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| Input Contribution |
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| Title:\* | Joint\_Edge\_Fog\_computing\_with\_underlying\_network |
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| Input related to\* | TR-0052 Edge and Fog Computing in oneM2M system |
| Intended purpose ofdocument:\* | [x]  Decision[ ]  Discussion[ ]  Information[ ]  Other <specify> |
| Impacted other TS/TR(s) | N/A |
| Decision requested or recommendation:\* | Introducing Key Issue regarding joint Edge/Fog computing with underlying network  |
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# Introduction

Underlying networks such as 3GPP 5G Core supports virtualization and Edge/Fog computing. This means that underlying network can be instantiated and deployed Edge/Fog nodes dynamically. Such information (i.e., the creation of a virtual network, the supported service type of the virtual network, the location of the virtual network) can be used by the oneM2M system to jointly perform Edge/Fog computing (e.g., offloading or service instantiation) on the same node where the virtual network is instantiated or one of nearst nodes to the virtual network.

An additional key issue is introduced in this contribution as part of Key Issue 3: Edge/Fog Computing with Underlying Network Information. If this additional key issue is agreed, a potential solution or an enhancement to existing proposed solutions will be introduced as a following up contribution.

### -----------------------Start of change 1-------------------------------------------

## 8.3 Key Issue 3: Edge/Fog Computing with Underlying Network information

Several clauses provide use cases, optimization scenarios, existing technologies and requirements related to Edge/Fog Computing with Underlying Network information, as follows:

1. High-precision Road Map Service using Edge/Fog Computing (clause 6.20 of TR-0026 [i.38]) provides a use case related to Underlying Network information. The information can be used to minimize the amount of data that needs to be sent from the devices and to minimize the amount of processing required by the Cloud Nodes, e.g. what networks are accessible at the current location and their congestion level. Following requirement based on the use case is also identified in TS-0002 [i.39].

**OSR-0151:** The oneM2M System shall enable services to receive and utilize location-based information about available access networks, their congestion level and other related network information when the information is provided by the Underlying Network.

1. Clauses 7.3.1 and 7.3.2 provide oneM2M Platform Optimization Scenarios. Those scenarios introduce data transfer optimization of 3GPP services based on providing radio network related information, location information and QoS information to Fog Nodes. A Fog node retrieves the information from 3GPP Underlying Network via 3GPP T8 interface or SGi interface (for ETSI MEC service calls). Currently the oneM2M System supports the T8 interface to communicate only to IN-CSE, which may be considered a “loose coupling” of the Edge/Fog deployment with the Underlying Network. Alternatively, cases of Edge/Fog deployments “tightly coupled” with the Underlying Network can be envisioned, e.g. if the 3GPP T8 interface is directly available to MN-CSEs as Edge/Fog nodes
2. Clause 6.2.3 introduces ETSI ISG MEC Architecture and APIs as an existing technology of Edge/Fog Computing. MEC RNIS API (clause 6.2.3.3.5) and LS API (clause 6.2.3.3.6) can be used to retrieve radio conditions in an area and device location respectively by using Edge Nodes. How the MEC service retrieves the necessary information from the Underlying Network is out of the scope in the current ETSI ISG MEC specifications. Should this functionality be defined, the APIs may be made available externally and provide additional methods for oneM2M to interwork with the Underlying Network for the purpose of enabling Edge/Fog deployment.

Assuming a Release 3 implementation, the oneM2M System supports the limited mechanisms for providing Edge/Fog Nodes with Underlying Network information, e.g. to adjust data processing and data transfer based on the Underlying Network information.

* The oneM2M System support of interfaces with the Underlying Networks such as 3GPP T8 interface for enabling Fog/Edge services should to be studied and clarified for loosely-coupled as well as tightly coupled deployment cases.
* The oneM2M System support of specialized interfaces such as the ETSI MEC should be studied and defined for interworking with the Underlying Networks for Edge/Fog deployment enablement.
* Use cases for utilization of specific Network-related information such as location-based information about available access networks, congestion level, etc. should be addressed.

Underlying networks such as 3GPP 5G Core now support network slicing, which is a technique allowing network operators to build multiple virtual networks dynamically on a shared physical network based on services or users. Available information related to network slicing such as guaranteed QoS, supported service types, and an identifier of a network slice can be used by the oneM2M system to jointly perform Edge/Fog computing functions (e.g., offloading or service instantiation) on the same node where a network slice is instantiated or nearst nodes that can support oneM2M Edge/Fog functions.

### -----------------------End of change 1-------------------------------------------