

# 安全性評価基盤の提供価値

## (シナリオDB – 仮想評価環境 – 実システム接続)

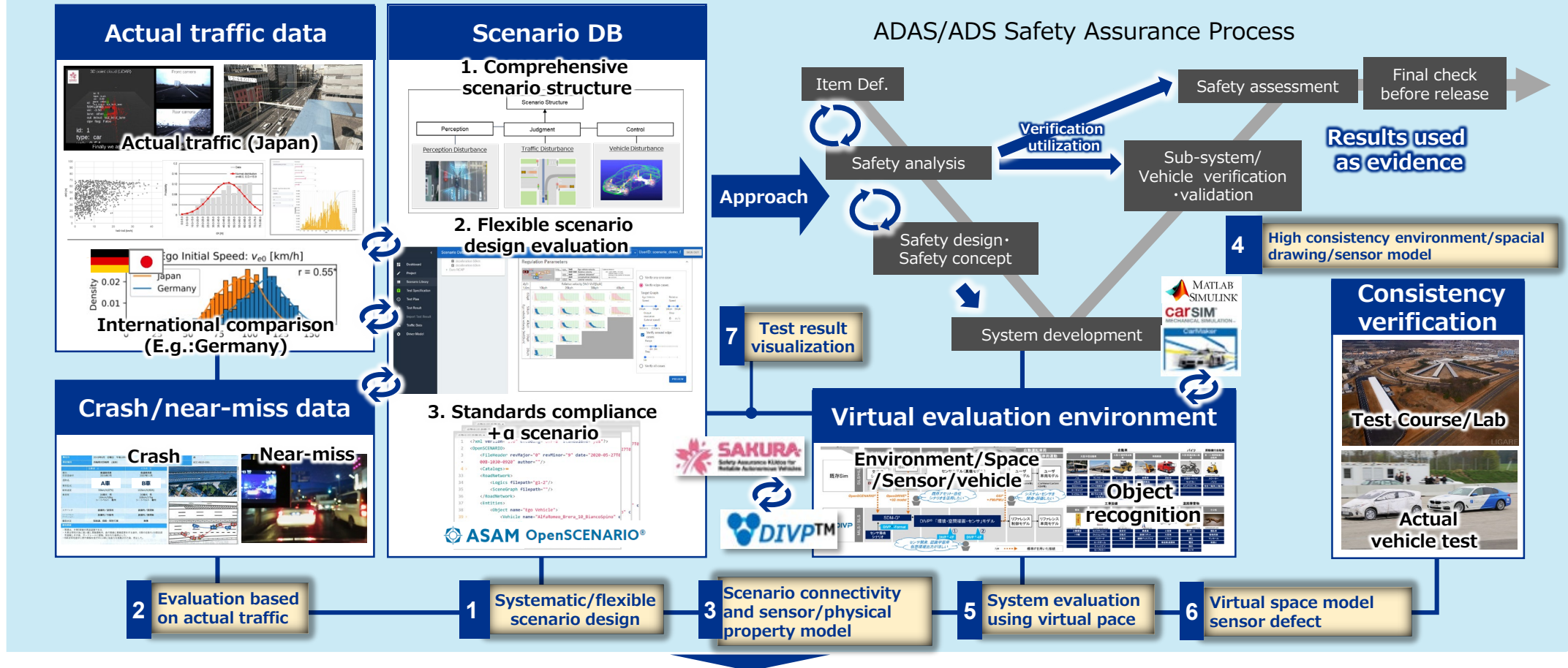
令和3年12月6日

# Workshop Agenda

Item	
A M	1. Hosting of the workshop
	2. Efforts to the Automated Driving Safety Evaluations Safety Assurance joint promotion TF SAKURA Project (Scenario DB) DIVP Project (virtual evaluation environment)
	3. Each Safety Evaluation Platform Added Value・Q&A 1 Systematic and flexible scenario design 2 Setting evaluation conditions based on actual traffic 3 Scenario connectivity & sensor/physical property model
P M	[Break]
	4 Highly consistent environment / spatial drawing sensor model
	5 System evaluation with a virtual space
	6 Virtual space model sensor weaknesses
	7 Test result visualization
	Overall Q&A
[Break]	
	4. Future development plans・Q&A

# **Safety evaluation platform Added value (Overall)**

## Early scenario-base validation for efficient design system development



**System Specifications**

High quality item definition

1

**Generation of unforeseeable scenario**

Necessary scope assessment

2

	Alert	Warning	Cut in	Cut out	Acceleration	Deceleration (Stop)
lane change						
merge						
overtake						
branch						

**Reproduction of sensor weaknesses**

High quality virtual evaluation

3 4 5 6

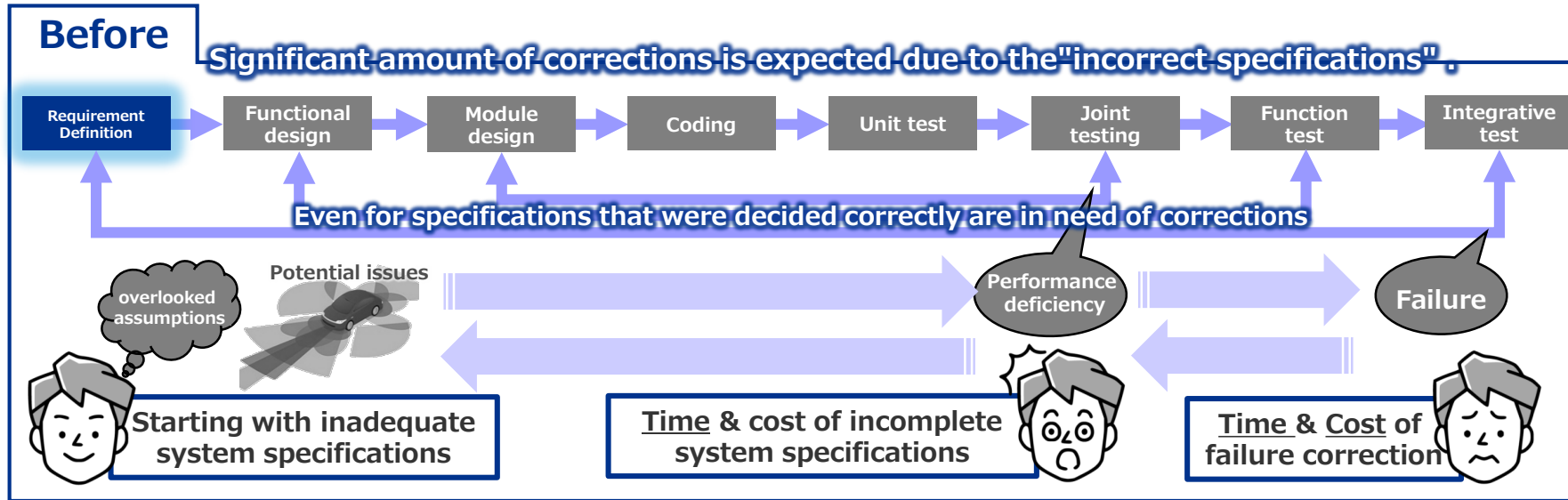
**Visualization results/control**

Continuous integration

7

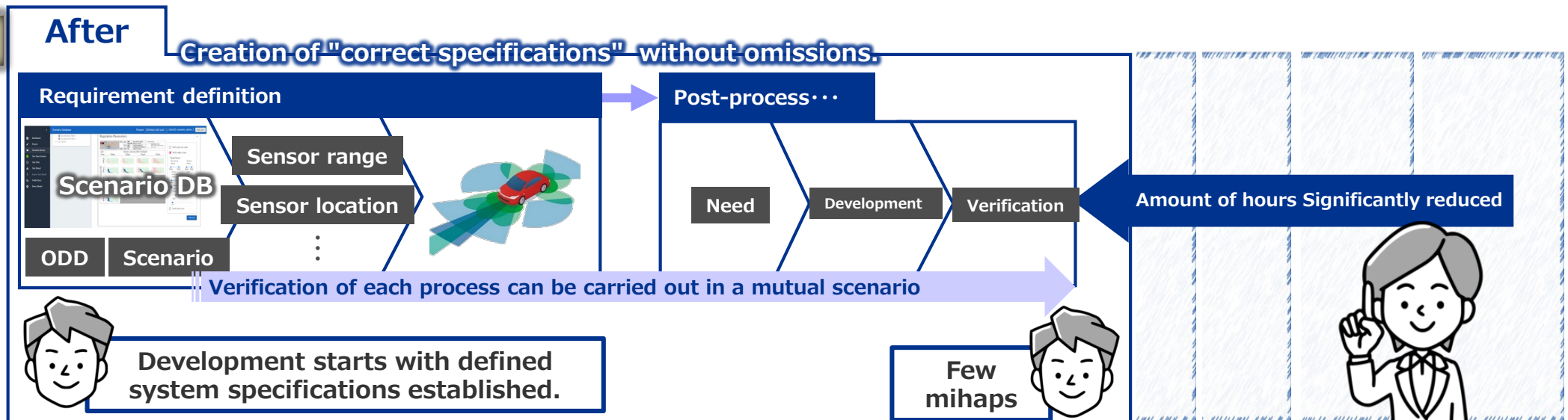
# Delight [Part 1] (Before/After)

## I Definition of high quality items: Sensor set-up



Proposed value

1 Systematic/flexible scenario design



## II Required scope assessment set-up: generation of foreseeable scenario

### Before

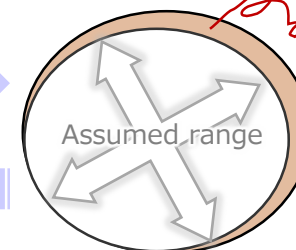
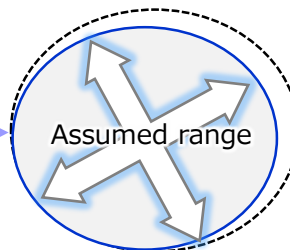
Required-operation-design-area/insufficient-verification-range-setting, problems caused by these cannot be.



**Safety that autonomous cars must meet**

Autonomous vehicle systems, under their ODD/OD, shall not cause any traffic accidents resulting in injury or death that are reasonably foreseeable and preventable"

Intention



Reasonably foreseeable ranges are set

Missing/leaking Verified set-ranges

Poorly explained verification ranges result in issues difficult to

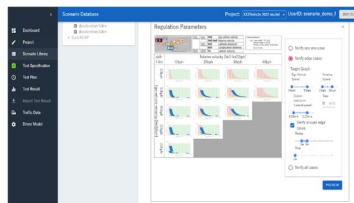
Added value

2 Evaluation based on actual traffic

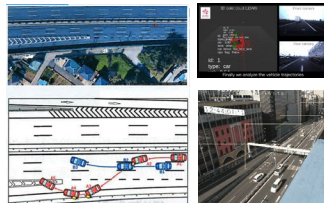
### After

Generation of flexible evaluation scenarios matching operational domain & actual traffic.

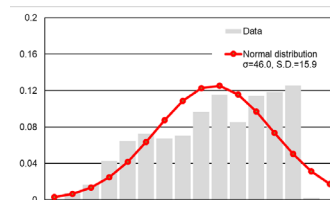
Scenario Structure



Actual traffic flow data



Parameter ranges



Each process demonstrate why the verification extent is acceptable.

Future possibilities based on traffic conditions of set foreseeable ranges

It is possible to explain the verification ranges with clear evidences

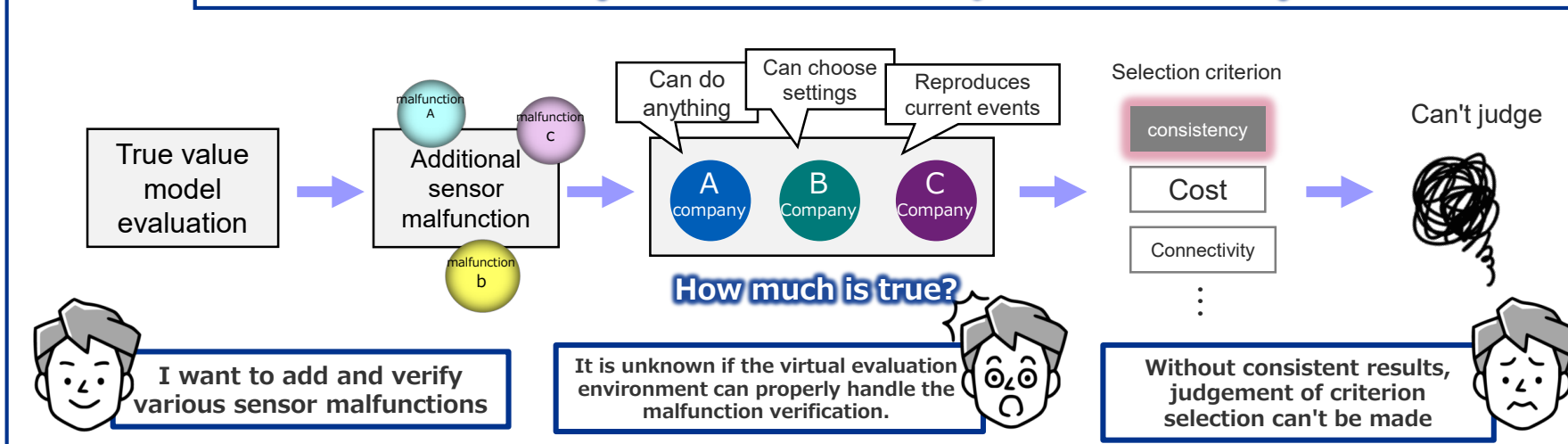
UP

Raising explainability/transparency!

# Delight [Part 3] (Before/After)

## III Consistently high virtual evaluation : reproduction of sensor weaknesses

**Before** Actual vehicle test cannot verify various sensor malfunctions, and verification validity is difficult with a virtual evaluation environment

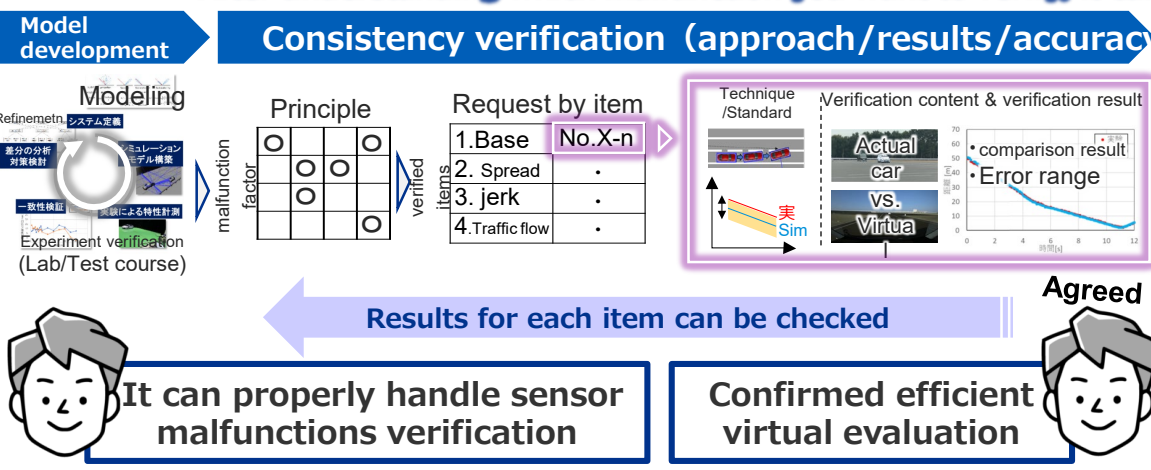


Added value

- 3 Scenario connectivity and sensor/physical property model
- 4 High consistency environment/spacial drawing/sensor model
- 5 System evaluation using virtual pace
- 6 Virtual space model sensor defect

## After

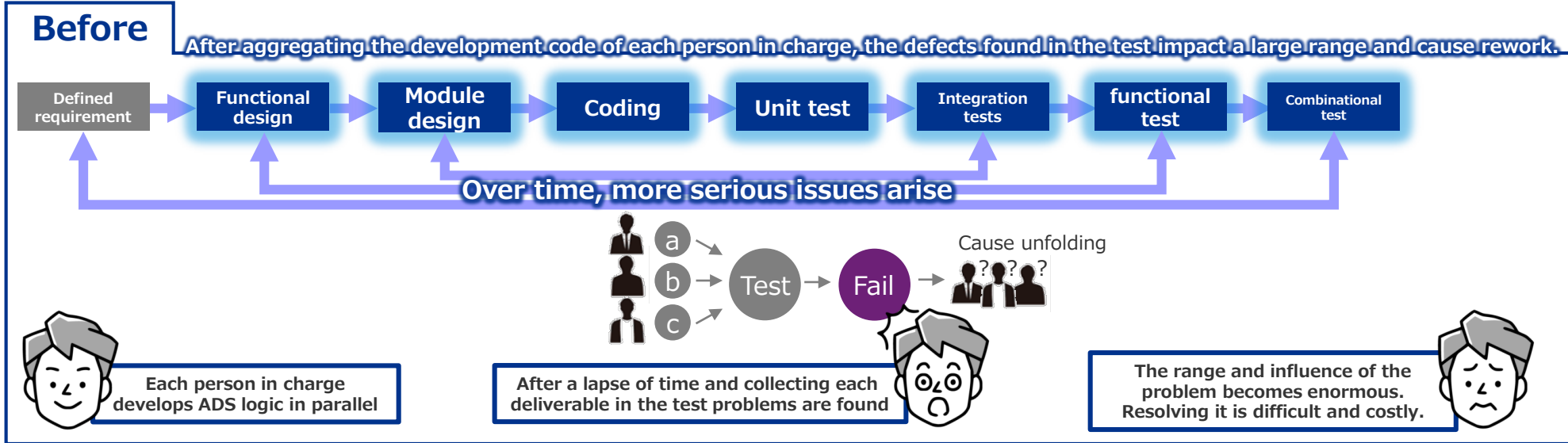
After understanding which malfunction you want to verify, it can be reproduced and verified.



It is verifiable with the appropriate environment!



## IV Continuous integration: results visualization/management



Added value

7 Test result visualization

