Microservice security:
a systematic literature review

BACKGROUND

Microservices is an emerging paradigm for developing distributed systems. The literature on microservice security is spread over many venues and composed of contributions mainly addressing specific scenarios or needs.

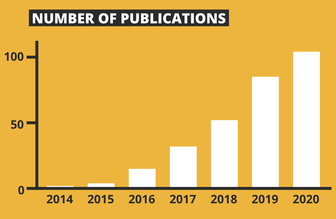
In this work, we conduct a **systematic review of the field**, gathering

290
relevant publications, collected from 2014 to 2020

We analyse our dataset along two lines:
A. Quantitatively, through publication metadata
B. Qualitatively, through 20 research questions

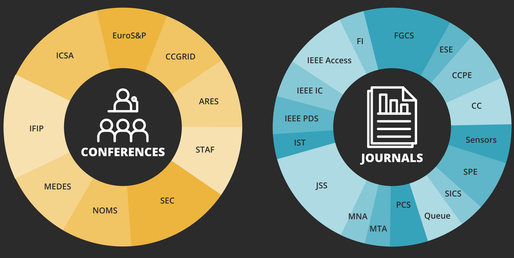
PUBLICATION INCREASE

As expected, security in **microservice systems has gained a lot of academic interest in recent years**. This is reflected by the sharp increase in the number of publications since 2014.

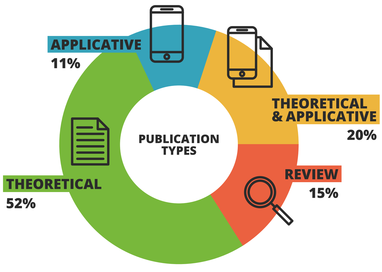


FRAGMENTATION OF PUBLICATIONS

The community is highly fragmented and there are no dedicated venues collecting contributions from microservice security researchers, which means that keeping up with the state of the art is difficult.



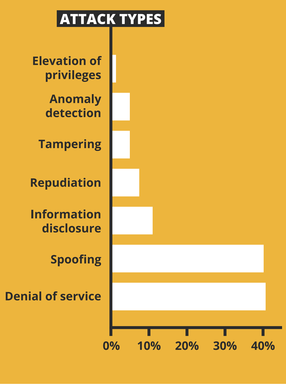
PUBLICATION TYPES



The majority of publications are theoretical (52%). There is a clear need for technology transfer to implement new ideas.

THREAT MODEL

Security in microservice frequently comes as an afterthought, whereas it should be one of the main concerns for their engineering. **The number of spoofing, tampering, and repudiation attacks highlights the need to address the general problem of data provenance in microservices**. There are no dedicated threat models to help developers become aware of those particular threats.



SUMMARY OF CHALLENGES

Data provenance
Technology transfer
Security-by-design adoption
Dedicated attack trees and threat models
Comprehensive technological references
Migration to microservices
Global view/control
React & recover techniques
DevSecOps
Fragmentation of outlets

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