

PROZA NET -

Digitalna platforma za kritičnu infrastrukturu

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KONČAR



Zašto imamo digitalne platforme?

- Olakšano povezivanje digitalnih sustava – ubrzani razvoj funkcija
- Prilagodba sustava krajnjem korisniku – dodatna vrijednost
- Ljepilo koje povezuje aplikacije i uređaje!

Aplikacije / Usluge

Digitalne platforme

Broker

Middleware

Enterprise Service Bus

...

IT Infrastruktura (Operacijski sustavi, mrežna oprema)

Gdje se koriste digitalne platforme u KI?

Kritična infrastruktura

Struja

Voda

Plin i nafta

Željeznice

Podatkovni centri

Odašiljači i veze

Osnovne funkcije

Vođenje sustava

Naplata usluge

Gdje se koriste digitalne platforme?

OT sustavi

SCADA

EMS

DMS

RT AMI

FLISR

ADMS

IT sustavi

GIS

Asset Mgmt

Device Mgmt

AMI MDM

CRM

ERP

Osnovne funkcije

Vođenje sustava
(npr. SCADA)

Naplata usluge
(npr. Billing)



Gdje se koriste digitalne platforme?

OT sustavi

SCADA

EMS

DMS

RT AMI

FLISR

ADMS

Digitalna platforma

Real time
sabitnica

CIM Model Mgmt

Data Lake

Security

IT sustavi

GIS

Asset Mgmt

Device Mgmt

AMI MDM

CRM

ERP



Kako to radimo u Končaru?

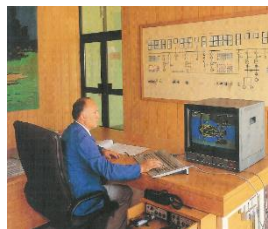
- Integracija postojećih i najnovijih tehnologija u jedan digitalni sustav
- Rezultat više od 40 godina iskustva u razvoju softvera

PROZA C/A



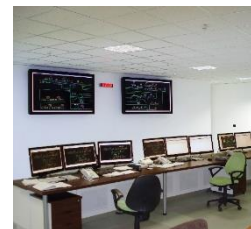
1984.

PROZA R/F



2008.

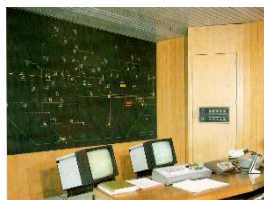
PROZA NET v.3.0



1979.



2019.



PROZA D/R

1995.



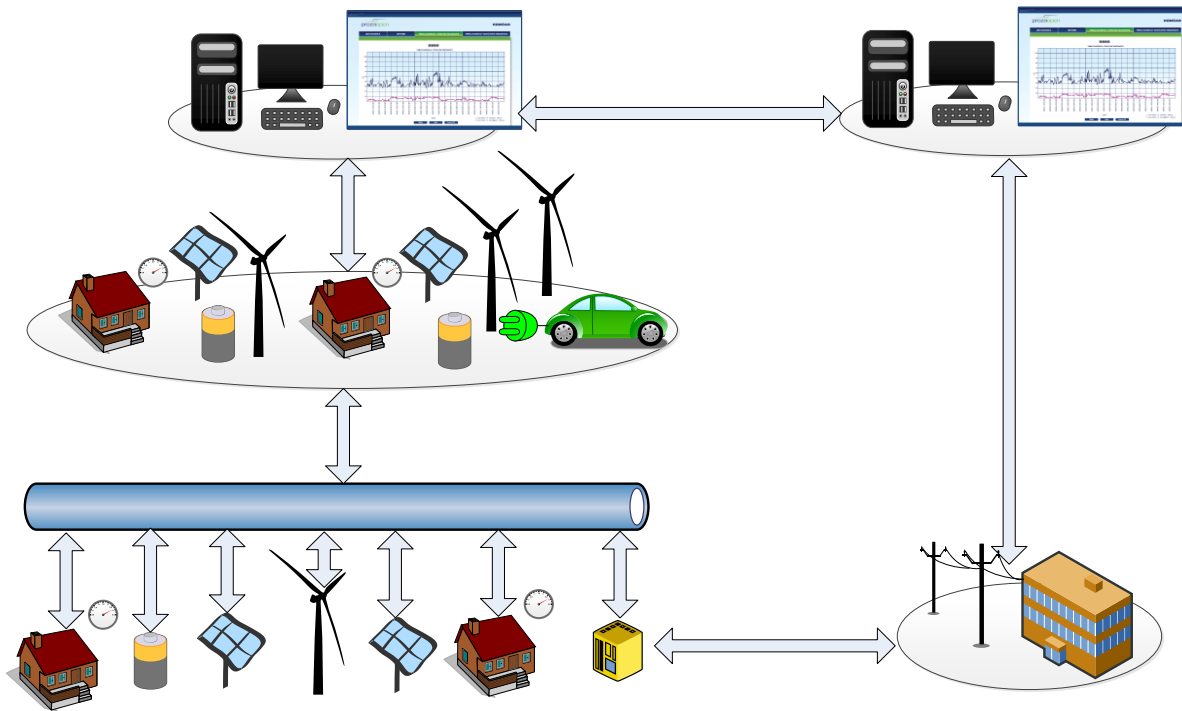
PROZA NET v1.0

2015.

prozanet
v3.5

SCADA – Supervisory Control and Data Analysis

- Digitalized data – > **information**
- Data acquisition – > **analysis**
- Power systems – > **digital transformation**



prozanet

prozalkku

prozaagc

KONČAR

4 načela PROZA NET platforme



1#

PROZA NET – Prikupi sve digitalne podatke!

International standards

IEC 61850

IEC 60870-5-101/103/104

DNP3 Serial/TCP

OPC / OPC UA

SNMP

ICCP / TASE.2

Proprietary non-standards

Modbus Serial / TCP

Courier

SPA

LON LAG 1.4

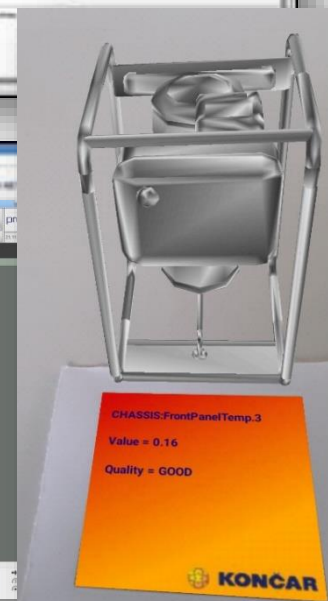
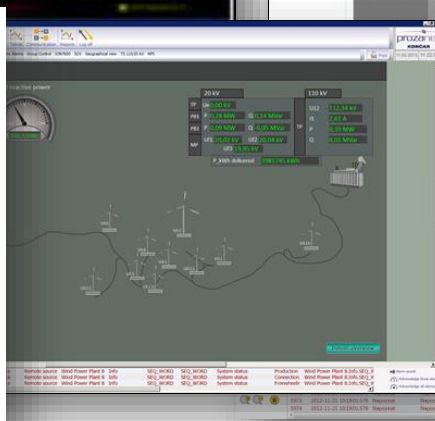
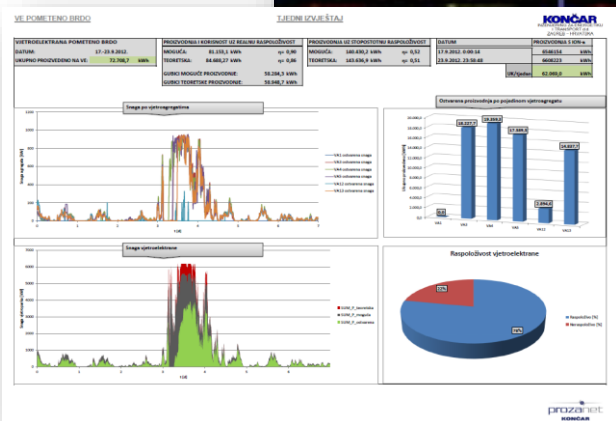
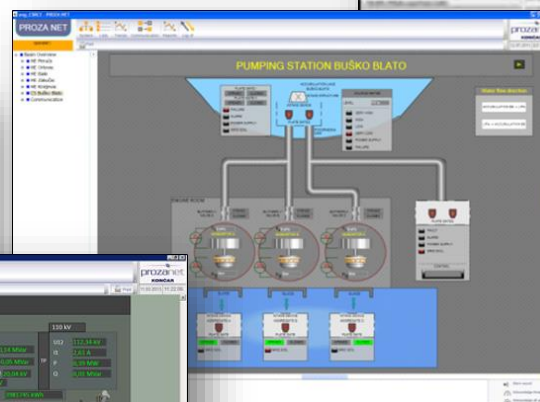
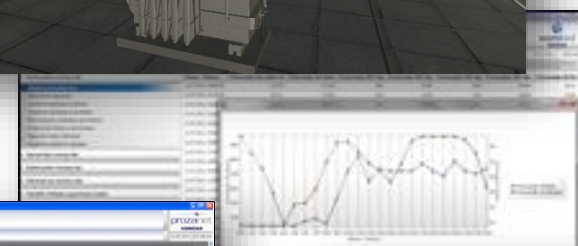
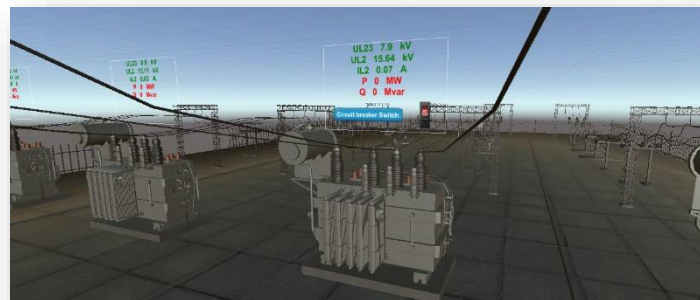
ILSA

...

2#

PROZA NET – Vizualiziraj bilo kakav sustav!

- HMI / GUI Framework
- Dinamičko bojanje mreža
- Pristup putem Web-a
- Proširena stvarnost

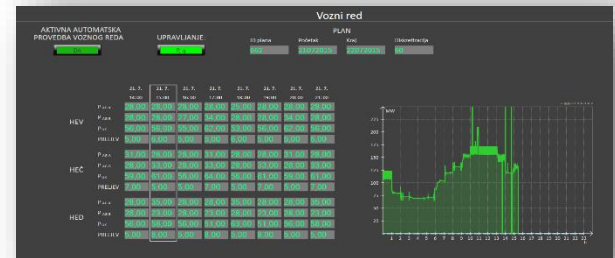
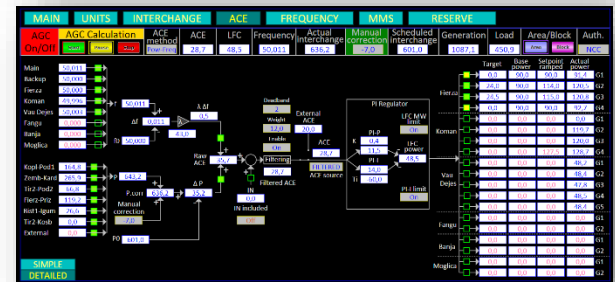
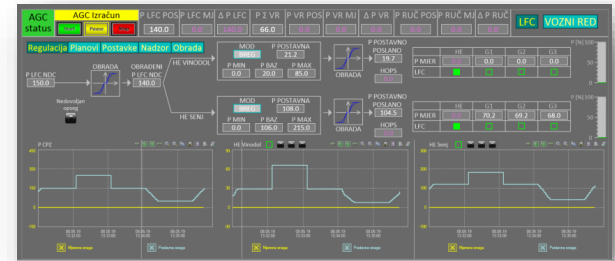
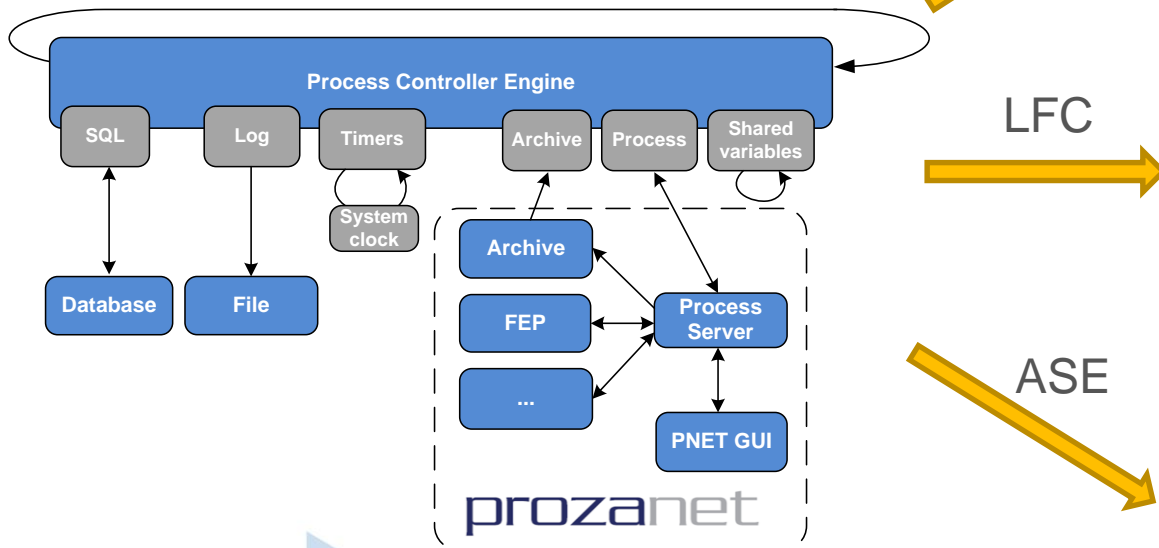


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3#

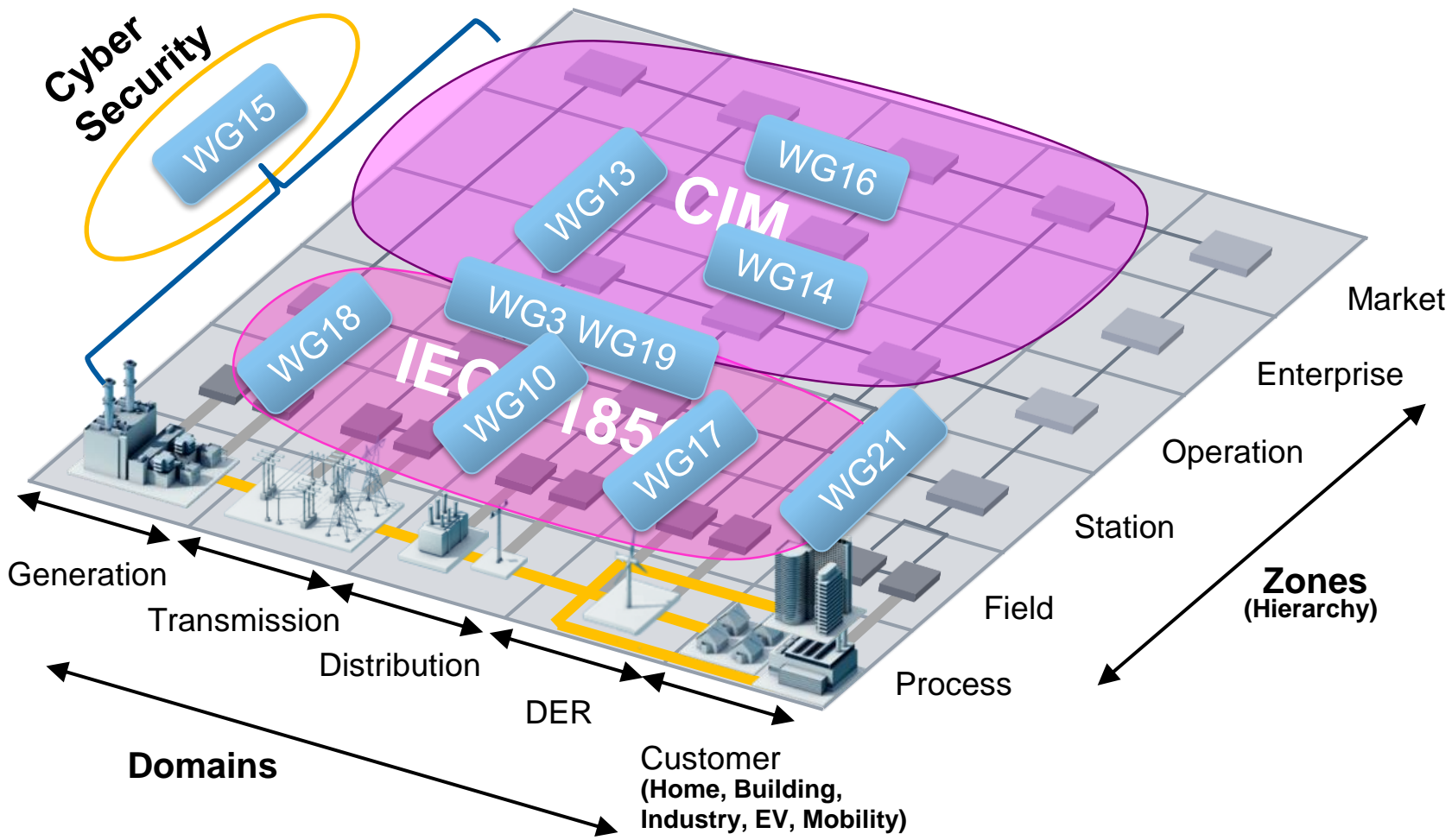
PROZA NET – Automatiziraj bilo kakav sustav!

- Soft PLC platform
- Brzi razvoj prototipa – Python, JavaScript
- Linux i Windows podrška
- Primjena umjetne inteligencije



3#

Kibernetička sigurnost – tema svih IEC zona

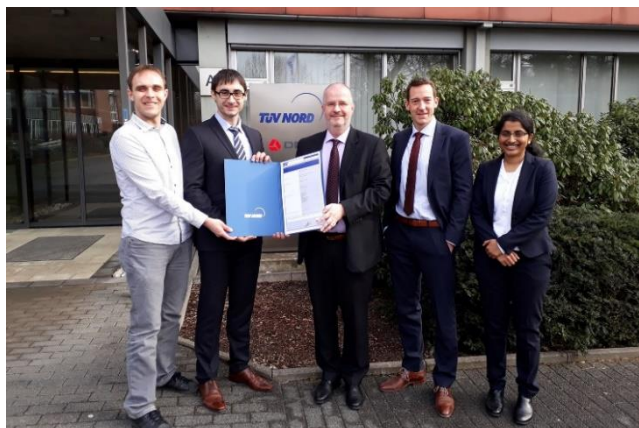


KONČAR digitalna platforma PROZA NET

- Kibernetska sigurnost kritične infrastrukture
- IEC 62443-2-4 – kibernetski sigurni SCADA
- **Prvi certificirani sustav - svjetsko priznanje!**



prozanet

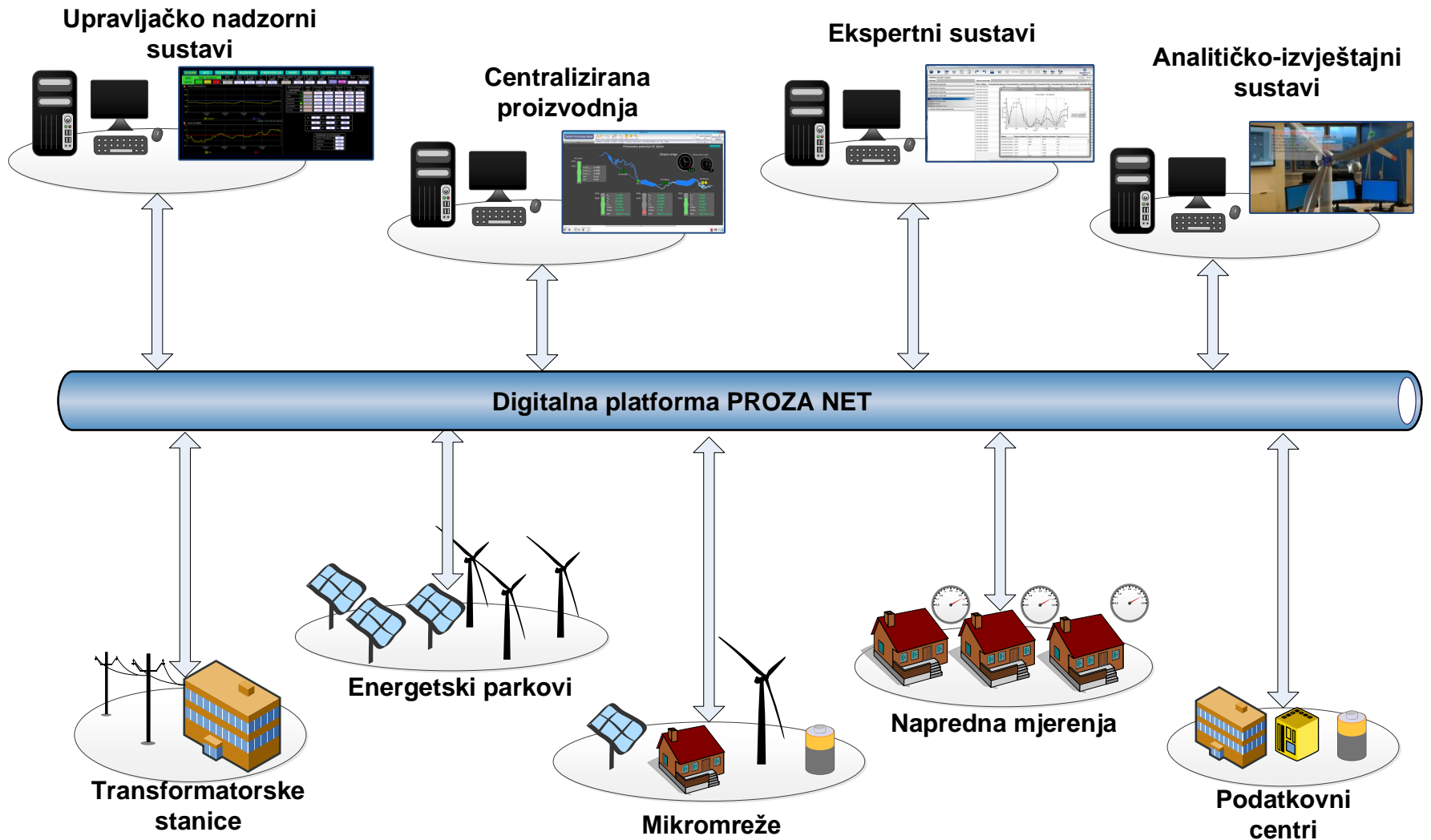


IEC IECCE		Ref. Certif. No.
		DE 7-0493
IEC System of Conformity Assessment Schemes for Electrotechnical Equipment and Components (IECEE)		
Certificate of Conformity – Industrial Cyber Security Capability		
Type	Solution Capability Assessment	
Name and Address of the Applicant	KONČAR-Power Plant and Electric Traction Engineering, Inc. Fallerovo 22, 10000 Zagreb, Croatia	
Certificate Coverage (including Version)	SCADA System / Integration Platform: PROZA NET V3.4	
Standard	IEC 62443-2-4: 2015 IEC 62443-2-4: 2015 AMD1:2017	
Requirements Assessed / Total Requirements	Solution Staffing (8/11); Assurance (4/7); Solution Hardening (7/9); Network Security (5/9); Data Protection (5/6); Wireless (0/8); SIS (0/12); Configuration Management (4/4); Remote Access (5/5); Event Management (3/8); Account Management (9/17); Malware Protection (7/8); Patch Management (7/12); Backup/Restore (6/9)	
Additional Information (if necessary may also be reported on page 2)	<input type="checkbox"/> Additional Informatics on page 2	
As shown in the Test Report Ref. No. which forms part of this Certificate	35230726	
This Certificate of Conformity, issued by the National Certification Body, certifies that the above have been found to be in conformity with the requirements of the Industrial Cyber Security Capability Scheme (IECEE DD-2001) as it relates to the claims declared by the Applicant.		
Date: 2016-12-20	Signature: Matthias Springer	

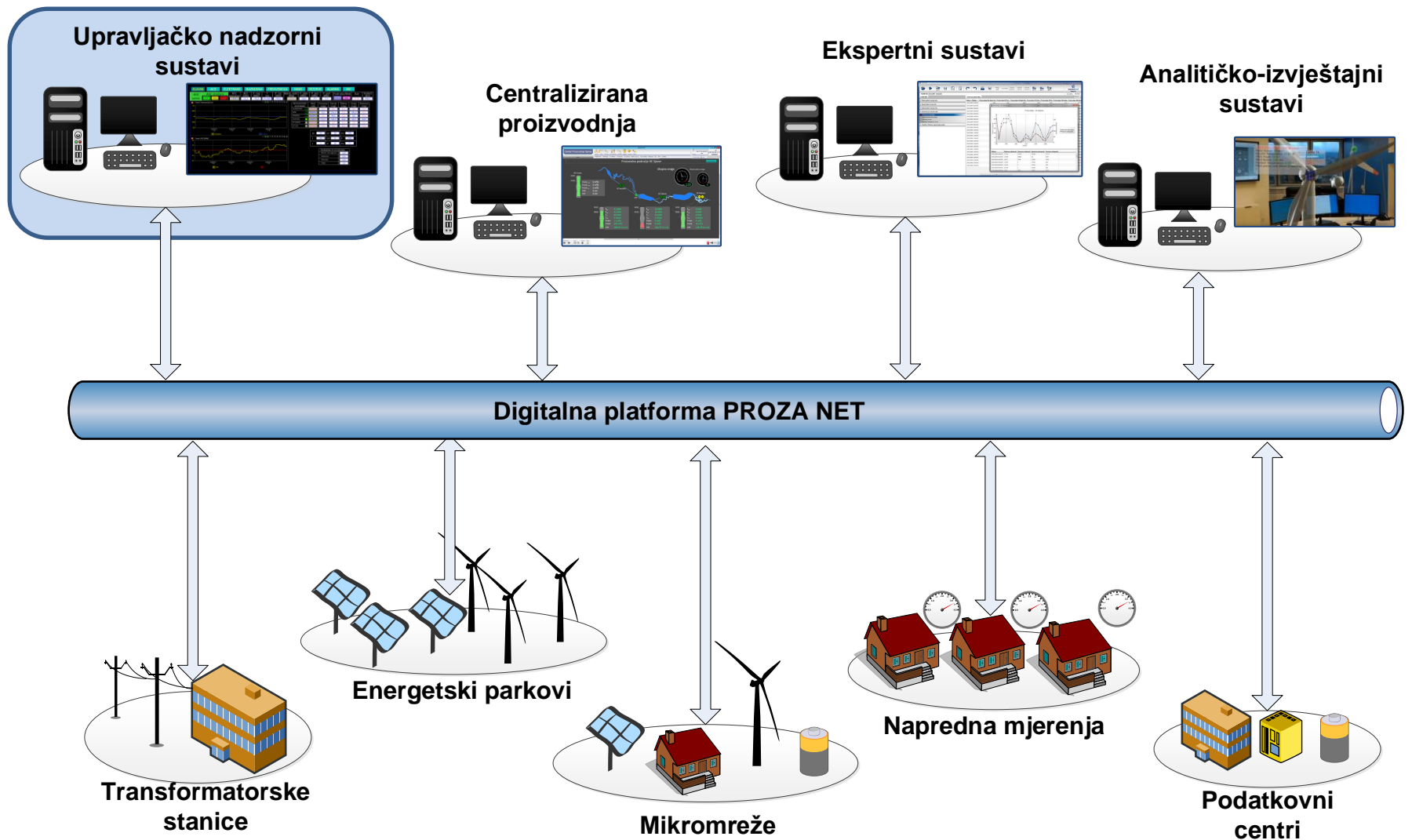
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Digitalna platforma za kritičnu infrastrukturu

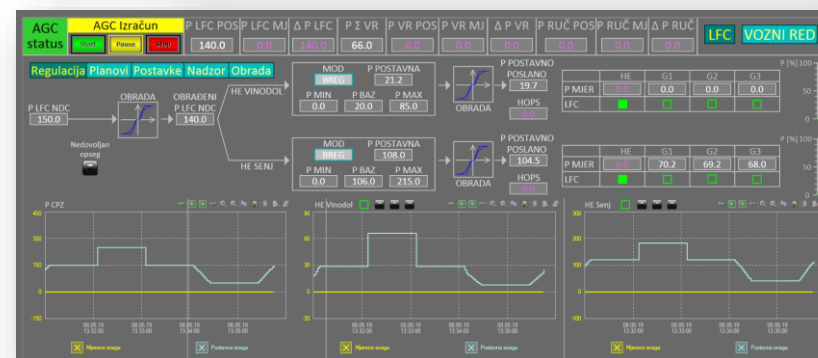
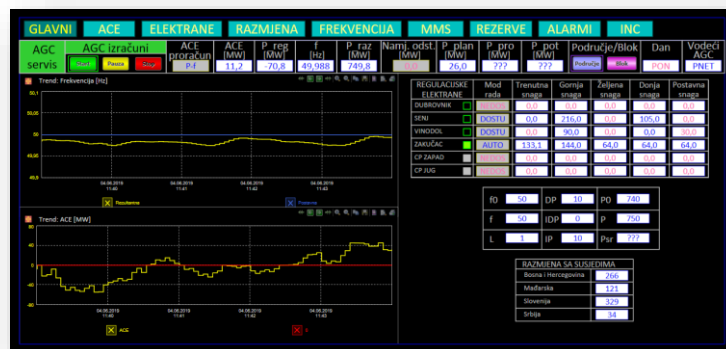
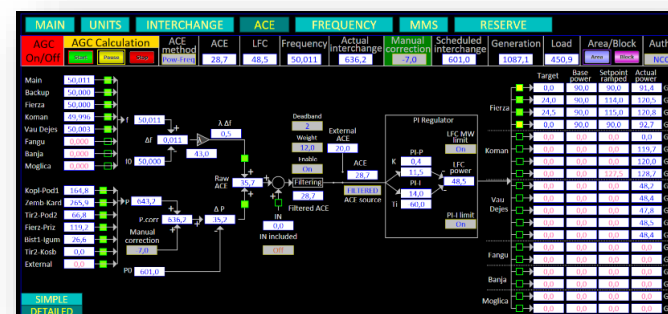


Digitalna platforma za kritičnu infrastrukturu

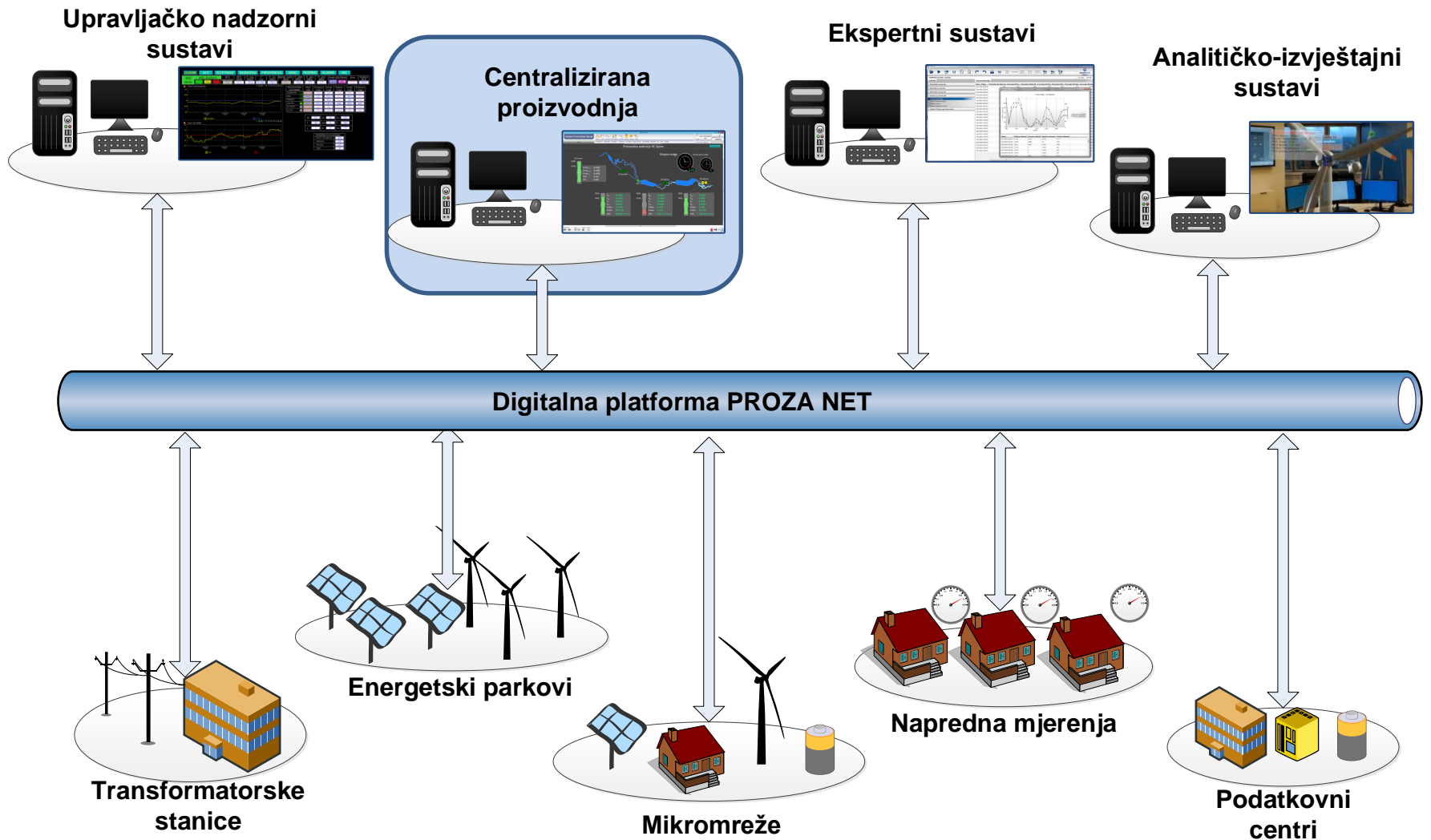


Upravljačko-nadzorni sustavi

- Projekti: **NDC AGC**
- Automatsko upravljanje proizvodnjom
- Upravljanje:
 - Regulacija frekvencije (LFC)
 - Vozni red (ASE)
 - Razmjena odstupanja (IGCC)

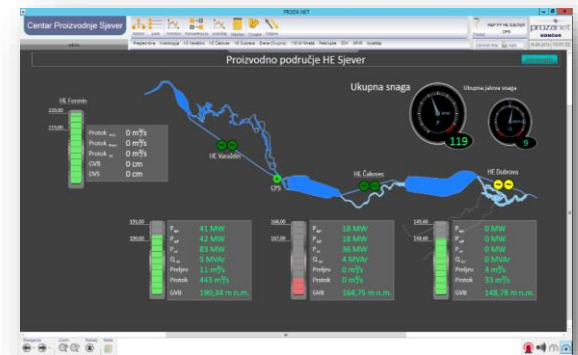
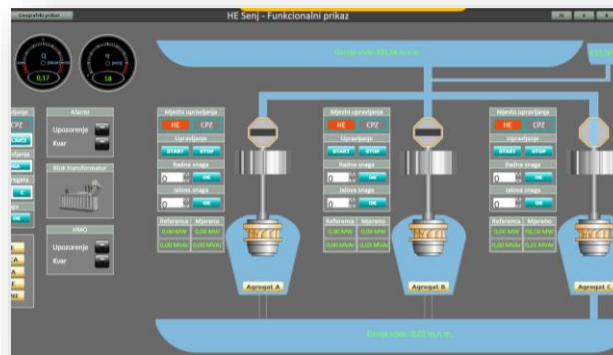


Digitalna platforma za kritičnu infrastrukturu

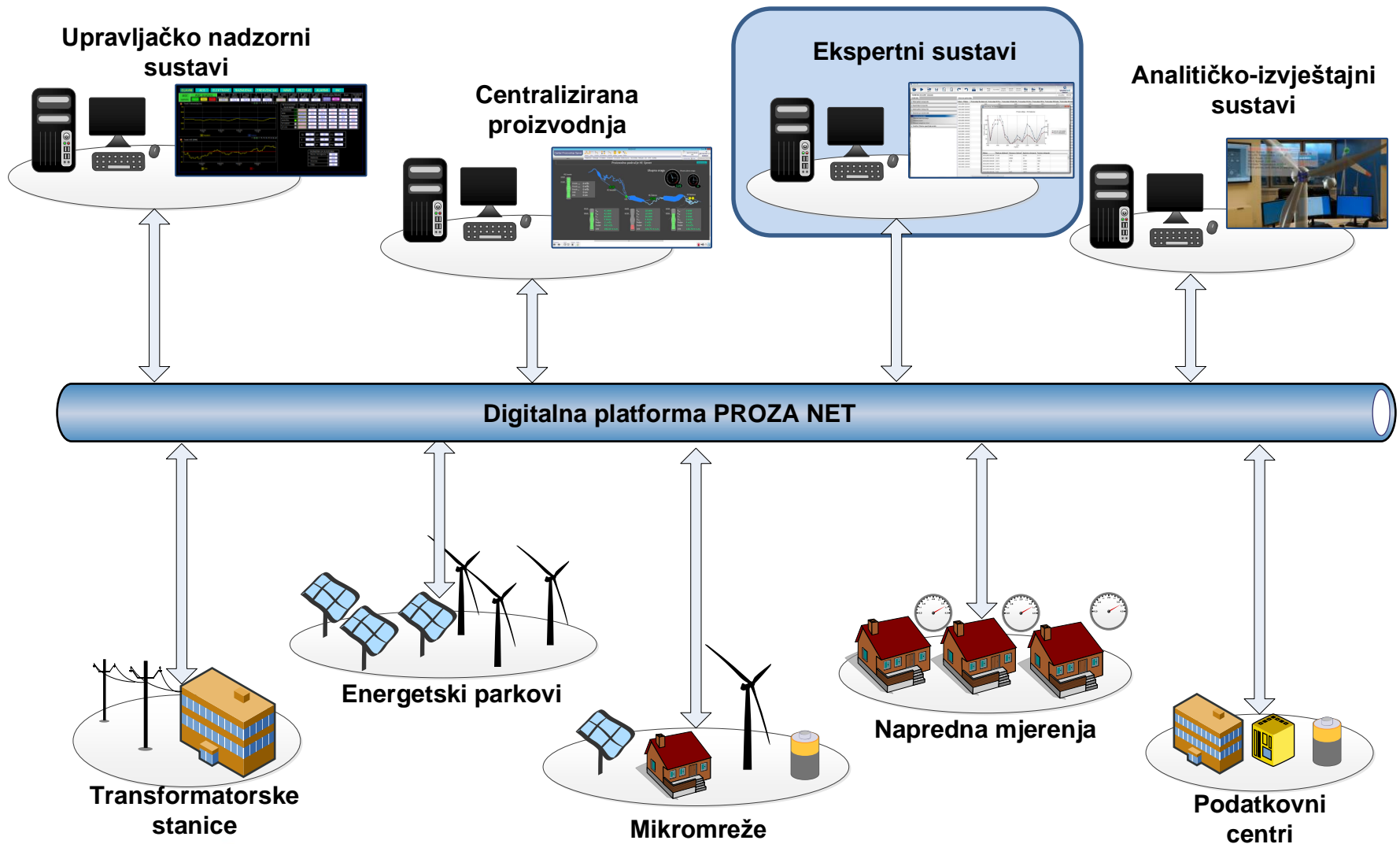


Centralizirana proizvodnja

- Projekt: **Centar Proizvodnje Sjever**
- 3 hidroelektrane na Dravi
- 250 MW instalirane snage
- Centralizirano upravljanje
- Optimizacija proizvodnje

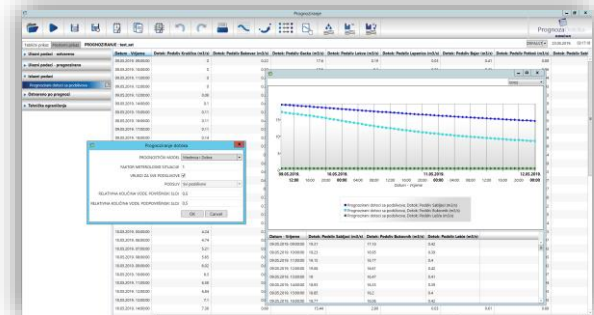
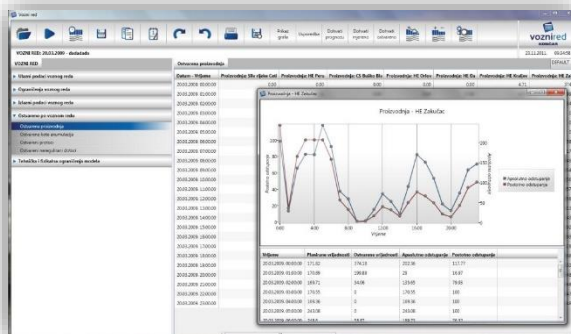
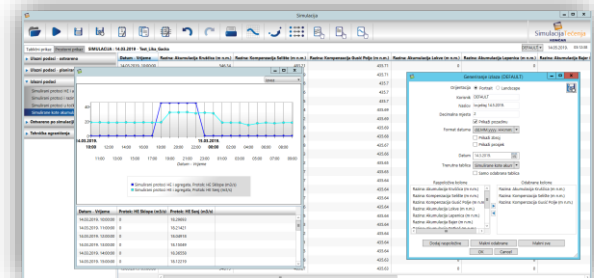
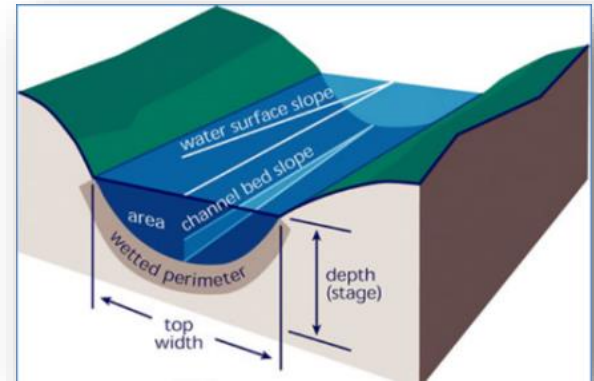


Digitalna platforma za kritičnu infrastrukturu

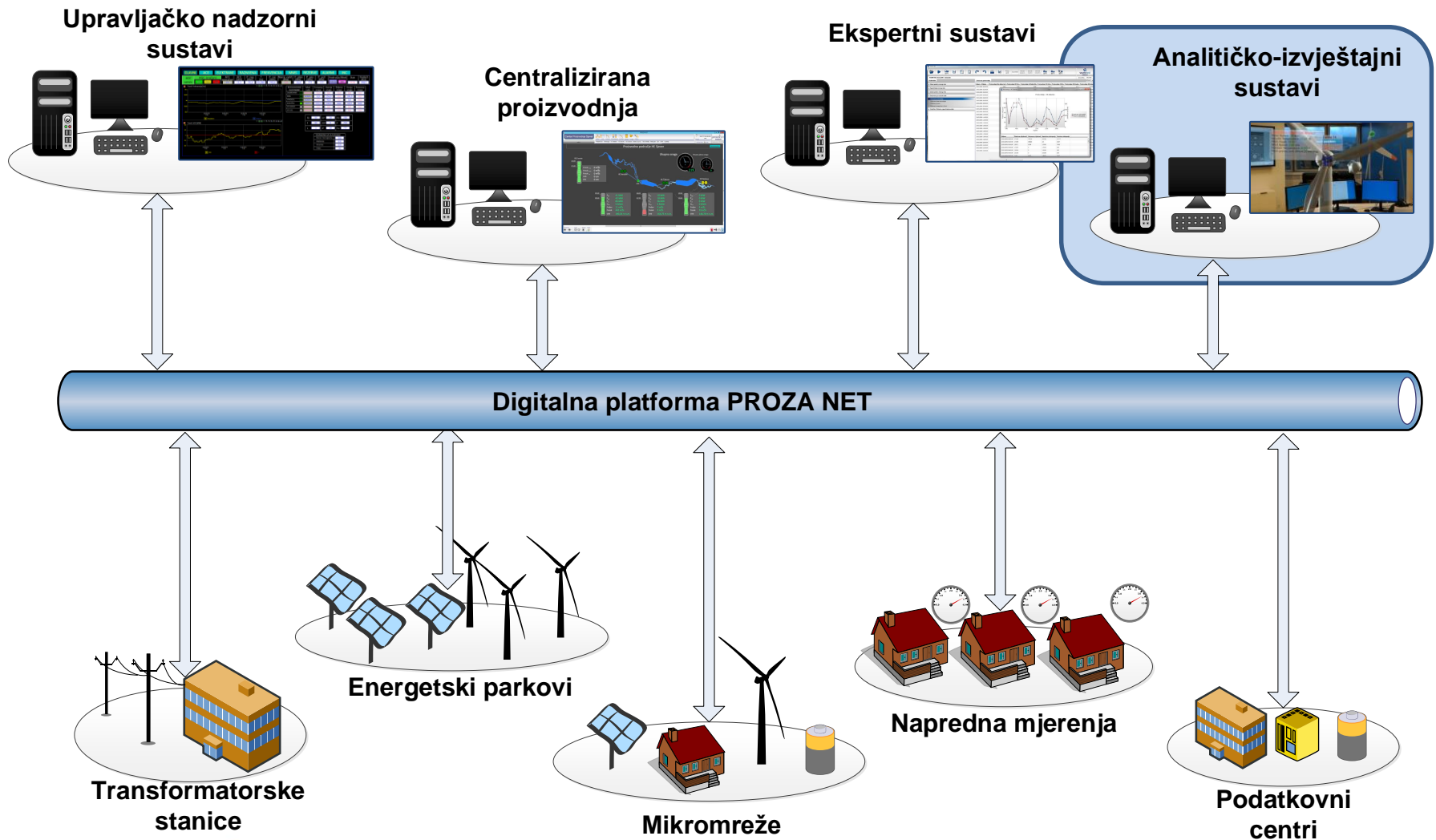


Ekspertni sustavi

- Projekt: **Centar Proizvodnje Zapad**
- Primjena AI tehnika
- Povećana proizvodnja (**ROI < 1 god**)
- Funkcije cilja:
 - Optimizacija proizvodnje
 - Praćenje dotoka
 - Kontrola poplava

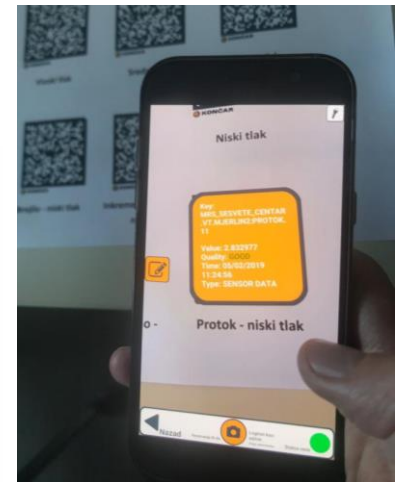
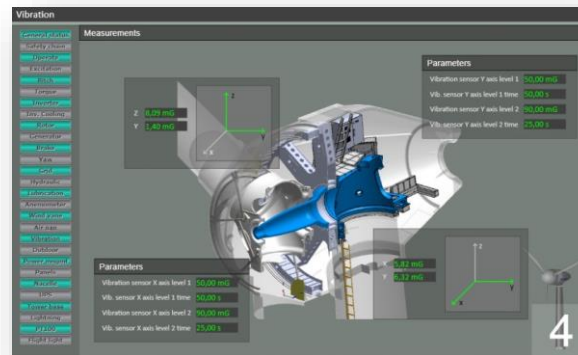


Digitalna platforma za kritičnu infrastrukturu

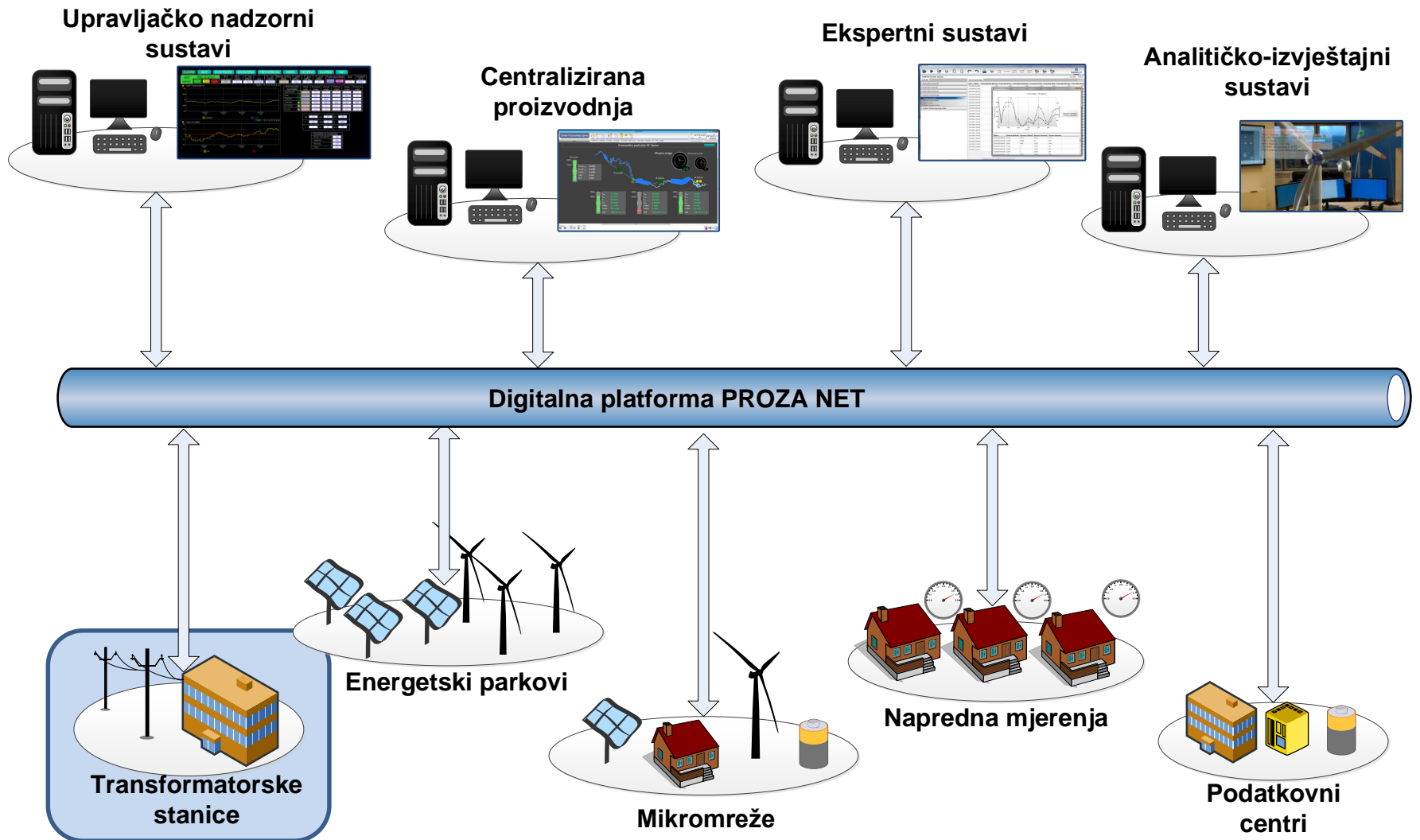


Analitičko-izvještajni sustavi

- Projekt: **RTGo (Pometeno brdo)**
- Digitalizacija održavanja
- Upravljanje timovima
- Automatsko izvještavanje
- Značajke
 - Proširena stvarnost
 - Termovizija
 - Hololens podrška

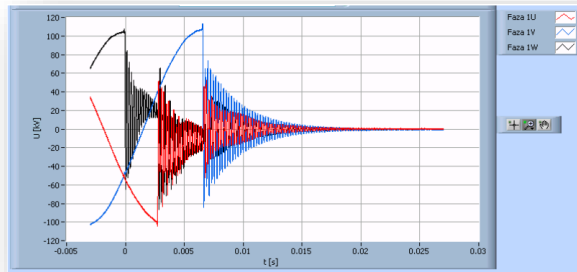
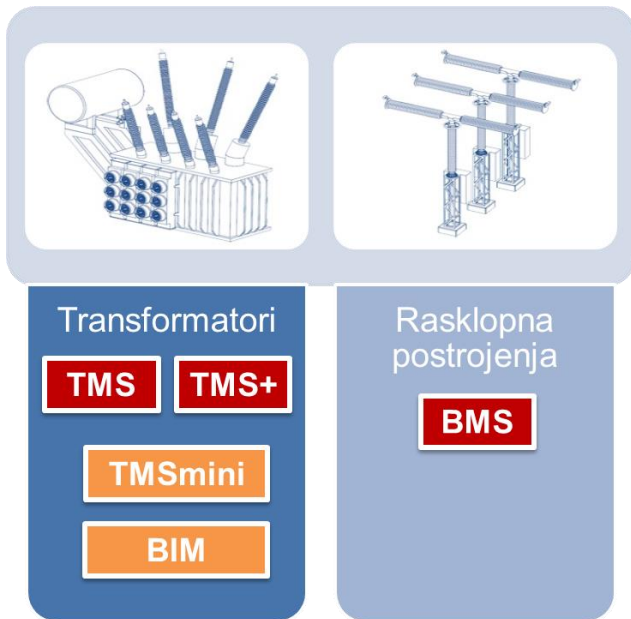


Digitalna platforma za kritičnu infrastrukturu



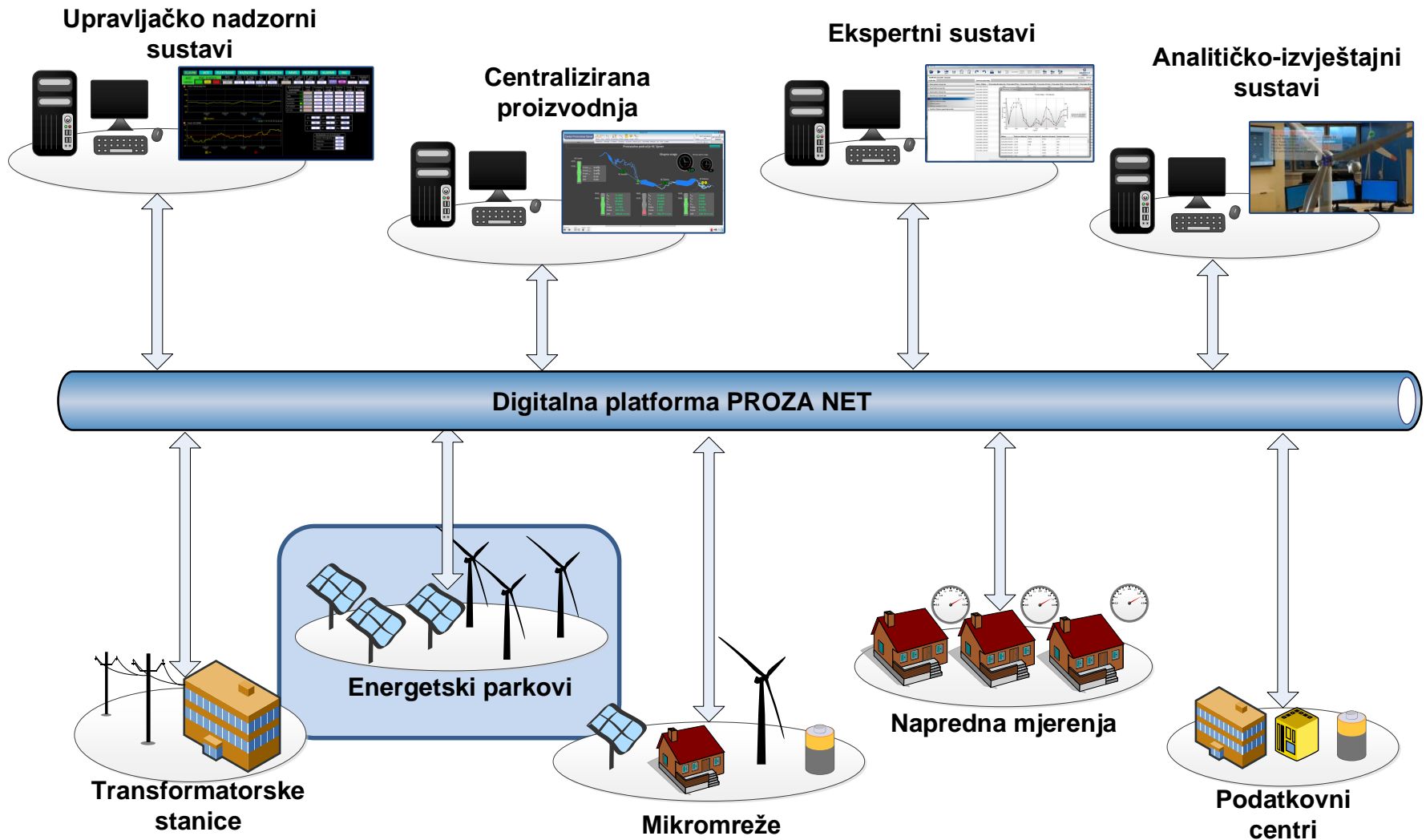
Transformatorske stanice

- Projekt: **OETC (Oman)**
- 400/220/110 kV
- Transformatori: (2x500MVA) & (2x125MVA)



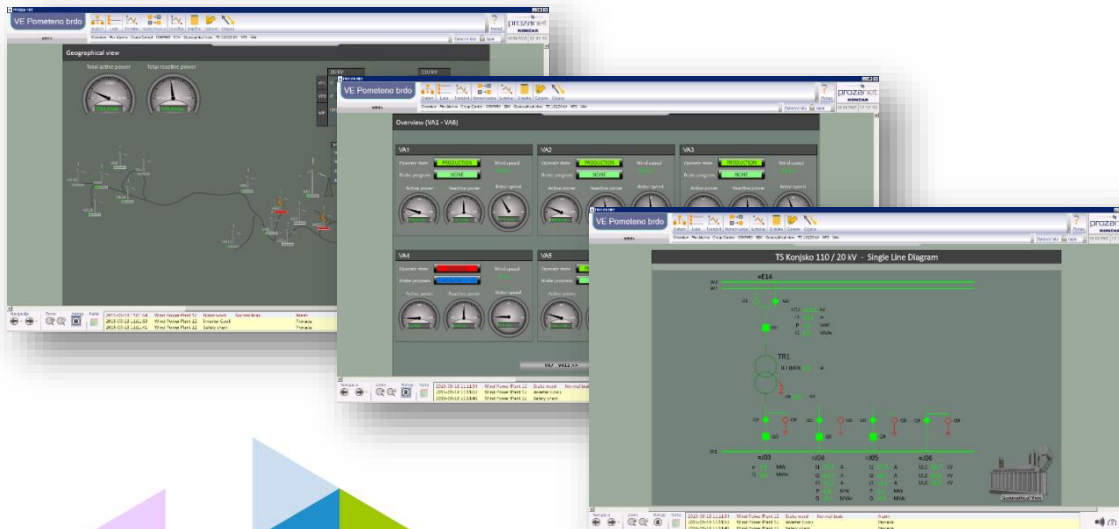
KONČAR

Digitalna platforma za kritičnu infrastrukturu

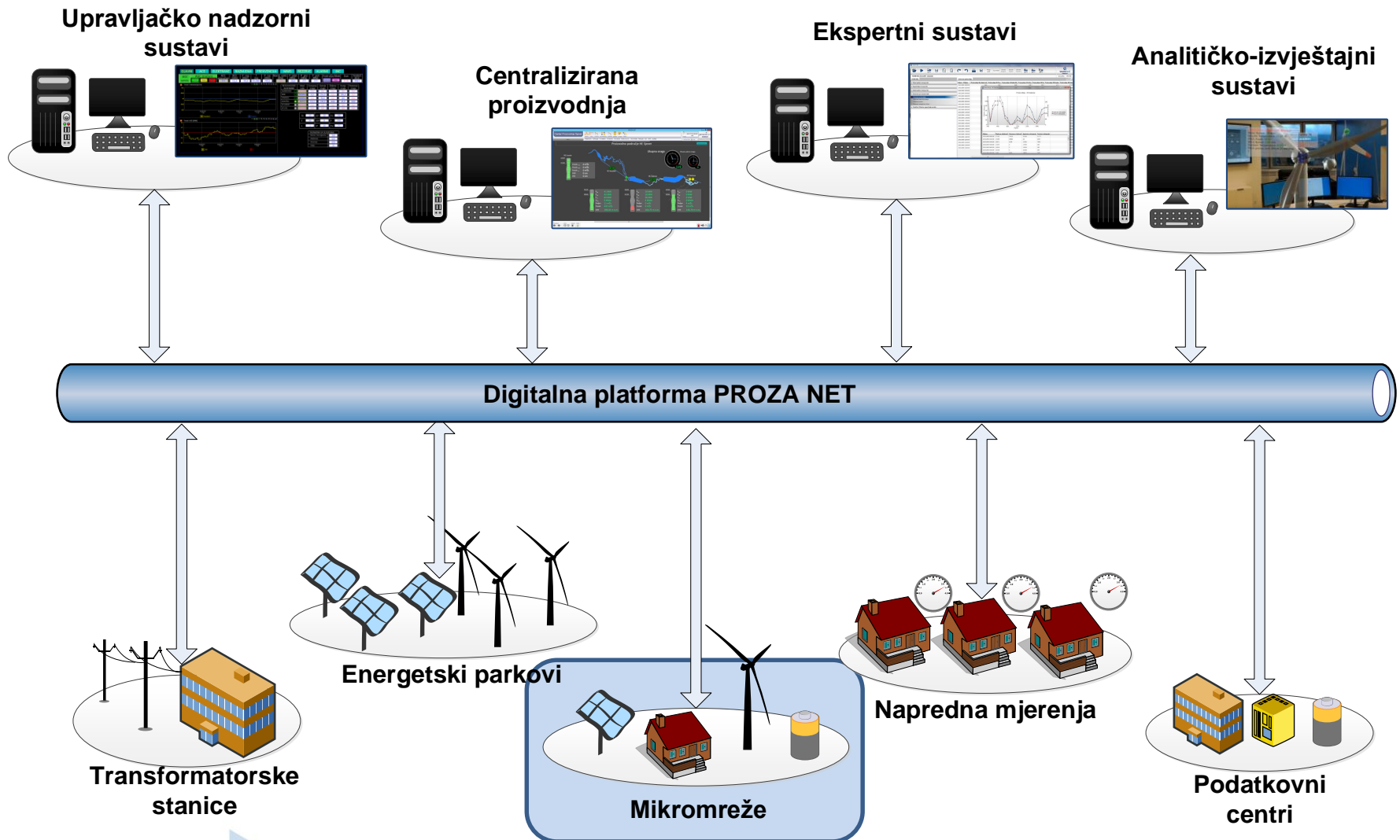


Energetski parkovi

- Projekt: **EP Pometeno Brdo**
- Vjetar + sunce + pohrana energije
- Virtualna elektrana različitih OIE
- Nadogradnja SCADA sustava
- Integracija s tržištem el. energije

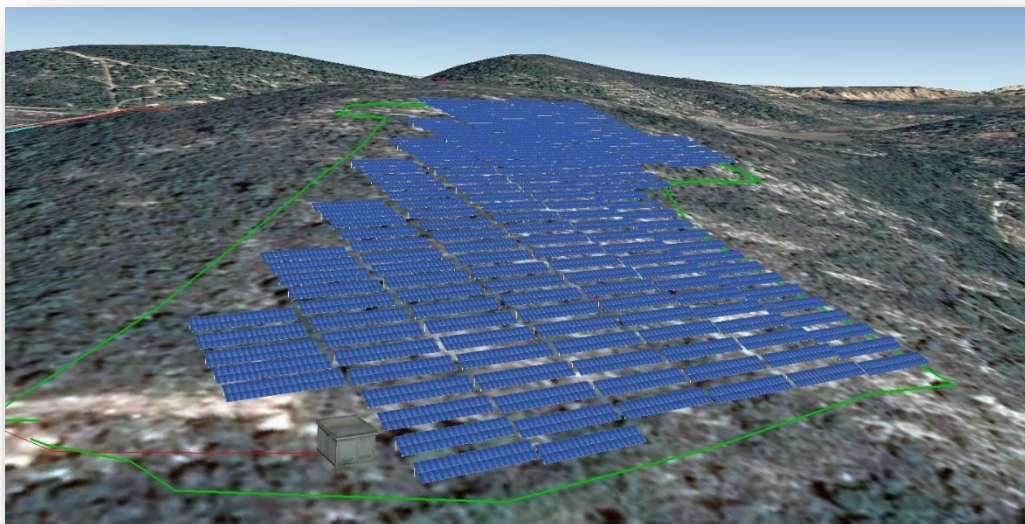


Digitalna platforma za kritičnu infrastrukturu



Mikromreže

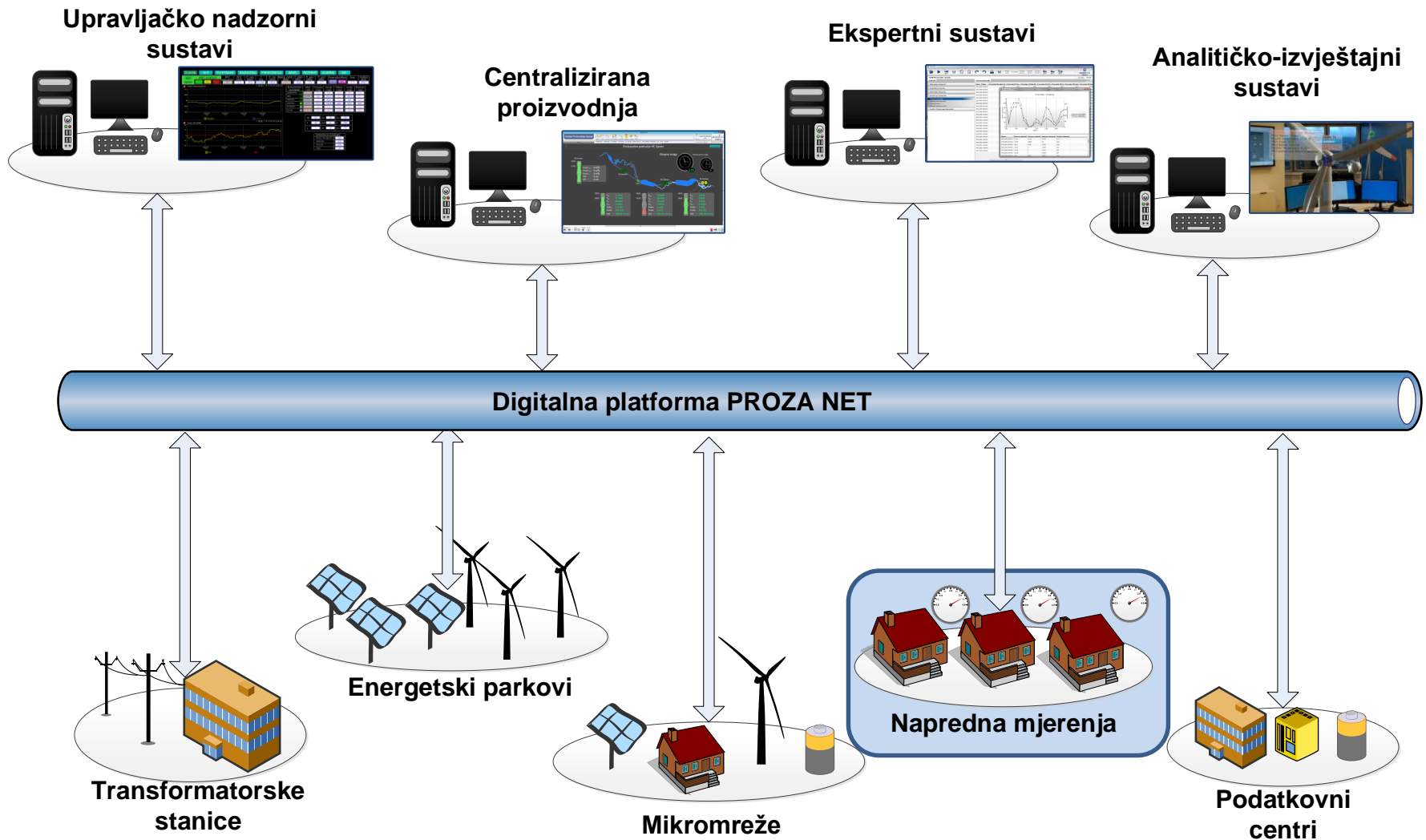
- Projekt: **Sunčana elektrana Vis**
- 2,7 MW instalirane snage
- PROZA NET - Otočni rad sustava



*Pretvarač razvijen u
KONČARU*

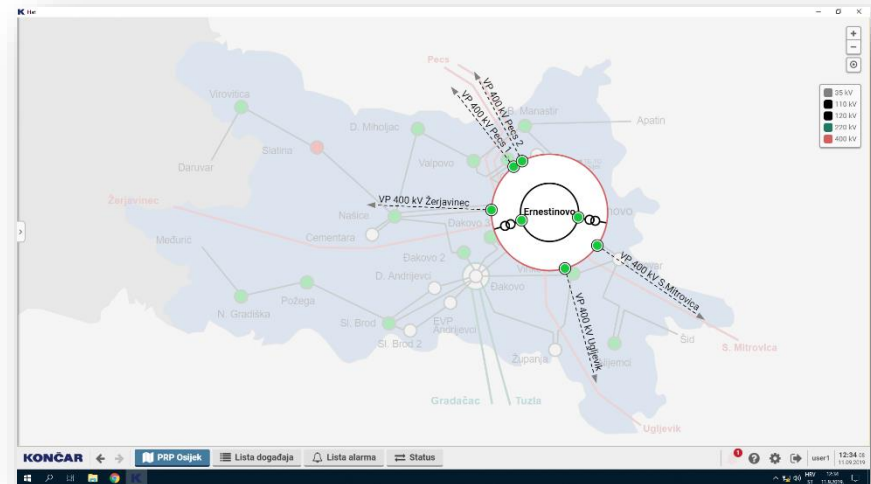
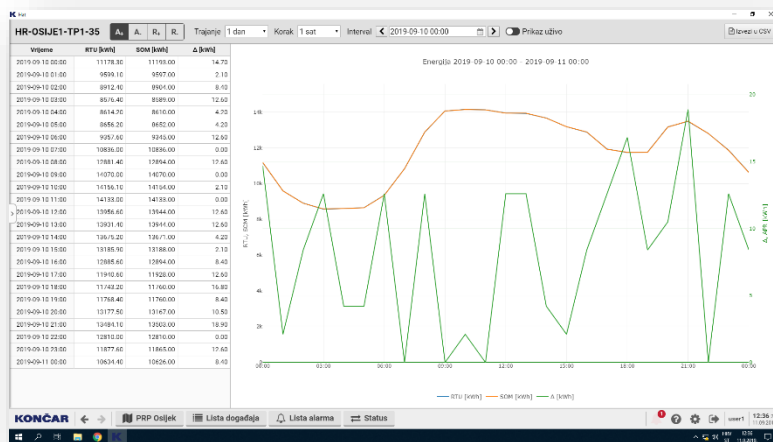
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Digitalna platforma za kritičnu infrastrukturu

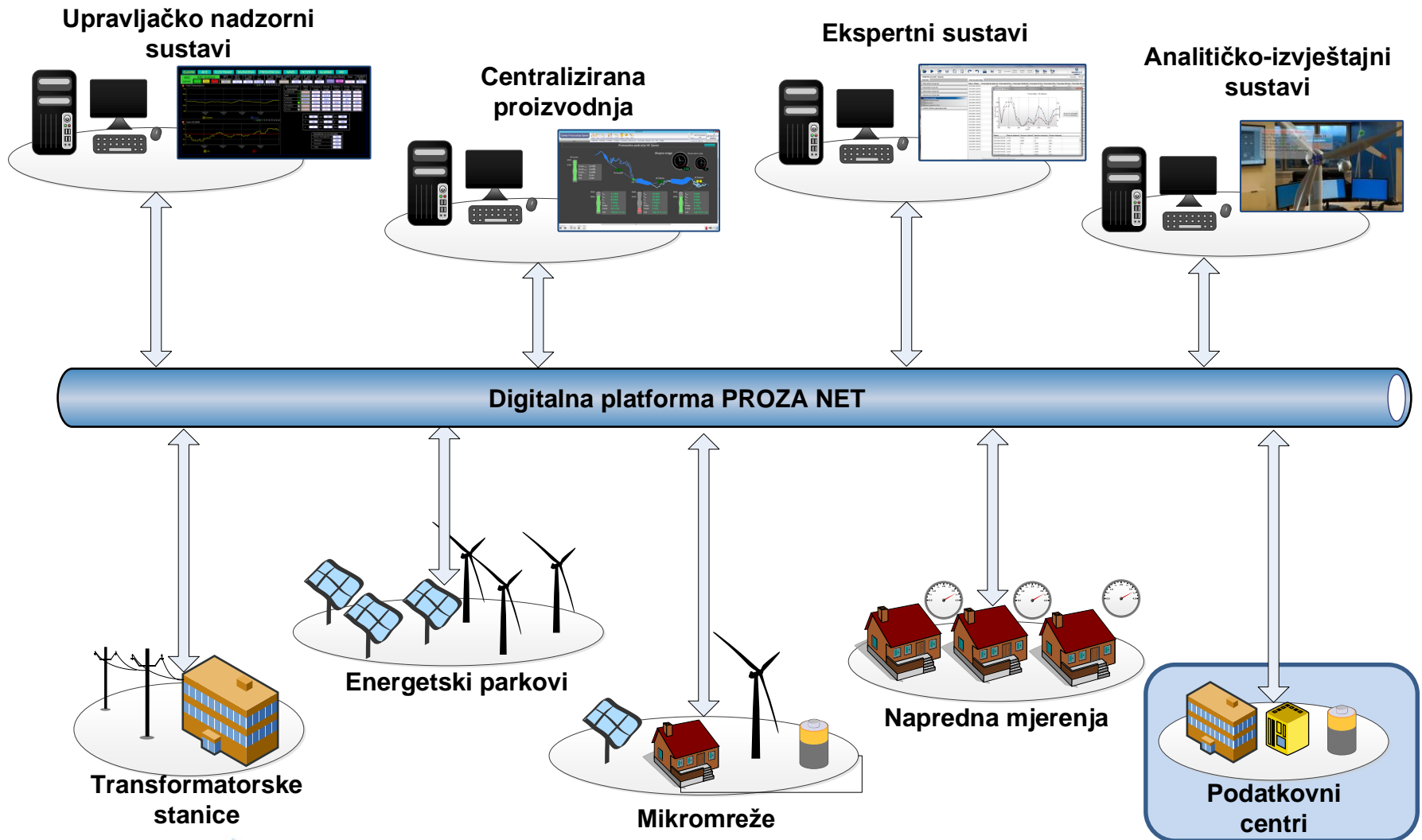


Napredna mjerenja

- Projekt: **HOPS UGM**
- Mjerenja u realnom vremenu
- IEC 104 prihvat podataka
- Nadzor očitavanja i izvještavanje
- PROZA NET & IoT podrška

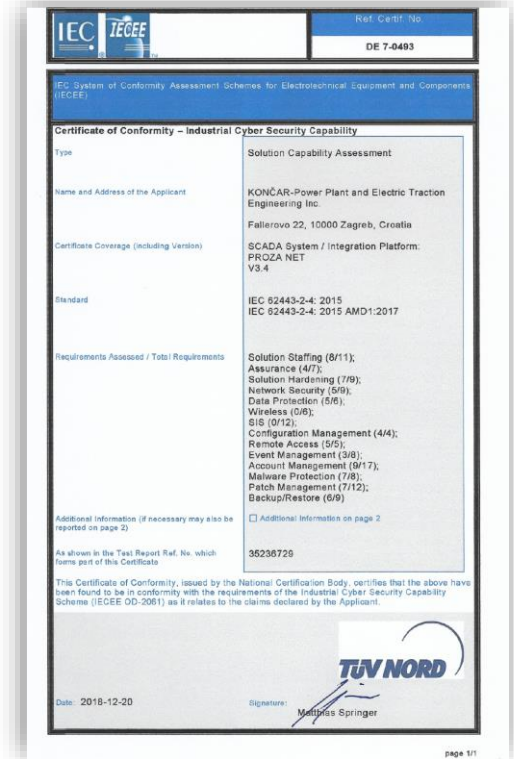
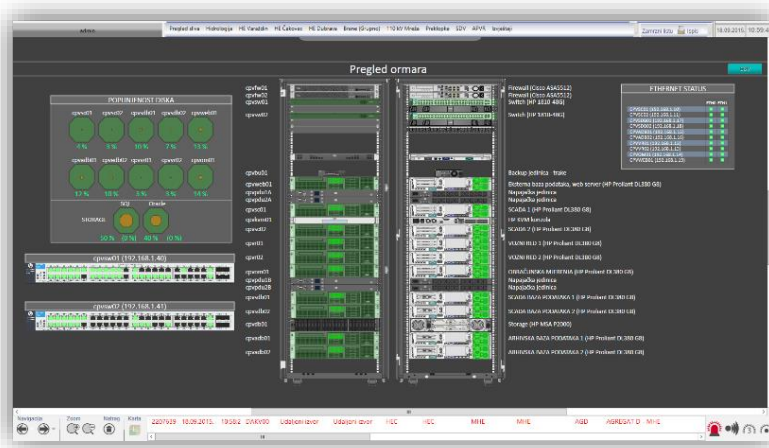


Digitalna platforma za kritičnu infrastrukturu



Podatkovni centri

- Projekt: **Podatkovni centar CPZ**
- Veza IT i OT opreme
- Prva kibernetički akreditirana platforma
- IEC 62443-2-4 certifikat



4 načela PROZA NET platforme



4 načela PROZA NET platforme+istraživanje!

1. Prikupi sve digitalne podatke

2. Vizualiziraj svaki podsustav

PROZA NET
digitalna platforma

3. Automatiziraj proces

4. Na kibernetički siguran način

Sustavna nadogradnja kroz istraživačke projekte

Europski istraživački projekti



OS4eES

Mikromreže i virtualne elektrane



Aktivno upravljanje proizvodnjom



FLEXCoop

Energetske zadruge



Regionalno upravljanje prijenosnim sustavom



TRINITY

Regionalno upravljanje tržištem električne energije



BALIHT

Upravljanje baterijskim sustavima

ATTEST

DSO-TSO integracija



Big data u energetici

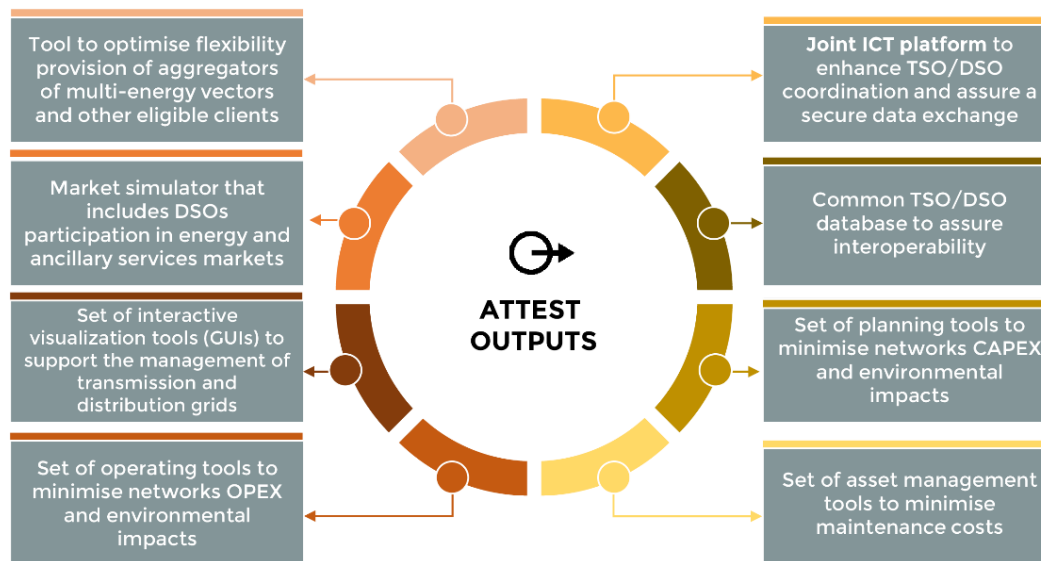
frESCO

Napredni ESCO

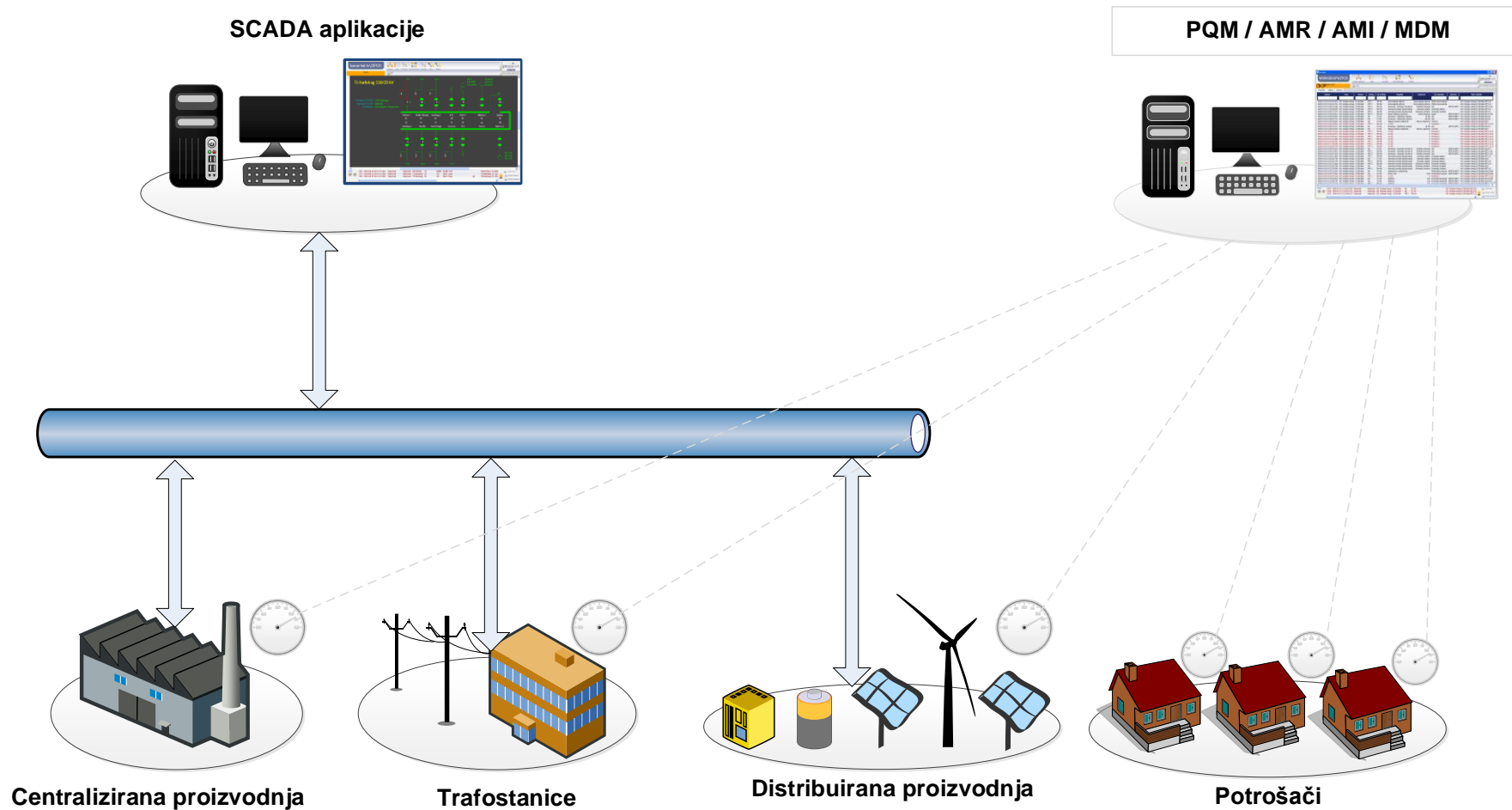
KONČAR

ATTEST (01/2020 – do 01/2023)

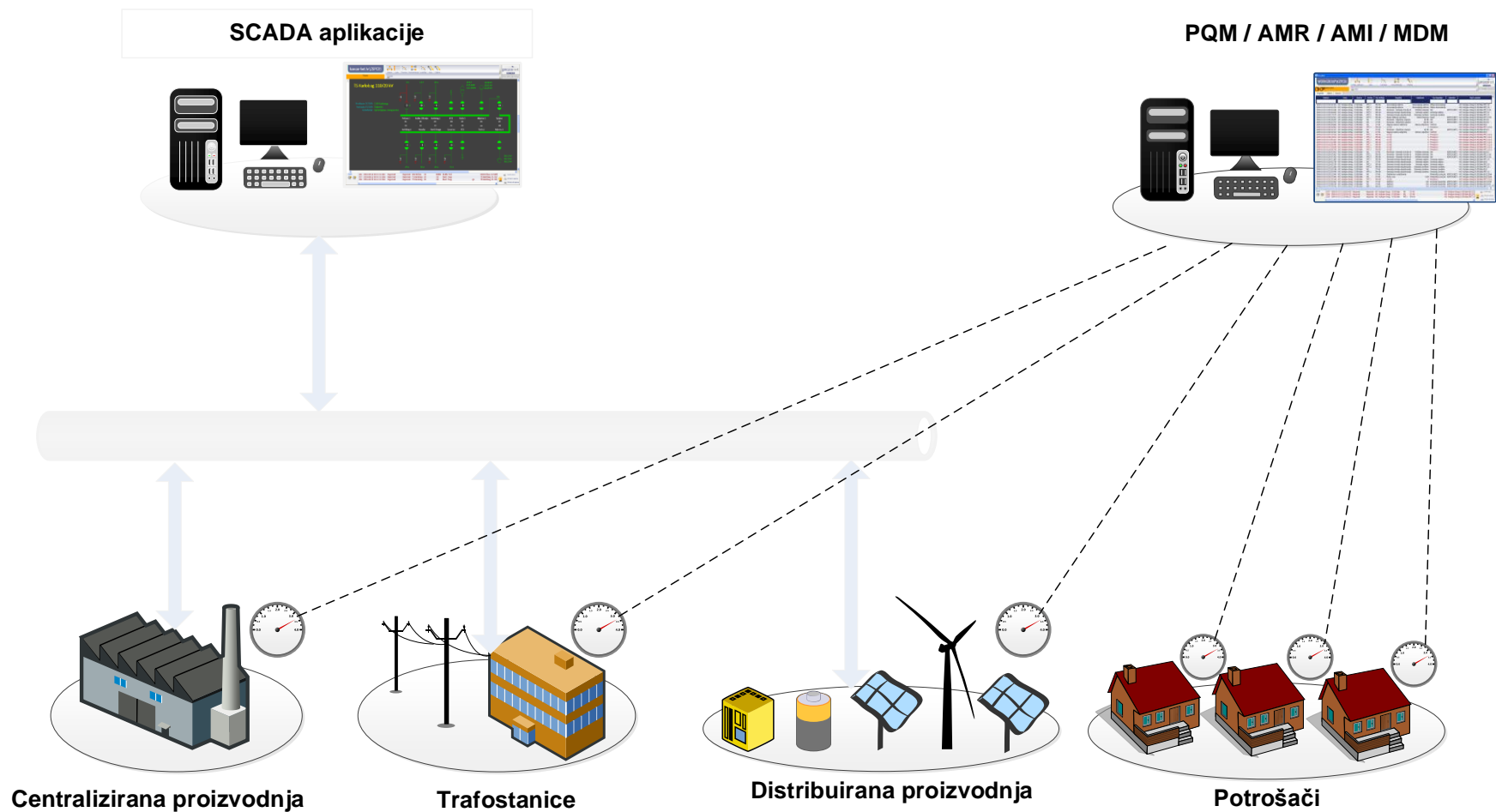
- Advanced Tools Towards cost-efficient decarbonisation of future reliable Energy Systems
- RIA – Research and Innovation, budžet cijelog projekta 4 M EUR
- Razvoj softverskih alata za operatora distribucijskog sustava u 2030.
- Snažno hrvatski orijentiran:
 - partneri KONČAR-KET, HEP ODS, HOPS i ICENT,
 - pilot u HEP ODS-u



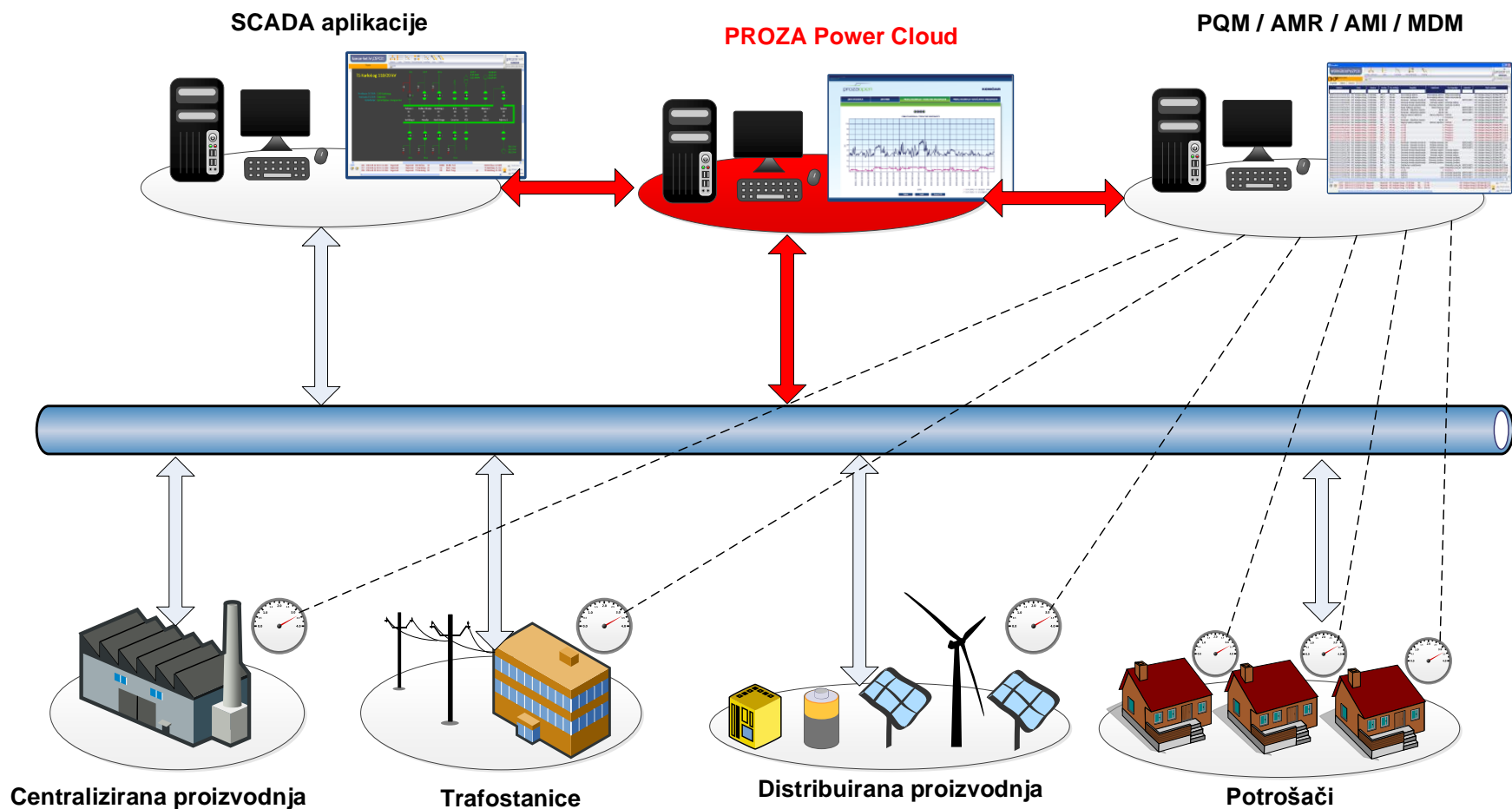
1. Podatkovni otok – Procesni podaci - SCADA



2. Podatkovni otok – Mjerni podaci – Billing i PQM



Povezivanje podatkovnih otoka u operatorima usluga



Napredena mjerenja vs. Uobičajena mjerenja

Napredna mjerenja

Analiza u stvarnom vremenu

Prikupljanje na min rezoluciji

Veza sa SCADA podacima

Integritet podataka

Pomoć u odlučivanju

Utjecaj na vođenje procesa

Neovisnost o proizvođačima

Uobičajena mjerenja

Cikličko prikupljanje

Nije povezano sa SCADA-om

Nije vezano uz vođenje sustava

Naknadna analiza

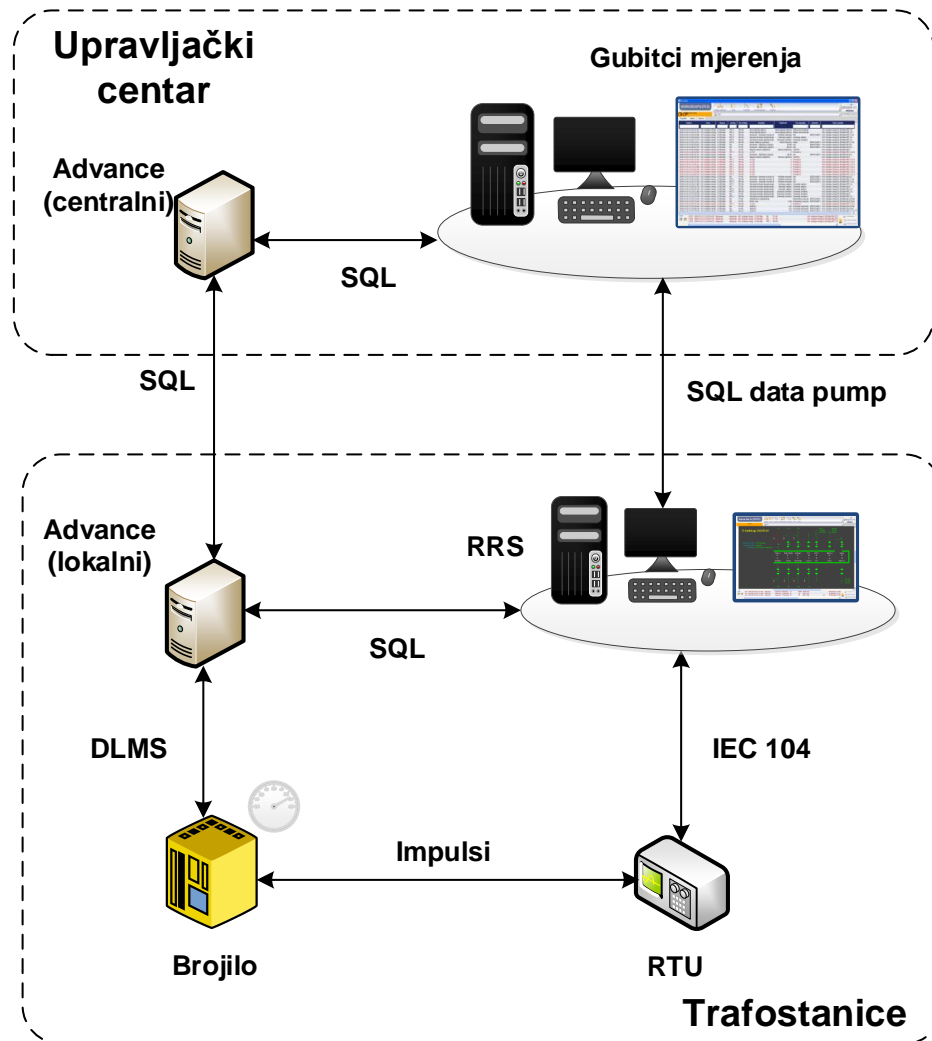
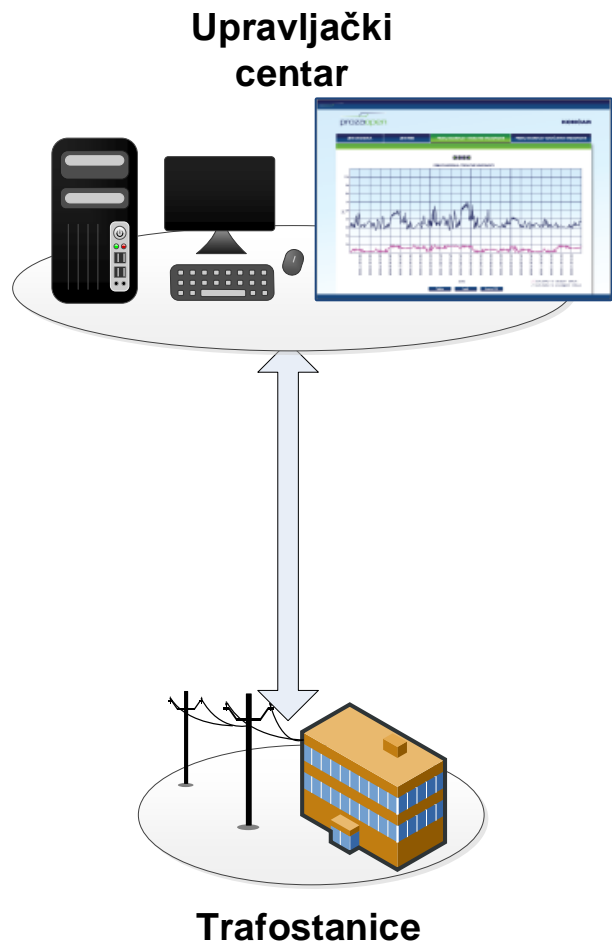
Naknadno izvještavanje

Nije povezano s procesom

Vezano uz proizvođača

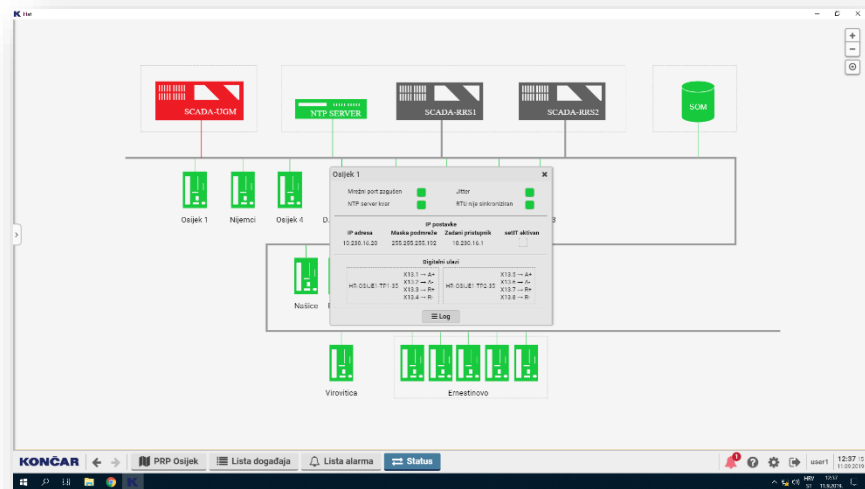


PROZA Power Cloud – Shema povezivanja

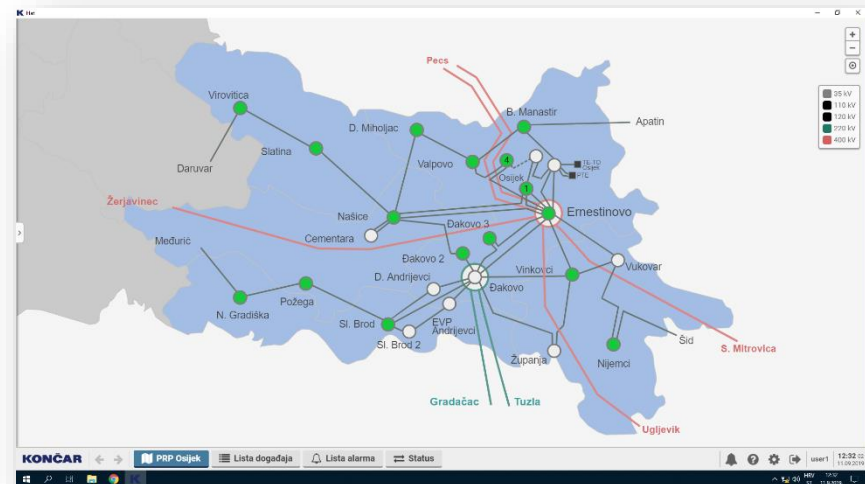


PROZA Power Cloud – Online konfiguriranje

- Web zasnovana konfiguracija
 - Mreža
 - Uređaji
 - Vizualizacija
- Online upravljanje sustavom
- Uređivanje vizualizacije

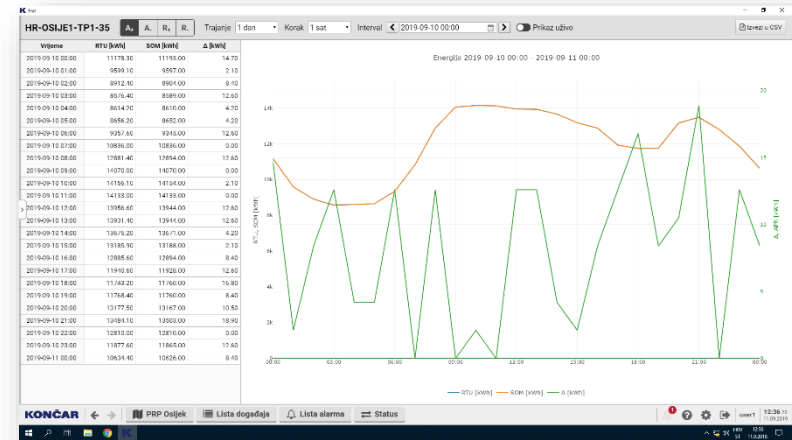
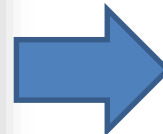


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2	2019-09-11 11:10:00.000	2019-09-11 12:10:57.902	H. Manastr	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	2.100000000000	ALARM	HR H MANA- TP1
3	2019-09-11 11:30:00.000	2019-09-11 12:10:57.902	H. Manastr	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	1.049999999999	NORMAL	HR H MANA- TP1
4	2019-09-11 12:30:00.000	2019-09-11 12:02:57.783	Virovitica	110 kV	RTU01	Darunar	A- PREKORAČEN APR	15min	APR	0	NORMAL	HR VIRODARUV-1
5	2019-09-11 12:30:00.000	2019-09-11 12:02:57.783	Virovitica	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	2.099999999999	NORMAL	HR VIRODARUV-1
6	2019-09-11 11:45:00.000	2019-09-11 11:47:57.667	Valpovo	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	0	NORMAL	HR VALPOV-TP1-0
7	2019-09-11 11:45:00.000	2019-09-11 11:47:57.667	Slatina	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	2.100000000000	NORMAL	HR SLATIN-TP1-0
8	2019-09-11 11:45:00.000	2019-09-11 11:47:57.667	Virovitica	110 kV	RTU01	Darunar	A- PREKORAČEN APR	15min	APR	66	ALARM	HR VIRODARUV-1
9	2019-09-11 11:30:00.000	2019-09-11 11:32:57.815	Slatina	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	4.2	ALARM	HR SLATIN-TP1-0
10	2019-09-11 11:30:00.000	2019-09-11 11:32:57.815	Valpovo	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	2.100000000000	ALARM	HR VALPOV-TP1-0
11	2019-09-11 11:30:00.000	2019-09-11 11:32:57.815	Slatina	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	4.2	ALARM	HR SLATIN-TP1-0
12	2019-09-11 10:30:00.000	2019-09-11 11:10:57.742	Ernestinovo	110 kV	RTU06	TP1	A- PREKORAČEN APR	15min	APR	16.5	ALARM	HR ERNST-TP1-1
13	2019-09-11 10:45:00.000	2019-09-11 11:10:57.742	Ernestinovo	110 kV	RTU05	TP1	A- PREKORAČEN APR	15min	APR	16.5	NORMAL	HR ERNST-TP1-1
14	2019-09-11 10:45:00.000	2019-09-11 11:10:57.742	Bakovo 3	110 kV	RTU01	TP2	A- PREKORAČEN APR	15min	APR	16.5	ALARM	HR BAKO3-TP2-1
15	2019-09-11 11:00:00.000	2019-09-11 11:10:57.742	Dakovo 3	110 kV	RTU01	TP2	A- PREKORAČEN APR	15min	APR	9.899999999999	NORMAL	HR BAKO3-TP2-1
16	2019-09-11 11:00:00.000	2019-09-11 11:02:57.662	Slatina	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	2.1	NORMAL	HR SLATIN-TP1-0
17	2019-09-11 10:45:00.000	2019-09-11 10:47:57.576	Njemetci	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	1.049999999999	NORMAL	HR NJEMC-TP1-0
18	2019-09-11 10:45:00.000	2019-09-11 10:47:57.576	Slatina	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	4.2	ALARM	HR SLATIN-TP1-0
19	2019-09-11 10:45:00.000	2019-09-11 10:47:57.576	Slatina	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	2.1	NORMAL	HR SLATIN-TP1-0
20	2019-09-11 10:30:00.000	2019-09-11 10:32:57.601	Njemetci	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	2.100000000000	ALARM	HR NJEMC-TP1-0
21	2019-09-11 10:30:00.000	2019-09-11 10:32:57.601	Slatina	35 kV	RTU01	TP1	A- PREKORAČEN APR	15min	APR	4.200000000000	ALARM	HR SLATIN-TP1-0
22	2019-09-11 06:45:00.000	2019-09-11 10:10:57.658	Bakovo 2	35 kV	RTU01	TP1	R- PREKORAČEN APR	15min	APR	4.200000000000	ALARM	HR BAKO2-TP1-0



PROZA Power Cloud – Analiza i izračun

- Analiza kvalitete podataka u stvarnom vremenu
- Jednostavno prototipiranje algoritma u Python programskom jeziku
- Linux/Windows supported
- Cloud-deployable (Red Hat cloud, MS Azure, AWS)
- Kibernetički sigurna platforma – IEC 62443 podržan



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