VMUC-EM

the WebServer Solution for any energy management applications

Applications that we can use the VMUC-EM

- Conventional energy
- Building, shopping centers, hospitals, public services etc
- And many other applications of markets that requiring an energy monitoring system

VMUC-EM WebSERVER solution

Why the VMUC-EM ?

- To supply a complete solution including metering, logging, analysis and communication features for any energy management applications (which is also an extraordinary driver to sell our energy management instrumentation and accessories)
- To replace existing software solutions with a more robust and reliable proposal

- No need of a dedicated PC for monitoring
- No HD crash problems which lead to data losses
- No compatibility problems due to different operating systems, different languages, libraries, etc.
- Polling device, datalogger, Ethernet gateway in a single, very compact, unit
- Modular concept for additional input/output whenever needed
- Optional modular modem for wireless Ethernet connections

VMUC-EM WebSERVER solution

Features and Benefits

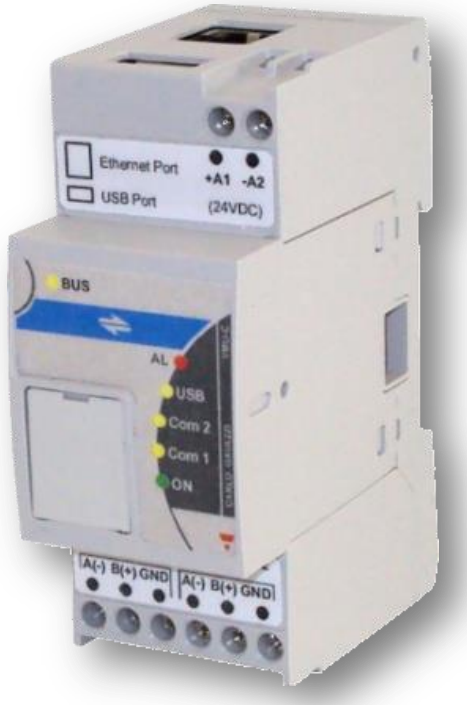
CUSTOMER ISSUE :	OUR SOLUTION:	BENEFITS:
Remote electric plant information access	Web-based module allowing the access to all key information of any plant when an Internet connection is available	Flexible and compact integrated solution, specifically developed to complete CG offer of energy meters, power analysers and optional VMU modules
Remote electric plant information access when wired Internet is not available	Additional mobile modem unit allowing the wireless access to all key information of any plant	Modular mobile solution designed to be part of the VMU-C architecture being easy to install and to use
Remotely collect and analyse all the plant data (or group of plants data) by customer's own software, SCADA or BMS system	FTP data push function can be enabled on VMU-C, in order to have a scheduled updating of the remote server database	VMU-C EM is able to periodically update the remote server and log all the info locally in case the Internet connection is temporarily not available

VMUC-EM WebSERVER solution

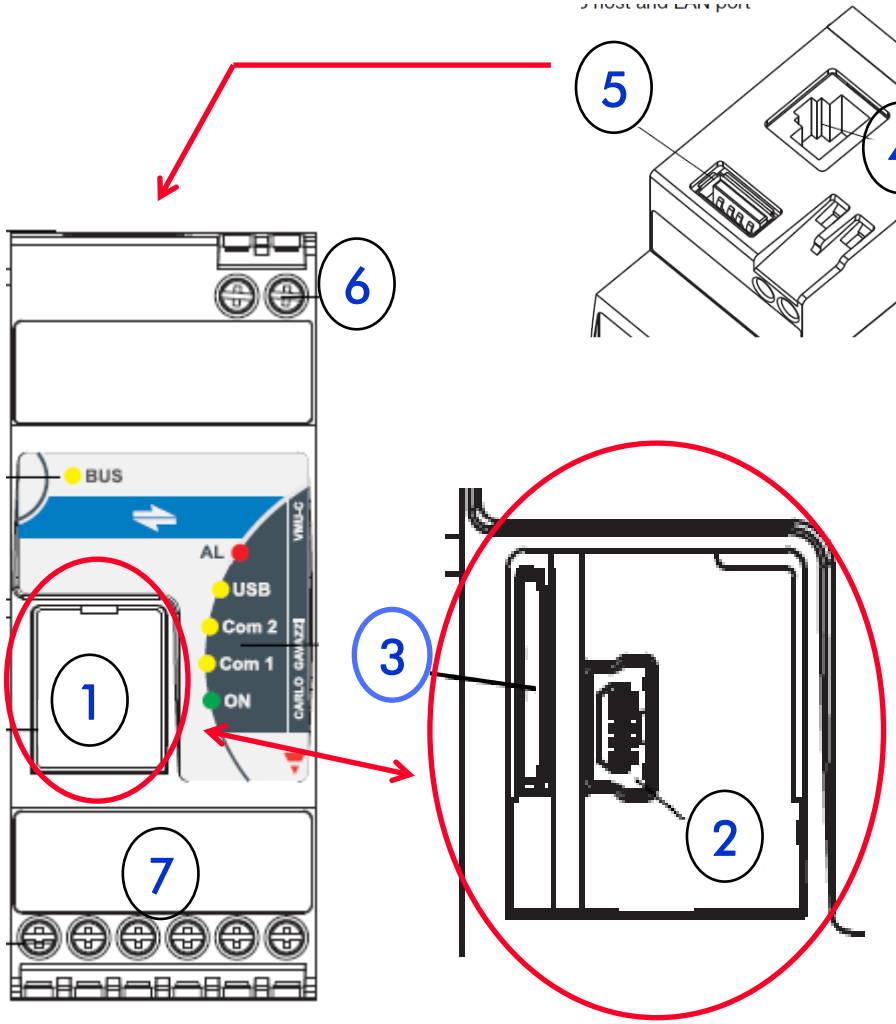
- Integrated modular local monitoring system for Energy Management based on **WEB access**
- VMUC-EM can collect data from:
  - **Energy Meters** (EM21, EM23, EM24, EM33, EM26, WM30, WM40, ...)
  - **Array groups** (temperatures, Analogue signals, Pulse rate signals, digital input status)
- VMUC-EM can manage **on its local bus** up to 5 VMU modules:
  - Up to n.1 VMUW (universal mobile **modem**)
  - Up to n.1 VMUP-EM (environmental variables module)
  - UP to n.3 VMUO-EM (input/output module)
- VMUC-EM can manage on its local RS485 busses up to 10 Array groups (COM1) and up to 32 Energy Meters (COM2) .

VMUC-EM WebSERVER solution

- Micro PC with Web-server and Web service capability
- Environment variables: temperature, analogue signals (0-120.0mV and 0 – 20.00mA), tachometer signal.
- Energy Meters: AC information: Voltage, Current, Active/Reactive power, Active/Reactive energy, Power Factor, ...
- Energy Meters: Counters from digital inputs (e.g. Hot Water, Cold water, GAS, ...).
- Storage Interval time: selectable among 5 – 10 – 15 – 30 – 60 min.
- The stored sample within the selected time interval results from the continuous average calculation of the measured values.
- Variables shown as graphs and in real time reading format.
- Alarms control with automatic e-mailing and SMS management
- All data exports on XLS format
- Data storage up to 30 years (into its 4Gb memory)
- Two RS485 communication ports (Modbus)
- One Ethernet port
- Two multi purpose USB 2.0 ports
- 12 to 28 VDC power supply
- Dimensions: 2-DIN modules
- Protection degree (front): IP40



VMUC-EM WebSERVER solution



1. Front plastic door
2. Mini USB connector (it can be used for a first configuration)
3. Plug-in slot per micro SD or micro SDHC (it is used to have a copy of the data-base and in case of d disaster-recovery should be needed)
4. RJ45connector for Ethernet connection
5. USB "A" type connector (as per the point 3)
6. Power supply terminals
7. COM1 and COM2 terminals

LEDs: ON : power supply indication and SD card writing operation in progress (if flashing)
COM1: communication activity indicator
COM2: communication activity indicator
USB : writing operation in progress
AL : at least one active alarm
BUS : communication activity over RJ45 connector

VMUC-EM WebSERVER solution

- Each **VMUM-EM** module can manage up to:
  - 1 VMUP-EM unit

    (environmental variables module);
  - 3 VMUO-EM units (the input/output module);

VMUC-EM WebSERVER solution

Data logger and local bus manager

- Local display: 6-DGT readout
- Communication bus: RS485 (Modbus), baud rate up to 115.200 bits/s
- Local bus: up to 4 mixed VMUP-EM and VMUO-EM units
- *"Two temperature inputs: Pt100 or Pt1000, 2 or 3-wire (-50.0 to +200.0°C)"*
- *"Or One digital input: Detection ON/OFF status"*
- Clock: European or American format selection (internal battery)
- Real and virtual alarm management
- **Data stamping format: date, time, temperatures, analogue inputs and digital pulse ratio**
- **Data stamping interval: selectable 5-10-15-30-60 minutes**
- **Events stamping: date and time of: alarms, digital inputs status changing and other events**
- Power supply: 12 to 28VDC
- Mounting: DIN-rail
- MTBF / MTTF: 24.2 years (gf, 50°C, MIL standard "MIL-HDBK-217F")
- Operating temperature: -25°C to 55°C
- Storage temperature: -30°C to 70°C

VMUM-EM

VMUC-EM WebSERVER solution

Environment measurement unit

- Local multicolour LED: colour code for diagnostic purpose
- Local bus: **one** VMU-P unit per bus
- **Two channels for temperature measurement (Pt100 or Pt1000, 2 or 3 wires)**
- **One analogue input (120mV or 20mA)**
- **One digital pulse rate input (0 to 1000Hz max.)**
- Accuracy ±0.5% RDG
- Data format: 4-DGT
- Power supply: self-power supply from VMUM-EM unit
- Mounting: DIN-rail
- MTBF / MTTF: 31.7 years (gf, 50°C, MIL std “MIL-HDBK-217F”)
- Operating temperature: -25°C to 55°C
- Storage temperature: -30°C to 70°C

VMUP-EM

VMUC-EM WebSERVER solution

I/O unit

- Local multicolour LED: colour code for diagnostic purpose
- Local bus: up to 3 VMUO-EM units
- **Two digital inputs for "Detection ON/OFF status"**
- **Two digital outputs for Alarm notification or automatic activation/deactivation of an external load (by means of the internal clock or as a remote control).**
- Output type: relay, SPST type (AC 1-5A @ 250VAC, AC 15-1.5A @ 250VAC)
- Power supply: self-power supply from VMUM-EM unit
- Mounting: DIN-rail
- MTBF / MTTF: 65.4 years (gf, 50°C, MIL std "MIL-HDBK-217F")
- Operating temperature: -25°C to 55°C
- Storage temperature: -30°C to 70°C

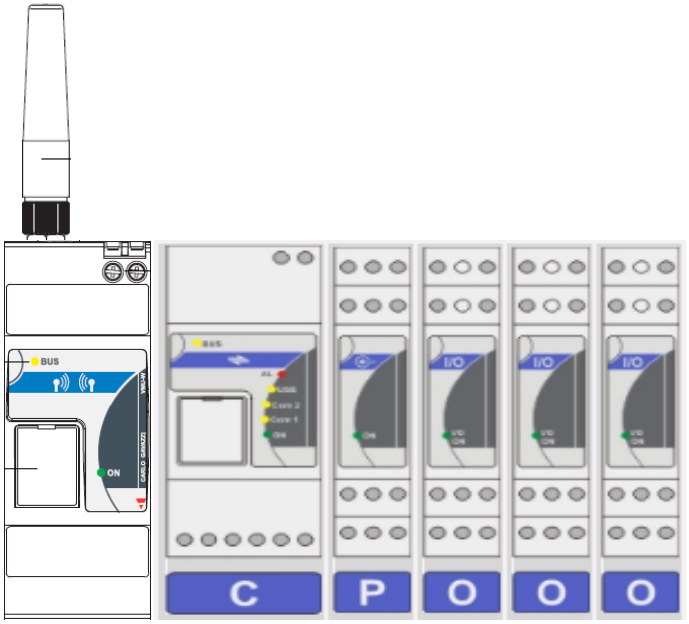
VMUO-EM

VMUC-EM WebSERVER solution

In case of a **wired Internet communication not available**, in the VMUC-EM system it is possible to add the modem **VMUWAUMMXX**

The VMU-W modem is based on “UMM” (Universal Mobile Modem) communication technology (GPRS / UMTS).

With the VMU-W, in addition to the scheduled email service, it is possible to manage the remote plant surveillance by a SMS alert received by maintenance personnel on mobile phone.



VMUC-EM WebSERVER solution

MODEM

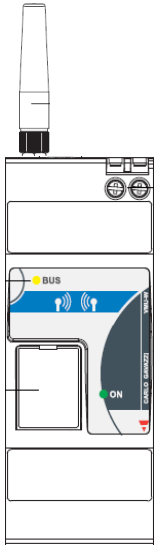
- Quad band modem: 850MHz, 900MHz, 1800MHz, 1900MHz
- GSM, GPRS, EDGE standard, UMTS, HSPA standard
- Class4 (2W, 33dBm) @ GSM 850 / 900 MHz
- Class1 (1W, 30dBm) @ GSM 1800 / 1900 MHz
- ClassE2 (0.5W, 27dBm) @ EDGE 850 / 900 MHz
- ClassE2 (0.4W, 26dBm) @ EDGE 1800 / 1900 MHz
- Class3 (0.25W, 24dBm) @ UMTS
- Power supply: 12 to 28 VDC
- Mounting: DIN-rail
- Main purpose: Access to the Web-Server (VMUC-EM) and all its functionalities if the wired network is not available
- Additional purpose: To send SMS
- SIM (25 x 15mm) for data communication (M2M SIM only)
- Operating temperature: -25°C to 55°C
- Storage temperature: -30°C to 70°C

VMUW

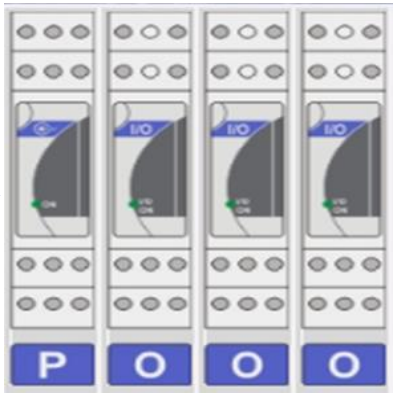
VMUC-EM WebSERVER solution

RJ45 connector for
LAN connection

Modem



LOCAL Bus

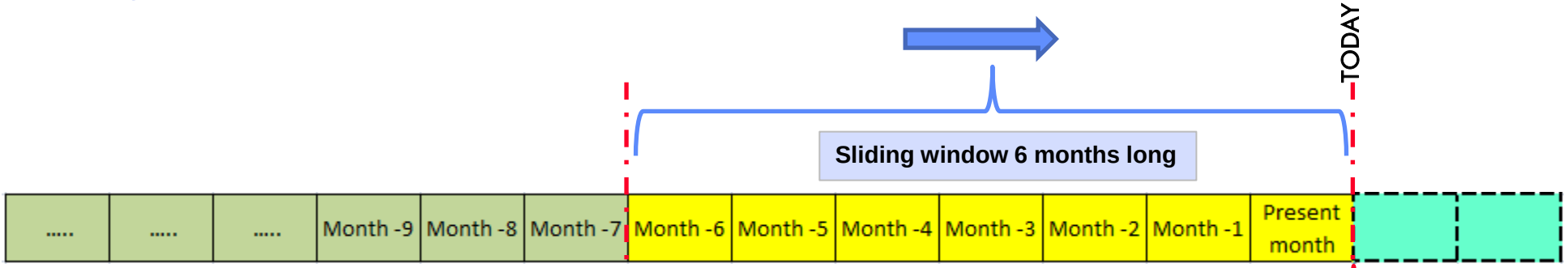


COM1
Up to 10 VMUM-EM groups

COM2
Up to 32 Energy Meters

Storing data in the VMUC-EM

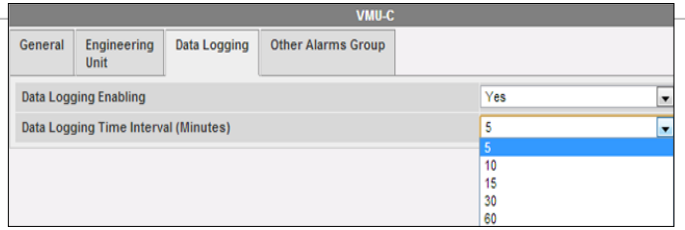
VMUC-EM is able to grant the declared 30 years of data storing capability by using its internal 4 Gb memory considering the below rule:



After the 6-month period from the instant period, VMUC-EM will delete the stored daily data (with the "high" resolution). Only the monthly and yearly data (min, Max and Avg) stay present in the VMUC-EM memory (the daily graphs are no longer available).

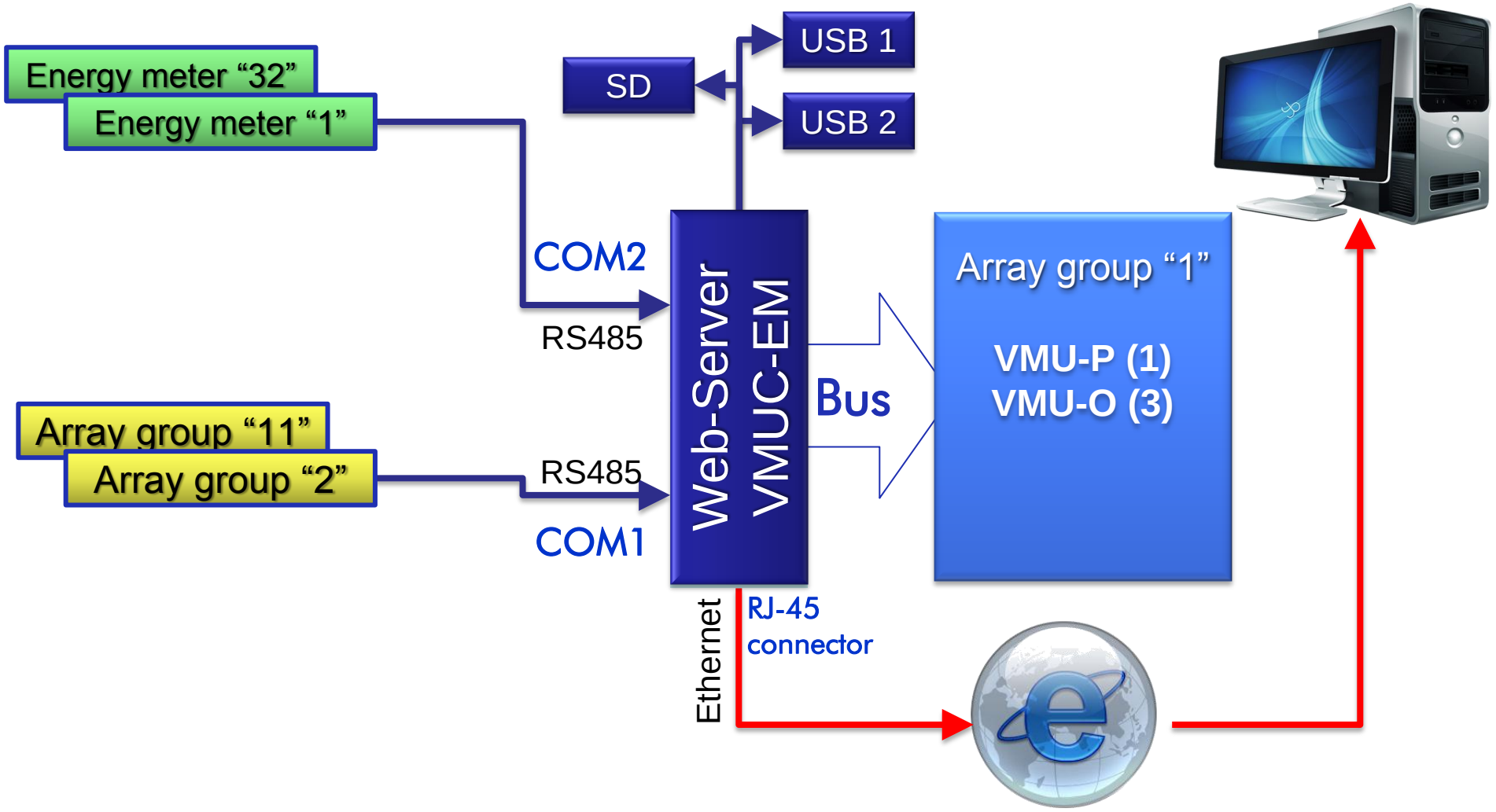
Available graphs: Monthly and Annual

From current instant the data are available with the selected time interval (selectable among 05, 10, 15, 30 or 60 minutes) for 6 months back.



Available graphs: Daily, Monthly and Annual

Example of communication architecture with wired Internet access



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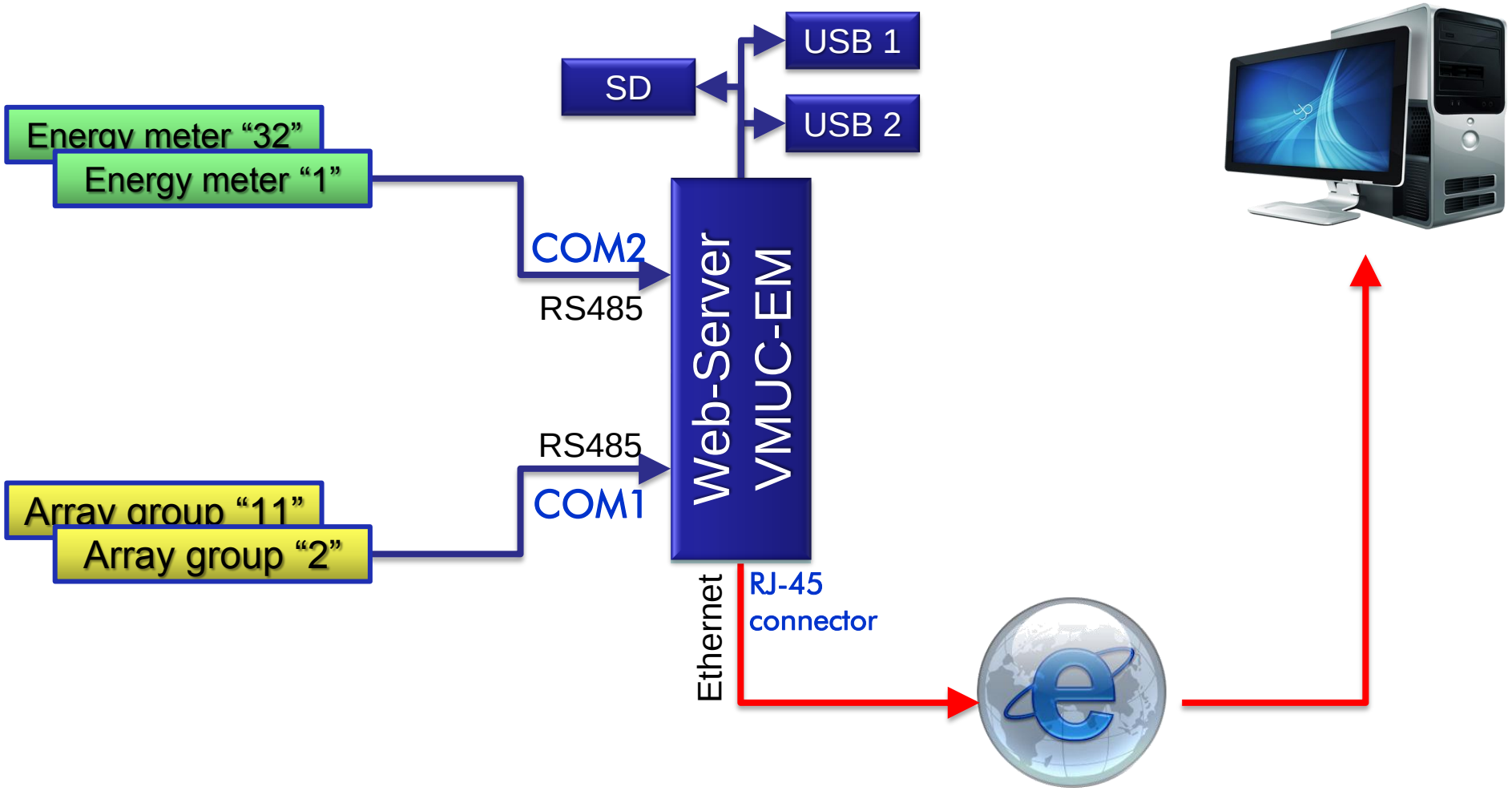

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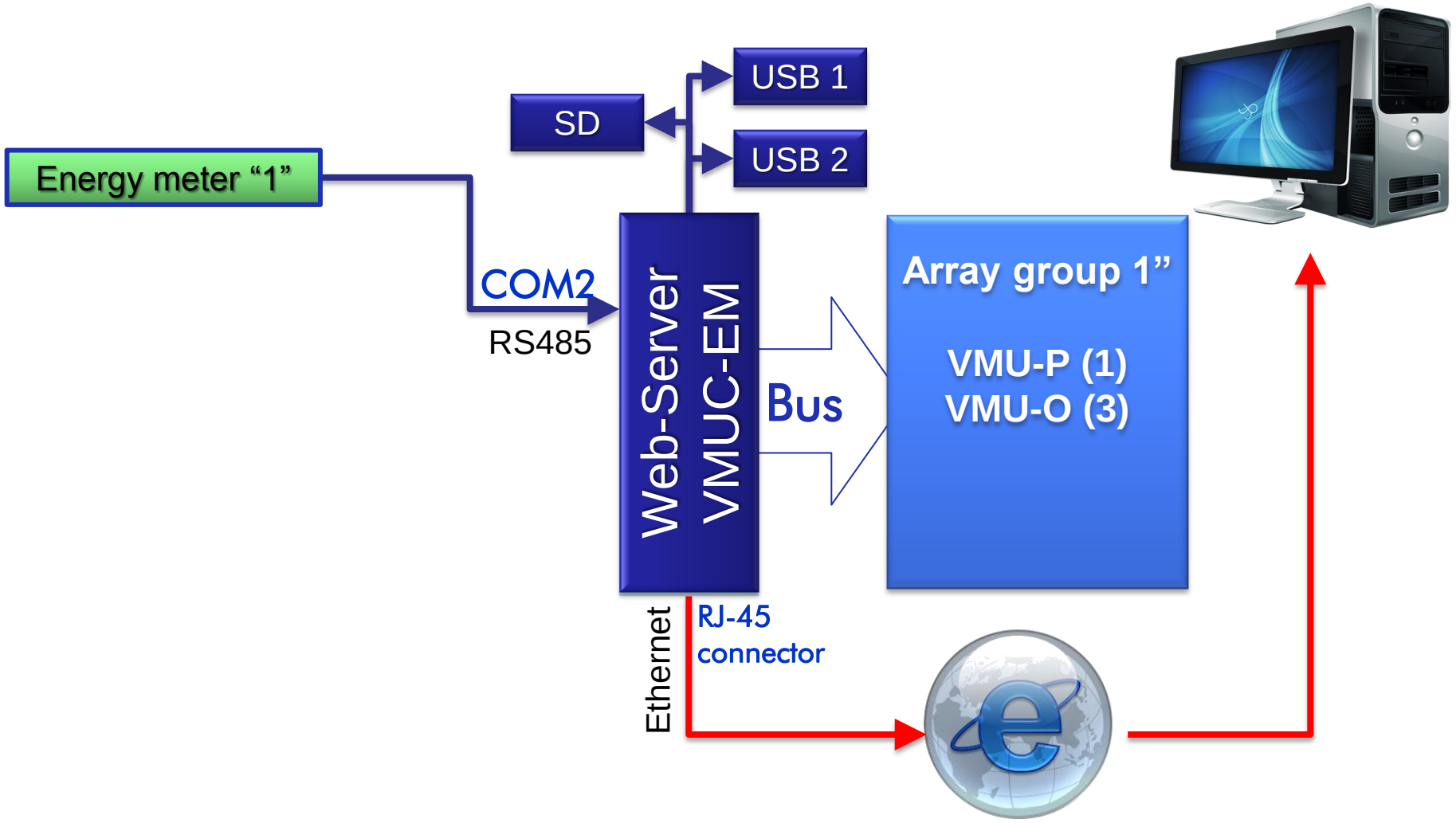
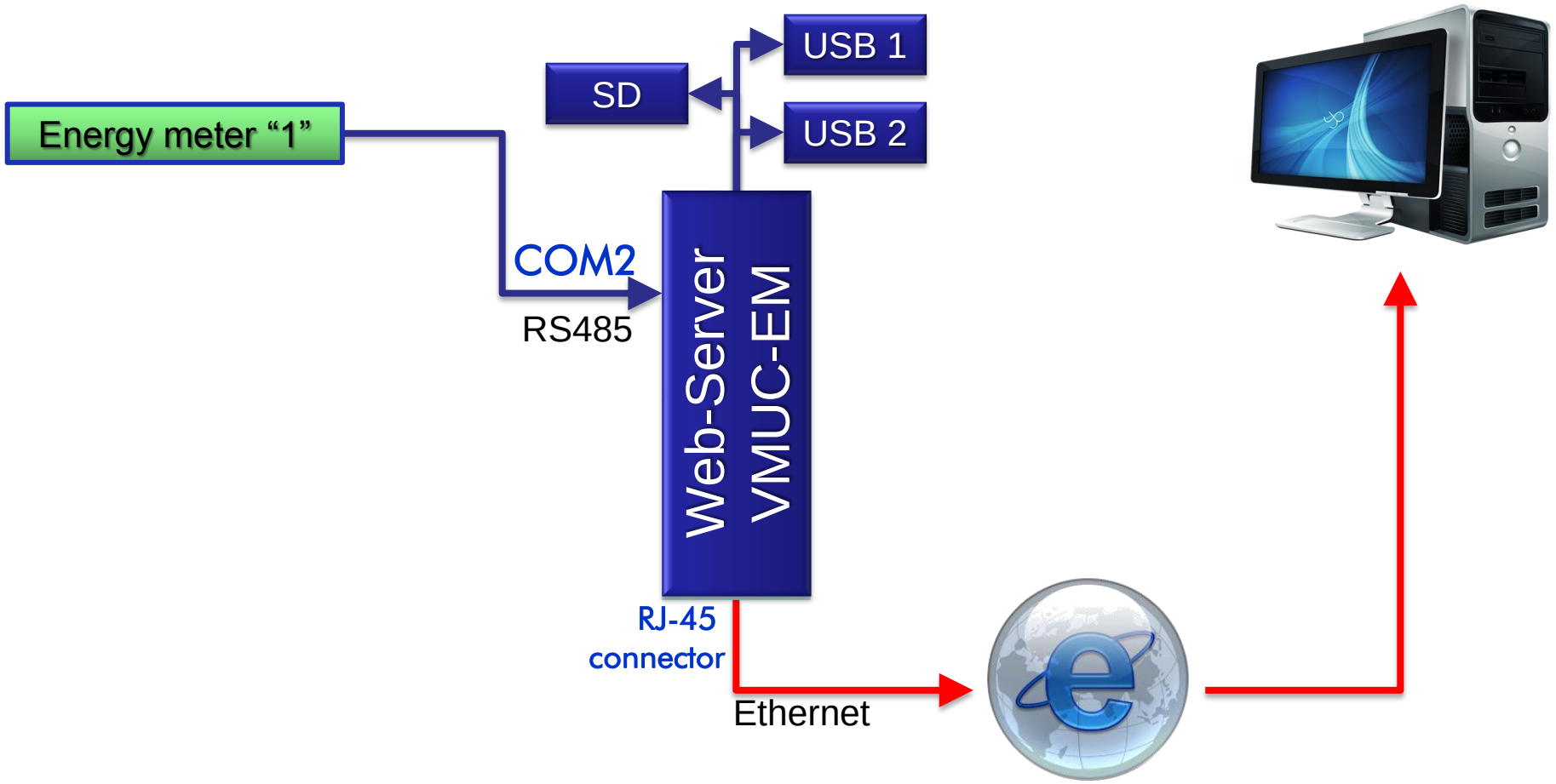


Example of communication architecture with wired Internet access and energy meter management only



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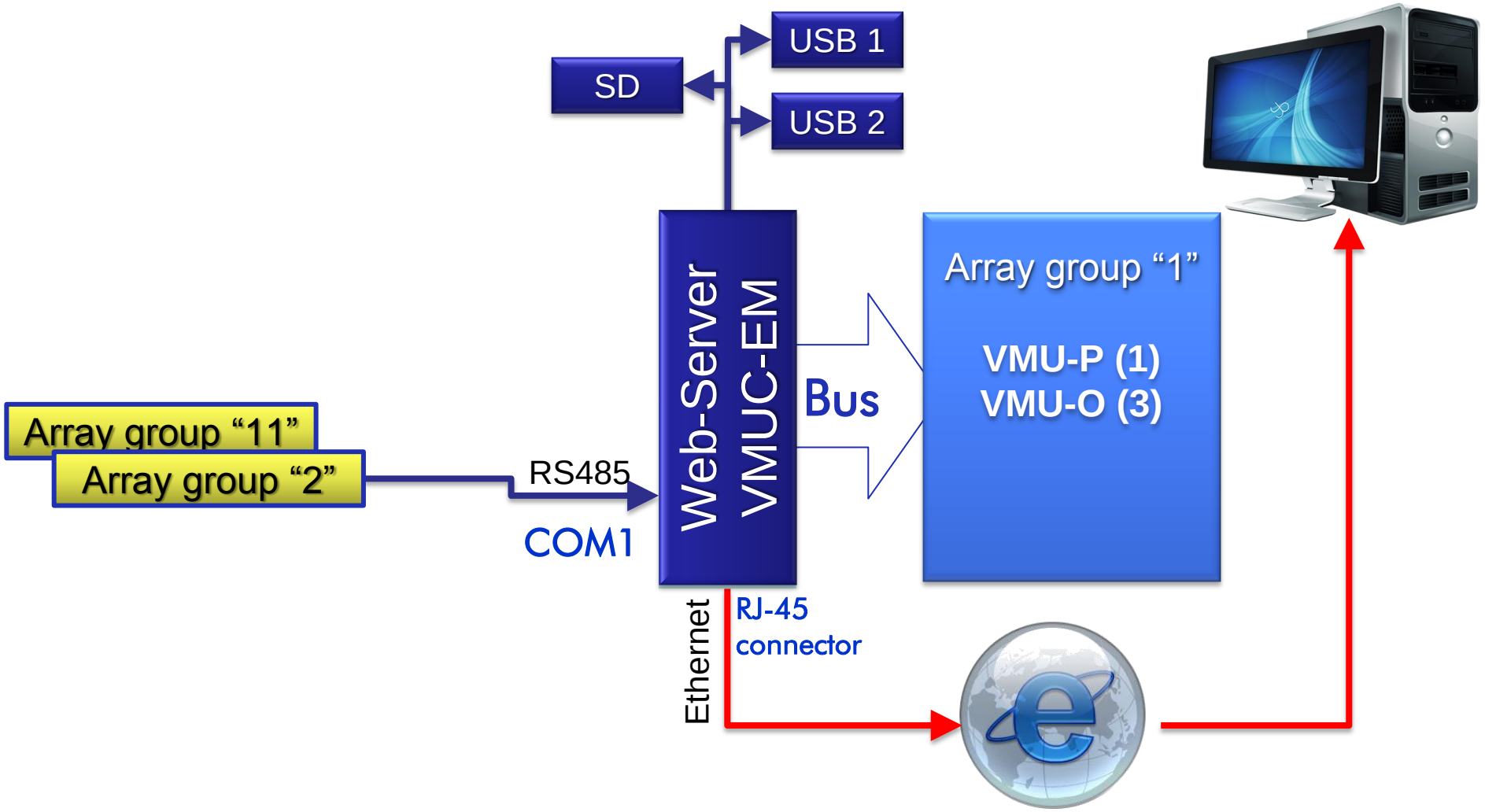

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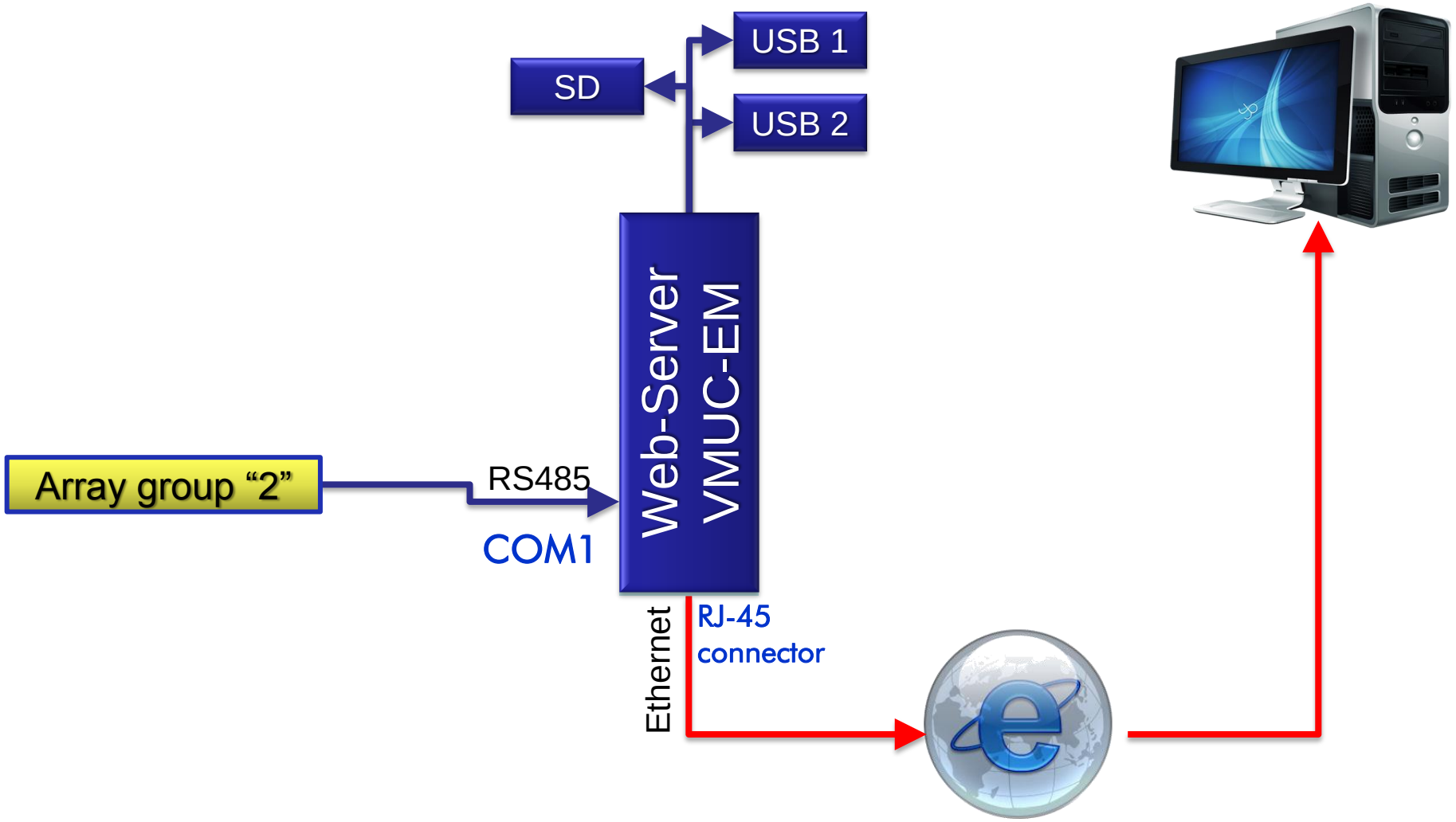

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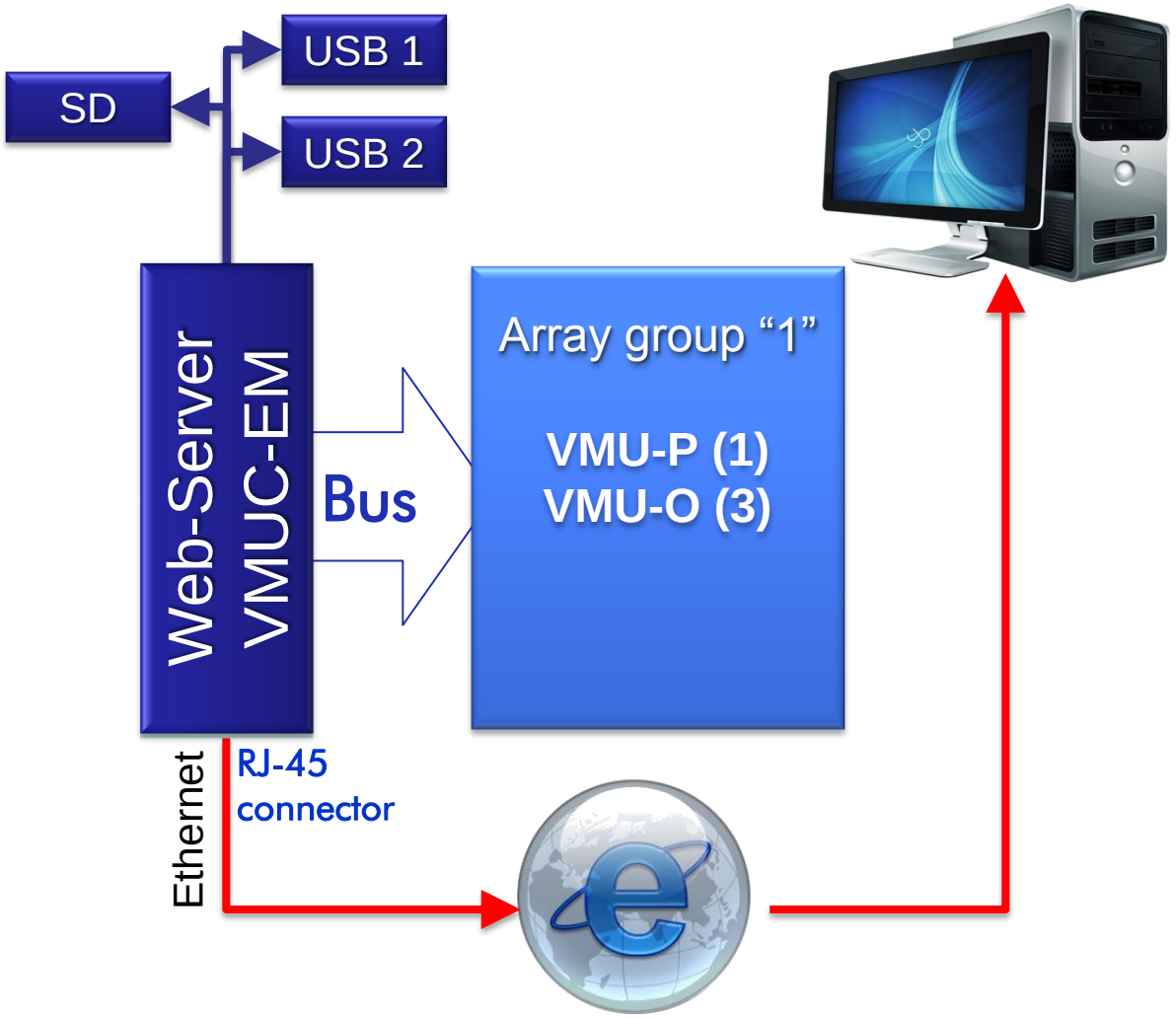
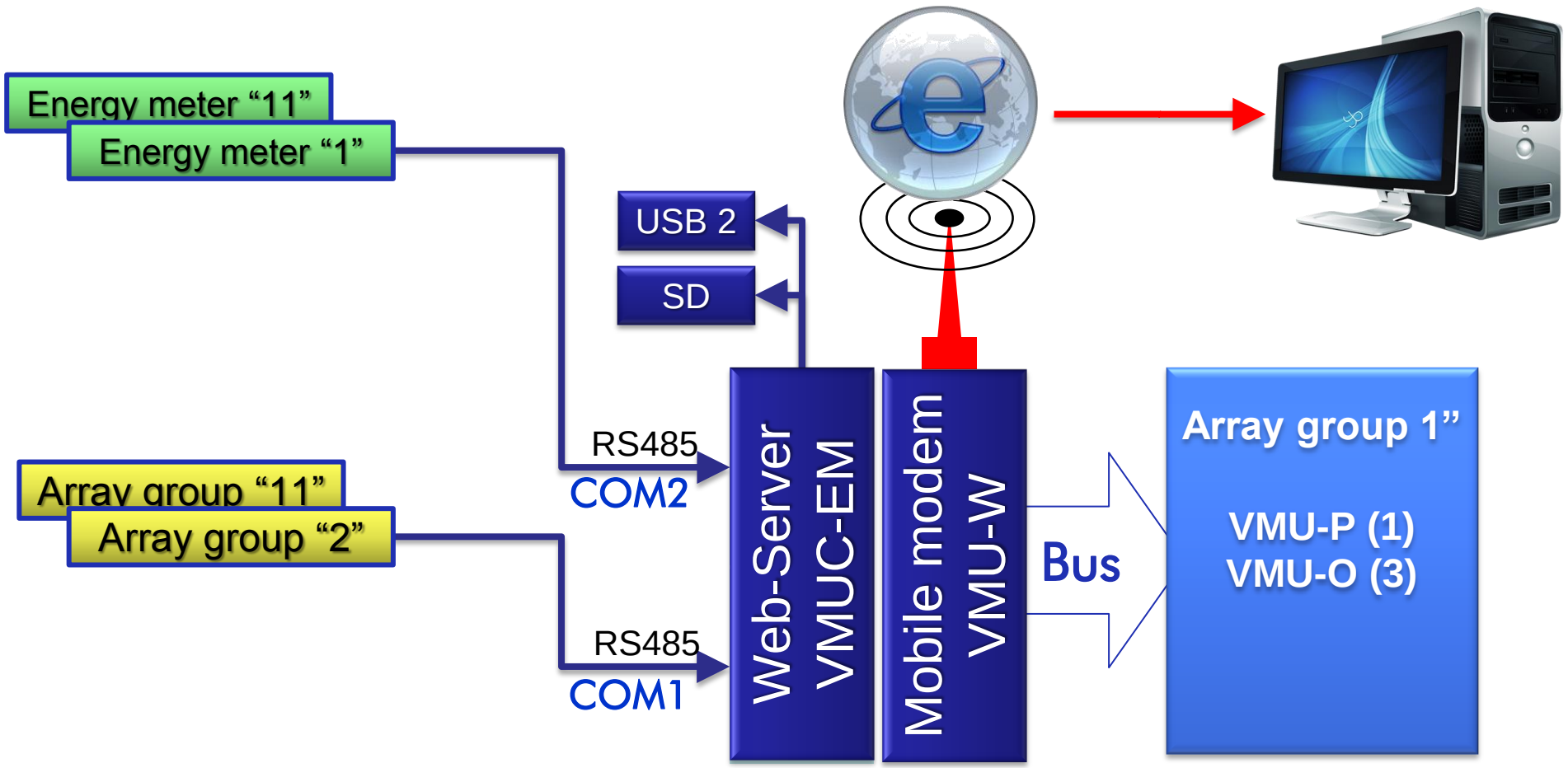


Example of communication architecture with wireless Internet access



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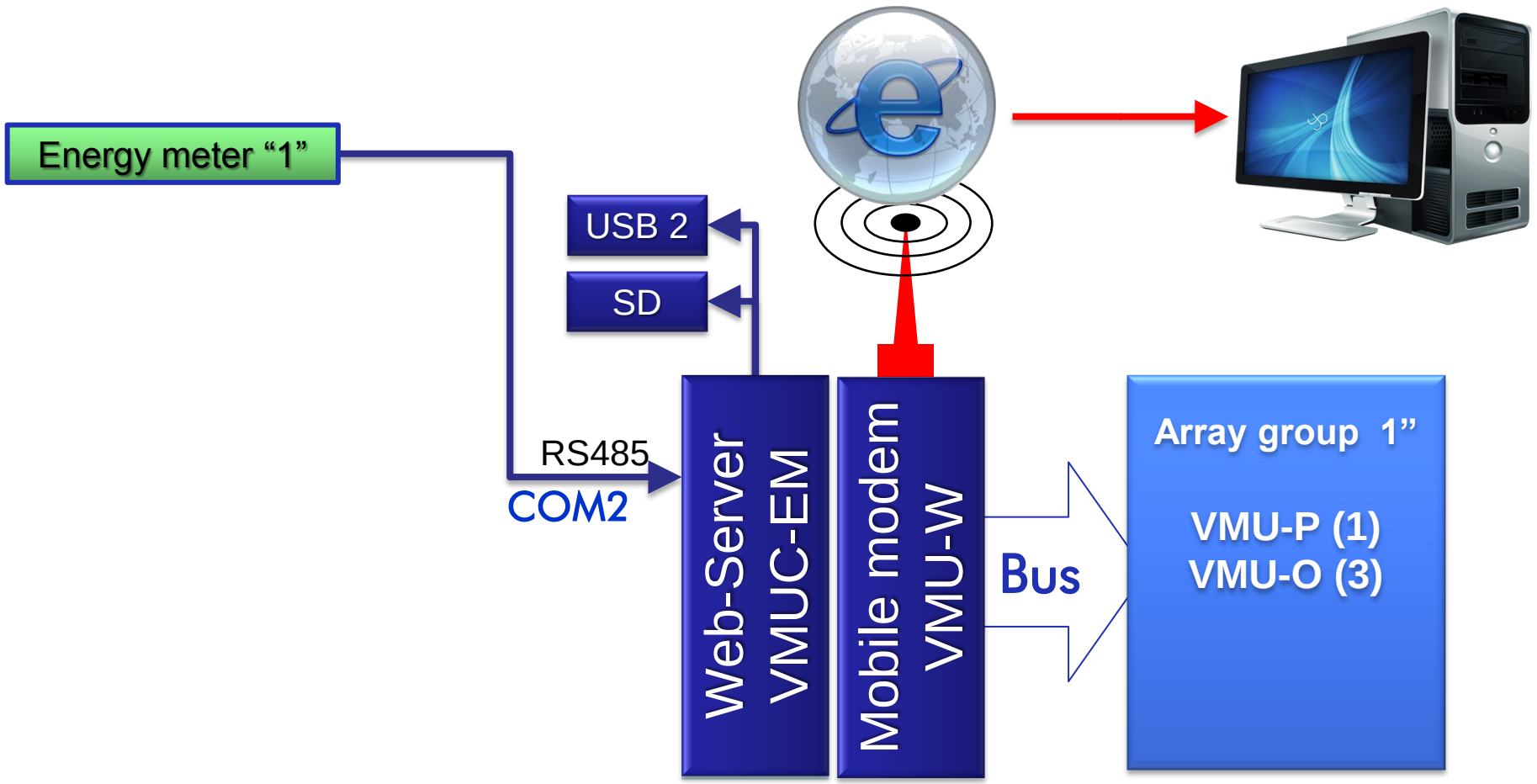
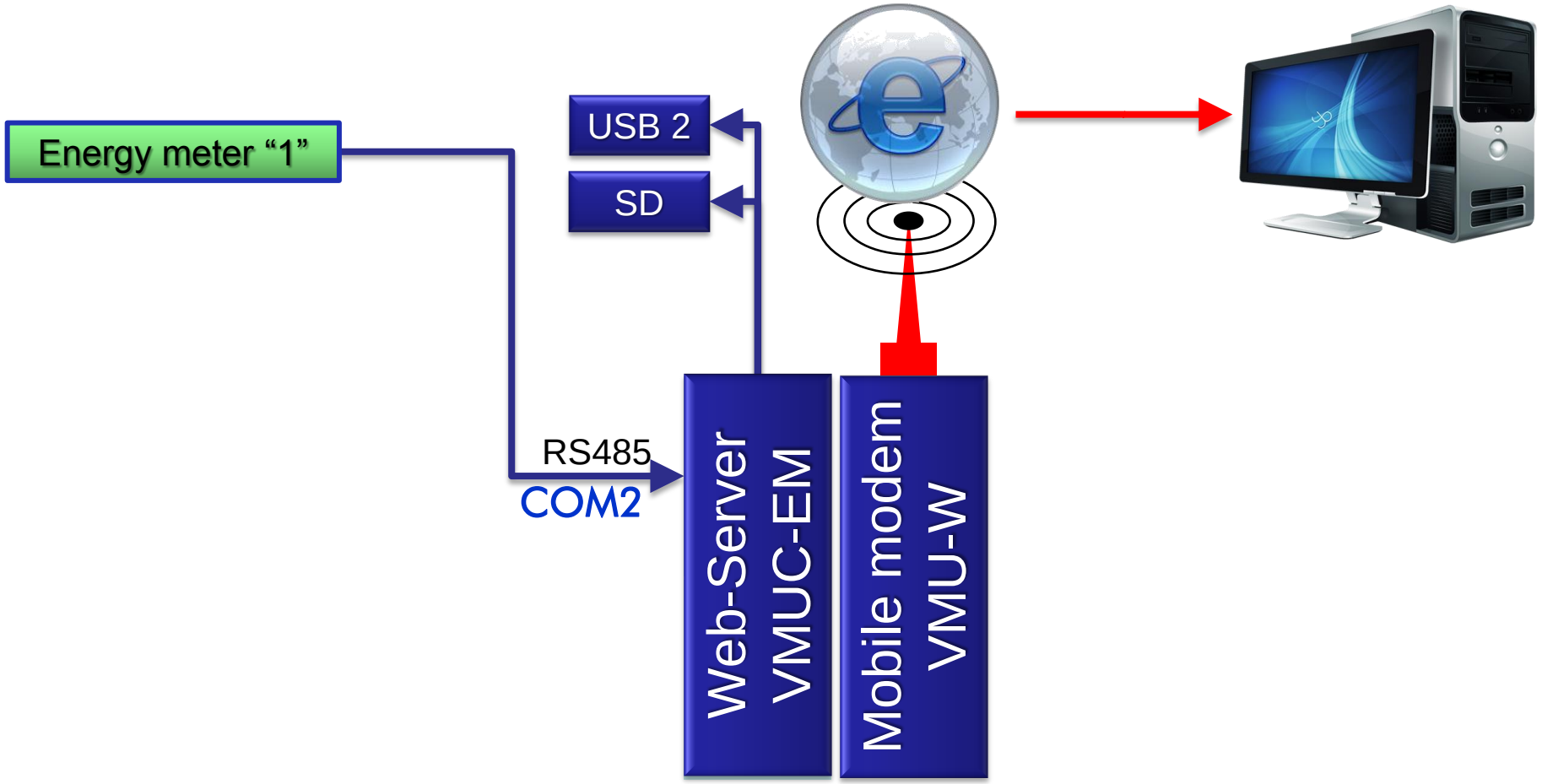
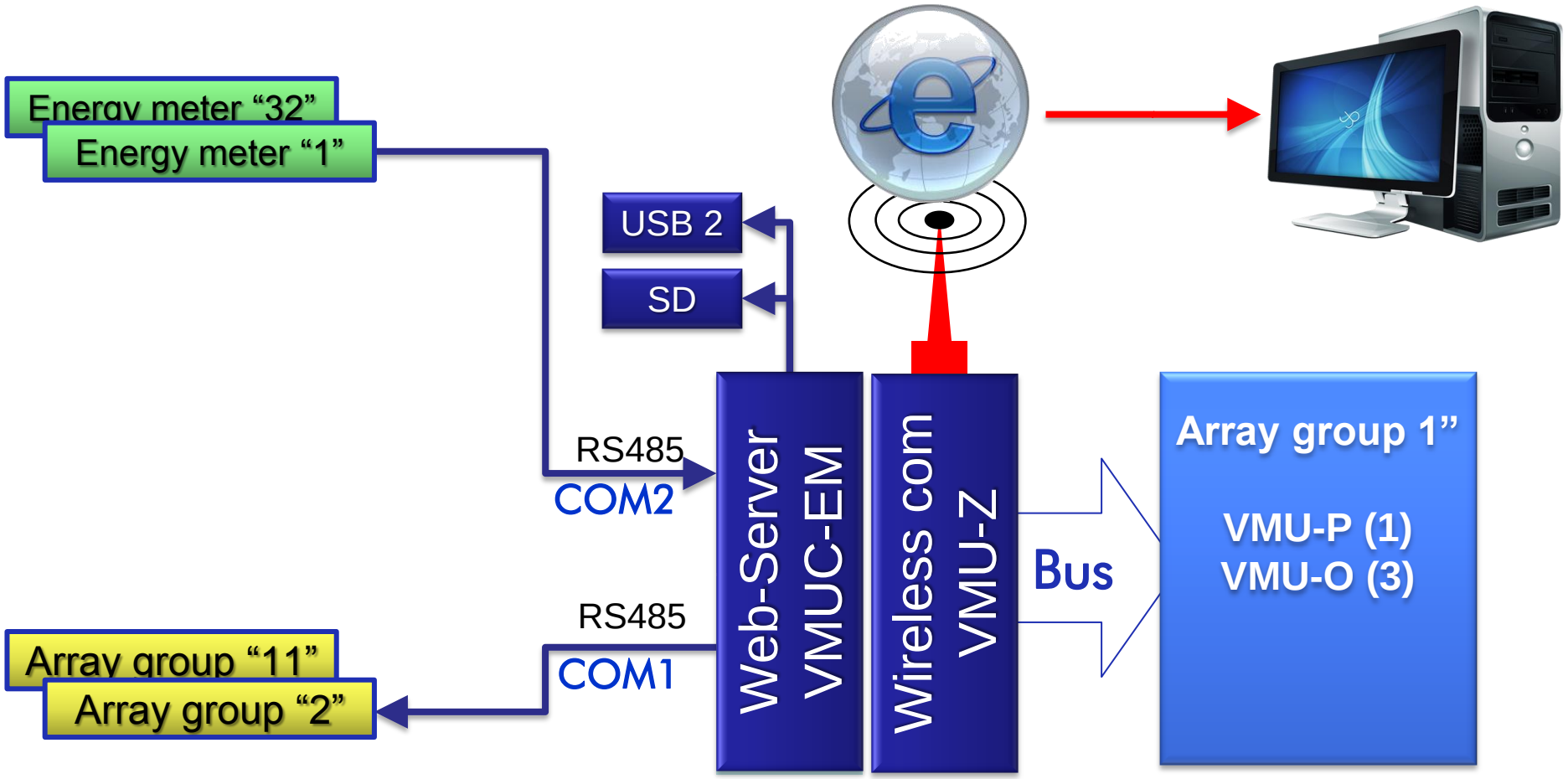


Example of communication architecture with wireless Internet access and energy meter management only

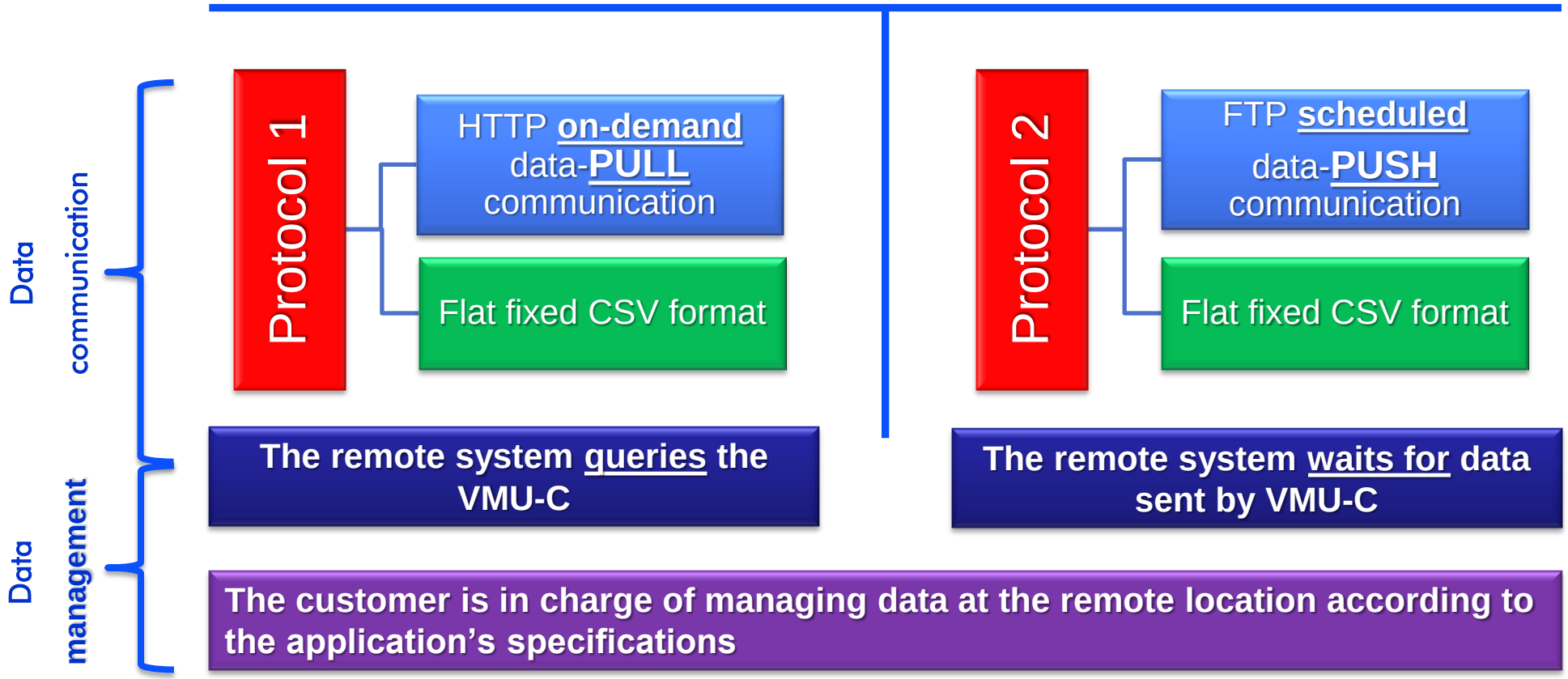


Example of communication architecture with wireless internal LAN access



VMUC-EM FTP: 2 M2M open protocols available

"Communication Protocol = communication rules + data format"



VMUC-EM FTP: 2 M2M open protocols available

When and why this type of protocol should be used?

1) When the amount of instruments to be monitored is greater than 32 units, two or more VMUC-EM must be used to allow for the proper monitoring of the data.

2) When the instruments to be monitored belong to different installations but "below" the same owner.

3) When the instruments to be monitored belong to different installations, same owner, but installed in different geographic area

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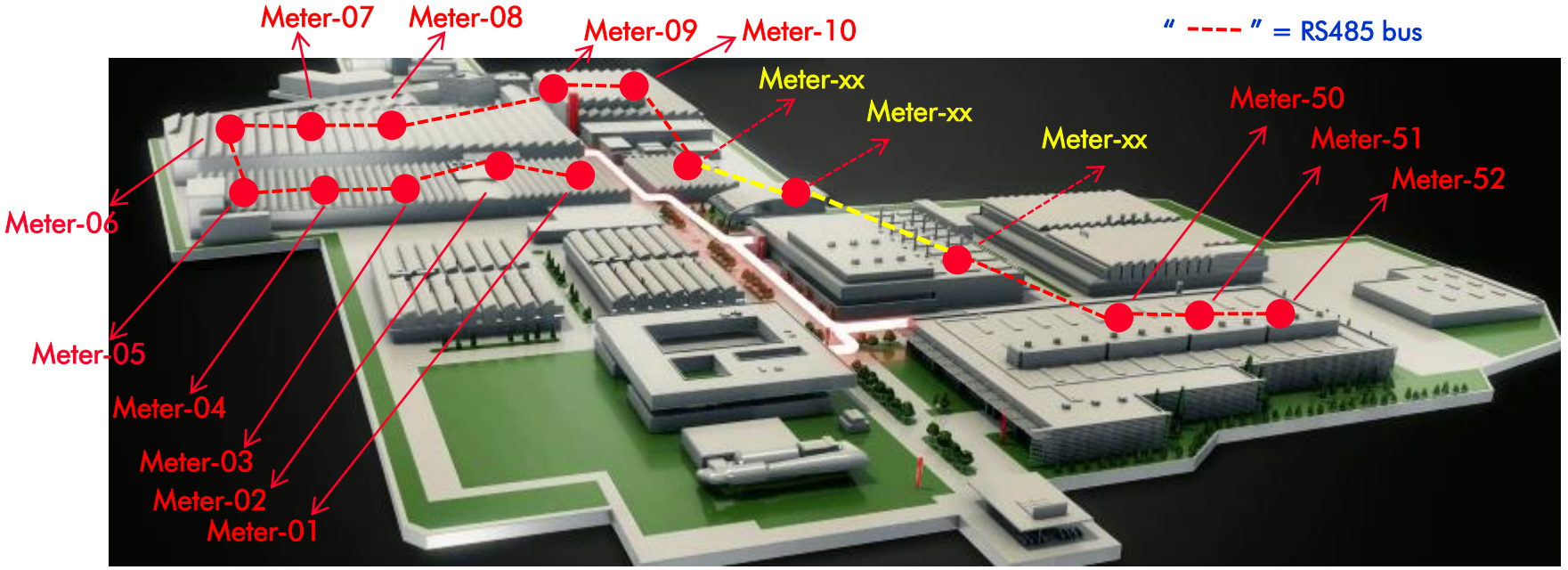

- In a similar application, even if all the Energy Meters are connected through a RS485 bus, at least n.2 VMUC-EM have to be used.

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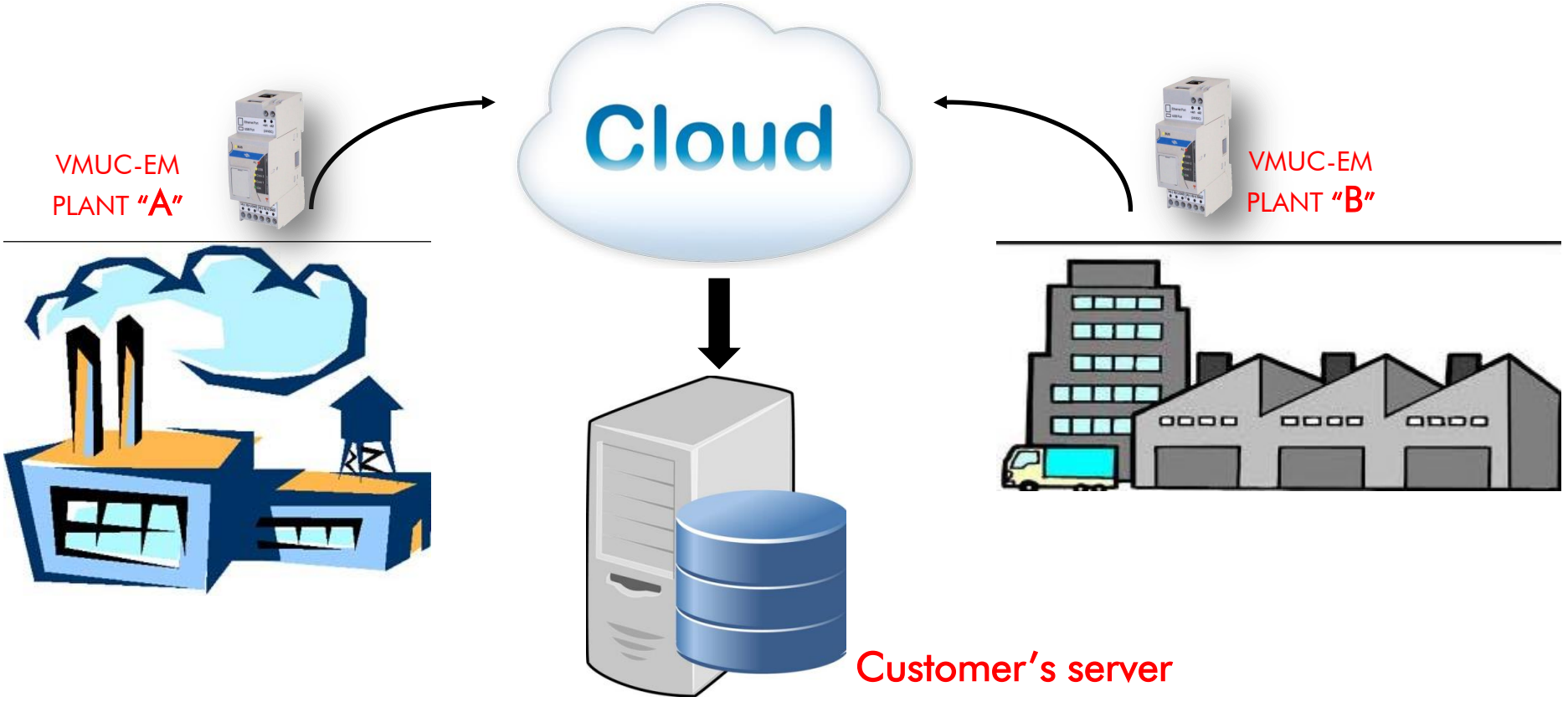

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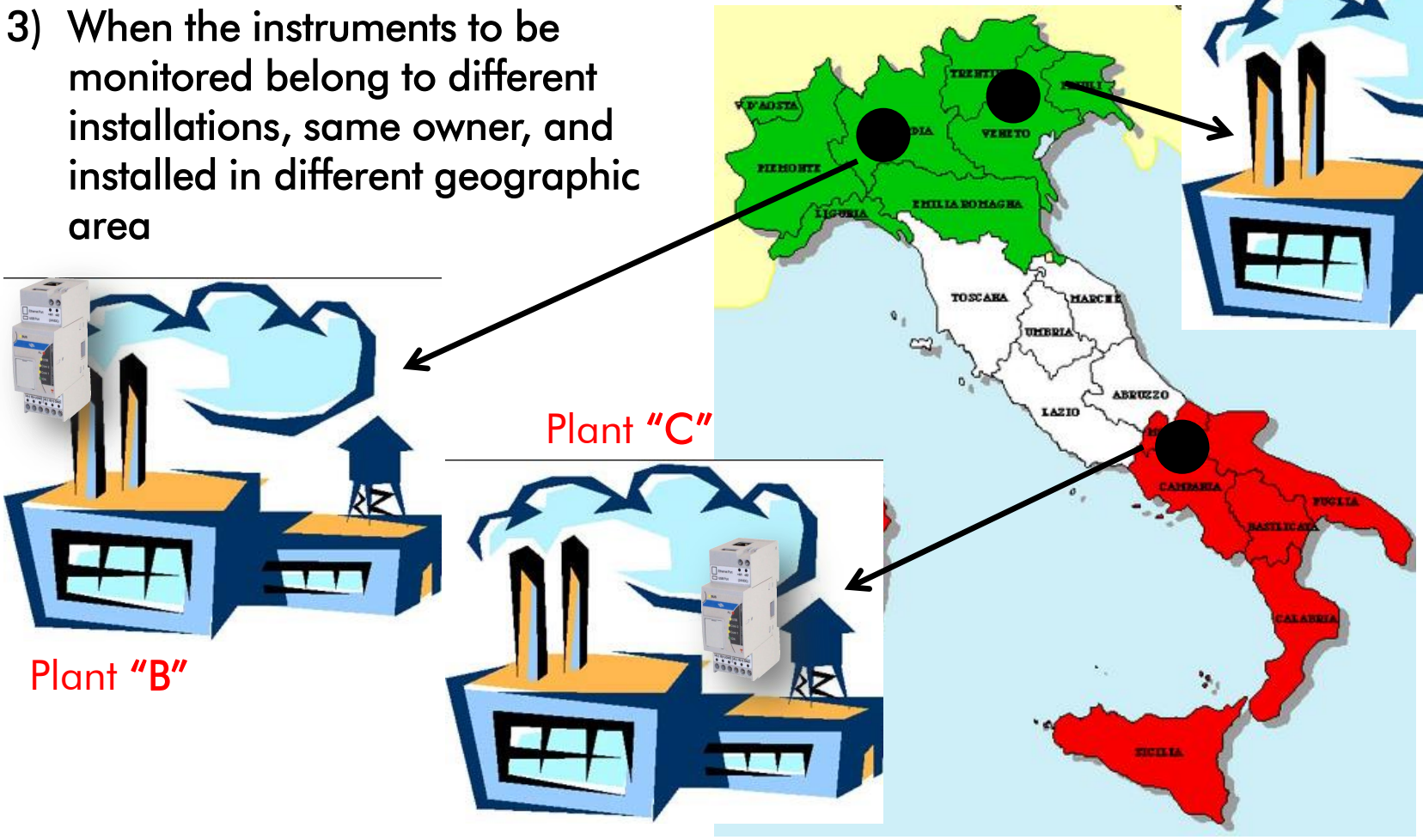
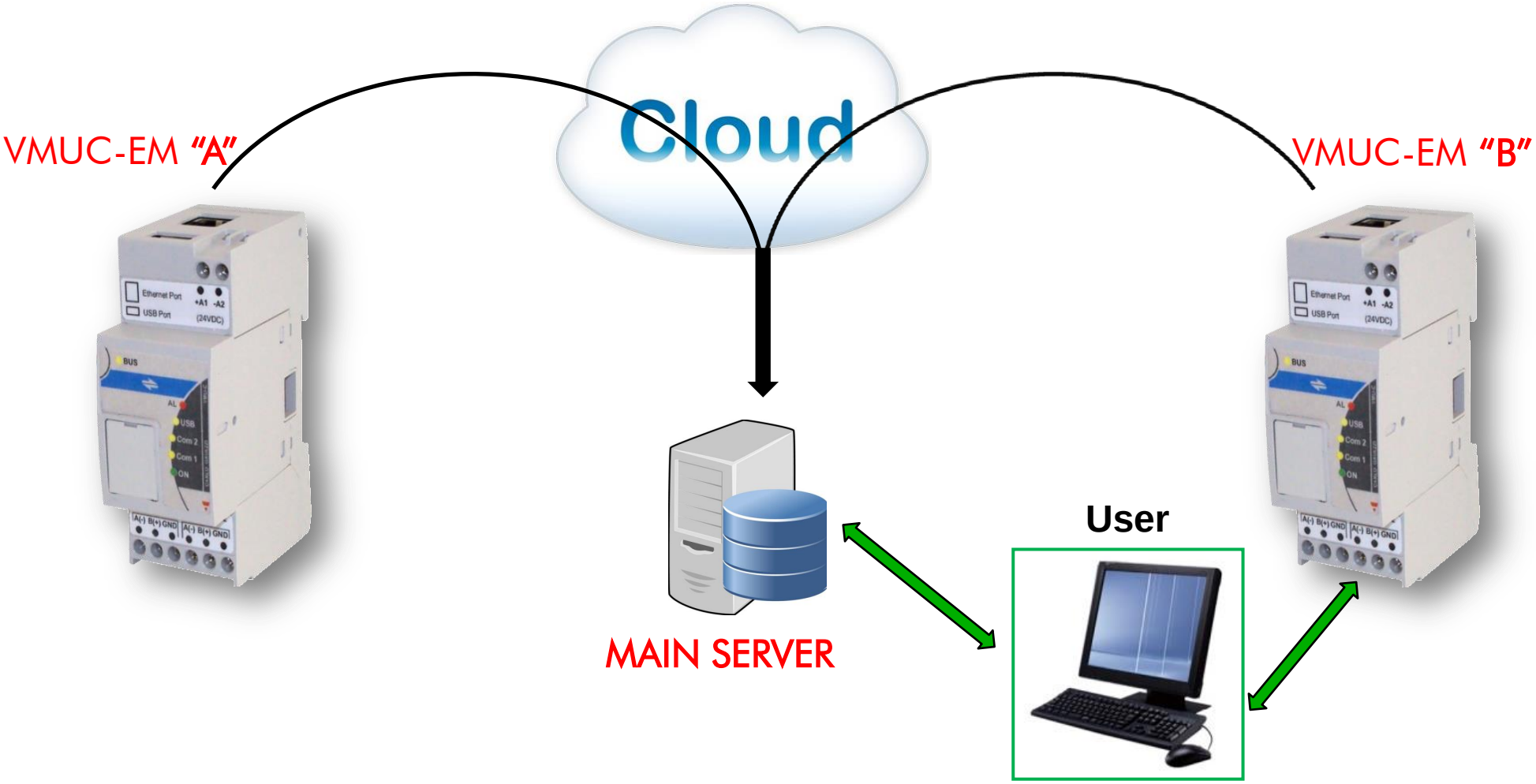


VMUC-EM FTP: FTP scheduled data-PUSH communication



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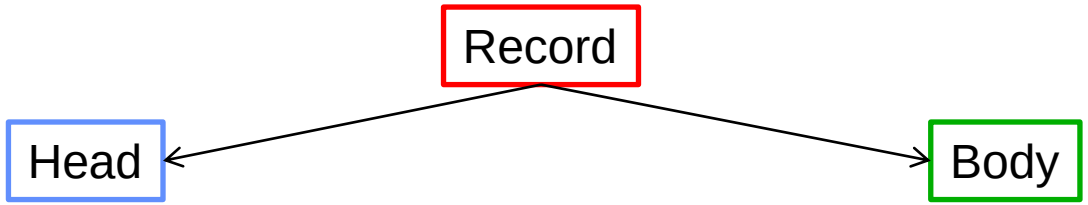

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	OK																			
2	AC	EM_VIRTUAL	EM_VIRTUAL			1378127400	2013-09-02T15:10:00+02:00	472421.1	0.0	0.0	224.7	227.1	224.5	389.7	389.4	390.6	390.1	29.3	18.8	
3	AC	CPT-DIN_B_AV5_AV	Meter_4_Commerci	4	1378127400	2013-09-02T15:10:00+02:00	116061.0			224.7	227.2	224.5	389.7	389.4	390.7	390.0	5.9	3.8		
4	AC	CPT-DIN_B_AV5_AV	Meter_6_Shipment	6	1378127400	2013-09-02T15:10:00+02:00	184009.7			224.8	227.4	224.4	389.9	389.7	390.7	390.3	10.2	4.7		
5	AC	CPT-DIN_B_AV5_AV	Meter_8_Production	8	1378127400	2013-09-02T15:10:00+02:00	153775.9			224.7	227.1	224.5	389.7	389.4	390.7	390.1	9.3	7.8		
6	AC	CPT-DIN_B_AV5_AV	Meter_10_Office	10	1378127400	2013-09-02T15:10:00+02:00	18574.5			224.5	226.9	224.6	389.5	389.2	390.4	390.0	4.0	2.5		
7	AC	EM_VIRTUAL	EM_VIRTUAL		1378127700	2013-09-02T15:15:00+02:00	472422.2	0.0	0.0	224.5	227.1	224.6	389.7	389.7	390.4	389.8	29.7	18.9		
8	AC	CPT-DIN_B_AV5_AV	Meter_4_Commerci	4	1378127700	2013-09-02T15:15:00+02:00	116061.2			224.5	227.2	224.6	389.7	389.7	390.5	389.7	5.9	3.8		
9	AC	CPT-DIN_B_AV5_AV	Meter_6_Shipment	6	1378127700	2013-09-02T15:15:00+02:00	184010.0			224.6	227.4	224.5	389.9	390.0	390.5	389.9	10.2	4.7		
10	AC	CPT-DIN_B_AV5_AV	Meter_8_Production	8	1378127700	2013-09-02T15:15:00+02:00	153776.4			224.5	227.1	224.6	389.7	389.6	390.4	389.7	9.4	7.7		
																	390.3	389.9	4.2	2.7
																	390.4	389.8	30.3	19.0
																	390.4	389.7	5.9	3.8
																	390.4	389.8	10.9	4.7

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VMU-C_BN0250021001H_ALARM_2013-09-02-15-40-02_S.csv	3	File con valori...	02/09/2013 18:31:00	-rw-r--r--	ftp ftp
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VMU-C_BN0250021001H_ALARM_2013-09-02-15-10-03_S.csv	3	File con valori...	02/09/2013 18:01:00	-rw-r--r--	ftp ftp
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VMU-C_BN0250021001H_ALARM_2013-09-02-14-10-03_S.csv	3	File con valori...	02/09/2013 17:01:00	-rw-r--r--	ftp ftp
VMU-C_BN0250021001H_VAR_2013-09-02-14-05-22_S.csv	7.707	File con valori...	02/09/2013 16:56:00	-rw-r--r--	ftp ftp
VMU-C_BN0250021001H_ALARM_2013-09-02-13-40-03_S.csv	3	File con valori...	02/09/2013 16:31:00	-rw-r--r--	ftp ftp
VMU-C_BN0250021001H_VAR_2013-09-02-13-35-23_S.csv	7.705	File con valori...	02/09/2013 16:26:00	-rw-r--r--	ftp ftp

VMUC-EM FTP: FTP scheduled data-PUSH communication

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1		Model		Name		Serial address	timestamp	Date and time	+ kWh tot	- kWh tot	VLN sys	VLN1	VLN2	VLN3	VLL sys	VL12	VL23	VL31	A
2	OK																		
3	AC	EM_VIRTUAL		EM_VIRTUAL			1371729900	2013-06-20T14:05:00+02:00	465554.2	0.0	0.0	222.5	226.1	223.8	387.6	386.8	389.0	387.7	27.8
4	AC	CPT-DIN_B_AV5_AV6		CPT_4_CommercialOffice		4	1371729900	2013-06-20T14:05:00+02:00	115420.3			222.5	226.2	223.8	387.5	386.9	389.1	387.6	1.4
5	AC	CPT-DIN_B_AV5_AV6		CPT_6_Shipment		6	1371729900	2013-06-20T14:05:00+02:00	180343.7			222.6	226.4	223.8	387.7	387.0	389.2	387.8	12.2
6	AC	CPT-DIN_B_AV5_AV6		CPT_8_Production		8	1371729900	2013-06-20T14:05:00+02:00	151772.3			222.6	226.1	223.8	387.6	386.9	389.2	387.7	9.5
7	AC	CPT-DIN_B_AV5_AV6		CPT_10_Office		10	1371729900	2013-06-20T14:05:00+02:00	18017.9			222.3	225.9	223.8	387.4	386.5	388.7	387.6	4.7
8	AC	EM_VIRTUAL		EM_VIRTUAL			1371730200	2013-06-20T14:10:00+02:00	465554.9	0.0	0.0	222.3	225.4	223.2	386.8	386.2	387.9	386.8	26.0
9	AC	CPT-DIN_B_AV5_AV6		CPT_4_CommercialOffice		4	1371730200	2013-06-20T14:10:00+02:00	115420.3			222.4	225.5	223.1	386.7	386.2	388.0	386.7	1.5
10	AC	CPT-DIN_B_AV5_AV6		CPT_6_Shipment		6	1371730200	2013-06-20T14:10:00+02:00	180344.0			222.5	225.6	223.1	386.9	386.4	388.0	387.0	10.7
11	AC	CPT-DIN_B_AV5_AV6		CPT_8_Production		8	1371730200	2013-06-20T14:10:00+02:00	151772.6			222.4	225.4	223.2	386.8	386.2	388.0	386.8	9.4
12	AC	CPT-DIN_B_AV5_AV6		CPT_10_Office		10	1371730200	2013-06-20T14:10:00+02:00	18018.0			222.1	225.2	223.3	386.6	386.0	387.7	386.9	4.4
13	AC	EM_VIRTUAL		EM_VIRTUAL			1371730500	2013-06-20T14:15:00+02:00	465555.7	0.0	0.0	222.7	226.1	223.7	387.6	386.7	389.1	387.9	25.4
14	AC	CPT-DIN_B_AV5_AV6		CPT_4_CommercialOffice		4	1371730500	2013-06-20T14:15:00+02:00	115420.3			222.8	226.2	223.7	387.6	386.7	389.1	387.9	1.4
15	AC	CPT-DIN_B_AV5_AV6		CPT_6_Shipment		6	1371730500	2013-06-20T14:15:00+02:00	180344.2			222.8	226.3	223.7	387.8	386.9	389.1	388.0	10.4
16	AC	CPT-DIN_B_AV5_AV6		CPT_8_Production		8	1371730500	2013-06-20T14:15:00+02:00	151773.0			222.8	226.1	223.8	387.7	386.7	389.1	387.9	9.2

VMUC-EM FTP: **FTP scheduled data-PUSH communication**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
1	OK																		
2	AC	EM24_AV5		EM24_DEMO	2	2	1379329200	2013-09-16T11:00:00+00:00	472558.9	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0	4000.0	400.0
3	AC	EM24_AV5		EM24_DEMO	2	2	1379329500	2013-09-16T11:05:00+00:00	472789.0	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0	4000.0	400.0
4	AC	EM24_AV5		EM24_DEMO	2	2	1379329800	2013-09-16T11:10:00+00:00	473019.3	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0	4000.0	400.0
5	AC	EM24_AV5		EM24_DEMO	2	2	1379330100	2013-09-16T11:15:00+00:00	473249.4	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0	4000.0	400.0
6	AC	EM24_AV5		EM24_DEMO	2	2	1379330400	2013-09-16T11:20:00+00:00	473479.1	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0	4000.0	400.0
7	AC	EM24_AV5		EM24_DEMO	2	2	1379330700	2013-09-16T11:25:00+00:00	473709.0	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0	4000.0	400.0
8	EN	VMU-P		VMU-M_001[.1]	1	1	1379329200	2013-09-16T11:00:00+00:00	27.2	32765.0	32.4	0.0							
9	EN	VMU-P		VMU-C_EM[.1]			1379329200	2013-09-16T11:00:00+00:00	111.1	32766.0	30.26	0.0							
10	EN	VMU-P		VMU-M_001[.1]	1	1	1379329500	2013-09-16T11:05:00+00:00	27.2	32765.0	32.4	0.0							
11	EN	VMU-P		VMU-C_EM[.1]			1379329500	2013-09-16T11:05:00+00:00	111.1	32766.0	44.74	0.0							
12	EN	VMU-P		VMU-M_001[.1]	1	1	1379329800	2013-09-16T11:10:00+00:00	27.2	32765.0	32.4	0.0							
13	EN	VMU-P		VMU-C_EM[.1]			1379329800	2013-09-16T11:10:00+00:00	111.1	32766.0	29.3	0.0							
14	EN	VMU-P		VMU-M_001[.1]	1	1	1379330100	2013-09-16T11:15:00+00:00	27.1	32765.0	32.4	0.0							
15	EN	VMU-P		VMU-C_EM[.1]			1379330100	2013-09-16T11:15:00+00:00	111.1	32766.0	9.28	0.0							

Data from environmental units (VMUP-EM)

Data from Energy Meters (Emxx or WMxx)

VMUC-EM FTP: **FTP scheduled data-PUSH communication**

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
1	OK																
3		Model		Name		Serial address	timestamp	Date and time	+ kWh tot	- kWh tot	VLN sys	VLN1	VLN2	VLN3	VLL sys	VL12	VL23
5	AC	EM24_AV5		EM24_DEMO	2	2	1379323800	2013-09-16T09:30:00+00:00	468419.6	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0
6	AC	EM24_AV5		EM24_DEMO	2	2	1379324100	2013-09-16T09:35:00+00:00	468648.7	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0
7	AC	EM24_AV5		EM24_DEMO	2	2	1379324400	2013-09-16T09:40:00+00:00	468879.0	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0
8	AC	EM24_AV5		EM24_DEMO	2	2	1379324700	2013-09-16T09:45:00+00:00	469109.5	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0
9	AC	EM24_AV5		EM24_DEMO	2	2	1379325000	2013-09-16T09:50:00+00:00	469339.2	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0
10	AC	EM24_AV5		EM24_DEMO	2	2	1379325300	2013-09-16T09:55:00+00:00	469568.9	0.0	2300.0	2300.0	2300.0	2300.0	4000.0	4000.0	4000.0
11																	
12																	
13		Model		Name		Serial address	timestamp	Date and time	Temp. Ch1	Temp. Ch2	Analogue input	Pulse rate input					
15	EN	VMU-P		VMU-M_001[.1]	1	1	1379323800	2013-09-16T09:30:00+00:00	25.9	32765.0	32.2	0.0					
16	EN	VMU-P		VMU-C_EM[.1]			1379323800	2013-09-16T09:30:00+00:00	111.1	32766.0	31.09	0.0					
17	EN	VMU-P		VMU-M_001[.1]	1	1	1379324100	2013-09-16T09:35:00+00:00	26.1	32765.0	32.2	0.0					
18	EN	VMU-P		VMU-C_EM[.1]			1379324100	2013-09-16T09:35:00+00:00	111.1	32766.0	11.13	0.0					
19	EN	VMU-P		VMU-M_001[.1]	1	1	1379324400	2013-09-16T09:40:00+00:00	26.2	32765.0	32.2	0.0					
20	EN	VMU-P		VMU-C_EM[.1]			1379324400	2013-09-16T09:40:00+00:00	111.1	32766.0	8.92	0.0					
21	EN	VMU-P		VMU-M_001[.1]	1	1	1379324700	2013-09-16T09:45:00+00:00	26.2	32765.0	32.2	0.0					
22	EN	VMU-P		VMU-C_EM[.1]			1379324700	2013-09-16T09:45:00+00:00	111.1	32766.0	28.88	0.0					
23	EN	VMU-P		VMU-M_001[.1]	1	1	1379325000	2013-09-16T09:50:00+00:00	26.3	32765.0	32.2	0.0					

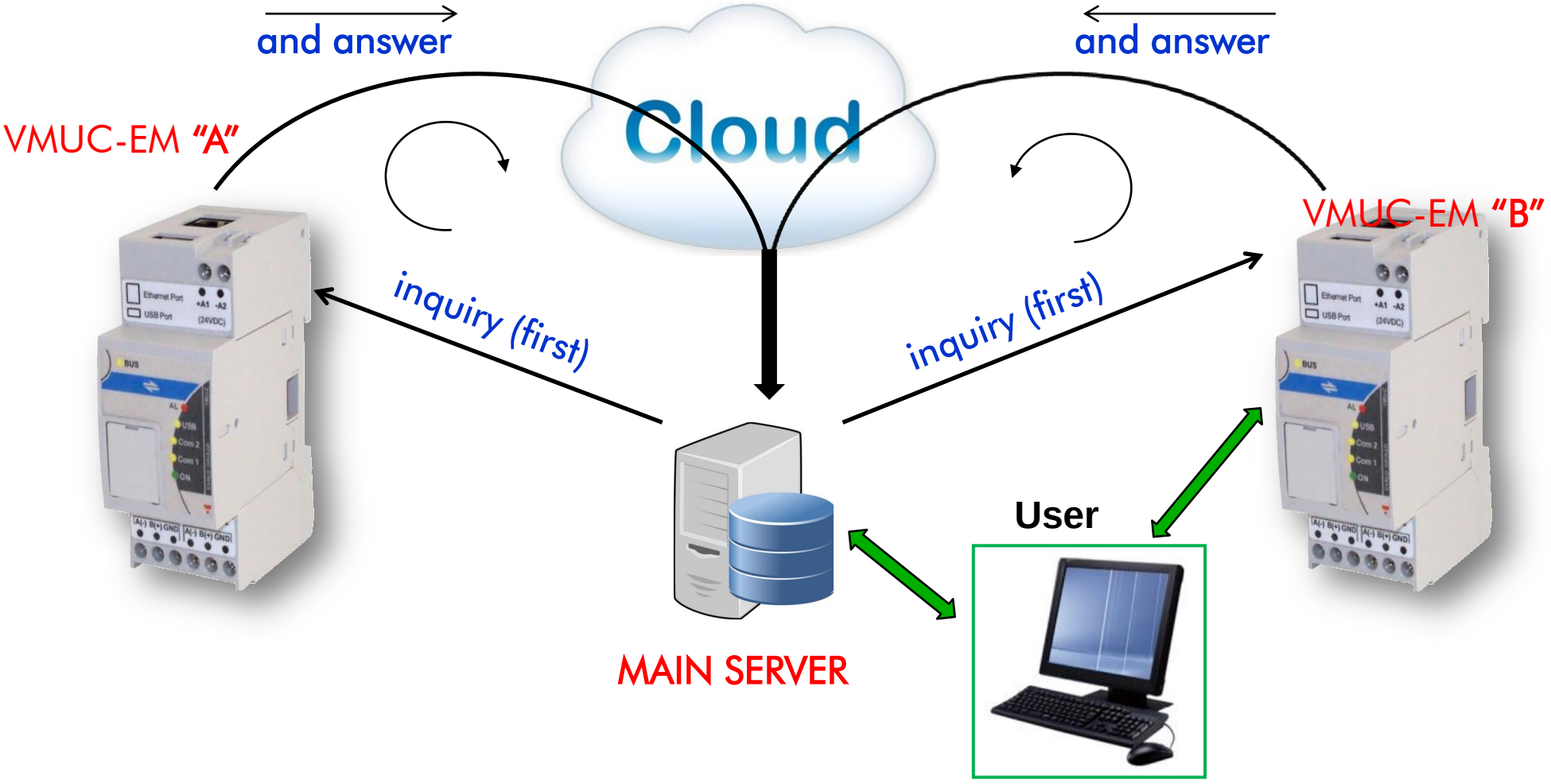
Data from environmental units (VMUP-EM)

Data from Energy Meters (Emxx or WMxx)

VMUC-EM FTP: **FTP scheduled data-PUSH communication**

http://www.epochconverter.com/

VMUC-EM FTP: HTTP on-demand data-PULL communication



VMUC-EM FTP: HTTP on-demand data-PULL communication

All the information can be obtained by means of HTTP requests, structured as follows:

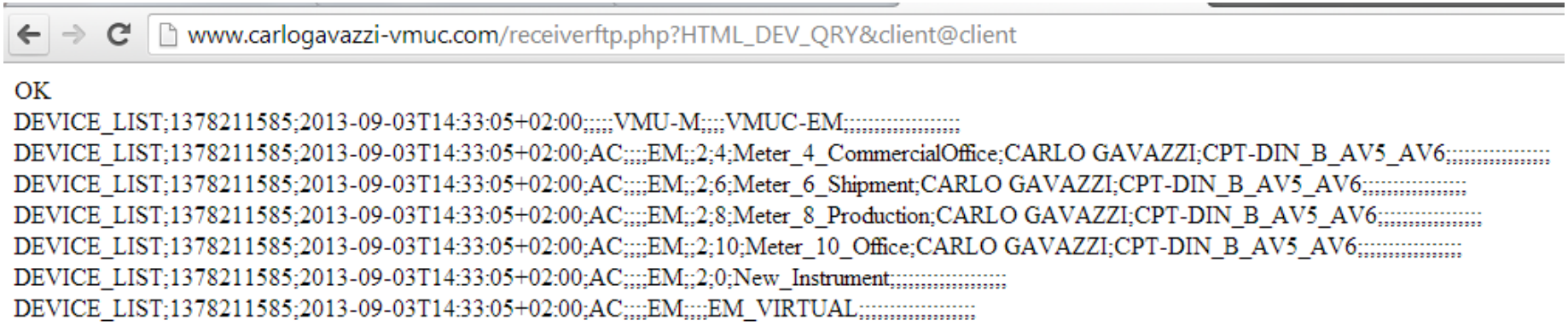
http://myVMUC.mydomain.com/special_page?command&user@password&parameter1&...parameterN

Also in this case, three different types of information are available:

- Alarms
- Data
- Device list

VMUC-EM FTP: **FTP on-demand data-PULL communication**

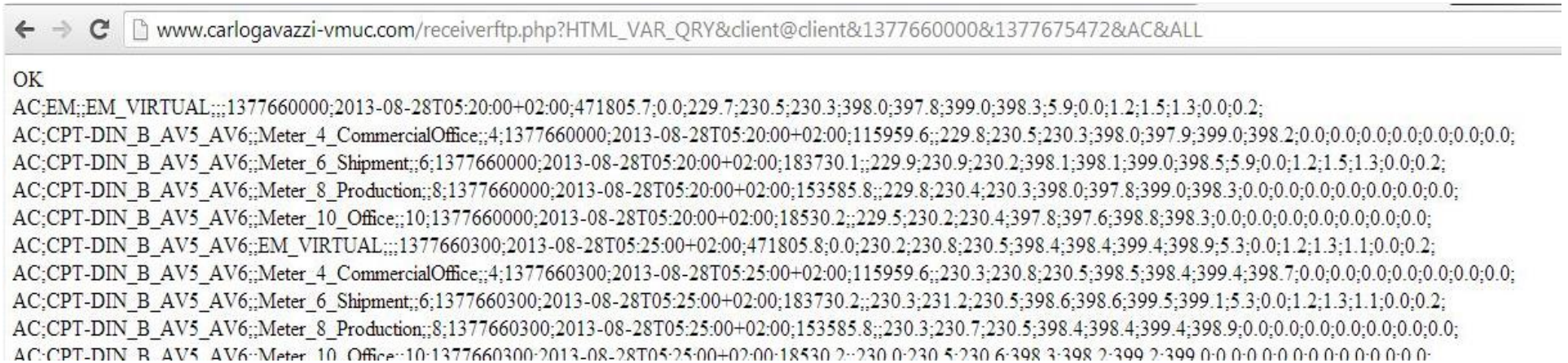
Example: structure of query to obtain the device list:



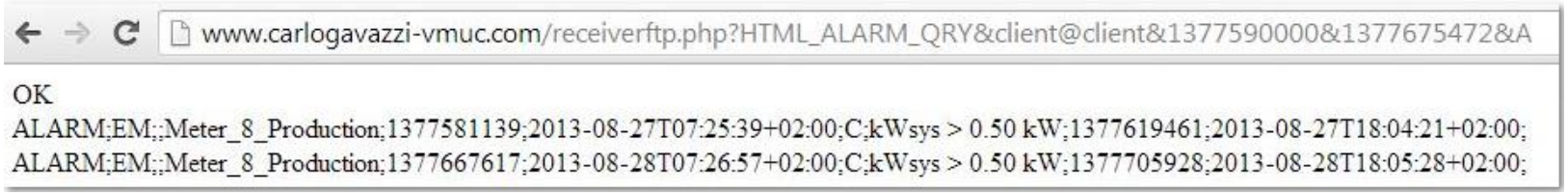
Note: any software capable of managing HTTP request/response processes could be used to remotely pull VMU-C data (example of freely available software packages are WGET and CURL).
Data are then processed according to the application needs by means of the user's software.

VMUC-EM FTP: HTTP on-demand data-PULL communication

Example: structure of query to obtain the DATA list:



Example: structure of query to obtain the ALARM list:



VMUC-EM WebSERVER solution

Customer issue: In a small industry, there is the need to allocate the cost of each single production machine. This is important both to keep consumptions under control and to split in the proper way the cost of the energy in each product.

Our Solution: A complete monitoring system can be easily carried out by installing energy meters or power analysers to each single machine cabinet and connecting them to VMU-C EM via RS485. A second serial line in VMU-C EM is connecting various VMU series I/O modules, which allows gathering temperature, flow, any scalable analogue variable information, plus digital input status.

Benefits: The architecture of the monitoring system is extremely simple and compact: in addition to the meters, just a 2-DIN module VMU-C EM and the I/O modules are to be installed. The VMU-C EM acts at the same time as a polling device, a datalogger, web-server for data analysis, a gateway for Internet data availability, and it can also send scheduled emails with, for example, monthly data from each measurement point, or specific alarm email in case any.

If this system is used to monitor a remote installation, e.g. an aqueduct pump station, where the wired Internet is not available, a VMU-W modem can be simply added to the system, granting wireless Internet connectivity for all the VMU-C EM functions.

Relevant applications

VMUC-EM WebSERVER solution

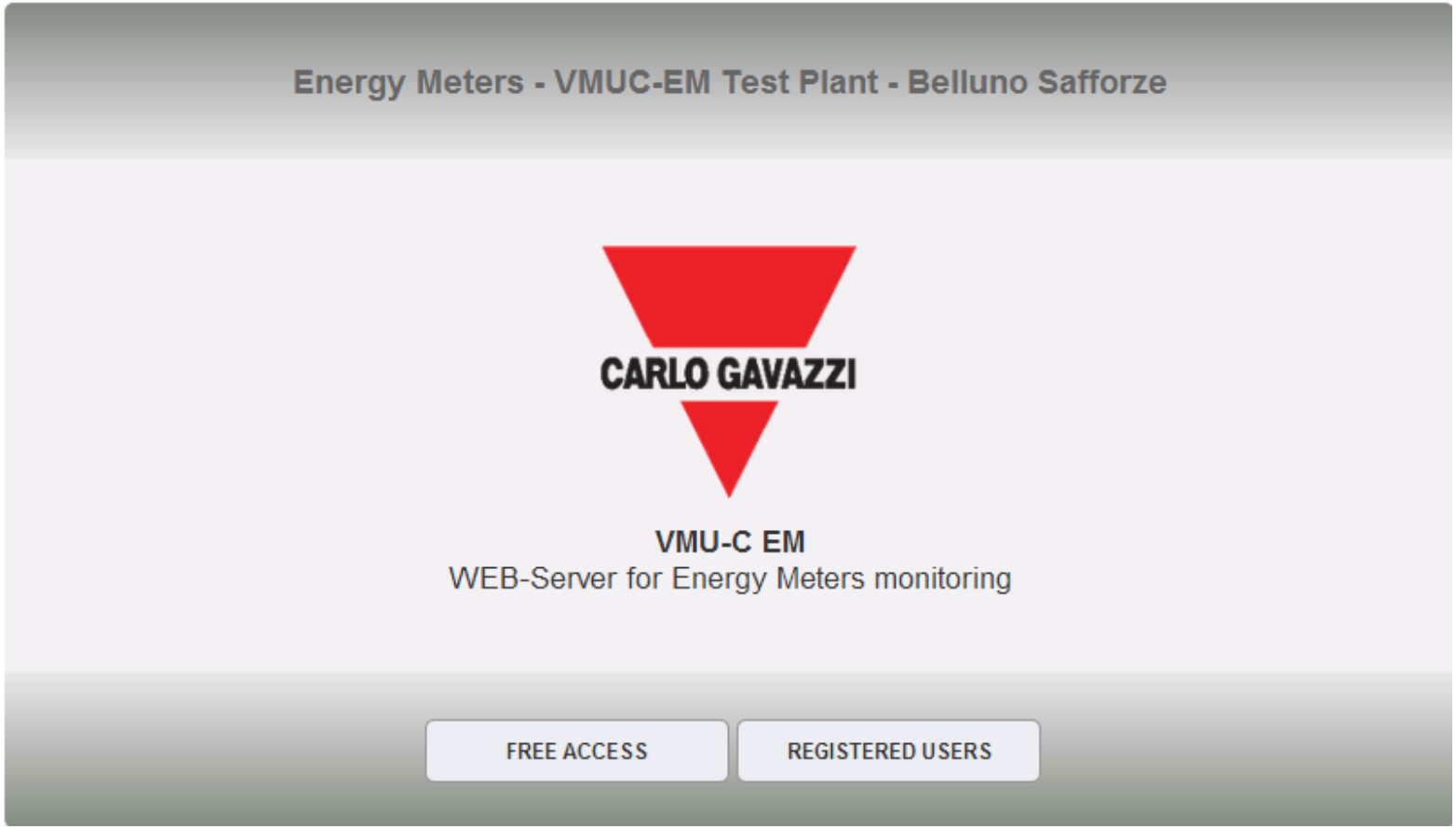
Customer issue: in all the sub-metering applications involving re-billing of energy costs (e.g. single apartments in a residential building or shops within a mall), it is required to have revenue approved meters (MID) in each single flat switch gear.
While the official value to be charged is the meter one, it is also necessary a device to centralize all the information both for statistic and control purposes.

Our Solution: The load to be monitored (apartment or shop consumption) are measured by a MID energy meters connected in a RS485 network to a VMU-C EM master.
The VMU-C EM is a web-server based solution that allows collecting, displaying and analysing all the consumtions information from the field, in any PC connected to the Internet, in the same location of the meters or remotely by a standard browser.

Benefits: The architecture of the monitoring system is extremely simple and compact: in addition to the meters, just a 2-DIN module VMU-C EM is to be installed.
In case the metering points are to be controlled by customer's own SCADA solution, VMU-C EM can easily push all the collected data directly into the database from which the SCADA is taking any info.

Relevant applications

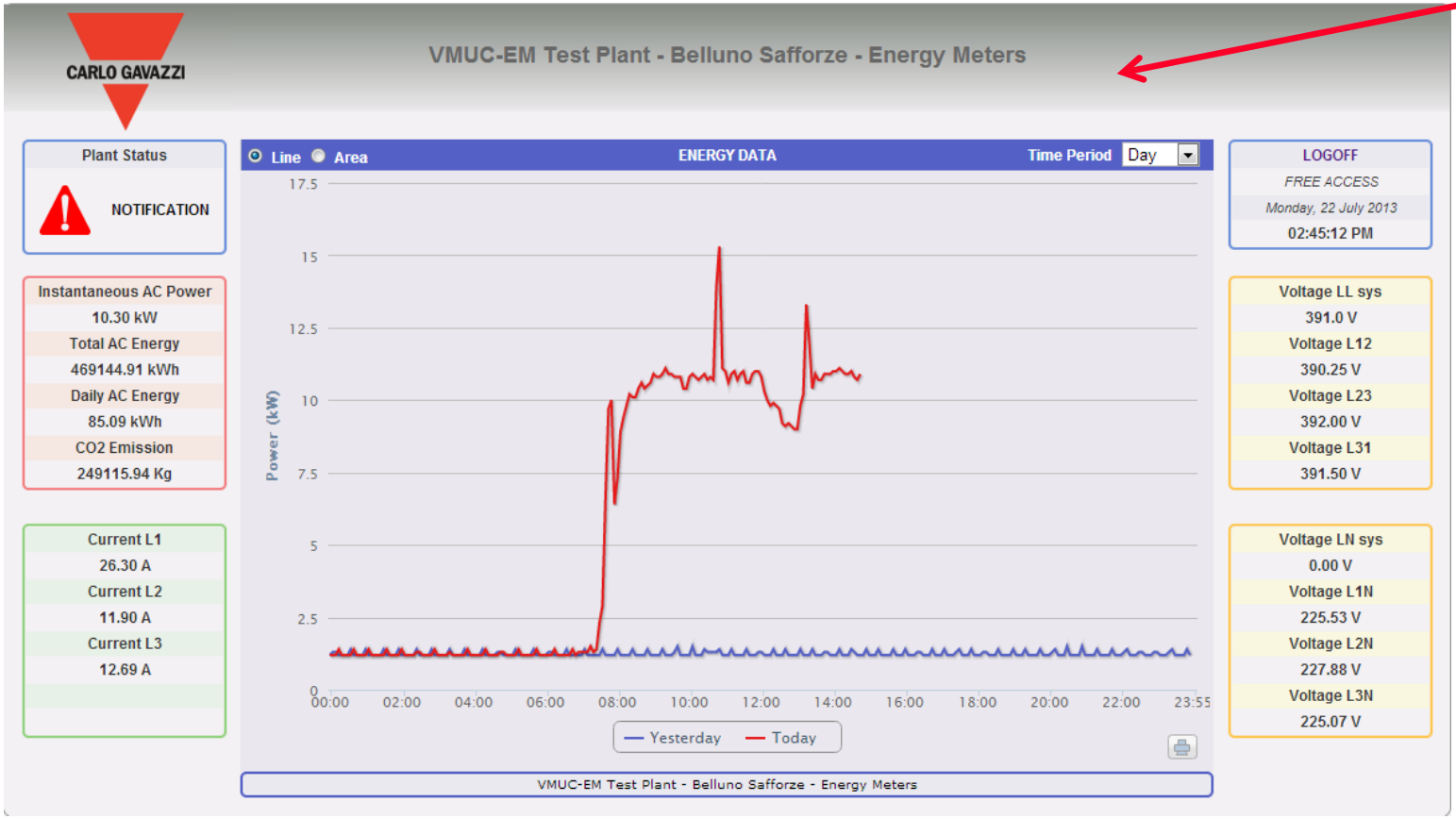
Online Web Server (WMUC-EM): www.carlogavazzi-vmuc.com



Username: user Password: user

Online Web Server (WMUC-EM): Free access (FREE ACCESS

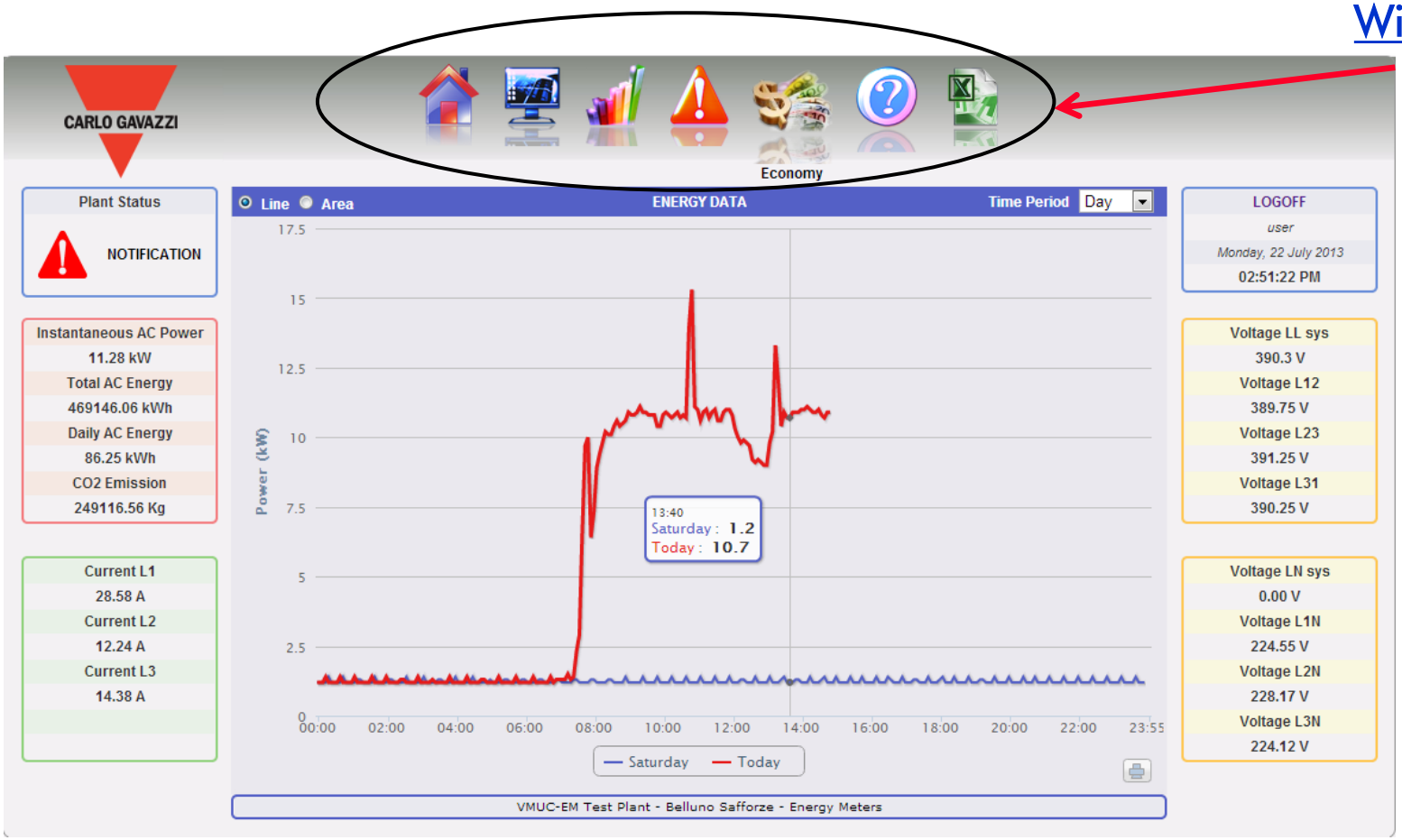
No surfing icons available



Online Web Server (WMUC-EM): User access (

REGISTERED USERS

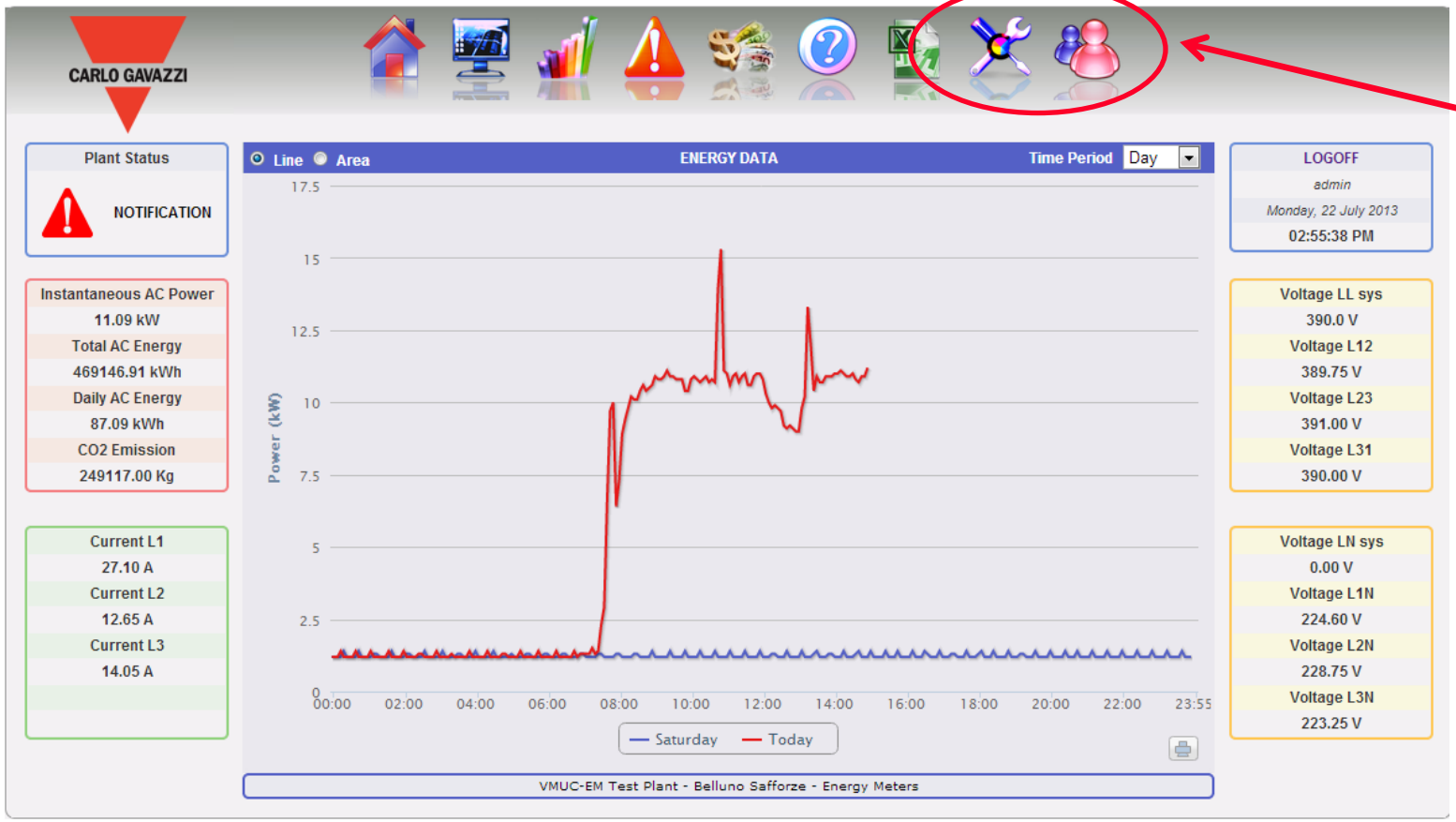
With surfing icons available but without "Setup" icon



Online Web Server (WMUC-EM): Administrator access (

REGISTERED USERS

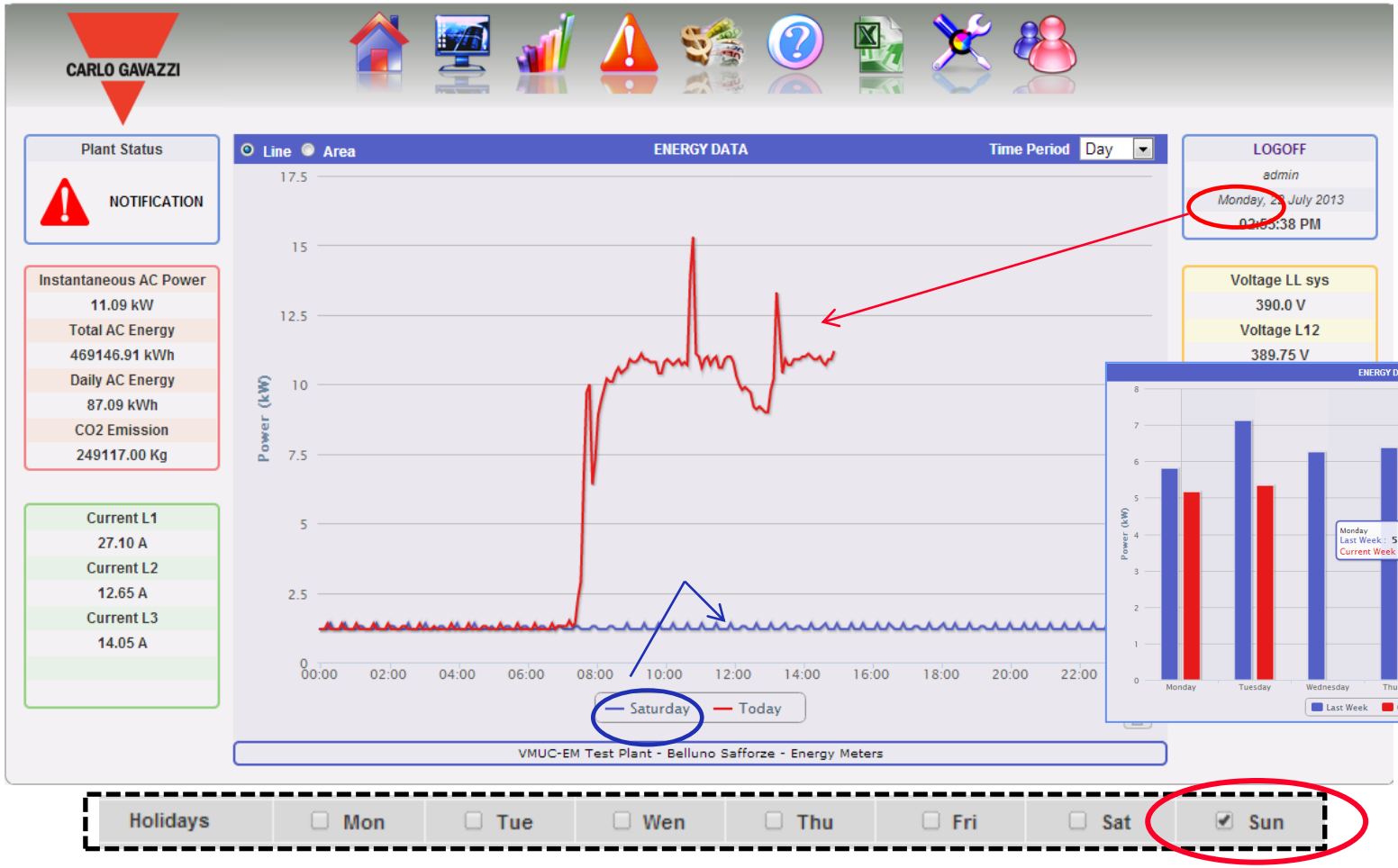
With surfing icons available and with "Setup" and "Account" icons



Home page:

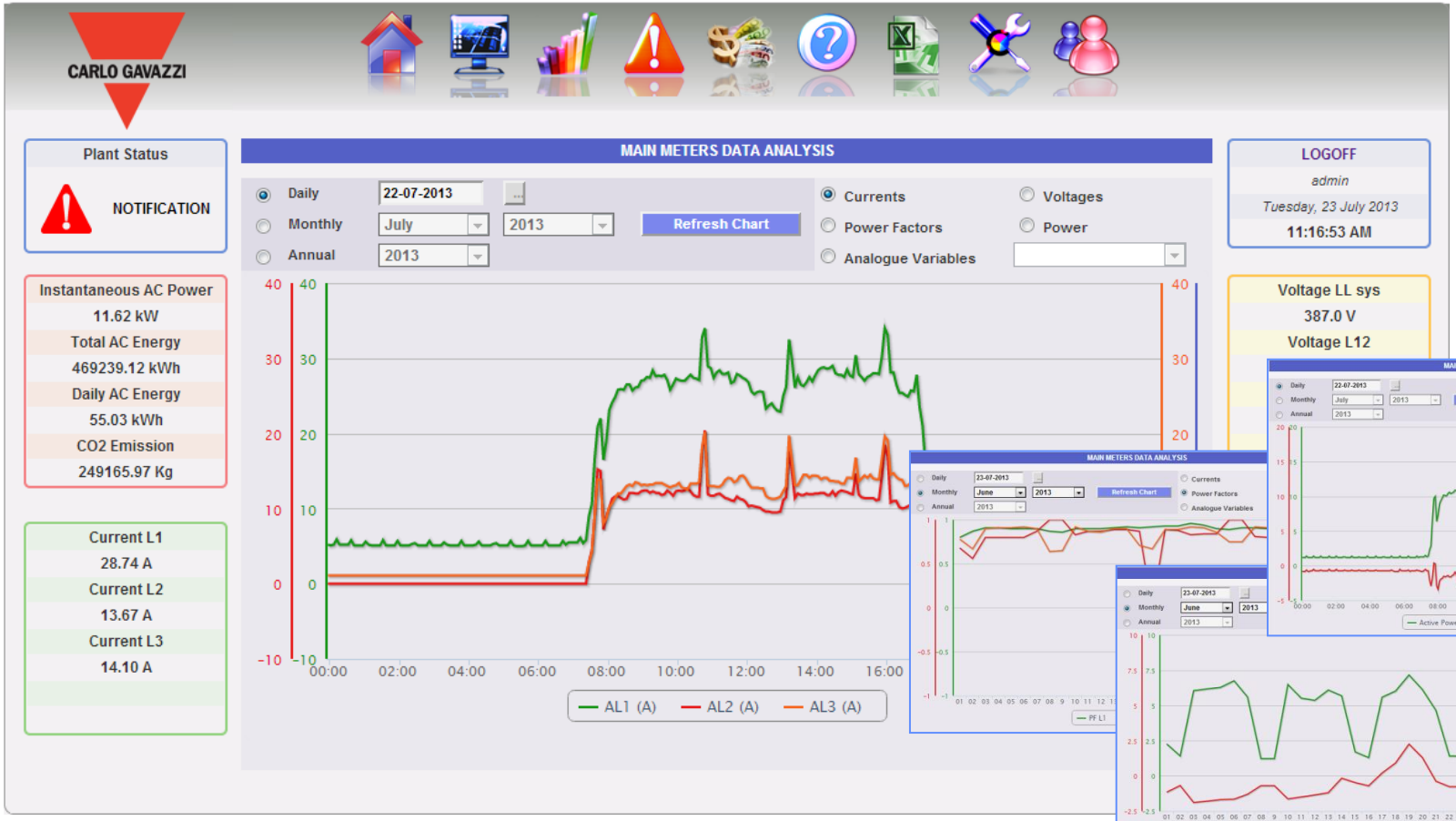
Present *working* day against the previous *working* day

(or present ***non-working*** day against the previous ***non-working*** day)



Monitor page:

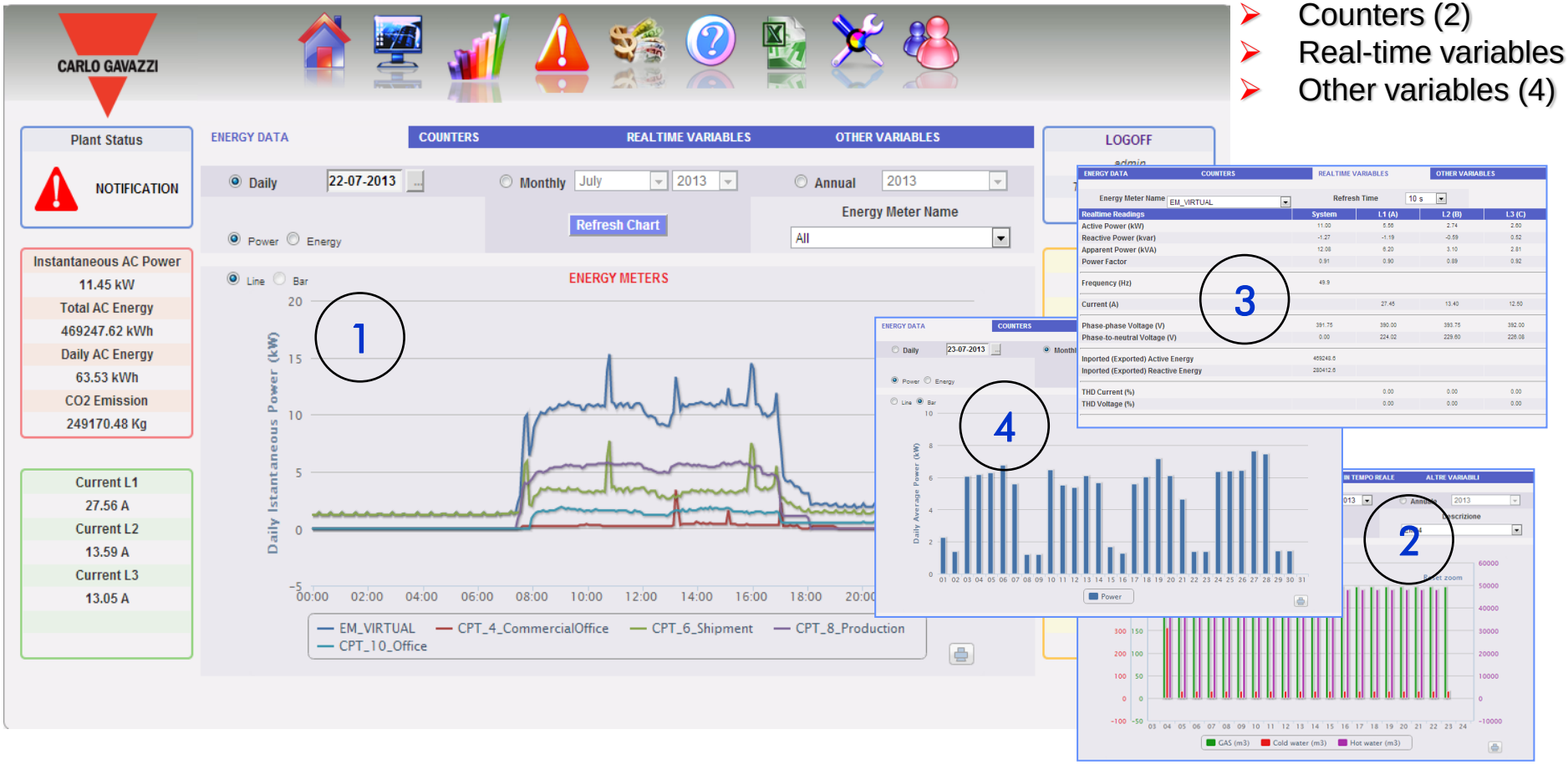
Daily / Monthly / Annual trends of the *main* variables of the *main* meter:



- Current
- PowerFactor
- Voltage
- Power
- \+
- Analogue variables

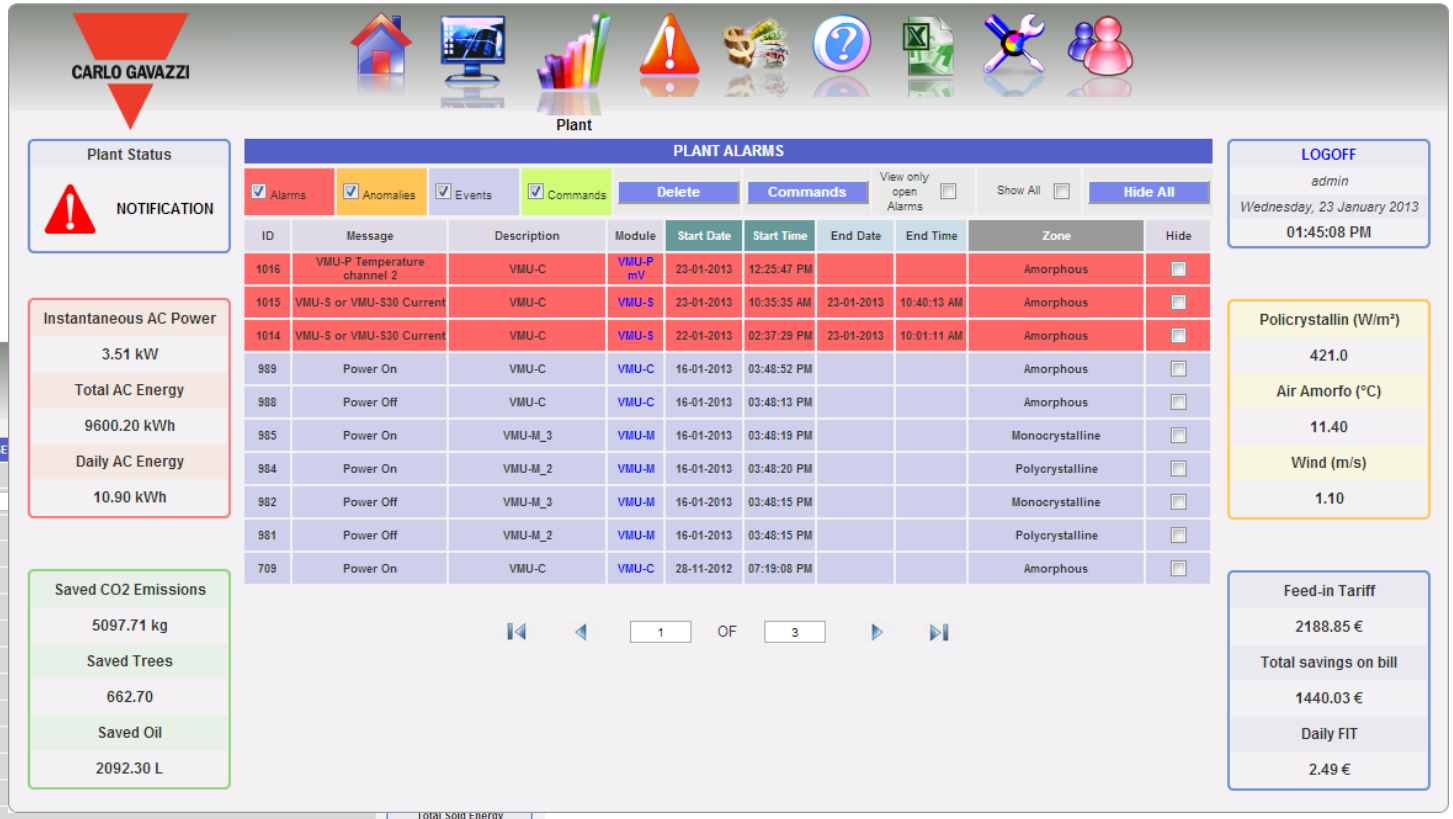
Plant pages:

- Available pages:
  - Energy data (1)
  - Counters (2)
  - Real-time variables (3)
  - Other variables (4)

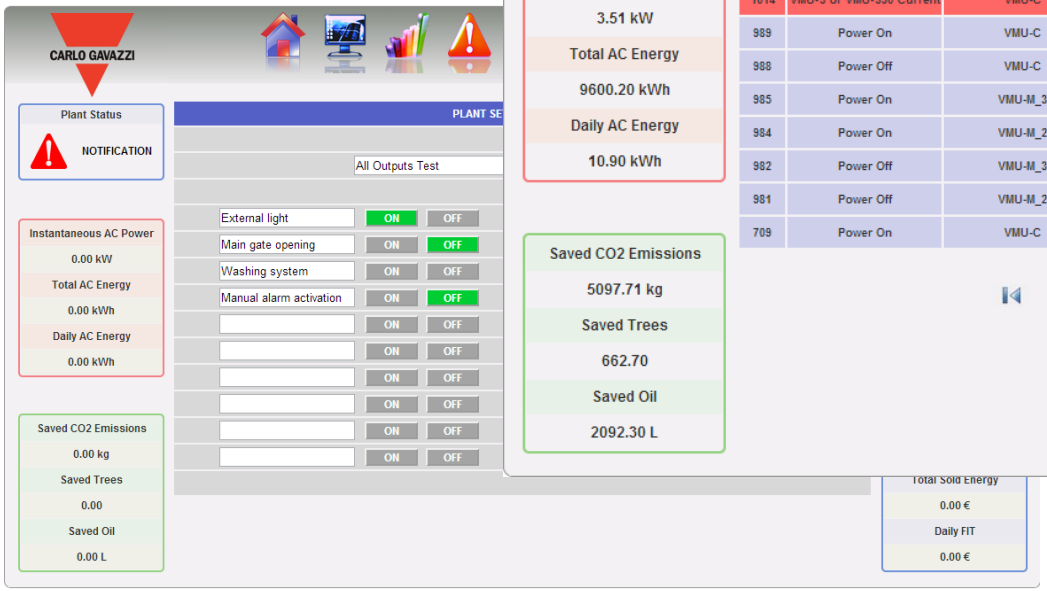


Alarm and Command pages:

➢Alarms



➢Commands

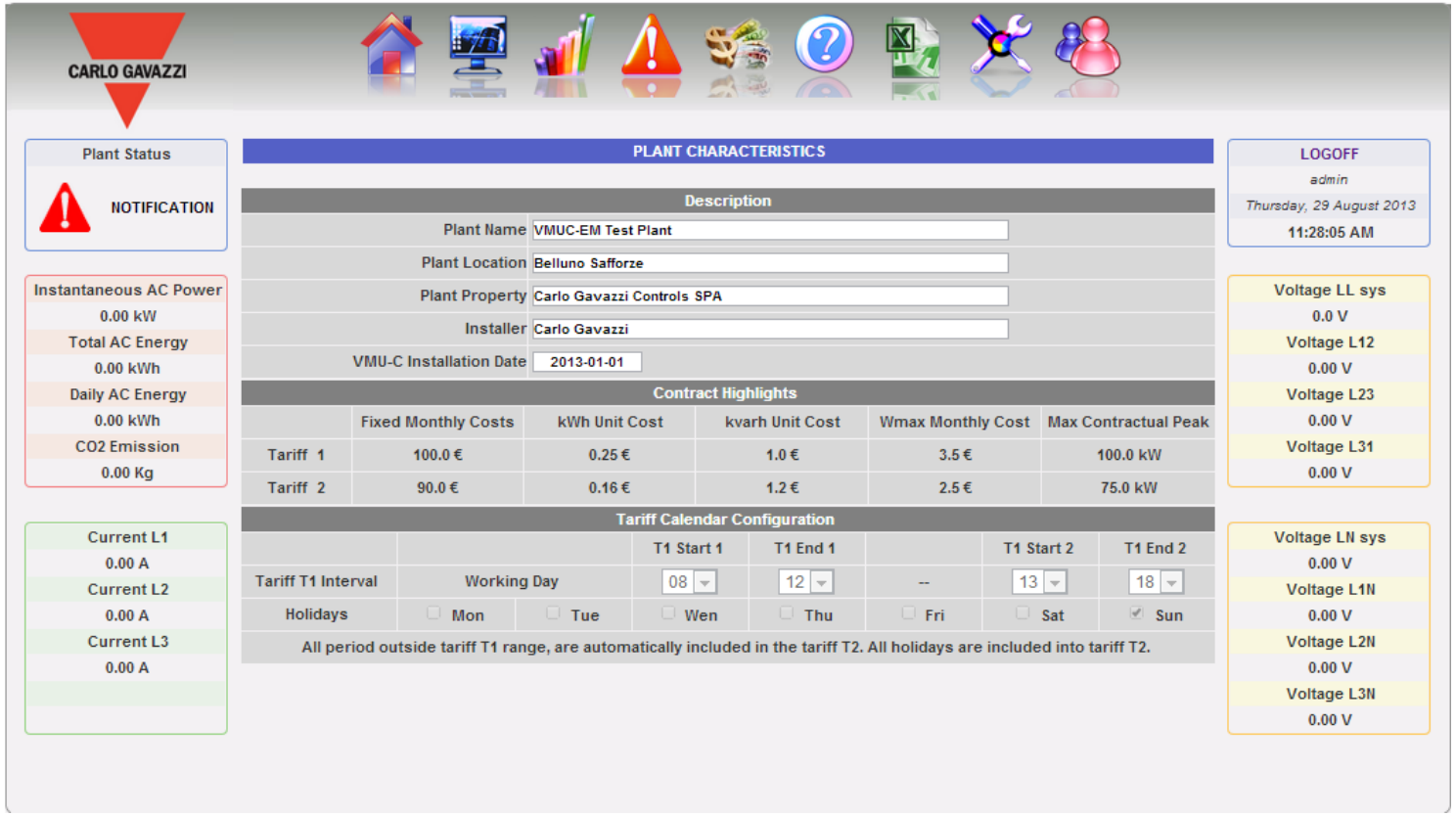


Economy page:

- Available information:
  - Total (€)
  - Consumed kWh / kvarh (€)
  - Fee due to the overload (€)

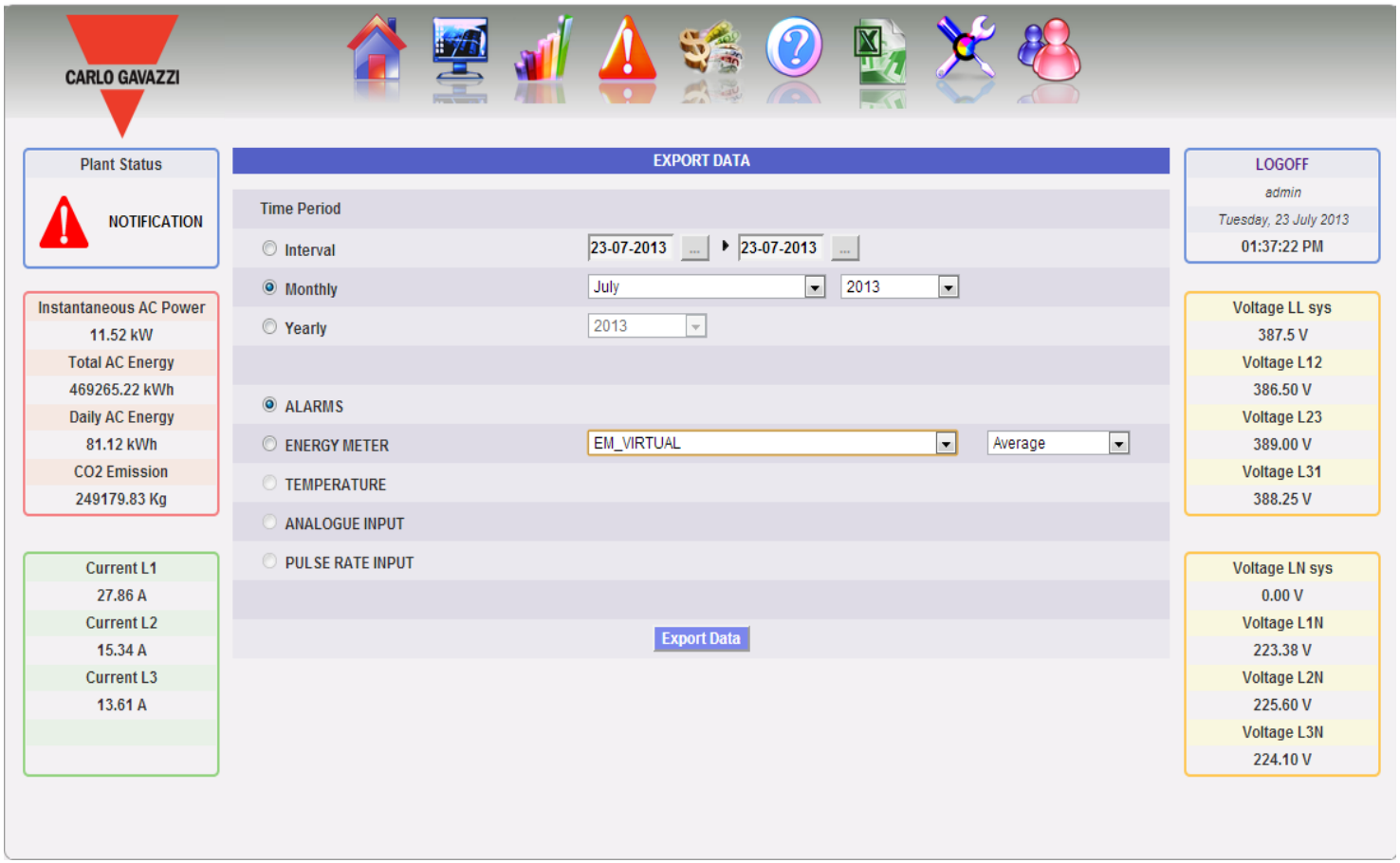
Information page:

- Available information:
  - Main description
  - Contract Data
  - Tariff setting
  - Tariff calendar



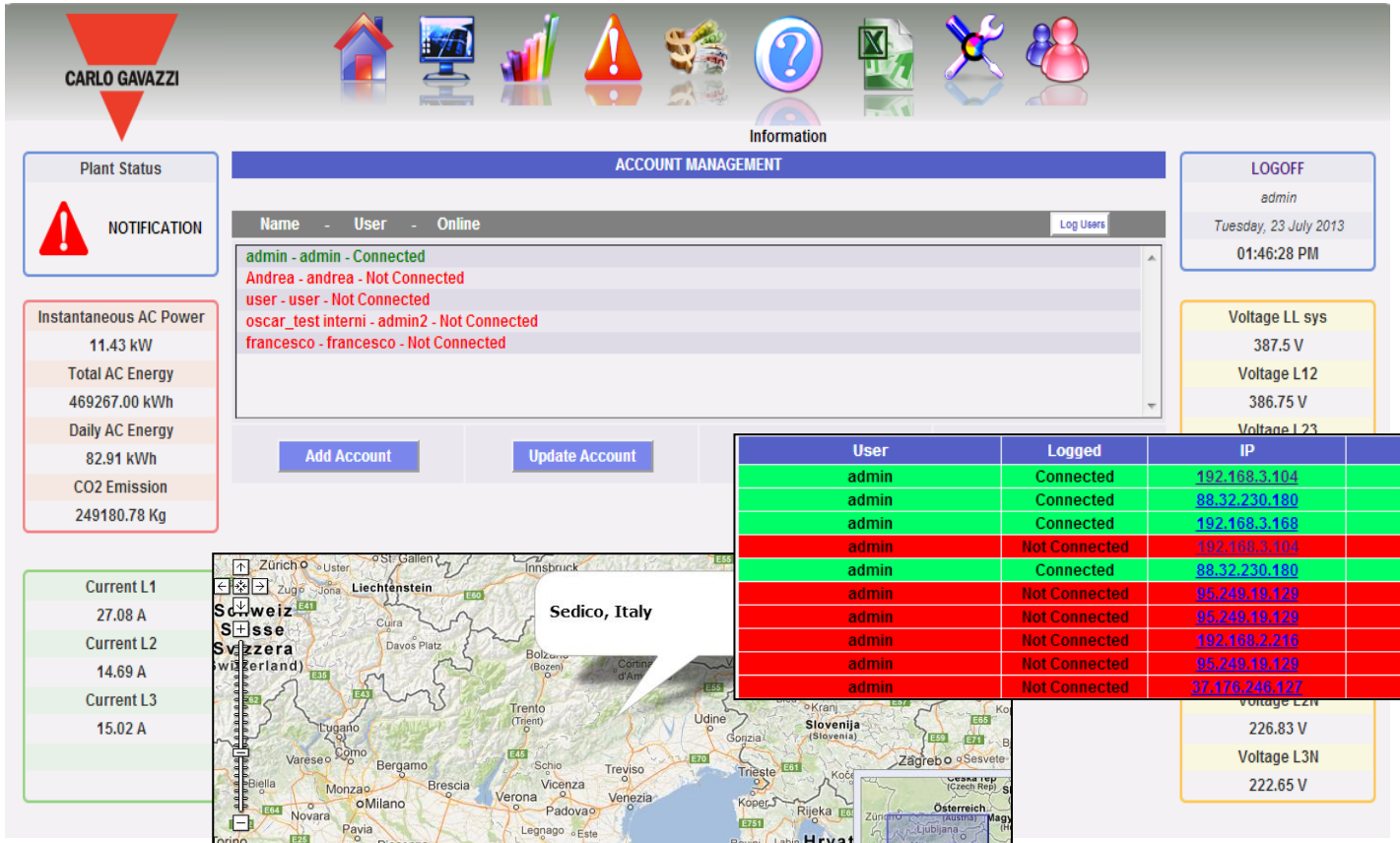
Excel export page:

- Exportable information:
  - Alarms
  - Energy Meter Data (Max, min, Avg)
  - Temperature
  - Analogue input
  - Pulse Rate Input



Account page:

- Account management:
  - List of the registered users
  - Addresses and location of the connected users.

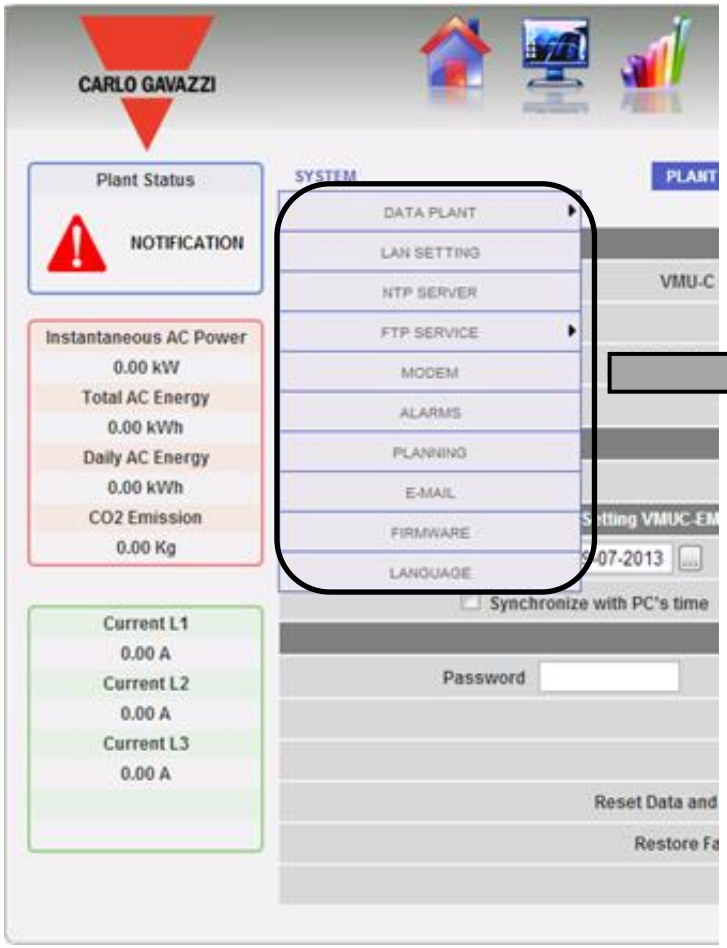


User	Logged	IP	Last Login
admin	Connected	192.168.3.104	24-01-2013
admin	Connected	88.32.230.180	24-01-2013
admin	Connected	192.168.3.168	24-01-2013
admin	Not Connected	192.168.3.104	24-01-2013
admin	Connected	88.32.230.180	24-01-2013
admin	Not Connected	95.249.19.129	23-01-2013
admin	Not Connected	95.249.19.129	23-01-2013
admin	Not Connected	192.168.2.216	23-01-2013
admin	Not Connected	95.249.19.129	23-01-2013
admin	Not Connected	37.176.246.127	23-01-2013

Setting page:

- Full configuration of the system:
  - Energy Meters
  - VMUO-EM
  - VMUP-EM
  - Commands
  - VMUM-EM
  - VMU-C

Setting SYSTEM page:



- Description of the plant
- IP address, subnet mask, …
- NTP server setting for clock synchronization
- Setting for FTP service setting
- Setting of the VMU-W (modem)
- Alarm setting (groups and alarms)
- Scheduled e-mail planning (daily, weekly, …)
- Configuration out-going e-mail server
- Firmware update, reset commands, …
- Language setting and decimal symbol for exported excel files (“.” or “,”)

Data Plant Description page:

Plant Description

Plant Name	VMUC-EM Test Plant
Plant Location	Belluno Safforze
Plant Property	Carlo Gavazzi Controls SPA
Installer	Carlo Gavazzi
VMU-C Installation Date	2013-01-01 yyyy-mm-dd
Currency	€

Contract Highlights

	Fixed Monthly Costs	kWh Unit Cost	kvarh Unit Cost	Wmax Monthly Cost	Max Contractual Peak
Tariff 1	100.0 €	0.25 €	1.0 €	3.5 €	100.0 kW
Tariff 2	90.0 €	0.16 €	1.2 €	2.5 €	75.0 kW

Save Setting

Tariff Calendar Configuration

		T1 Start 1	T1 End 1		T1 Start 2	T1 End 2
Tariff T1 Interval	Working Day	08	12	--	13	18

	Mon	Tue	Wen	Thu	Fri	Sat	Sun
Holidays	☐	☐	☐	☐	☐	☐	☑

All period outside tariff T1 range, are automatically included in the tariff T2. All holidays are included into tariff T2.

Save Setting

Main description of the installation

Details of the economical contract

Tariffs (up to 2) and holidays setting

LAN setting:

Network Setting

VMU-C Name	VMU-C 0 1 (Example: VMU-C01)
Use the following IP Address:	Get an IP address Automatically (DHCP)
IP Address: 192.168.2.xx	
Subnet Mask: 255.255.255.0	
Default Gateway: 192.168.2.xx	
Use the following DNS server addresses:	Get DNS Server address automatically
Preferred DNS server: 192.168.1.x	
Alternative DNS server:	

Save Setting

Dynamic IP Address Management

Enable Dynamic DNS	Server Dynamic DNS	DynDns.org
	Hostname	
	Username	
	Password	

Save Setting

LAN setting
(fix address or
DNS or DHCP service)

Setting in case of
the dynamic DNS
service is used

NTP service setting:

Clock Synchronisation	
Enabling Network Clock Synchronisation	☑
NTP Server 1 :	ntp1.inrim.it
NTP Server 2 :	ntp2.inrim.it
Save Setting	

In order to have DATE and TIME always correctly synchronized, the NTP server can be used

FTP service setting:

FTP SERVICE

Enable FTP Service	☑
Server Address	10.1.5.9
Remote Directory	testem
Server User	vmucem_test
Server Password	••••••
Client User	client
Client Password	••••
Upload Time Interval	00 - 30 (hh:mm)
Alarms Flag	☑
Measurement Flag	☑
First Delivery (Date / Time)	07 - 05 - 2013 09 : 20 : 01

Save Setting

Test Connection

Address and other info about the server where to save the data sent by all the connected VMUC-EM

Defined interval time for PUSH data

Alarm info and/or Variables.
Data and time of the first operation of PUSH.

Modem "VMUW" setting:

Modem Connection Status

Signal		Model	*VMU-W.A.UMM.1.X*
Network Registration	*vodafone IT*	Data Connection	*Connected*
IP address	*91.80.19.* XXX		

Modem Configuration

☑ Modem Enabling	☑ Internet Connection Enabling	☐ SMS Enabling

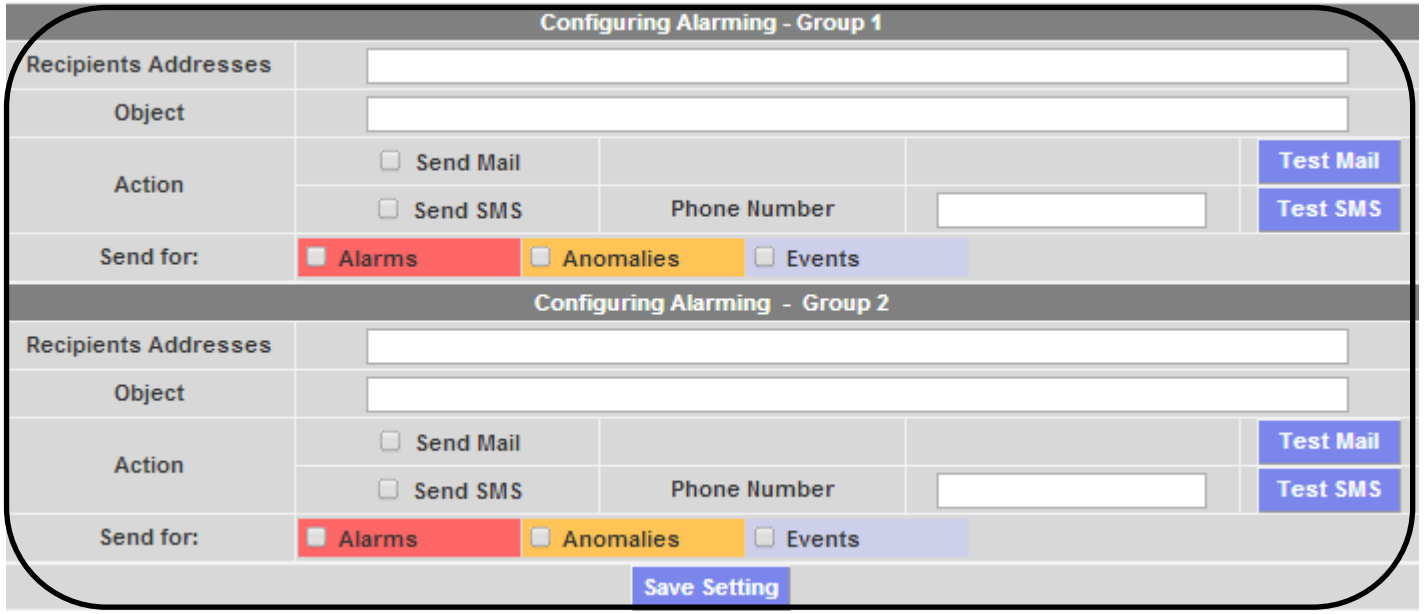
Modem setting for Internet Connection

Provider: VODAFONE IT M2M

Save Setting

In case of a wired Internet connection is not available, the UMTS modem can be used.

ALARMS setting:



It is possible to create up to 2 groups of people where to address the email (or SMS messages when the Modem is present) in case of an alarm rises.

PLANING (scheduled email) setting:

Scheduling Sending data via Mail		
Recipients Addresses		
Action	☐ Send Mail	Test Mail
Send Plant Data	☐ Daily	☐ Weekly
	☐ Monthly	☐ Yearly
	Save Setting	

If activated, an email with the main data from the plant (Power and Energy) can be sent with the set interval time (daily / weekly / monthly / yearly)

Email setting:

Configuring Outgoing Mail Server	
Sender Address	vmucem.pss@gmail.com
Sender Name	VMUCEM.pss
Server SMTP	smtp.gmail.com
Username Server SMTP	vmucem.pss
Password Server SMTP	••••••••••

Save Setting

In order to be able to send emails, in the VMUC-EM setting, the above boxes have be properly fulfilled with the server SMTP data.

Date/Time setting, Reset commands and Firmware updating:

VMU-C Firmware Update	
VMU-C Serial Number	BN1090002001H
MAC Address	00-19-EE-10-06-B2
Installed Firmware Version	Ver. B16_A1
VMU-C Update	Browse... Load

Here it is possible to verify the firmware release and just in case to update it

Remote Reboot	
VMU-C Reboot	Reboot

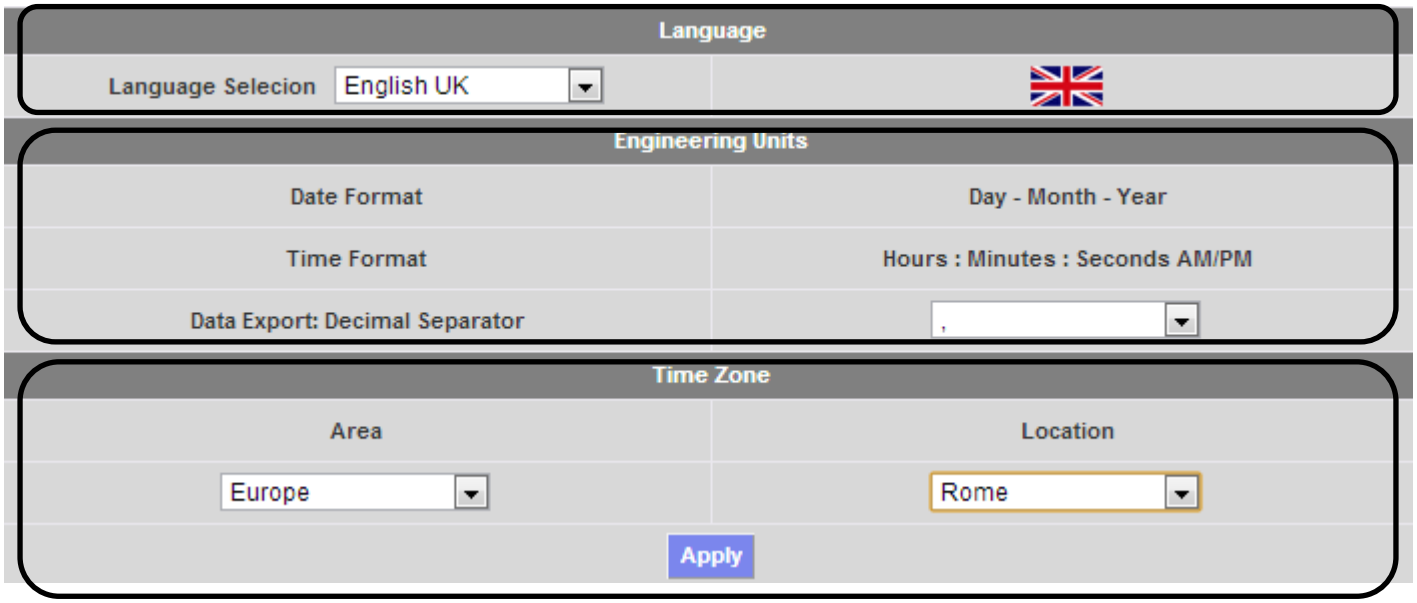
Setting VMUC-EM's Date and Time - VMU-M EM's Synchronization					
VMU-C's Date	29-08-2013 ...	VMU-C's Time	15	08	04 hh:mm:ss
Synchronize with PC's time			Adjust		

Date and time setting

System Data Reset			
Password		Confirm Password	
Data Reset			Reset
Events Reset			Reset
Reset Data and Plant Settings			Reset
Restore Factory Settings			Reset

RESET commands

Language setting:

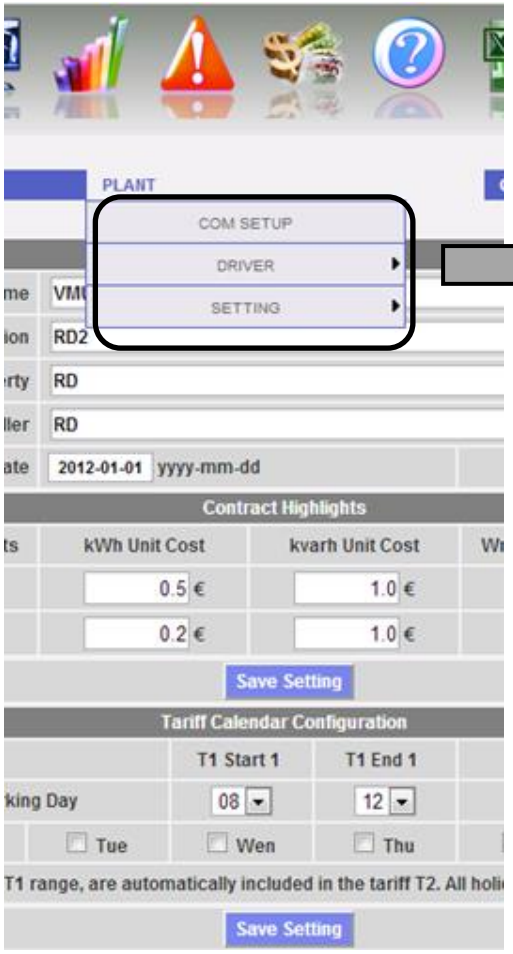


Language setting

Setting of the decimal separator to be used in all the created Excel files

Setting of the geographic area where the VMUCEM has been installed

Setting PLANT page:



- COM1 setting
- DRIVER pages (list of the available drivers, …)
- VMUC-EM main setting

Setting PLANT page:

COM Port Setup	
COM1 (VMU-M EM)	
Baud Rate	115200
Parity	None
Data bits	8
Stop bits	1
	Save Setting

- COM1 setting
-
-

Setting PLANT page:

Available driver list			
Brand	**Driver**	**Version**	**Instrument**
CARLO GAVAZZI	EM21	2.2	Energy Meter
CARLO GAVAZZI	EM21_PF	2.2	Energy Meter
CARLO GAVAZZI	EM21_R	1.1	Energy Meter
CARLO GAVAZZI	EM23_AV2_AV9	1.0	Energy Meter
CARLO GAVAZZI	EM24_AV0	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV5	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV5_PF	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV6	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV9_AV2	2.3	Energy Meter
CARLO GAVAZZI	EM24_AV9_AV2_PF	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV5	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV5_PF	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV6	2.3	Energy Meter
CARLO GAVAZZI	EM26_AV6_PF	2.3	Energy Meter
CARLO GAVAZZI	EM33	2.1	Energy Meter
CARLO GAVAZZI	WM30	2.2	Energy Meter
CARLO GAVAZZI	WM40	2.3	Energy Meter

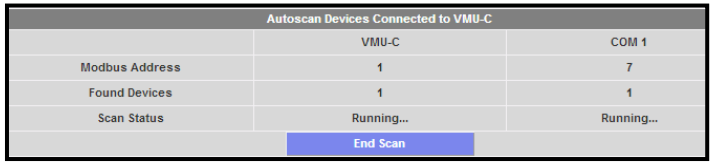
- DRIVER (list of the available drivers)

Setting PLANT page:

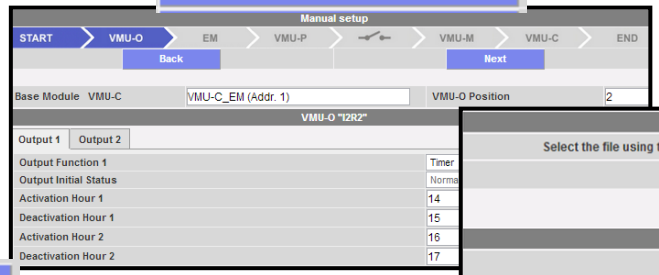
VMU-C Settings		
Autoscan Devices Connected to VMU-C		Find Connected Vmu-m
Perform the manual configuration of the devices connected to the VMU-C		Manual Setup
Resume Configuration		Resume Configuration
Load Configuration from File		Import

-
-
- VMUC-EM main setting

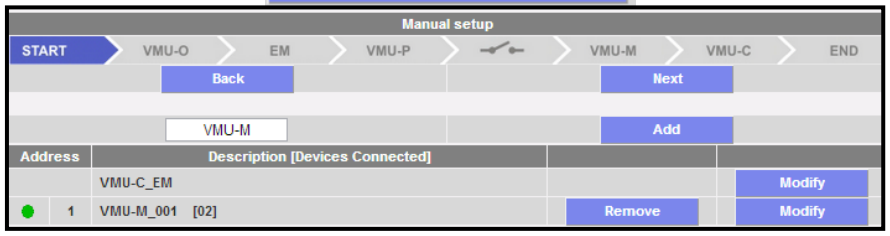
Find Connected Vmu-m



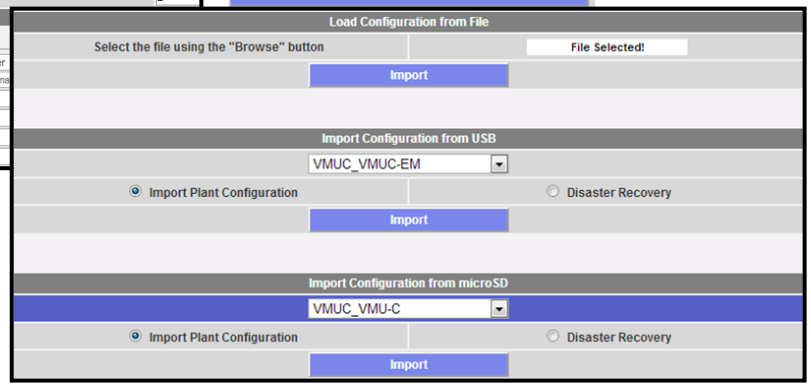
Resume Configuration



Manual Setup



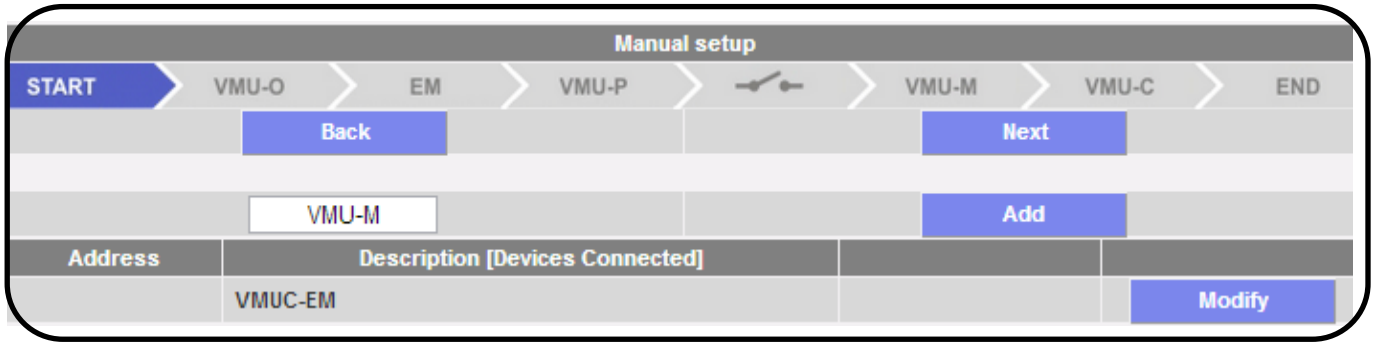
Import



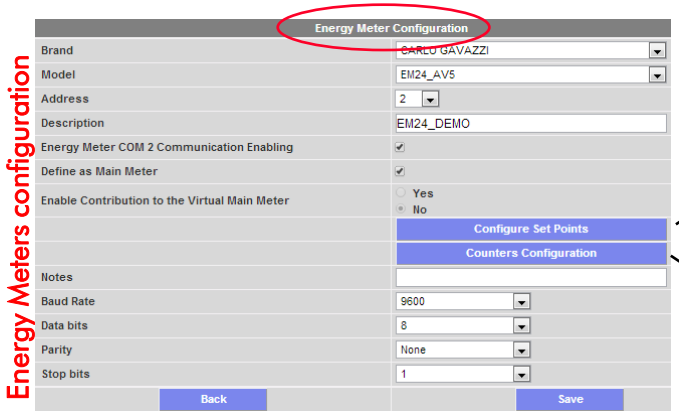
- *Import plant configuration*
- *Disaster recovery function*

Setting PLANT page:

VMUC-EM main setting



Full configuration of all the Array modules (VMUM, VMUO and VMUP) plus a partial configuration of the connected Energy Meters.

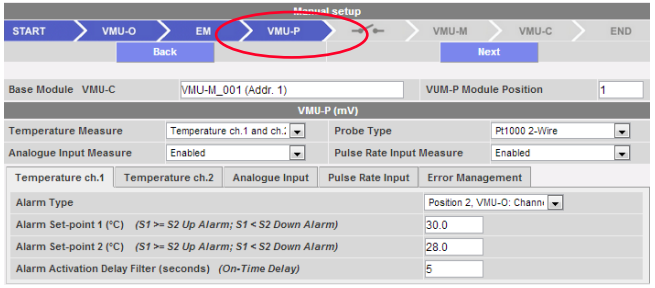


Configure Set Points

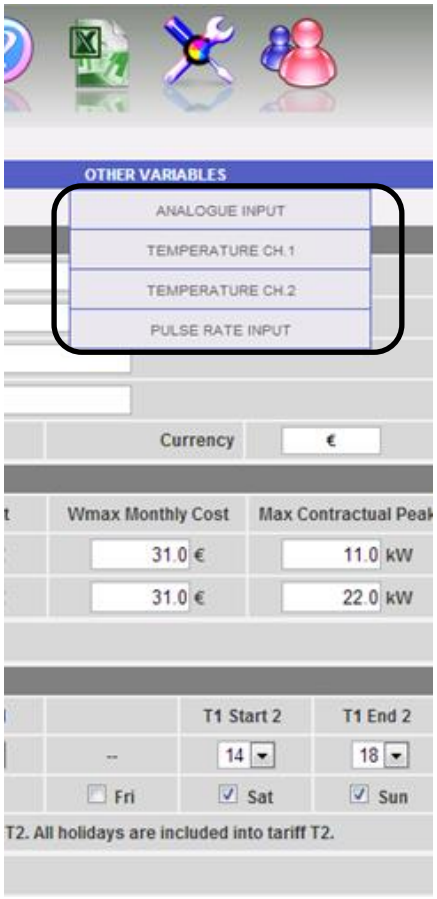
Counters configuration

Array modules configuration:

- VMU-O
- VMU-P
- VMU-M
- VMU-C



Setting OTHER VARIABLES page:



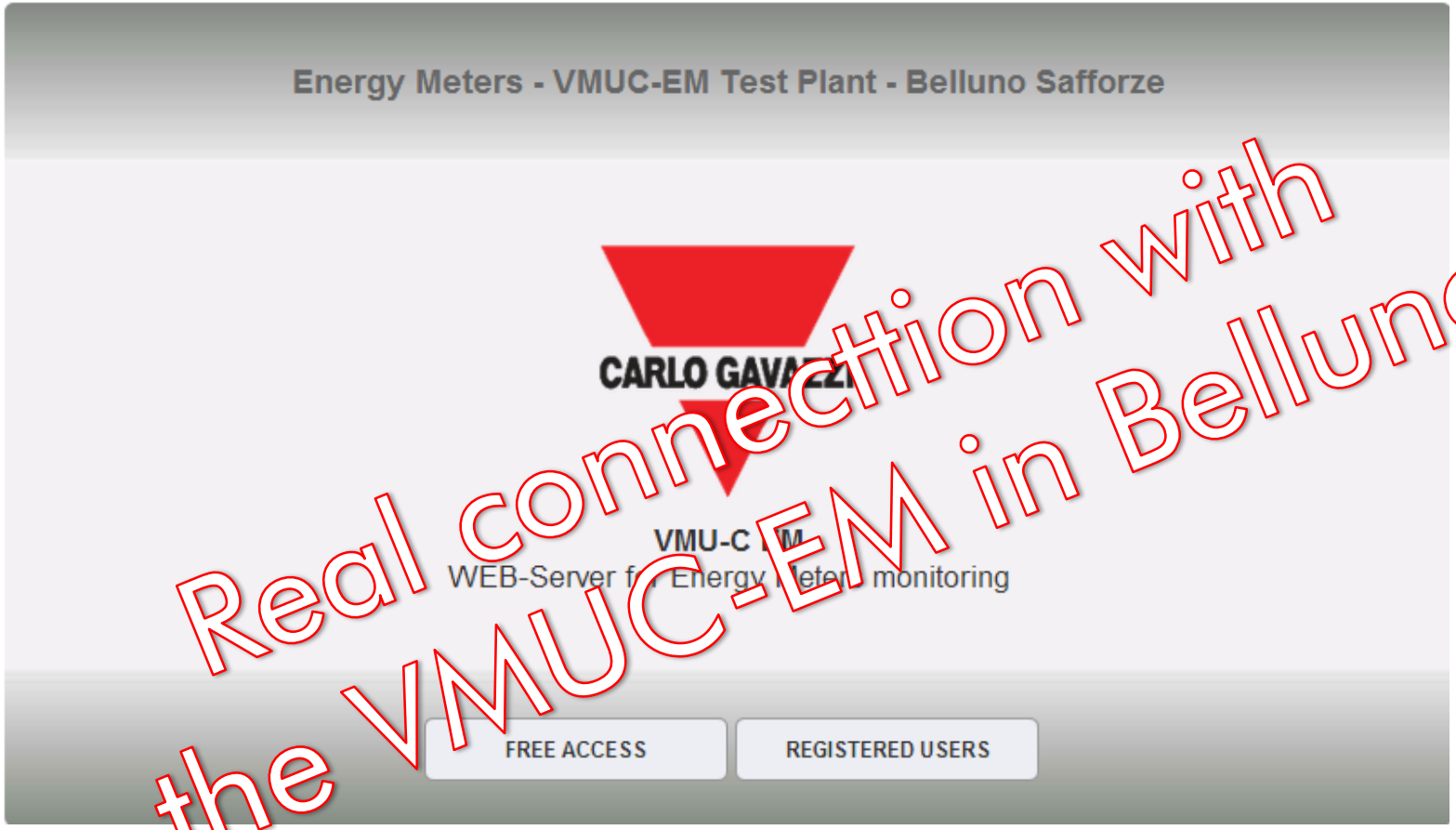
- Descriptions of the additional probes:
  - Temperature probes (Pt100 and Pt1000)
  - Analogue probes (mV and mA)
  - Pulse rate input (pulses)

ANALOGUE INPUT		
Description	VMU-M	
Analogue_In_mA	VMU-C_EM	Details
Analogue_In_mV	VMU-M_001	Details

Temperature ch.1		
Description	VMU-M	
VMUC_Temp_ch1	VMU-C_EM	Details
VMUM_Temp_ch1	VMU-M_001	Details

PULSE RATE INPUT		
Description	VMU-M	
Pulse_Rate_Input	VMU-C_EM	Details
Pulse_Rate_Input	VMU-M_001	Details

Online Web Server (WMUC-EM): www.carlogavazzi-vmuc.com



Real connection with the VMUC-EM in Belluno

Username: user Password: user