Document type	Source type	ISSN	ISBN	DOI
Conference Paper	Book Series	18650929	978-303071502-1	10.1007/978-3-030-71503-8_1

Publisher
Springer Science and Business Media Deutschland GmbH

Original language
English

Volume Editors
Botto-Tobar M., Montes León S., Camacho O., Chávez D., Torres-Carrión P., Zambrano Vizuete M.

View less

Communications in Computer and Information Science • Volume 1388 CCIS, Pages 3 - 17 • 2021 • 2nd International Conference on Applied Technologies, ICAT 2020, 2 December 2020 - 4 December 2020

Marine Delay and Disruption Tolerant Networks (MaDTN): Application for Artisanal Fisheries

Bedon H.[a] , Lopez Pastor J.[a] , Cedeno Herrera E.[a,b] , Nieto C.M.[c]

Save all to author list

[a] Exponential Technology Group (GITX-ULIMA), Institute of Scientific Research (IDIC), University of Lima, Lima, Peru

[b] Faculty of Informatics, Electronics and Communication, Universidad de Panamá, Panamá, Panama

[c] Department of Telematic Engineering, Universidad Politécnica de Madrid, Madrid, Spain

Abstract

Author keywords

Indexed keywords

SciVal Topics

Funding details

Abstract

The artisanal fishing activity carried out on the coasts where the production of fish can be exploited is affected by a lack of communication between the vessels in order to provide relevant information related to multiple marine sensor parameters. It is mainly due to the rugged geographic area that causes highly disruptive communication links and in which traditional IP-based communications with transport protocols such as TCP or UDP do not work properly. This paper presents and evaluates a new communications architecture to provide services to marine sensor networks using a disruption tolerant networking (DTN) based solution. We propose a new architecture that takes into account the different vessels densities. We assume a finite sensor population model and a saturated traffic condition where every sensor always has frames to transmit. The performance was evaluated in terms of delivery probabilities, delay and a DTN scenario indicator (DSI) proposed. Through simulations, this paper reveals that Low Density scenery yield greater latency, and more density of nodes has better results. We achieved a successful delivery rate of 74% and a latency of 2h approximately. Finally indicators

shows that high density of nodes is strongly recommended for fishery scenery models.

shows that high density of nodes is strongly recommended for fishery scenery models. © 2021, Springer Nature Switzerland AG.

Author keywords

Delay-Disruption tolerant networks; Epidemic routing; IoT; Mule; ONE Opportunistic network simulator; Wireless sensor networks

Indexed keywords

SciVal Topics

Funding details

References (22)

View in search results format >

All

Export Print E-mail Save to PDF Create bibliography

1 (2009) *Xbee/Xbee-Pro Ros2c Zigbee RoRF Module*, p. 325. , p

2 Lindgren, A., Mascolo, C., Lonergan, M., McConnell, B.
Seal-2-Seal: A delay-tolerant protocol for contact logging in wildlife monitoring sensor networks
(2008) *2008 5th IEEE International Conference on Mobile Ad-Hoc and Sensor Systems, MASS 2008*, art. no. 4660064, pp. 321-327. Cited 28 times.
ISBN: 978-142442575-4
doi: 10.1109/MAHSS.2008.4660064
View at Publisher

3 Alnajjar, F., Saadawi, T.
Performance analysis of routing protocols in delay/disruption tolerant mobile ad hoc networks
(2011) *10th WSEAS International Conference on EHAC'11 and ISPRA'11, 3rd WSEAS Int. Conf. on Nanotechnology, Nanotechnology'11, 6th WSEAS Int. Conf. on ICOAA'11, 2nd WSEAS Int.Conf. on IPLAFUN'11*, pp. 407-417. Cited 7 times.
ISBN: 978-960474276-9

4 Basuki, A.I., Wuryandari, A.I.: Delay-tolerant-networks design and prospect on fishery communication networks. In: IEEE 4th International Conference on System Engineering and Technology (ICSET), November 2014, pp. 1–6 (2014). https://doi. org/10.1109/ICSEngT.2014.7111781

5 Bedon, H., Miguel, C., Alcarria, R., Fernández, Ruiz, F.J.: Message fragmentation assessment in DTN nanosatellite-based sensor networks. Ad Hoc Netw. 44, 76– 89. https://doi.org/10.1016/j.adhoc.2016.02.015, http://www.sciencedirect.com/science/article/pii/S1570870516300567

6 Fall, K.
(2007) *Delay-Tolerant Networking Architecture*. Cited 828 times.
https://tools.ietf. org/html/rfc4838

7 Grados, B., Bedon, H.: Software components of an IoT monitoring platform in google cloud platform: a descriptive research and an architectural proposal. In: Botto-Tobar, M., Zambrano Vizuete, M., Torres-Carrión, P., Montes León, S., Pizarro Vásquez, G., Durakovic, B. (eds.) ICAT 2019. CCIS, vol. 1193, pp. 153– 167. Springer, Cham (2020). https://doi.org/10.1007/978-3-030-42517-312

8 Ochiai, H., Ishizuka, H., Kawakami, Y., Esaki, H.

A field experience on DTN-based sensor data gathering in agricultural scenarios

(2010) *Proceedings of IEEE Sensors*, art. no. 5690899, pp. 955-958. Cited 11 times.
ISBN: 978-142448168-2
doi: 10.1109/ICSENS.2010.5690899

View at Publisher

9 Lin, H.-M., Yu, G., Pang, A.-C., Pathmasuntharam, J.S.

Performance study on delay tolerant networks in maritime communication environments

(2010) *OCEANS'10 IEEE Sydney, OCEANSSYD 2010*, art. no. 5603627. Cited 26 times.
ISBN: 978-142445221-7
doi: 10.1109/OCEANSSYD.2010.5603627

View at Publisher

10 Burrell, J., Brooke, T., Beckwith, R.: Vineyard computing: sensor networks in agricultural production. IEEE Perv. Comput. 3, 38–45 (2004). https://doi.org/10. 1109/MPRV.2004.1269130

11 Keränen, A., Kärkkäinen, T., Ott, J.: Simulating mobility and DTNs with the ONE (invited paper). J. Commun. 5(2), 92–105 (2010). https://doi.org/10.4304/jcm.5.2.92-105, http://www.jocm.us/index.php?m=content&c=index&a=show& catid=65&id=218

12 Keränen, A., Ott, J., Kärkkäinen, T.

The ONE simulator for DTN protocol evaluation (Open Access)

(2009) *SIMUTools 2009 - 2nd International ICST Conference on Simulation Tools and Techniques*. Cited 1718 times.
ISBN: 978-963979945-5
doi: 10.4108/ICST.SIMUTOOLS2009.5674

View at Publisher

13 Kong, L., Yang, T., Zhao, N.

Maritime opportunistic transmission: When and how much can DTN node deliver?

(2019) *2019 IEEE/CIC International Conference on Communications in China, ICCC 2019*, art. no. 8855892, pp. 943-948. Cited 2 times.
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=8848288
ISBN: 978-172810732-5
doi: 10.1109/ICCChina.2019.8855892

View at Publisher

14 Selavo, L., Wood, A., Cao, Q., Sookoor, T., Liu, H., Srinivasan, A., Wu, Y., (...), Porter, J.

LUSTER: Wireless sensor network for environmental research

(2007) *SenSys'07 - Proceedings of the 5th ACM Conference on Embedded Networked Sensor Systems*, pp. 103-116. Cited 180 times.
ISBN: 978-159593763-6
doi: 10.1145/1322263.1322274

View at Publisher

15 Loubser, M.
(2006) *Delay Tolerant Networking for Sensor Networks*. Cited 12 times.
https://www. semanticscholar.org/paper/Delay-Tolerant-Networking-for-Sensor-Networks-Loubser/37254ba8b5ffaae8863a3499e1b88f1478cb0fef

16 Seye, M.R., Ngom, B., Diallo, M., Gueye, B.

Work in Progress: A low cost geographical localization system for a more secure coastal artisanal fishery in Senegal

(2019) *6th International Conference on Information and Communication Technologies for Disaster Management, ICT-DM 2019*, art. no. 9032947.
http://ieeexplore.ieee.org/xpl/mostRecentIssue.jsp?punumber=9018169
ISBN: 978-172814920-2
doi: 10.1109/ICT-DM47966.2019.9032947

View at Publisher

17 Morales, A., Alcarria, R., Cedeno, E., Robles, T.

An extended topic-based pub/sub broker for cooperative mobile services

(2013) *Proceedings - 27th International Conference on Advanced Information Networking and Applications Workshops, WAINA 2013*, art. no. 6550577, pp. 1313-1318. Cited 3 times.
ISBN: 978-076954952-1
doi: 10.1109/WAINA.2013.119

View at Publisher

18 Sharma, A., Diwaker, C.: Impact of node mobility and buffer space on replication-based routing protocols in DTNs. In: Kumar, A., Mozar, S. (eds.) ICCCE 2018. LNEE, vol. 500, pp. 607–613. Springer, Singapore (2019). https://doi.org/10.1007/978-981-13-0212-1 62

19 Shi, Y., Li, H., Du, W.C., Ma, J.X., Li, F.B.: Modeling and performance analysis of marine DTN networks with nodes-cluster in an ad hoc sub-net, pp. 182–187. Atlantis Press (2016). https://doi.org/10.2991/ceis-16.2016.36, https://www. atlantis-press.com/proceedings/ceis-16/25867854, ISSN: 2352-538X

20 Sheltami, T., Al-Roubaiey, A., Mahmoud, A., Shakshuki, E.

A publish/subscribe middleware cost in wireless sensor networks: A review and case study

(2015) *Canadian Conference on Electrical and Computer Engineering*, 2015-June (June), art. no. 7129476, pp. 1356-1363. Cited 9 times.
http://ieeexplore.ieee.org/xpl/conhome.jsp?punumber=1000225
doi: 10.1109/CCECE.2015.7129476

View at Publisher

21 Vahdat, A., Becker, D.
(2000) *Epidemic Routing for Partially-Connected Ad Hoc Networks*, p. 14. Cited 3576 times.
, p

22 Pöttner, W.-B., Büsching, F., Von Zengen, G., Wolf, L.

Data elevators: Applying the bundle protocol in delay tolerant wireless sensor networks (Open Access)

(2012) *MASS 2012 - 9th IEEE International Conference on Mobile Ad-Hoc and Sensor Systems*, art. no. 6502520, pp. 218-226. Cited 13 times.
ISBN: 978-146732433-5
doi: 10.1109/MASS.2012.6502520

View at Publisher

Cedeño Herrera, E.; Faculty of Informatics, Electronics and Communication, Universidad de Panamá, Panamá, Panama; email:edwin.cedenoh@up.ac.pa