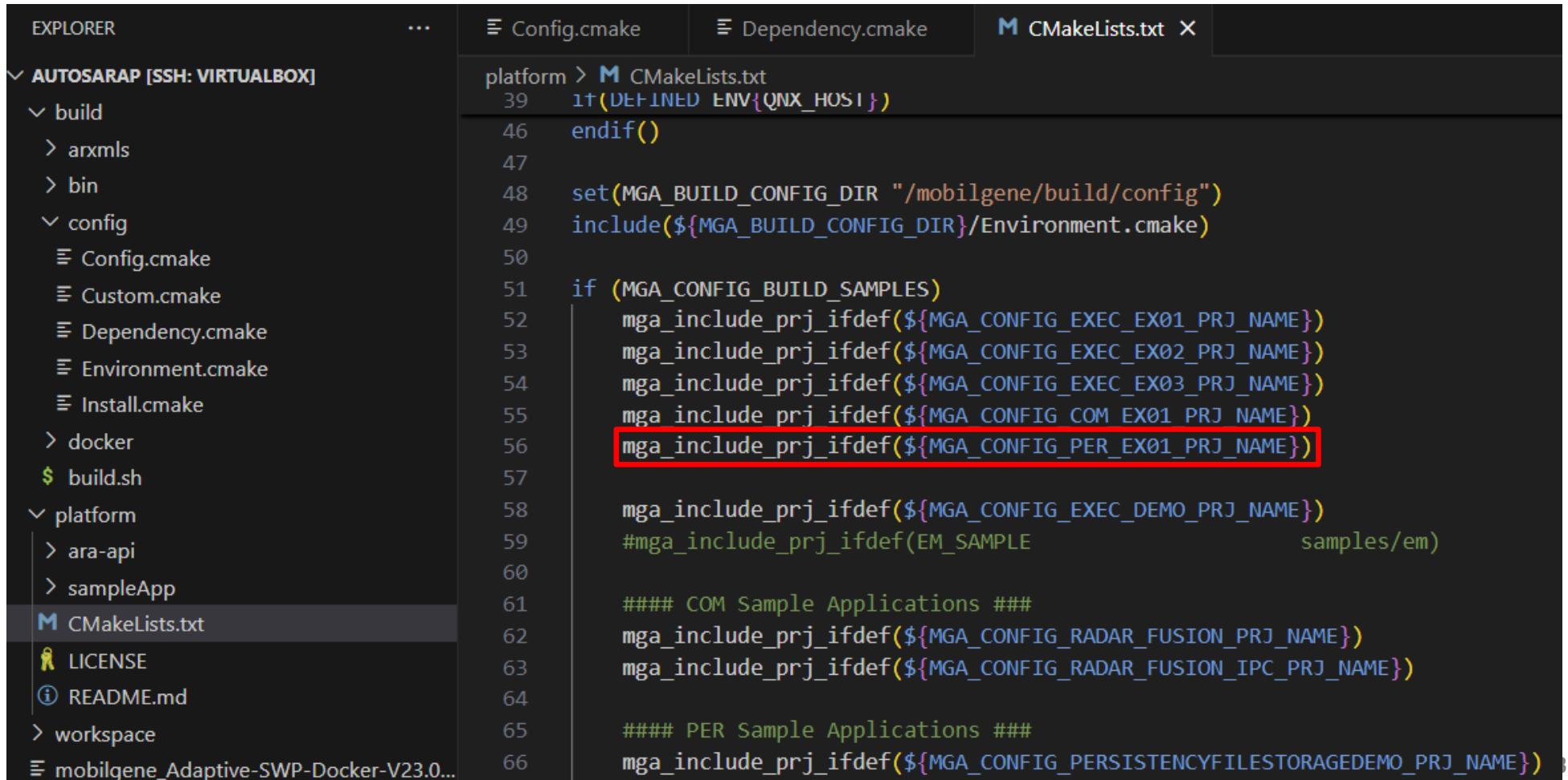
- ✓ 'build' - 'config' - 'Dependency.cmake'에 추가하고자 하는 Adaptive Application 관련 의존성 설정 추가



# PER: Build

- **Adaptive Application을 Build 목록에 추가**

- ✓ Adaptive Application을 'platform' - 'CMakeLists.txt'에 추가하여 Build 목록에 추가

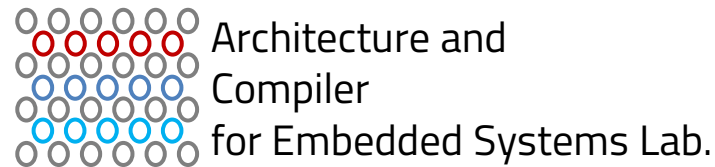


```
EXPLORER
└─ AUTOSARAP [SSH: VIRTUALBOX]
   └─ build
      └─ arxmls
      └─ bin
      └─ config
         ├── Config.cmake
         ├── Custom.cmake
         ├── Dependency.cmake
         ├── Environment.cmake
         └─ Install.cmake
      └─ docker
      └─ $ build.sh
      └─ platform
         ├── ara-api
         ├── sampleApp
         └─ CMakeLists.txt
      └─ LICENSE
      └─ README.md
      └─ workspace
      └─ mobilgene_Adaptive-SWP-Docker-V23.0...

platform > M CMakeLists.txt
39  if(DEFINED ENV{QNX_HOST})
46  endif()
47
48  set(MGA_BUILD_CONFIG_DIR "/mobilgene/build/config")
49  include(${MGA_BUILD_CONFIG_DIR}/Environment.cmake)
50
51  if (MGA_CONFIG_BUILD_SAMPLES)
52      mga_include_prj_ifdef(${MGA_CONFIG_EXEC_EX01_PRJ_NAME})
53      mga_include_prj_ifdef(${MGA_CONFIG_EXEC_EX02_PRJ_NAME})
54      mga_include_prj_ifdef(${MGA_CONFIG_EXEC_EX03_PRJ_NAME})
55      mga_include_prj_ifdef(${MGA_CONFIG_COM_EX01_PRJ_NAME})
56      mga_include_prj_ifdef(${MGA_CONFIG_PER_EX01_PRJ_NAME})
57
58      mga_include_prj_ifdef(${MGA_CONFIG_EXEC_DEMO_PRJ_NAME})
59      #mga_include_prj_ifdef(EM_SAMPLE samples/em)
60
61      ##### COM Sample Applications #####
62      mga_include_prj_ifdef(${MGA_CONFIG_RADAR_FUSION_PRJ_NAME})
63      mga_include_prj_ifdef(${MGA_CONFIG_RADAR_FUSION_IPC_PRJ_NAME})
64
65      ##### PER Sample Applications #####
66      mga_include_prj_ifdef(${MGA_CONFIG_PERSISTENCYFILESTORAGEDEMO_PRJ_NAME})
```

# Q & A

**Thank you for your attention**



**School of Electronics Engineering, KNU**

ACE Lab (junho7513@knu.ac.kr)