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ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

SEAS 12004

Project leader:	ENGIE, Philippe Bourguignon
Email:	Philippe.bourguignon@engie.com
Website:	https://the-smart-energy.com/

Name: SEAS Ontologies		
Input(s):	Main feature(s)	Output(s):
▪ ▪	▪ Available at https://w3id.org/seas ▪ Knowledge model developed for SEAS ▪ Modular and versioned ontologies ▪ Extensible to model new domains	▪ ▪
Unique Selling Proposition(s):	▪ Comprehensive description of the Smart Grid and Smart Home domain ▪ Extensible to other domains ▪ Respects the best practices in terms of metadata and publication ▪ Aligned to existing reference ontologies ▪ See https://w3id.org/seas	
Integration constraint(s):	▪ N/A	
Intended user(s):	▪ Knowledge Engineers and Software developers	
Provider:	▪ ARMINES-Fayol	
Contact point:	▪ Maxime.Lefrancois@emse.fr	
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0	
	Latest update 22.11.2016	

Name: SPARQL-Generate		
Input(s):	Main feature(s)	Output(s):
▪ A set of RDF Graphs ▪ A set of documents in heterogeneous formats	▪ Available at: https://w3id.org/sparql-generate ▪ Extension of SPARQL 1.1 to generate RDF from RDF and documents in heterogeneous formats ▪ Implementation on Apache Jena ▪ Demonstration web site	▪ A RDF Graph
Unique Selling Proposition(s):	▪ Easy to learn and use ▪ Very flexible and extensible to new data formats ▪ An online form with syntax checking to start testing it. ▪ See https://w3id.org/sparql-generate	
Integration constraint(s):	▪ Useable as a Java library, an executable Jar, a Web service ▪ Java library available on Maven Central	
Intended user(s):	▪ Research Engineers, Knowledge Engineers and Software developers	
Provider:	▪ ARMINES-Fayol	
Contact point:	▪ Maxime.Lefrancois@emse.fr	
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0	
	Latest update: 22.11.2016	

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Name: Process Execution Platform ontology		
Input(s):	Main feature(s)	Output(s):
▪	▪ Available at: https://w3id.org/pep ▪ An ontology aligned with the core SSN ontology	▪
Unique Selling Proposition(s):	▪ No competing solution ▪ Description of process executors that implement processes and generate process executions ▪ Respects the best practices in terms of metadata and publication ▪ Aligned to existing the W3C SSN and SAN reference ontologies	
Integration constraint(s):	▪ N/A ▪	
Intended user(s):	▪ Knowledge Engineers and Software developers	
Provider:	▪ ARMINES-Fayol	
Contact point:	▪ Maxime.Lefrancois@emse.fr	
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0	
	Latest update: 22.11.2016	

Name: Java library to ease the development of Process Execution Platform		
Input(s):	Main feature(s)	Output(s):
▪	▪ Extension of Jena Jersey that helps to develop process execution platforms ▪ helps to develop RESTful APIs that expose algorithms that take RDF as input and output RDF ▪ Available on the demonstration web site: https://w3id.org/pep/get-started.html	▪

Unique Selling Proposition(s):	▪ No competing solution ▪ Very easy to develop a new RESTful API that exposes an algorithm that consumes and produces RDF Graphs. ▪ One possible implementation of the Process Execution Platform ontology ▪ Uses RDF Presentation and RDF Presentation negotiation ▪ The developer just needs to develop a class with a method: `public Future<Model> execute(Model input) throws PEPException {...}` Where `Model` is a RDF Graph in the Apache Jena library
Integration constraint(s):	▪ Useable as a Java library, available on Maven Central
Intended user(s):	▪ Research Engineers, Knowledge Engineers and Software developers
Provider:	▪ ARMINES-Fayol
Contact point:	▪ Maxime.Lefrancois@emse.fr
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0

Latest update: 22.11.2016

Name: RDFP ontology		
Input(s):	Main feature(s)	Output(s):
▪	▪ Available at: https://w3id.org/rdfp/ ▪ An ontology to describe RDF graphs and how they can be represented as documents in any format	▪
Unique Selling Proposition(s):	▪ Describes: 1. How to lift a document to RDF 2. How to validate the RDF Graph 3. How the document can be validated, 4. How a RDF graph can be lowered to a document. ▪ Respects the best practices in terms of metadata and publication	
Integration constraint(s):	▪ N/A ▪	
Intended user(s):	▪ Knowledge Engineers and Software developers	
Provider:	▪ ARMINES-Fayol	
Contact point:	▪ Maxime.Lefrancois@emse.fr	
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0	
	Latest update: 22.11.2016	

Name: RDF Presentation negotiation on top of Java Jersey		
Input(s):	Main feature(s)	Output(s):
▪	▪ Extension of Jena Jersey and Apache Jena that helps to develop RESTful APIs that consume and produce RDF ▪ Available on the demonstration web site: https://w3id.org/rdfp/get-started.html	▪

Unique Selling Proposition(s):

- Very easy to develop a new RESTful API that consumes and produces RDF, and negotiate the format with the client.
- It hides the RDF Presentation description and RDF Presentation Negotiation parts, and lets the end developer focus on manipulating RDF Graphs as Apache Jena models.
- The developer can use the Apache Jena `Model` class as parameter or return type for a Jersey resource method:

```
@POST
public Response
doPost(@GraphDescription("https://w3id.org/rdfp/example/graph")
Model model) {
    ...
}
```

```
@GET
@GraphDescription("https://w3id.org/rdfp/example/graph")
public Model doGet() {
    Model model = ...
    return model;
}
```

Integration constraint(s):	▪ Useable as a Java library, available on Maven Central
Intended user(s):	▪ Research Engineers, Knowledge Engineers and Software developers
Provider:	▪ ARMINES-Fayol
Contact point:	▪ Maxime.Lefrancois@emse.fr
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0

Latest update: 22.11.2016

Name: Ontology Publication Platform		
Input(s):	Main feature(s)	Output(s):
▪ Ontologies	▪ Checks the quality of ontologies ▪ Generate their documentation ▪ Generate a website that expose the ontology according to the best practices in terms of metadata and publication ▪ Available on the demonstration web site: https://w3id.org/ontop/get-started.html	▪ A Website that expose the ontologies
Unique Selling Proposition(s):	▪ Very easy to: 1. check the quality of ontologies; 2. generate their documentation automatically; 3. expose them on a website according to the best practices in terms of metadata and publication.	
Integration constraint(s):	▪ Useable as a Maven plugin and a Java web library, available on Maven Central; ▪ Generates a Java web application.	
Intended user(s):	▪ Research Engineers, Knowledge Engineers and Software developers	
Provider:	▪ ARMINES-Fayol	
Contact point:	▪ Maxime.Lefrancois@emse.fr	
Condition(s) for reuse:	▪ https://www.apache.org/licenses/LICENSE-2.0	
	Latest update: 22.11.2016	

Name: Energy resources management system for microgrids		
Input(s):	Main feature(s)	Output(s):
Energy resources forecasts (consumption and generation) Market price forecasts Demand response programs specifications Resources prices	Energy resource scheduling taking into account the forecasts Management from the perspective of the aggregator (microgrid operator) Application of demand response programs	▪ Scheduled generation, consumption, purchase/sale in the market and external suppliers, and batteries charge/discharge
Unique Selling Proposition(s):	Dynamic resources optimization using the most recent forecasts Fast execution time Available to any entity	
Integration constraint(s):	Available as web service Requires the specification of all inputs (including the results from the several forecasts)	
Intended user(s):	Researchers / Academics Energy resource aggregators	
Provider:	Polytechnic of Porto – GECAD (Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development)	
Contact point:	Zita Vale – zav@isep.ipp.pt	
Condition(s) for reuse:	Licensing Authorization by request	
	Latest update: 15.11.2016	

Name: Hybrid software and hardware simulation platform		
Input(s):	Main feature(s)	Output(s):
Energy resources specifications Simulation scenario definition	Simulation of scenarios composed by physical devices (consumption and PV generation), located in real buildings; and complemented by software agents that can represent multiple entities (consumers, generators, electric vehicles, microgrids, buildings, etc.). OPAL-RT is used to perform real-time simulations, to model components that are not physically available and to provide Hardware in the Loop capabilities Multiple algorithms (intelligent components) are used for scheduling, forecasting and decision support This hybrid simulation platform results from the contribution of several other past and current projects	▪ Simulated and real generation, consumption, purchase/sale in the market and external suppliers, and batteries charge/discharge

Unique Selling Proposition(s):	Combination of software simulation with physical devices control Interaction with real-time simulation platform (OPAL-RT) Representation, through software agents, of other facilities and players Use of real historical data Use of real-time gathered data
Integration constraint(s):	Physical part is available at a specific site Hardware is used daily by GECAD researchers
Intended user(s):	Researchers / Academics Energy resource aggregators Building energy managers
Provider:	Polytechnic of Porto – GECAD (Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development)
Contact point:	Zita Vale – zav@isep.ipp.pt
Condition(s) for reuse:	Licensing Authorization by request

Latest update: 15.11.2016

Name: SEAS Shared Intelligence Platform		
Input(s):	Main feature(s)	Output(s):
Algorithms' specific inputs	Integration of multiple algorithms from distinct partners Availability of the algorithms to multiple parties Possibility of defining and executing sequences of algorithms Case study repository to store, re-use and adapt previous case study scenarios	Algorithms' specific outputs
Unique Selling Proposition(s):	Available to multiple entities Independent of development software and platform Multiple algorithms from different sources and natures Allows studying and comparing results of previous case studies executed by other partners using a single algorithm or combinations of algorithms	
Integration constraint(s):	Available as web service Requires the specification of all inputs for each algorithm	
Intended user(s):	Researchers / Academics Companies	
Provider:	Polytechnic of Porto – GECAD (Research Group on Intelligent Engineering and Computing for Advanced Innovation and Development)	
Contact point:	Zita Vale – zav@isep.ipp.pt	
Condition(s) for reuse:	Licensing Authorization by request	
	Latest update: 15.11.2016	

Name: ARMINES Electricity Demand Forecast Provider		
Input(s):	Main feature(s):	Output(s):
▪ Historical electric demand ▪ Numerical weather predictions	▪ The algorithm uses machine learning to calculate day ahead electric demand forecasts	▪ Day ahead forecasts for the electric demand for one or multiple individual users in a geographic location

Unique Selling Proposition(s):	▪ Forecasts are probabilistic allowing to be used for risk management
Integration constraint(s):	▪ http://seas.persee.eu:8080/electricity-demand/docs/
Intended user(s):	▪ Electricity retailers ▪ Distribution network operators ▪ Transmission system operators ▪ Electricity consumers
Provider:	▪ ARMINES
Contact point:	▪ Andrea.michiorri@mines-paristech.fr
Condition(s) for reuse:	▪ The current version is for research only

Latest update: 14.11.2016

Name: ARMINES PV production Forecast Provider		
Input(s):	Main feature(s)	Output(s):
▪ Historical PV production ▪ Numerical weather predictions	▪ The algorithm uses machine learning to calculate day ahead electricity production form PV plants	▪ Day ahead forecasts for the production for one or multiple PV plants in a geographic location
Unique Selling Proposition(s):	▪ Forecasts are probabilistic allowing to be used for risk management	
Integration constraint(s):	▪ http://seas.persee.eu:8080/PV-production/docs/	
Intended user(s):	▪ PV producers ▪ Distribution network operators ▪ Transmission system operators	
Provider:	▪ ARMINES	
Contact point:	▪ Andrea.michiorri@mines-paristech.fr	
Condition(s) for reuse:	▪ The current version is for research only	
	Latest update: 14.11.2016	

Name: SEAS Reference Architecture Model (S-RAM)		
Input(s):	Main feature(s)	Output(s):
	Document describing the reference architecture define within the SEAS project Gap analysis of existing solutions for managing energy consumption and production Presentation of S-RAM terminology and main principles Description of S-RAM interfaces	
Unique Selling Proposition(s):	Innovative architecture proposition based on distributed core services Dynamic, scalable, automated and secure Compatible with several others existing architectures, standards, systems and platforms	
Integration constraint(s):	Requires additional feedbacks from pilots and future implementations	
Intended user(s):	Researchers / Academics Companies	
Provider:	IMT/Telecom Bretagne – RSM	
Contact point:	Guillaume Habault (guillaume.habault@telecom-bretagne.eu)	
Condition(s) for reuse:	Project deliverable Need to determine with ASEMA if their S-RAM implementation choices could be added to the document (Intellectual property rights concern)	
	Latest update: 15.11.2016	

Name: PV Production Estimation Algorithm		
Input(s):	Main feature(s)	Output(s):
▪ Hourly-based production values (historical values if any) ▪ Position of the PV system	Contact a Weather Forecast Service to retrieve hourly-based weather forecast for the given position (and historical value if necessary and available) Machine-learning algorithm computing production estimation	▪ Hourly-based PV production estimation for the given position (the estimation interval depend on the weather forecast interval, 24h, 48h or more)

Unique Selling Proposition(s):	Based on machine learning concept, avoid using mathematical formula which would require more inputs Dynamic (adapt to real production) Fast execution time
Integration constraint(s):	Available as software for Energy Management System (Possibility to make it available as a service, for EMS to remotely have access to it) Requires the specification of all inputs
Intended user(s):	Researchers / Academics Energy Management System / Distribution System Operator
Provider:	IMT/Telecom Bretagne – RSM
Contact point:	Guillaume Habault (guillaume.habault@telecom-bretagne.eu)
Condition(s) for reuse:	Open-source (https://www.apache.org/licenses/LICENSE-2.0)
	Latest update: 15.11.2016

Name: WiSUN IPV6 Network Solution for SmartGrids/Smart-Buildings and Smart-Metering		
Input(s):	Main feature(s)	Output(s):
▪ NA	▪ Full IPv6 ▪ WiSUN alliance ▪ Based on IETF IOT and IEEE protocols ▪ Long Range/ Short Range Adaptive ▪ High bit rate (from 12.5 kbps to 1.2 Mbps) ▪ Star/Meshed Architecture	▪ NA
Unique Selling Proposition(s):	▪ Negotiable based on demand ▪	
Integration constraint(s):	▪ NA ▪	
Intended user(s):	▪ Utilities, Telco Operators, IoT Operators, Building managers	
Provider:	▪ Itron	
Contact point:	▪ Mehdi.mani@itron.com	
Condition(s) for reuse:	▪ Licensing to be purchased ▪	
Latest update: <INSERT LATEST UPDATE DATE HERE>		

Name: HEATING MANAGEMENT STRATEGY TO MINIMIZE PEAK CONSUMPTION (HMPC)		
Input(s):	Main feature(s)	Output(s):
House characteristics User's set points Consumption forecast data Weather forecast data	Minimize building peak consumption guaranteeing user thermal comfort using a smart control strategy of heating components Sell services to system operators, aggregators or virtual power plants	Consumption profile Heating set points
Unique Selling Proposition(s):	Energy management software for heating systems and intelligent use of building power	
Integration constraint(s):	No other library needs; No Matlab License need Communication network Meters (temperatures, consumptions) Digital control for heating components	
Intended user(s):	Building from small to large size	
Provider:	French Alternative Energies and Atomic Energy Commission (CEA LITEN)	
Contact point:	Tran Quoc Tuan – QuocTuan.TRAN@cea.fr Elvira Amicarelli – Elvira.Amicarelli@cea.fr	
Condition(s) for reuse:	Commercial license	
	Latest update: 31 August 2016	

Name: HEATING MANAGEMENT STRATEGY TO MAXIMIZE THERMAL COMFORT (HMTC)		
Input(s):	Main feature(s)	Output(s):
House characteristics User's set points Consumption forecast data Weather forecast data	Maximize user thermal comfort using a smart control strategy of heating components	Consumption profile Heating set points
Unique Selling Proposition(s):	▪ Energy management software for heating systems	
Integration constraint(s):	No other library needs; No Matlab License need Communication network Meters (temperatures, consumptions) Digital control for heating components	
Intended user(s):	Building from small to large size	
Provider:	French Alternative Energies and Atomic Energy Commission (CEA LITEN)	
Contact point:	Tran Quoc Tuan – QuocTuan.TRAN@cea.fr Elvira Amicarelli – Elvira.Amicarelli@cea.fr	
Condition(s) for reuse:	Commercial license	
	Latest update: 31 August 2016	

Name: HEATING MANAGEMENT STRATEGY TO MINIMIZE ELECTRICITY COSTS (HMSEC)		
Input(s):	Main feature(s)	Output(s):
House characteristics User's set points Consumption forecast data Weather forecast data	▪ Minimize electricity cost guaranteeing user thermal comfort using a smart control strategy of heating components	Consumption profile Heating set points Daily electricity cost
Unique Selling Proposition(s):	Energy management software for heating systems and intelligent use of building energy	
Integration constraint(s):	No other library needs; No Matlab License need Communication network Meters (temperatures, consumptions) Digital control for heating components	
Intended user(s):	Building from small to large size	
Provider:	French Alternative Energies and Atomic Energy Commission (CEA LITEN)	
Contact point:	Tran Quoc Tuan – QuocTuan.TRAN@cea.fr Elvira Amicarelli – Elvira.Amicarelli@cea.fr	
Condition(s) for reuse:	Commercial license	
	Latest update: 31 August 2016	

Name: HEATING MANAGEMENT STRATEGY TO MAXIMIZE THERMAL COMFORT (HMTC)		
Input(s):	Main feature(s)	Output(s):
House characteristics User's set points Consumption measurements Temperature measurements	Maximize user thermal comfort using a smart control strategy of heating components	Consumption profile Heating set points
Unique Selling Proposition(s):	▪ Real-time energy management software for heating systems	
Integration constraint(s):	No other library needs; No Matlab License need Communication network Meters (temperatures, consumptions) Digital control for heating components	
Intended user(s):	Building from small to large size	
Provider:	French Alternative Energies and Atomic Energy Commission (CEA LITEN)	
Contact point:	Tran Quoc Tuan – QuocTuan.TRAN@cea.fr Elvira Amicarelli – Elvira.Amicarelli@cea.fr	
Condition(s) for reuse:	Commercial license	
	Latest update: 31 August 2016	

Name: ANN-based Algorithm for communities load forecasting		
Input(s):	Main feature(s)	Output(s):
Consumption and weather historical data Weather forecast data	Short-term power consumption forecast for multi-buildings neighborhood connected to distribution grids	Consumption profile
Unique Selling Proposition(s):	Load forecast software for communities consumption	
Integration constraint(s):	No other library needs; No Matlab License need Communication network Meters (temperature, consumptions)	
Intended user(s):	Large-size building and communities	
Provider:	French Alternative Energies and Atomic Energy Commission (CEA LITEN)	
Contact point:	Tran Quoc Tuan – QuocTuan.TRAN@cea.fr Elvira Amicarelli – Elvira.Amicarelli@cea.fr	
Condition(s) for reuse:	Commercial license	
	Latest update: 31 August 2016	

Name: A stochastic approach for smart home energy management		
Input(s):	Main feature(s)	Output(s):
Electricity price forecast Generation forecast for renewable resources Weather forecast data Comfort level	HEMS optimization service solves Load Commitment (LC) problem taking time-varying prices, generation from renewable sources, demands for each appliance in household, battery storage capacity, and grid constraints into account. LC problem aims to achieve the household minimum payment without degrading comfort level of prosumers.	Recommendations regarding; Electricity sell/buy decisions Charge/discharge periods for battery storage Usage periods for controllable/uncontrollable appliances

Unique Selling Proposition(s):	Non-utility solutions are focused on both quantitative and qualitative benefits, such as increased comfort and quality of life, as well as reductions in energy use. Utility solutions, on the other hand, must be based on clearly defined return-on-investment calculations that satisfy the reliability or economic needs of the utility.
Integration constraint(s):	mmon communication protocols (REST, SOAP, HTTP,etc)
Intended user(s):	Electricity consumers/prosumers
Provider:	Innova IT Solutions
Contact point:	O. Tufan Doğan – osdogan@innova.com.tr
Condition(s) for reuse:	Commercial license

Latest update: 1 December 2016

Name: Go SeasObjects library to ease the development of SEAS compatible services and clients		
▪ Input(s):	▪ Main feature(s)	▪ Output(s):
▪	▪ Types, functions and utilites for handling SeasObjects in a simple manner ▪ Eases development of SEAS compatible services and clients. ▪ Available at seas.asema.com/git ▪	▪

Unique Selling Proposition(s):	▪ No competing solution for Go ▪ Easy to start working with SEAS using Go. ▪ Developer doesn't need to worry about RDF. ▪ Commonly used features and utilities already implemented. ▪
Integration constraint(s):	Usable as Go library
Intended user(s):	Software developers
Provider:	EKE
Contact point:	Mikko.seppanen@eke.fi
Condition(s) for reuse:	▪ GNU LGPL3
	▪ *Latest update: 30.11.2016*

Name: SeasObjects library for semantic, object oriented data transfer between heterogeneous systems		
• Input(s):	• Main feature(s)	• Output(s):
▪ In-memory objects and data handled by applications.	▪ Types, functions and utilites for serializing and deserializing objects into RDF in a simple manner ▪ Eases development of SEAS compatible services and clients. ▪ Available at seas.asema.com	▪ Standard representation of timeseries, commands and other standardized objects and their properties in RDF

Unique Selling Proposition(s):	○ Fast evelopment of semantic applications in various operating systems and programming languages ○ Completely hides the complexities of RDF and offers one, familiar and intuitive way to program ○ Integrated validation tools, tester tools for API compatibility ○ Possibility to autogenerate and autoconfigure APIs
Integration constraint(s):	Requires the use of one of the following programming languages: Java, C#, Python, C++, Go
Intended user(s):	Software developers
Provider:	Asema Electronics
Contact point:	jani@asema.com
Condition(s) for reuse:	• GNU LGPL3
	• *Latest update: 04.12.2016*