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Exploitable Results by Third Parties

17002 AutoDC

Project details

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Name: Patent application: Source Selection based on Diversity for Transfer Learning		
Input(s):	Main feature(s)	Output(s):
▪ Candidate source ML models ▪ Candidate source data sets	▪ Automated selection of source model for transfer learning	▪ Selected source ML model
Unique Selling Proposition(s):	▪ Select source model for transfer learning from multiple available source domains **with little to no data** in target domain. Automatic and highly scaleable due to only looking at diversity which is a marginal quantity. ▪ In addition to the patent application there is a paper published on this: H. Larsson, J. Taghia, F. Moradi and A. Johnsson, "Source Selection in Transfer Learning for Improved Service Performance Predictions," 2021 IFIP Networking Conference (IFIP Networking), 2021, pp. 1-9, doi: 10.23919/IFIPNetworking52078.2021.9472818.	
Integration constraint(s):	▪ None, this is an intellectual property	
Intended user(s):	▪ People/software responsible for ML model management	
Provider:	▪ Ericsson AB	
Contact point:	▪ https://www.ericsson.com/en/patents/contact-ericsson-ipr-licensing-team	
Condition(s) for reuse:	▪ Commercial license to be negotiated	
	Latest update: September 2021	

Name: Patent application: Policy Induced Feature Selection		
Input(s):	Main feature(s)	Output(s):
▪ Measurement data ▪ Policies (features that we know will be monitored) ▪ Number of desired features to be selected	▪ Unsupervised feature selection taking domain knowledge into account	▪ List of selected features

Unique Selling Proposition(s):	▪ Reduce monitoring overhead by selecting features irrespective of tasks. ▪ Our method does this while still being able to leverage domain expertise which helps the method in selecting generalizable features
Integration constraint(s):	▪ None, this is an intellectual property
Intended user(s):	▪ People/software in charge of data center operations and monitoring
Provider:	▪ Ericsson AB
Contact point:	▪ https://www.ericsson.com/en/patents/contact-ericsson-ipr-licensing-team
Condition(s) for reuse:	▪ Commercial license to be negotiated

Latest update: June 2020

Name: Automated Source Selection for Online Learning		
Input(s):	Main feature(s)	Output(s):
▪ Cloud service mesh	▪ Improved resource utilization for cloud services	▪ Resource allocation
Unique Selling Proposition(s):	▪ Online algorithm for scheduling of cloud resources for advanced chained cloud services, i.e. service meshes. ▪ Improved timeliness and reduced resource allocation at around 10% compared to standard algorithms ▪ Patent application filed September 27, 2021	
Integration constraint(s):	▪ N/A	
Intended user(s):	▪ Cloud service providers	
Provider:	▪ Ericsson	
Contact point:	▪ Johan Eker	
Condition(s) for reuse:	▪ IPR license	
	Latest update: September 2021	

Name: Automated informative network security alerts engine		
Input(s):	Main feature(s)	Output(s):
▪ Clavister NetWall firewall log events	▪ Automated aggregation of related log events for a security incident or error state	▪ Informative network security alerts highlighting the problem and the likely root cause

Unique Selling Proposition(s):	▪ Analysis of log events typically require advanced insights into the system and its security features to understand what went wrong and how to solve the problem. ▪ The enhancement introduced with informative network security alerts minimize the need for the administrator to interpret the log events as the informative network security alert contains information for the incident and proposed mitigations suitable for solving the problem.
Integration constraint(s):	▪ Requires use of Clavister NetWall firewalls in the network
Intended user(s):	▪ Network security admins using Clavister InCenter to manage Clavister NetWall firewalls.
Provider:	▪ Clavister AB
Contact point:	▪ https://www.clavister.com/company/contact-us/
Condition(s) for reuse:	▪ Commercial licensing of Clavister solutions available

Latest update: September 2021

Name: Network device identification and inventory control		
Input(s):	Main feature(s)	Output(s):
▪ Clavister NetWall firewall log events	▪ Automated identification of brand, model and OS of network devices protected by Clavister NetWall firewalls	▪ Inventory of network devices

Unique Selling Proposition(s):	▪ To fully understand the risks and security state of a closed private network, it is important to have full insight of devices connected to the network. ▪ Maintaining strict inventory control of devices connected to a closed private network improves cybersecurity as new unknown devices connected to the network may pose security risks.
Integration constraint(s):	▪ Requires use of Clavister NetWall firewalls in the network
Intended user(s):	▪ Network security admins using Clavister InCenter to manage Clavister NetWall firewalls.
Provider:	▪ Clavister AB
Contact point:	▪ https://www.clavister.com/company/contact-us/
Condition(s) for reuse:	▪ Commercial licensing of Clavister solutions available

Latest update: September 2021

Name: Paper: State discovery and prediction from multivariate sensor data		
Input(s):	Main feature(s)	Output(s):
▪ A data describing data center operation	▪ Data analysis process extracting operational states of the data center and then predicting future states	▪ Definition of operational states ▪ Prediction of future states

Unique Selling Proposition(s):	▪ A data analysis workflow to extract states from high-dimensional sensor data set describing the operation of a data center. ▪ There is a paper describing the results: Olli-Pekka Rinta-Koski, Miki Sirola, Le Ngu Nguyen, Jaakko Hollmén. State discovery and prediction from multivariate sensor data. ECML PKDD Workshop – Analytics and Learning from Temporal Data, Springer Lecture Notes in Artificial Intelligence
Integration constraint(s):	▪ This is a publication and a defined workflow
Intended user(s):	▪ Data analysts interested in analyzing data center operation
Provider:	▪ Aalto University
Contact point:	▪ Aalto University, Department of Computer Science, Finland
Condition(s) for reuse:	▪ The results may be with the appropriate citation and acknowledgement of the original authors ▪

Latest update: September 2021

Name: Grid balancing using FFR, Fast Frequency Reserve		
Input(s):	Main feature(s)	Output(s):
▪ FFR start/stop request from grid owner	▪ New datacenters can be seen as a resource in the power grid balancing rather than just a burden with high energy consumption. Batteries can be put in active use for revenue, not only passive backup.	▪ UPS power control

Unique Selling Proposition(s):	▪ The rise of renewable energy production, decommissioning of nuclear and coal power plants with high inertia, and increasing electricity demand have put a strain on the electrical power grid in many countries. New demand flexibility is needed to tackle power grid balancing issues. FFR, Fast Frequency Reserve is a method to rapidly shut down consumers when the demand is greater than the supply and the grid frequency is falling below a treshold. Typically the UPS will shut down in 0.7 seconds and run on the internal battery for 30 seconds in order to help stabilize the power grid. After a 15 minute re-charge of batteries the cycle can be repeated.
Integration constraint(s):	▪ Comsys direct current UPS HW
Intended user(s):	▪ Datacenter owners
Provider:	▪ Comsys AB
Contact point:	▪ https://comsys.se/contact.html
Condition(s) for reuse:	▪ Commercial license to be negotiated
	Latest update: <2021-09-29 >

Name: Reinforcement learning for energy improvements in data centers		
Input(s):	Main feature(s)	Output(s):
▪ Connected datacenter	▪ Energy efficient control of cloud services using reinforcement learning	▪ Algorithms
Unique Selling Proposition(s):	▪ Online algorithm for workload and facility management to reduce energy usage through reinforcement learning. ▪ Demonstrates around 60% improved power usage efficiency (PUE) over the already world-class RISE ICE data center. ▪ The proposed holistic approach to datacenter management is cutting-edge ▪ Publication: A. Heimerson, R. Brännvall, J. Sjölund, J. Eker, J. Gustafsson, ”Towards a Holistic Controller: Reinforcement Learning for Data Center Control”, 9th International Workshop on Energy-Efficient Data Centres (E^2DC 2021)	
Integration constraint(s):	▪ None	
Intended user(s):	▪ Developers, researchers	
Provider:	▪ LU	
Contact point:	▪ Karl-Erik Årzén	
Condition(s) for reuse:	▪ Algorithms	
	Latest update: September 2021	

Name: Automated Source Selection for Online Learning		
Input(s):	Main feature(s)	Output(s):
▪ Candidate data sources	▪ Automated reduction of data sources for efficient online learning	▪ Selected sources

Unique Selling Proposition(s):	▪ Online algorithm for source selection (i.e., feature selection) in the context of online learning. ▪ Can significantly reduce monitoring and training overhead. ▪ Description: X. Wang, F. Shahab Samani, and R. Stadler, “Online feature selection for rapid, low-overhead learning in networked systems,” arXiv preprint, 2020. ▪ Demonstration: X. Wang, F. Shahab Samani, A. Johnsson, R. Stadler: “Online Feature Selection for Low-overhead Learning in Networked Systems,” 2021 17th International Conference on Network and Service Management (CNSM), pp. 1-7. IEEE, 2021. ▪ Code: X. Wang, “Online stable feature set (OSFS) algorithm implementation,” 2021. [Online]. Available: https://github.com/Xiaoxuan-W/OSFS
Integration constraint(s):	▪ None
Intended user(s):	▪ Developers, researchers
Provider:	▪ KTH
Contact point:	▪ Rolf Stadler
Condition(s) for reuse:	▪ Public Software license

Latest update: September 2021

Name: Host and service AutoDiscovery		
Input(s):	Main feature(s)	Output(s):
▪ IP-based network devices ▪	▪ To automatically discover new hosts & services a discovery tool was needed to enhance the Autonomous Datacenter with monitoring metrics. ▪ The AutoDiscovery tool is written to be applied in all types of IP-based computer networks.	▪ Monitoring ▪ Data collection ▪ Alerting, graphing, dashboarding ▪ Data exporting for analysis
Unique Selling Proposition(s):	▪ * Automatic host- and service discovery ▪ * Type of device detection ▪ * Automation of data collection	
Integration constraint(s):	▪ New devices must be reachable by monitoring server to be found by AutoDiscovery. ▪	
Intended user(s):	▪ Any organization running a datacenter or server network.	
Provider:	▪ ITRS Group	
Contact point:	▪ Robert Claesson <rclaesson@itrsgroup.com>	
Condition(s) for reuse:	▪ AutoDiscovery can be re-used in any type of datacenter or server network.	
	Latest update: 2021-09-30	

Name: Autoscaling of monitoring resources		
Input(s):	Main feature(s)	Output(s):
▪ Metrics for resource usage (CPU, memory, disk io)	▪ To use the right number of resources for the monitoring platform, ITRS have developed a service that automatically can scale the amount of server resources up and below, depending on the resource usage. ▪ When the demand for resources is high, the Autoscaling service can add resources, and when the demand decreases it can lower the resources, in order to save processing power and energy.	▪ A more resource effective monitoring platform

Unique Selling Proposition(s):	▪ Being able to lower the amount of total resource usage for the monitoring platform, due to only increase resources on demand. This can lower power and energy usage.
Integration constraint(s):	▪ Kubernetes cluster is required for the Autoscaling service to run.
Intended user(s):	▪ Any organization running a datacenter or computer network.
Provider:	▪ ITRS Group
Contact point:	▪ Robert Claesson <rclaesson@itrsgroup.com>
Condition(s) for reuse:	▪ The Autoscaling service is built to fit any type of datacenter or computer network.

Latest update: 2021-09-30

Name: Data collection for power usage		
Input(s):	Main feature(s)	Output(s):
▪ Power metrics from servers, containers and PDUs	▪ Collect metric data from servers, PDUs and UPS units to export for data analysis, smarter power usage, lower power costs and billing.	▪ Power monitoring ▪ Data exporting for analysis ▪ Alerting, graphing, dashboarding

Unique Selling Proposition(s):	▪ Monitor and analyze power usage and use data for billing. ▪ Export power usage for analysis and resource planning
Integration constraint(s):	▪ -
Intended user(s):	▪ Organizations running datacenters or computer networks
Provider:	▪ ITRS Group, Comsys, hi5
Contact point:	▪ Robert Claesson <rclaesson@itrsgroup.com>
Condition(s) for reuse:	▪ Can be re-used in any datacenter using Comsys, ITRS and hi5 products.

Latest update: 2021-09-30

Name: Optimized Telco EDGE Cooling		
Input(s):	Main feature(s)	Output(s):
▪ Customer needs for EDGE telco sites	▪ New telco solution like 5g demands small and medium telco edge data centers widely spread around. This leads ,maintenance of these becoming a critical OPEX components.	▪ Comparison of diffent cooling technology concepts CAPEX, OPEX and maintenance.

Unique Selling Proposition(s):	▪ Lower TOC based on rather small day one increased CAPEX, but significantly lower maintenance costs. Even improved energy efficiency and increased uptime.
Integration constraint(s):	▪ Granlund EDGE Telco solution
Intended user(s):	▪ Telcos
Provider:	▪ Granlund Oy
Contact point:	▪ https://www.granlund.fi/
Condition(s) for reuse:	▪ Negiotable with Granlund partners
	Latest update: <2021-09-29 >

Name: Commercial product called Echidna		
Input(s):	Main feature(s)	Output(s):
▪ All component measurement ▪	▪ A system that includes all the components from Hi5 together ▪	▪ The system generates invoice source data with the actual consumption from measurement resources

Unique Selling Proposition(s):	▪ Invoice documentation based on agreements and consumption of resources. Used for invoicing ▪ Price logic module and creation of agreement ▪ By customer or project ▪ Chargeback by day or month ▪ Creates source data for invoicing ▪ Can create invoices in financial system through API and xml ▪
Integration constraint(s):	▪ Require one or more data source modules created by Hi5 in the AutoDC project
Intended user(s):	▪ Industry/company that need more automation and control over the actual consumption to be able to invoice or distribute costs correctly
Provider:	▪ Hi5 (Advania)
Contact point:	▪ https://www.hi5.se/
Condition(s) for reuse:	▪ A commercial product.

September 29, 2021

Name: Data source components and agreement data		
Input(s):	Main feature(s)	Output(s):
▪ Data from vendor / application (API) ▪ Xml/csv files	▪ Contract management with pricing ▪ Component with integration to API from OP5 ▪ VmWare integrations component ▪ Import of generic files ▪ Module for PDU and UPS, kWh usage	▪ Data that other systems can use. ▪ Invoice documentation

Unique Selling Proposition(s):	▪ Link between pricing and agreements that automatically provide a current value ▪ Possible to use metrics by source from API from ITRS OP5 (GHz, CPU, RAM, Disk, kWh etc.) ▪ Automatic metric collection by application/system from vmware ▪ File import for gathering resource usage in AutoDC that has no API access ▪ Log energy consumption by energy source (solar or grid) and based by application/server (kWh)
Integration constraint(s):	▪ ITRS OP5 for Op5 data collection ▪ Vmware vSphere, for vmware data collection ▪ Comsys UPS / PDU for data collection
Intended user(s):	▪ Source data for business logic ▪ People/software using API:er as a data source ▪ Data can be used for decision support by other applications (e.g. where to put load, based on CO2 usage per GHz Cpu used)
Provider:	▪ Hi5 (Advania)
Contact point:	▪ https://www.hi5.se/
Condition(s) for reuse:	▪ Available to everyone in the project. Outside the project, it is a component that is part of a commercial product.

September 29, 2021

Name: Passive Free Cooling Solution		
Input(s):	Main feature(s)	Output(s):
▪ High temperature water from Immersion Cooling Units	▪ Free cooling solution based on heat pipe and passive cooling without pumps or fans. No moving parts and no powerconsumption for cooling	▪ Concept ▪ Prototype solution

Unique Selling Proposition(s):	▪ Cooling solution without moving parts requiring no maintenance. ▪ Free cooling solution without any energy input for compressor, fan or pump
Integration constraint(s):	▪ -
Intended user(s):	▪ Datacenter operators
Provider:	▪ Swegon
Contact point:	▪ Carl-Ola Danielsson
Condition(s) for reuse:	▪ Can be used in any datacenter running high temperature immersion cooling.

Latest update: 2021-09-30

Name: Privacy preserving of control algorithm		
Input(s):	Main feature(s)	Output(s):
▪ A control algorithm	▪ Homomorphic encryption system	▪ The system that can take control signals and do compute in a encrypted format
Unique Selling Proposition(s):	▪ Proof of concept demonstration of privacy preserving control algorithm for edge data center based on homomorphic encryption. ▪ Protected data or algorithm between control provider and user of controlled equipment	
Integration constraint(s):	▪ Require the white paper for description and open source software	
Intended user(s):	▪ Industry/company that need to protect algorithm and data	
Provider:	▪ RISE AB	
Contact point:	▪ https://www.ri.se/	
Condition(s) for reuse:	▪ Reference to author and RISE	
	September 29, 2021	

Name: Microgrid DC with Mixed Energy Storage with complementary model		
Input(s):	Main feature(s)	Output(s):
▪ Microgrid DC	The microgrid DC can be used to test and study various load balancing approaches. It is equipped with both electrical and thermal storage plus local electrical production by PV-panels. The available system model and control interfaces enables both simulation and real world testing for entities interesting in evaluating the possibility of Microgrid enabled datacenters.	▪ Model and control interface of the microgrid DC.

Unique Selling Proposition(s):	▪ The possibility of using thermal and electric energy storage in combination with local PV-production and free cooling creates a unique platform for testing load balancing concepts for future EDGE DC scenarios. The accompanied model also enables the possibility to create large-scale implementation with a large population of DCs.
Integration constraint(s):	▪ The complexity of the installation (almost) requires on-site presence to configure and execute tests.
Intended user(s):	▪ Researchers and companies that needs access to a real world EDGE-DC test platform.
Provider:	▪ RISE
Contact point:	▪ www.ri.se
Condition(s) for reuse:	▪ Commercial service through RISE

Latest update: September 2021

Name: Interface to RISE ICE's CFD model		
Input(s):	Main feature(s)	Output(s):
▪ RISE real-time CFD models	Possibility to access the CFD from external programs to perform load-balancing control	▪ An API to the model

Unique Selling Proposition(s):	▪ Access to the unique real-time CFD model to perform studies and control, air-flow and heating studies faster that real time.
Integration constraint(s):	▪ Will need require a powerful server to run the CFD simulation and programmer skills to create the connection.
Intended user(s):	▪ Data center designers and operators. Researchers and engineers that studies air-flow in datacenters.
Provider:	▪ RISE
Contact point:	▪ www.ri.se
Condition(s) for reuse:	▪ The API is free to use. The underlying simulation framework (CFD-model) might be used for non-commercial use through agreement with RISE.
	Latest update: September 2021

Name: Automated ML Data Pipeline		
Input(s):	Main feature(s)	Output(s):
▪ Sensory data from HVAC equipment, environmental data (temperature, humidity, etc), energy cost data, etc.	▪ An automated process for ML-based predictive modules. The framework includes data extraction, training, model creation, approval, monitoring and validation components.	▪ Models for predicting temperature, energy cost, etc for multiple zones within a facility.
Unique Selling Proposition(s):	▪ Collect, analyze, train and produce prediction models. ▪ Monitor and maintain the model accuracy. ▪ Predict a range of environmental or cost states. ▪ Deploy on-prem or in the cloud.	
Integration constraint(s):	▪ -	
Intended user(s):	▪ Organizations running datacenters or other commercial facilities.	
Provider:	▪ Mariner Partners Inc	
Contact point:	▪ Alex Petrovic <alex@marinerpartners.com>	
Condition(s) for reuse:	▪ -	
	Latest update: 2021-09-30	

Name: Predictive Supply Air Temp Optimization		
Input(s):	Main feature(s)	Output(s):
▪ Sensory data from HVAC equipment, temperature and/or cost predictions.	▪ Use ML prediction models to determine the optimal set instructions of to alter operations of the HVAC Air intake/outtake modules based on predicted system states.	▪ Set of specific instructions for the HVAC / BAS system.

Unique Selling Proposition(s):	▪ Collect, and analyze HVAC operational states. ▪ Predict the near-future comfort / environmental states. ▪ Determine the most optimal set of changes to minimize the energy cost and maintain the ideal environmental conditions. ▪ Continuous / iterative operations.
Integration constraint(s):	▪ -
Intended user(s):	▪ Organizations running datacenters or other commercial facilities.
Provider:	▪ Mariner Partners Inc
Contact point:	▪ Alex Petrovic <alex@marinerpartners.com>
Condition(s) for reuse:	▪ -
	Latest update: 2021-09-30

Name: Cost-responsive Supply Air Temp Optimization		
Input(s):	Main feature(s)	Output(s):
▪ Sensory data from HVAC equipment, temperature readings and cost predictions.	▪ Use combination of algorithms to determine the optimal set of instructions to alter operations of the HVAC Air intake/outtake modules based on predicted energy costs.	▪ Set of specific instructions for the HVAC / BAS system.

Unique Selling Proposition(s):	▪ Collect, and analyze HVAC operational states. ▪ Predict the near-future comfort / environmental states. ▪ Determine the most optimal set of changes to minimize the energy cost. ▪ Continuous / iterative operations.
Integration constraint(s):	▪ -
Intended user(s):	▪ Organizations running datacenters or other commercial facilities.
Provider:	▪ Mariner Partners Inc
Contact point:	▪ Alex Petrovic <alex@marinerpartners.com>
Condition(s) for reuse:	▪ -

Latest update: 2021-09-30