Things Monitor Guide

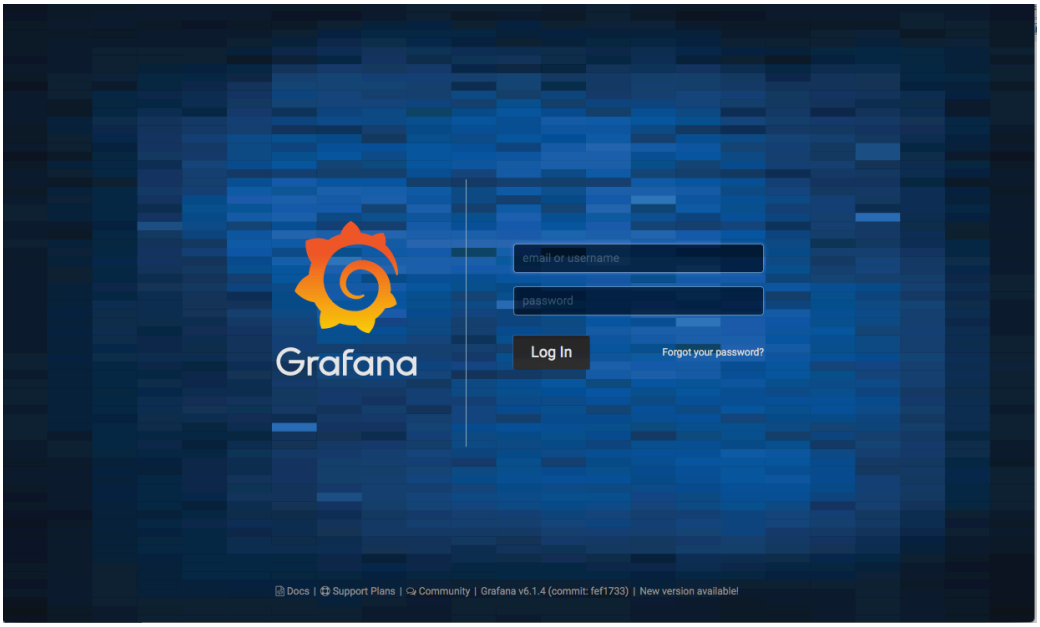
Things monitor is a service that aims at providing an overview of the VICINITY platform by presenting several statistics regarding the IoT infrastructures registered in the platform. On the one hand we aim at presenting an overview of the platform, and, on the other hand, we aim at showing the overview of the IoT infrastructures registered by the different users. Our goal is to show the size of VICINITY, its variety, how accurate the descriptions provided by the users are (Thing Descriptions provided to the agents), how many interoperable things there are, and the contextual data inserted to enrich the descriptions.

The things monitor consists in a set of dashboards, each of which displays a set of charts. There are a large number of dashboards, however we distinguish two types: the dashboard called "ThingsInVICINITY" that displays charts with the data of the whole platform, i.e., provides an overview of VICINITY, and, the rest of the dashboards that are named after their user's name and depict some charts about that user registered IoT infrastructures.

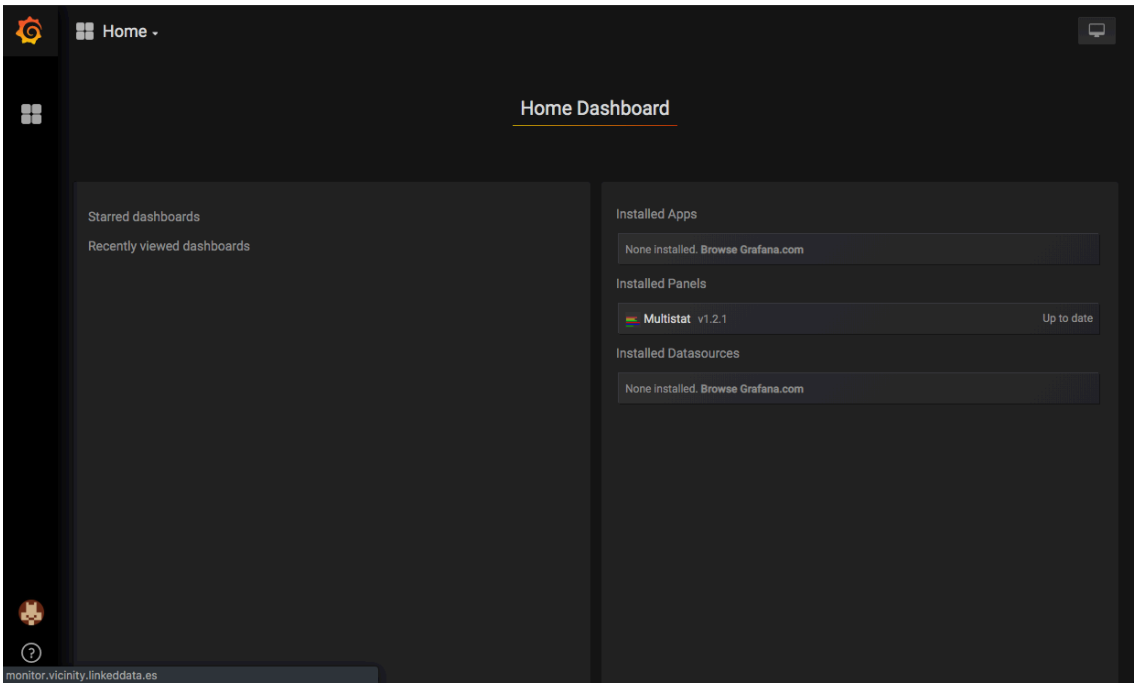
This service displays charts and information using only the Thing Description of the IoT infrastructure, and thus, there is no room to a leak of real-time value data from the infrastructures. Nevertheless, as we will explain later, allows to clearly identifying the current status of VICINITY, and its current needs.

1. Accessing to the service

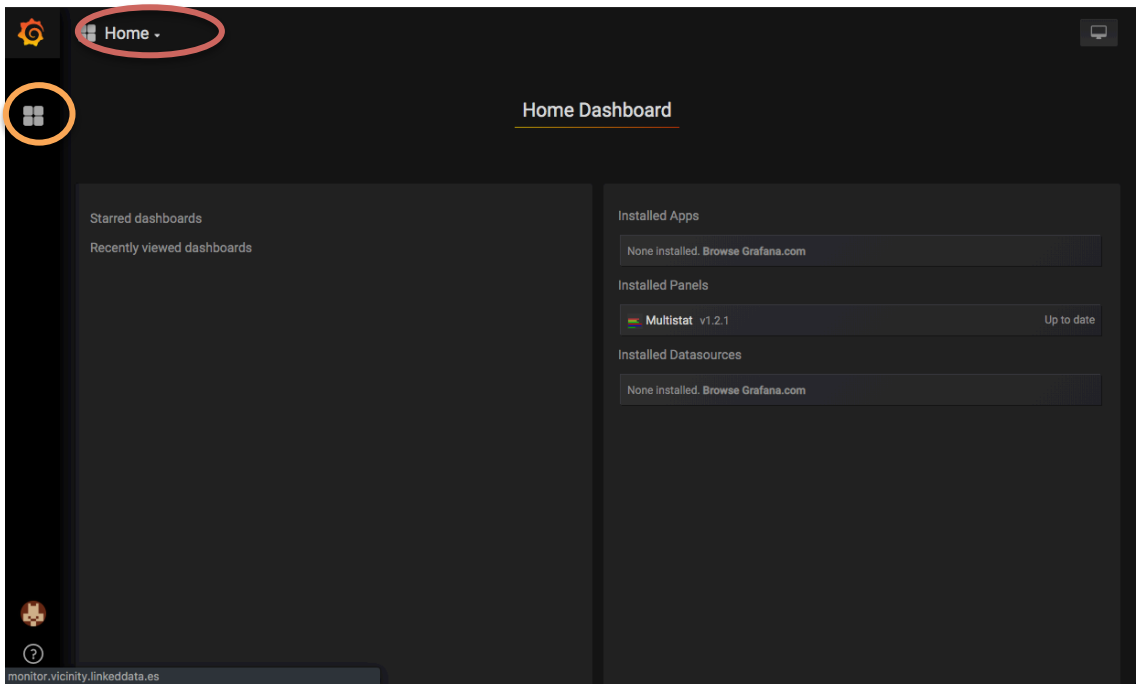
The things monitor service is accessible through the following link: http://monitor.vicinity.linkeddata.es/. Once accessed the following screen will appear:



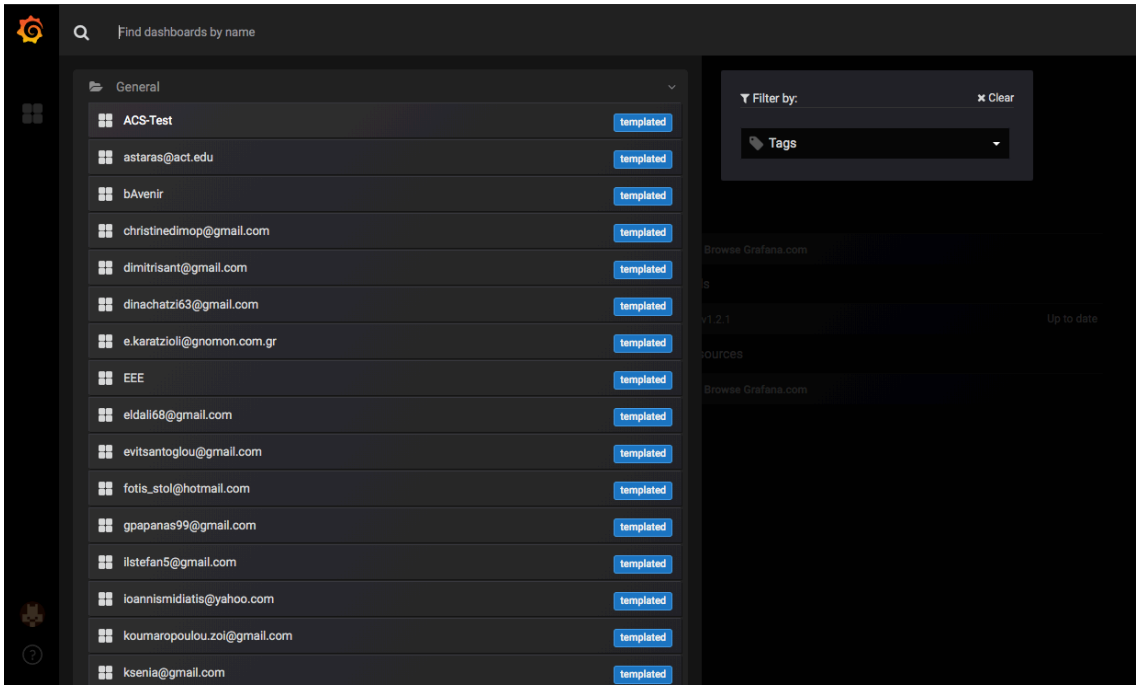
After successfully login with valid credentials we will be redirect to the following screen



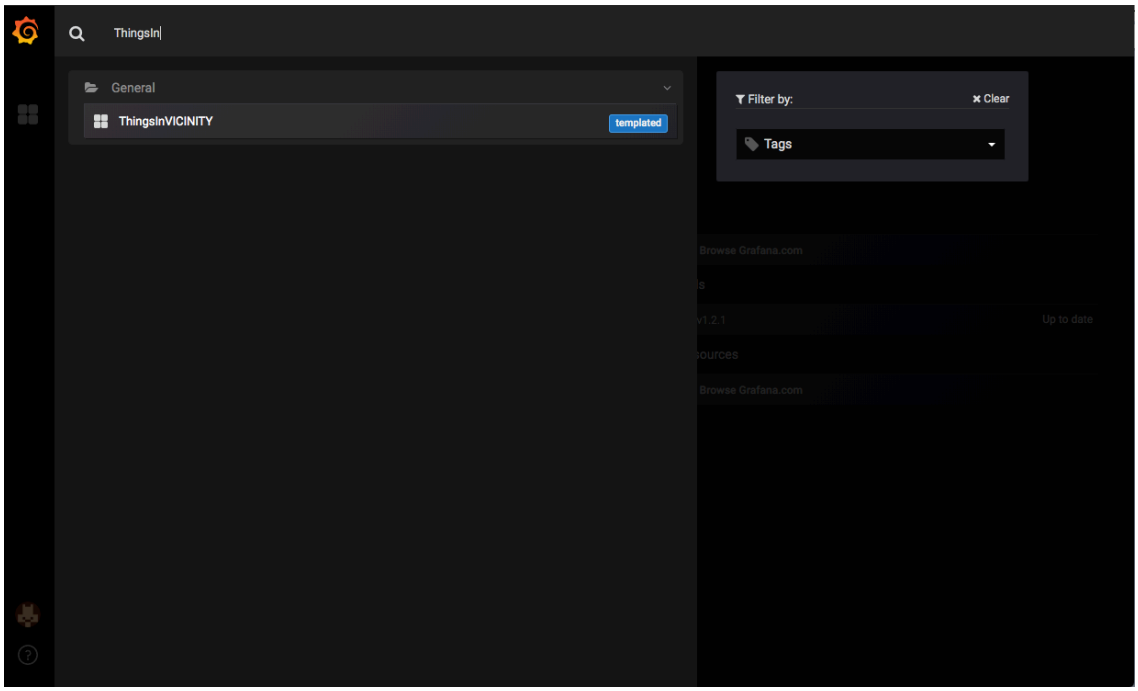
There are two ways to reach the different dashboards, observing the figure below, we could use any of the buttons pointed out by a circle



In both cases, we will see a screen displaying all the dashboards available. In this case we will click on the bottom marked by the red circle. After clicking the following screen will be displayed



Each of the elements displayed is a dashboard. An user can rely on the search box above to look for a specific dashboard. For instance, an user can look for the dashboard "ThingsInVICINITY" to see an overview of VICINITY.

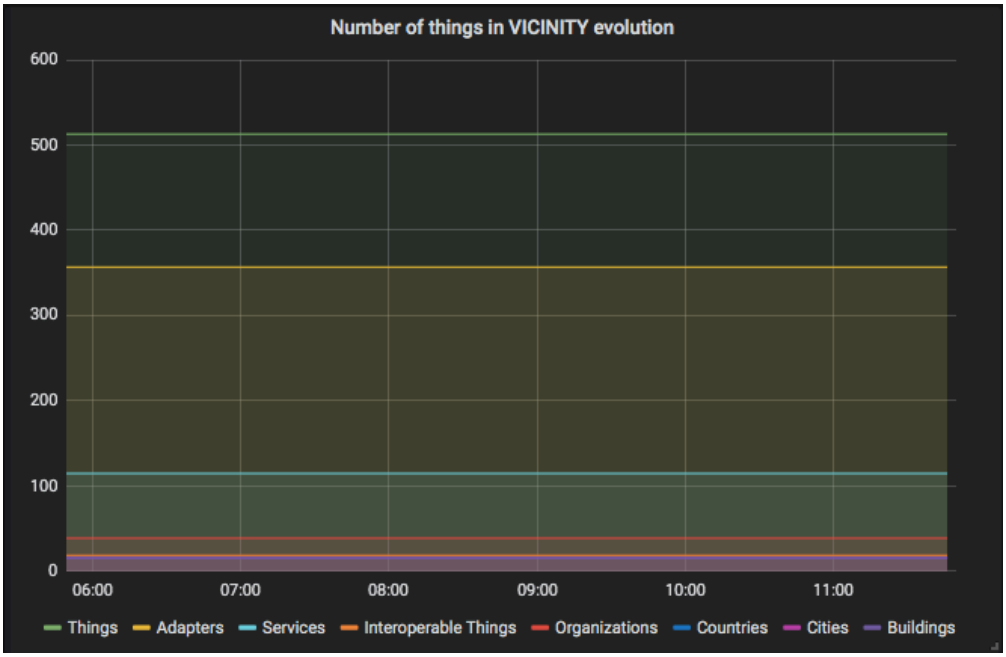


2. VICINITY Overview: ThingsInVICINITY dashboard

Once we access the dashboard named "ThingsInVICINITY" a set of charts will be displayed. Each of these graphs aims at showing a specific aspect of the platform. In following subsections we explain each of them, as well as, the desirable value they should have.

2.1. VICINITY evolution

The things monitor is updated once every day, therefore we are able to chart how it evolves.



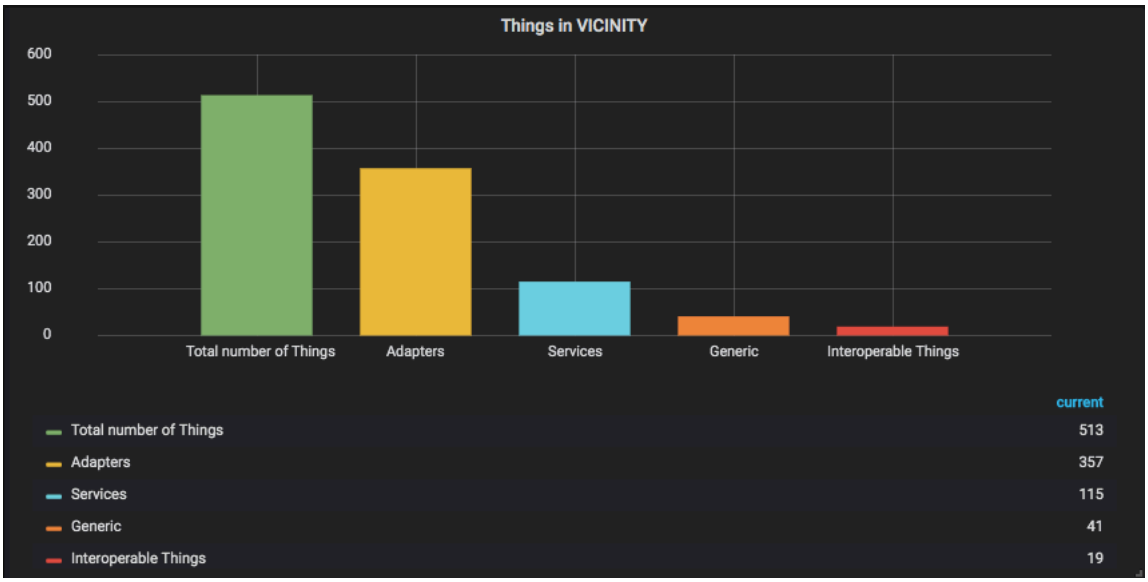
In this piece of chart we see a set of lines that represent the number of things in VICINITY: the number of things labeled with a specific class from the Adapters ontology, the number of services, the number of interoperable things, and so on. We can see that the lines are flat for the whole time, i.e., from 06:00 am to 11:00am, meaning that in such clip of time no data was inserted in the platform nor deleted.

Desirable status: this chart aims at displaying how the platform evolves, and thus, has not a desirable status.

2.2. Things in VICINITY

This chart aims at showing how accurate are the Thing Description of the registered IoT infrastructures. On the one hand we have the column *Total number of Things,* that represents all the devices, sensors, and services registered in VICINITY regardless they correctness. Next, we have the column *Adapters* that stands for those Things registered in VICINITY in which Thing Description they were labeled using the Adapters Ontology. Then, we have the *Services* column that states which Things registered in VICINTIY where labeled as service. Finally, we have the *Generic* column that is Things with a non-specific enough label in their Thing Description These four columns display the accuracy of the Things registered in VICINITY. Finally, we have the column *Interoperable Things* that reports the number of things that can benefit from the semantic interoperability services; which can be either genetic, from adapters or from services. This last column reports how many Things in

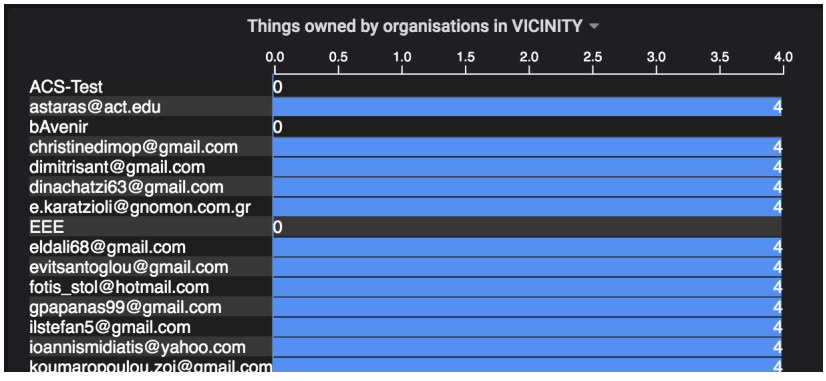
VICINITY were provided with a suitable Thing Description so they can be used, and they can use, the semantic interoperability services.



Desirable: the perfect scenario for this chart would be that the column of *Generic* is zero, and thus, the sum of the *Adapters* and *Services* columns has the same value of the *Total number of Things.* Regarding the column *Interoperable Things* it should have the same value of *Total number of Things.*

2.3. Things owned by organizations in VICINITY

This chart aims at showing how many things a specific user of VICINITY has registered in the platform.

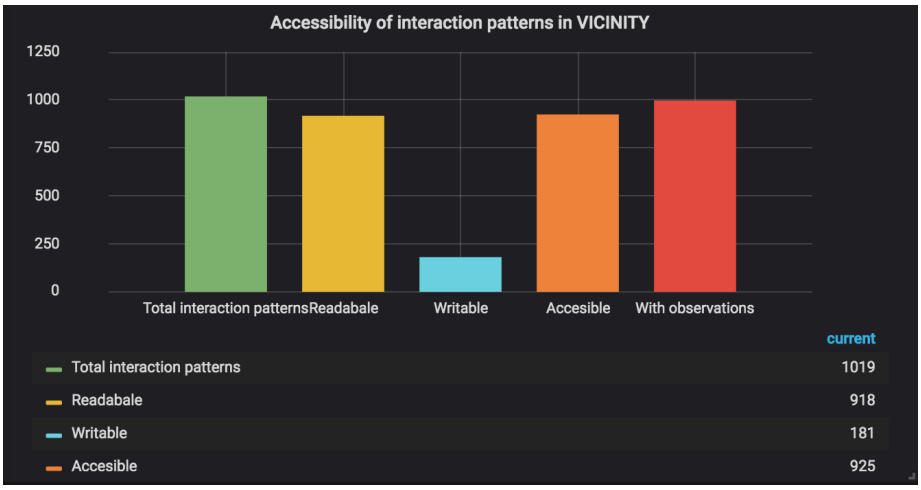


Desirable: this chart is only displaying how many things the users have, and thus, the only desirable value is that all users have something registered; otherwise such account would not have a reason to be.

2.4. Accessibility of Interaction Patterns

This chart aims at showing the interaction patterns that the Things registered in VICINITY have. The interaction patterns are the ways in which a third-party user can interact with the registered Thing. There are three types of interactions available, read, write, and access. In addition, the interaction patterns are usually related with a kind of observation. For instance, one interaction pattern may expose as readable the data of an observed property like the humidity.

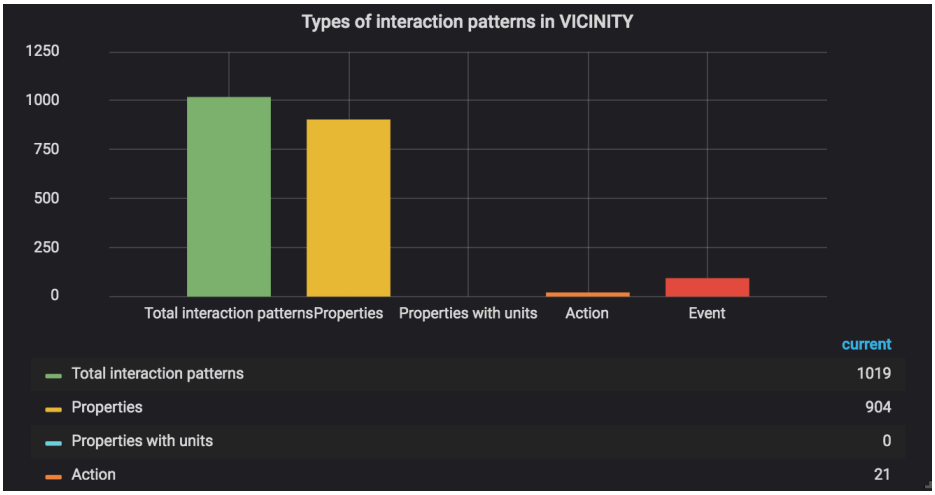
This chart consist of one column called Total Interaction Patterns (Green) that denotes the total number of interaction patterns, then in yellow the column Readable denotes the number from these total that are readable. Next, in light blue we have the Writable interaction patterns. Following, in orange we have the accessible ones. Finally, in red, we have the interaction patterns that observe a property. Consider that the interaction patterns can be readable, writable, and accessible; and therefore, such sets are overlapped.



Desirable: regarding the Readable, Writable and Accessible there is now way to specify a desirable value. Nevertheless, the red column denoting the patterns with observations should have the same value of the green column Total Interaction Patterns; meaning that all the interaction patterns are observing something.

2.5. Types of Interaction Patterns

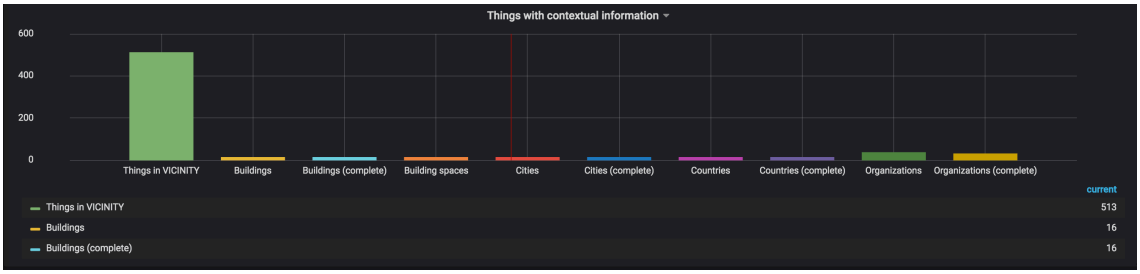
In VICINITY we distinguish between three types of interaction patterns: properties, actions, or events. In addition, those interaction patterns that are properties may denote units. In this chart we present one column for each of these type of patterns and the Total Interaction Patterns.



Desirable: in this case the desirable scenario is that the sum of the Properties the Action and the Event column values is the same of the Total Interaction Patterns column; meaning that all the interaction patterns have a type specified. On the other hand, the column Properties with units (that is 0 in the picture) should have the same value of the column Properties (yellow); meaning that all the properties has units specified.

2.6. Things with contextual information

This chart shows the Things in VICINITY and their contextual data, which can be: buildings, building spaces, cities, countries, and organizations. In addition, the building, cities, countries and organizations may have incomplete data. As a result, this chart presents one column for each type of the contextual data, and for some, a second column specifying if the data is complete; for instance *Buildings (complete)*. In addition, to contextualize the amount of data about the context we provide the Things in VICINITY that denotes the total number of Things registered in the platform.

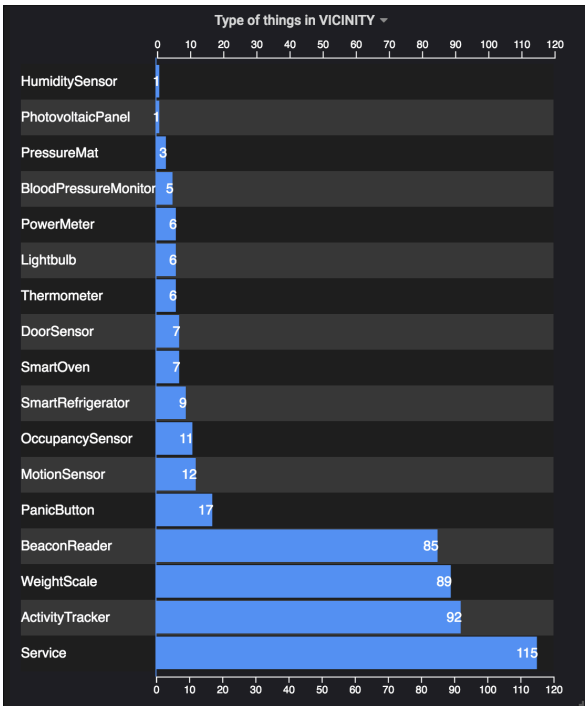


Desirable: in this chart all columns should have the same value of the column Things in VICINITY; meaning that all the registered infrastructures in the platform have complete contextual data.

2.7. Type of Things in VICINITY

This chart aims at showing the different Things that were annotated with a type from the Adapters ontology, or are a service. Notice that each of the

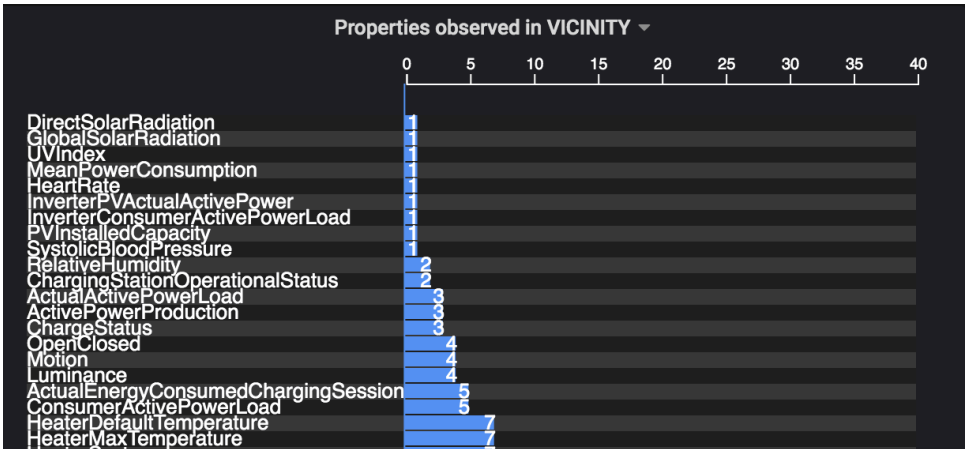
columns represents one of these types and the values are the number of things annotated.



Desirable: in this chart there is not a desirable value. However, the platform may benefit by the presence of a large number of Things that have different types.

2.8. Properties observed in VICINITY

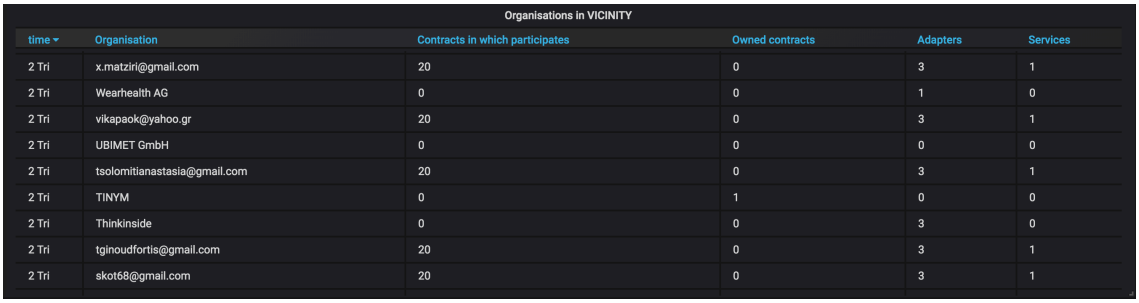
This chart reports the different type of observations that the interaction patterns capture. The observation types are modeled in the Adapters ontology.



Desirable: in this chart there is not a desirable value.

2.9. Organizations in VICINTIY

In this case we do not expose a chart but a table; which shows the different accounts in VICINITY (*Organizations* column), the contracts in which such account participates by providing data (*Contracts in which participates* column), the contracts in which this account consumes data (*Owned contracts* column), and the number of adapters or services that this account has (*Adapters* and *Services* columns).



Organisations in VICINITY

time	Organisation	Contracts in which participates	Owned contracts	Adapters	Services
2 Tri	x.matziri@gmail.com	20	0	3	1
2 Tri	Wearhealth AG	0	0	1	0
2 Tri	vikapaok@yahoo.gr	20	0	3	1
2 Tri	UBIMET GmbH	0	0	0	0
2 Tri	tsolomitianastasia@gmail.com	20	0	3	1
2 Tri	TINYM	0	1	0	0
2 Tri	Thinkinside	0	0	3	0
2 Tri	tginoudfortis@gmail.com	20	0	3	1
2 Tri	skot68@gmail.com	20	0	3	1

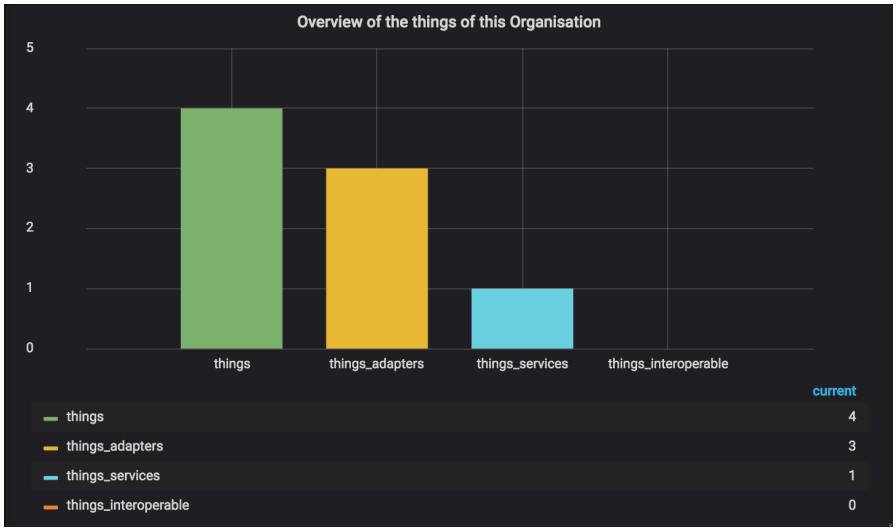
Desirable: in this case no organization should have zero contracts, either in the *Contracts in which participates* or in the *Owned contracts.* In addition, no organization should have zero *Adapters* and *Services.*

3. VICINITY user's dashboards

Once we access to the Things Monitor we can choose any dashboard named as an user from the platform to check the status of the registered IoT platform owned by such user. In following subsections we explain the different charts that profile the IoT infrastructure of a specific user, as well as, the desirable value that the charts should display.

3.1. Organizations in VICINTIY

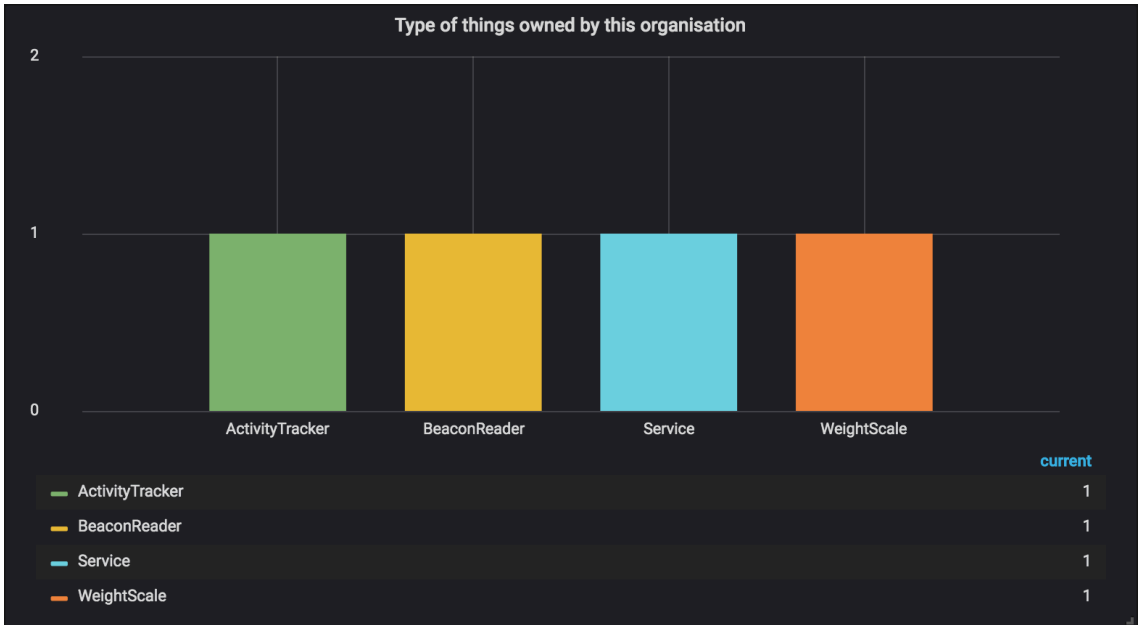
This chart aims at showing how accurate are the Thing Description of the registered IoT infrastructures belonging to an organization are. On the one hand we have the column *Total number of Things,* that represents all the devices, sensors, and services registered in VICINITY regardless they correctness. Next, we have the column *Adapters* that stands for those Things registered in VICINITY in which Thing Description they were labeled using the Adapters Ontology. Then, we have the *Services* column that states which Things registered in VICINTIY where labeled as service. These three columns display the accuracy of the Things registered in VICINITY by a specific organization. Finally, we have the column *Interoperable Things* that reports the number of things that can benefit from the semantic interoperability services. This last column reports how many Things in VICINITY were provided with a suitable Thing Description so they can be used, and they can be use, by the semantic interoperability services.



Desirable: the perfect scenario for this chart would be that the sum of the *Adapters* and *Services* columns has the same value of the *Total number of Things.* Regarding the column *Interoperable Things* it should have the same value of *Total number of Things.*

3.2. Type of Things owned by an organization

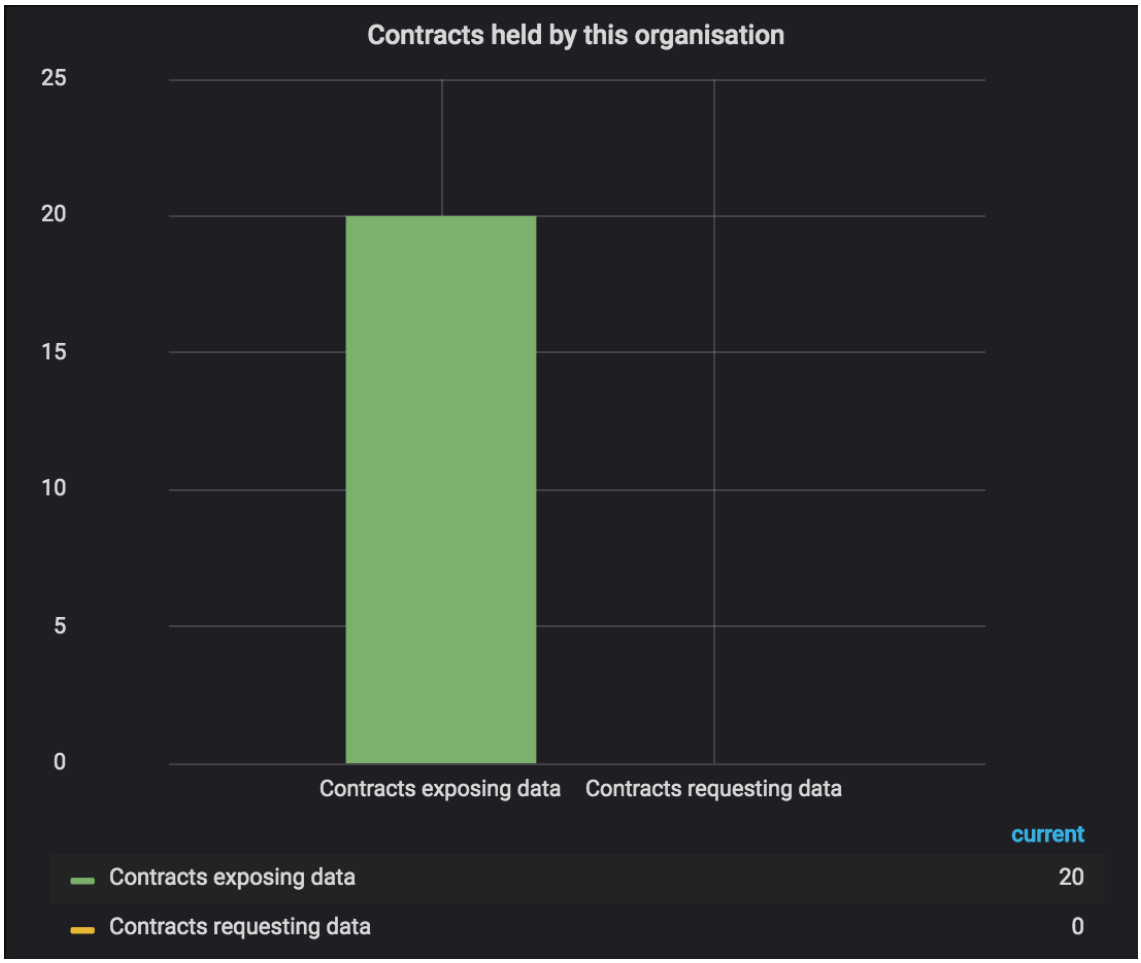
This chart depicts the type of Things registered by a specific organization. The types are the ones described in Adapters ontology, or services.



Desirable: in this chart there is not a desirable value.

3.3. Contracts held by an organization

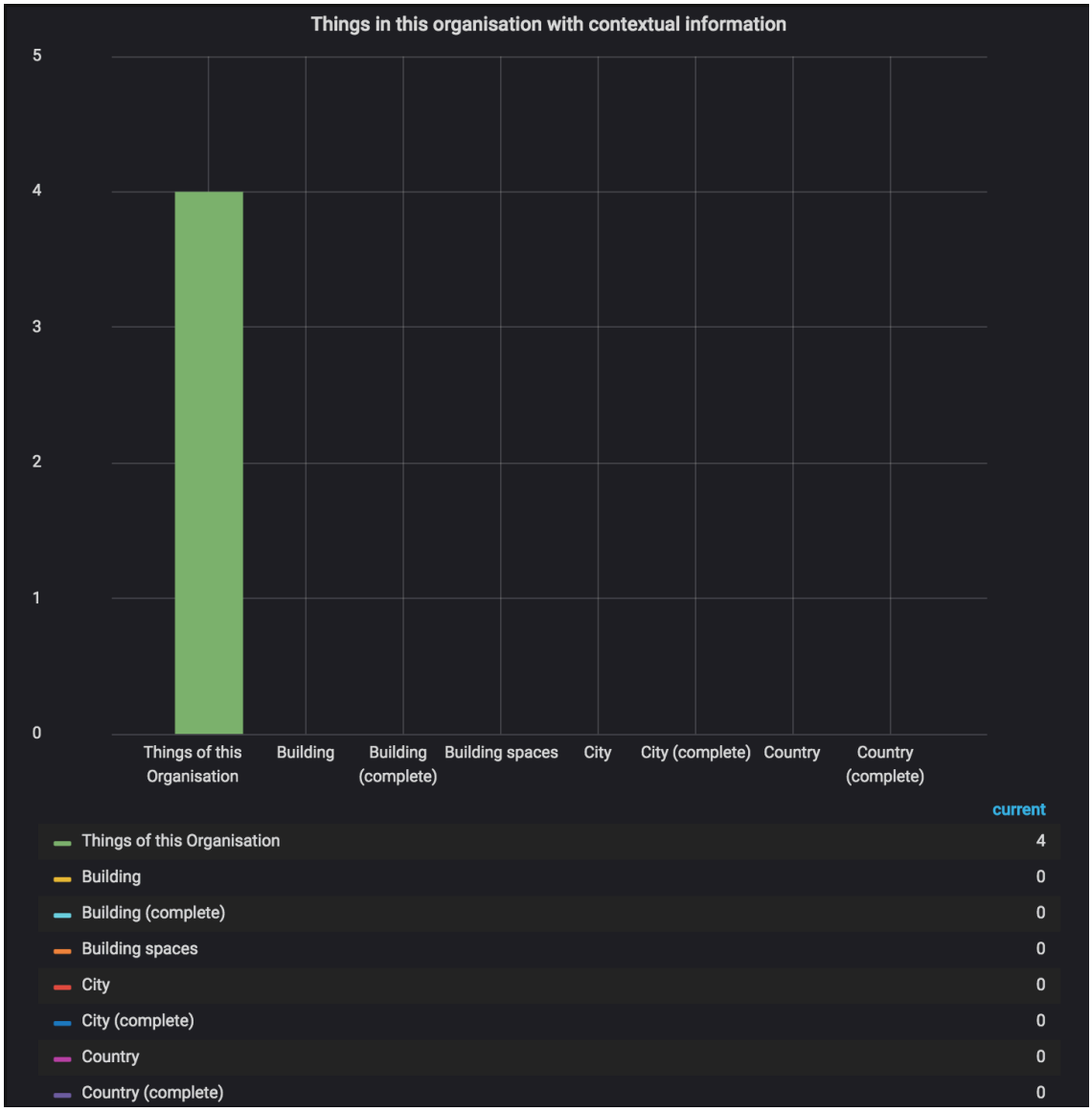
This chart shows the contracts that an organization has signed either to read data from another user's infrastructure (denoted by column *Contracts requesting data*) or exposing data (denoted by column *Contracts exposing data*).



Desirable: in this chart the desirable scenario is that no column has a value of zero.

3.4. Things in this organization with contextual information

This chart denotes the contextual information provided by an user for its IoT infrastructures registered in VICINITY. Similarly to the chart explained in Section 2.6 this chart reports the amount of Things with information bout buildings, building spaces, cities, and countries.



Desirable: in this chart all columns should have the same value of the column Things of this Organization; meaning that all the registered infrastructures in the platform by this organization have complete contextual data.