



The HES

Homologation specification

v.1.3

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1. Introduction

1.1. Purpose

The aim of this document is to describe specification required for homologation.

2. Especificación técnica de Sistema de Gestión y Operación

The HES has in its internal database the list of meters and POD (Point of Deliver). The provisioning of these information can be done from web site (one by one and massively) and via integration (automatically).

On website specific reports that allows to see the list and the status of meters and PODs are available.

Usage Points

idusagepoint	name	associated meter	balance meter	address	region	latitude	longitude	insertdate utc	lastupdate
100123	POD001	UAAEEDN10100080395	False	Address test	Bristol	50.12345	50.12345	3/27/2018 12:00:00 AM	12/
105293	ELETRA_POD	UAAEEDN11200110971	False	Via Rubattino 54	Milano	45.46373	9.1911	4/11/2018 10:11:23 AM	10/
105353	POD035	UCAUEEDN12400000551	False	Via del test	Milano	36	11	10/5/2020 8:30:58 AM	12/
105348	POD034	UAAEEDN11200000762	False	Via bruno cesana	Milano	35.12	4.99	3/10/2020 9:59:09 AM	12/
105339	POD033	666CE1234567890123	False	Via del 666POD1	Milano	39	14	4/30/2019 1:24:08 PM	12/
105337	POD032	UAAEEDN11200129694	False	POD5	Milano	46	19	2/18/2019 2:56:39 PM	12/
105335	POD031	UAAEEDN13201244454	False	pod30	Milano	40	19	2/18/2019 1:06:46 PM	12/
105333	POD030	UAAEEDN13201244458	False	VERDET0008	Milano	46	19	2/5/2019 1:07:16 PM	12/

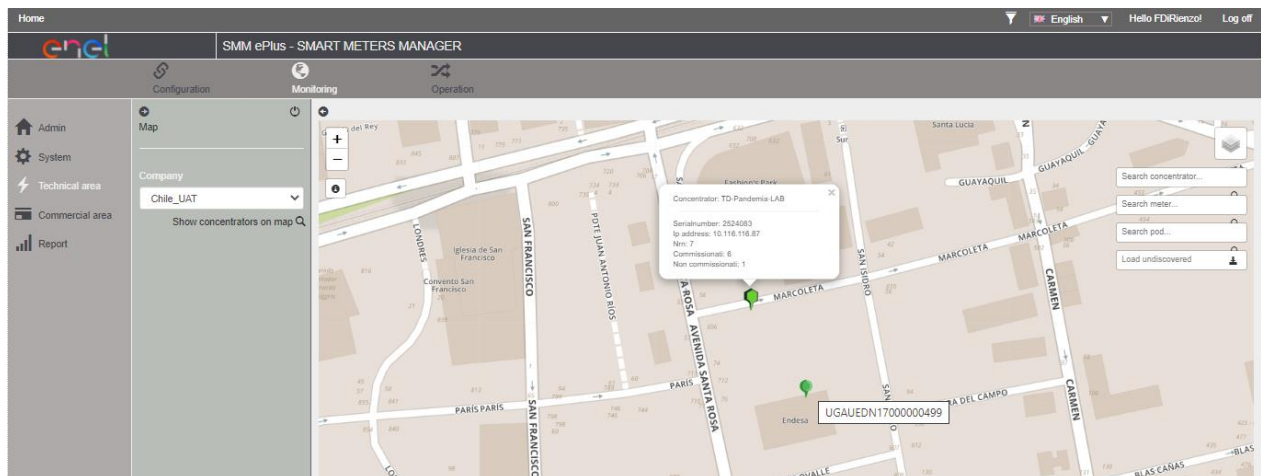
filter by: value:

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Meters

idmeter	meter type	serialnumber	serialNumber board	macaddress	firmware	hardware	insertdate utc	lastupdate utc
156197	CERM1	UAAEEDN10100080395	UAAEEDN10100080395	860214013A0B	11	L01207	4/11/2018 10:00:17 AM	4/11/2018 10:00:17 AM

Each POD is identified from a specific address and specific coordinates (latitude and longitude) in order to show exact position on the map.



It's possible to create, update and delete the associations between meters and PODs.

These operations can be done from web site (one by one and massively) and via integration (automatically).

There are specific reports regarding the relationship between meters and PODs.

pod ☒ NULL serialnumber ☒ NULL

tariff name All breaker state All

1 of 1 Find | Next

Meter - POD associations

pod	serialnumber	address	state	tariff	breakerstate
POD019	UAAEEDN11200129683	Via Rubattino 54	Commissioned	Chile_THR_Tariff	Not connected
POD021	UAAEEDN11200129687	via nazareno 15	Installed	Default tariff -CERM1	Connected
POD025	UCAUEDN12400099992	podtest5	Installed	Default tariff -CERT1	Connected
POD026	UCAUEDN12400099994	podtest8	Installed	Default tariff -CERT1	Connected
POD033	666CE1234567890123	via del 666POD1	Installed	Default tariff -GET1	Connected
POD037	UAAEEDN17100000551	via rubattino	Installed	Default tariff -CERM1	Connected
POD036	UAAEEDN11130112020	Duomo Square	Installed	Default tariff -CERM1	Connected
POD035	UCAUEDN12400000551	via del test	Commissioned	Default tariff -CERT1	Not connected
POD034	UAAEEDN11200000762	via bruno cesana	Installed	Default tariff -CERM1	Connected

filter by concentrator name value: TD-Pandemia-LAB

1 of 1 Find | Next

Meters in field

concentrator	usagepoint	balance meter	macaddress	serialnumber	type	state	process state	nrn	is reachable	breakerstate	error instantclosure	row	phase
TD-Pandemia-LAB	Lab_Pandemia_TRL1	False	A600220001F3	UGAUEDN17000000499	CERS3	Commissioned		0	True	5	False	1	Phase T
TD-Pandemia-LAB	CH104E133654700955952	False	860E240E9630	UAAEEDN18700955952	CERM1	Installed		0	False	100	False		
TD-Pandemia-LAB	112233	False	860E240D14C8	UAAEEDN18700857288	CERM1	Commissioned		0	True	5	False	3	Phase T
TD-Pandemia-LAB	112255	False	860E240E995A	UAAEEDN18700956762	CERM1	Commissioned		0	True	5	False	4	Phase T

In addition, automatic csv are extracted every day.



MeterInFieldReport MeterReport_2020-
_2020-12-22.csv 12-22.csv

The relationship between the meter and the concentrator is managed by The HES: the association is usually done automatically when a meter is discovered by the concentrator, but can also be modified manually.

Set associations

Company

Chile

Upload associations file

Filter concentrators by

All

Find concentrators

Filter meters by

...

☒ All meters without concentrator

Find meters

Initialized concentrators

Name	Serial number	Software version	Versionsw Int
TD-1000	17CEC50610052620	050116	22
TD-100082	19CEC50610062306	050116	22
TD-10030	18CEC50610058567	050116	22
TD-100425	18CEC50610060883	050116	22
TD-10044	18CEC50610061022	050116	22

Total items: 2893 (Selected items: 1)

Installed meters

The selected concentrator has fw 22. It is possible to associate to this concentrator only meters that have been autodiscovered through Autodiscover "Discovered by TD-10030".

POD name	Serial number	State	Associated to	Process state	Discov
833994	UAAEEDN15202594371	Installed			False
833992	UAAEEDN15202591283	Installed			False
299915	UAAEEDN16202728450	Installed			False
120758	UAAEEDN16202819536	Installed			False

In the website it is possible to see meters that have been discovered by the concentrator, but with an automatic association not possible.

concentrator name

NULL

View Rep

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Find | Next

Concentrator Autodiscovery Conflicts

concentrator	associated concentrator	mac address	exists in database	serialNumber in database	comm quality	description	discovery date local	insert date utc	current state	curr
TD-3027	TD-4307	86041E24A300	true	UAAEEDN15202401024	130	Commissioned and reachable by another concentrator	12/22/2020 3:44:55 AM	12/22/2020 12:27:30 PM	commissioned	reach
TD-3027	TD-4307	86041E24A318	true	UAAEEDN15202401048	176	Commissioned and reachable by another concentrator	12/22/2020 4:12:17 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-3027	TD-4307	86041E24A31A	true	UAAEEDN15202401050	224	Commissioned and reachable by another concentrator	12/22/2020 4:34:02 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-3027	TD-4307	86041E24A31D	true	UAAEEDN15202401053	105	Commissioned and reachable by another concentrator	12/22/2020 3:48:08 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-3027	TD-4307	86041E24A328	true	UAAEEDN15202401054	128	Commissioned and reachable by another concentrator	12/22/2020 4:23:02 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-3027	TD-4307	86041E24A341	true	UAAEEDN15202401089	134	Commissioned and reachable by another concentrator	12/22/2020 4:19:15 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-3027	TD-4307	86041E24A3A6	true	UAAEEDN15202401190	162	Commissioned and reachable by another concentrator	12/22/2020 4:03:55 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-3027	TD-4307	86041E24A3C6	true	UAAEEDN15202401222	130	Commissioned and reachable by another concentrator	12/22/2020 4:33:54 AM	12/22/2020 12:27:31 PM	commissioned	reach
TD-5464	TD-4212	86041E24A3CC	true	UAAEEDN15202401228	112	Commissioned and reachable by another concentrator	12/21/2020 11:41:27 PM	12/22/2020 12:22:40 PM	commissioned	reach
TD-5464	TD-4212	86041E24A3CF	true	UAAEEDN15202401231	245	Commissioned and reachable by another concentrator	12/21/2020 11:41:45 PM	12/22/2020 12:22:40 PM	commissioned	reach

When an association is done, the concentrator tries to recruit the meter; this operation can be automatic or manual.

If this recruitment is completed successfully, the system automatically creates two configuration activities:

- 1- The first is the technical configuration of the meter: clock synchronization, daylight saving time configuration, load profile interval, switch from public meter keys to private keys.
- 2- The second is the technical configuration of the meter inside the concentrator: the concentrator needs to know which load profile and readings collect for that meter.

When this flow is completed, the meter is automatically read by concentrator several times per day (depending on system configuration).

Meters can be read and manages remotely (if recruited by a concentrator) or locally, using Android application.

2.1. Collected information

All the information collected by the system are shared with local integration system that is in charge of the storage. Each information is exported with the identification of the device, the timestamp and an attribute indicating the kind of information.

The exported information are:

- Pushed on cloud queues that can be consumed
- Appended on daily csv files

The share of information is described in **SMMePlus - Architecture v4.0** document in section **2.5. SMMePlus Integration Service application.**

The kind of information collected by the system are:

- Events
 - o Massive events are exported.
- Readings
 - o Statistic information are saved in internal database.
 - o Last current period reading for active energy for each meter is saved.
 - o Massive readings are exported.
- Load profiles
 - o Statistic information are saved in internal database.
 - o Massive load profiles are exported.
- Alarms
 - o Massive alarms are exported.
- Voltage variation
 - o Massive voltage variation are exported.
- Voltage interruption
 - o Last interruption values per each meter are saved internally.
 - o Massive voltage interruption are exported.
- Measurands
 - o Statistic information are saved in internal database.
 - o Massive measurands are exported.

2.1.1. Events

This an example of csv file generated daily by the system. The same information are pushed on cloud queues.



LPE_2020-12-21_3.csv HPE_2020-12-22.csv
v

- HPE file contains high priority events (results of workorder).
- LPE file contains events with normal/low priority (reachability, commissioning).

2.1.2. Readings

This is an example of a csv file generated daily by the system. The same information is pushed on cloud queues.



R_2020-12-21_3.csv



PP_2020-12-21_3.csv



MP_2020-12-21_3.csv



DC_2020-12-21_3.csv

- R file contains current period readings.
- DC file contains previous period readings (used for billing).
- MP file contains maximum power on demand readings.
- PP file contains readings related to prepayment feature.
- M file contains measurands registers.

On the front-end there are several reports showing statistic information and last collected information.

Last current reading for meters

Offset minutes from UTC: -180

concentrator	usagepoint	macaddress	serialnumber	version app1	state	process state	t1	t2	t3	t4	t5	t6	tot	reading date local	last update local
TD-Pandemia-LAB	112255	860E240E995A	UAAEEDN18700956762	3131	Commissioned		19	0	0	0	0	0	19	12/22/2020 10:51:12 AM	12/22/2020 10:57:32 AM

Daily closure info per meter

concentrator	mac address	serialnumber	version app1	table type	energy type	last closure date local	errordesc	is unreachable	is error	last update utc
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	3131	0002	Active Forward Energy	12/16/2020 12:00:00 AM		False	False	12/17/2020 5:11:02 AM
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	3131	0004	Reactive Forward Energy	12/16/2020 12:00:00 AM		False	False	12/17/2020 5:11:02 AM

Last prepaid credit reading for meters

Offset minutes from UTC: -180

concentrator	usagepoint	macaddress	serialnumber	version app1	state	process state	available credit	available currency credit	last trans id	local date	last update local
TD-Pandemia-LAB	112255	860E240E995A	UAAEEDN18700956762	3131	Commissioned		0	0	0	12/22/2020 10:51:45 AM	12/22/2020 10:57:32 AM

Aggregated info per meter

concentrator	concentrator sn	conc nrm	mac address	serialnumber	row	version app1	commissioned	nrm	last dc active local	last dc reactive local	last dc active export local	last lp active local	last current reading a
TD-Pandemia-LAB	19CEC50610069794	7	860E240E995A	UAAEEDN18700956762	4	3131	True	0	12/16/2020 12:00:00 AM	12/16/2020 12:00:00 AM		12/16/2020 8:00:00 PM	12/22/2020

2.1.3. Load profiles

This is an example of a csv file generated daily by the system. The same information is pushed on cloud queues.



S_2020-12-16_3.csv

On the front-end there is a specific report showing statistic information about load profile collection.

Load profile info per meter

concentrator	mac address	serialnumber	table type	energy type	pload date local	tip	errordesc	is unreachable	is error	last update utc
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	02	Active Forward Energy	12/16/2020 8:00:00 PM	15		False	False	12/17/2020 1:42:29 AM
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	04	Reactive Forward Energy		15		False	False	12/10/2020 1:59:01 AM
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	08	Active Reverse Energy		15		False	False	12/10/2020 1:59:01 AM
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	10	Reactive Reverse Inductive Energy		15		False	False	12/10/2020 1:59:01 AM
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	20	Reactive Forward Capacitive Energy		15		False	False	12/10/2020 1:59:01 AM
TD-Pandemia-LAB	860E240E995A	UAAEEDN18700956762	40	Reactive Reverse Capacitive Energy		15		False	False	12/10/2020 1:59:01 AM

2.1.4. Alarms

This an example of csv file generated daily by the system. The same information are pushed on cloud queues.



SWE_2020-12-21_3.
csv

2.1.5. Voltage variation

This an example of csv file generated daily by the system. The same information are pushed on cloud queues.



VV_2020-12-16_3.cs
v

2.1.6. Voltage interruption

Every day a specific csv is created containing collected voltage interruptions. The same information are pushed on cloud queues.



VI_2021-01-25_2.csv

On the front-end there is a specific report showing last interruption information per each meter.

Last interruptions for meters													Offset minutes from UTC: 60			
concentrator	usagepoint	macaddress	serialnumber	version app1	state	process state	meter time local	last update local	THVI	TSI	TLI	NSHV R cur	NAV V R cur	NLOV R cur	TSHV R cur	
GIALLOT01	POD016	860214006A64	UAAEEDN10100027236	3146	Commissioned		12/21/2020 4:30:58 PM	12/21/2020 4:31:33 PM	50	1	180	0	2	2	0	
GIALLOT01	POD035	8E0818000227	UCAUEDN12400000551	3038	Commissioned		12/18/2020 12:15:40 PM	12/18/2020 12:16:00 PM	35	6	180	0	0	0	0	
GIALLOT01	POD001	860214013A08	UAAEEDN10100080395	3133	Commissioned		12/18/2020 12:15:25 PM	12/18/2020 12:16:00 PM	40	6	180	1	1	2	0	
GIALLOT01	POD006	860214006A92	UAAEEDN10100027282	3131	Commissioned		12/18/2020 12:14:55 PM	12/18/2020 12:15:59 PM	50	1	180	0	1	2	0	
GIALLOT01	POD014	8E081800016C	UCAUEDN12400000364	5138	Commissioned		12/18/2020 12:14:34 PM	12/18/2020 12:15:59 PM	35	6	180	0	0	0	0	
GIALLOT01	POD018	860214013A08	UAAEEDN10100080395	3133	Commissioned		12/18/2020 12:14:34 PM	12/18/2020 12:15:59 PM	40	6	180	0	0	2	0	

2.1.7. Measurands

Every day a specific csv is created containing collected measurands. The same information are pushed on cloud queues.



M_2021-03-31.csv

On the front-end there is a specific report showing statistic information about measurands collection.

Measurands info per meter

concentrator	mac address	serialnumber	table type	energy type	ttmp	value type	measurand date local	errordesc	is error	last update utc
GIALL0T01	86041601817B	UAAEEDN11200110971	0D	RMS R-line-phase voltage RMS_V(t)	15 min	Average value evaluated in each TMP period (the value has to be stored at the end of each TMP period)	12/22/2020 1:15:00 AM		True	12/22/2020 4:44:11 PM
GIALL0T01	86041601817B	UAAEEDN11200110971	0F	Power factor COS_PHI(t) (three phase measurement)	15 min	Instantaneous value synchronized with TMP period	12/22/2020 1:15:00 AM		False	12/22/2020 4:44:12 PM
GIALL0T01	86041601817B	UAAEEDN11200110971	03	Positive inductive reactive energy R+L(t)	15 min	Instantaneous value synchronized with TMP period	12/22/2020 1:15:00 AM		False	12/22/2020 4:44:12 PM
GIALL0T01	86041601817B	UAAEEDN11200110971	0B	Negative inductive reactive energy R-L(t)	15 min	Instantaneous value synchronized with TMP period	12/22/2020 1:15:00 AM		False	12/22/2020 4:44:12 PM
GIALL0T01	86041601817B	UAAEEDN11200110971	10	Last quarter of hour mean positive active power LQM_W+(t)	15 min	Instantaneous value synchronized with TMP period	12/22/2020 1:15:00 AM		False	12/22/2020 4:44:12 PM
GIALL0T01	86041601FA98	UAAEEDN11200129688	01	Positive active energy E+(t)	15 min	Maximum value evaluated in each TMP period (the value has to be stored at the end of each TMP period)	12/22/2020 1:15:00 AM		True	12/22/2020 3:49:44 PM
GIALL0T01	86041601FA98	UAAEEDN11200129688	07	Positive active power W+(t)	15 min	Maximum value evaluated in each TMP period (the value has to be stored at the end of each TMP period)	12/22/2020 1:15:00 AM		True	12/22/2020 3:49:44 PM
GIALL0T01	86041601FA98	UAAEEDN11200129688	0D	RMS R-line-phase voltage	15 min	Average value evaluated in each TMP period (the value has to be stored at the end of each TMP period)	12/22/2020 1:15:00 AM		True	12/22/2020 3:49:44 PM

Existing measurands registers in meters are:

MSR_TYPx	Description	Note
0x01	Positive active energy E+(t)	
0x02	Negative active energy E-(t)	
0x03	Positive inductive reactive energy R+L(t)	
0x04	Positive capacitive reactive energy R+C(t)	
0x05	Negative inductive reactive energy R-L(t)	
0x06	Negative capacitive reactive energy R-C(t)	
0x07	Positive active power W+(t)	
0x08	Negative active power W-(t)	
0x09	Positive inductive reactive power Q+L(t)	
0x0A	Positive capacitive reactive power Q+C(t)	
0x0B	Negative inductive reactive power Q-L(t)	
0x0C	Negative capacitive reactive power Q-C(t)	
0x0D	RMS R-line-phase voltage RMS_V(t)	
0x12	RMS S-line-phase voltage RMS_V(t)	
0x13	RMS T-line-phase voltage RMS_V(t)	
0x0E	RMS R-line-phase current RMS_I(t) (at secondary of CT in case of semi-direct meter)	
0x14	RMS S-line-phase current RMS_I(t) (at secondary of CT in case of semi-direct meter)	
0x15	RMS T-line-phase current RMS_I(t) (at secondary of CT in case of semi-direct meter)	
0x0F	Power factor COS_PHI(t) (three phase measurement)	
0x10	Last quarter of hour mean positive active power LQM_W+(t)	
0x11	Last quarter of hour mean negative active power LQM_W-(t)	
0x16	Power factor COS_PHI(t) for R-line-phase	Not available on monophasic
0x17	Power factor COS_PHI(t) for S-line-phase	Not available on monophasic

0x18	Power factor COS_PHI(t) for T-line-phase	Not available on monophasic
0x19	Phase angle for R-line-phase	Not available on monophasic
0x1A	Phase angle for S-line-phase	Not available on monophasic
0x1B	Phase angle for T-line-phase	Not available on monophasic
0x1C	Phase angle for three phase measurement	Available on monophasic on fw >= 13 and on JOBI-M
0x1D	Network fundamental frequency	
0x1E	Neutral current (only for direct meters) phase 2 of the project	
0x1F	Phase angle for R-line-phase and Neutral Current phase 2 of the project	
0x20	RMS R-line-phase current RMS_I(t) Primary Circuit	
0x21	RMS S-line-phase current RMS_I(t) Primary Circuit	
0x22	RMS T-line-phase current RMS_I(t) Primary Circuit	

In SMMePlus User Manual section “5.7 Measurands Profiles”, it’s possible to find more details.

2.2. Reachability

Since often meters and concentrators are not reachable for the 100% of the time, the system uses a dedicated counter, called “nrn” in order to manage the reachability of concentrators and meters.

- The counter is incremented every time the device can’t be reached
- When the “nrn” exceeded a specific value, the device is declared “not reachable”.

2.2.1. Concentrators

For concentrators, the system usually executes:

- 3/4 times per day the Daily Closure collection scheduled activity.
- 3/4 times per day the load profile collection scheduled activity.
- 2/3 times per day the measurands collection scheduled activity.
- 1 time per day the CEDData collection scheduled activity.
- 1 time per day the Autodiscovery results collection scheduled activity.
- 2/3 times per week the Autodiscovery Repeater collection scheduled activity.
- On demand activities (configurations, work orders...).

Every time the system tries to contact the concentrator and the connection fails, the nrn is incremented. Every time the system tries to contact the concentrator and the connection succeeds, the nrn is reset to 0.

When the nrn value exceeded the maximum value defined in settings (visible in setting section of the website and usually set as 40), the system changes the “is reachable” flag to FALSE.

Is behavior has been implemented because usually concentrators are not reachable every hour of the day. We set a concentrator as unreachable when the connectivity problems persist.

2.2.2. Meters

For meters, the system executes:

- On demand activities (configurations, workorders...).
- Collection of information through scheduled activities of concentrators.

Every time the system tries to contact the meter and the connection fails, the nrn is incremented.
Every time the system tries to contact the meter and the connection succeeds, the nrn is reset to 0.

In addition, when the system analyzes the result of scheduled activities, the system checks if the data provided by concentrator for that meter has already been collected. If the answer is yes (last time the concentrator has given me the same information) it means that the meter hasn't been reached by the concentrator. So the nrn is incremented also in this case.

When the nrn value exceeded the maximum value defined in settings (visible in setting section of the website and usually set as 40), the system changes the "is reachable" flag to FALSE.

2.2.3. Event

When a meter or a concentrator changes their reachability status, the system generates a specific event. The event contains the identification of the device, the timestamp and the kind of event.

Events are immediately pushed on the could queues and are appended to daily csv.

3.1.0.49	Meter Reachable
3.1.0.85	Meter Unreachable

This kind of events are appended on LPE csv

```
concentrator;meter;pod;type;date;correlationid;severity;description;externalrequest;breakerstate
TD-33585;UAAEEDN15202595407;2566646;3.1.0.49;2021-04-10 18:34:52.834;;0;Meter Reachable;;-
TD-66462;UAAEEDN17204606617;306944;3.1.0.49;2021-04-10 18:35:06.520;;0;Meter Reachable;;-
TD-51022;UAAEEDN17305243609;883525;3.1.0.49;2021-04-10 18:21:19.405;;0;Meter Reachable;;-
TD-66462;UAAEEDN17204609879;306955;3.1.0.85;2021-04-10 18:35:04.239;;0;Meter Unreachable;;-
TD-26750;UAAEEDN17305240178;736610;3.1.0.85;2021-04-10 18:30:12.100;;0;Meter Unreachable;;-
TD-66462;UAAEEDN17204609917;306961;3.1.0.49;2021-04-10 18:35:01.379;;0;Meter Reachable;;-
TD-66462;UAAEEDN17204604840;306959;3.1.0.49;2021-04-10 18:35:04.364;;0;Meter Reachable;;-
```

2.2.4. Report

The information about the devices reachability can be see in reports available on the website (real time updated) and on daily csv extractions.

In "Concentrator in field" report it's possible to see concentrator information.

ity	nm	is reachable	ins
	441	False	
	0	True	
	0	True	
	0	True	
	1	True	
	0	True	
	0	True	
	0	True	
	30	True	

In “Meter in field” report it’s possible to see meter information.

Meters in field

concentrator	usagepoint	balance meter	macaddress	serialnumber	type	state	process state	nm	is reachable	break
TD-Pandemia-LAB	Lab_Pandemia_TRI_1	False	A600220001F3	UGAUEDN17000000499	CERS3	Commissioned		0	True	
TD-Pandemia-LAB	112233	False	860E240D14C8	UAAEEDN18700857288	CERM1	Commissioned		0	True	
TD-Pandemia-LAB	112255	False	860E240E995A	UAAEEDN18700956762	CERM1	Commissioned		0	True	
TD-Pandemia-LAB	112257	False	860E240E9957	UAAEEDN18700956759	CERM1	Commissioned		0	True	
TD-Pandemia-LAB	certpro1	False	860E240D14C6	UAAEEDN18700857286	CERM1	Commissioned		0	True	
TD-Pandemia-LAB	certpro2	False	860E240CAF83	UAAEEDN18700831363	CERM1	Commissioned		0	True	
TD-Pandemia-LAB	CH104E133654700955952	False	860E240E9630	UAAEEDN18700955952	CERM1	Installed	To commission	0	False	

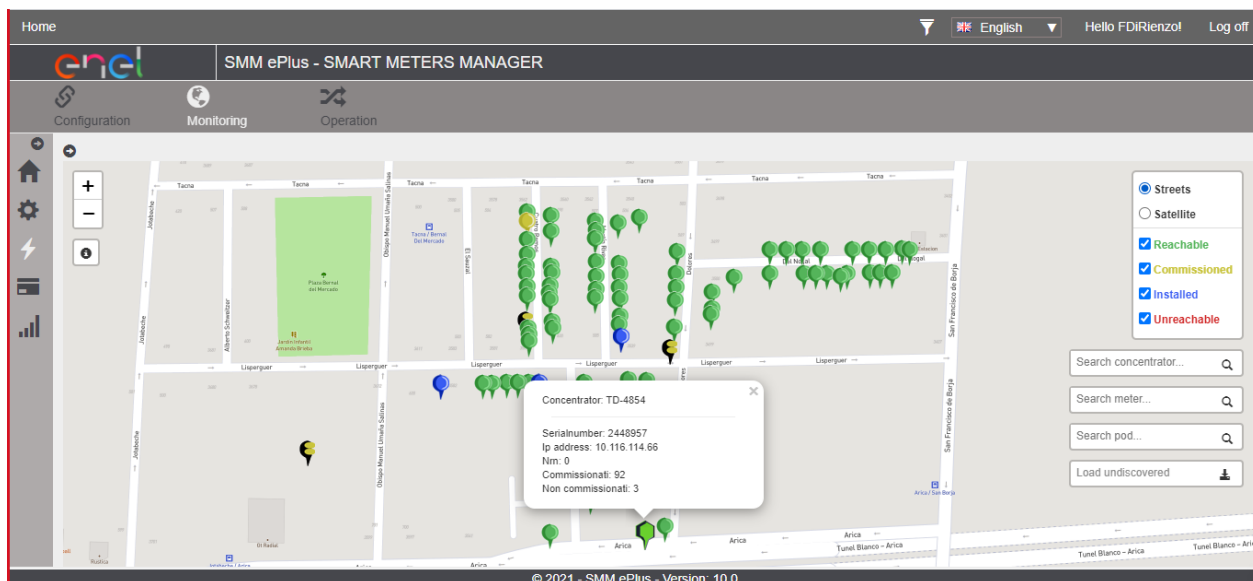
The same extractions are done every night and are available on the storage.



MeterInFieldReport ConcentratorInFiel
_2020-12-22.csv dReport_2020-12-22

2.2.5. Map

In the “Map” section of the website, it’s possible to select a concentrator and view all associated meters. Icons are colored based on the status of the devices (reachable/unreachable, commissioned ...)

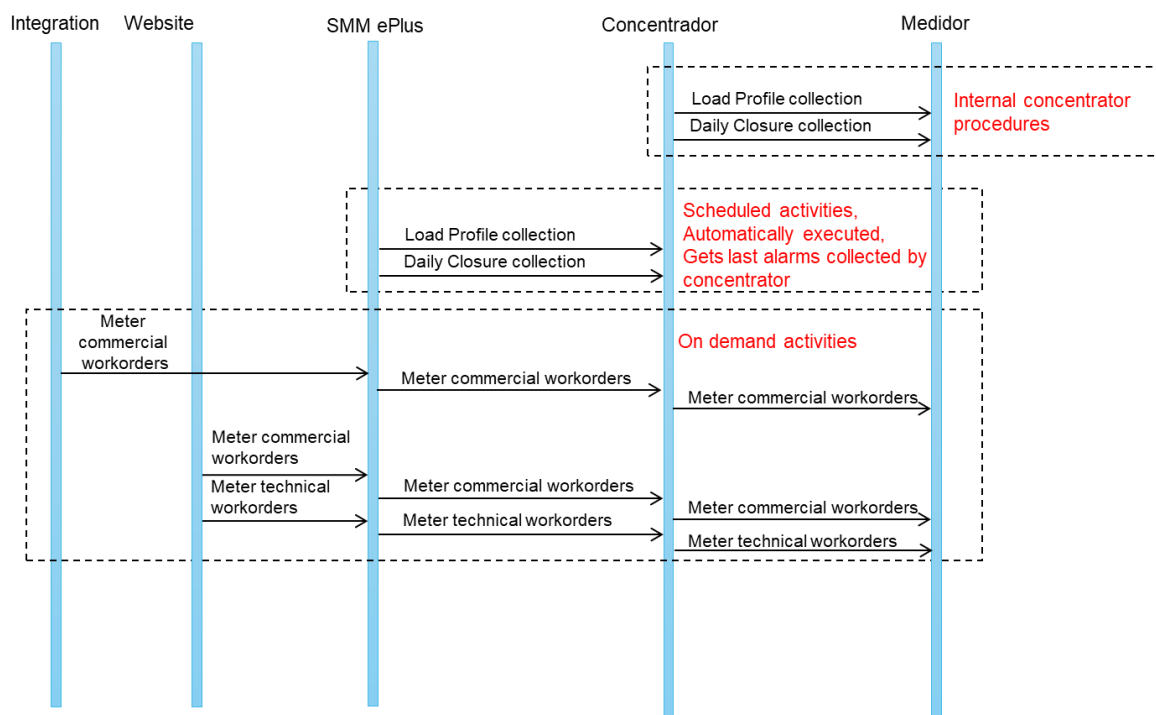


2.3. Alarms

2.3.1. Meters

Meters alarms are collected in several ways, on demand and automatically:

- During every commercial workorder, requested via website or through integration.
- During “meter autodiagnostic” technical workorder, available on website.
- During load profile and daily closure collection: the system gets the value of meter status words collected by concentrator during last n2pload procedure.



4

Each alarm can generate a specific events, containing the identification of device, the identification of the alarm and the timestamp.

The system provide the possibility to configure the alarms that has to generate the events and alarms that hasn't to generate the events.

This is the list of alarms that can be generated in current version of the system regarding meters.

PUP	3.26.0.85	There is a power out
ORD	3.36.17.85	Clock not aligned
ONSI	3.36.17.79	CE without temporal reference
AFC	3.23.1.79	Alarm on communication line
SGR	3.18.17.88	Data segregated
WDOG	3.37.0.85	Watch dog alarm
INTA	3.26.17.43	Consumption with circuit-breaker open
CAPE	3.12.29.212	Meter case opening
DRAM	3.18.85.85	RAM Diagnostics
DEEP	3.18.42.85	EEPROM Diagnostics
DFLA	3.18.92.85	FLASH Diagnostics
DZCR	3.21.0.85	Zero crossing circuit diagnostic
MAGN	3.12.66.257	Magnetic Field Application
UNLOCKED	3.12.298.62	Lock
DDSP	3.13.17.85	Display circuit diagnostic
OLU	3.12.60.88	Optical interface locked out due failed password attempts
KP_ON	3.12.32.62	Provisional Keys
NCO	3.15.17.22	Non cut-off function
BAT_LOW	3.2.22.150	Battery alarm

TC_REM	3.12.29.79	Terminal cover removed
WRNTHD	3.20.81.286	Warning threshold active
POV	3.26.38.35	The POV procedure has a positive result
DMIS	3.21.67.85	Measurer circuit diagnostic
NPR	3.12.202.76	Non-protected Read enabled
NPW	3.12.282.76	Non-protected Write enabled
DBT_LMT	3.20.81.150	Debit Limit

2.3.2. Concentrators

Every time the system connects to a concentrator, the alarms are collected and saved in database. It's possible to consult last concentrator status word value in "Concentrator in Field" report available on website.

sw update	status word	last csw update utc	stop activit
Not running			False
			False
			False
			False
Not running	04B01E	12/5/2019 11:08:07 PM	False
Not running			False
Not running	00981E	12/23/2020 7:26:58 AM	False
Not running	08980E	4/16/2020 10:22:59 AM	False
Not running	08981E	12/22/2020 8:14:10 PM	False

The same information is also available in the daily csv "ConcentratorInFieldReport".



ConcentratorInFiel
dReport_2020-12-22

For concentrator status word no event is exported, but the analysis of most important active alarms can be found in daily csv “ConcentratorStatusWordAnalyzedReport_YYYY-MM-DD”.csv



ConcentratorStatus
WordAnalyzedRepo

A power up	CERCO Power up
S ModeCha	CERCO functioning modality variation (standalone/remote)
T Amm	Expired time-out communication with AMMS.
L Tamper Detection	Tamper Detection
F ConnC	CONN-C procedure completion.
U PLC Modem Failure	PLC modem failure
C Time Zone Enable	Time Zone handling enabled/disabled
M Available	Not used
I PhaseR Missing	Phase R missing
J PhaseS Missing	Phase S missing
K PhaseT Missing	Phase T missing
Y CBT Diag	Reserved for CERCO diagnostics.
Z Post	Error in CERCO self-diagnostics
B CE Table Load	CE Table loaded
O Sync	CERCO Synchronised (with valid temporal reference)
E LVAct	Communication active on LV net
G DST	Daylight saving time period configured.
R Dis	Not used

2.4. Features

This is the complete list of features of the system:

- Concentrator technical configuration.
- Concentrator synchronization (at the end of each activity).
- Concentrator status word collection (at the end of each activity).
- Concentrator firmware update.
- Custom script execution on concentrators.
- DST configuration on concentrator.
- Concentrator Mutual Authentication configuration.
- Concentrator Repeater table reading.
- Load profile collection.
- Daily Closure collection.
- Voltage variation collection.
- Voltage interruption collection.
- Measurands collection.
- Autodiscovery results collection.
- Meter technical configuration.
- Meter synchronization.
- Meter autodiagnostic (reset and read status word).
- Commercial meter workorders:
 - Reading (local and remote)

- Maximum power reading.
- Detachment (local and remote).
- Reconnection (local and remote).
- Reduction (local and remote).
- Tariff/contract configuration (no possibility to create new tariffs/contracts in the system yet).
- Prepayment management:
 - Prepay configuration / disable (local and remote).
 - Credit charge/reduction workorder (local and remote).
 - Credit read workorder (local and remote).
 - Automatic credit and alarms through CEData.
- Custom script execution on meters.
- DST configuration on meter.
- Meter firmware update.
- Meter status word collection during commercial workorder, daily closure and load profile collection.
- Daily report extractions (collected data and alarms).
- Concentrator wake up listener
- Last Gasp concentrator listener
- Last Gasp meter listener

3. Especificación técnica de Sistema de Seguridad

3.1. Meter and concentrator keys

When commissioning is completed, the “meter technical configuration” activity switches the meter keys from public to private ones. Concentrator keeps the keys of recruited meters in its database.

The couple of keys of meters and concentrators are unique.

Meter and concentrator keys are stored encrypted in internal database.

3.2. Logs

In relation with logs of activities, there are several types of information:

Website:

- Each website logs activities in a text file per each day.
- These files are saved in the same FTP folder of the web site and are never deleted.
- To access the FTP it's required the username and the password.

```

SMMePlus-WP-20210401.log
15 2021-04-01 11:57:08,906 +00:00|INFO|24|MainAreaController|1e01ec68-e2ed-4d3a-8d1e-5f1983d9a207|User MainAdmin is in MainArea page
16 2021-04-01 12:00:41,962 +00:00|INFO|61|TechnicalAreaController|b521411c-352b-49a9-a3e4-2fbc315d1f44|MainAdmin | update | concentrator installation |
idconcentratorfield: 7302, idcompany: 6, name: TD-5660, idprocedureprofile: 8, idconcentrator: 7803, idconcentratorsport: 4, idsubstation: 7302,
idtransformer: 7302, idmodule: 7794, idethernet: , idsimcard: 7797, idprofileuser: 1
17 2021-04-01 12:00:42,321 +00:00|INFO|117|ServiceFabricController|633a69f7-2957-4829-900f-fc3bc59d5e79|MainAdmin | Actors - ConcentratorActorService |
idconcentratorfield: 7302 | gatewayport: 8124
18 2021-04-01 12:05:34,574 +00:00|INFO|96|CommercialAreaController|df491cc3-bale-4573-ad8e-fd000d5c224d|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426013, idmeter: 426061, concentrator: TD-5660, idmeteractivitytype: 8
19 2021-04-01 12:05:34,589 +00:00|INFO|96|CommercialAreaController|df491cc3-bale-4573-ad8e-fd000d5c224d|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426014, idmeter: 426062, concentrator: TD-5660, idmeteractivitytype: 8
20 2021-04-01 12:05:34,589 +00:00|INFO|96|CommercialAreaController|df491cc3-bale-4573-ad8e-fd000d5c224d|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426015, idmeter: 426063, concentrator: TD-5660, idmeteractivitytype: 8
21 2021-04-01 12:05:34,605 +00:00|INFO|24|PropagationServiceRestClient|0a3954e5-06bf-4908-a790-4162051a5b67|PropagateData - companyId:6, objectType:"WorkOrder"
22 2021-04-01 12:05:34,620 +00:00|INFO|24|PropagationServiceRestClient|0a3954e5-06bf-4908-a790-4162051a5b67|PropagateData - request: "
http://10.132.20.228:8124/api/Jobs"
23 2021-04-01 12:05:35,542 +00:00|INFO|96|CommercialAreaController|df491cc3-bale-4573-ad8e-fd000d5c224d|MainAdmin | insert contract workorder | propagation
service client | idcompany: 6, gatewayport: 8124 | propagation client result isok: True
24 2021-04-01 12:16:02,718 +00:00|INFO|95|CommercialAreaController|fa109721-29ba-4c47-a198-b971b20ea7cb|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426106, idmeter: 426154, concentrator: TD-5660, idmeteractivitytype: 8
25 2021-04-01 12:16:02,749 +00:00|INFO|96|PropagationServiceRestClient|688484bf-0047-4d72-987d-f031efbaf641|PropagateData - companyId:6, objectType:"WorkOrder"
26 2021-04-01 12:16:02,749 +00:00|INFO|96|PropagationServiceRestClient|688484bf-0047-4d72-987d-f031efbaf641|PropagateData - request: "
http://10.132.20.228:8124/api/Jobs"
27 2021-04-01 12:16:03,218 +00:00|INFO|95|CommercialAreaController|fa109721-29ba-4c47-a198-b971b20ea7cb|MainAdmin | insert contract workorder | propagation
service client | idcompany: 6, gatewayport: 8124 | propagation client result isok: True
28 2021-04-01 12:17:05,211 +00:00|INFO|154|CommercialAreaController|d6fb8bda-95fd-4daf-a301-ce296df23a43|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426112, idmeter: 426160, concentrator: TD-5660, idmeteractivitytype: 8
29 2021-04-01 12:17:05,227 +00:00|INFO|154|CommercialAreaController|d6fb8bda-95fd-4daf-a301-ce296df23a43|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426113, idmeter: 426161, concentrator: TD-5660, idmeteractivitytype: 8
30 2021-04-01 12:17:05,227 +00:00|INFO|154|CommercialAreaController|d6fb8bda-95fd-4daf-a301-ce296df23a43|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426114, idmeter: 426162, concentrator: TD-5660, idmeteractivitytype: 8
31 2021-04-01 12:17:05,227 +00:00|INFO|154|CommercialAreaController|d6fb8bda-95fd-4daf-a301-ce296df23a43|MainAdmin | insert | contract workorder |
idcompany: 6, idprofileuser: 1, idpod: 426115, idmeter: 426163, concentrator: TD-5660, idmeteractivitytype: 8

```

Backend:

- The services in backend logs in text files in the file system of the servers.
- These logs are used in case of specific analysis, usually if an activity has some problems in execution.
- To access these logs it's necessary to have local access to servers of the cluster.

```

SMMPlus MeterReading-20210409.log
25 2021-04-09 09:08:14,911 +00:00|INFO|11|MeterReadingCommandLoader|620d2931-c7b3-491e-be98-a50153c1972e|7ed4163a-9a51-4f57-aa71-c157bfa632fb|MeterReadingCommandLoader.Load - 6 command
26 2021-04-09 09:08:15,083 +00:00|INFO|3|MeterReadingCommandExecutor|620d2931-c7b3-491e-be98-a50153c1972e|7ed4163a-9a51-4f57-aa71-c157bfa632fb|MeterReadingExecutor for idconcentratorfi
27 2021-04-09 09:08:26,645 +00:00|INFO|6|MeterReading|620d2931-c7b3-491e-be98-a50153c1972e|6c70876d-ca36-4b02-b03c-2cfa55114848|WorkerService#RunWorkItemTask - Going to invoke RunWorkItem for
28 2021-04-09 09:08:26,645 +00:00|INFO|27|MeterReading|620d2931-c7b3-491e-be98-a50153c1972e|6c70876d-ca36-4b02-b03c-2cfa55114848|WorkerService#RunWorkItemTask - fabric://SMMPlusChile/M
29 2021-04-09 09:08:26,645 +00:00|INFO|27|MeterReading|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|MeterReading execution for idconcentratorfield: 7704. A
30 2021-04-09 09:08:26,645 +00:00|INFO|27|MeterReading|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|workData.IdConcentratorActivityType == (Int)Concentrator
31 2021-04-09 09:08:26,911 +00:00|INFO|12|MeterReadingCommandLoader|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|1 WorkOrder found
32 2021-04-09 09:08:26,958 +00:00|INFO|12|MeterReadingCommandLoader|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|MeterReadingCommandLoader.Load - 6 command
33 2021-04-09 09:08:27,036 +00:00|INFO|3|MeterReadingCommandExecutor|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|MeterReadingExecutor for idconcentratorfi
34 2021-04-09 09:08:59,723 +00:00|INFO|27|MeterReadingCommandExecutor|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|SincroAndDwdBuffer is running for idcon
35 2021-04-09 09:09:11,864 +00:00|INFO|3|MeterReadingCommandExecutor|620d2931-c7b3-491e-be98-a50153c1972e|7ed4163a-9a51-4f57-aa71-c157bfa632fb|SincroAndDwdBuffer is running for idcon
36 2021-04-09 09:09:14,739 +00:00|INFO|12|MeterReadingCommandExecutor|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|SincroAndDwdBuffer completed for idcon
37 2021-04-09 09:09:14,786 +00:00|INFO|13|MeterReadingCommandAnalyzer|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|MeterReadingCommandAnalyzer.Analyze for
38 2021-04-09 09:09:14,880 +00:00|INFO|13|MeterReadingCommandAnalyzer|620d2931-c7b3-491e-be98-a50153c1972e|24cc2d64-17f0-4830-8af5-b04650d4cd95|UAAEEDN18700958335 - READ_METER_MACADDRE

```

Database:

- As described Infrastructure document, SQL Auditing feature is enabled and writes on Azure Storage Explorer the logs of queries and stored procedure, success and failed log in.

Location: [sqlauditlogs](#) / [smmplus-db-sa-server](#) / [SMMPlus_SAPRO_DB](#) / [SqlDbAuditing_ServerAudit](#) / 2021-01-02

Search blobs by prefix (case-sensitive)

☐ Show deleted blobs

Name	Modified	Access tier	Blob type	Size	Lease state	
<input type="checkbox"/> 📁 [-]						...
<input type="checkbox"/> 📄 00_00_00_148_7063.xel	1/2/2021, 1:04:33 AM		Append blob	49.96 MiB	Available	...
<input type="checkbox"/> 📄 00_04_33_530_7064.xel	1/2/2021, 1:09:07 AM		Append blob	49.95 MiB	Available	...
<input type="checkbox"/> 📄 00_09_07_902_7065.xel	1/2/2021, 1:13:38 AM		Append blob	49.94 MiB	Available	...
<input type="checkbox"/> 📄 00_13_38_419_7066.xel	1/2/2021, 1:16:22 AM		Append blob	49.63 MiB	Available	...
<input type="checkbox"/> 📄 00_16_33_673_7067.xel	1/2/2021, 1:16:26 AM		Append blob	49.63 MiB	Available	...

00_00_00_906_15684.xel	
Displaying 52240 Events	
name	timestamp
audit_event	2021-04-01 02:00:00.9067963
audit_event	2021-04-01 02:00:00.9069015
audit_event	2021-04-01 02:00:00.9122647
audit_event	2021-04-01 02:00:00.9187140
audit_event	2021-04-01 02:00:00.9207136
audit_event	2021-04-01 02:00:00.9211035
audit_event	2021-04-01 02:00:00.9279666
audit_event	2021-04-01 02:00:00.9280713
audit_event	2021-04-01 02:00:00.9527983
audit_event	2021-04-01 02:00:00.9529171
audit_event	2021-04-01 02:00:00.9642688
audit_event	2021-04-01 02:00:00.9643604
audit_event	2021-04-01 02:00:00.9672200
Event: audit_event (2021-04-01 02:00:00.9122647)	
Details	
Field	Value
session_context	
session_id	168
session_server_prin...	SMM_APP_USER
statement	exec [TECH].[usp_mdb_AddOrUpdateMeterDailyClosure] @Idmeterfield=734525,@Idenergydailyclosure=N'1',@sunreachable=1,@semonr=0,@errordesc=NTMeter is unreachable',@lastclosuredate=2021-03-30 00:00:00'
succeeded	True
target_database_pr...	0
target_database_pr...	

Report:

- In The HES website, reports are used to check results of activities in the system.

Completed Works

Offset minutes from UTC: -240

idwork	user	concentrator	activity type	startdate utc	enddate utc	startdate local	enddate local	link	resu
9099278		TD-5009	Decommissioning	4/12/2021 10:27:25 AM	4/12/2021 10:28:04 AM	4/12/2021 6:27:25 AM	4/12/2021 6:28:04 AM	see details	✓
9097564		TD-5009	Verify Commissioning	4/12/2021 10:27:01 AM	4/12/2021 10:27:26 AM	4/12/2021 6:27:01 AM	4/12/2021 6:27:26 AM	see details	✓
9099270		TD-464	Commissioning	4/12/2021 10:26:01 AM	4/12/2021 10:27:25 AM	4/12/2021 6:26:01 AM	4/12/2021 6:27:25 AM	see details	✓
9099268		TD-3470	Commissioning	4/12/2021 10:25:49 AM	4/12/2021 10:27:09 AM	4/12/2021 6:25:49 AM	4/12/2021 6:27:09 AM	see details	✓
9099258		TD-64705	Commissioning	4/12/2021 10:20:57 AM	4/12/2021 10:26:54 AM	4/12/2021 6:20:57 AM	4/12/2021 6:26:54 AM	see details	✓
9099269		TD-6754	Commissioning	4/12/2021 10:25:53 AM	4/12/2021 10:26:44 AM	4/12/2021 6:25:53 AM	4/12/2021 6:26:44 AM	see details	✓
9099259		TD-7393	Commissioning	4/12/2021 10:21:32 AM	4/12/2021 10:26:36 AM	4/12/2021 6:21:32 AM	4/12/2021 6:26:36 AM	see details	✓
9099265		TD-928	Commissioning	4/12/2021 10:24:28 AM	4/12/2021 10:26:26 AM	4/12/2021 6:24:28 AM	4/12/2021 6:26:26 AM	see details	✓

3.3. Data Integrity

In relation with collected information, data are immediately pushed to cloud queues and can't be modified from the user.

3.4. Data Confidentiality

The website is accessible from Enel network and csv files provided by the system can be accessed using a connection string.

Certificates are necessary for deployment operations.

3.5. User permissions



SMMePlus - Users
and sessions v1.1.pc

4. Especificación técnica de Sistema de Sincronización Horaria

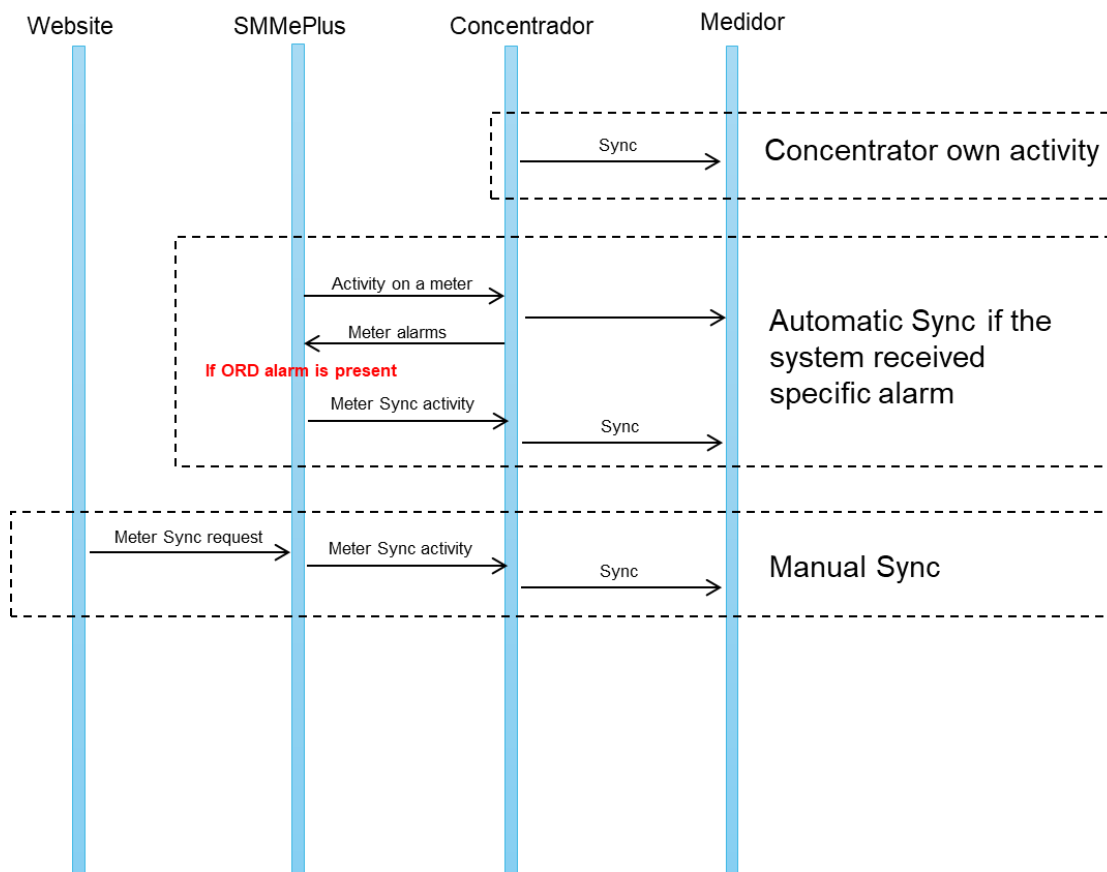
4.1. Meters

When a meter is recruited by a concentrator, the concentrator is in charge of meter synchronization.

In addition, the system provides the possibility to force the concentrator to synchronize the meter using the concentrator own time.

This technical meter workorder is called “Meter Synchronization” and can be generated in two ways:

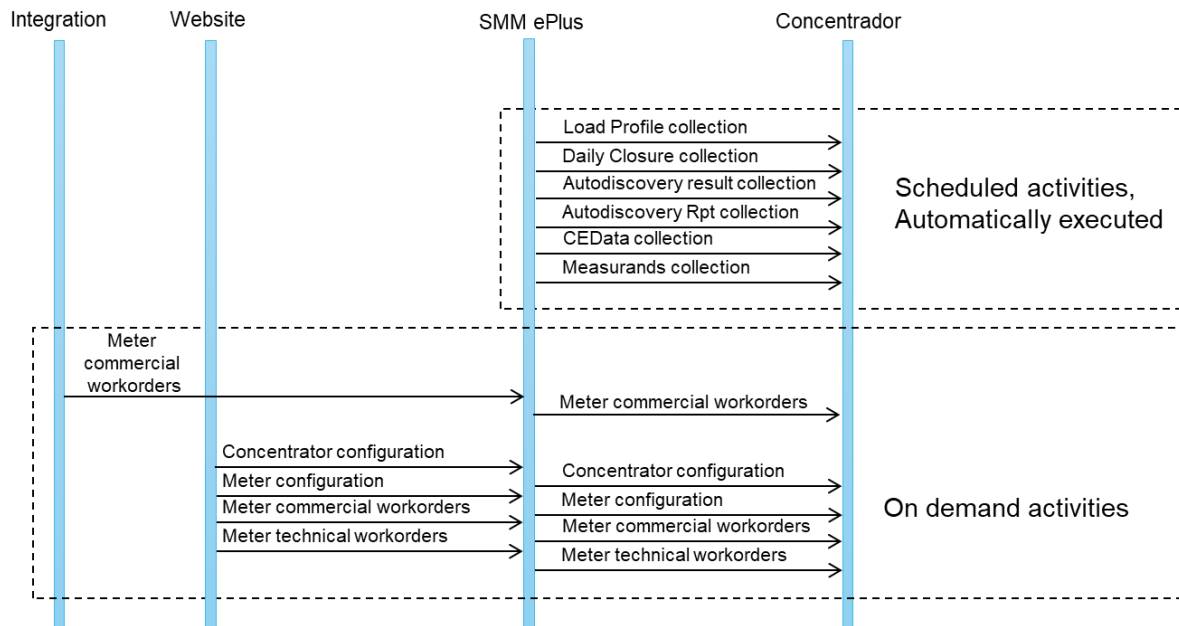
- 1) The user, through the website, manually generate the activity
- 2) The system receives a specific alarm regarding clock not-synchronized and automatically generate the activity (this feature can be enabled or disabled).



4.2. Concentrators

The concentrator is synchronized by the system at every connection. Connections consist of:

- 1) Scheduled operations, executed automatically by the system.
- 2) On demand operations, executed by the user through the website on concentrator and meter.
- 3) On demand operations, required via integration by integrated system.



The servers hosting the services of the system are not configured with local time. The servers are configured with UTC time and the system is in charge of the conversion from UTC to local time before executing the synchronization activity.

NTP protocol is used by “Windows Time” service that is running on each SMM ePlus server and maintains time and date synchronization.

In the system database, two tables are in charge of storing timezone values:

1. Timezone table.
2. Daylight Saving Time table.

5. Especificación técnica de Sistema y Aplicaciones



SMMePlus -
Infrastructure - Hom



SMMePlus -
Architecture v4.0.pd

6. Especificación técnica de DB para Operador de Datos

<http://confluence.enelint.global/display/STARBEAT/Product+Catalogue+-+STAR+BEAT>

<http://confluence.enelint.global/display/STARBEAT/IN+-+StarBeat>

In order to specify read or write permission the “Shared access signature” property of Azure Storage Account could be used.

In the other direction (from local systems to The HES), The HES exposes a service in the intranet that is used to provision information and request activities.

7.6. I7

Reports of the website uses the read-only replica of database.

7.7. I8

A specific table of read-only replica database is accessible from Stakeholders.

7.8. I9

Reports of the website uses the read-only replica of database.

7.9. I10

A specific table of read-only replica database is accessible from Stakeholders.

8. Especificación Técnica de Almacén de Datos y Reportes

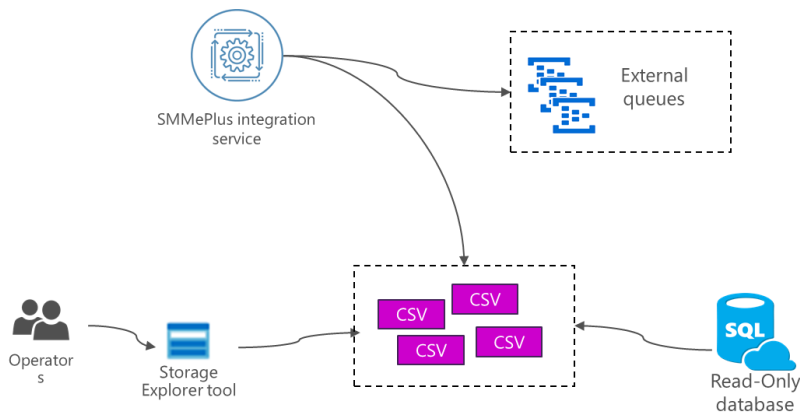
The HES provides reports in three ways:

8.1. Website



On website several reports are available and are always updated. The description of reports available on website is described in **SMMPlus_UserManual v1.35** in section **9 Report**.

8.2. Daily csv



8.2.1. Daily extraction from read-only database

Csv files are extracted usually once a day from read-only database and contains massive information for all managed devices. The available reports are regarding:

- Activities in progress and completed.
- Detachment and reconnection executed.
- Meters status.
 - o Reachability.
 - o Collection of information.
 - o Configuration.
- Concentrator status.
 - o Reachability.
 - o Configuration.
 - o Scheduled activities execution.
 - o Aggregated statistics for recruited meters.

The detailed description of csv extraction is described in **SMMePlus - Architecture v4.0** in section **2.5.1.1. CSV file.**

8.2.2. Daily files from integration

SMMePlus Integration Service is the component in charge of integration between SMMePlus and External Systems.

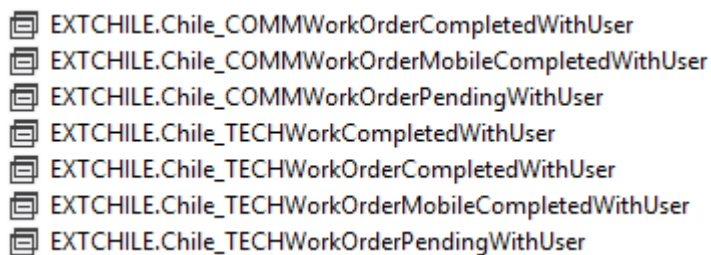
As described in **SMMePlus - Architecture v4.0** in section **2.5. SMMePlus Integration Service application**, the SMMePlus integration service creates every day one or more csv files containing:

- Readings.
- Load profile.
- Voltage Variation.
- Events and alarms.
- Measurands (currently developing).
- Voltage Interruptions (currently developing).

BD repository

The BD repository have all the information about the readings, alarms, load profile and POD information.

Until now, following views are available for Business for a direct consultation. Views are on a read-only database and can't be modified.



EXTCHILE.Chile_COMMWorkOrderCompletedWithUser
 EXTCHILE.Chile_COMMWorkOrderMobileCompletedWithUser
 EXTCHILE.Chile_COMMWorkOrderPendingWithUser
 EXTCHILE.Chile_TECHWorkCompletedWithUser
 EXTCHILE.Chile_TECHWorkOrderCompletedWithUser
 EXTCHILE.Chile_TECHWorkOrderMobileCompletedWithUser
 EXTCHILE.Chile_TECHWorkOrderPendingWithUser

Chile_COMMWorkOrderCompletedWithUser

Gives information about commercial workorder that have been created though the website of the system.

Chile_COMMWorkOrderMobileCompletedWithUser

Gives information about commercial workorder that have been executed locally on the meter using the mobile application.

Chile_COMMWorkOrderPendingWithUser

Gives information about commercial workorder that have been created though the website of the system and are not completed yet.

Chile_TECHWorkCompletedWithUser

Gives information about on-demand activities sent to concentrator and already completed. This report includes activities related to concentrator and related to meters.

Chile_TECHWorkOrderCompletedWithUser

Gives information about remote activities executed on meters. This report includes commercial and technical read/write operations, requested from website, from external system or automatically generated.

Chile_TECHWorkOrderMobileCompletedWithUser

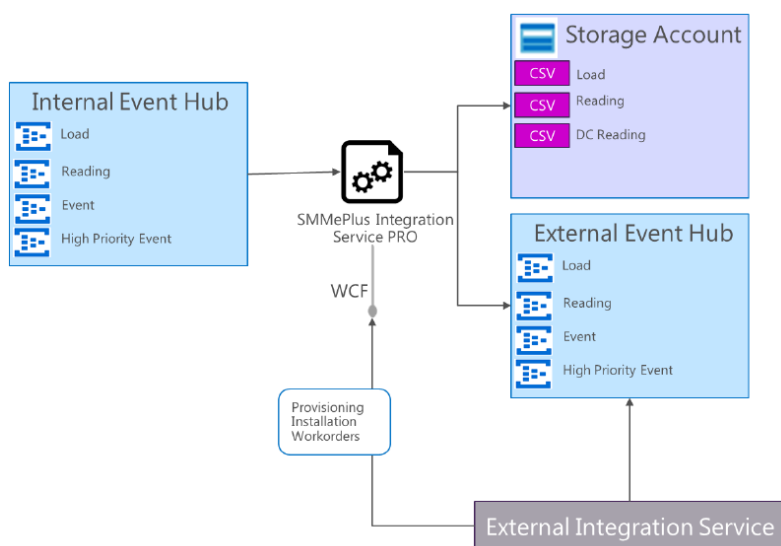
Gives information about technical workorder that have been executed locally on the meter using the mobile application.

Chile_TECHWorkOrderPendingWithUser

Gives information about remote activities on meters not completed yet. This report includes commercial and technical read/write operations, requested from website, from external system or automatically generated.

8.3. Local database

The SMMePlus integration service pushes all collected information on cloud queues that are consumed by local services.



The integration provided by the system is described in:

- **SMMePlus - Architecture v4.0** in section 2.5.1.2. External Event Hubs
- **SMMePlus - Requirements - Integration 2.4**