

Software solution for energy monitoring and electrical data analysis



Benefits

- Ease of energy monitoring and electrical data analysis thanks to a software-based solution.
- Full stack solution. Linux-based solution including operating system, database and web user interface.
- Multisite data aggregator: up to 100 remote installations.
- Configurable account management: different levels of user accounts and multiple languages available.
- Ease of deploying, either On-premises or in the Cloud.
- One shot license: no annual fees.

Description

Em²-Server is the extension of the Carlo Gavazzi range of energy meters and power analysers. It allows multiple users to access to information according to their profile through its web interface and to manage energy and electrical data from multiple sites. Data are delivered via Internet by UWP 3.0 and/or VMU-C EM devices connected locally to energy meters and power analysers. Data are also time-normalized, stored on a database and aggregated according to the needs. A set of analysis tools and reporting functions allows users to get the most profitable value from the measured data points.



Main features

- Compatible with any Carlo Gavazzi energy meter and power analyser, via local data aggregators (UWP 3.0 or VMU-C EM).
- Compatible with any Modbus energy meter thanks to the UWP 3.0 Modbus Commander or the VMU-C EM Modbus Driver Editor.
- Distributed as VMware® virtual machine, ready for use without any external database or software tool.
- Note: Carlo Gavazzi has not any technical or commercial agreement with VMware®.
- · Simple per-gateway licensing plan.
- Robust relational database.
- Account-based data access.



Main functions

- · Data aggregation for analysis and reporting from up to 100 distributed sites.
- Compatibility with any Carlo Gavazzi energy meters and power analysers, via UWP 3.0 or VMU-C EM local aggregators.
- Virtual meters and virtual POD (point of delivery) creation.
- On-the-fly data aggregation: data are transmitted by UWP 3.0 or VMU-C EM and immediately processed.
- Multiple users.
- Multiple languages.
- · Data analysis tools.
- Load profiling tool.
- Cost analysis and simulation.
- Excel® reporting with embedded Pivot Tables for offline analysis.
- PDF reporting with bill simulation for POD (point of delivery) analysis.



- DVD with Em²-Server software, web-server functions, relational database distributed as OVF virtual machine for easy integration into VMware® environments
- License activation code (see Em²-Server license on page 5 for further details)
- Instructions sheet



Architecture Centralized database **On-premises** Cloud • Multiple users ٠ Data management tools Em²-Server Standard Browsers Up to 100 sites . 000000 VMU-C EM UWP 3.0 RS485 RS485 MODBUS/RTU MODBUS/RTU MODBUS/TCP MODBUS/TCP MBUS (via SIU-MBM 01, SIU-MBM 01 160) Wireless MBUS (via SIU-MBM 02) MobBosh releases (via UWP M, UWP A) MBUS (via SIU-MBM 01, SIU-MBM 01 160) Wireless MBUS (via SIU-MBM 02) t +



Software features



Deployment

Media	DVD
Format	OVF standard format
Compatibility	VMware® virtual machine

Virtual machine's host characteristics

CPU (min)	64 bit (AMD Opteron / Intel Itanium)					
RAM (min)	8 GB (dedicated)					
Free disk space (min)	According to portfolio size (100 GB for the bare virtual machine), suggested at least 500GB					
Host operating system	VMware® compliant					

User interface

Virtual machine installation	VMware® software tools		
Network configuration	VMware® console access		
Application software (adminis- tration)	Web-Browser		
Application software (use)	Web-Browser		
Web-Browser compatibility	Firefox, Chrome, Internet Explorer, Safari, Opera*		

*Note: Carlo Gavazzi tested Em²-Server with the latest versions of the named browsers (2014-April)



Backup Virtual machine backup and snapshot based on VMware® compliant backup tools*

*Note: The user is responsible for data integrity and for putting in place any necessary action to grant that information are stored and managed in a reliable and safe way, including the necessary backup and disaster recovery procedures and solutions.



Em²-Server license

License structure	 Base license: it allows activating the server instance to connect up to 20 VMU-C EM and UWP 3.0 units to the target server instance. Base license extension: it allows extending the actual number of VMU-C EM / UWF 3.0 units. 						
	Managed VMU-C / UWP 3.0 units	License					
	20	1 base license					
Nacassany liconso	40	1 base license + 1 base license extension					
Necessary license	60	1 base license + 2 base license extensions					
	80	1 base license + 3 base license extensions					
	100	1 base license + 4 base license extensions					
License check	It is necessary a valid Internet connection with outbound communication on ports 80 and 443 to activate the Em ² -Server's license. Em ² -Server periodically and remotely checks the license validity with Carlo Gavazzi's license servers. If the license check is not possible or the result is not valid, the relevant Em ² -Server instance is disabled and data pushed by VMU-C EM / UWP 3.0 units do not enter the Em ² -Server's database.						

Communication

Protocol

Carlo Gavazzi DP (Data Push) protocol based on web-server communication



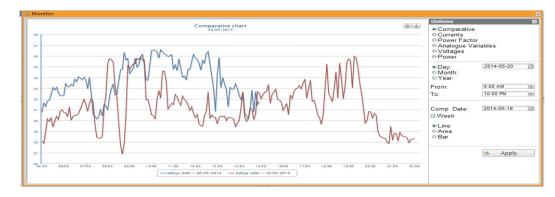
Web server

Main page



- · Web-based access via standard browser.
- · Multiple accounts.
- Configurable access rights for each user.
- Map for locating UWP 3.0 and VMU-C EM devices.
- Navigator tool for organizing the system in cost centres according to the needs.
- On-the-fly update of the whole database, during the reception of data.

Monitoring tool



- Real time (according to sampling interval) and historical data displaying of each energy meter and power analyser variables.
- · Easy navigation of available meters and cost centres.

Analysis tool

• Real time (according to sampling interval) and historical data displaying of any combination of variables.

• Comparison of trends in different time intervals.



Synoptic tool



- Real time (according to sampling interval) displaying of energy meters and power analysers on top of one or more layouts or schematics.
- Multiple panels can be managed.

Load profile tool



- · Statistical analysis of daily consumption data.
- Calculation of the daily baseline.
- Estimation of the maximum power for dealing with energy suppliers.

Em²-Server





Tariff management

Costs	Analysis	Database Exp	ort			Exp	ort (Jueu	le																												
																									0	ptio	ns										
																									e	Ву	lev	/el				• E	3y n	nete	er		
																									Т	ype			Sin	gle	mete	er, m	ultipl	le C	ontra	acts	
																									s	tart	da	te:	20	19-1	0-23						
																									E	nd	dat	e:	20	19-1	0-23						
Meter:		Belluno SCO - I	MAIN	N m	eter	WM	40		~																												
viotor.				-					_																									Re	eset s	elect	tion
		Contract: N	lexi	со Т	ariff	s																															
		Tariffs Dai				iods	Ful	I cont																													
		Year:		2019						•																									om p		
		January	S	Μ	T	W	T	F	S	S	M	T	W	T 10	F	5 S	_	_	1 V	V T 16 1	F		_	_	_	W	_	F	_		_	T 29			F	S	S
	A	February				2	3	4	2	3	1 A	0 5	6	7	8				_						_	_					_	25					
Add Co	Contract	March						1	2	3	4	5	6		8	9			_	13 1															29	30	31
Export	Electricity	April		1	2	3	4	5	6	7	8	9	10	11	12																	30					
	T1 T2	May				1	2	3	4	5	6	7	8	9						15 1														30	31		
V	Mexico Tariffs	June							1	2	3	4	5	6		8																		27		29	30
		July		1	2	3	4	5	6	7	8	9	10	11	12	13				17 1												30					
		August					1	2	3	4	5	6	7	8	9	10	11	12	13	14 1	15	16	7 1	8 1	19 2	0 2	1 2	2 2	3 24	1 25	26	27	28	29	30	31	
		September	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18 1	19 2	20	1 2	2 2	23 2	4 2	5 2	6 2	7 28	3 29	30						
		October			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16 1	17	18	9 2	10 2	21 2	2 2	3 2	4 2	5 26	5 27	28	29	30	31			
		November						1	2	3	4	5	6		8	9	10	11	12	13 1	14	15	6 1	7	18	9 2	0 2	1 2	2 23	3 24	25	26	27	28	29	30	
		December	1	2	3	A	5	6	7	8	0	10	11	12	13	14	15	16	17	18 1	0	20	1 2	12	2 -	14 2	5 2	6 2	7 25	2 20	30	31					

- Calendar and tariff settings for cost calculation.
- Multiple contracts management for cost simulation.

Excel reporting

	09/2019		Туре	¥Ξ Si	A	PivotTable Fie	
		Cost (€)	Capacitive kvarh			Pivot i able Fie	as -
Italy.Belluno SCO	22955,984					Choose fields to add to r	eport:
CoffeeMachines_+_Toilets_EM111	434,5	71,39	Inductive kvarh				
kVarh	94,3	16,97	kVAh			Search	
kWh	340,2	54,42	kVarh			Main Level	
Corridor_sockets_EM111	66,9	11,15				Main Level Sub Level	
kVarh kWh	0	0,00	kWh			Contract	
	66,9	11,15				From	
Customer_Service_Offices_EM111	24,099	3,83				To To	
kVarh kWh	0	0,00				✓ Type	
	24,099	3,83				Tariff	
Main_meter_Rogowsky_EM210 kVarh		1.492,77 86.33				✓ Totalizer	
kVarn kWh	479,6	86,33				Threshold	
						Overpeaks	
BMAIN_meter_WM40 kVarh	9119,085 317,079	57,07					
kWh	8802,006					Drag fields between area	s helow
Production1 Lighting EM340	0002,000	0,00					
kVarh	0	0,00				Filters	III Columns
kWh	0	0.00					Month/Year
Production1 Lines I4 EM340	397,5	66,05					∑ Values
kVarh	1,7	0,31					
kwh	395.8	65.74					
Production1 Lines I5 EM340	0	0,00				E Rows	Σ Values
kVarh	0	0.00				Main Level	 Totalizer
kWh	ő	0.00				Sub Level	 Totalizer ▼ Cost (€)
Production1_Main_EM330	1199.3	198.35					Cost (E)
kVarh	2,5	0,45				Туре	
kWh	1196,8						

- Excel reports with Pivot table for analysing consumptions and energy cost over a time interval.
- Report split into user / cost centre (for a selectable group of devices).



Billing simulation report



CARLO GAVAZZI CONTROLS S.p.A. via Safforze, 8, Belluno, (32100) controls@gavazziacbu.it +39 0437 355811

STATEMENT DATE 13/03/2020

AMOUNT DUE 3,985.72 €

SERVICE ADDRESS	MEASUREMENT POINT
CUSTOMER: Name	MAIN_meter_WM40
Address, City, (Zip Code) Email Phone Number	

BILLING PERIOD									
DATE	kWh READING	kvarh READING							
01/01/2020	959,990.5 kWh	36,052.3 kvarh							
29/02/2020	979,789.1 kWh	39,637.2 kvarh							

	CHARGES	DETAILS	
COSTS	QUANTITY	UNIT PRICE	SUBTOTAL
Active energy			
t1	13,578.4 kWh	0.17 €	2,308.32€
t2	6,219.0 kWh	0.15 €	932.85 €
Total	19,797.4 kWh		3,241.17 €
Reactive energy	y		
t1	3,297.5 kvarh	0.60 €	677.04 €
t2	2,398.3 kvarh	0.18 €	67.51 €
Total	5,695.8 kvarh		744.55 €
	TOTAL CI	HARGES	
Total			3,985.72 €

 PDF reports with custom templates containing calculated costs according to measured consumptions and contract of choice.

• Report split into user / cost centre (for a selectable group of devices).



References

Further reading

Document	Where to find it
User manual	www.productselection.net/MANUALS/UK/em2-server_eim.pdf
Software update	www.productselection.net/MANUALS/UK/em2-server_sw_download.pdf

CARLO GAVAZZI compatible components

Purpose	Component name/code
Web server	VMUCEMAWSSUX
	UWP30RSEXXX
	СРА
	EM24 EM26
	EM210
Energy meters and power analysers (families)	EM111 EM112 EM330 EM340
	EM270 EM271 EM280
	ET112 ET330 ET340
	WM20 WM30 WM40
Pulse concentrator	VMUMCAS1I2EM VMUOCAI3XXEM



How to order

EM2SERVERSTD

Enter the code replacing the symbol 🗆 with the selected option (e.g.: EM2SERVER STD L1)

Options	Description
L1	Base license (up to 20 VMU-C EM/UWP 3.0)
L2	Base license extension (additional 20 VMU-C EM/UWP 3.0)*

*Note: up to 100 VMU-C EM / UWP 3.0 can be managed by a single Em² -Server instance.



COPYRIGHT ©2020 Content subject to change. Download the PDF: www.productselection.net