KRONOMETRIX

DATA FABRIC

DATASHEET

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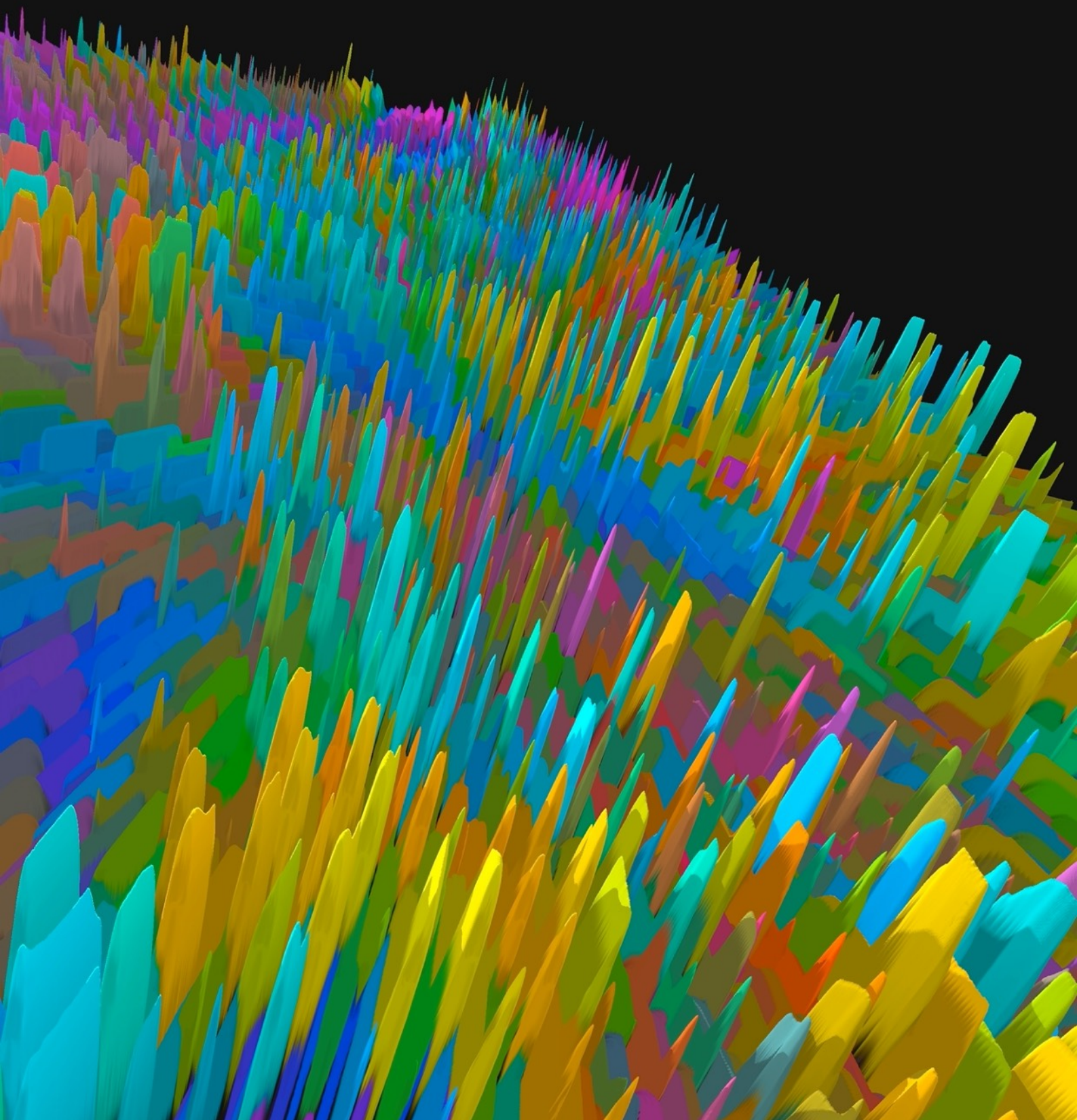
Kronometrix Distributed Data Fabric

Product data sheet, November 2020 Version 1.8.8

To obtain technical support for any Kronometrix products, visit the Get Technical Support section in the Support area on our website www.kronometrix.com/support. You'll find a wide range of support options, including our free web-based discussion forums.

Original, raw data is fundamental to any data analysis, from ICT enterprise to weather and environment. To really understand how your world works you need to have the best data.

Kronometrix does that for you



DATA RECORDING

An automatic, simple to use, data collection package with a small memory and system footprint, supporting raw data. It's available for ICT enterprise, environmental and industrial IoT monitoring

Open Source Software

TECHNICAL SPECIFICATIONS

CPU	x64, ARMv8 64bit
Memory	32 MB RAM
Storage	128 MB, 750KB per day, per data source
Sample Rate	Default 60 seconds, configurable
Connectivity	RS-232, RS-485, RJ45, IEEE 802.11
Protocols	SERIAL, TCP, UDP, HTTP(S), MODBUS, SNMP, BLE, BACNET *
Operating Systems	Debian 7,8,9,10 RedHat Entreprise Linux 5,6,7 Raspbian 4 SUSE Entreprise Linux 11, 12 MacOS * FreeBSD 11, 12 Windows 10, 2008 R2, 2012 R2, 2016
Virtualization	KVM Xen, Citrix XenServer Solaris Containers Linux Containers FreeBSD Jails
Cloud Providers	Amazon Web Services Google Cloud Platform Azure Microsoft Digital Ocean IBM, Oracle, Rackspace
Deployment	**K_1** - Industrial IoT Gateway Binary package management system

RECORDERS

OPERATING SYSTEM

- **sysrec** - Overall system performance
- **cuprec** - Per CPU data recorder
- **diskrec** - Per disk data recorder
- **nicrec** - Per NIC data recorder
- **hdwrec** - System inventory data recorder
- **procrec** - Process/Task data recorder
- **faultrec** - Fault Management data recorder *

NETWORK MANAGEMENT

- **snmprec** - Ethernet and SAN Switch *
- **netrec** - TCP, UDP data recorder

INTERNET SERVICES

- **certrec** - X.509 certificate recorder
- **direc** - Per directory recorder
- **svcrec** - IMAP, SMTP, POP3, HTTP, TCP(Any)
- **ntprec** - NTP server recorder
- **smtprec** - Sendmail SMTP server data recorder *
- **imaprec** - Dovecot IMAP/POP server data recorder *

MIDDLEWARE

- **httprec** - NGINX, Apache, Tomcat, PHP-FPM
- **dbrec** - MariaDB, MySQL, PostgreSQL *
- **jvmrec** - Java VM memory statistics
- **webrec** - HTTP response time analyser

INDUSTRIAL IoT

- **axisrec** - Network AXIS camera data recorder
- **bacrec** - Building management BACnet data recorder *
- **blrec** - Bluetooth Low Energy data recorder *
- **rs485rec** - Industrial data recorder
- **wsrec** - General weather station recorder RS-232/USB

* Available Q2, 2021

DATA CORTEX

SMART ALARMS
DATA ANALYSIS
VISUALIZATION

TECHNICAL SPECIFICATIONS

CPU	x64 (SSE4), ARMv8 64bit
Memory	16 GB RAM (x64) default 64 GB RAM (x64) recommended 1-4GB RAM (ARM v8) default
Storage	10GB of available disk space
Sample Rate	Default 60 seconds, configurable
Connectivity	RJ45, IEEE 802.11
Protocols	HTTP, HTTPS, WEBSOCKET
Summary Statistic Functions	Min, Max, Mean Last Count FrequencyCount Sum, SumSqrt Variance, StandardDeviation Percentile
Data Filters	STALL RANGE COUNTER
REST API	HTTP based API Authentication Data Provisioning Summary Statistics Raw data Widgets Inventory and Information
Deployment	**ARM64 image** Raspberry PI 3,4 single-board computers **Intel x64 image** Virtualization: ESX, Hyper-V, KVM, Xen Bare-metal server: Intel/AMD x64 **kronometrix.io** - Kronometrix SaaS

FEATURES

- Multi-user system
- Multi-industry subscription based system
- Role-based access control system
- UTC time and date support
- Calendar support
- Smart Alarms: data source and device level
- Operator acknowledgement alarms
- Built-in operational availability, planned maintenance
- Per user threshold sets, export/import JSON
- System notification channel
- Data anomaly detector *
- Statistical chart analysis mode
- Chart analysis: Min, Max, Mean, Trend, Percentile
- Chart trend-line: linear, exponential, log, polynomial
- Multi-aggregate Data
- Workload Management system
- Exploratory raw data analysis
- Dark Mode
- Fabric Management and Observability
- Factory Reset

APPLICATIONS

- Default built-in applications
- Support for 3rd parties applications
- Kronometrix Store *

* Available Q2, 2021

INFORMATION TECHNOLOGY

Kronometrix has been designed to measure the performance, availability and the reliability of computing infrastructure, from operating system, networks to applications and services. Easy to be deployed in a data-centre or at a public cloud provider, **Kronometrix** is a very simple and time saving solution to monitor your ICT infrastructure.

Computer System Performance

Measuring computer system's performance is essential for how well your ICT infrastructure works on public or private installations, analyzing the following metrics:

- CPU, memory, storage, network: utilization, throughput
- system run-queue
- system and device availability and errors
- system inventory: number of disks, network cards

Web Stack Performance

If you are a software developer or a DevOps and build or maintain J2EE or PHP applications, you would love the big picture from the application to the operating system itself. From inside your network, **Kronometrix** Web Stack performance data subscription can hold and analyse LAMP, J2EE, WAMP stacks directly from your application down to the operating system, keeping track of:

- web application response time and availability
- HTTP Server: utilization, throughput and errors
- middleware server: utilization, throughput and errors
- database server: utilization, throughput and errors
- operating system: utilization, throughput and errors

End-User Performance

How are your web and internet enterprise services performing outside your network, in terms of performance and availability ? Do you know what is slow and what is fast ? Do you know your service availability from different geo-location points in Europe, Asia or the Americas ? **Kronometrix** is offering the end-user performance data subscription to analyse these aspects.

Keep track of your web sites, and services like: POP3, IMAP, SMTP, LDAP, DNS, SSH2, HTTP, AD along with your security certificates, without worrying that they will expire before you know:

- web sites response time, availability and errors
- enterprise services performance and availability
- X.509 certificates availability and expiration time
- top view across web sites, including fastest, slowest

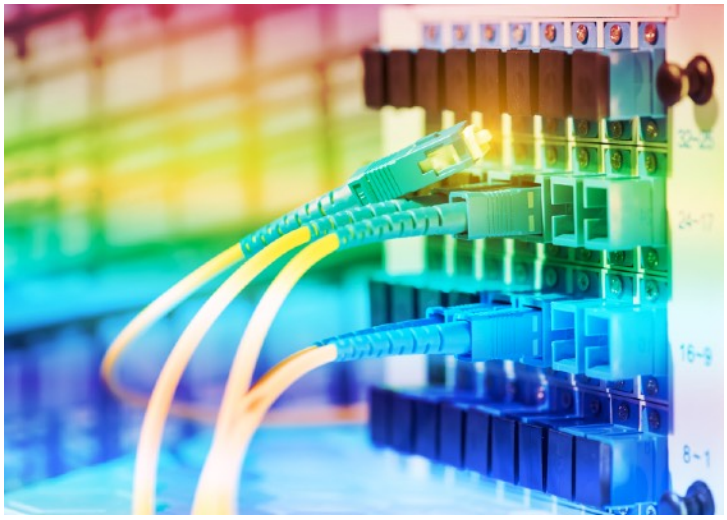
Data-Centre Performance

For large and dense installations, like data-centres **Kronometrix**, can reduce costs in operations using a smart and simple way to collect, analyze and report:

- operating system utilisation, availability and errors
- enterprise services performance and availability
- X.509 certificates availability and expiration time
- network equipment utilisation and availability
- facility, HVAC, UPS, environmental condition
- PUE, the power usage effectiveness

Kronometrix can analyse your computer systems, services, network performance, availability and inventory changes. It can understand your planned maintenance breaks, at the data source or device level, correctly calculating the operational availability.

Requiring no maintenance, easy access to raw data, simple applications built using standard HTML5 and Javascript, makes **Kronometrix** the best distributed data fabric analytics for Information Communications and Technology.



Kronometrix Applications

All our data visualization and dashboards are developed as rich user-interface based applications, built on top of Kronometrix distributed data fabric. By default there are a number of built-in applications, specific to different industries. Developers and users are encourages to expand the functionality of Kronometrix by writing new applications, which have access to raw data, summary statistics and all important core features of our data fabric. In the near future we will open a new app store where companies, developers can participate, write, publish and purchase new applications.

COMPUTER SYSTEM / DATA-CENTRE PERFORMANCE

- **Executive**: bird's-eye dashboard of operating system usage and inventory
- **Top**: display updated, sorted infrastructure usage
- **Healthcheck**: operative general status dashboard
- **Availability**: data source availability view
- **Treemap**: processor, memory utilisation as a treemap
- **Heatmap**: processor utilisation past 1 hour
- **Ops**: operational dashboard focused 5 and 30'
- **System**: overall processor, memory, disk, network utilisation
- **CPU**: per-processor utilisation dashboard
- **Memory**: memory summary statistics utilisation
- **Storage**: disk IOPS throughput
- **Network**: per-network adapter throughput in packets and KB/sec
- **Services**: top service reporter uptime and response (data-centre)
- **CertCheck**: X.509 certification status application (data-centre)
- **Anomaly**: data anomaly detector
- **Inventory**: system description software and hardware
- **Raw data**: original data available over time

WEB STACK PERFORMANCE

- **Webapp**: application response-time analyser
- **HTTP**: server summary statistics
- **OS**: operating system overall performance
- **Status**: availability reporting application
- **Inventory**: system description software and hardware
- **Raw data**: original data available over time

END-USER PERFORMANCE

- **Overview**: report top slowest and fastest websites
- **TopWeb**: website response time and uptime top usage
- **CertCheck**: X.509 certification status application
- **Services**: top service response time
- **Healthcheck**: general status up and down services
- **Webstat**: individual website reporting application
- **Svcstat**: individual service reporting application
- **OS**: operating system overall performance
- **Raw data**: original data available over time

ENVIRONMENT

Indoor Air Quality

Kronometrix can analyse indoor air quality using different type of sensors, recording key IAQ metrics by collecting and transporting data for analytics conversion and analysis.

The following metrics are collected:

- Air temperature (C/F)
- Relative humidity (%)
- Dew point (C/F)
- CO_2 - Carbon dioxide level in ppm
- TVOC - Total Volatile Organic Compounds in mg/m3
- $PM_{2.5}$ - Particulate matter 2.5 microns
- PM_{10} - Particulate matter 10 microns

City Air Quality

City pollution is a very important factor for population health. **Kronometrix** can monitor outdoor pollution by analysing data from various sensors, reporting:

- Air temperature (C/F)
- Relative humidity (%)
- NO_2 - Nitrogen dioxide in ppm
- CO - Carbon monoxide in ppm
- SO_2 - Sulfur dioxide in ppm
- O_3 - Ozone in ppm
- TVOC - Total Volatile Organic Compounds in mg/m3
- $PM_{2.5}$ - Particulate matter 2.5 microns
- PM_{10} - Particulate matter 10 microns

WEATHER

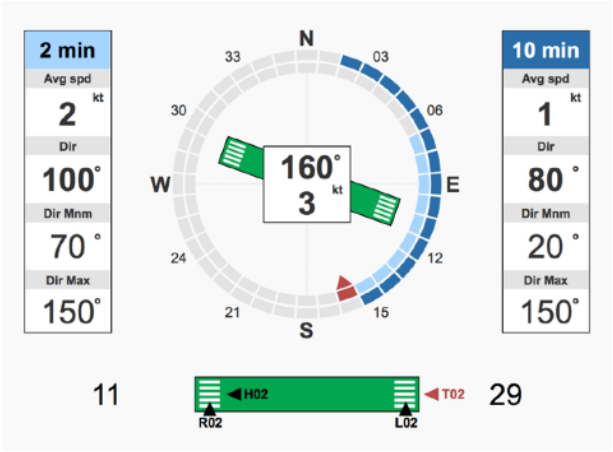
General Meteorology

We keep track of weather conditions collecting, analysing and displaying data from automatic weather stations like Vaisala AWS310 series or non-automatic stations, analysing:

- Wind speed, direction, gust
- Air, ground temperature (C/F)
- Relative humidity (%)
- Air pressure
- Sea level reduced air pressure
- Pressure tendency
- Solar radiation

Aviation Meteorology

For small airports and airfields (non-CAT) **Kronometrix** can monitor weather conditions which are affecting the flight plan and air traffic management. We are collecting and analysing data from automatic weather stations, monitoring the following parameters:



- Wind speed min/max, direction, gust
- Air, ground temperature (C/F)
- Relative humidity (%)
- Air pressure
- Cloud level, visibility and coverage
- Air pressure tendency
- Runway visibility and wind conditions

INDOOR AIR QUALITY

- **Air quality**: per room indoor air conditions
- **Healthcheck**: data feed operational dashboard
- **Raw data**: original data available over time

CITY AIR QUALITY

- **Air quality**: outdoor air quality index dashboard
- **Weather**: outdoor weather conditions
- **Traffic**: road and traffic conditions
- **UPS**: Uninterruptible power supply status
- **Healthcheck**: data feed operational dashboard
- **Raw data**: original data available over time

GENERAL METEOROLOGY

- **Top**: all stations wind, temperature, hour precipitations top usage
- **Meteo**: meteorologist dashboard
- **Charts**: charts and trends dashboard
- **Healthcheck**: data feed operational dashboard
- **Availability**: station, sensor availability dashboard
- **Raw data**: original data available over time

AVIATION METEOROLOGY

- **ATC**: 1 runway air traffic controller dashboard (ICAO Annex3 compatible)
- **Healthcheck**: data feed operational dashboard
- **Availability**: station, sensor availability dashboard
- **Charts**: charts and trends dashboard
- **Raw data**: original data available over time

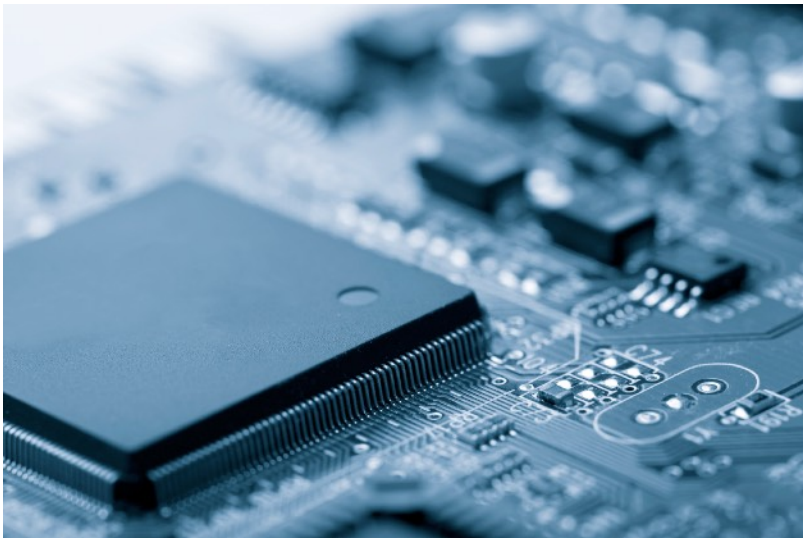
Air Quality

Air pollution presents a major problem in modern society, directly affecting everyone's health from children to workers, and the elderly, with immediate symptoms or long-term effects. To combat these problems we need to know the air quality in and around our homes, offices, or the city's environment. If we don't measure it, we can't know it. Kronometrix continuously keeps track of key environmental metrics in order to analyse the quality of the indoor or outdoor air: from carbon dioxide, air temperature, relative humidity, volatile organic compounds, organic or inorganic particulates to gaseous pollutants: ozone, sulphur dioxide, nitrogen oxides, and carbon monoxide.

In our complex and rapidly changing modern society, we need to decide what level of pollution is acceptable to us and act accordingly. Kronometrix helps to understand these and set the correct expectations.

SENSORS, DEVICES

Kronometrix connects to a wide variety of data sources: everything from IoT devices, ICT enterprise to weather and environment sensors, using different data subscriptions. Check the latest, supported hardware compatibility list, including information about vendor, device type and model, the protocol and Kronometrix coverage, from recording to analytics modules.



VENDOR	MODEL	PROTOCOL	RECORDING	ANALYTICS
MEMORY CARDS				
Transcend	Ultimate 633X UHS-I U3	U3	yes	yes
Transcend	High Performance 330S	A2, V30, U3	yes	yes
SanDisk	Extreme Pro, Extreme Plus	A2, V30, U3	yes	yes
SINGLE-BOARD COMPUTER				
Raspberry PI	3B, 3B+	HTTPS, Modbus	yes	yes
NETWORK CAMERAS				
Axis Communications	Q1615-E MkII	HTTP/HTTPS	yes	yes
Axis Communications	Q6052-E PTZ	HTTP/ HTTPS	yes	yes
AIR QUALITY				
Tongdy Sensing Technology	IAQ-G01	Modbus-RTU	yes	yes
Tongdy Sensing Technology	MSD-1618	Modbus-RTU	yes	yes
Vaisala	GMW95	Modbus-RTU	yes	yes
Vaisala	AQT420	Modbus-ASCII	yes	yes
WEATHER				
Fine Offset Electronics	WH-1080	Serial	yes	yes
Vaisala	QML201	HTTP	yes	yes
Vaisala	WXT530	Serial	yes	yes
Vaisala	HMP155	Serial	yes	yes
Vaisala	AWS310	HTTP		yes
INDUSTRIAL AUTOMATION				
Phoenix Contact	QUINT-UPS 24/12/5	Modbus-RTU	yes	yes
Phoenix Contact	QUINT-UPS 24/10	Modbus-RTU	yes	yes
Phoenix Contact	QUINT-UPS 24/24/x #	Modbus-RTU	yes	yes

QUINT-UPS 24/24/x, x=5,10,20,40

REFERENCE

Data Source

Any system connected to a public or private network with at least one valid IPv4, IPv6 address, associated to a single Kronometrix data subscription e.g. a computer system running FreeBSD or Debian operating system, an automatic weather station, a database server, a graphical 3D CAD workstation, a network IP camera, etc.

Device

A sub-system component, like a storage disk device, a network card, a temperature sensor which does not include or deliver any IPv4, IPv6 information and it does require a data source to properly function and operate.

Data Subscription

A collection of data sources of a certain type having a unique id (SID). Example: computer performance data subscription, end-user performance data subscription, indoor air quality data subscription. Kronometrix can handle one or many data subscriptions.

Data Message

A collection of one or many metrics, parameters specific to a data source. A data source (DS) can offer one or many data messages, which Kronometrix Analytics must process for analysis and visualisation.

Kronometrix Analytics (KA)

Kronometrix Analytics contains different technologies, to collect, analyse and visualise data in a simple manner. Includes: an engine to process, execute and filter data, a summary statistic library to offer functions which can be used to compute different things, an in-memory database to store and manage the data, and a light and powerful visualisation layer to build applications. This can be conveyed as a software-only application deployed on a private network or as a cloud-based software (SaaS).

Kronometrix Databus (KBUS)

Kronometrix databus, is a complete system, capable to receive, filter and convert native, specific data traffic into Kronometrix data messages. There can be different types of data buses: MQTT, DDS, Aviation Meteorology, Feedliner, RDBMS-TCP, etc. Each databus is responsible for different type of data traffic, using its own validation and data protocols.

Kronometrix Data Recording (KDR)

Data recording and transport package with a low memory and system footprint, supporting raw data. Includes data recorders for different industries and a transport utility responsible to deliver data to one or many Kronometrix Analytics fabric or to 3rd parties systems.

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Kronometrix connects to a wide variety of data sources: everything from IoT devices, ICT enterprise to weather and environment sensors. In addition to multifaceted data ingress, the distributed data fabric provides high-speed transport for data consolidation, analysis and visualization in real-time.

For more information contact us

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