



Some points keep in your mind as context

Electric Vehicle Design Contest 2022

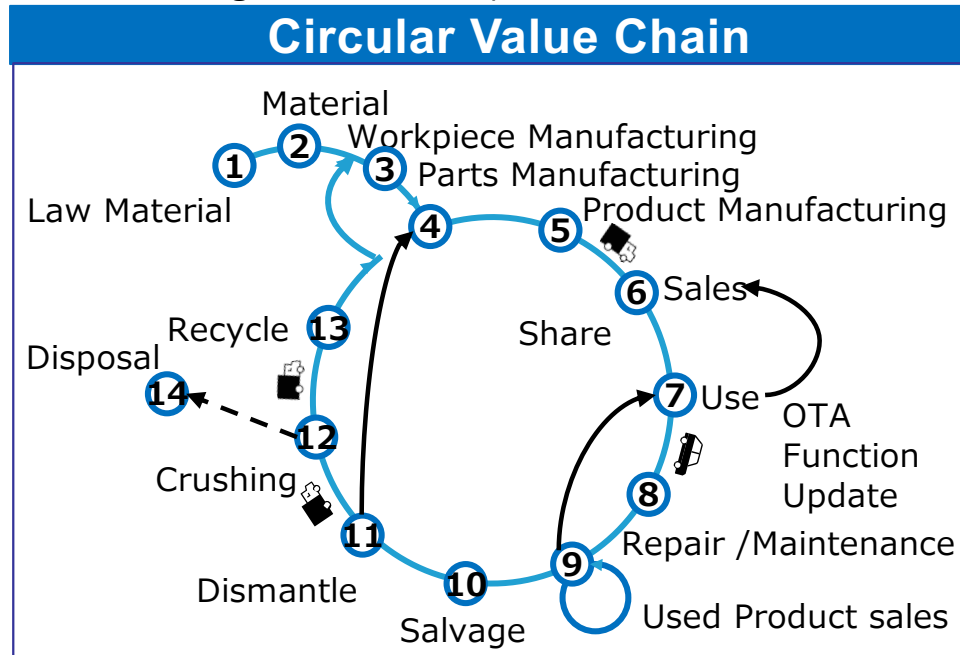
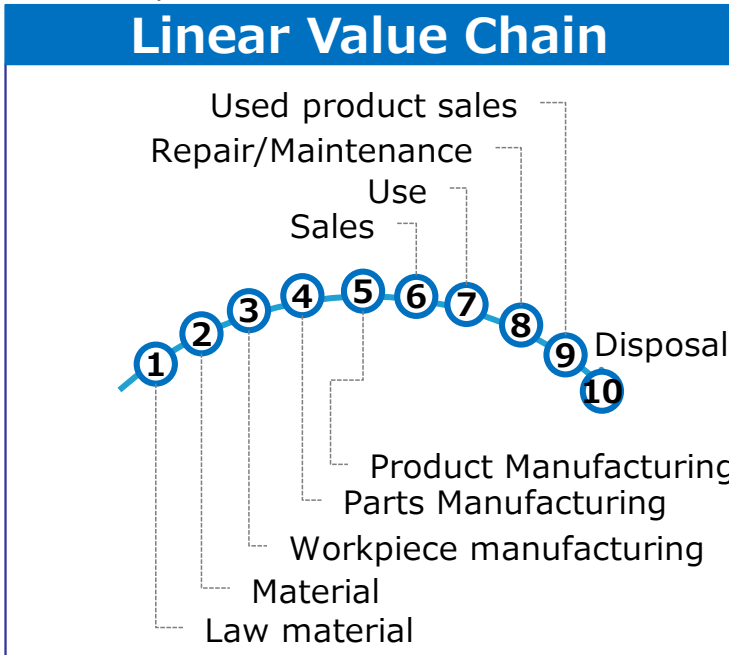
Yoshiyuki Kawashima
CTO Automotive Industry
IBM Japan
Global Automotive Centre of Competency
IBM Corporation



Circular Economy



Ref: <https://iot-automotive.news/ibm-mercedes-benz-envisioning-a-new-wave-in-power/>

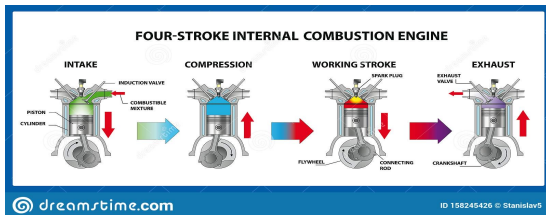


- 5R
- Reduce
- Reuse
- Recycle
- Repair
- Refuse
- (Not use unclean made)

What is Electric Vehicle ?

Energy efficient drive system

- Combustion Engine: Low efficiency
- Electric Motor: Direct Drive



Driving Pressure

- Acceleration
- Precise drive /traction control

Ref: <https://www.idtechex.com/ja/research-article/emerging-electric-motor-technologies-for-the-ev-market/24839>
<https://www.dreamstime.com/type-internal-combustion-engine-called-four-stroke-their-movements-strokes-piston-entire-firing-image158245426>
<https://www.press.bmwgroup.com/global/article/detail/T0362758EN/the-bmw-group-at-the-consumer-electronics-show-ces-2022>
<https://www.goodspress.jp/reports/142829/2/?media=142838>

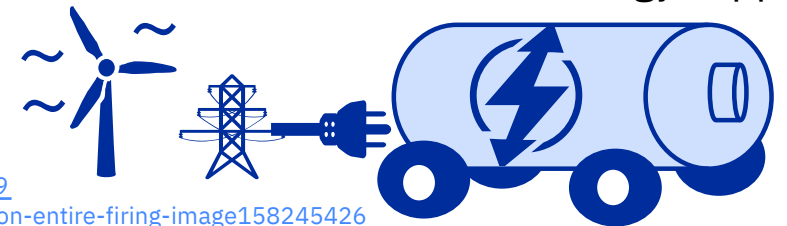


Comfortable Space

- Quiet
- Theater Room
- One more room in garage

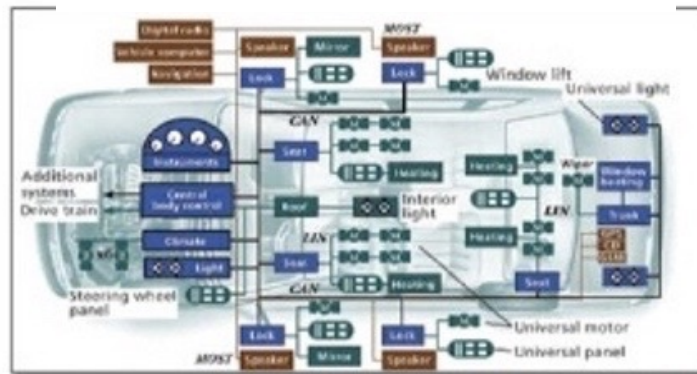
Energy Storage

- Moving battery
- Stabilize unstable sustainable energy supply

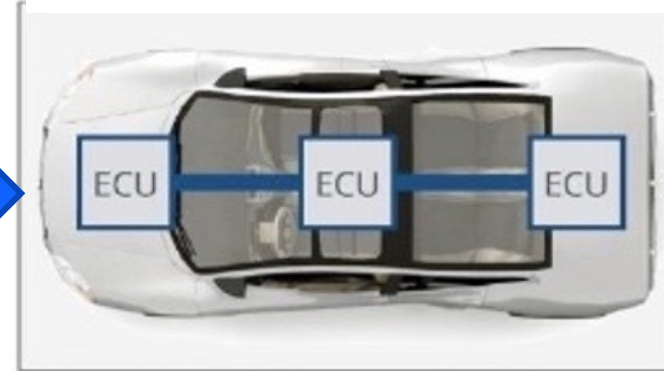


Architecture change of the Car

Conventional Architecture
(Mechanical Oriented)



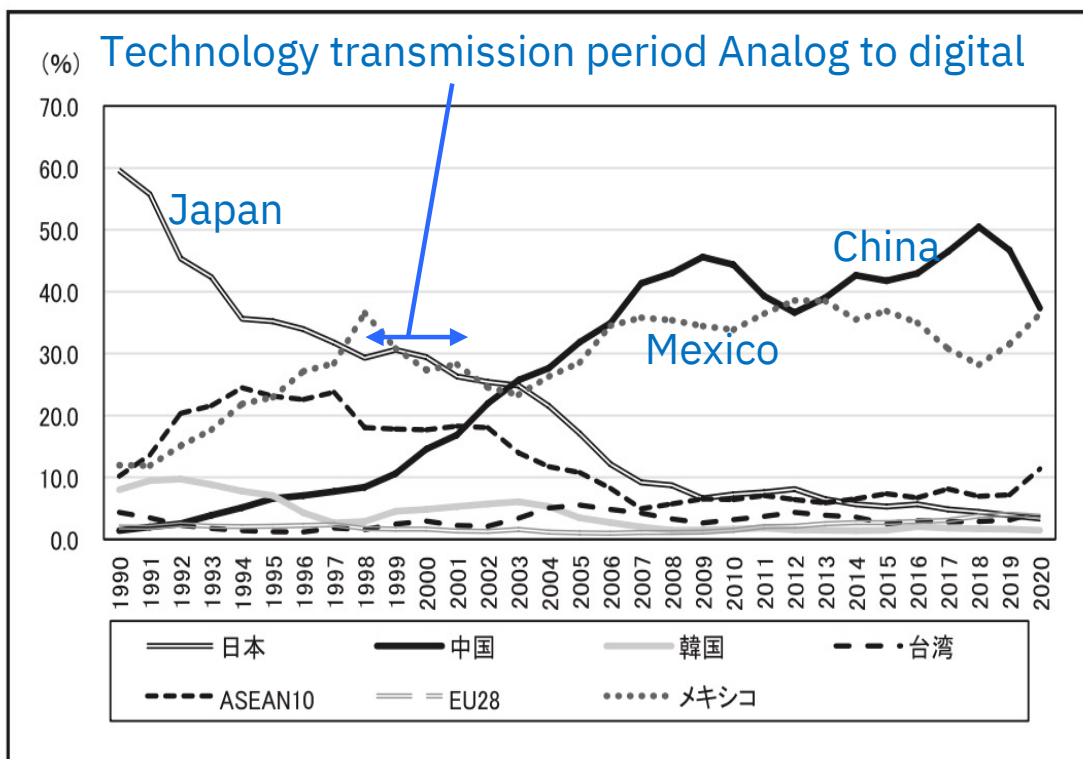
Software Oriented Architecture



<https://www.autovision-news.com/wp-content/uploads/2019/12/Centralized-Architecture.png>

Similar lesson learned in the past – Case Home Electric appliance

⑤映像機器輸入シェア (Visual Equipment import share US)



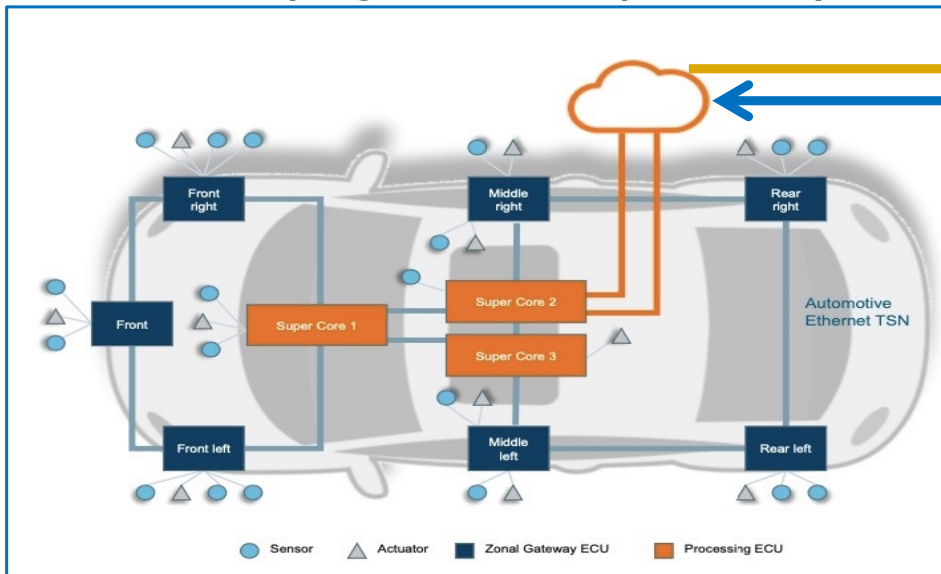
注. 映像機器・・・HS8521、8525.30、8525.40、8525.80、8528、9006

Reference : Dia.6 P118 World Trends and Investment, 2020
(世界貿易と投資 国際貿易投資研究所)

	Analog Home Electric Appliance	Digital Home Electric Appliance
Manufacturing Type	Integral	Modular (Reference design]
Add value by	Hardware	Software (Focus function)
Ease of Entry	Difficult	Easy (Need Reference)
Success Factor	New Product (Leading edge Function)	Design (User Experience)
Success Organization	R&D (New Technology)	R&D with market trends and analysis

The figure of Car: Internet of the Things Device

Car = Σ Functions
 = Σ Mechanical component
 + Σ Software (Program- module- parameters)



Outbound data → Cloud

Inbound data ← Cloud

Remote control

- Air conditioner
- Door lock
- Start Engine

Safety Function

- Hazard distribution
- Car Control info.
- Map distribution

Function stabilization

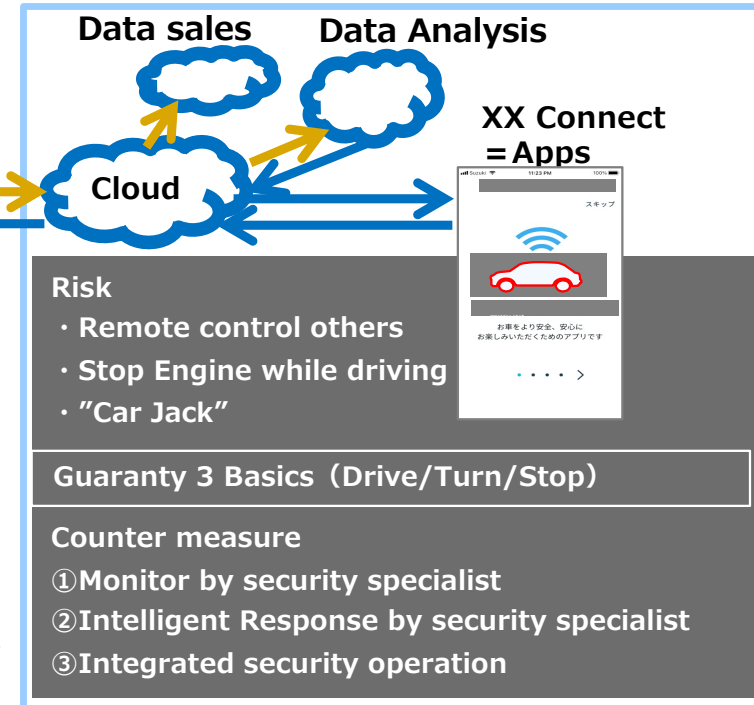
- Software updates
- Add function by S/W

Evolve function

- Software updates
- Add function by S/W

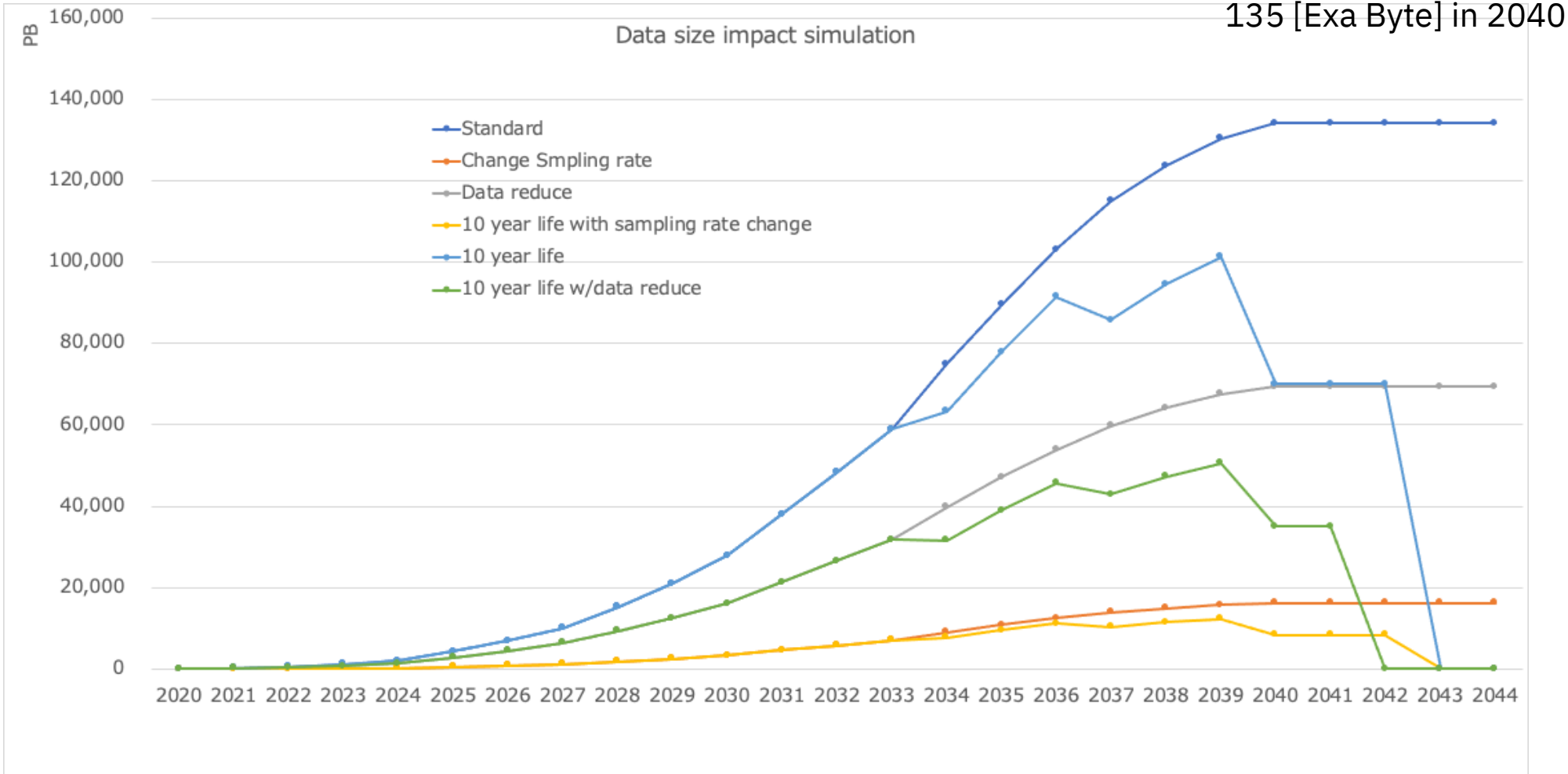
Latest functionality

- Software updates
- Map distribution



Ref:IEEE https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/eipatd-presentations/2019/D1-04_KLAUS-Zonal_EE_Architecture.pdf

Increasing data: example of car probe data



IT Technology's Evolution

Corresponding to Data Centric and Artificial Intelligence world

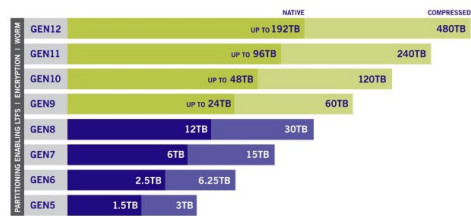
More data

More Fast Processing

More smart , low energy consumption

LTO ULTRIUM ROADMAP

ADDRESSING YOUR STORAGE NEEDS



NOTE: Compressed capacity for generation 5 assumes 2:1 compression. Compressed capacities for generations 6-12 assume 2.5:1 compression.

<https://www.ibm.com/support/t/pages/system/files/inline-files/WSCAccelerateTape101-9-27-18.pdf>

Standard Logic

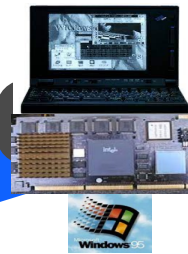


ASIC era



ASIC : application specific integrated circuit

Chip set era



Start of SoC era



SoC : System on a Chip

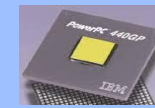
Standard Product



ASSP

(application specific standard products)

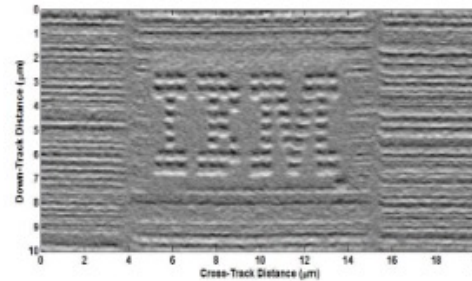
Add user logic to standard architecture



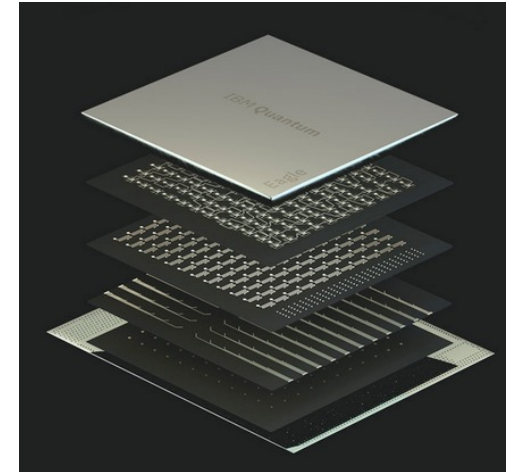
CSSP

(customer specific standard products)

Product Technology Demonstration
330 TB per cartridge



Quantum Computer



<https://newsroom.ibm.com/2021-11-16-IBM-Unveils-Breakthrough-127-Qubit-Quantum-Processor>

