

# AUTOSAR Methodology

Methodology in Practice

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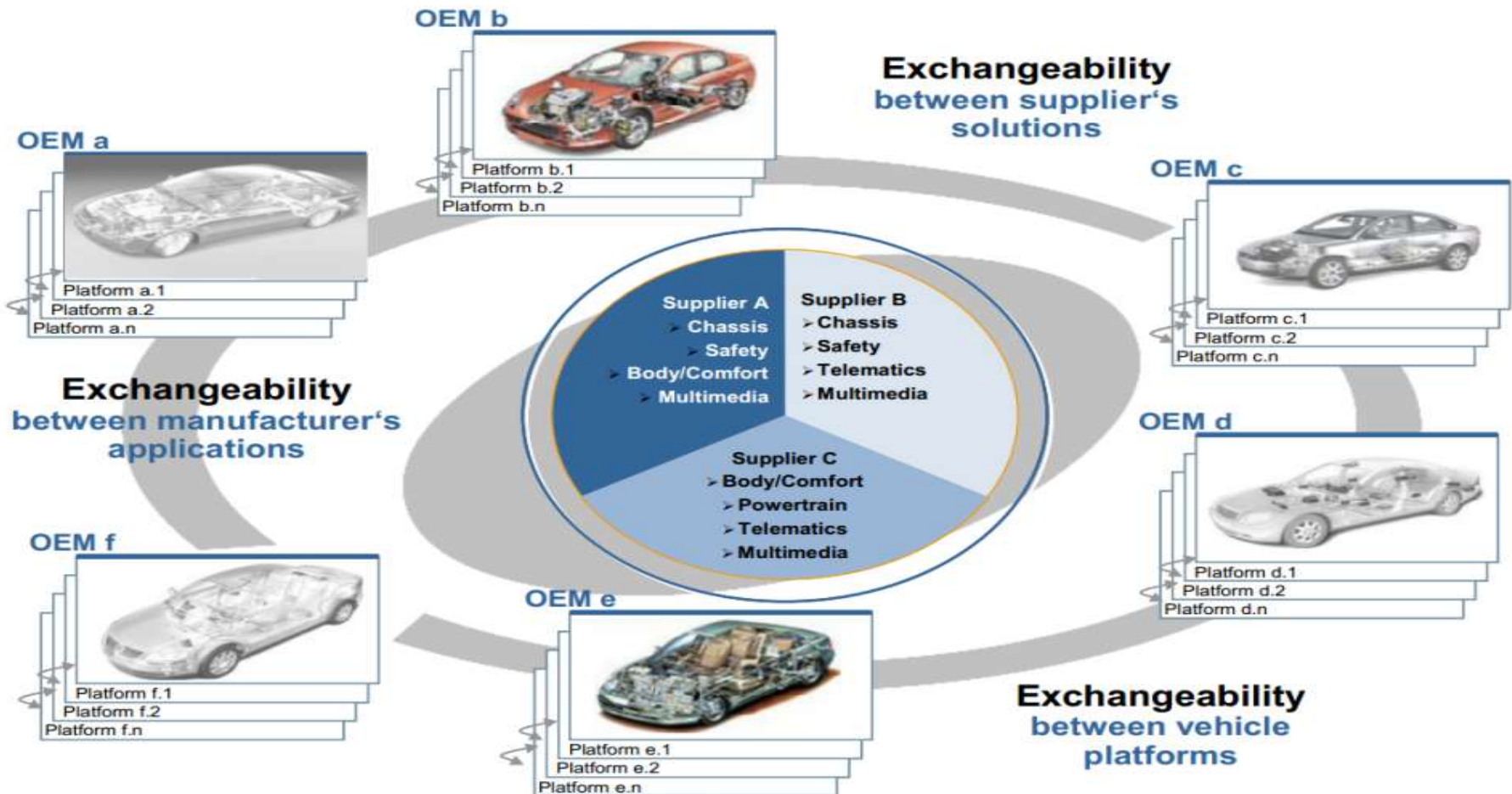
## Road Ready with AUTOSAR 4.0

1. AUTOSAR today
2. AUTOSAR 4.1.1 vs. 3.2.2
3. OEM 동향
4. Methodology
5. Methodology in Practice

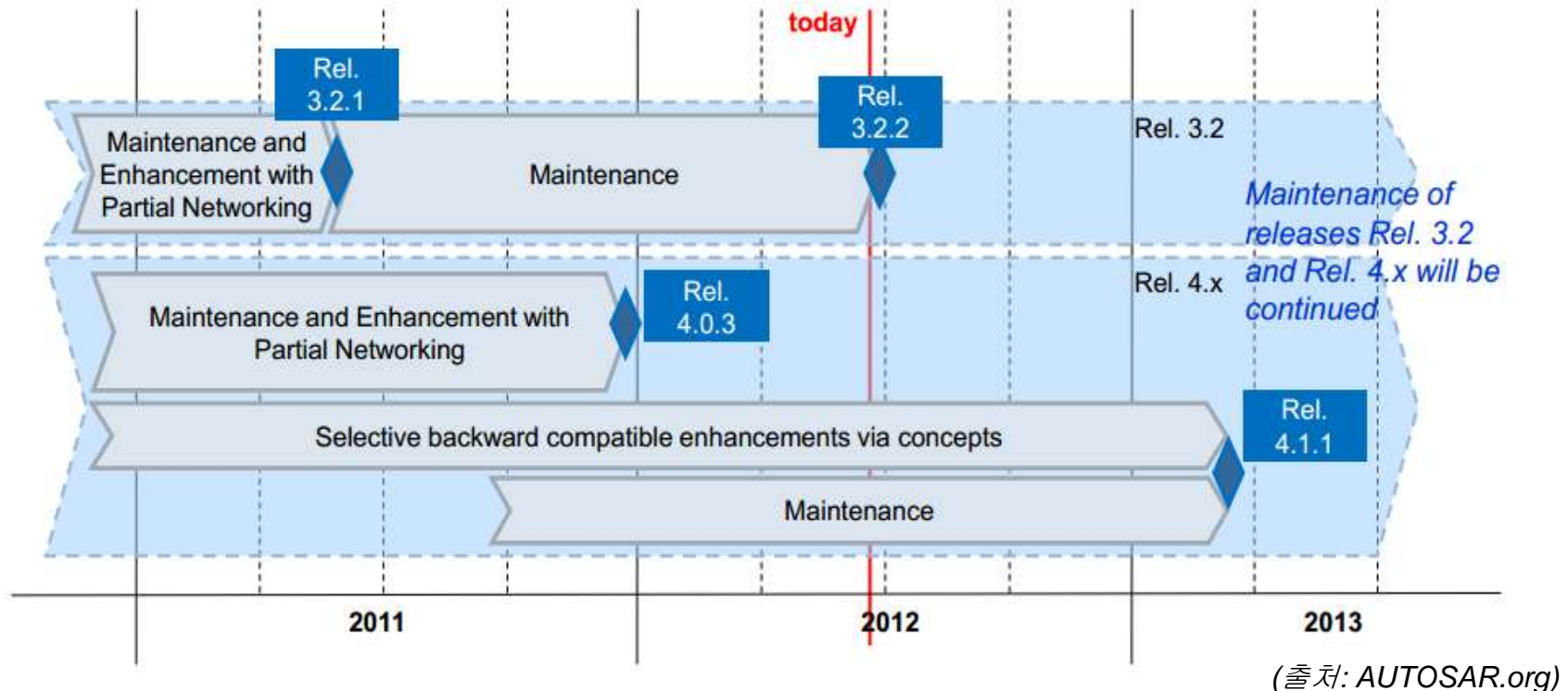


“표준에서 협력하고 구현에서 경쟁”

“Cooperate in standard, Competitive in implementations”



- AUTOSAR 3.2.1은 2011년 5월 release
  - 이후 Maintenance / Computability 를 위한 Plan만 존재
- AUTOSAR 4.0.3은 2011년 12월 release
  - 2013년 3월 AUTOSAR 4.1.1 출시 예정
  - AUTOSAR 4.1.1 에서는 다수의 신규 기능이 적용



# AUTOSAR 4.1.1 vs. 3.2.2

- AUTOSAR 4.1.1은 30여 가지의 신규 기능 추가 및 안정성 강화
- AUTOSAR 3.2.2는 backward compatibility 와 안정성 강화

4.1.1

- 기능 Enhancement 중 → 각 종 신규 기능 추가 검토 중 (31개)  
Ex : Multi core, Efficient Energy Management, Communication, Testing, Application interfaces...
- BUG FIX / maintenance
- backward compatibility 강화

3.2.2

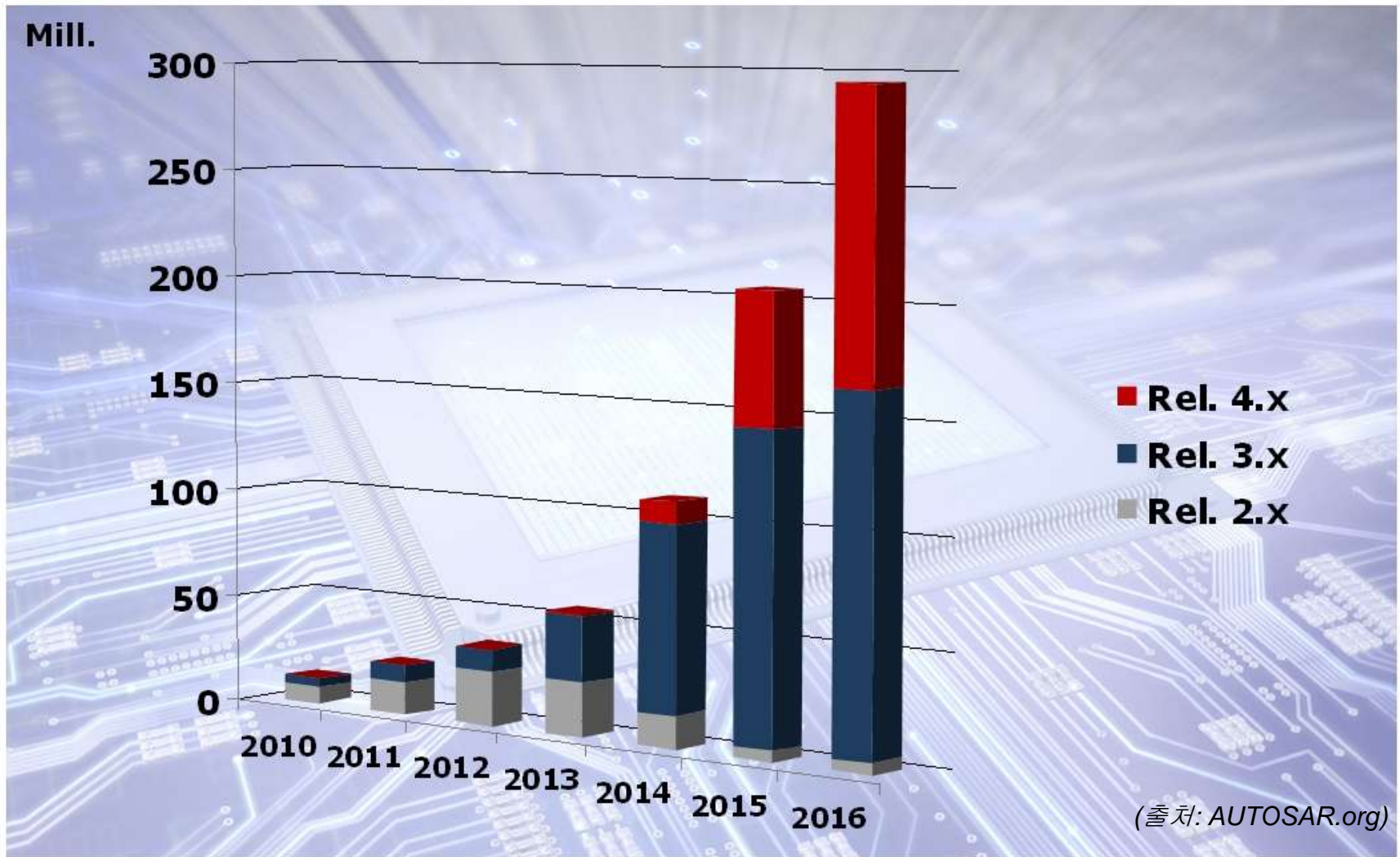
- 사양 finalization 중
- BUG FIX / maintenance
- backward compatibility 강화
- 개발 편의성 증대
- 양산 프로젝트로부터의 각종 feedback 반영

Press  
Release

- Maximum of 2 releases will be supported in parallel
  - **Active Release** : To support extensions (eg: 4.x)
  - **Maintenance Only Release** : To support bug fixes (eg: 3.2.x)

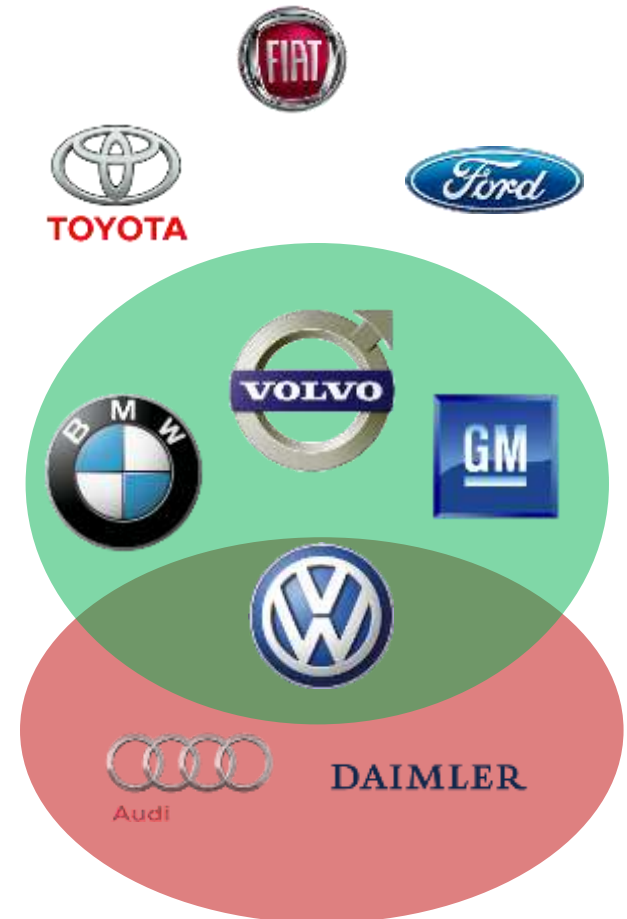
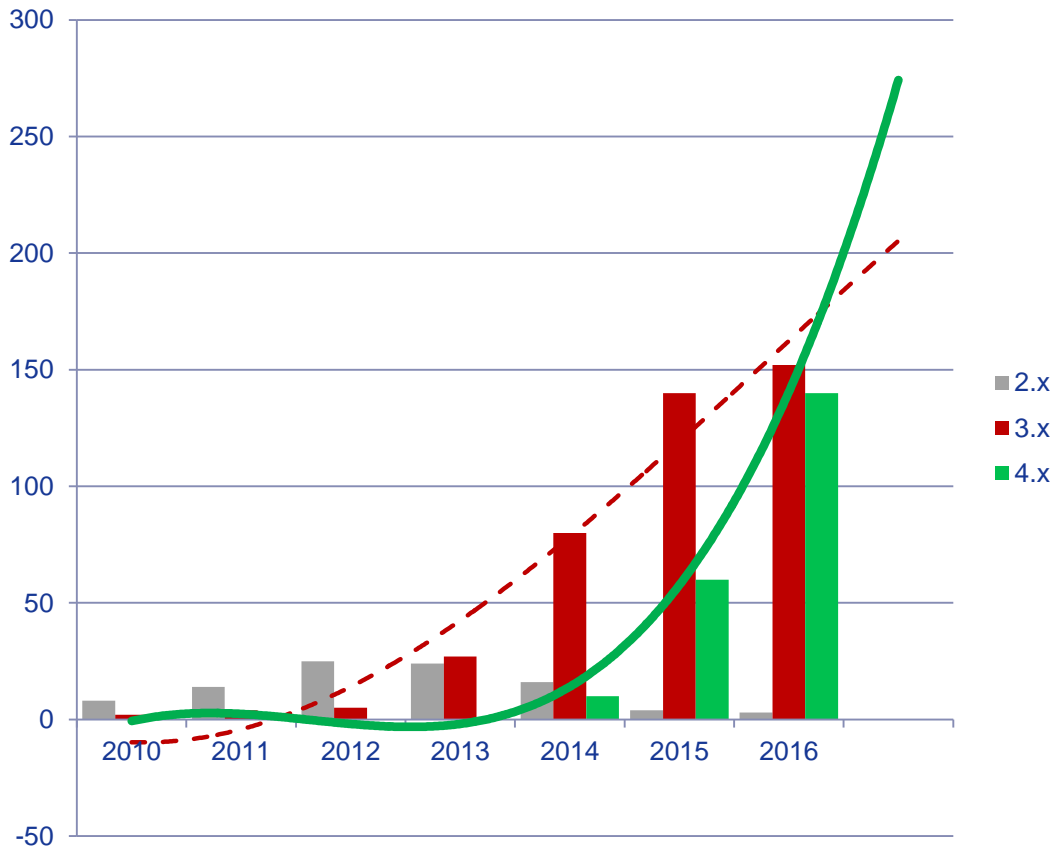
(출처: AUTOSAR.org)

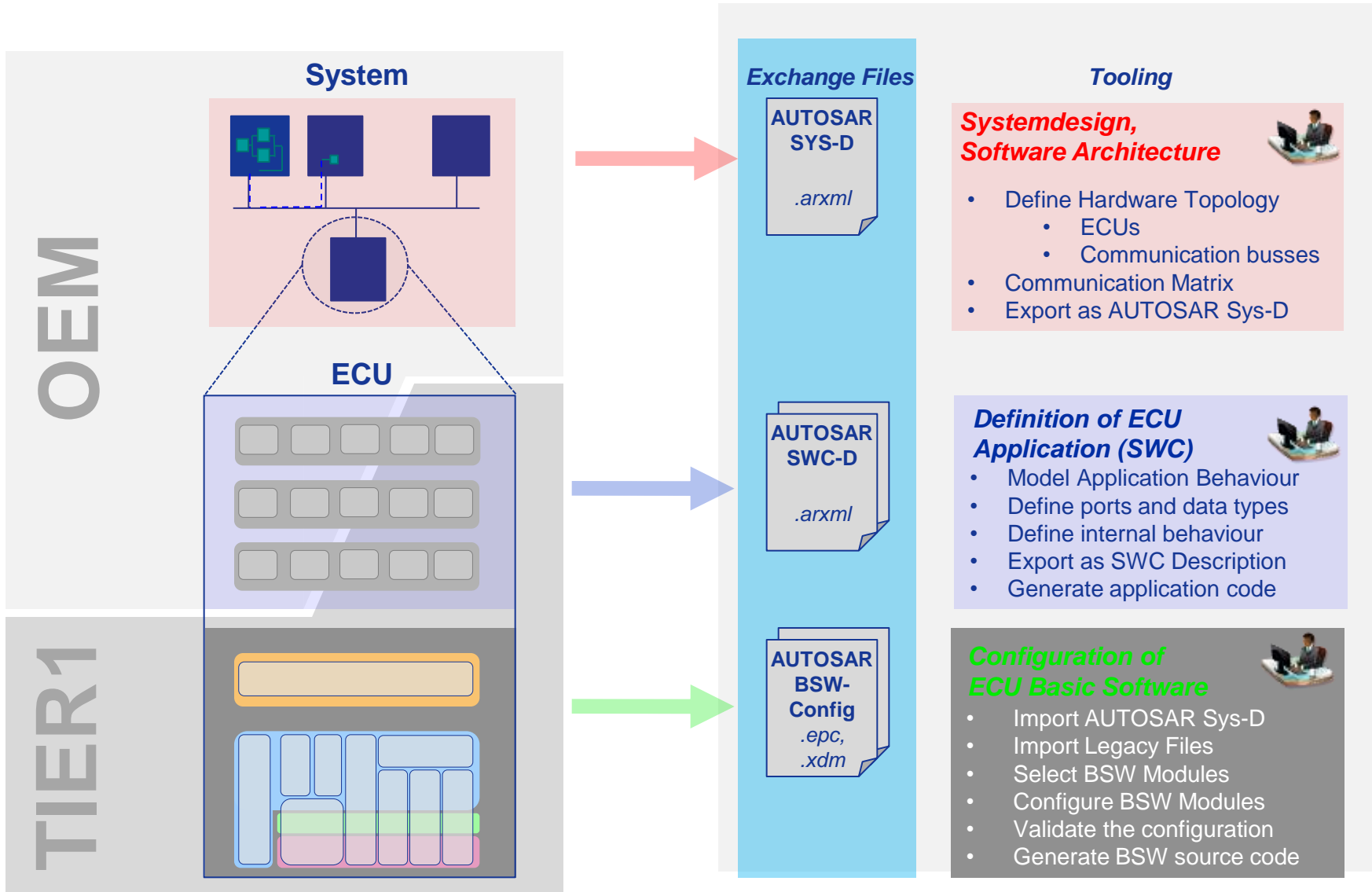
## Volume of ECUs with AUTOSAR



# OEM 동향 (2/2)

- AUTOSAR 3.x - Daimler, AUDI
- AUTOSAR 4.x – BMW, VOLVO, GM
  - BMW, VOLVO와 GM은 국내 Supplier 물색에 적극적임
- 기타 – TOYOTA, FIAT, FORD

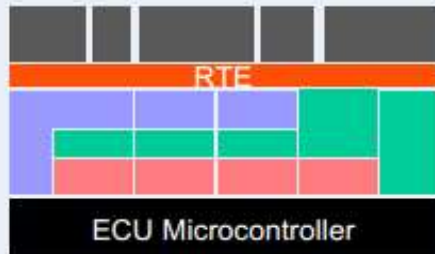




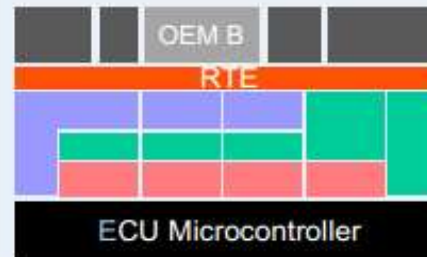


# Benefit of Methodology

Fully AUTOSAR  
compliant ECU



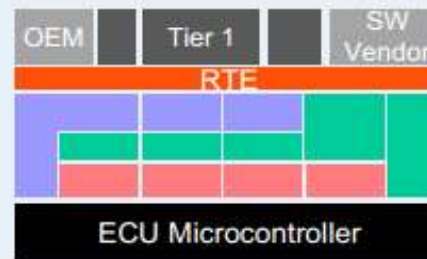
Scenario A



The supplier provides the ECU to a different OEM.



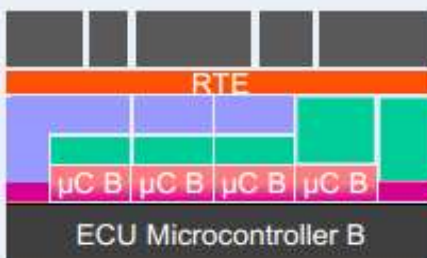
Scenario B



Integration of features, delivered from different sources.

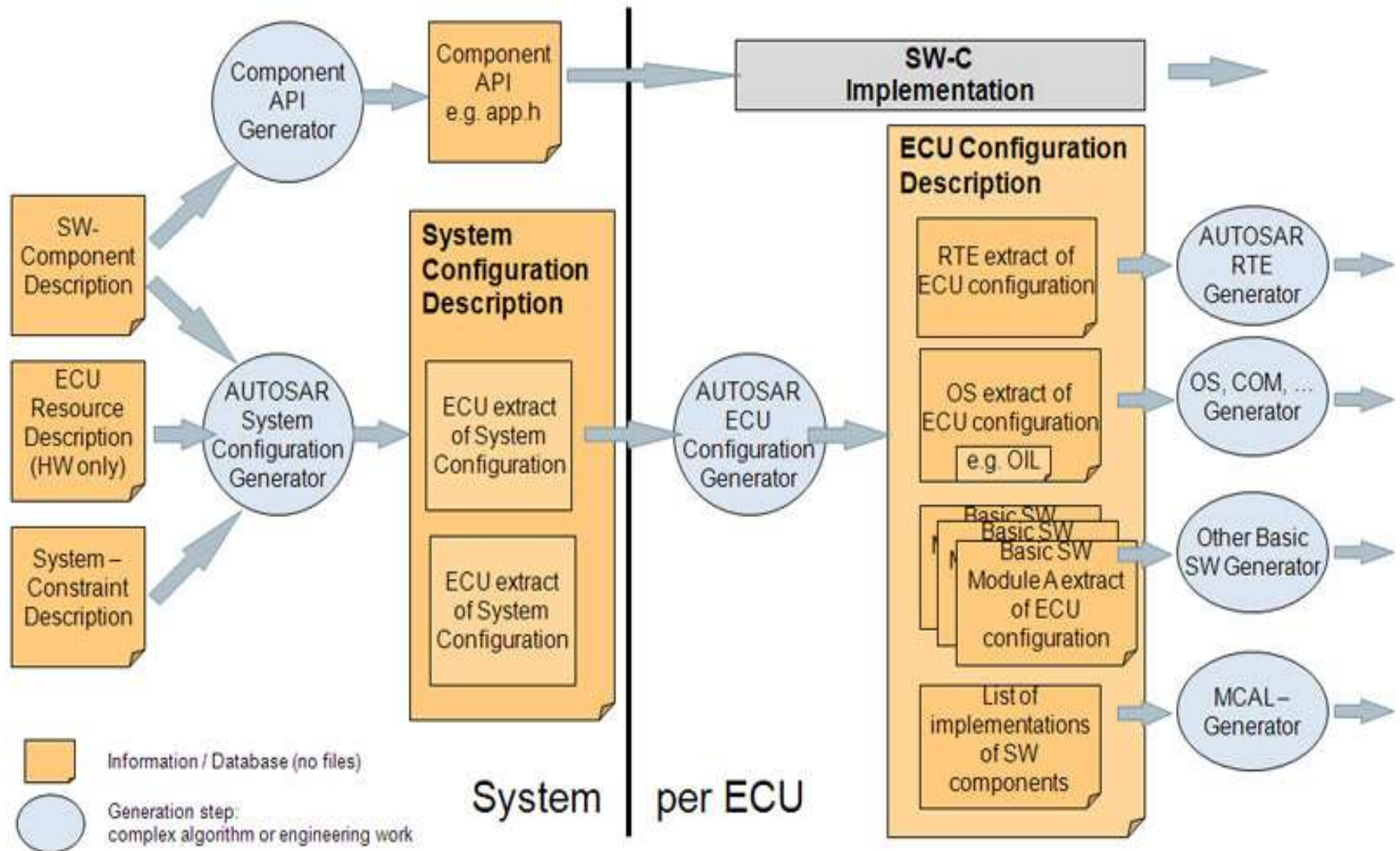


Scenario C

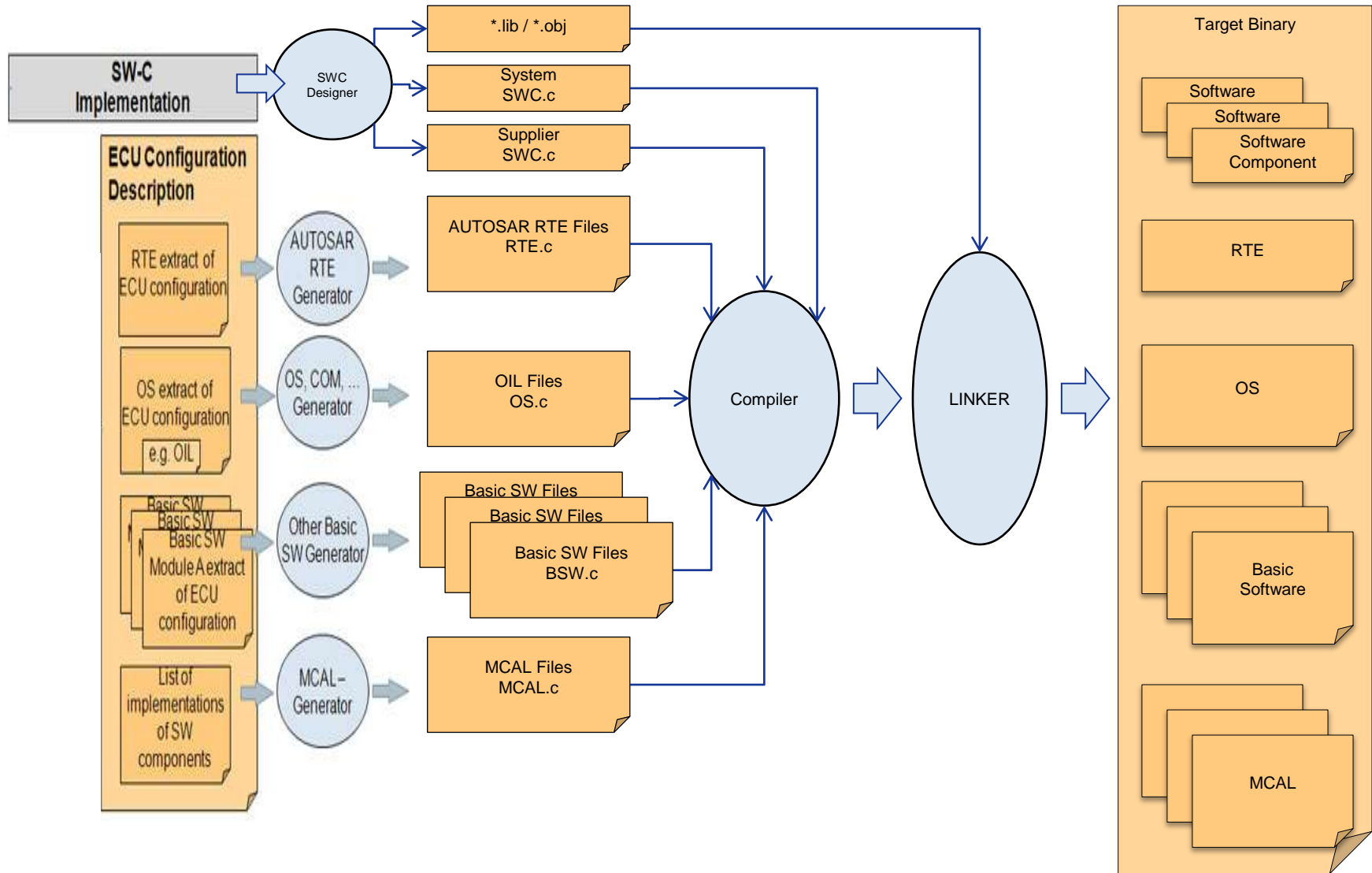


The hardware changes.

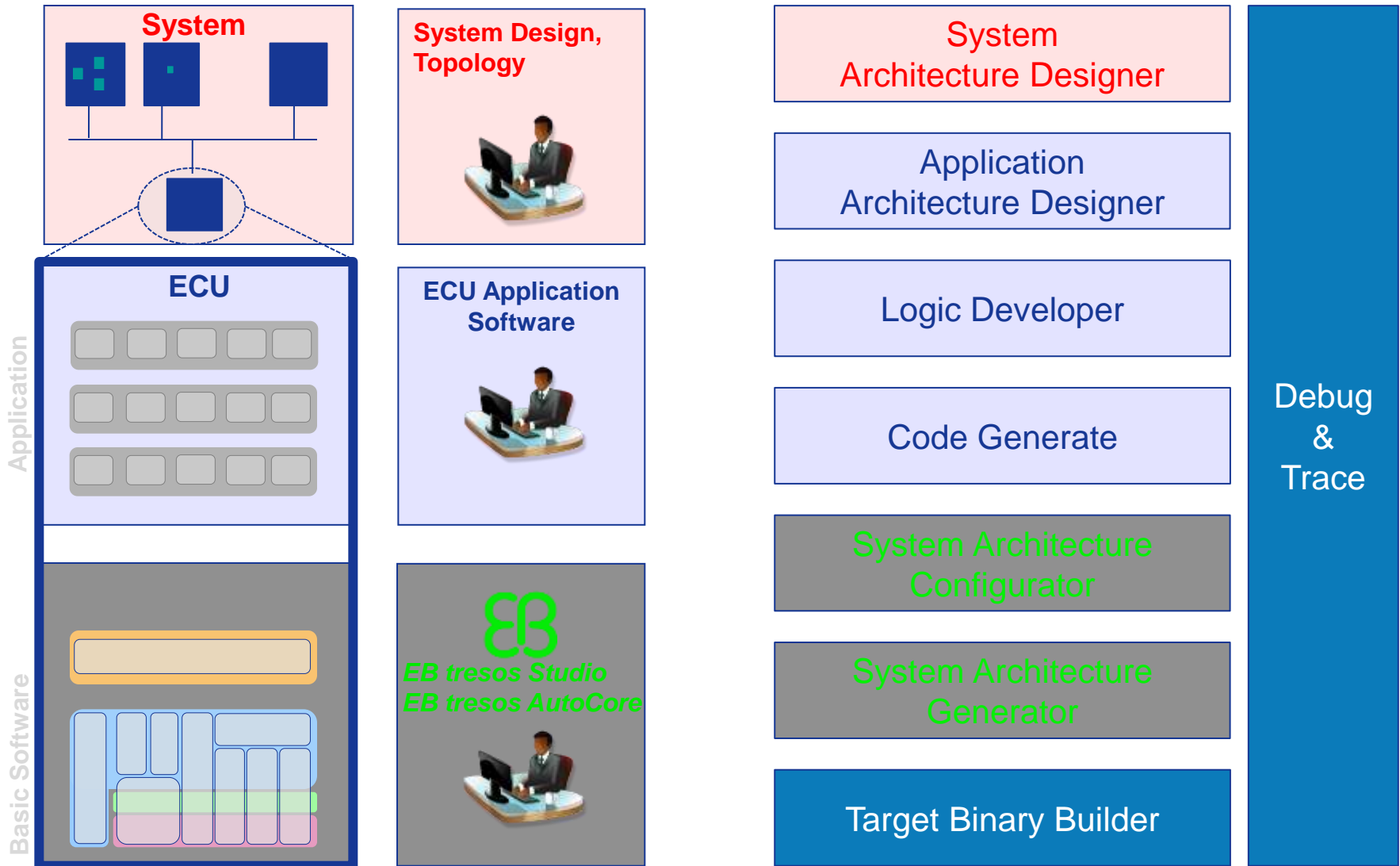
# Methodology, System

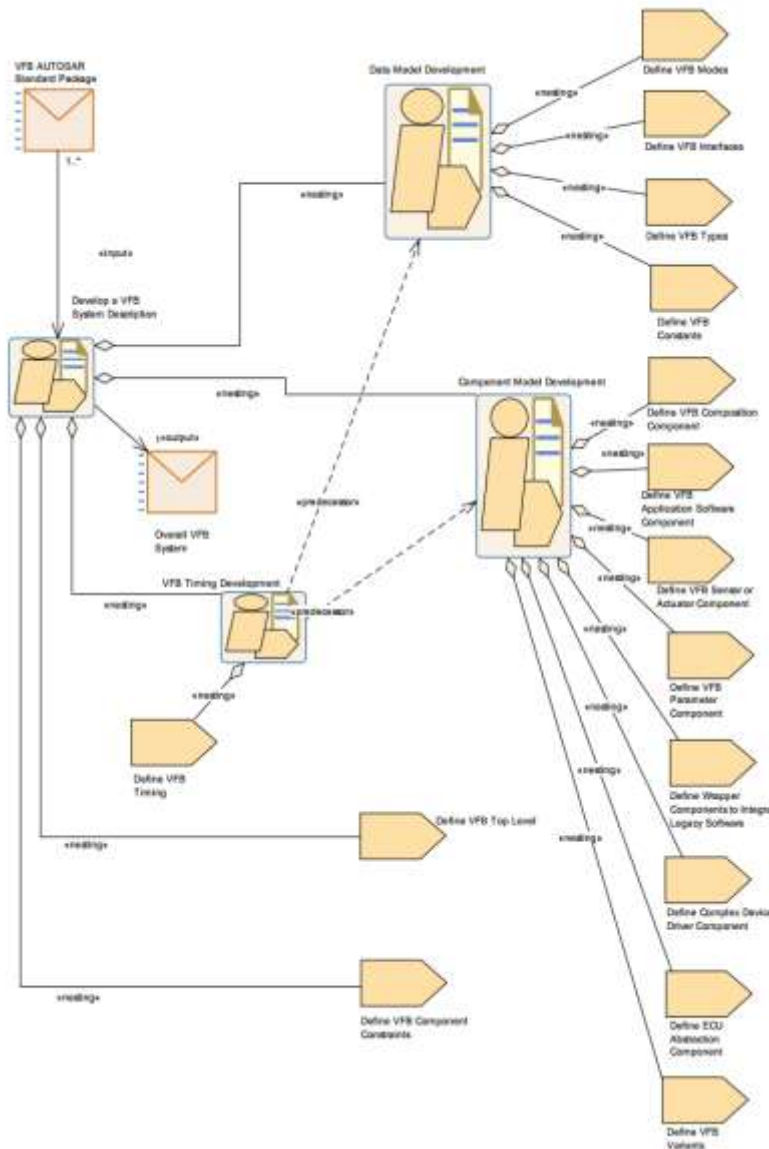


# Methodology, per ECU



# Tool Chain





■ Design CDD / IoHwAbs

■ Design Atomic SW-C

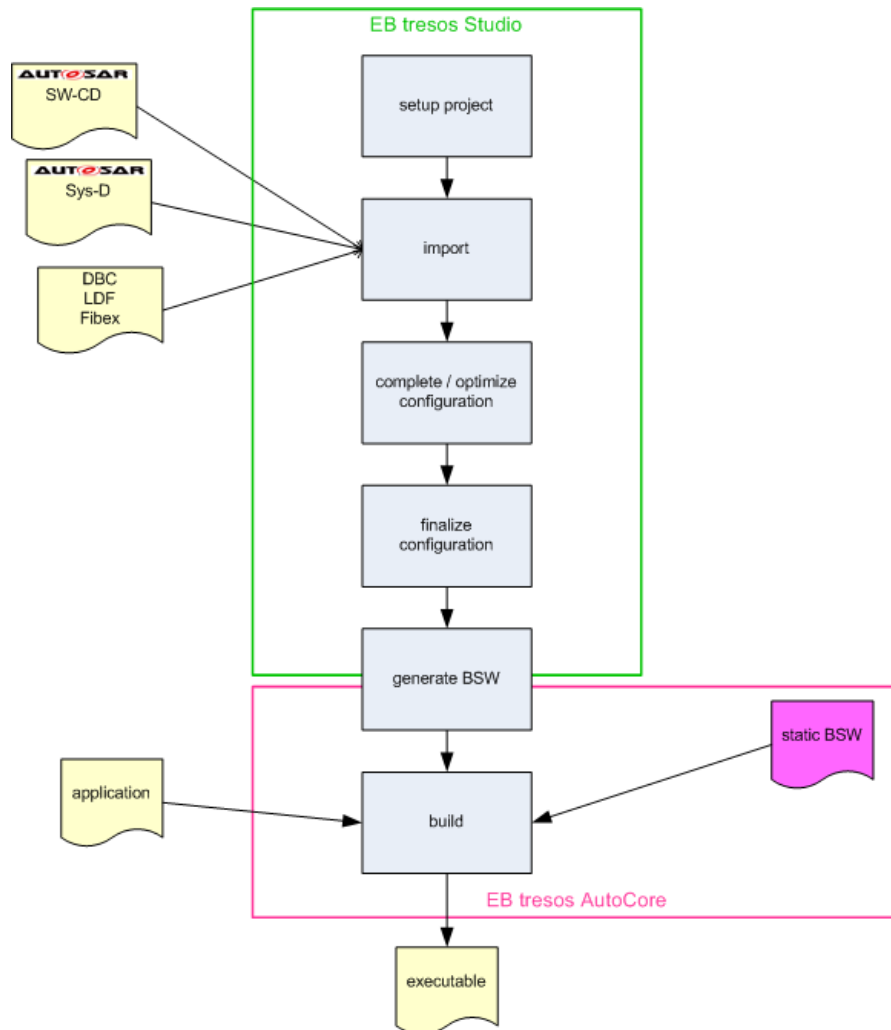
■ Port, Interface

■ Design Internal Behavior

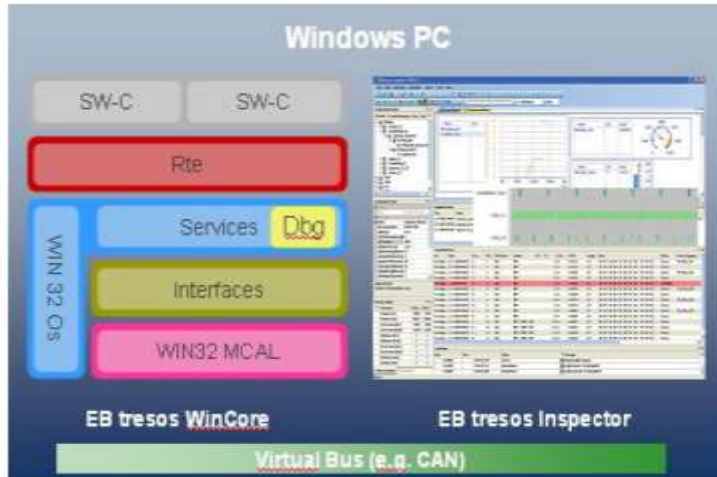
■ Implementation / Runnable

■ Design SW-C Timing

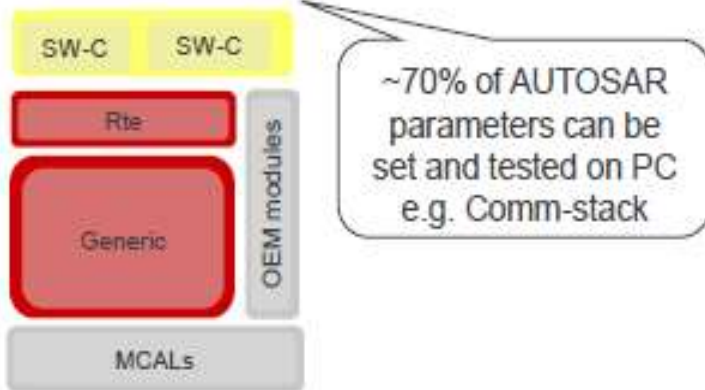
■ Map SW-C to ECU



- Import Architecture
- Configure ECU
- Configure BSW
- Optimize SWC, BSW
- Generate Code
- Build Binary Image



## PC based tests

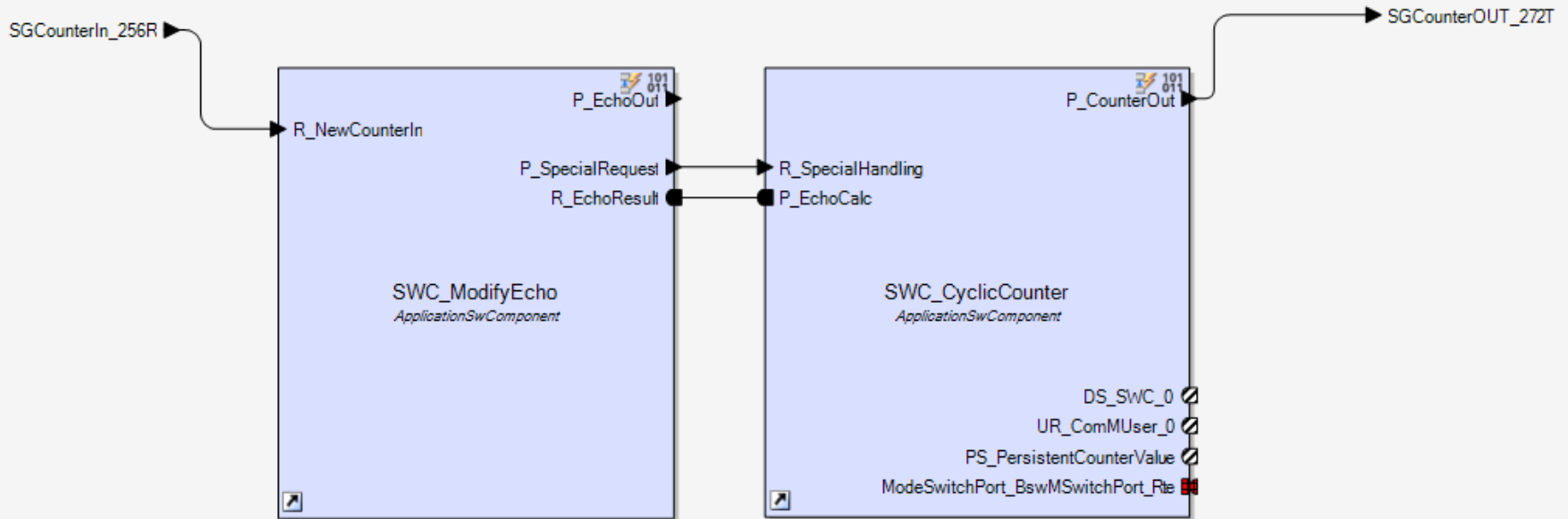


- Win32-X86 기반의 AUTOSAR 솔루션
- HW independent 한 모듈(SWC) 개발 가능
- AUTOSAR 교육
  - 개발 프로세스에 따른 실습 가능
- Target HW가 준비 전까지 BSW pre-configuring 가능
- 실제 target 과의 결과치 비교로 문제점 추정
  - HW 에서 문제 발견 시, WinCore에서 동일 환경 test
- EB tresos Inspector (w/ EB HW) 를 통한 target system과 연동 지원

1. OEM 요구사항 접수
  - SoftwareComponents.arxml – OEM SWC(ModifyEcho / Cyclic\_Counter)
  - CanSystem.arxml - 기존 DBC 파일 정보 + ECU Mapping 관련 정보
  - BswMMode.arxml - Basic Software configuration 정보
2. OEM 요구 사항(Software Components) 분석
  - MS Notepad vs. XML Editor vs. dSpCase Systemdesk vs. IBM Rhapsody
  - Application 분석
  - Application Logic Review
3. OEM 요구 사항 적용 및 구현
  - Application 및 Basic Software Configuration Import
  - Basic Software Configuration
4. ECU Binary Image 생성 및 테스트
5. Supplier 고유 Application Logic 추가



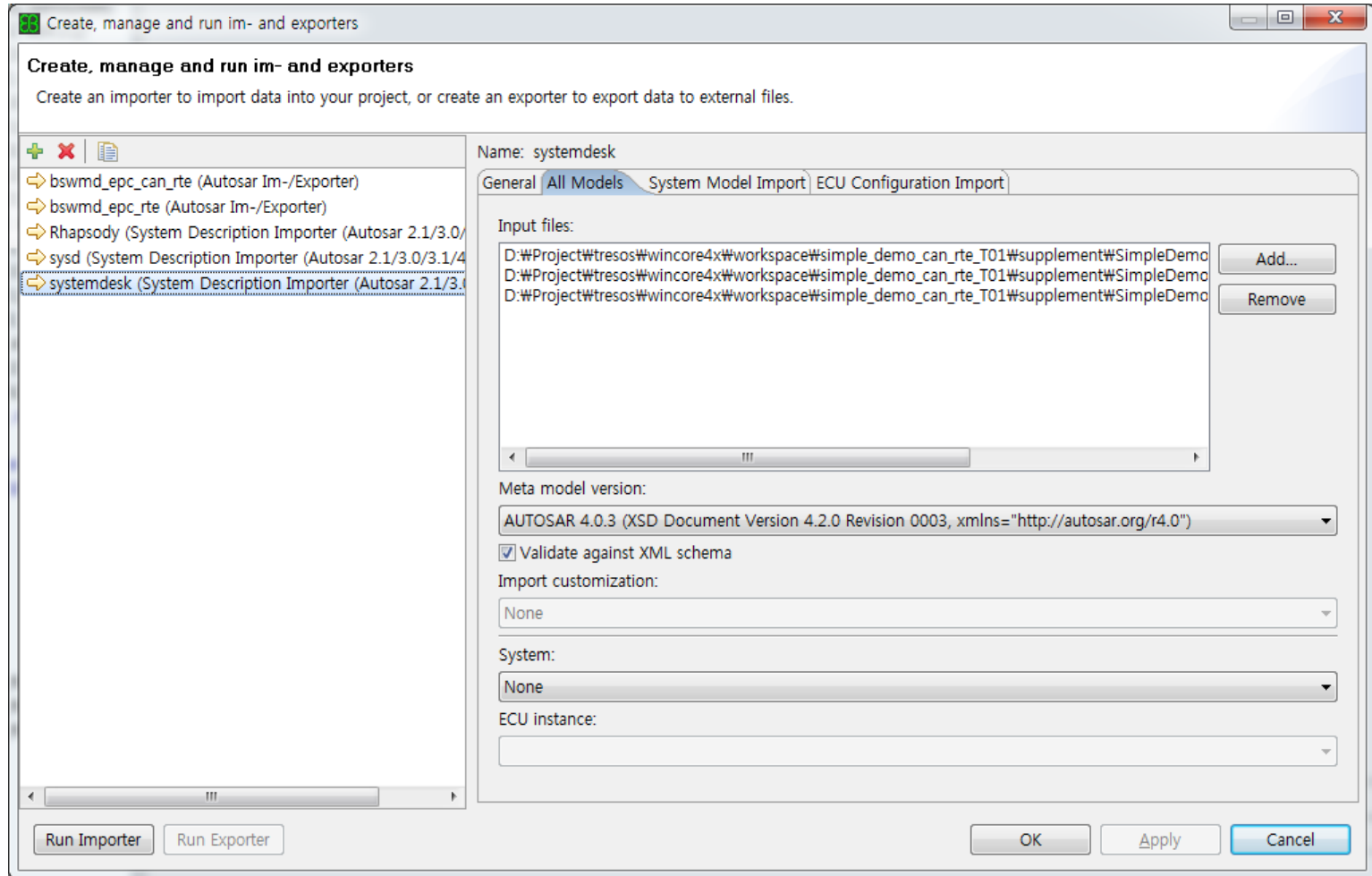
- Application Software Component 두 개
  - Runnable 3개
  - Communication 및 Basic Software Service



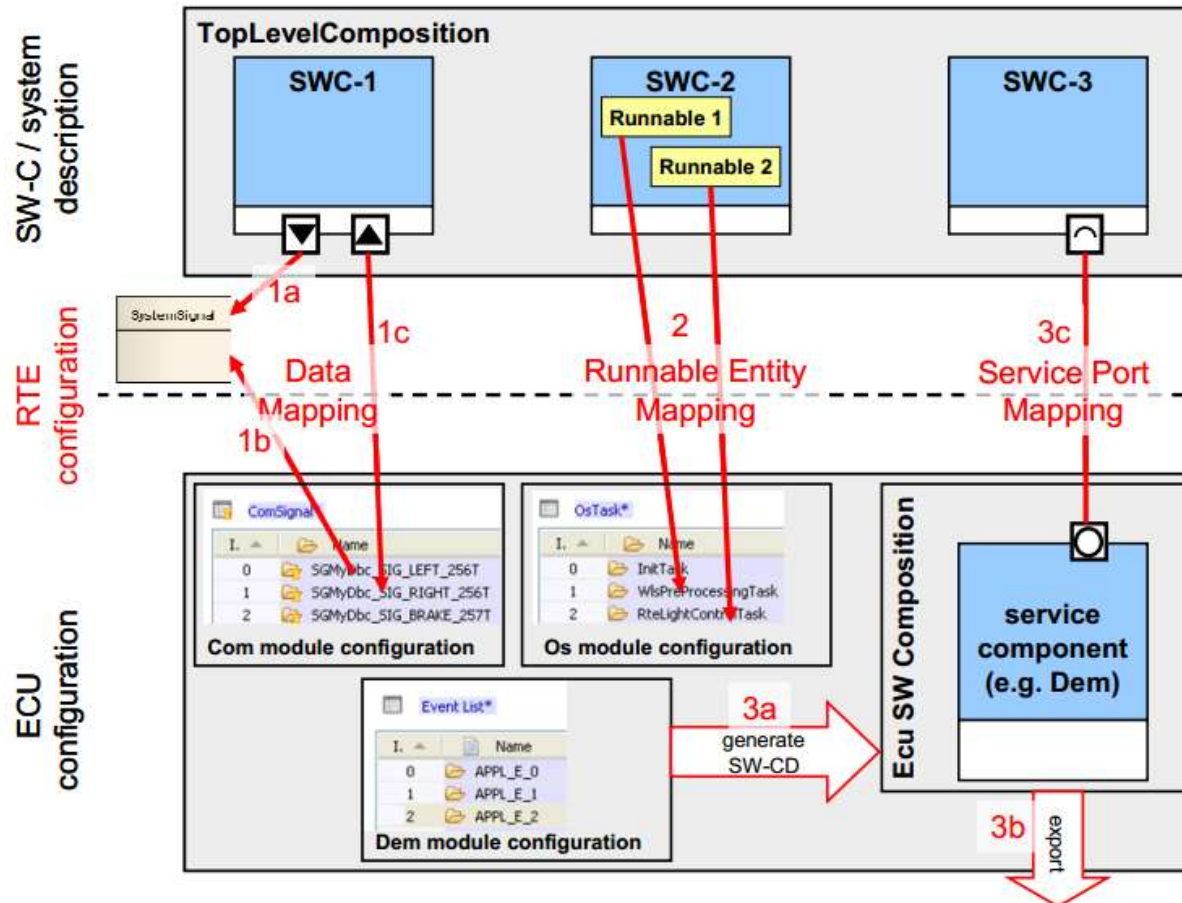
- Runnable 간의 Event/Message 전달 내용 분석
  - Cyclic – 주기마다 Irv + 1 하여 저장 및 Com port로 Send
  - ModifyEcho – 신규 Data 입력 발생시 SWC\_CyclicCounter에 NewCounterValue 전달



- SWC 및 System 요구 사항 import.
  - 다양한 툴과 다양한 버전을 지원함.



- Basic Software Configuration
  - BSW Module Configuration
  - 3가지 RTE 주요 Mapping (Data, Runnable, Service Port)



# ECU Binary 생성과 테스트

- RTE 및 BSW Configuration Parameter code 생성.
- 타겟 보드용 Binary Image 생성
- Run & Test on Target.

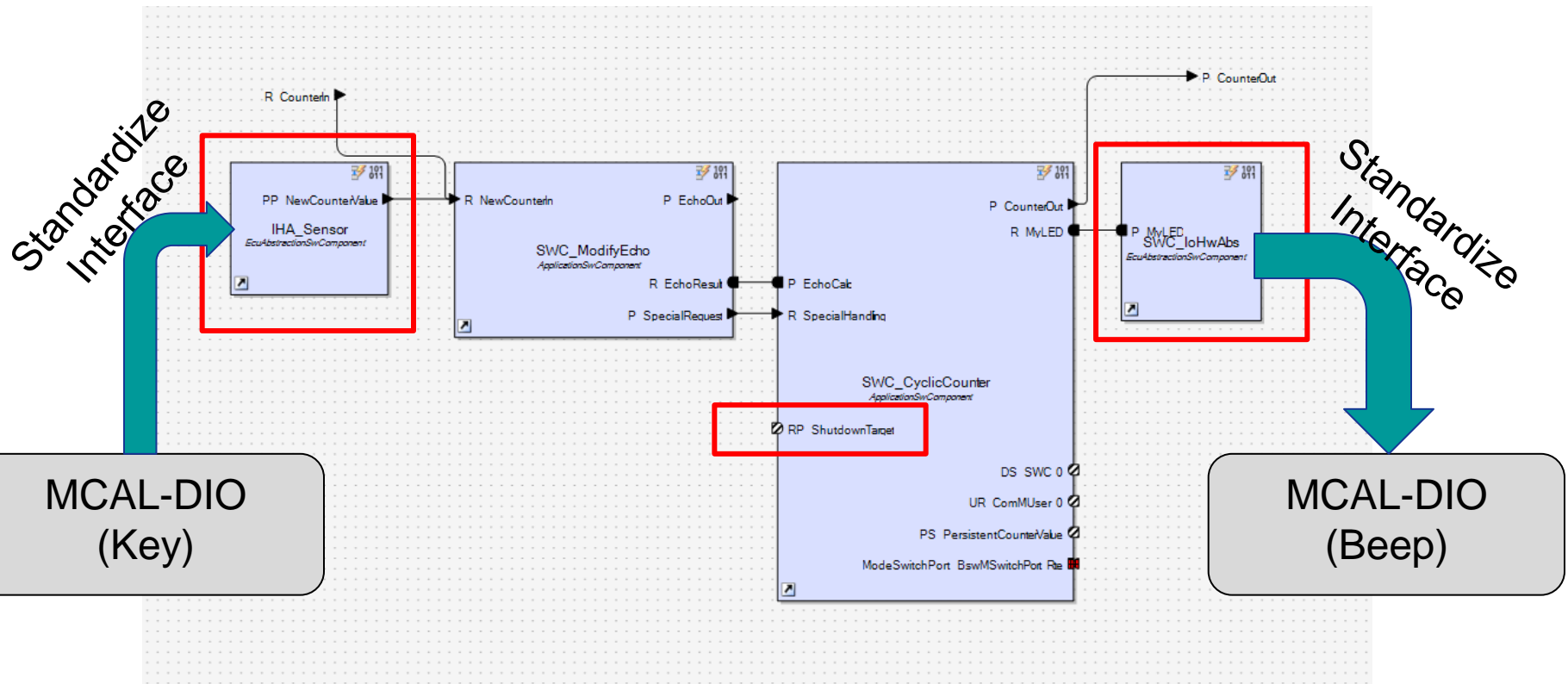
SoftDevice  
CAN over TCP/IP

Bus	Time	Channel	Slot	Slot Status	NF	Header	ID	Cycle	H-CRC	Length	Data	Stat
CAN1	194.448121500	1					0x110			1	E9	Val
CAN1	195.648190500	1					0x110			1	EA	Val
CAN1	196.848259100	1					0x110			1	EB	Val
CAN1	198.048328300	1					0x110			1	EC	Val
CAN1	199.248396900	1					0x110			1	ED	Val

Time	Name	Bus	Unit	Coded Value	Coded Stat.	Physical V.	Physical Stat.	Symbol	Bitsize	Invalid Value	Initial Value	Default Val.
199.258396900	CounterOut	CS		237	Val10	237.000000	Val10		8			

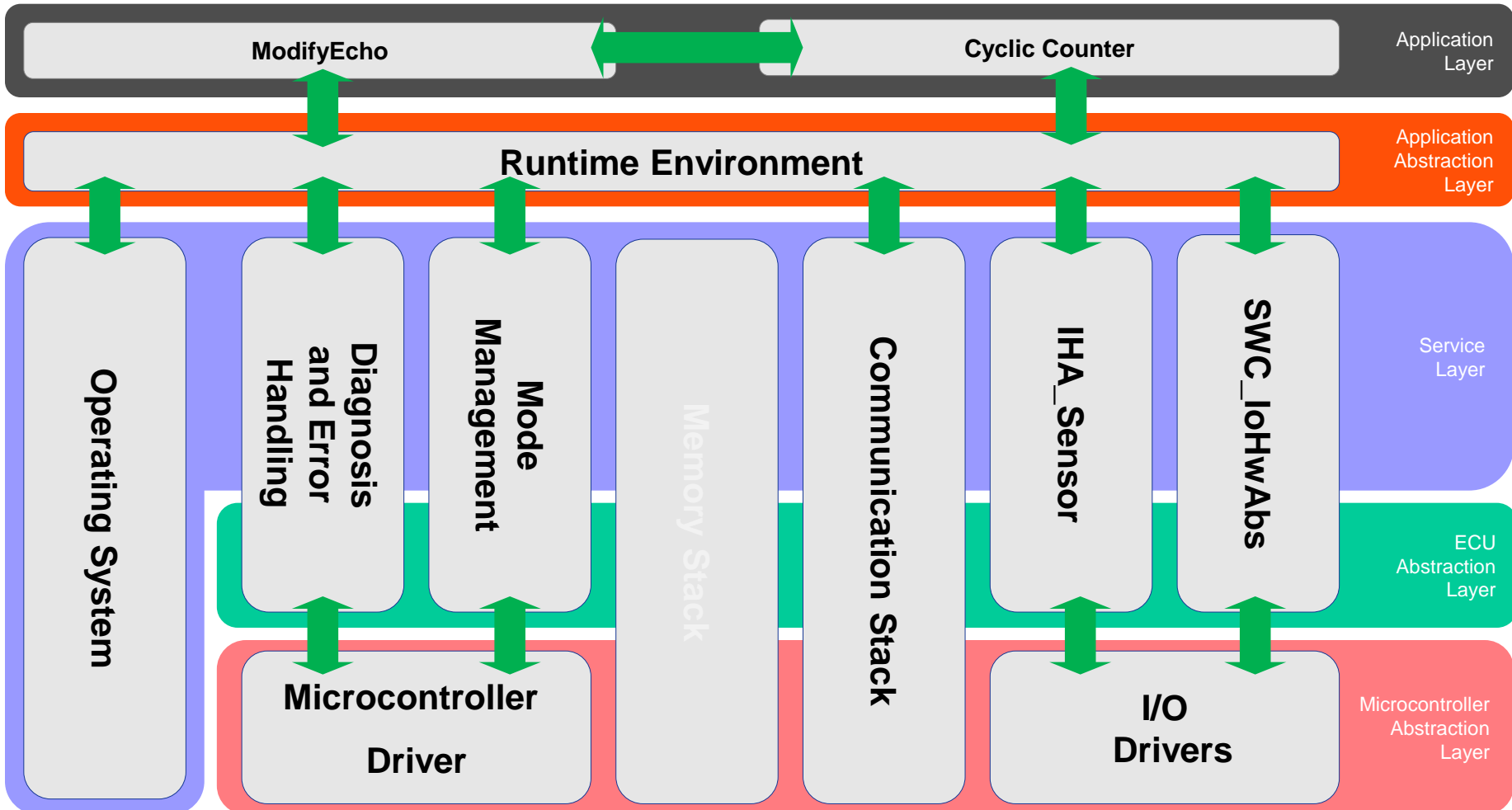
# Supplier 기능 추가 및 빌드

- EcuAbstraction SWC 2개 추가
  - Sensor / Actuator SWC
  - MCAL(DIO) 연결 – stub 코드의 수정
- Basic Software Service 추가
  - Shutdown Target



# Wrap Up Methodology

- OEM 요구사항과 공급업체 Application 통합 Binary 제작.
- Application과 EcuAbstraction은 Target과 완전 분리되어 독립적으로 구동



# EB's Cooperations

	Official cooperation	Tool	Technical agreements	Used in customer projects with EB tresos Interoperability tests	
				AUTOSAR 3.1	AUTOSAR 4.0
<b>dSPACE</b>	✓	SystemDesk	✓	✓	✓
		TargetLink	✓	✓	
<b>IBM</b>	✓	Rhapsody	✓		✓
<b>Mentor Graphics</b>		VSA <small>(Volcano Vehicle Systems Architect)</small>	✓		✓
<b>The MathWorks</b>	✓	Embedded Coder	✓	✓	✓
		Polyspace	✓	✓	
<b>INCHRON</b>		chronVIEW	✓		
<b>DASSAULT SYSTEMES</b>		AUTOSAR Builder (Geensoft)	✓		✓
<b>vector</b>		DaVinci	✓		