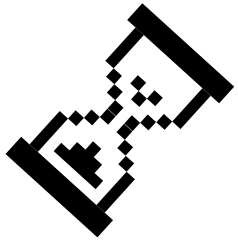
Info River solution for Desafio #3



Aveiro Tech City Hackathon 2022

October 10 to 14

AVEIRO
CÂMARA MUNICIPAL

TECH CiTY

Desafio #3

Este desafio deve fornecer uma plataforma IoT para a gestão de uma crise. Focada na Gestão de Emergências, essa plataforma deve gerir riscos para comunidades, meio ambiente e infraestrutura. É o centro de controlo principal dos Serviços de Emergência, mas cada indivíduo e organização tem um papel a desempenhar. Além disso, esta plataforma deverá usar sensores de IoT e dados gerados no edge para aumentar a capacidade de obter informação e tomar decisões. Esta solução propõe-se a ajudar as empresas prepararem-se melhor, responderem mais rapidamente e enviarem informações vitais a quem precisa. Para conseguir isso, a plataforma deve obter e processar dados de forma eficiente para fornecer relatórios em tempo real e atualizações críticas, pois segundos podem fazer a diferença. Além disso, como o ciclo de gestão de emergência depende em grande parte da latência e da rápida tomada de decisões, soluções edge/fog devem ser consideradas. Assim, a plataforma deverá concentrar-se em serviços de computing continuum para responder à complexidade de processar informação vital.

Proposed by _ ubiwhere

Our Approach

End to end emergency and crisis management system with

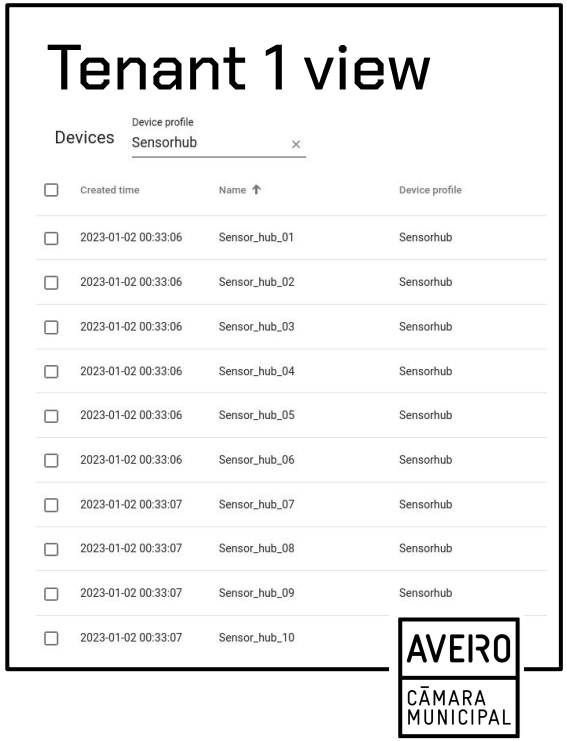
- **Easy multi tenant (city/state) support**
- **Route optimization using live traffic**
- **Incident monitoring from single dashboard**
- **Incident Reporting**
- **Live Map with incident and first responder**
- **City wide sensor monitoring at one place**

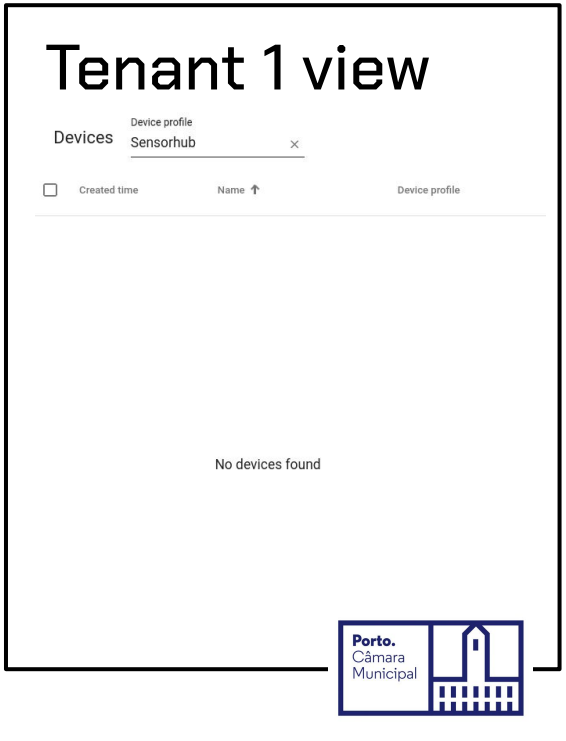
and much more . . .

01

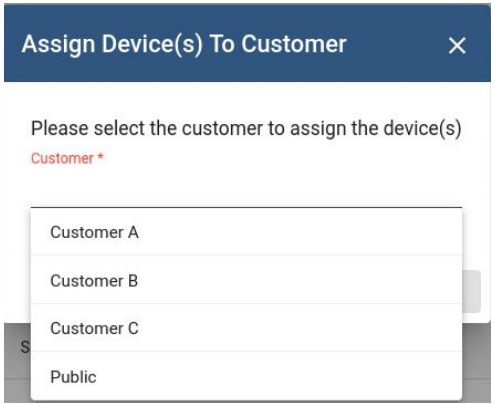
Multi-tenancy

Each city/state is a tenant and and they manage their own devices & entities



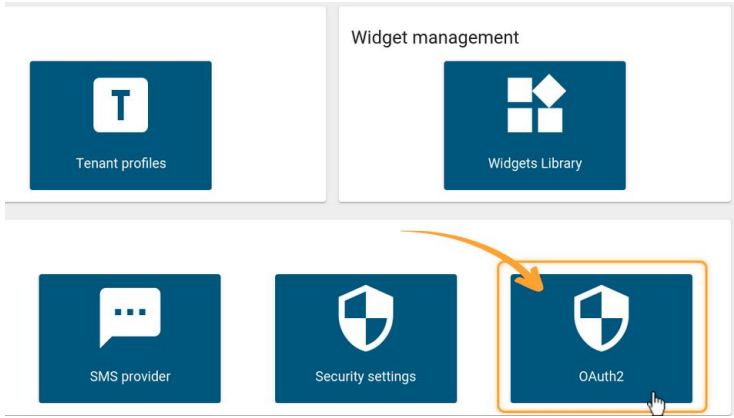


- As you can see each tenant manages their own devices and entities.
- Only the responsible tenant admins can view and manage devices.



Devices can be further assigned to customers which can be divisions or departments inside the city itself (Fire department, Police).

Same thing can be done with Dashboards as well, so only certain set of users are able to view certain details.



Two different cities (tenants) can also communicate with each other and have protocols/agreements to share data.

Inter-tenant communication can be done using OAuth on-behalf-of (OBO) or similar mechanism. Thingsboard has built in support for OAuth 2.0.

02

Routes optimisation

Loose terms,

First Responder: Police, Ambulance, Firefighters, etc.

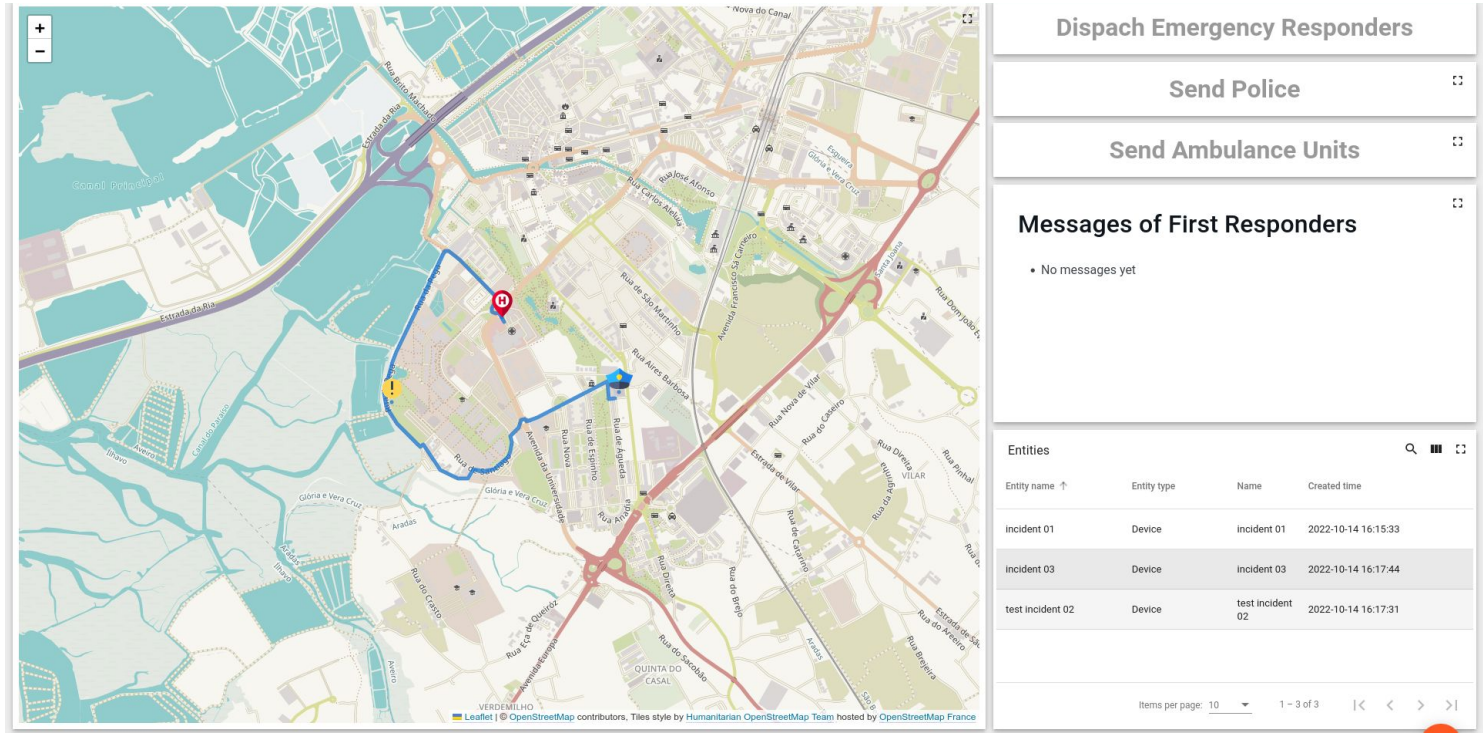
Dispatcher: 112 (or similar) calls receiving people

Approach Used

- Load map of a place
- Convert to set of Nodes and Edges
- Add weights to edges using traffic sensors
- Using graph optimization algorithms, find optimal path between two nodes

Result

* Red color represents the optimal path



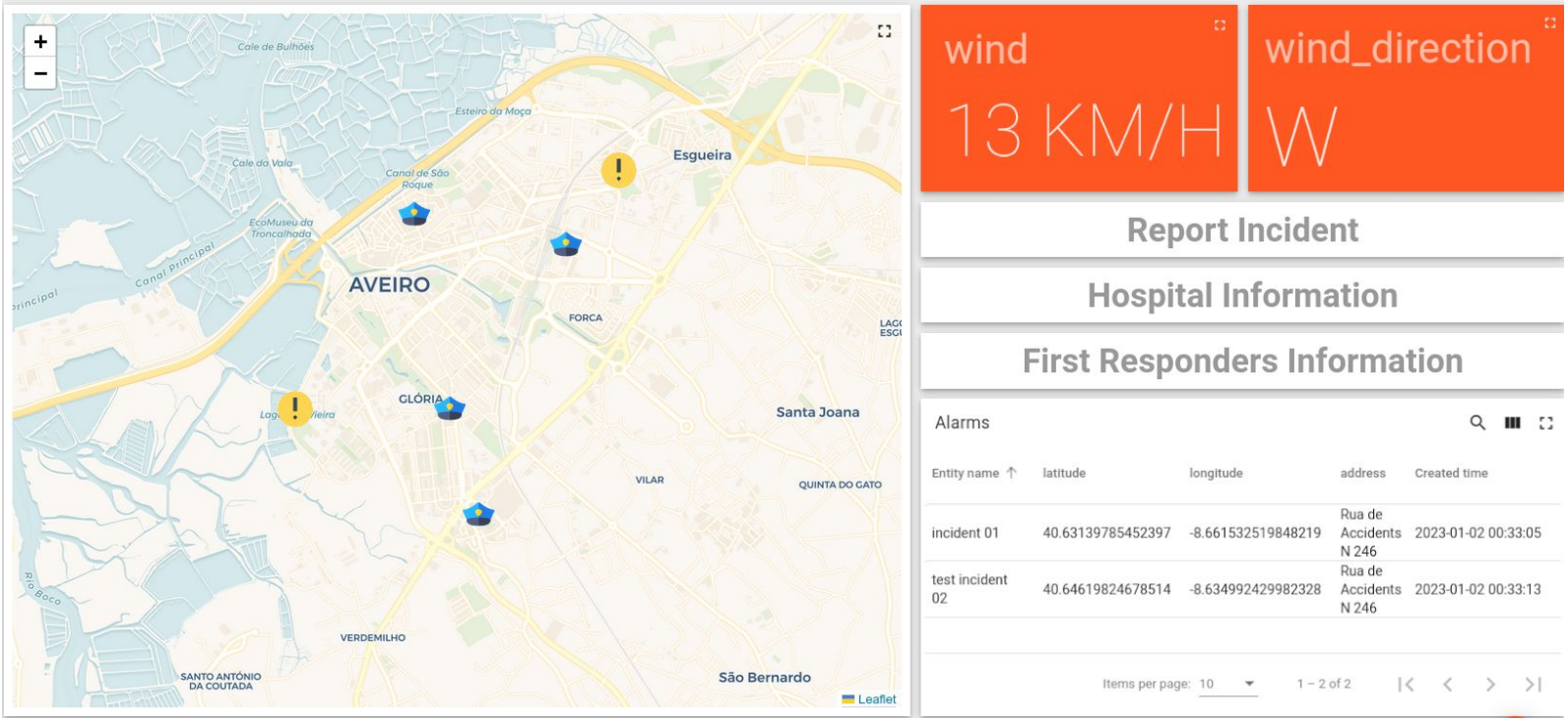
This would be seen by Dispatcher team once they click on a particular incident and once they have dispatched the appropriate first responder unit, the route info would be forwarded to their dashboards as well.

*** Optimal path shown from Police unit to Incident(yellow exclamation) and Incident to Hospital**

03

Alarms

Incidents are marked with Flashing Yellow marks



- Any Incidents that are reported through any medium (automatic sensors, other dispatchers, etc) are shown as flashing yellow exclamation markers.
- Once solved and marked as not active, it would disappear from the map but still be visible to admins on Thingsboard.

Alarms

Entity name	latitude	longitude	address	Created time
incident 01	40.63139785452397	-8.661532519848219	Rua de Accidents N 246	2023-01-02 00:33:05
test incident 02	40.64619824678514	-8.634992429982328	Rua de Accidents N 246	2023-01-02 00:33:13

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Active incidents are also shown as alarms on the sidebar with the information about its location, type of incident and creation date.

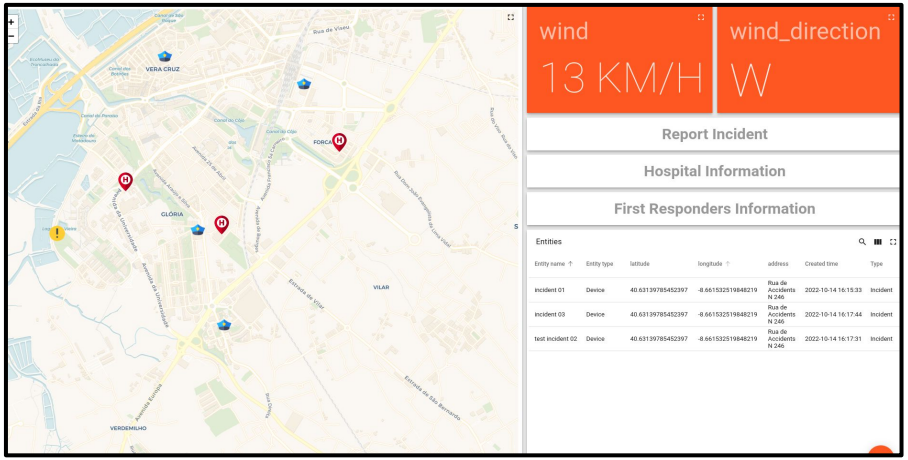
*** The address, latitude and longitude shown on the picture are just type randomly and do not correlate to real-world.**

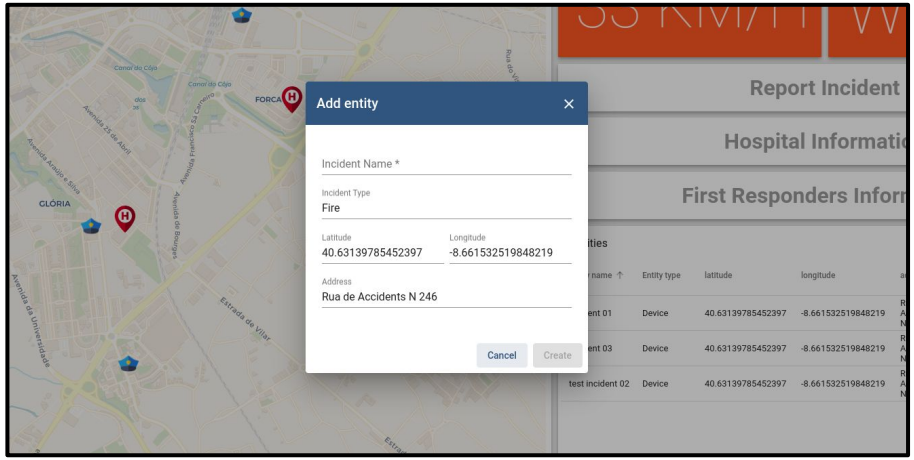
BONUS

Some other Features

Just some other minor things that were also implemented

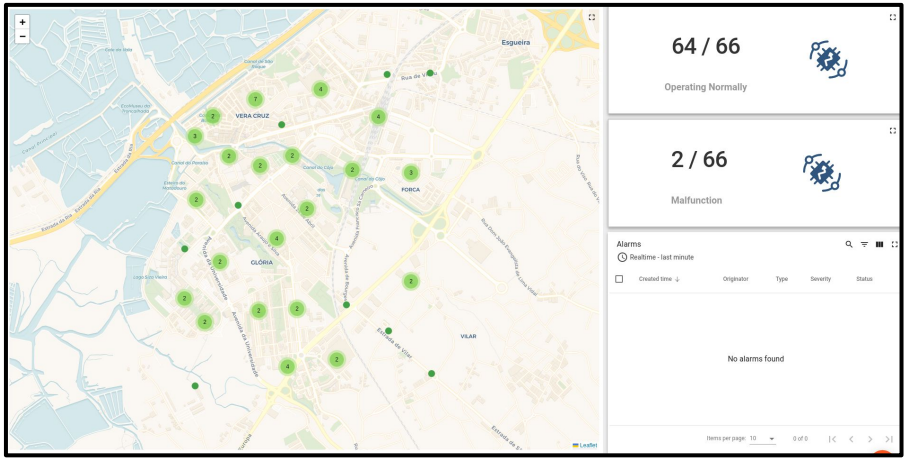
Dispatcher Dashboard

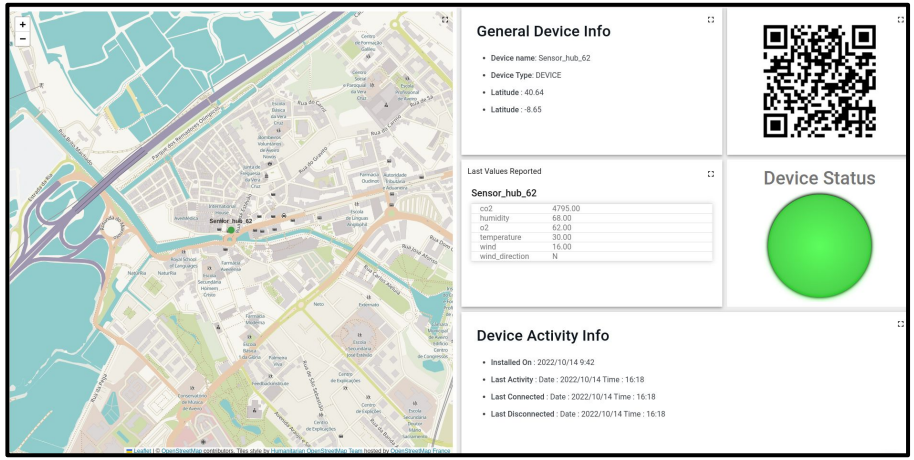




- Dispatchers can any incidents along with FR units and hospitals.
- Navigable to other parts of system which will give them more details.
- **Report new incidents** (ones that cannot be detected by sensors) which would immediately trigger internal system to find optimal FR units, hospitals and paths to save those precious seconds.

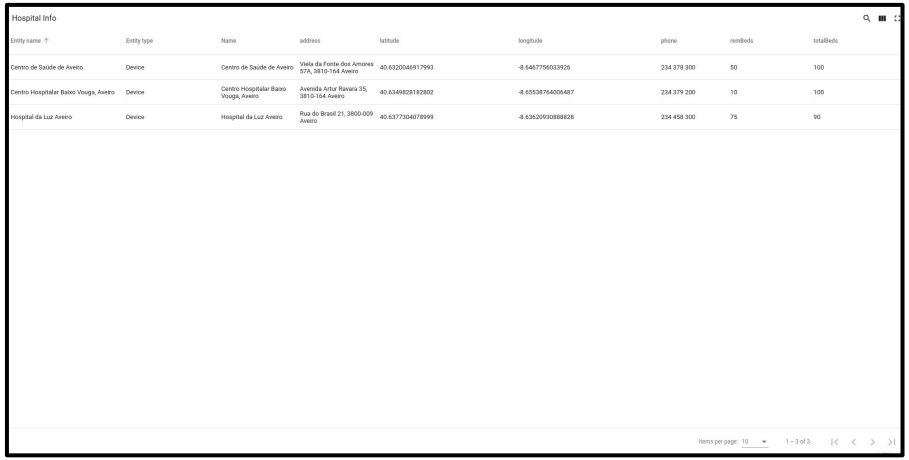
Device Management





- Device (sensor hubs) Management Dashboard intended to be used by a device manager or repair person
- Detailed information about all the devices and provides information about malfunctioning hubs at a single glance.

First Responder Live Information



Hospital Info

Entity name	Entity type	Name	address	latitude	longitude	phone	remBeds	totalBeds
Centro de Saúde de Aveiro	Device	Centro de Saúde de Aveiro	Viela da Fonte dos Amores 57A, 3810-164 Aveiro	40.632004691799 3	-8.6467756033926	234 378 300	50	100
Centro Hospitalar Baixo Vouga, Aveiro	Device	Centro Hospitalar Baixo Vouga, Aveiro	Avenida Artur Ravara 35, 3810-164 Aveiro	40.6349828182802	-8.655387640064 87	234 379 200	10	100
Hospital da Luz Aveiro	Device	Hospital da Luz Aveiro	Rua do Brasil 21, 3800-009 Aveiro	40.6377304078999	-8.6362093088882 8	234 458 300	75	90

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onders Information

	Entity type	Name	address	latitude	longitude	phone
Humanitária dos Bombeiros Aveiro Velhos	Device	Associação Humanitária dos Bombeiros Voluntários Aveiro Velhos	Rua Dr. Mário Sacramento, 3810-104 Aveiro	40.6318261359168	-8.6488848924636 8	234 400 700
Novos de Aveiro	Device	Bombeiros Novos de Aveiro	Rua Conselheiro Luís de Magalhães, 3800-124 Aveiro	40.643884248805	-8.6518433690071 1	234 450 700
Responder hipotético 1	Device	Primeiros a Responder hipotético 1	Alameda Silva Rocha, 3800-385 Aveiro	40.6419595571458	-8.6393812899405	234 400 701
Responder hipotético 2	Device	Primeiros a Responder hipotético 2	Rua Direita de Aradas 47 A, 3810-005 Aveiro	40.6252233482777	-8.6465288404087 9	234 400 789

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- Hospital and FR information that is updated in real time.
- Live location of FR units along with their other information.
- Real time updates about the number of hospital beds available.

THANK YOU

INFO RIVER