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ITEA 3 is a EUREKA strategic ICT cluster programme

Exploitable Results by Third Parties

ITEA3 18030 MACHINAIDE

Project details

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Name: Twinaide

Input(s):	Main feature(s)	Output(s):
▪ DT data from sources such as Kafka, RabbitMQ, InfluxDB	▪ Interoperability and management of digital twins' data ▪ creation of digital twin hierarchy ▪ ability to pull data from different sources and display on graphics	▪ Interoperable digital twin data that can be monitored and analyzed on a single platform

Unique Selling Proposition(s):	▪ Ability to bring digital twins together ▪ Monitor real-time data from multiple sources ▪ Create own hierarchy using Azure DTDL, ▪ Flexible and user-friendly interface
Integration constraint(s):	▪ API requests and user queries must come from the Twinaide UI ▪ Specific controllers must be added for each third-party provider
Intended user(s):	▪ Transportation managers ▪ Production managers ▪ Users in a large ecosystem with multiple digital twins ▪ External users without control over digital twins
Provider:	▪ Dakik Software
Contact point:	▪ Kamer@dakikyazilim.com
Condition(s) for reuse:	▪ Open-source license agreement must be followed

Latest update: 13/02/2023

Name: Contribution to the companion specification for material handling machines (Standardization)

Input(s):	Main feature(s)	Output(s):
▪ Knowledge of material handling domain and OPC-UA	▪ Standardized OPC-UA data model for cranes	▪ Companion specification for cranes and hoists

Unique Selling Proposition(s):	▪ Enables interoperability between different crane and other industrial machine vendors ▪ Compatibility with OPC UA CS for robots in factories and manufacturing
Integration constraint(s):	▪ Needs IP capable networks or gateways
Intended user(s):	▪ Crane industries ▪ Smart factories and smart material handling and manufacturing ▪ Material handling domain and logistics, in general ▪ TRL 5 – technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies)
Provider:	▪ Joint VDMA Working Group OPC UA for Cranes and Hoists
Contact point:	▪ Link to the VDMA Workgroup: https://opcua.vdma.org/viewer/-/v2article/render/31851035
Condition(s) for reuse:	▪ Companion specification and node set will be freely available to registered OPC UA users.

Latest update: 20/02/2023

Name: Twinbase software

Input(s):	Main feature(s)	Output(s):
▪ Digital twin description documents in JSON or YAML format ▪	▪ Modifies digital twin description documents to make them easily available ▪ Distributes documents via an HTTP server that has both human and machine user interfaces	▪ Digital twin description documents ▪

Unique Selling Proposition(s):	▪ Public Twinbase instances can be hosted on free-of-charge GitHub services ▪
Integration constraint(s):	▪ Modifying the digital twin description documents is currently only possible via git operations ▪ The exact format of the digital twin description documents is currently not standardized outside the Twinbase software ▪ The exact protocol for fetching digital twin description documents is currently not standardized outside the Twinbase software
Intended user(s):	▪ Digital twin owners and users
Provider:	▪ Aalto University
Contact point:	▪ Software available: https://github.com/twinbase/twinbase
Condition(s) for reuse:	▪ Licensed under the open-source MIT License
	Latest update: 23/02/2023

Latest update:

Name: kmac_mediator

Input(s):	Main feature(s)	Output(s):
▪ DT data from Ditto, Mindsphere, and Kafka	▪ Ability to collect data from different sources to monitor on a platform ▪ Exploration of digital twin hierarchy	▪ Graph output that can be monitored on a platform

Unique Selling Proposition(s):	▪ Access authentication for each Digital Twin platform (Eclipse Ditto (REST), Mindsphere (REST), Kafka) ▪ Receive real-time twin data ▪ Explore and list data structures in the twin data
Integration constraint(s):	▪ Need to be pre-granted access to each DT data ▪ DT platforms must be online to provide real-time data ▪ Python3
Intended user(s):	▪ Users in a large ecosystem with multiple digital twins ▪ External users without control over digital twins
Provider:	▪ ETRI
Contact point:	▪ yk_lee@etri.re.kr
Condition(s) for reuse:	▪ Open-source license agreement must be followed

Latest update: 20/02/2023

Name: Knowledge Graph-based Twin Data Management

Input(s):	Main feature(s)	Output(s):
▪ DT data from TwinBase	▪ List and mange (add / update / remove) entire digital twins ▪ Visualize knowledge graphs of digital twins ▪ Support semantic search interface	▪ DT information ▪ DT knowledge graph ▪ SPARQL Results

Unique Selling Proposition(s):	▪ Enable to support interoperability between DT platforms through TwinBase ▪ Query DT data semantically ▪ Monitor real-time data periodically through a Broker (with REST APIs)
Integration constraint(s):	▪ Use JSON as a data exchange format ▪ Integrate with DT platforms through a Broker (with common REST APIs)
Intended user(s):	▪ End user who want to know (or search) DT information
Provider:	▪ ETRI
Contact point:	▪ yk_lee@etri.re.kr
Condition(s) for reuse:	▪ TwinBase instance must be running

Latest update: 20/02/2023

Name: Eclipse TRACE4CPS v0.1

Input(s):	Main feature(s)	Output(s):
▪ Execution logs: timed events, signals	▪ Generic execution log abstraction ▪ Model-centric (system executions over time) ▪ Analytics: library of generic performance analysis algorithms ▪ Customizable views providing insightful execution perspectives	▪ Visualizations: Gantt charts of system executions incl. dependencies ▪ Execution trace analytics: critical path, execution comparisons, runtime verification based on MTL / STL specifications

Unique Selling Proposition(s):	▪ Understand dynamic behavior of all kinds of systems by its domain-independent capabilities to visualize and analyze concurrent activities in relation to the system resources ▪ Supports the Acquire – Assess – Act feedback loop on the system digital twin ▪ Enables fusion of both operational controller data with domain models specified in low-code models
Integration constraint(s):	▪ Java 8 / 1.8 (64-bit) ▪ Eclipse IDE version 2020-06 ▪ install Eclipse TRACE4CPS™ feature from Eclipse TRACE4CPS™ update site, the feature includes Eclipse Modeling Framework (EMF), Xtext, Xtend, custom extension of JFreeChart 1.5.2
Intended user(s):	▪ Domain experts of high-tech equipment industry
Provider:	▪ Eclipse Foundation www.eclipse.org/trace4cps
Contact point:	▪ bas.huijbrechts@tno.nl (TNO-ESI)
Condition(s) for reuse:	▪ EPL 2.0 license

Latest update: 23/2/2023

Name: OPC-UA based high speed data PLC interface

Input(s):	Main feature(s)	Output(s):
▪ Instrumented (PLC) control software	▪ High speed interface for low-level machine / control data ▪ Scalable data acquisition ▪ Based on open-source standard OPC-UA	▪ Operational data-based applications: anomaly detectors, dashboards ▪ Insights into the usage and design of control models ▪ Behavioral analysis: python, Jupyter notebooks, machine learning

Unique Selling Proposition(s):	▪ Disclosing data at high sampling rates makes it possible to real-time monitor (PLC) control software e.g. generated from low-code models ▪ OPC-UA standard ensures interoperability ▪ Closing the feedback loop: model / design → control software → generated data → behavior model → change insight
Integration constraint(s):	▪ TNO proprietary Smart Connected Factory / Factory Explorer framework for data acquisition, storage & visualization ▪ Common off the shelf open-source solutions as storage and analysis platform for data & metadata, e.g. Kafka broker for distribution, InfluxDB for storing time-series data, XML / json for metadata, Grafana for analysis
Intended user(s):	▪ Service integrators of (PLC-based) industry equipment ▪ System designers, for feedback on design
Provider:	▪ TNO
Contact point:	▪ jeroen.broekhuijsen@tno.nl (TNO-ACE)
Condition(s) for reuse:	▪ Usage (of interface software) under TNO licensing conditions ▪ TNO support is possible as B2B consultancy

Latest update: 23/2/2023

Name: DTWeb python library

Input(s):	Main feature(s)	Output(s):
▪ Digital twin identifier	▪ Fetches digital twin description documents from Twinbase	▪ Digital twin description document as a python dict object

Unique Selling Proposition(s):	▪ Makes accessing digital twin description documents simpler for client software programmed in python
Integration constraint(s):	▪ Currently works only for fetching digital twin description documents stored in Twinbase
Intended user(s):	▪ Software developers who need to easily access information about digital twins
Provider:	▪ Aalto University
Contact point:	▪ Available from PyPI as dtweb: https://pypi.org/project/dtweb/
Condition(s) for reuse:	▪ Licensed under the open-source MIT License

Latest update: 23/02/2023