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### Resource Allocation Methods in Vanets: A Systemic Literature Review

Andrew Trombly

Texas A&M University-San Antonio

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# RESOURCE ALLOCATION METHODS IN VANETS: A SYSTEMIC LITERATURE REVIEW



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SAN ANTONIO

4/21/2023

Andrew B. Trombly  
Texas A&M University - San Antonio  
atrom01@jaguar.tamu.edu

# Outline

- Background
- Methodology
- Categorizations
- Challenges
- Conclusion



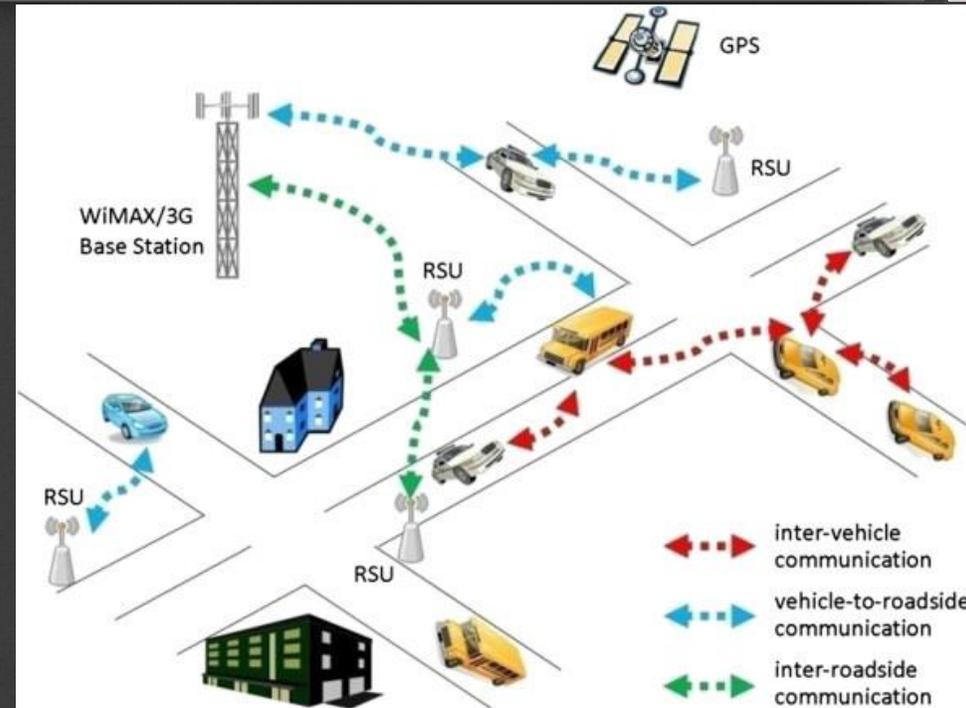
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# Background



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- VANET (Vehicular Networks/IoV)
  - V2V, V2I, V2C, V2X
  - RSU or Base Station
  - 5G



Eiza, M.H. *et al.* (2013) "Investigation of routing reliability of vehicular ad hoc networks," *EURASIP Journal on Wireless Communications and Networking*, 2013(1). Available at: <https://doi.org/10.1186/1687-1499-2013-179>.

# Methodology



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## Research Questions

- RQ1 : What are the current methods of addressing resource allocation in Vehicular Networks?
  - RQ2: What are the areas these methods are applied in VANETs?
  - RQ3: What challenges does resource allocation in Vehicular Networks face?
- 2022 – 2017
  - IEEE, ACM, Google Scholar, Science Direct, SpringerLink

Table 2: Break down of papers by approach and source engine

Engine	Breakdown				
	Algorithms	Architecture	Offloading	Scheduling	Slicing
ACM	8	2	2	1	0
Google Scholar	13	4	13	2	7
Science Direct	5	0	9	1	6
SpringerLink	4	3	2	4	2

Table 1: Break down of papers by approach and year published

Approach	Year					
	2017	2018	2019	2020	2021	2022
Algorithms	3	2	6	6	7	6
Architecture	2	3	2	0	0	0
Offloading	1	0	0	4	13	8
Scheduling	0	0	0	3	4	2
Slicing	1	1	3	2	2	7

# Categorizations

- Offloading
- Slicing
- Architectures
- Algorithms
- Scheduling



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# Offloading

- Mobile Edge Computing
- Fog Computing



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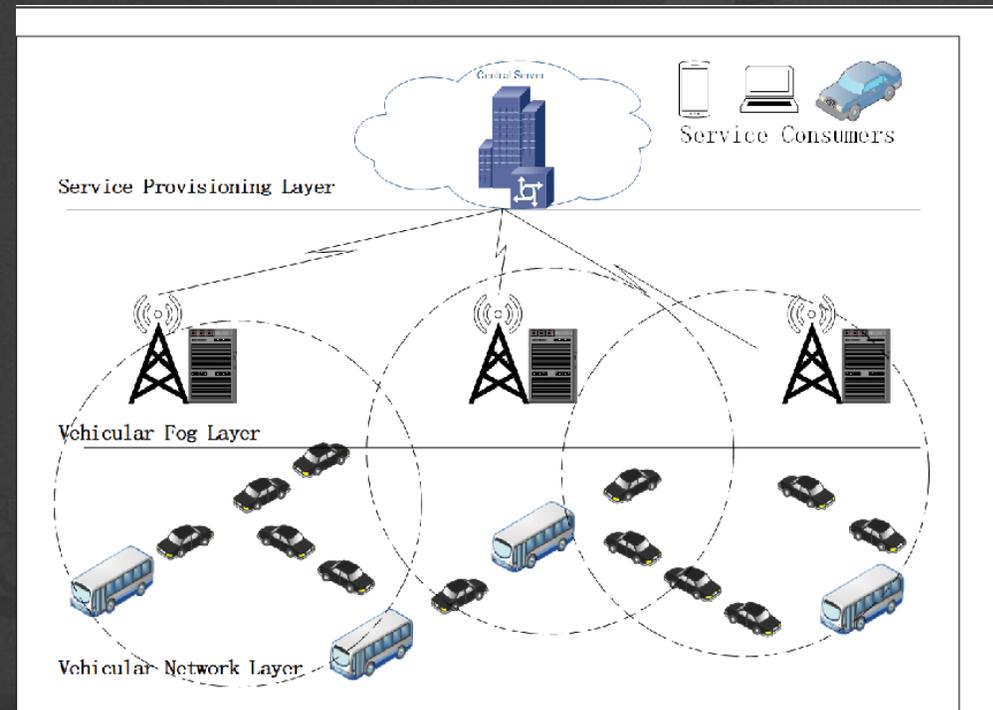
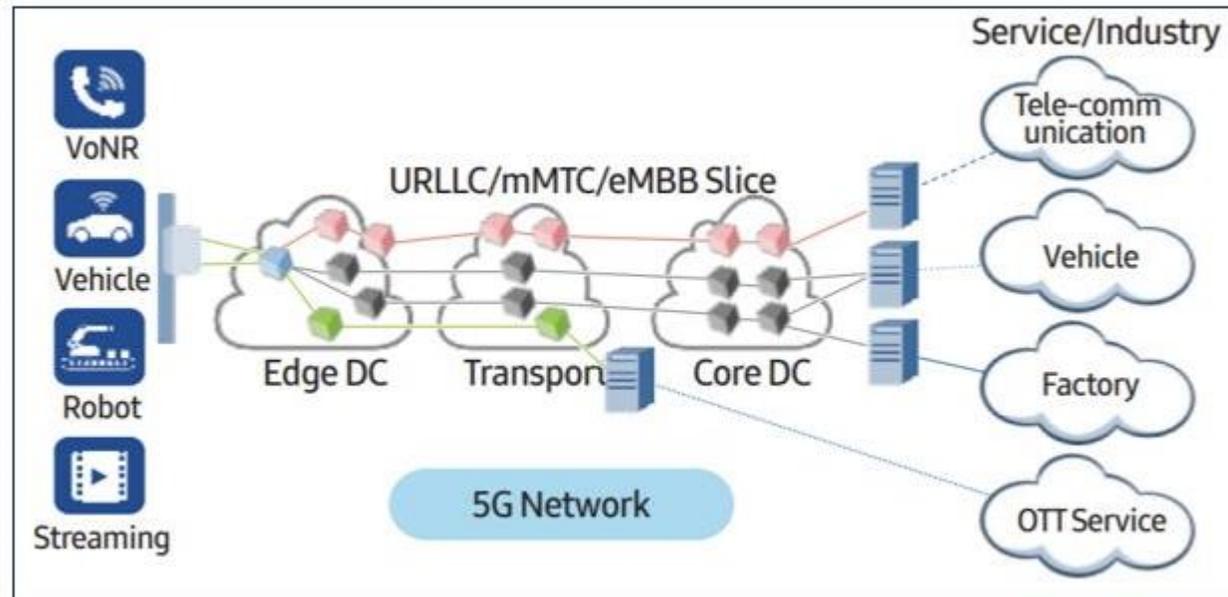


FIGURE 1. Vehicular fog computing architecture [3].

# Slicing



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“What Is the Difference between 4G & 5G Network Slicing? - MONIEM-Tech.” *Moniem*, [moniem-tech.com/questions/what-is-the-difference-between-4g-5g-network-slicing/](https://moniem-tech.com/questions/what-is-the-difference-between-4g-5g-network-slicing/).

# Architectures



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SDN Enabled Dual Cluster Head Selection and Adaptive Clustering in 5G-VANET - Scientific Figure on ResearchGate. Available from: [https://www.researchgate.net/figure/SDN-enabled-5G-VANET-integrated-network-architecture\\_fig1\\_315472721](https://www.researchgate.net/figure/SDN-enabled-5G-VANET-integrated-network-architecture_fig1_315472721) [accessed 19 Apr, 2020]

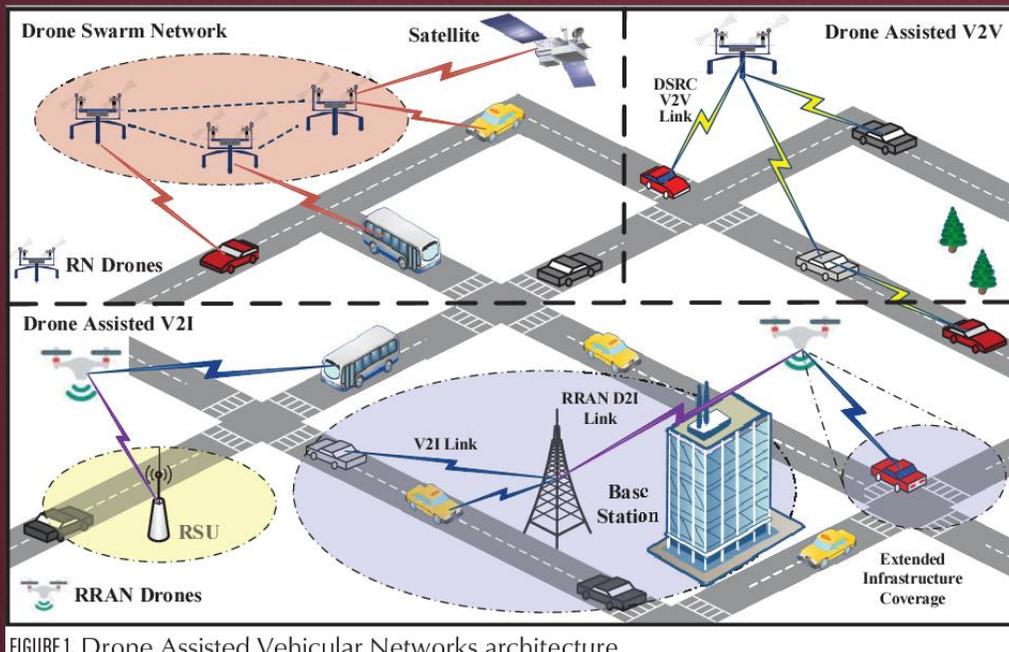
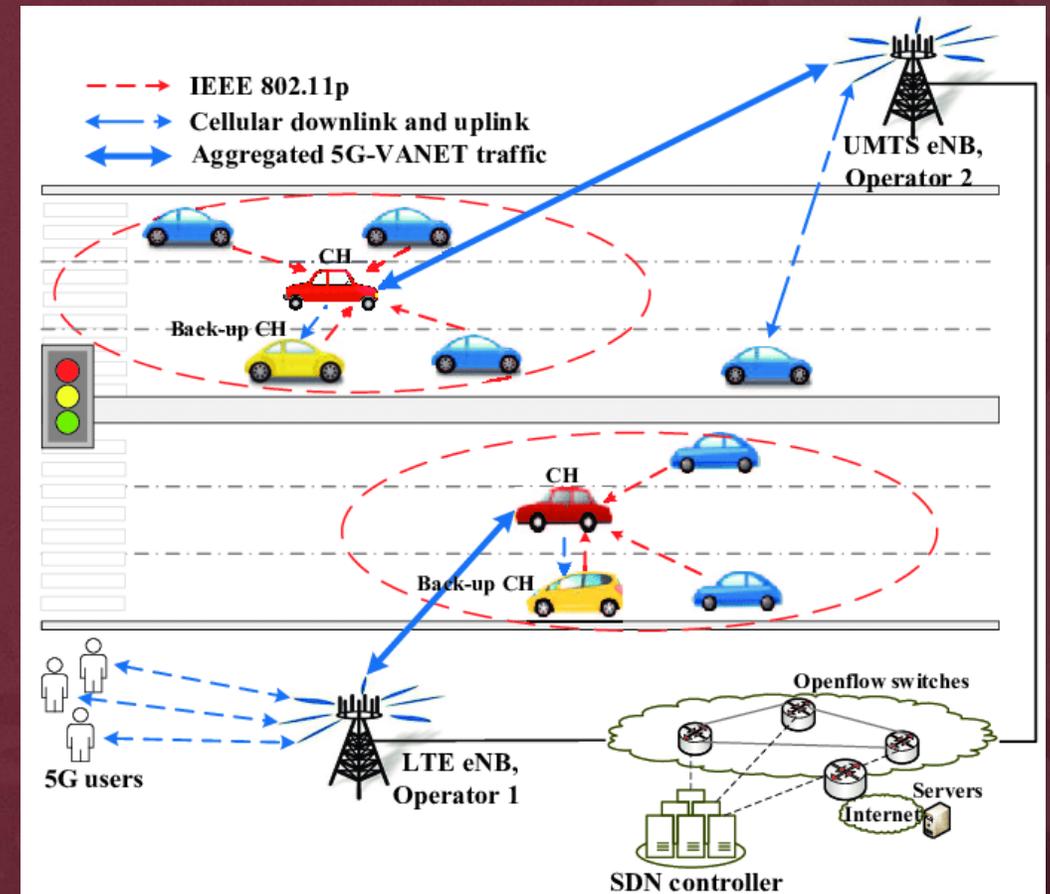


FIGURE 1. Drone Assisted Vehicular Networks architecture.

Shi, Weisen et al. "Drone Assisted Vehicular Networks: Architecture, Challenges and Opportunities." IEEE Network 32 (2018): 130-137.



# Algorithms

- Game Theory
- Machine Learning / AI
- Graph Algorithms
- Bio-Inspired Methods

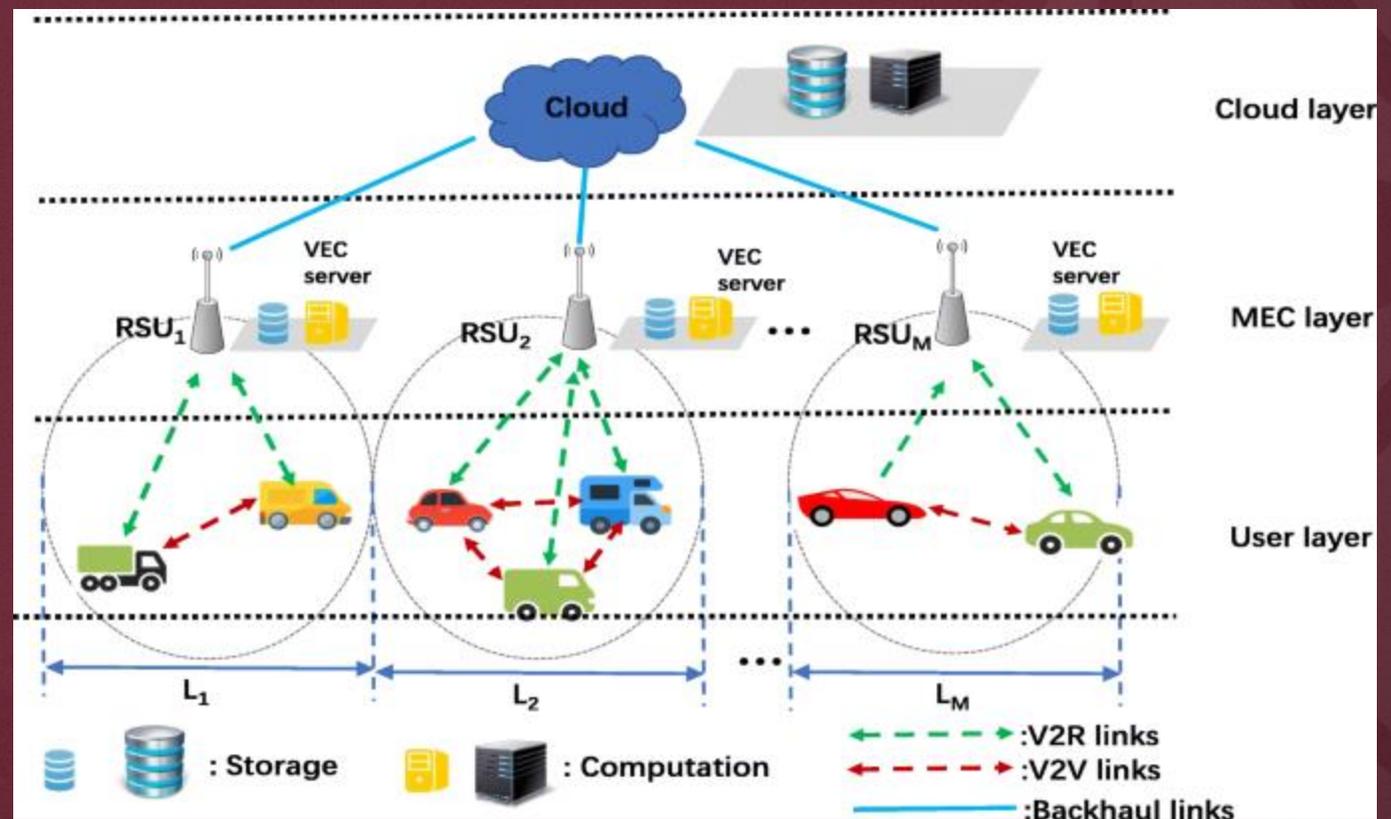


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# Scheduling



- Mostly in Edge and Fog computing



# Challenges



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- Road Side Units
- Vehicular cloud computing
  - Edge/Fog
- Vehicle to Everything communication
- UAVs in VANETs
- Utilizing SDNs in VANETs
- Energy Consumption
- Security

# Conclusion

- Questions?



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