

Central control room upgrade with the zenon software platform

MPK Łódź drives efficiency in public transport

MPK Łódź, a leading provider of public transportation services in Poland, has upgraded its central power control room using the zenon software platform from COPA-DATA. The new solution delivers operational independence, modern tools to manage tram traction substations, and improved comfort for passengers.



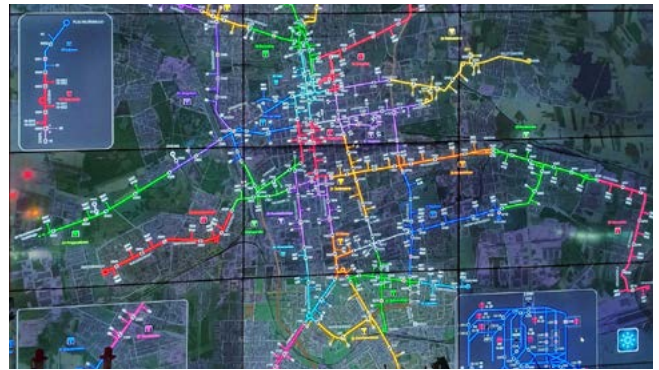
MPK Łódź operates the tram service across the metropolitan Łódź area. Every day, it coordinates 200 tram units and 400 buses. The supporting infrastructure includes more than 30 traction substations located in Łódź and nearby towns. When existing technical limitations hampered both the growth and everyday operation of the infrastructure, MPK Łódź began a project to update its substations. One of the key challenges was eliminating reliance on third-party providers while upgrading the outdated control solution.

ON A PROVEN TRACK OF INNOVATION

The tram service in Łódź has a rich history dating back 125 years. Its first electric trams hit the streets on December 23rd, 1898, with the first suburban routes from Łódź to Pabianice i Zgierz starting operation in early 1901. The development was a result of the sheer passion and determination of Juliusz Kunitzer, “the father of Łódź’s tram service”. It was the first electric tram service in the Kingdom of Poland and ushered in a true revolution in public transportation.



Medium voltage and direct current switchboards in a tram traction substation.



Control Room with overview screen displaying all substations in Łódź and nearby towns.

While celebrating its heritage, MPK Łódź continues to innovate. On the occasion of its 100th anniversary, a new Chamber of Tradition was opened in 1998, now the Museum of Municipal Transportation. Significant steps in modernization include the upgrades to the Chocianowice depot hall in 1999 and the transition to low-floor Cityrunner models for all tram operations in 2002.

Today, the company employs 3,115 people, including 1,040 bus drivers and 623 tram drivers. The public transportation service includes 19 daytime tram routes, 48 daytime bus routes, and nine nighttime tram routes. It is provided using four operator facilities, two for each service. In addition, the technical division modernizes tram cars, the rail and network division repairs tracks and overall infrastructure, and the handicapped transportation division operates a door-to-door service for children, youths, and adults with motor dysfunction.

A MOVE IN THE RIGHT DIRECTION

To improve the management of the tram traction substations in Łódź and nearby towns, including Zgierz, MPK Łódź initiated a project to upgrade its central control room. The project included the implementation of a modern, automated control room management solution based on COPA-DATA's zenon software platform.

The new solution enables the company to monitor and control all substations from one central location. Jakub Gałęski, the Deputy Manager of Rail and Network Division and Head of Traction Power Section in MPK Łódź, explains: "The upgrade to the central control room was a key step

towards bringing tram network management up to modern standards. Using the zenon software platform, we now have enhanced control over power supply and are able to quickly respond to network events. In addition to improving operational efficiency, this solution greatly improves passenger comfort, which is our priority."

For the comprehensive refurbishment of the central control room, MPK Łódź installed modern equipment, including power distribution cabinets, server cabinets, and automated workstations, as well as the advanced SCADA software based on zenon. Together, these components resulted in a state-of-the-art power control center that enables easy and efficient network management across the region.

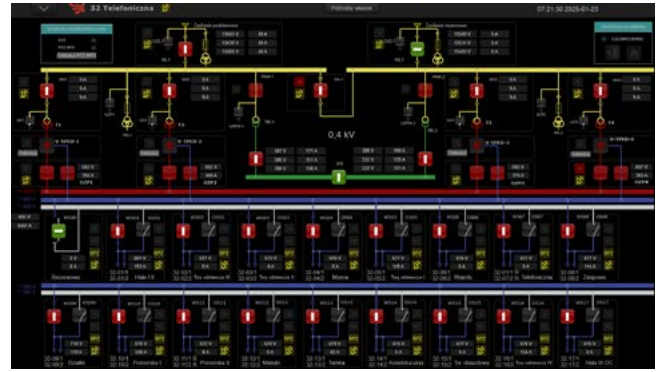
NEW REDUNDANT ARCHITECTURE BOOSTS RESILIENCY

The upgrade included the deployment of a redundant data server architecture with support for unlimited variables and operator workstations with relevant client licenses. This work included comprehensive hardware replacement as well as the deployment of new technical solutions. As well as new UPS power supplies, MPK Łódź installed new DELL EMC PowerEdge R740 primary and secondary data servers, DELL PRECISION 3930 Rack primary and secondary automated workstations, a video server, a time server with satellite-based synchronization, and a new main synoptic board using 12 55-inch panels.

Today, MPK Łódź's central control room is a modern tram network power management center that collects information



View of over 30 tram substations in Łódź and nearby towns with integrated automatic line coloring and visual alarms.



The schematic visualization of energy stations is separated into transformers, switchgear bays, and power lines. Operators are able to monitor current and voltage flows within sections and to check the status of safeguards and switches.

from all substations. The solution supports data exchange with the local telecontrol systems in the substations using modern communication protocols, including Modbus TCP and Modbus RTU protocols. In addition, the system controls switches and isolators, locking them in repair or standby mode when required. This enables an immediate response to any events that occur across the power grid.

A CENTRALIZED OVERVIEW ENSURES IMMEDIATE RESPONSE

The main synoptic board is a key component of the control room. zenon Monitor Administration controls data visualization across 12 screens. They display a diagram of the power grid supplying electricity to the tram network. The entire contact network was overlaid onto the city map, including all power supply points. This allows dispatchers to quickly identify relevant network components and make informed operational decisions.

The solution uses zenon Automatic Line Coloring for automated route color-coding and topological route color-coding on mnemonic schemes. By having color-coded substation power supply areas overlaid on the city map, a clear view enables immediate comprehension and response. For example, MPK Łódź can quickly switch between power supply devices in substations.

The new control room management solution based on zenon displays and records all control processes, including the operation of technical equipment, diagnostic information, and actions by personnel. It can also display device status simulations on diagrams. Operating data is

provided in diagrams, tables, and reports, enabling MPK Łódź to analyze current and historical network parameters. State changes are recorded in the event log.

Events from all substations are sent to the dispatcher, who assigns appropriate priority to them. High-priority events are sent to an Alarm Message List in zenon. Here, they are highlighted by the station number flashing red and a beeper, until the dispatcher confirms the event. The company is now able to quickly respond to emergencies – for example, by dispatching backup vehicles or redirecting trams. This reduces inconvenience to passengers.

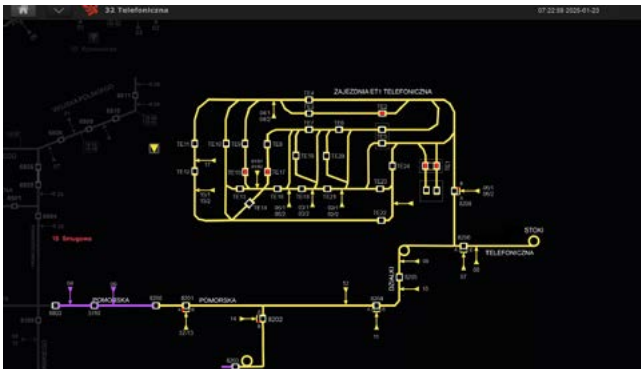
zenon Historian is used to provide the data archive. In subsequent analysis, events can be filtered by date, event type, and substation number.

ADVANCED FEATURES IN ZENON

The zenon software platform's open architecture ensures flexibility, scalability, potential for future upgrades, and supports third-party integrations.

“zenon is an intuitive solution with almost unlimited functionality,” says Grzegorz Jaglarski, Traction Power Specialist in Rail and Network Division in MPK Łódź. “These capabilities were efficiently presented to us during the training sessions provided by the COPA-DATA team.”

Following zenon training, MPK Łódź's personnel gained additional self-sufficiency in system operation. As well as eliminating reliance on third parties, this has helped the team to improve operational performance.



A schematic of tram tracks, including tram switches and tram stops around the Telefontyczna tram depot, enables traffic to be viewed and infrastructure to be managed in real time.

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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A system monitoring and diagnostics panel with a list of events and technical statuses in each location. This provides details for system variables, enabling MPK Łódź to see current device statuses and quickly identify failures.

“The upgrade of the central control room was a key step towards bringing the tram network management up to modern standards. Using the zenon software platform, we now have enhanced control over power supply and are able to quickly respond to network events. In addition to improving operational efficiency, this solution greatly improves passenger comfort, which is our priority.”

JAKUB GAŁĘSKI, DEPUTY MANAGER OF RAIL AND NETWORK DIVISION AND HEAD OF TRACTION POWER SECTION, MPK ŁÓDŹ

The upgrade to MPK Łódź's central control room has greatly improved safety and efficiency throughout the tram network management. Consequently, MPK Łódź is able to maintain high satisfaction levels for users of the public transport system and swiftly respond to the changing needs of this dynamic metropolitan area.

HIGHLIGHTS:

- Modern control room that supports 30 traction substations
- Traction network visualized on city map
- “Big Screen” synoptic board using 12 screens
- Automated route color-coding with zenon Automatic Line Coloring
- Redundant data servers to improve system resilience
- MPK Łódź's personnel trained to use zenon Editor
- Eliminated reliance on third parties
- Faster response to emergencies and improved passenger comfort