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ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

13029

Water-M

Project details

Project leader:	Jean-Jacques Busson (Eolane)
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Metadata & Data manipulation language & Visualisation		
▪ Input(s):	▪ Main feature(s)	▪ Output(s):
▪ Binary to profiles ▪ Measurement and representation method	▪ Spatial metadata specifying the geographic coordinates and/or the elevation of the sensors (Indoor large farming or water management platforms) ▪ Water throughput, humidity, LED brightness Monitoring, augmented measurements form what we call Geo Time Series® (GTS) ▪ differentiating factor of Warp 10 is that both space (location) and time	▪ Have geo-located readings without having to use four separate series and having to keep track of the reading context. ▪ Water leakage and malfunction detection ▪ Sensors could be describe in open Onthology (SEAS and / or WaterM onthology)

Unique Selling Proposition(s):	▪ Extensible stack oriented programming language with specific Water Management possible request ▪ Capacity to create complex search on Big data with an easy language "find all the sensors water nodes active during last Monday in the perimeter delimited by this geo-fencing polygon of that indoor farming zone" ▪ Capacity for large water command control auctioneer, in indoor and outdoor farming but also in water distributed sensors to be positioned with very high efficiency. ▪ Capacity to managed data compression local treatment (aka FOG computing) for long ranged access networks (LoRA)
Integration constraint(s):	▪ Use WARP IO open source package ▪ Grafana and its Grafana-WarpDB module for data visualisation. ▪ RDF OWL manipulation if SEAS ontology use
Intended user(s):	▪ Water and farming programmers for information technology monitoring solution ▪ Programmers using time series concept
Provider:	▪ Cityzen data Warp io site http://www.warp10.io/ and the specific Water-M Wiki site (Contact point will deliver access).
Contact point:	herve rannou <herve.rannou@cityzendata.com>

Metadata & Data manipulation language & Visualisation	
Condition(s) for reuse:	▪ open source for Warp IO package ▪ + Licensing for the specific Iot Lora data Fog computing module engine
	▪ *Latest update : November 2017*

PICOGATEWAY		
Input(s):	Main feature(s)	Output(s):
▪ Messages received in LoRa	▪ Gateway which transfers data from a node to server ▪ Exposes a web server with the messages received	▪ Raw data

Unique Selling Proposition(s):	▪ A ready-to-use Indoor LoRa concentrator for Small & Private Network, Smart water metering, Smart Farming, Smart Building, Smart Asset ▪ Low cost device ▪ Embedded Network & Application Server
Integration constraint(s):	▪ REST API service for data access ▪ Indoor only ▪ LoRa 868 or 433 MHz band 3 channels(LoRaWan™default) ▪ 470 MHz version for China's market
Intended user(s):	▪ Customer who wants to get data from LoRa network
Provider:	▪ Eolane
Contact point:	▪ Jean-Jacques Busson <jean-jacques.busson@eolane.com>
Condition(s) for reuse:	▪ Commercially available
	Latest update: December 15, 2017

Name: LORA STACK		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Sensor data payload	▪ Software brick that decodes and encodes data using LORA protocol	▪ Data over LoRa
Unique Selling Proposition(s):	▪ Integration in products and solutions made by éolane (Sensing Labs LoRa Transmitters for water and energies measurement , éolane vibration sensor "movee", LORA/RS422 adapter for Alstom, ….)	
Integration constraint(s):	▪ Hardware : STM32 microcontroller with FreeRTOS	
Intended user(s):	▪ Internally used by eolane for customer product development.	
Provider:	▪ Eolane	
Contact point:	▪ Jean-Jacques Busson <jean-jacques.busson@eolane.com>	
Condition(s) for reuse:	▪ Internal reuse only	

Latest update: December 15, 2017

High Performance on ARM cortex solution : WARP IO adapted solution		
▪ Input(s):	▪ Main feature(s)	▪ Output(s):
▪ Processors characteristics and instruction set	▪ manipulate sensor data on very small embedded CPU solutions (ARM cortex) ▪ Improved efficiency for analytics and storage on such small package solutions (could be open hardware raspberry Pi solutions)	▪ Collect, store and manipulate sensor data. ▪ Very open and extendable data model

Unique Selling Proposition(s):	▪ Able to represent any Sequence Data ▪ could manage millions of series (10 million of data point and around 10 K data points/s) ▪ Afterwards, the same Warp Script could run of Standalone or distributed hosting solution to reach very high performance and scalability ▪ Creation of dynamical presentation or data visualization with Apache Zeppelin.
Integration constraint(s):	▪ Knowing time series concept and ideally tools such as ▪ Spark, FLINK batch solution ▪ Real time existing tool such as apache storm (open source). ▪ Apache Zeppelin
Intended user(s):	▪ Programmers searching High Performance on small CPU packages ▪ Performance evaluation expert
Provider:	▪ Cityzen data Warp io site http://www.warp10.io/ and the specific WaterM Wiki site (Contact point will deliver access).
Contact point:	herve rannou <herve.rannou@cityzendata.com>
Condition(s) for reuse:	▪ open source
	▪ *Latest update : November 2017*

Keyaqua novel features (Communication with EHP, SAMI and RemoteMX)		
Input(s):	**Main feature(s)**	**Output(s):**
- Water quantity monitoring - Water quality monitoring	- Graphical interface - Location info - Novel features: adapting EHP data provision and SAMI predictive tool as a part in Keyaqua, RemoteMX	Visual management tool for water supply network

Unique Selling Proposition(s):	- Easy-to use visual layout integrating several information sources with location info - Easy access via browser
Integration constraint(s):	- Usable via Web browser - Network data in database format like Oracle, PostGIS, ESRI Shape or georeferenced vector (DWG, DGN)
Intended user(s):	Water utilities, industrial water operators
Provider:	Keypro Oy
Contact point:	CEO Toni Paila <toni.paila@keypro.fi>
Condition(s) for reuse:	Available as a commercial service product

Latest update: December 2017

SAMI: Platform for measurement data management and creating monitoring services		
Input(s):	Main feature(s)	Output(s):
▪ Real-time measurements in water distribution network ▪ For example pressure and flow measurements	▪ Sensor data management and availability ▪ Data sharing via open WCF and JSON interfaces ▪ Platform for creating online monitoring web services	▪ Open source platform ▪ Demo version of online web service for monitoring hydraulic state of a water distribution network

Unique Selling Proposition(s):	▪ Open source platform for sensor data management ▪ Documented API for getting data and building up third party solutions
Integration constraint(s):	▪ Sensors in water distribution network with data available via internet ▪ Building up server environment
Intended user(s):	▪ Water utilities, water distribution network operators and managers
Provider:	▪ Savonia UAS
Contact point:	▪ Eero Antikainen < eero.antikainen@savonia.fi>
Condition(s) for reuse:	▪ Open source, released in Github https://github.com/SavoniaUAS/SaMi ▪ Demo version of monitoring web service is not public

Latest update: December 2017

Water distribution optimization and management using hydraulic network modelling		
Input(s):	Main feature(s)	Output(s):
▪ Spatial data for distribution network (pipes, water sources, storage, pumps, …) ▪ Basic data about water demands, pressure, …	▪ Hydraulic model for planning, optimizing and management of water distribution in a geographical information system (GIS)	▪ Calibrated hydraulic model for Vehmersalmi distribution network (Kuopio Waterworks Ltd)

Unique Selling Proposition(s):	▪ Documented methods for hydraulic network model creation ▪ Documented methods for hydraulic network model calibration
Integration constraint(s):	▪ Basic data for hydrzulic network model creation ▪ EPANET modelling tool (open source)
Intended user(s):	▪ Water utilities, supply network managers, design consultants
Provider:	▪ Savonia UAS
Contact point:	▪ Eero Antikainen < eero.antikainen@savonia.fi>
Condition(s) for reuse:	▪ EPANET tool available for free (www.epa.cov/water-research/epanet) ▪ Results of this part is available for free (Thesis, Jari Puurunen)

Latest update: December 2017

Network flow monitoring		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Sensor data from various quality monitoring station	▪ Water balance monitoring service based on clamp-on flow meters and supportive data enrichments	▪ Information service; processed data via EHP data service ▪ Raw data

Unique Selling Proposition(s):	▪ Clamp-on sensors for easy installation ▪ Early warning for possible disruptions in water flow balance ▪ Low maintenance costs
Integration constraint(s):	▪ EHP-data.com internet user interface, Rest API interface for data delivery to other systems ▪ The standard Rest API user interface can be send for any server to get the monitoring data from the EHP-data.com server
Intended user(s):	▪ Water Utility operators
Provider:	▪ EHP Environment
Contact point:	▪ Jaakko Seppälä, chairman of board <jaakko.seppala@ehp-tekniikka.fi>
Condition(s) for reuse:	▪ Information is also available via Keyaqua by Keypro

Latest update: December 2017

Water quality data monitoring		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Sensor data from various quality monitoring station	▪ Novel features for information provision, eg. integration with Keyaqua ▪ Algorhitms to process the quality parameter info	▪ Processed quality data ▪ Raw data

Unique Selling Proposition(s):	▪ Real-time quality monitoring for various parameters ▪ No need for external energy supply, solar panels ▪ Low maintenance costs
Integration constraint(s):	▪ EHP-data.com internet user interface, Rest API interface for data delivery to other systems ▪ The standard Rest API user interface can be send for any server to get the monitoring data from the EHP-data.com server
Intended user(s):	▪ Industrial operators, environmental permit authorities
Provider:	▪ EHP Environment
Contact point:	▪ Jaakko Seppälä, chairman of board <jaakko.seppala@ehp-tekniikka.fi>
Condition(s) for reuse:	▪ Available as an information service via EHP ▪ Information is also available via Keyaqua by Keypro

Latest update: November 2017

MACHForc - Web application for data solution and computing		
Input(s):	Main feature(s):	Output(s):
▪ Device data with analog/digital inputs ▪ Manual lab/process inputs	▪ Sensor-cloud data solution for remote data management ▪ Data analytic applicable	▪ Advanced reporting ▪ Process improvement

Unique Selling Proposition(s):	▪ Application with supercomputing capacity ▪ Highly scalable for customized analytics deployment
Integration constraint(s):	▪ Areas with possible data transmission to internet
Intended user(s):	▪ Chemical processing industries, smart water technology providers, and their clients
Provider:	▪ RemoteMX Oy
Contact point:	▪ yingchan.lin@remoteMX.com
Condition(s) for reuse:	▪ System upkeep

Latest update: Dec 15th, 2017

Aquamatrix: Flow/Pressure Meter		
Input(s):	Main feature(s):	Output(s):
▪ Flow data ▪ Pressure data ▪ Dynamic pressure ▪ Temperature data ▪ Water network information	▪ Combined flow, static and dynamic pressures meters ▪ Integrated data exchange ▪ LoRa/Sigfox/GPRS/NB-IoT interfaces	▪ Accurate consumption data to any browser ▪ Leakage detection ▪ Network condition data

Unique Selling Proposition(s):	▪ First combination meter with accurate flow, static and dynamic pressure measurement ▪ Data algorithms for precise water flow management and leak detection
Integration constraint(s):	▪ Aquamatrix.fi user interface ▪ GPRS/Sigfox/LoRa/NB-IoT network
Intended user(s):	▪ Water utilities and housing estates/property owners
Provider:	▪ Aquamatrix Oy (Novel Econet Spin-off company released during Water-M)
Contact point:	▪ Antti Herlevi <antti.herlevi@econetgroup.fi>
Condition(s) for reuse:	▪ Available as an information service via Aquamatrix ▪ Information is also available via Keyaqua by Keypro

Latest update: December 2017

Heavy metal monitoring		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Electrochemical sensors (EHP)	▪ Real-time monitoring for low concentrations of heavy metals	▪ Monitoring result as numerical value

Unique Selling Proposition(s):	▪ Real-time monitoring for low concentrations of heavy metals ▪ No need for external energy supply (possible to use solar panels)
Integration constraint(s):	▪ Data transfer via internet connection, GPRS or LoRa
Intended user(s):	▪ Industrial operators, water utilities, environmental permit authorities
Provider:	▪ MEOLINE Oy (a spinoff company released during the Water-m Project)
Contact point:	▪ Jarkko Räty, Meoline Oy
Condition(s) for reuse:	▪ Available via EHP data service, which is further integrated with Keyaqua

Latest update: December 2017

Trend analysis tool		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Water data monitoring	▪ Shows the direction, the speed and the severity of the change ▪ Graphical output information	▪ Early warning for critical variables
Unique Selling Proposition(s):	▪ Easily exploitable for any data ▪ Tool for condition monitoring, risk assessment, early warning and prediction	
Integration constraint(s):	▪ Matlab based algorithm, can be transformed to self-executable. ▪ Requires low computational capacity	
Intended user(s):	▪ Research engineers, water utilities, supply network managers	
Provider:	University of Oulu / Control Engineering	
Contact point:	▪ Esko Juuso, Jani Tomperi	
Condition(s) for reuse:	▪ Available from University of Oulu / Control Engineering	

Latest update: November 2016

Name: MIND 4.0		
Input(s):	**Main feature(s)**	**Output(s):**
▪ Any kind of data produced from Scada, IoT, Sensors or Databases (on finalized form	▪ Real-time data process management ▪ Near-real time index performance for big scale data ▪ Flexible and scalable ▪ Includes visualization components ▪ Machine Learning Algorithms to extract new meanings from data ▪ Rule based event processing ▪ Report and notification ability on selected data	▪ Reports which include filtered data content on csv, pdf or xls format ▪ Actions that trigger web services ▪ Alerts or notifications via e-mail or messaeges
Unique Selling Proposition(s):	▪ In Real-Time Data Analysis Tool ▪ Dynamic Dashboard to visualize custom created graphics ▪ Anomaly Detection ▪ Industry 4.0 Compatible ▪ Scalability, low latency, fault tolerance, high availability ▪ http://mind40.com/	
Integration constraint(s):	▪ Linux based system cluster. Machine amount of this cluster is highly dependent on live coming data size. ▪ ElastichSearch and Kibana Platform	
Intended user(s):	▪ System Analyzers, Performance Analyzers ▪ Device Operators, End Users	
Provider:	▪ MANTIS	
Contact point:	▪ Aydin Can POLATKAN – aydincanpolatkan@mantis.com.tr	
Condition(s) for reuse:	▪ Software licensing per company, per year	

Latest update: 12.12.2017

Name: Water telemonitoring system		
Input(s):	Main feature(s):	Output(s):
Any kind of data produced from Scada, IoT, Sensors or Databases (on finalized form	- Real-time data process management - Near-real time index performance for big scale data - Flexible and scalable - Includes visualization components - Machine Learning Algorithms to extract new meanings from data - Rule based event processing - Report and notification ability on selected data	- Reports which include filtered data content on csv, pdf or xls format - Actions that trigger web services - Alerts or notifications via e-mail or messaeges
Unique Selling Proposition(s):	- Ideal tool for hydrographic, leakage detection, frost warning and pump monitoring - Integrates disease and irrigation models - In Real-Time Data Analysis Tool - Dynamic Dashboard to visualize custom created graphics - Anomaly Detection - Industry 4.0 Compatible - Scalability (500-1000 live sensors), low latency, fault tolerance, high availability (uptime 99%) - Error rates lower than 1% - Lower price than competing professional solutions - Past and current collaboration with public institutions in the field of water administration - Easy services customization based on customer's needs	
Integration constraint(s):	- Linux based system cluster. Machine amount of this cluster is highly dependent on live coming data size. - ElastichSearch and Kibana Platform	
Intended user(s):	- Government agencies for emergencies (flood, fire, draught); - Regional and national public water administration organizations (National Administration "Romanian Waters"; National Marine Research and Development Institute "Grigore Antipa", Constanța; National Institute for Hydrology & WM, with its water directorates, etc.). - Other stakeholders affected by urban water (underground tunnels, metro, micro-hydropowerplants, PV parks, urban agriculture, industry, fishing, water transport, etc.) - System Analyzers, Performance Analyzers - Device Operators, End Users	

Name: Water telemonitoring system	
Provider:	▪ BEIA
Contact point:	▪ GEORGE SUCIU – george@beia.ro
Condition(s) for reuse:	▪ Software licensing per beneficiary, per year
	Latest update: 12.12.2017

WiSUN Stack		
Input(s):	Main feature(s)	Output(s):
▪ Water application data ▪ IPv6 packet	▪ Gateway which transfers data from a node to server ▪ Exposes a web server with the messages received	▪ IPv6 packet ▪ Water application data

Unique Selling Proposition(s):	▪ Long range (up to 10 km) and meshed high speed ▪ Low consumption (battery life time 20 years)
Integration constraint(s):	▪ ARM Cortex X platforms
Intended user(s):	▪ Industries, utilities
Provider:	▪ Itron
Contact point:	▪ Mehdi.mani@itron.com
Condition(s) for reuse:	▪ Licensed prototype available

Latest update: December 15, 2017