

# MEC-based Stable Topology Prediction for Vehicular Networks

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## MEC-based Stable Topology Prediction for Vehicular Networks

### Use Case Details:

| Attributes                    | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Informational                                                                                                                                                                                                                                                                    |
|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                          | New                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | The use case is proposed under the <a href="#">ICN</a> BP family                                                                                                                                                                                                                 |
| Industry sector               | Area: SDN & NFV<br>University: Gachon University<br>Country: Republic of Korea                                                                                                                                                                                                                                                                                                                                                                                                                                              | We focus on the problems related to networking and software technology for a better connection. The technology that allows to build IT infrastructure, and aims to grow into a 'Software Defined Infrastructure' company.                                                        |
| Business driver               | The stable vehicular network is essential to enable various applications such as autonomous driving through VANETs. Proposed MEC architecture tends to enable a promising infrastructure where a stable network topology can be predicted locally to improve the network performance by providing intensive calculation for vehicles in the adjacent roads. Thus, converging the two concepts of MEC and topology prediction can provide a strong use case for the vehicular networks such as proactive path stabilization. | The MEC-based Efficient Routing Algorithm can provide a stable path by using the predicted future position for the nearby vehicles. The information can also be made available to the adjacent road resulting from being useful to provide a stable topology on the road tracks. |
| Business use case             | <ul style="list-style-type: none"><li>Edge cloud deployable at RSUs to support applications such as ML-based location prediction, topology stabilization</li></ul>                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                  |
| Business cost - Initial build | Minimal configuration is three servers in total: <ul style="list-style-type: none"><li>Master/Database node (1<sup>st</sup> server)</li><li>Edge node 1 (2<sup>nd</sup> server)</li><li>Edge node 2 (3<sup>rd</sup> server)</li></ul>                                                                                                                                                                                                                                                                                       | Price factor depends on the cost of RSU quality, and should be only considered for physical deployment. i.e. wireless or wired.                                                                                                                                                  |
| Business cost - Operational   | Virtual environment does not require cost.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                  |
| Operational need              | Using the frontend GUI to: <ul style="list-style-type: none"><li>Orchestrate virtual resources</li></ul> Manage the edge applications                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                  |
| Additional details            | <ul style="list-style-type: none"><li>Support of path within a Single operator domain</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                             | PPT is attached as proposal statement.                                                                                                                                                                                                                                           |

### Species Details:

| Attributes              | Description                                                                                                   | Informational                                                        |
|-------------------------|---------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| Type                    | Integrated Cloud Native NFV/App stack (ICN)                                                                   |                                                                      |
| Blueprint Family        | Existing                                                                                                      |                                                                      |
| Use case                | Stable network topology in IoV                                                                                |                                                                      |
| Blueprint proposed name | MEC-based Stable Topology Prediction for Vehicular Networks                                                   |                                                                      |
| Initial POD cost        | Satellite POD                                                                                                 |                                                                      |
| Scale & Type            | System will be developed/deployed in VMs.                                                                     |                                                                      |
| Applications            | <ul style="list-style-type: none"><li>ML model</li><li>LTE network services</li><li>ProSe Functions</li></ul> | Open Air Interface (OAI) provided LTE network services will be used. |

|                              |                                                                                                                                                                                                                                                                                                                                         |  |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Infrastructure orchestration | <ul style="list-style-type: none"> <li>• OpenStack latest/stable release – VM orchestration</li> <li>• Kubernetes-based container orchestration</li> <li>• WeaveNet -based Container Networking</li> <li>• VNF Orchestration – ONAP</li> <li>• OS – Ubuntu 18.X LTS</li> <li>• CICD - Jenkins 2.249.1 LTS</li> </ul>                    |  |
| SDN                          | ONOS will be used at the application layer                                                                                                                                                                                                                                                                                              |  |
| Workload type                | VMs and Containers                                                                                                                                                                                                                                                                                                                      |  |
| Additional                   | <ul style="list-style-type: none"> <li>• 4 Virtual Machines <ul style="list-style-type: none"> <li>1. One Orchestration node</li> <li>2. Three Edge nodes</li> </ul> </li> <li>• Jenkins for Continuous Integration and Continuous Delivery</li> <li>• Personal servers will be integrated with the Linux Foundation servers</li> </ul> |  |

## Committers and PTL (Project Technical Lead)

Please enter in all names of the committers for the project.

PTL is done off of self nomination process. If you wish to be considered for the PTL, please indicate that by putting a Y in the self nomination column (use the slide to move the table left to right). Per Akraino rules, if there is only one nominee, that person becomes PTL (when confirmed by the Akraino TSC). If there is more than nominee, we will then have an election.

The election process is open and will go through 7 Oct. 2020 at Noon Pacific time.

| Committer      | Committer Company | Committer Contact Info         | Time Zone          | Committer Bio                                                                                                                                                                                  | Committer Picture | Self Nominate for PTL (Y/N)                                                        |                                                                                 |
|----------------|-------------------|--------------------------------|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Asif Mehmood   | Gachon University | malikasifmehmoodawan@gmail.com | Asia/Seoul (UTC+9) |  blocked URL  ID blocked URL |                   | Y                                                                                  |                                                                                 |
|                |                   |                                |                    |                                                                                                                                                                                                |                   | <div>First (1<sup>st</sup>)</div> <div>from: 29 Sep 2020<br/>to: 31 Aug 2022</div> | <div>Second (2<sup>nd</sup>)</div> <div>from: 20 Nov 2023<br/>to: Present</div> |
|                |                   |                                |                    |                                                                                                                                                                                                |                   |                                                                                    |                                                                                 |
|                |                   |                                |                    |                                                                                                                                                                                                |                   |                                                                                    |                                                                                 |
| Faisal Mehmood | Gachon University |                                | Asia/Seoul (UTC+9) |                                                                                                                                                                                                |                   | from: 20 Nov 2023<br>to: Present                                                   |                                                                                 |
|                |                   |                                |                    |                                                                                                                                                                                                |                   |                                                                                    |                                                                                 |
|                |                   |                                |                    |                                                                                                                                                                                                |                   |                                                                                    |                                                                                 |
|                |                   |                                |                    |                                                                                                                                                                                                |                   |                                                                                    |                                                                                 |



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Vijay Pal

2024 Akraino Spring Summit updated May 08, 2024 [view change](#)

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- [Network Cloud Family Seed Code](#) (Network Cloud Blueprint)



Jeff Brower

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