Newsletter

April-June 2017

"Interoperability as a Service" – Connecting IoT infrastructures and smart objects

Editorial

Prof. Dr. Christoph Grimm

Coordinator VICINITY project

Kaiserslautern

University of Technology

Hot summer in VICINITY

VICINITY is now at the end of its first reporting period. We have so far completed the VICINITY specification and have started on the implementation. What follows is a hot summer to review so far and to demonstrate the results. Time will show what is hotter: the summer or the workload and we all have a lot of work to do at the wrong time. Here is a summary:

• Deadline for the management and periodic reports is M19: July.

• Also, each partner has to **report** the usage of **financial resources** to be included in the periodic report for M1-M19. This will be done by each partner via the EC participant portal.

• **The EC Review is on 1st September, in Brussels (Av. Beaulieu) from 8:30 to 17:00** with a rehearsal the day before. All partners will be represented and we will have a working demo of our implementation.

• The "**Demo- and EPI-Meeting**" will take place in **Athens on 28/29 September.**

I would like to thank all partners for contributing to what I'm sure will be a successful review, in particular to Carna for taking the full workload on the reporting, and to Viktor for pushing so strongly to get the implementation and a working and impressive demo.

With the above in mind, I wish everybody a not too hot summer.

Latest News and Upcoming Events

Latest news – we have been very busy

- VICINITY booth at the IoT European Platforms Initiative village at SIdO from 5-6 April in Lyon, France.
- CAL on behalf of VICINITY participated in the "5G Network Infrastructure Workshop" hosted by ETSI on 6 April in Sophia-Antipolis, France.
- VICINITY booth at Hannover Messe Trade fair from 24-28 April in Hannover, Germany.
- Municipality Pilea-Hortiatis on behalf of VICINITY participated in CITY CHALLENGE-crowdhackathon # smartcity conference on 12-14 May in Athens, Greece.
- HITS on behalf of VICINITY presented a poster at pHealth2017 conference which was organised by TU Eindhoven on 14-16 May in Eindhoven, Netherlands.
- VICINITY project at "CERTH-ITI Open Day Workshop 2017" organised by CERTH-ITI on 16 May in Thessaloniki, Greece.
- CAL presented on behalf of VICINITY to the Smart to Future Cities event on 17-18 May in Kensington, London.
- Enercoutim on behalf of VICINITY participated in the NEXT.MOV Smart Region Summit-two-day conference on 17-18 May in Algarve, Portugal.
- The second VICINITY Stakeholder Advisory Board Webinar was held on 19 May.
- UPM presented a VICINITY paper at "EnWoT-The first International Workshop on Engineering the Web of Things" which was organised by researchers at Politecnico de Bari on 5 June in Rome, Italy.
- AAU presented a VICINITY paper at Global IoT Summit on 6-9 June in Geneva, Switzerland.
- Enercoutim and AAU on behalf of VICINITY participated in the IoT-EPI meeting on 6 June in Geneva, Switzerland.
- CAL presented on behalf of VICINITY to the ETSI Smart Sustainable Cities workshop on 7-8 June in Bordeaux, France.
- AAU presented a VICINITY paper at IEEE International Symposium on Industrial Electronics (ISIE 2017) on 19-21 June in Edinburgh, UK.
- CAL participated on behalf of VICINITY in the ETSI ISG CIM (cross-cutting Context Information Management for smart city interoperability) meeting on 19-20 June in Sophia Antipolis, France.

Upcoming Events

- VICINITY Review Meeting, 01 September 2017, in Brussels, Belgium.
- IoT-EPI Review and TF Meeting , 25-29 September 2017, in Athens, Greece.
- ETSI IoT Week, 23-27 October 2017 in Sophia Antipolis, France.

Results From Participation at Conferences

VICINITY at the SiDO conference

VICINITY was represented at the SiDO conference that took place in Lyon the 6th and 7th of April. The project was represented with a booth in the IoT EPI village. This provided us with a good opportunity to showcase the project to potential new stakeholders, as well as share information and meet up with some of the other IoT EPI projects.
The arrangers lists some key facts here. During these two days, as many as 6,500 trade visitors visited the exhibition itself, and 92 journalists and bloggers were also at location. IoT EPI presents some of their impressions here.
Both the arrangers and IoT EPI did a magnificent job at creating opportunities. The village served well both for interaction, as well as a platform for presenting projects and results. The village was visited and interviewed by members of the press. There were also made arrangements with the Mayor of Lyon – although some activities had to postponed, VICINITY received also a golden opportunity to pitch the project at visible locations. Even more important; we got to present VICINITY and the stakeholders for a large and very attentive audience.

During these two days, we were very visible with our logo and input on a number of arenas; the main presentation, the village with the VICINITY booth, a hackathon that took place, the impromptu pitch, the main screen that continuously ran the logos of the participating projects, the central located monitor used during the pitch, the brokerage event and several get-togethers that took place both before and after the main events. Additionally, the project was profiled in a magazine and featured in some b-rolls of our stand by a camera-team that visited one of the neighboring booths. There is more than an hour of video footage from the SiDO event, and a large number of photos were taken.

VICINITY at Hannover Messe 2017

Belonging to Rhineland-Palatinate, University of Kaiserslautern was given the opportunity to present its research to a broad audience during “Hannover Messe”, one of the largest trade fairs in the world, in the Research and Technology sector.
Christopher Heinz and Johannes Kölsch presented the VICINITY project. An electronic poster (Slideshow) was created as well as a printout giving a broad overview of VICINITYs ideas and visions. A strong emphasis was given to “Interoperability as a service” for existing ecosystems. Christopher Heinz also gave a talk on VICINITY during the “Science Square” Event, which took place in small sessions throughout the fair.
Johannes and Christopher both had interesting discussions with potential stakeholders, targeting users of VICINITY. Representatives from domains with which VICINITY addresses with its demo sites were very pleased with the idea and concept. They confirmed, that the VICINITY solution is feasible for them and tackles the sort of problems people are currently facing when connecting the “Things” in their respective fields.
We also talked to people from the industrial domain (Industry 4.0) and other sectors such as agriculture as well. We were assured by these “foreign domains”, that VICINITY is heading in the right direction by not introducing yet another.

Interview with a SAB member

Dolores Ordoñez

Founder of AnySolution

Please highlight here the most relevant parts of your CV.

– Graduate in Law from Deusto University with an Executive Masters in Innovation specialising in European funds and projects. I have worked in different departments of the public administration in the Balearic Islands, both at local level and at regional level and I have also been responsible for European funds (ERDF and ESF) and European projects (IV, V, VI FP, LIFE, etc), as well as Local Agenda 21 and other different regional strategies. Founder and coordinator of the SmartCities working group on the Spanish Platform es.Internet (Future Internet), member of the Executive Committee of TURISTEC (technological tourism cluster of the Balearics), member of the board of Planetic, Spanish technological platform for ICT, embedded system. Founder of AnySolution in 2014 together with Tayrne Butler. AnySolution is an SME that works around 3 main pillars: European projects (with 15 EU projects approved up to 2017), regional and international strategies for the public administration and companies and an engineering department that is developing our IoTSmartLock (IoT connected device for SmartBuildings and the tourism domain).

You are a graduate in law: how will the new EU data protection regulation affect Internet of Things data?

– Data is the future but most data comes from people, or things that belong to people. At the moment the gathering of generic data without personal identification is not a problem but people are becoming more and more aware that their data is being used to generate income for companies and they know how important the data they are giving away is. For this reason it is important for data protection policies to be clear and strict and harmonised throughout the EU to generate a real trust in users. On the other hand, companies must specify the use they are going to make of the data and say that it is going to be used for example for a certain service.

How did you develop an interest in Smart Cities? How long have you been working in this area?

– From my point of view SmartCities are the natural continuation of all sustainability strategies and Local Agenda 21 that were set up in the nineties, with a new ingredient being technology making them more efficient. My interest in the efficiency and sustainability of cities and regions stated at the end of the nineties and I have had the great opportunity to live and experience the transition of introducing technologies such as IoT, BigData and AI into our lives. This interest is both professional and personal.

– From my point of view, a Smart City must always be contemplated as everything, a great neuronal system that is hyperconnected and that thanks to this connectivity improves its efficiency, always with the aim of increasing quality of life. A Smart City that is

not humancentric, can never be Smart because technology must always be at the service of people.
– A great challenge is for cities to become "Smart" but an even greater one is for regions to become smart. It is important for Smart Cities to be connected, but in terms of technology it is also important for regions to develop in a balanced manner so that people stay in their places of origin and do not need to move to mega-cities to be able to evolve professionally. This will prevent that 75% of the world's population will be living in mega-cities by 2050, with the subsequent problems of many people living in the same place and those related with resource management.

As mentor of SMEs and an EU proposal evaluator, what would you recommend to SME participants in the future VICINITY open calls?

– The first thing would be that they should be capable of describing their idea clearly and precisely. A lot of the times, people want to say too much and forget the main objective of their proposals. Having a clear main idea and how to achieve it is essential if one wants to appeal to an evaluator and convince him/her that their project will be implemented efficiently.

– Another important issue are formalisms, so I recommend people read the call for proposals very carefully to avoid mistakes when submitting proposals. By knowing the call in detail, people will be able to have a better idea of what is expected from their proposal: the sector in which to implement the project, the technologies to be used, the importance of having alliances, etc.

What motivated you to join the VICINITY Stakeholder Advisory Board?

– VICINITY is a project that generates a great interest for developments and progress in the field of IoT. Like AnySolution, we have a special interest in knowing about any kind of innovation in IoT that will improve our IoTSmartLock. Although IoT is talked about a lot, there is still a lot to be done for it to be completely deployed. Interoperability is a key element, as is semantics. So for an SME like ourselves, to take part in SAB is a great honour and gives us the opportunity to learn from a group of experts as well as have the possibility of exchanging different points of view.

What is your area of interest in VICINITY and how do you think you will to contribute to the project?

– Our main point of interest is Smart Home and Smart Buildings because it is in these fields for which we are developing IoTSmartLock. We also believe it to be a transverse field because it is connected to others such as Smart Energy and Smart Mobility. Issues concerning connectivity with sensors and players inside and outside of buildings, as well as energy efficiency management, are great challenges for cities, especially when wanting to generate synergies that increase efficiency in buildings and improve quality of life. It can be used for different things and in different types of buildings, from public buildings to tourism accommodation (like airbnb to avoid copies of keys, of owners having to drop-off keys, etc) and it can even be used by the elderly helping them to stay independent that bit longer and continue to be able to live in their homes by using a technological device that will make their everyday life a lot easier; it gives family members or health services the possibility of keeping them monitored if necessary.
– For us, VICINITY is a breakthrough in terms of interoperability and offers great

possibilities in terms of generating cross-domain synergies because it will help us to develop new functions for our IoTSmartLock.

What is, in your opinion, the ultimate goal expected to be achieved with the help of VICINITY solution?

– From my point of view it is the possibility of generating interoperability between ecosystems that will allow users that do not have a technological profile, to connect to that ecosystem and interact with it. One of VICINITY's most important advantages, in my opinion, is the possibility it will give users to establish their own levels of privacy, so this will generate a feeling of trust among the users and this will increase the number of users in the ecosystem. The fact of acting as a social network, will raise awareness and make it possible to increase the potential of IoT ecosystems by improving cross-domain interoperability.

How much do users know about IoT and how VICINITY will change the conventional approach?

– IoT is being introduced into our lives slowly. We can find IoT in some Smart Cities in specific areas such as Smart Parking, the weather, positioning and more and more apps are being designed based on information given by sensors. Initially VICINITY will be a great breakthrough due to the developments made in the field of interoperability, currently the greatest problem in the deployment of IoT. The fact that these ecosystems can communicate with each other and with all kinds of users, and the fact of them being cross-sectoral will allow for the generation of new services based on the synergies identified in the different domains, based on the principle of respecting the privacy of each user.

Please feel free to add any question you consider necessary: How will SMEs benefit from VICINITY's outcomes?

– An SME on its own cannot develop interoperable ecosystems to support new services, but SMEs are flexible and show a great ability to adapt to new technologies and to the challenges of today's society. VICINITY will be positive for SMEs in two ways: on the one hand it will make it possible for them to take part in Open Calls and this will give them access to finance and funds to improve their IoT developments and to test them in real ecosystems and on the other hand it will help them to learn more about IoT and interoperability, as well give them the possibility of becoming users of cross-domain ecosystems that will be opened thanks to VICINITY.

Stakeholder Engagement Approach

The engagement and segmentation of stakeholders as the actors in the system design along with their roles, incentives and value creation expectations are an important part of the VICINITY. The Inform, Consult and Collaborate approach is an important driver behind research and innovation within the consortium.

IoT interoperability is not only about technical solutions, but also about consideration of

stakeholders' motivations and concerns that will accelerate or inhibit the adoption of particular solutions.
The VICINITY community ecosystem encompasses the different stakeholders, involved in the development, use, evaluation and further engagement of the VICINITY platform.
Stakeholder engagement activities will help VICINITY tackle the "resistance to change" weakness identified in the SWOT analysis. The key to doing this is to involve stakeholders in the project in order to define a solution that meets stakeholders' needs. VICINITY will define its IoT strategy by utilizing a wide range of stakeholder viewpoints. The building of a collaborative stakeholder network focused on solving shared problems through multi-sector, multi-expertise cooperation.

The strategy to ensure we have an effective stakeholder engagement has four main steps:

- Identify and analyse Stakeholders
- Define activities and tools
- Implement the plan
- Monitor the results

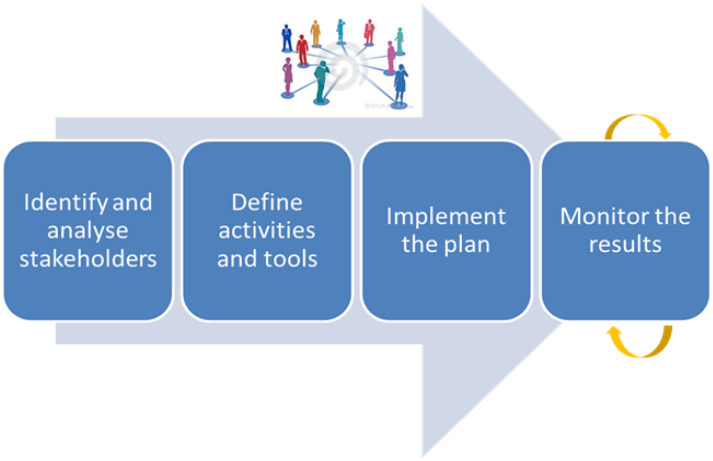

Figure 1. Stakeholders Management Plan.

Each pilot site strives to achieve a balance towards stakeholders between understanding their drivers to identifying barriers and engaging in activities.
The initial phase of interviewing stakeholders was followed up by the phase of keeping the community informed as to progress and clarifing any outstanding questions. Co-creation is very much part of our approach and it is synergistically demonstrated in public-private collaboration within the pilots. This collaboration underwent various phases of development from brainstorming and conceptual discussions to setting expectations of the expected outcomes.
VICINITY, due to the nature of the wide reach of interoperability concept that stretches from devices to the business process to the concept of shared economy and cross-domain use cases development involves many stakeholder segments.
Municipalities are an integral part of all three pilots. In the case of the Pilot in Pilea-Hortiatis, Greece, the Municipality is part of the consortium and actively co-creating and testing new home care models and engaging youth in health sports activities. The Martim Longo pilot, where the Municipality of Alcoutim is the main stakeholder in the use cases related to the energy efficiency and IEQ (interior environmental quality) models, are looking to assess the

impact on operations and optimization of delivery.
The ability to deliver services to citizens while leveraging available data within the municipality to maximise local value creation is a multidisciplinary task and can not be tackled through a simple linear project management approach. Ecosystems with contribute to value creation is a way forward.

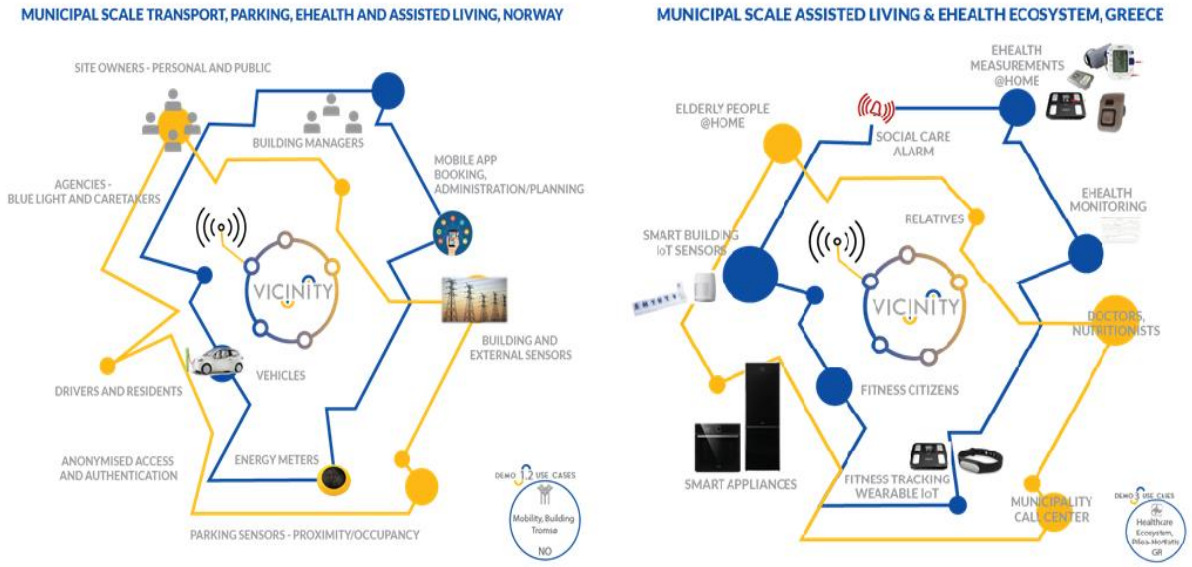

Figure 2. Stakeholder Ecosystems in VICINITY at DEMO sites.

An ecosystems building approach is used for all VICINITY DEMO sites. At the pilot site in the city of Tromsø, not only the municipal health care services company is engaged, but other departments, such as transport and telecom providers. There is strong commitment to coordinate and maximise operational goals and to roll out new optimised services not only to reduce costs but also to maximise value delivered and increase coordination between various cross-domain actors.
Although the IoT-enabled project is driven by technological efficiency, prioritising the allocation of parking spaces to emergency vehicles, organisational and process management through cross domain value creation are the core of these projects.

VICINITY Ontology

The presented interoperability approach relies on ontologies (i.e., semantic data models) that will be exploited throughout the VICINITY infrastructure. We refer to ontologies as “formal, explicit specifications of a shared conceptualization”. The VICINITY ontologies will be formal in the sense of following Description Logics and being implemented in the W3C Web Ontology Language (OWL) standard. The conceptualization to be shared among the VICINITY components and plugged systems will cover different domains of interest ranging from horizontal domains like time and space to specific definitions needed within the VICINITY ecosystem. For this reason, the VICINITY approach is based on a modular ontology network in which existing standard ontologies will be reused whenever possible.
The VICINITY ontologies development is based on ontological engineering good practices as for example:

• Reuse: existing ontologies or standard models are reused when possible increasing interoperability with external systems that might already be using such ontologies. For example, well known ontologies for describing sensors or units of measure are reused.
• Modularity: the semantic model is designed as a network in which modules are interconnected and refer to others.
• Extensibility: the ontologies allow the development of third-party extensions
• Publication: the ontology network modules are published following best practices and content negotiation mechanisms, so that human-oriented and machine-readable versions of the ontology are provided depending on user requests.
As a result, a network of ontologies (see Figure 3) is being developed within the project which is published at http://vicinity.iot.linkeddata.es. The ontologies being developed so far are: 1) an ontology for describing Web of Things (http://iot.linkeddata.es/def/wot/); 2) a core ontology for the model underlying the VICINITY use case (http://iot.linkeddata.es/def/core/); and 3) a mapping ontology to represent mappings between web resources and RDF models in order to allow interoperability in an IoT context based on VICINITY technical solutions (http://iot.linkeddata.es/def/wot-mappings/). The ontologies are under development and will continue to evolve.

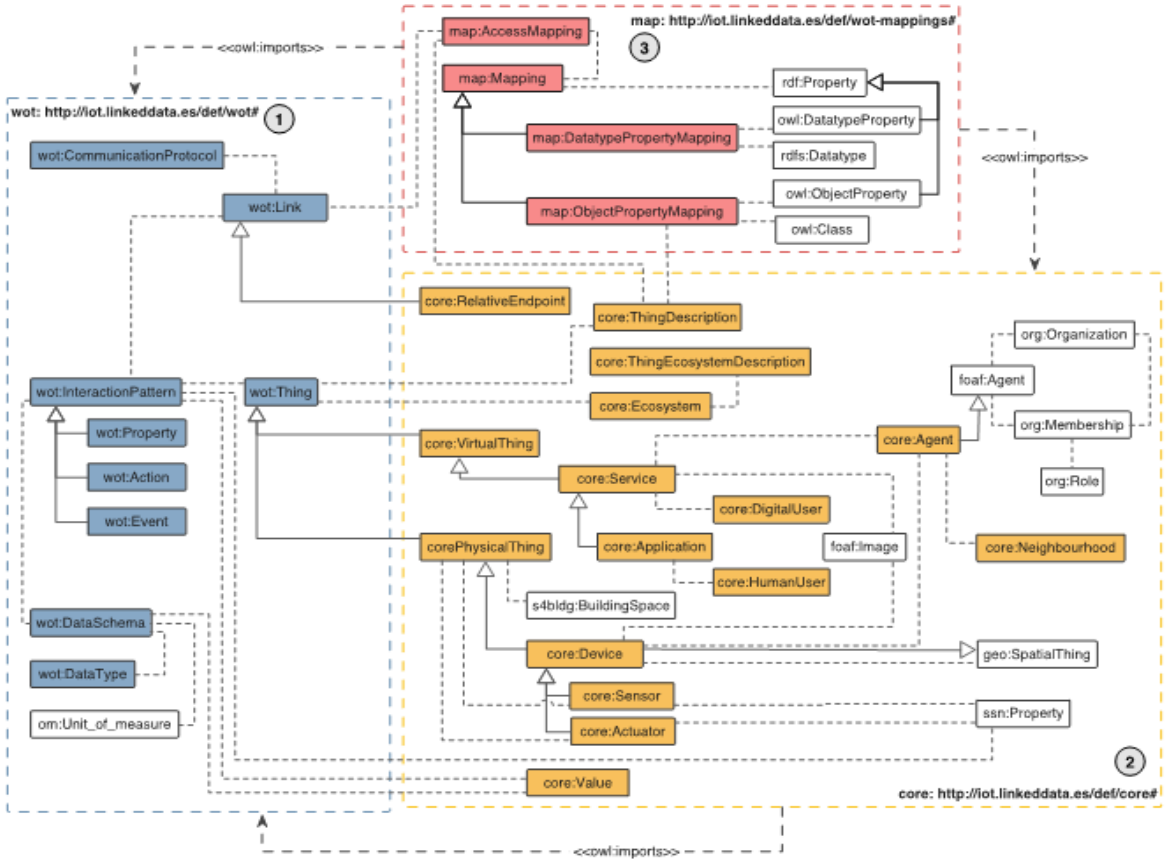

Figure 3. VICNITY ontology Network overview

VICINITY Core Components Implementation

VICINITY is currently implementating the first version of its Gateway API. This provides critical functionality for early validation of data exchange concepts for integrated infrastructures in VICINITY Pilot sites and VICINITY Value added services. This version of the VICINITY Gateway API provides features to read and set properties and execute actions through peer-to-peer networks. Future versions will provide features for processing events, device registration services or added-value services and semantic discovery and query services. The VICNITY Communication Server, Neighbourhood Manager and Semantic and dynamic configuration agent platform will also be added. Implementation of these core VICINITY components, is focused on management of the peer-to-peer network; user, device and service registration processes in virtual neighbourhood and the first version of the semantic repository.

VICINITY Semantic Discovery

The VICINITY architecture provides a standard way to discover heterogeneous IoT objects distributed among IoT infrastructures. The VICINITY approach is based on the work being done by the W3C Web of Things (WoT) WG (https://www.w3.org/WoT/IG/). This proposes a way of describing, exposing, and consuming web "things" by leveraging Semantic Web technologies.

One of the pillars of the W3C WoT is the Thing Description (TD), which aims to become a standardframe to describe web things semantically to make them interoperable. TDs are expected to cover all semantic meta-data necessary to specify the semantics of web things explicitly.

VICINITY builds on this standard frame to define the Thing Ecosystem Description (TED). The purpose of the TED frame is to support the description of ecosystems of Things, i.e., sets of Things that coexist in the same environment. In VICINITY, an IoT infrastructure makes up an ecosystem of IoT objects, the environment of which is the infrastructure itself. However, the VICINITY approach also considers as ecosystems those sets of IoT objects common environment which is defined by the scope of a query context for discovery. Such ecosystems made up of query-relevant IoT objects are described in what we call Virtual TEDs (VTEDs).

Therefore, VICINITY will rely on TDs to describe every IoT object (which can represent either physical or abstract Things) that belong to any integrated IoT infrastructure, which in turn will be described in TEDs.

One of the main challenges is to enable consumers to discover, in a distributed and dynamic scenario, those IoT objects that are relevant to their needs, but without having any prior knowledge about them. The VICINITY approach is based on the following assumptions for discovery to work:

- The VICINITY Ontology is the common and abstract information model to be used.
- The Semantic discovery & dynamic configuration agent platform is the semantic repository.
- Each time an IoT object is to be properly integrated into VICINITY (at registration time or after any change in its configuration), the TD must be inserted or updated in the semantic

repository.

• Gateway APIs of VICINITY Nodes are the semantic mediators between the actual consumers and the repository of TDs. Therefore, they provide an interface for Discovery requests.

• Gateway APIs must be able to specify discovery needs as semantic-based search criteria (SPARQL query).

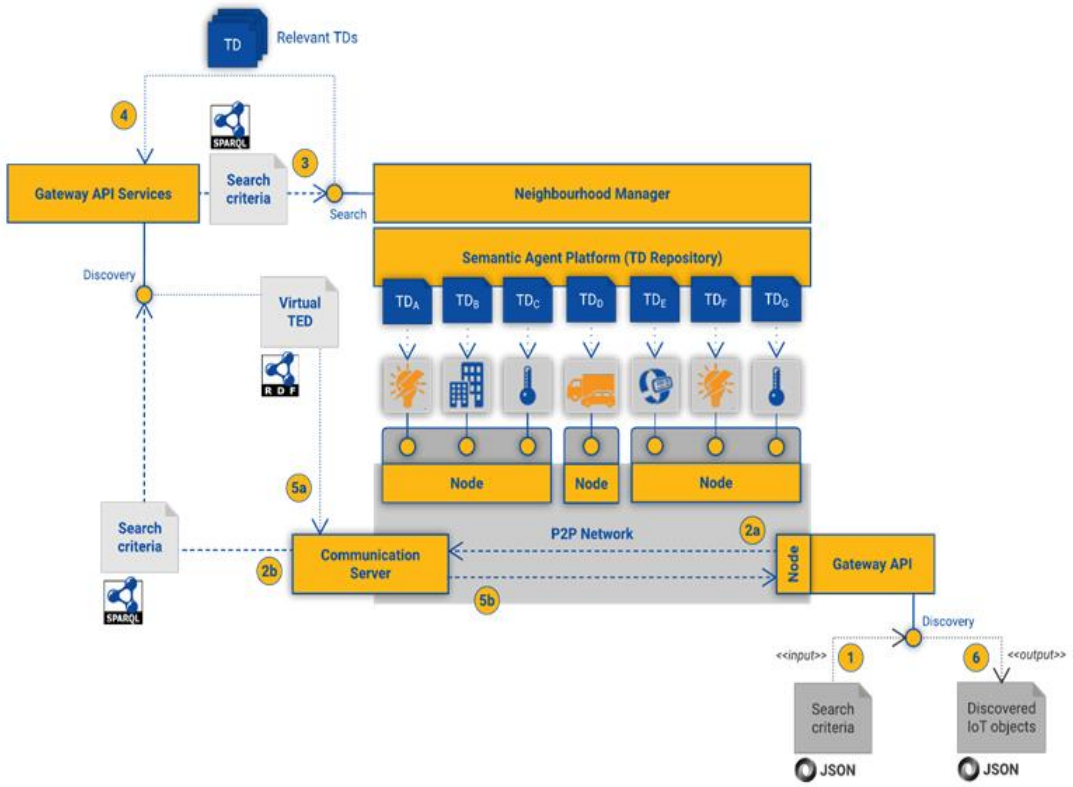

Figure 4. Semantic approach for discovery.

Fig. 4 illustrates how discovery works. The P2P Network is the secure channel that supports the discovery information flow between Gateway APIs and the Gateway API Services, through the VICINITY Communication Server. The illustrative sequence consists of the following interactions:

• With the aim of keeping actual consumers agnostic of semantics and ontology details, the Gateway APIs provide an interface that works at syntactic level, to specify schema-based search criteria. It is the Gateway API that must transform such request into its corresponding SPARQL query.

• The newly created SPARQL query that represents the given search criteria is securely transmitted to the Gateway API Services through the P2P Network.

• Once the Gateway API services component receives a search criteria in the form of a SPARQL query, it is forwarded to the Neighbourhood Manager, which is responsible for applying neighbourhood-filtering to all matching TDs obtained from the TD Repository; keeping only those TDs that represent IoT objects that belong to consumer's virtual neighbourhood.

• As the Gateway API Services component receives the filtered TDs mentioned above, it encapsulates them into a Virtual TED. Such VTED describes the virtual ecosystem that puts in conjunction the TDs that matches the underlying search criteria.

• The Gateway API Services component sends the newly created VTED to the requester through the P2P Network.

Scientific and Technical Publications

• “Semantic Discovery in the Web of Things”, Fernando Serena, María Poveda-Villalón, Raúl García-Castro, EnWoT-The first International Workshop on Engineering the Web of Things, 05 June 2017, Roma, Italy.

VICINITY Integrated Prototype Demonstration at Test-Bed Infrastructures

VICINITY is preparing to its first integrated prototype demonstration at the Test bed infrastructures for the first stage of implementation. The demonstration will assist the integration and preliminary testing of the overall VICINITY infrastructure. **This will be further demonstrated during the review meeting in Brussels on 1st September 2017 so wish us good luck.**
Several partners are working on the integration of their existing IoT infrastructures, devices and services for the demonstration.
• Gorenje - Smart oven
• CERTH - SiteWhere, Linksmart and IoTivity IoT infrastructures with several already deployed sensors/actuators in the real-working environment of the Smart House at CERTH (such as environmental sensors, smart plugs, HVAC, dimmable lights)
• University of Kaiserslautern - Eclipse Kura deployed on a Raspberry Pi integrated with colored dimmable light bulb
• Tinymesh - Environmental sensors
• Aalborg University - Grid simulator integrated with real-working laboratory infrastructure

These will be connected to VICINITY **and two different scenarios will be used for the prototype demonstration, complemented by the implementation of two high-level value-added services, as described below:**
• Tinymesh’s Value-Added service providing real-time calculation of indoor environment quality (Buildings analytics)
• CERTH’s Value-Added service, which allows the realisation of active Demand Response service by reducing the energy consumption of participating energy loads based on their available flexibility.

These will be connected as shown in Figure 5. The sensors/actuators deployed and the two Value-Added services that will be integrated, in order to give a first structured and concrete example of the VICINITY virtual neighbourhood.

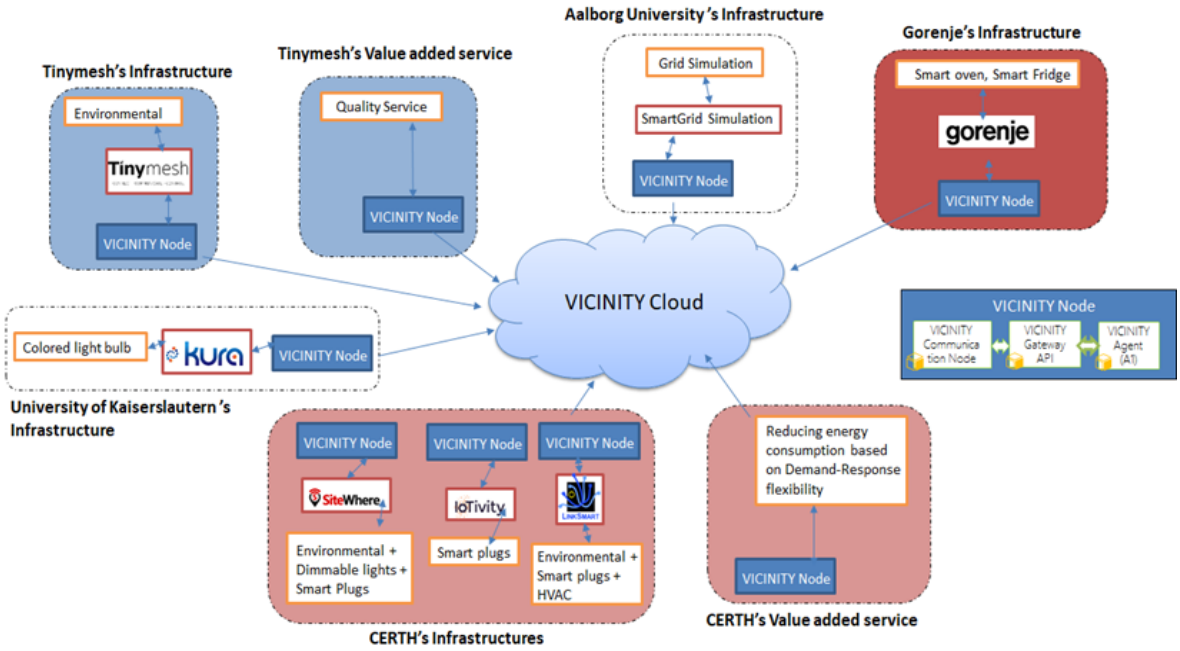

Figure 5. VICINITY integrated Prototype.

The Tinymesh Value-Added Service will collect data from the environmental sensors of Tinymesh and CERTH's infrastructure (through SiteWhere and Linksmart that are integrated to VICINITY for the prototype demonstration) in order to control the indoor environmental quality. The service processes the data from the environmental sensors and then provides feedback by changing the colour of the light bulb, integrated to VICINITY from University of Kaiserslautern's infrastructure utilizing Eclipse Kura (Figure 6).

Figure 6. Light bulb integrated with Eclipse Kura.

The scope of CERTH's Value-Added service is to allow an energy infrastructure (e.g. a facility operated on a battery storage system), to send Demand Response requests to participating IoT objects. These objects are non-critical energy loads such as lamps, HVAC etc. at CERTH's infrastructure and smart oven at Gorenje (Figure 7) that have flexibility in shifting/reducing their energy consumption upon demand. The light bulb of University of Kaiserslautern infrastructure will further be utilized in this scenario. The Value-added service will be triggered by Aalborg University infrastructure, which is a grid simulation, processes it based on the current conditions, requesting a energy demand reduction.

Figure 7. Smart fridge and oven from Gorenje.

CERTH's infrastructure supports the integration of the VICINITY Agent/Adapter, by providing three different IoT platforms/solutions for thorough testing and experimentation. The platforms use Linksmart with environmental sensors, smart plugs and HVAC, SiteWhere with smart plugs, dimmable lights and environmental devices and also IoTivity for the integration of smart plugs (Figure 8).

Figure 8. Eltako CO_2 / Temperature, Dimmer, Plugwise Smart Plug, Sense and LG HVAC.

Milestones

- General Assembly Meeting, May 31 to June 2, 2017, Thessaloniki, Greece.
- First version of the VICINITY Open Interoperability Gateway API available online!

IOT-EPI Open Calls

IoT-EPI is a European Initiative addressing the EU-funded H2020 IoT platform development programme. At the core of IoT-EPI are the seven research and innovation projects: Inter-IoT, BIG IoT, AGILE, symbIoTe, TagItSmart!, bIoTope and VICINITY.
These projects have organized or will organize several Open calls. Through these open call new projects will be funded.
bIoTope has published the first Open Call inviting organisations from outside their consortium to join the project and contribute to the evolution of the bIoTope ecosystems.

- Start: 22nd May 2017
- Deadline: 22nd August 2017
- Link

Other open calls will follow:

- symbIoTe for further information visit the following link
- Inter-IoT for further information visit the following link

FB Informatik · Design of Cyber-Physical Systems · TU Kaiserslautern
Postfach 3049 · Gottlieb Daimler Straße · 67663 Kaiserslautern

E-mail: post@vicinity2020.eu · Tel: +49 631 205 3283

This project has received funding from the European Union's Horizon 2020 Framework Programme for Research and Innovation under grant agreement no 688467.