Traffic steering for Traffic Digital Twin powered by Traffic Influence API
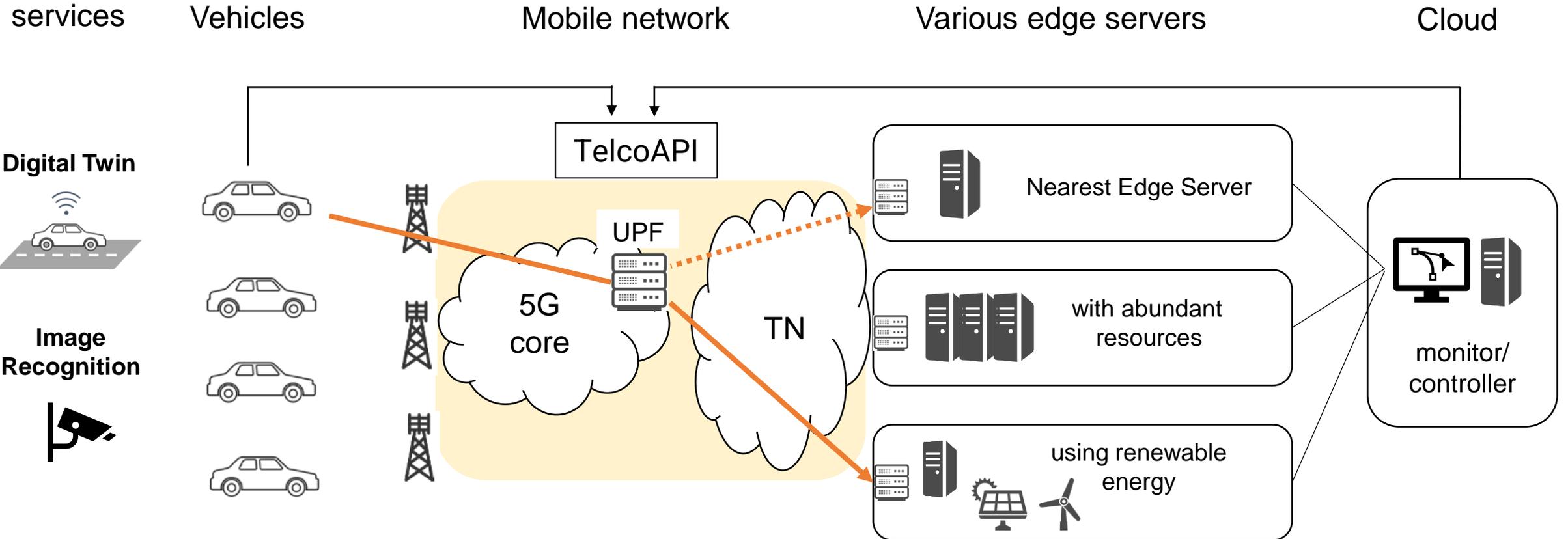
Automotive Edge Computing Consortium

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PoC Technical Overview

Vehicle applications have diverse requirements, requiring optimal edge server selection. TelcoAPI enables flexible edge selection based on the application.

Edge Cloud API :
A set of functions for utilizing and managing edge servers. (https://camaraproject.org/edge-cloud/)
The following two APIs are included:

Edge Application Management API :
Provides lifecycle management for applications, enabling Application Providers to deploy and manage applications efficiently.

Traffic Influence API :
Enables the establishment of optimal routing between user devices and edge servers.
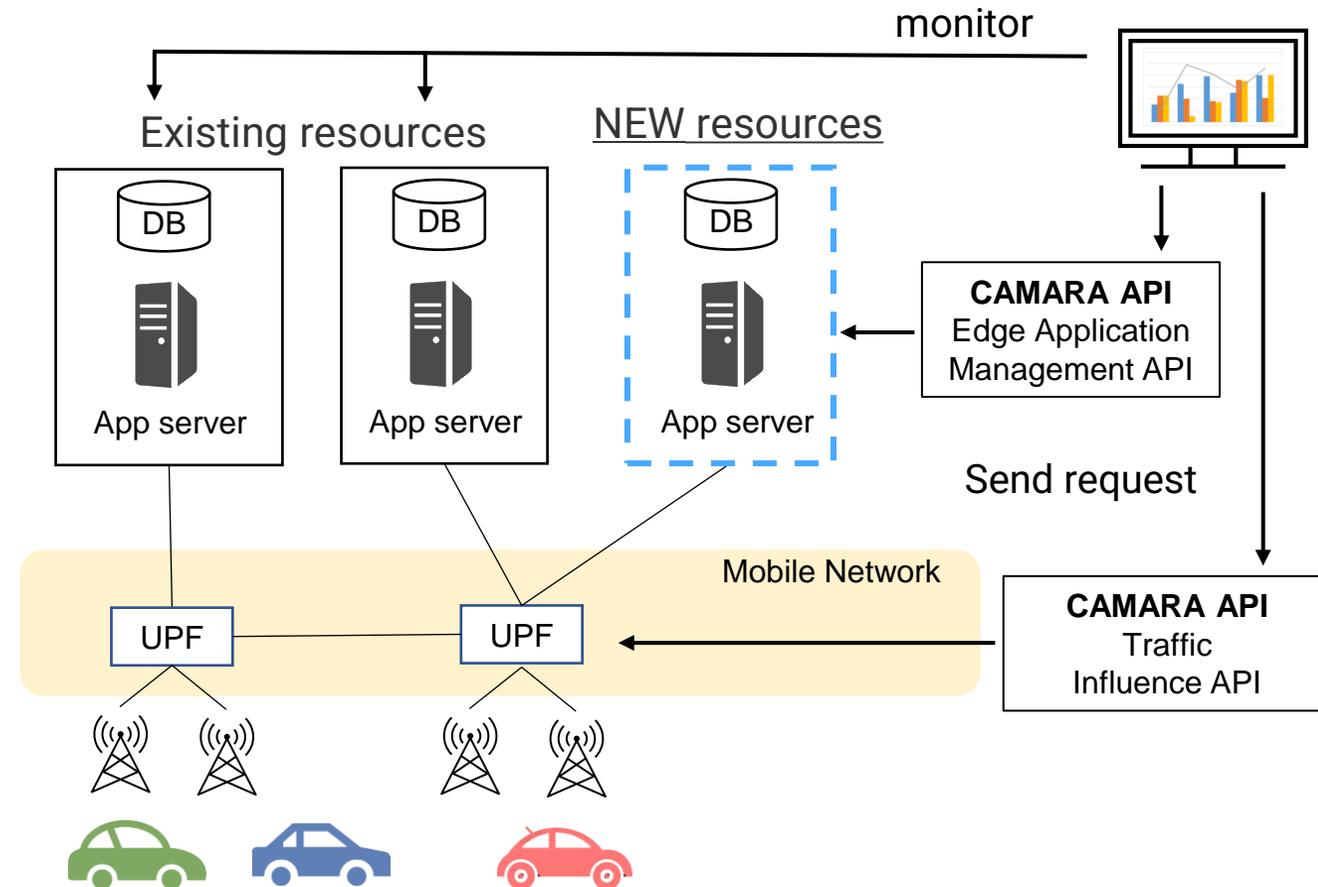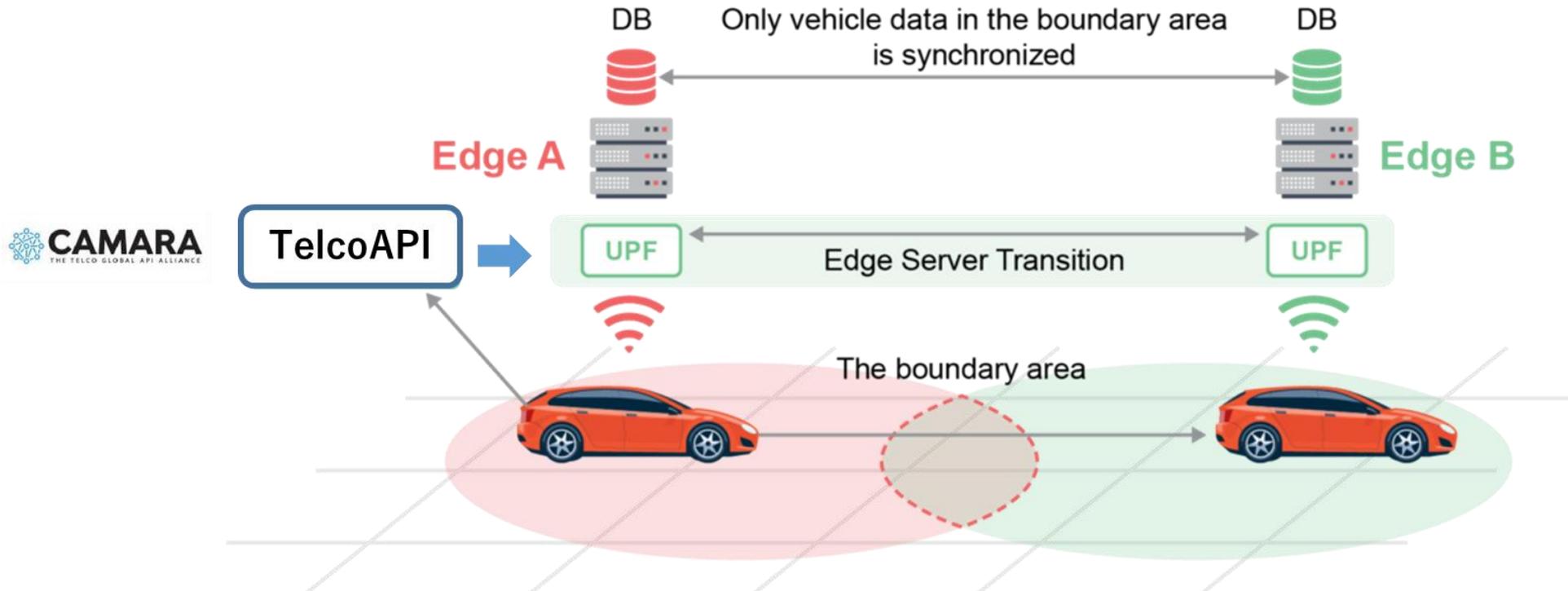
Traffic Digital Twin : Functional Architecture

Low latency and efficient data transmission are required for the realization of digital twins. ※
Processing local data on local edge servers may enable efficient service delivery.
However, since vehicles move between regions, transitioning edges according to their movement is necessary.
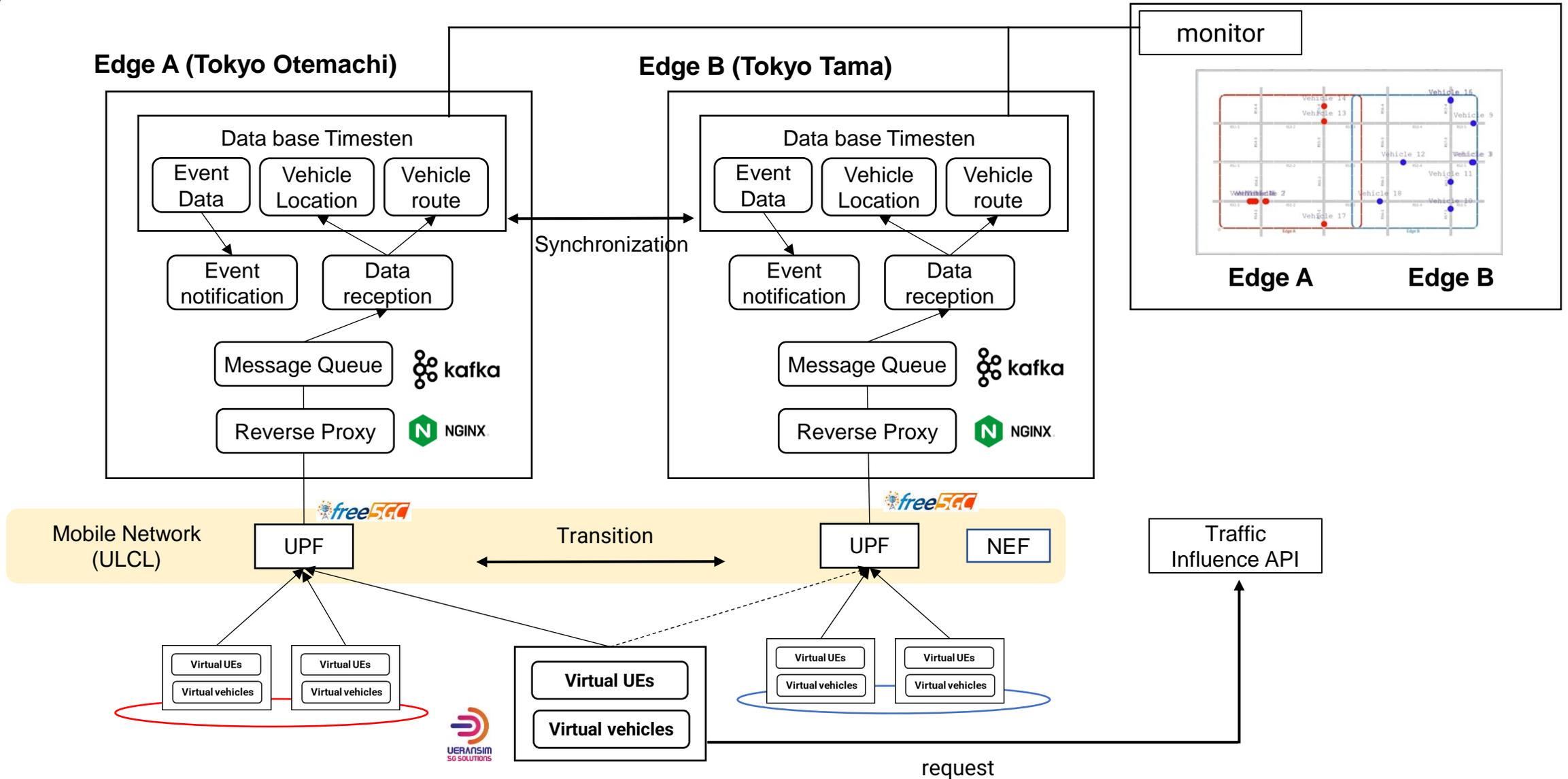**In This PoC, the following two functions were implemented.**

- Traffic Influence API is used to switch edges based on vehicle movement.
- By synchronizing only the vehicle data in the boundary areas between edges, a seamless transition is achieved.

※AECC Digital Twins (White Paper) Version 1.0 June 1, 2024

Traffic Digital Twin : PoC System Configuration

Edge A (Tokyo Otemachi)

Data base Timesten
- Event Data
- Vehicle Location
- Vehicle route
- Event notification
- Data reception

Message Queue — kafka

Reverse Proxy — NGINX

Edge B (Tokyo Tama)

Data base Timesten
- Event Data
- Vehicle Location
- Vehicle route
- Event notification
- Data reception

Message Queue — kafka

Reverse Proxy — NGINX

Synchronization

monitor

Edge A   Edge B

free5GC

Mobile Network (ULCL)

UPF

Transition

UPF

NEF

Traffic Influence API

Virtual UEs / Virtual vehicles

Virtual UEs / Virtual vehicles

Virtual UEs

Virtual vehicles

UERANSIM 5G SOLUTIONS

Virtual UEs / Virtual vehicles

Virtual UEs / Virtual vehicles

request

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AECC is currently seeking members to co-create a digital platform for the automotive industry.
Contact: infotech-contact@mail.toyota.co.jp