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| Input Contribution |
| Meeting ID\* | RDM#40 |
| Title:\* | Use case: Sending Data between Edge/Fog Nodes for Continuous Service. |
| Source:\* | Youngjin Na, Hyundai Motors, yjra@hyundai.comMinbyeong Lee, Hyundai Motors, minbyeong.lee@hyundai.comJaeSeung Song, KETI, jssong@sejong.ac.kr |
| Date:\* | 2019-05-20 |
| Input related to\* | TR-0026, Adding a new use case about Offloading Service Continuity between Edge/Fog Nodes. |
| Intended purpose ofdocument:\* | [x]  Decision[ ]  Discussion[ ]  Information[ ]  Other <specify> |
| Impacted other TS/TR(s) | TR-0052 |
| Decision requested or recommendation:\* | Add new use case of Sending Data between Edge/Fog Nodes for Continuous Service to TR-0026. |
| Template Version: January 2017 (Do not modify) |

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# 6.XX Offloading Service Continuity between Edge/Fog Nodes

### 6.XX.1 Description

Vehicle is requested for reliable and safety because it moves dynamic and fast on the road (e.g. highway). So the vehicle (e.g. V2X communication) should be supported continuous service when it is driving and communicating.

For example, there is a vehicle passing by around the Edge/Fog Node A of VRU (Vulnerable Road User) situation.

The Edge/Fog Node A is received data from the Cloud Node by offloading service. The Edge/Fog Node A analyses the road information data (e.g. other vehicles, pedestrian) which is collected by the vehicle. When the vehicle moves from the Edge/Fog Node A to the Edge/Fog Node B, the offloaded instances running on Edge/Fog Node A should be moved to Edge/Fog Node B without disconnecting the service. When the vehicle is connected to Edge/Fog Node B, it should receive the service from Edge/Fog Node B not from Edge/Fog A.

This offloading service continuity should be supported in a way to reduce the communication load and keep low latency without any service disconnection. To support offloading service continuity, direct communication between adjacent Edge/Fog nodes and synchronization with the central cloud platform are required.

### 6.XX.2 Source

RDM-2019-0048 Use case of Offloading Service Continuity between Edge/Fog Nodes

### 6.XX.3 Actors

* Vehicle: It is an application which is located on the road.
* Edge/Fog Node: It is the Node which computes, stores and analyses data. It is located between Cloud Nodes and end devices.
* Cloud Node: It is the Nodes which manage Edge/Fog Nodes, maintain database of Edge/Fog Nodes and interacts with Application Provider.
* RSU: It is located along vehicular paths and provides connection between vehicles and Edge/Fog Node in a RSU network.

### 6.XX.4 Pre-conditions

* A vehicle is equipped with sensor and device for road data collect and analysis.
* RSU service related resources are offloaded to Edge/Fog A from the IoT cloud.

### 6.XX.5 Triggers

* When the vehicle moves from the Edge/Fog Node A to the Edge/Fog Node B, the Edge/Fog Node A sends the data to the Edge/Fog Node B directly without passing the Cloud Node.

### 6.XX.6 Normal Flow

1. The Cloud Node offloads the Edge/Fog Node information to the Edge/Fog Node A.
2. A vehicle collects new data on the road and sends the data to RSU and Edge/Fog Node A.
3. After the Edge/Fog Node A analyses the road information data (e.g. other vehicles, pedestrian) which is collected by the vehicle, Cloud and Edge/Fog A make a decision to move offloaded resources to Edge/Fog B as the vehicle is moving towards Edge/Fog Node B. Then the Edge/Fog Node A sends the data to Edge/Fog Node B.
4. The Edge/Fog Node A sends some parts of collected data to the Cloud Node for synchronization.
5. The Cloud Node offloads the Edge/Fog Node information to the Edge/Fog Node B to support offloading service continuity.
6. The Edge/Fog Node B sends the data to the application on the moving vehicle.
7. The vehicle collects another new data on the road and sends the data to RSU and Edge/Fog Node B.
8. After the Edge/Fog Node B analyses the road information data which is collected by the vehicle, the Edge/Fog Node B sends the data to Edge/Fog Node C.
9. The Edge/Fog Node B sends the data to the Cloud Node for synchronization.
10. The Cloud Node offloads the Edge/Fog Node information to the Edge/Fog Node B.
11. The Edge/Fog Node B sends the data to the moving application.
12. The Edge/Fog Node A sends the data to the Cloud Node for synchronization.



Figure 6.XX.6.1 : Normal Flow – Offloading Service Continuity between Edge/Fog Nodes

### 6.XX.7 Alternative Flow

None

### 6.XX.8 Post-conditions

None

### 6.XX.9 High Level Illustration



Figure 6.XX.9.1 : High Level Illustration - Offloading Service Continuity between Edge/Fog Nodes

### 6.XX.10 Potential requirements

1. The oneM2M System shall enable to send data between Edge/Fog Nodes for continuous service support.
2. The oneM2M System shall enable to synchronize data between Edge/Fog Node and Cloud Node when send data between Edge/Fog Nodes.