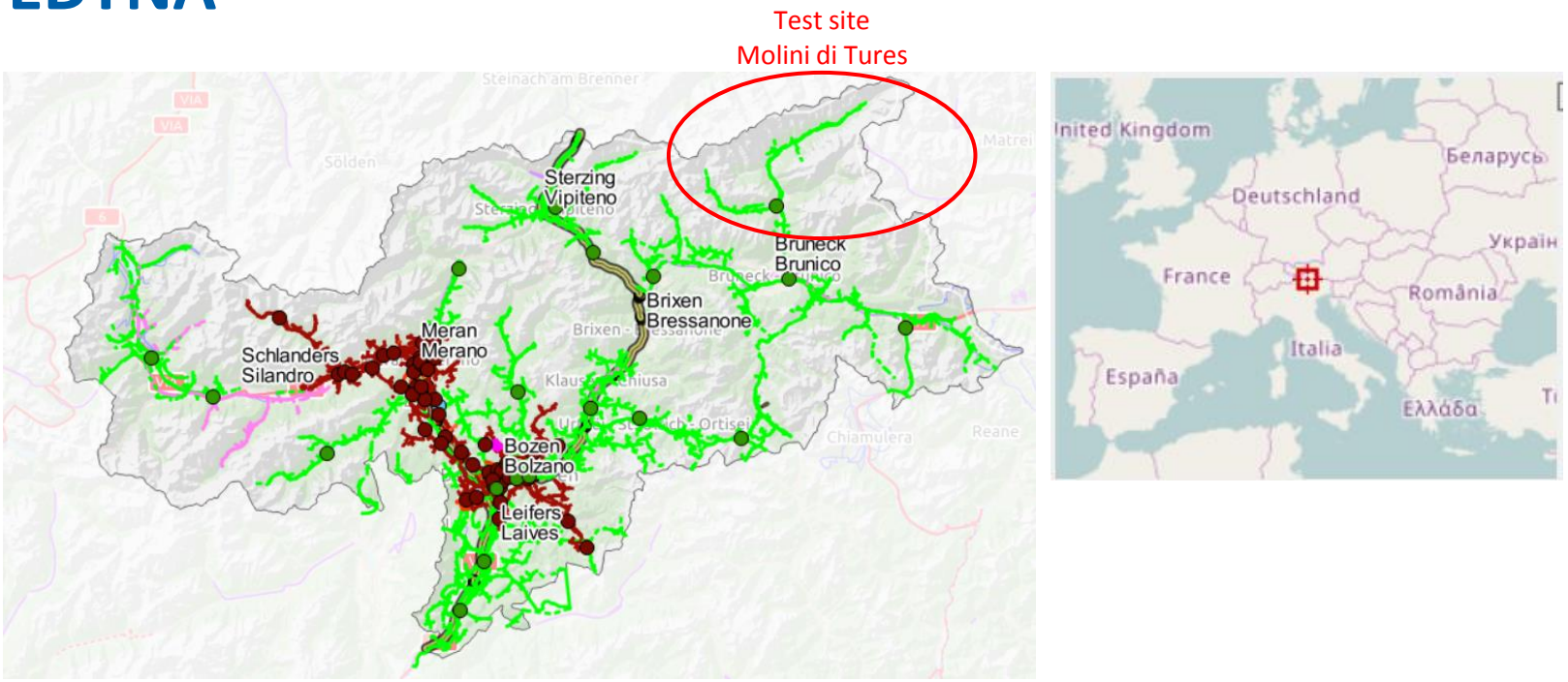
EDYNA



DSO of South Tyrol, Autonomous Province of Bolzano, alpine region in north Italy:

- 8705 km of feeders (HV, MV and LV)
- 54 primary substations HV/MV
- 4225 secondary substations MV/LV
- 240000 customers connected on our electric net

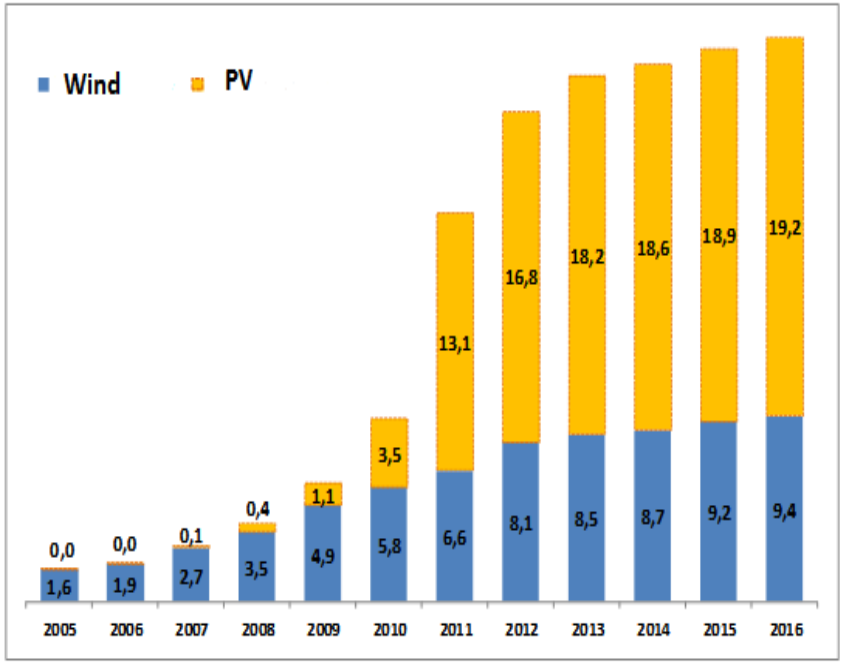
In South Tyrol there are other 2 DSO connected with the TSO (TERNA), and 48 small DSO connected to EDYNA

Italian context

Energy situation

Large increasing of RES in the last 10 years

New issues in terms of power management of the electrical grid



NEW CHALLENGES

- **Active Power rise up from MV to HV grid**
- **Unpredictability of RES**
- **Needs to improve the infrastructure for monitoring and control of MV and LV levels**

Italian Pilot Project - Implementation in field

MV grid of substation of Molini di Tures – Site of the SmartNet Italian pilot

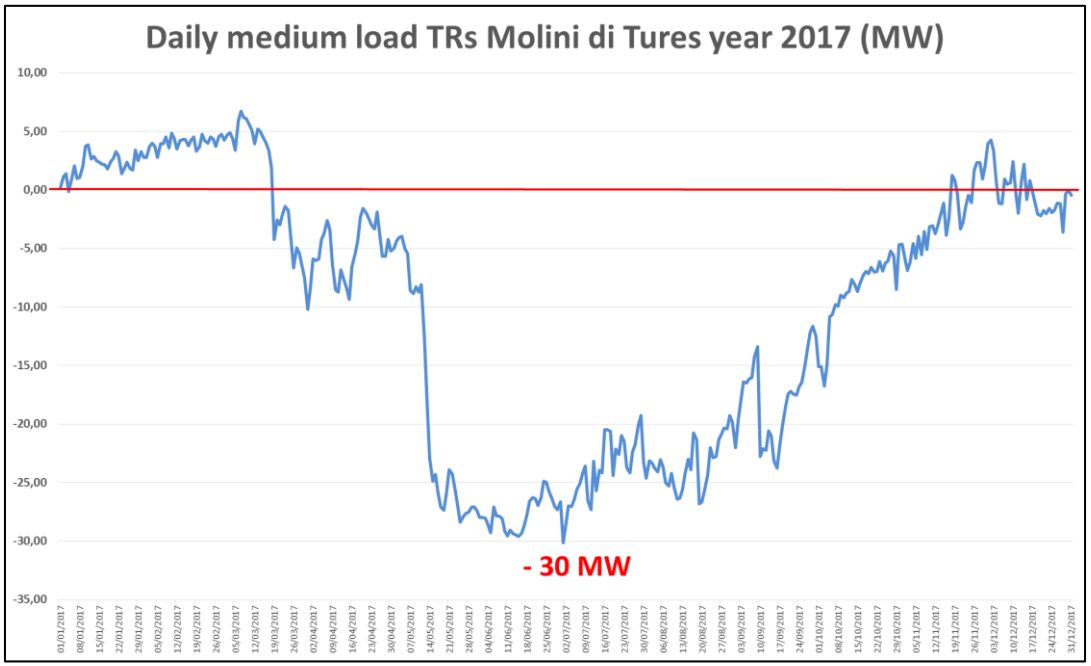
Substation of Molini di Tures:

2 x TR 40 MVA 132/20 kV.

MV generation: 33 generators with 43.5 MW of power (41.7 MW hydro, 1.5 MW thermo, 0.2 MW FV).

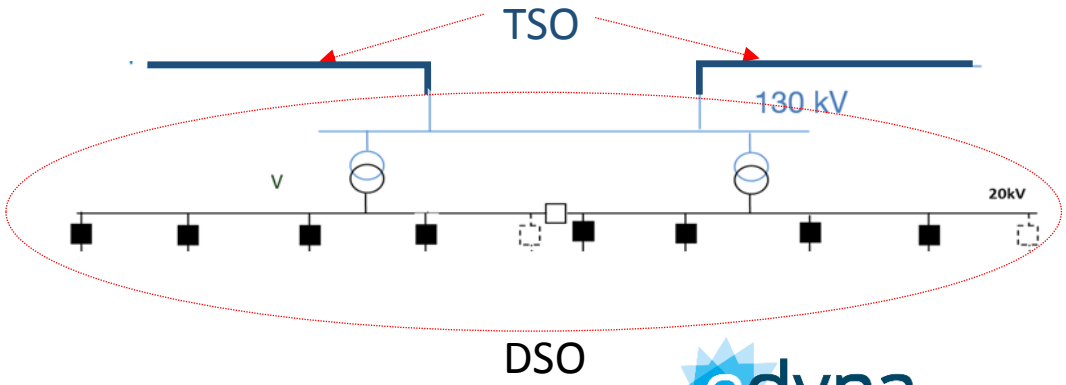
Others 0,85 MW of generation in LV (0,73 MW FV).

Also there are 9,6 MW of generation waiting to connect to the grid.



In Italy the property of the primary substations HV/MV is of the DSO, but the HV feeders are of the TSO.

The property border is at the end of the HV feeder, where it comes in substation.



Italian Pilot Project

Goals and solutions

The italian pilot project would like to implement new features for an innovative experimentation in field

Aggregation of information
in real time at the interconnection point between TSO-DSO (HV/MV transformer).

Voltage regulation
development of an architecture and implementation in field of a system for the voltage regulation by generators connected to HV and MV levels

Power-frequency regulation / balancing
development of an architecture and implementation in field of a system for the power-frequency regulation by generators connected to HV and MV levels

Aggregation of information

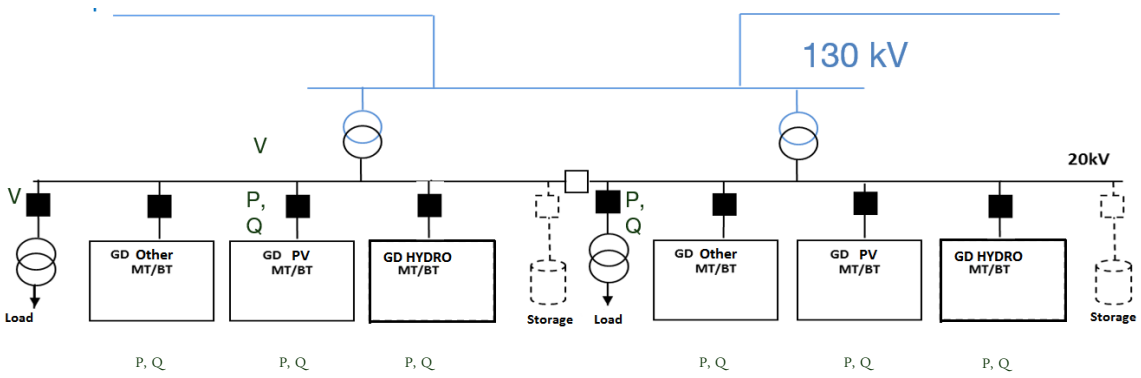
Implementation in pilot project

Data to be included in the aggregation

Nominal data
Total power installed

Load and generation
Real time data in terms of P and Q for all the sources

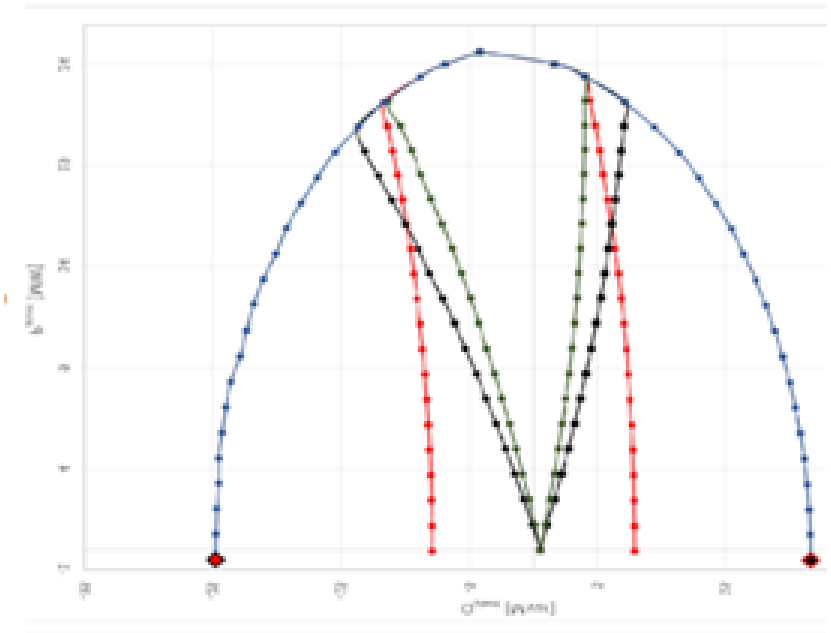
Forecast Data
P for all the sources



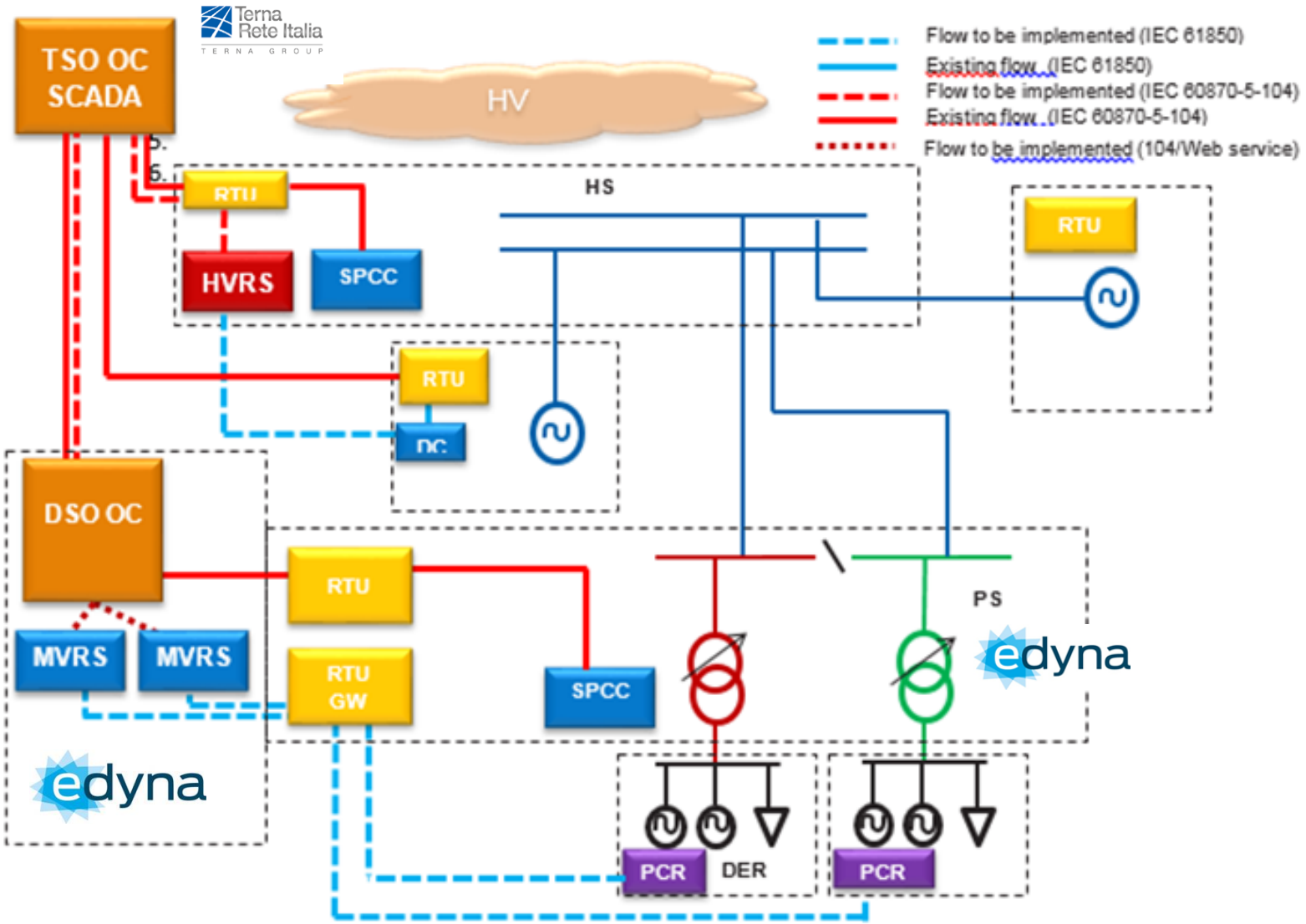
«Aggregate» of information at electrical node level

Virtual Capability

Virtual capability: it represents the **operational limits** in terms of P and Q, updated also considering the **operation point in real time** at the interconnection point. The construction of virtual capabilities is carried out by the DSO, because the limitation consider also **information about the topology** of the distribution network.



System architecture

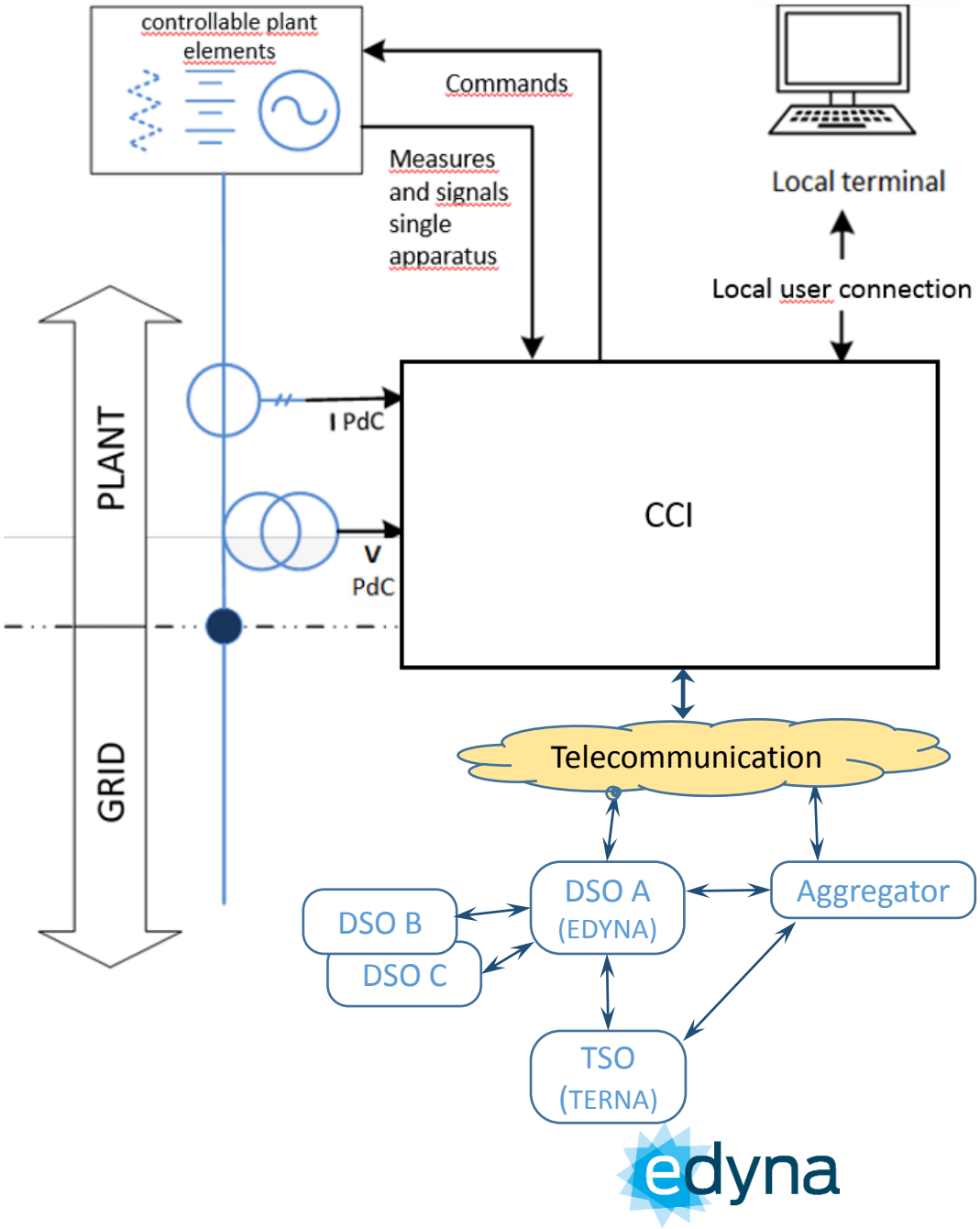


CCI and PCR

The Italian standardisation body CEI (*Comitato Elettrotecnico Italiano*) is working to define the characteristics of the CCI, *Controllore Centrale d'Impianto*, the device required to control and to measure the DERs in MV grid.

In SmartNet, in the Italian pilot, we are testing the PCR, *Plant Central Regulator*, that is a prototype of CCI, with similar characteristics.

On the side there is represented a hypothesis of information exchange still under evaluation.



Thank You

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