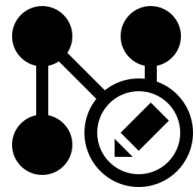
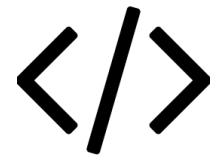


IoT Test and Simulation Tool



Code commit

New component

New scenario

IoT Test and Simulation

- ❖ Digital Twins for IoT Environment
- ❖ Real-time data collection
- ❖ Supports multiple IoT platforms
- ❖ Supports multiple type of sensors and actuators
- ❖ SaaS architecture
- ❖ Powerful data generator
- ❖ Different testing methodologies
- ❖ Supports DevOps movement



Digital Twins



Real Environment

Simulate IoT devices and network topology



Operational testing

Simulate legitimate behaviours



Functional testing

Add attacking nodes and malicious behaviors



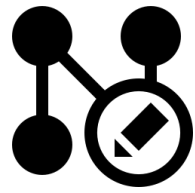
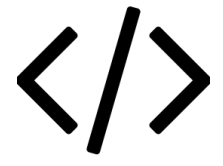
Security tests (pentesting)

Increase number of devices



Performance and scalability testing

IoT Test and Simulation Tool



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IoT
Test and Simulation



Digital Twins



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Performance and scalability testing

IoT Test and Simulation Tool

Motivation

Limitation of classical tools for Smart IoT Systems:

- *IoT Application Developer*: testing application on a real IoT device networks can be costly (for infrastructure, impossible to deploy 1000 sensors just for scalability testing), time and effort consuming (for software developer who has no hardware expertise).
- *IoT Application Operator*: needs to make sure all the functionalities, operations of the application work properly in different scenarios. But there are many scenarios that do not happen frequently in reality.
- *IoT Application Owner*: needs to make sure the deployed system is scalable, secured, but it is not advisable performing those tests on the production environment.

Solution

A Digital Twins based Solution:

- Simulate sensors/actuators in IoT system.
- Create a simulated IoT system (or facilitate the addition or removal of a new device) using simulated sensors/actuators.
- Support real-time data collection
- Simulate the normal and abnormal behaviours of IoT devices as well as simulating cyber-security attacks
- Easy to scale the number of IoT devices to test the scalability of the system
- Is part of the DevOps circle and supports continuous integration and continuous deployment.