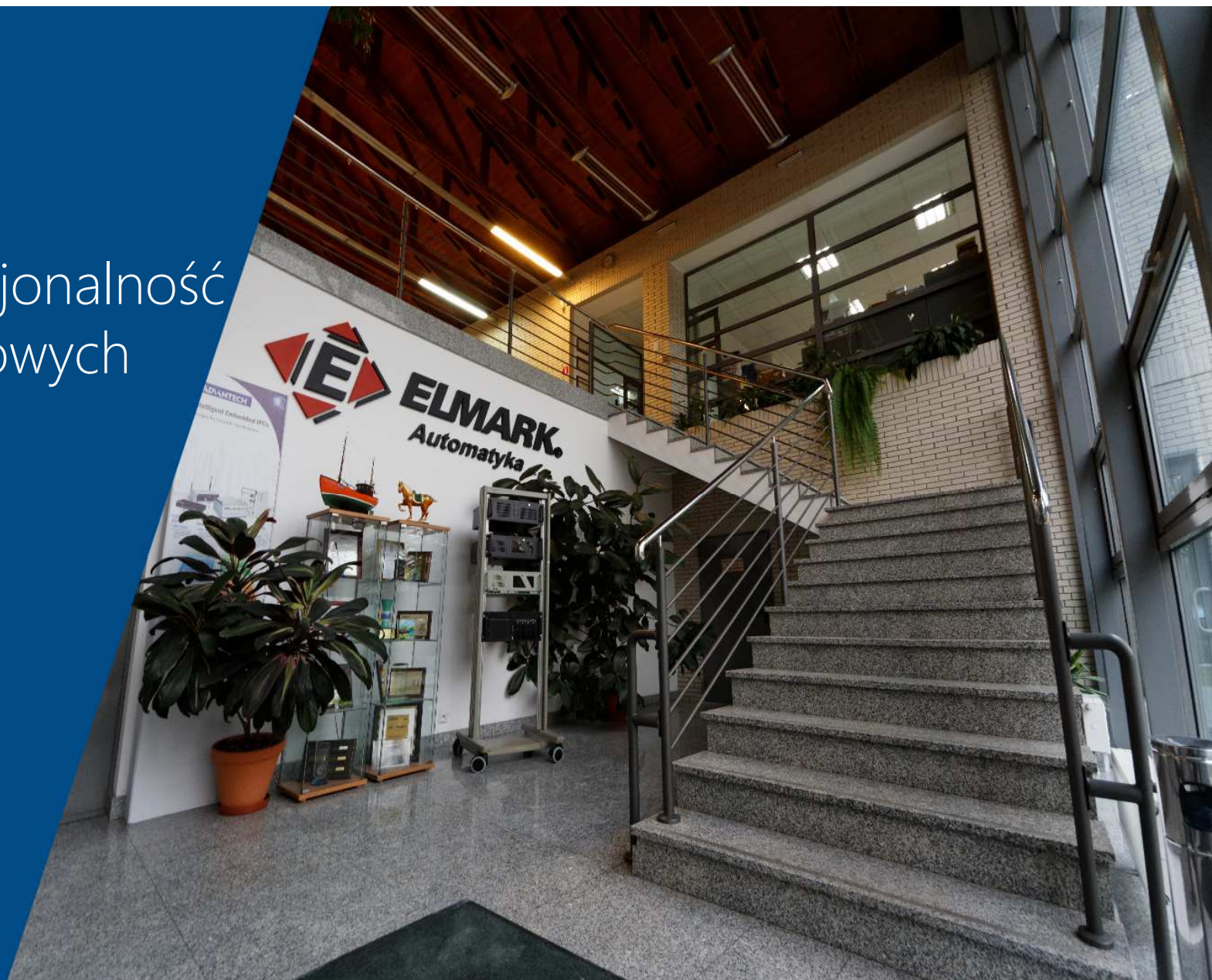
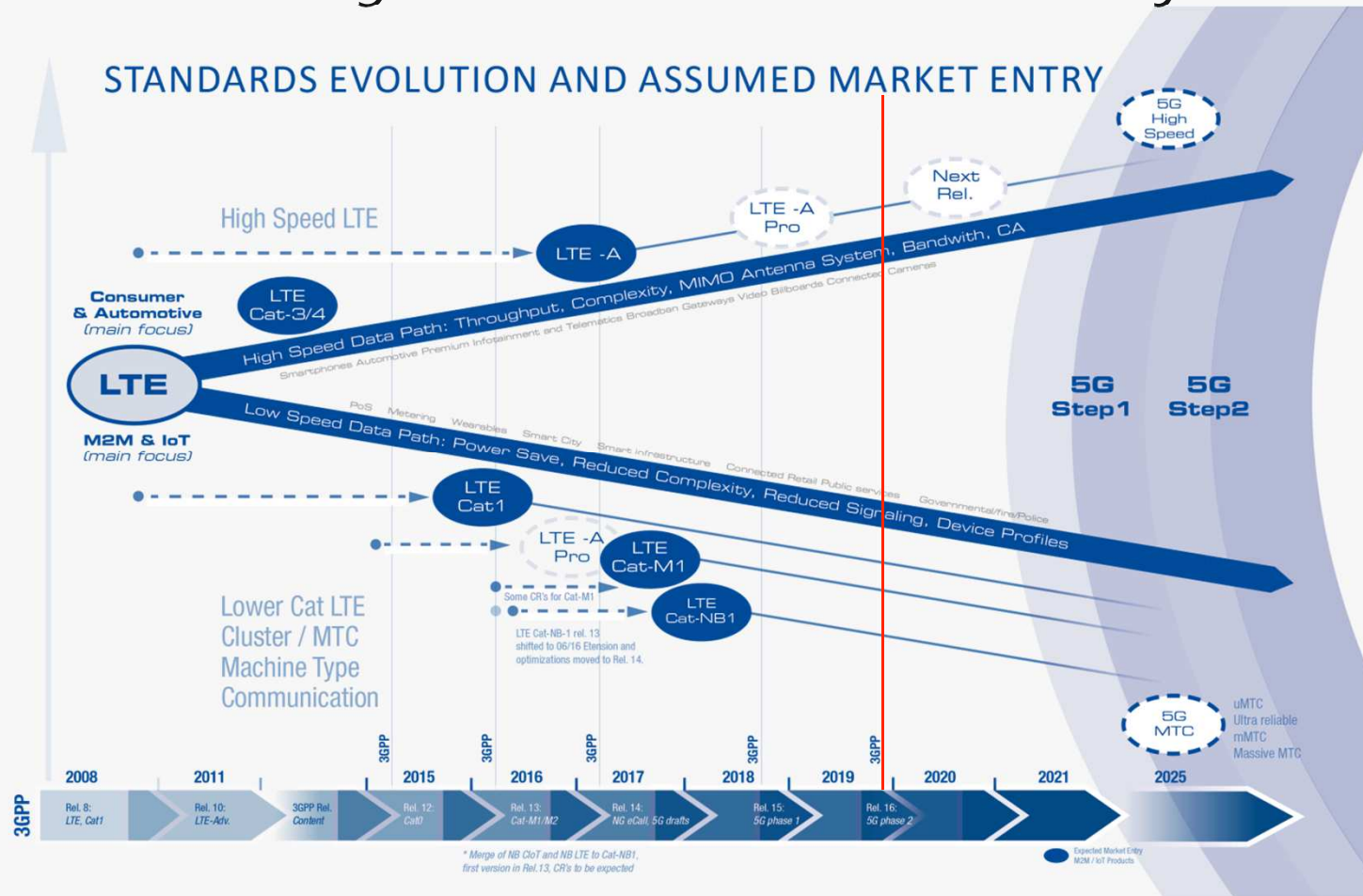


Jak poszerzyć funkcjonalność routerów przemysłowych

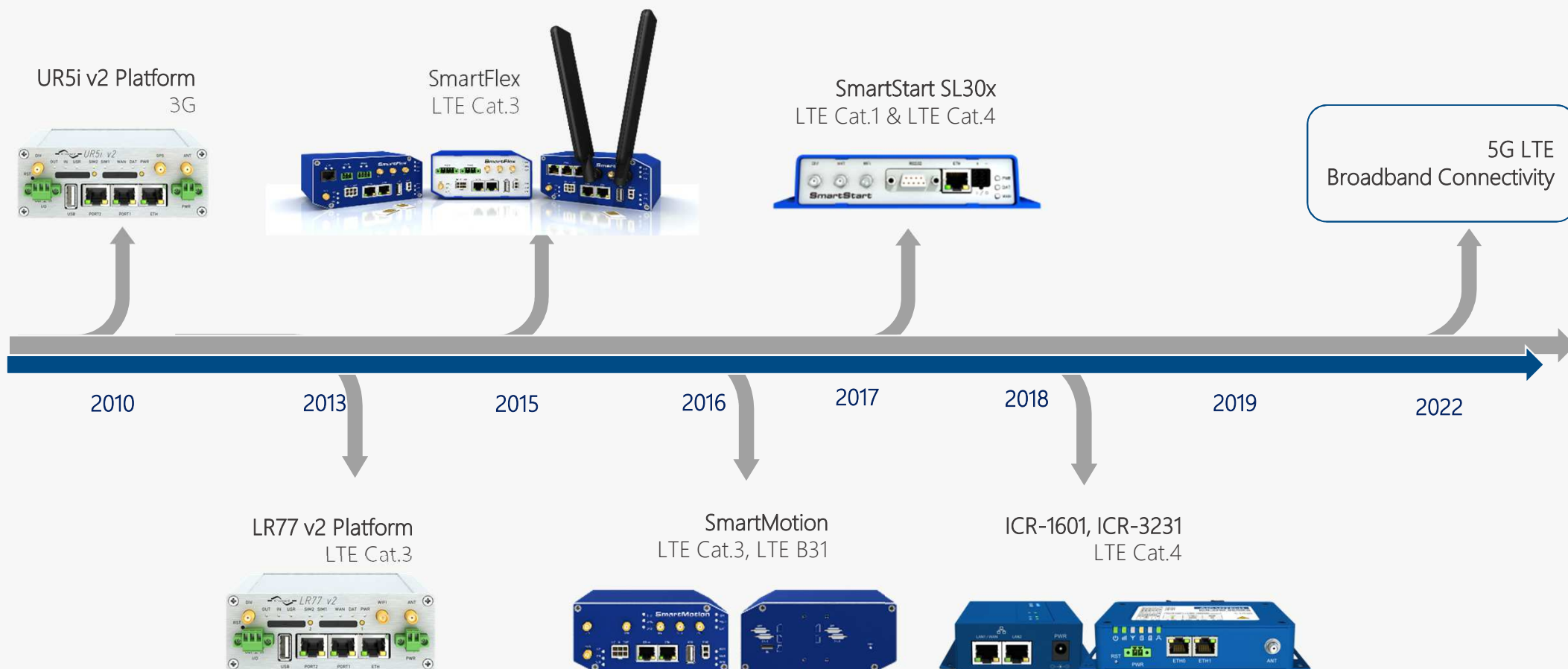
Przemysław Strzałą
ICG & IIoT Product Sales Manager



Ewolucja sieci komórkowych



Ewolucji routerów Advantech



v2

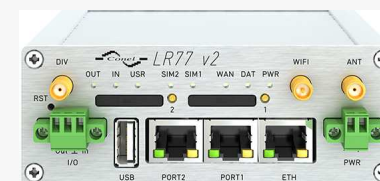
ER75i v2
2G (EDGE/GPRS)



UR5i v2
3G (UMTS/HSPA+)

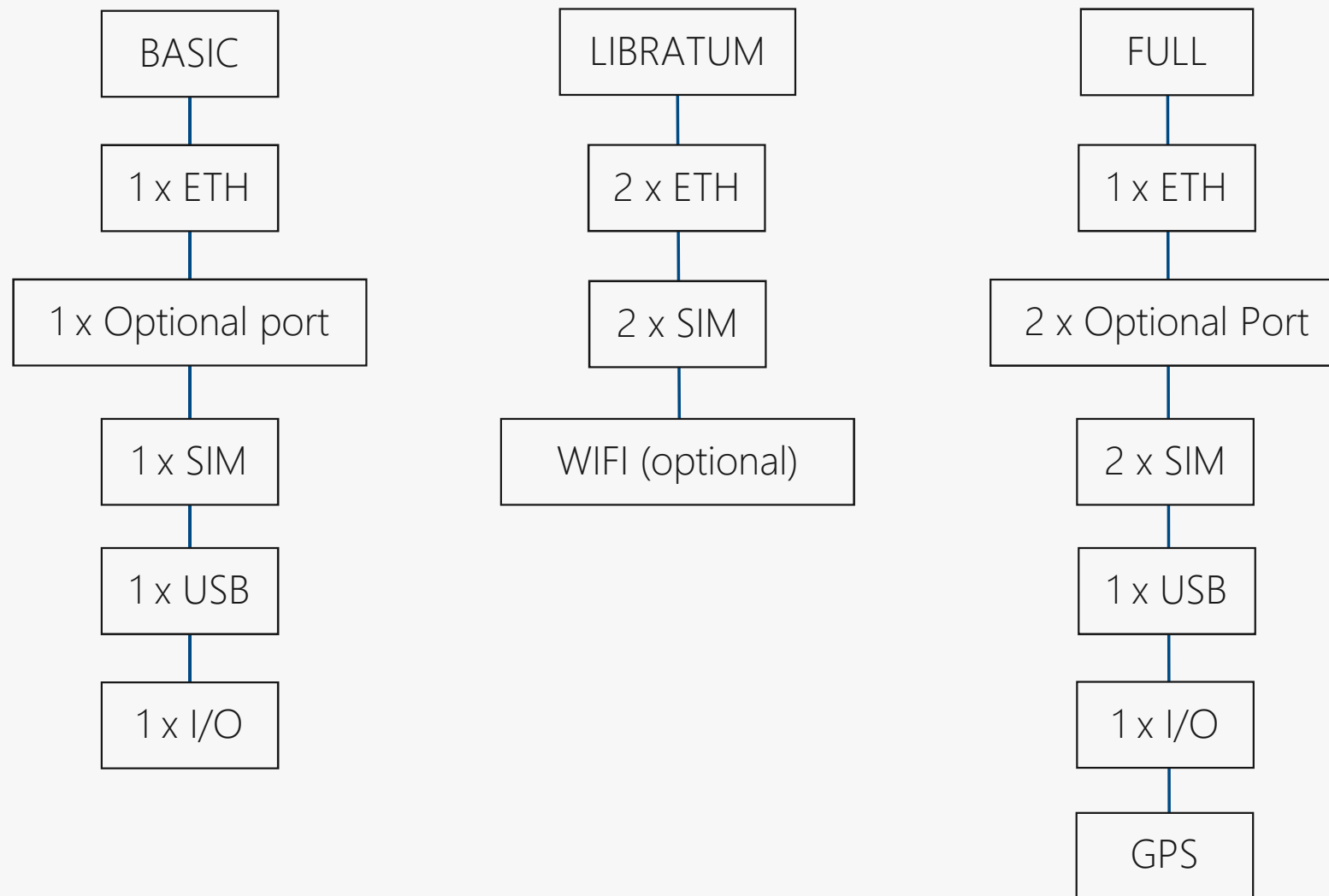


LR77 v2
4G (LTE)



2010

Modułowość serii v2

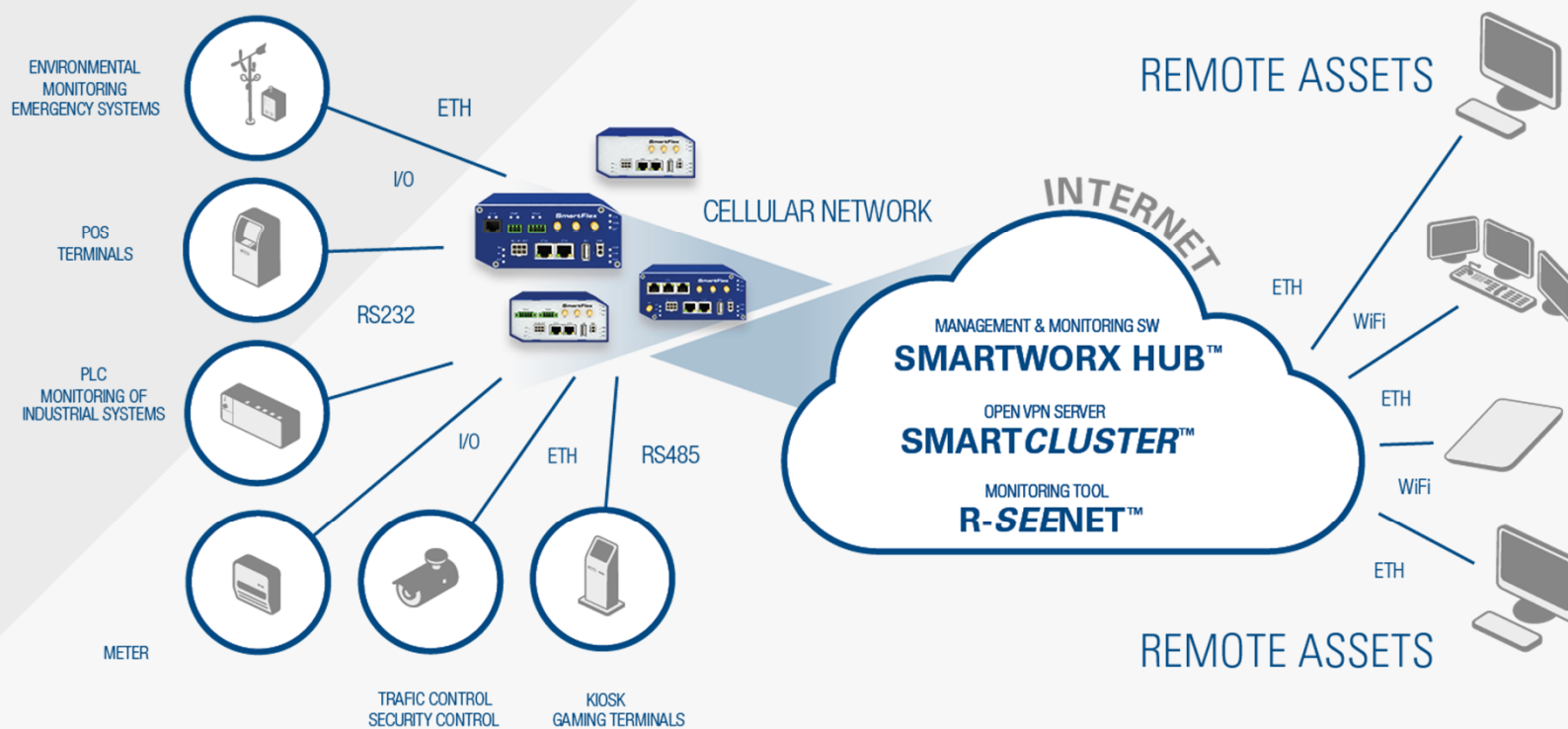


Parametry Hardware serii v2

- 1 x ETH
- 2 x Porty opcjonalne: ETH | RS232 | RS485/422 | M-Bus | w-Mbus | CNT | SD | WIFI (2,4GHz b/g/n) | 2xETH (switch)
- 1 x USB
- 1 x I/O
- 2 x SIM
- GPS
- Obudowa: Plastikowa / Metalowa
- Pamięć: 64 MB RAM, 16 MB Flash, 128 kB M-RAM
- Temperatura pracy: -40 °C to +75 °C

V3
2015

Możliwości rozbudowy



Parametry Hardware serii v3

- 2-5 x ETH (1 x ETH SmartStart)
- 1 x Porty Opcjonalne: 2xETH (switch) | ETH+RS232+RS485 | RS232+RS485 | RS232 | WIFI (2,4GHz/5GHz a/b/g/n)
- SD
- PoE / PoE+ (PD, PSE)
- 1 x I/O, 1 x USB
- 2 x SIM
- GPS
- Obudowa: Plastik / Metal
- Pamięć: 512 MB RAM, 256 MB Flash, 128kB M-RAM
- Temperatura pracy: -40 °C to +75 °C

Główne funkcje

Status
General
Mobile WAN
WiFi
WiFi Scan
Network
DHCP
IPsec
DynDNS
System Log
Configuration
LAN
VRRP
Mobile WAN
PPPoE
WiFi
WLAN
Backup Routes
Static Routes
Firewall
NAT
OpenVPN
• 1st Tunnel
• 2nd Tunnel
• 3rd Tunnel
• 4th Tunnel
IPsec
GRE
L2TP
PPTP
Services
Expansion Port 1
Expansion Port 2
USB Port
Scripts
Automatic Update
Customization
User Modules
Administration
Users
Change Profile
Change Password
Set Real Time Clock
Set SMS Service Center
Unlock SIM Card
Unblock SIM Card
Send SMS
Backup Configuration
Restore Configuration
Update Firmware
Reboot
Logout

- Dual SIM
- VPN
- Skrypty
- Moduły użytkownika
- Node-RED
- Konwersja standardów i protokołów

SmartStart



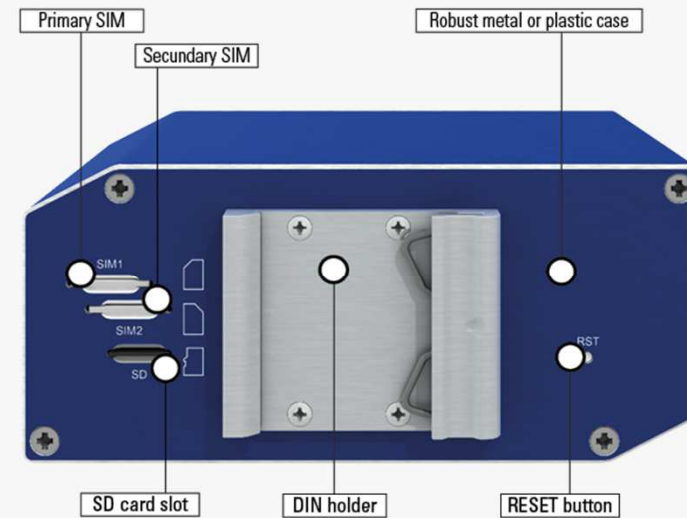
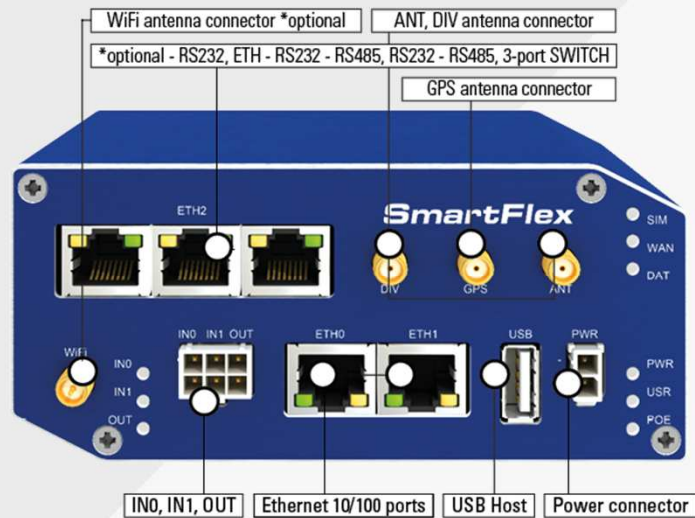
1 x ETH, 1 x RS232, 1 x I/O, 2 x SIM, WIFI (optional)

ICR-3231



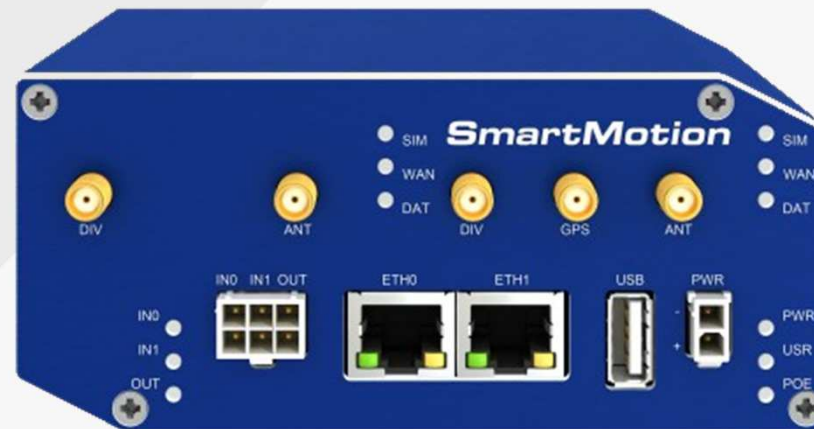
2 x ETH, 1 x RS232, 1 x RS-485, 1 x I/O, 2 x SIM, WIFI (optional)

SmartFlex



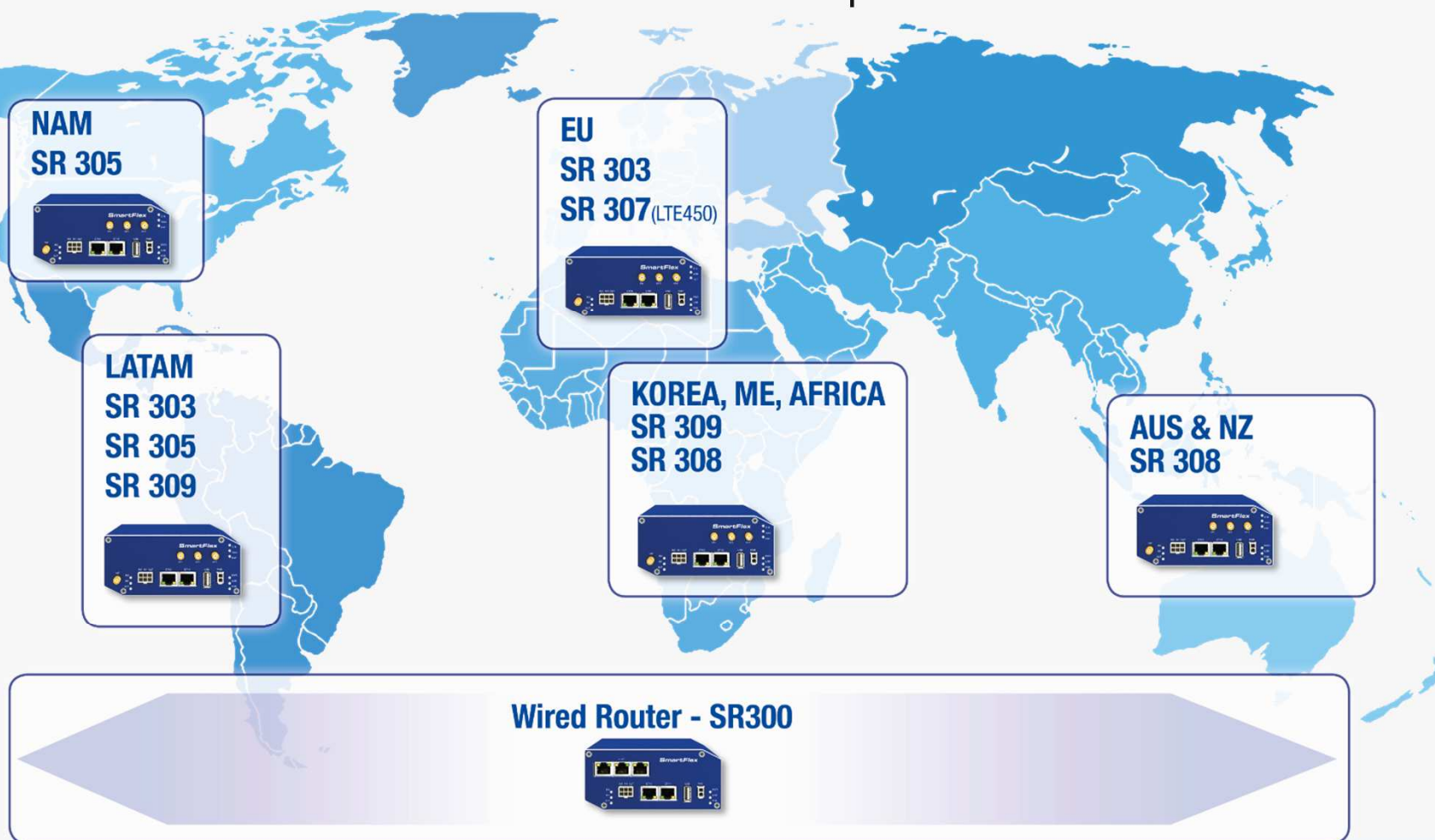
2-5 x ETH, 1 x RS232, 1 x RS-485 (opcjonalnie), 1 x I/O,
2 x SIM, WIFI (opcjonalnie), USB, microSD

SmartMotion



2 x ETH, 1 x I/O, 2 x Cellular modules, 4 x SIM

SmartFlex Global Map 2018



NAM
SL 302



EMEA
SL 304



LATAM
SL 302
SL 304



APAC
SL 306



Dodatkowe oprogramowanie

- WebAccess/VPN
- WebAccess/DNP
- Własne/Dedykowane moduły użytkownika

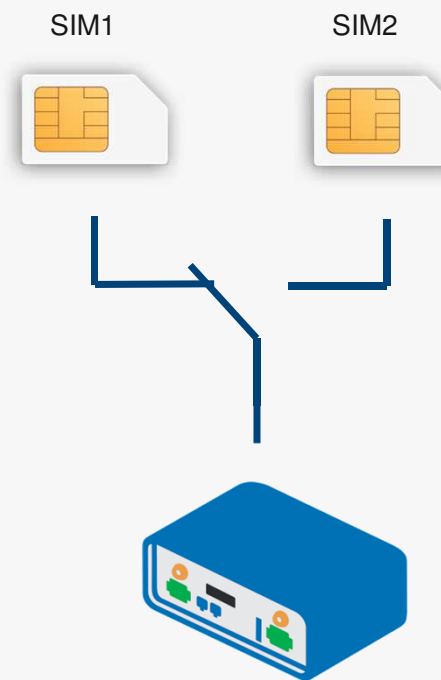
ADDITIONAL HW FEATURES

- HW WatchDog
- Battery – important for encrypted tunnels
- MRAM
 - /var/data//system
 - Emergency reboots
 - Reboot logs
- Mass storage devices
 - SD card
 - USB Mass Storage



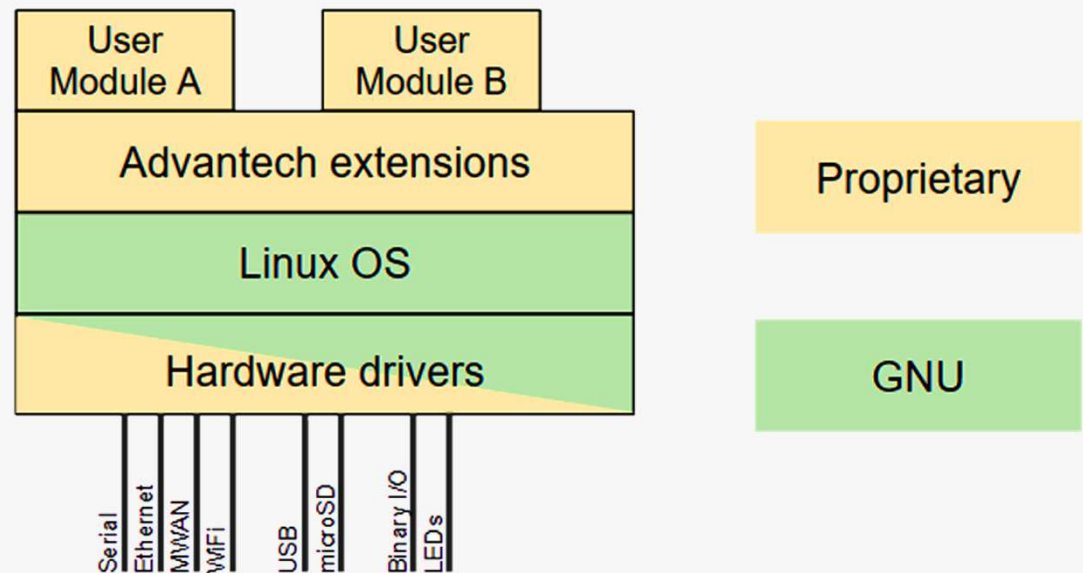
Mobile WAN

- Jeden lub dwa moduły MWAN
- Mechanizm przełączania pomiędzy kartami SIM
- Odblokowywanie kart SIM



Architektura Software'owa

- Bazą jest system Linux
- Oprogramowanie Open Source OS i Moduły użytkownika
- Dodatkowe moduły użytkownika



USEFUL SYSTEM UTILITIES

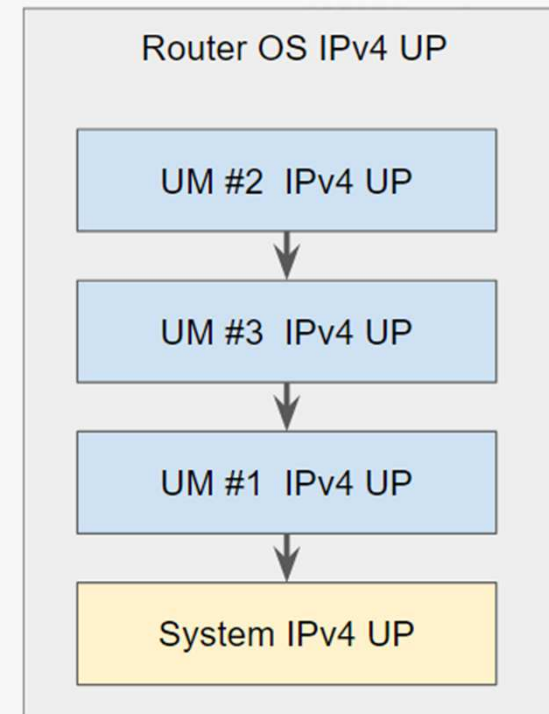
Preinstalled

- /bin/sh is bash
- sed
- awk
- nmap



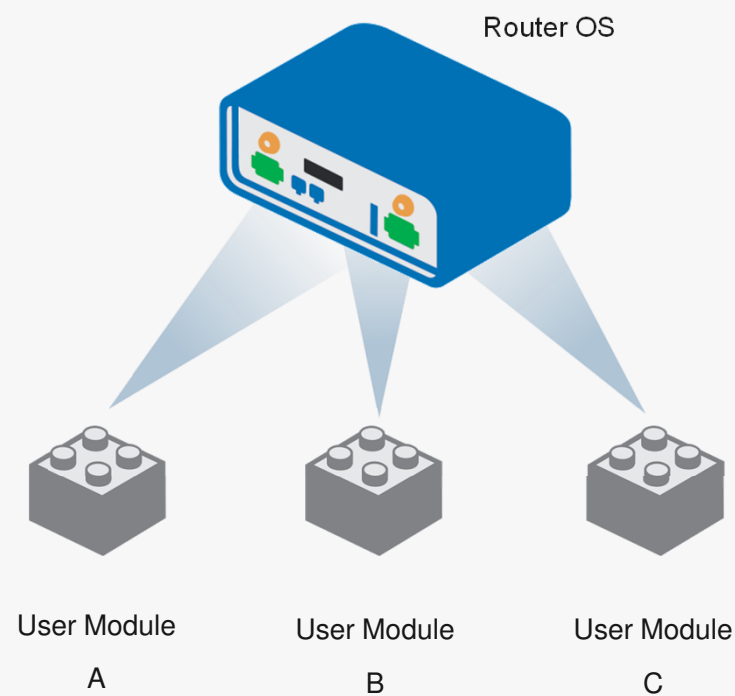
SKRYPTY

- Startup
- Up/Down for IPv4
- Up/Down for IPv6



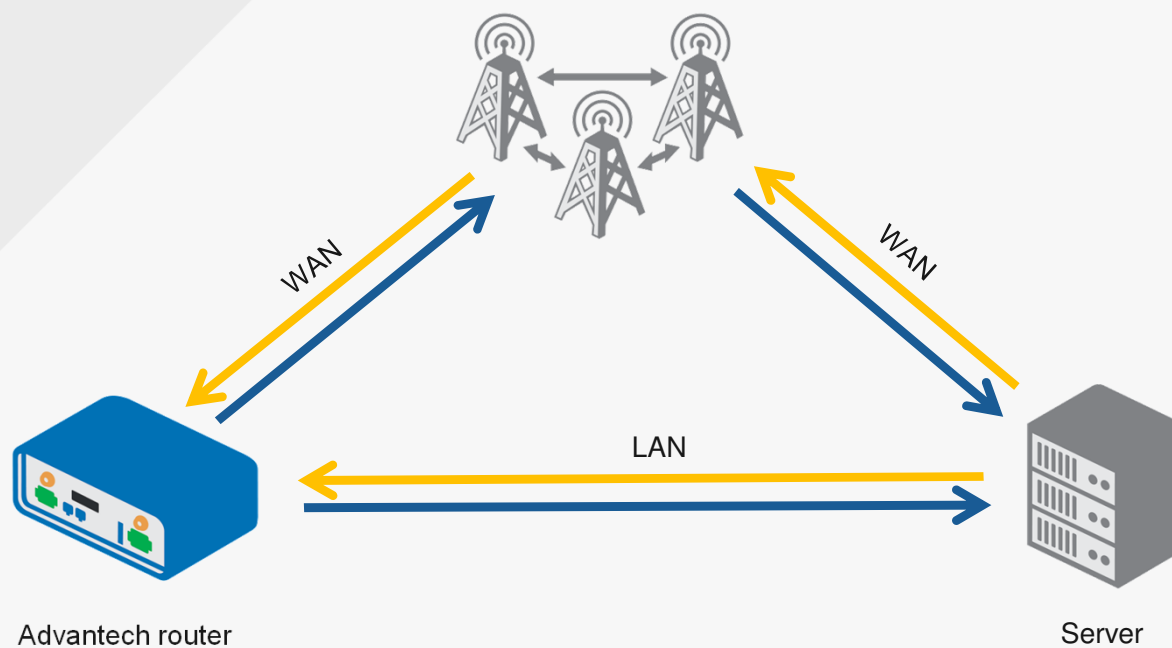
Moduły użytkownika SDK

- Moduły rozszerzające napisane w C / C++ / Python / Bash
- Brak zaśmiecania urządzenia
- Dedykowane szkolenia



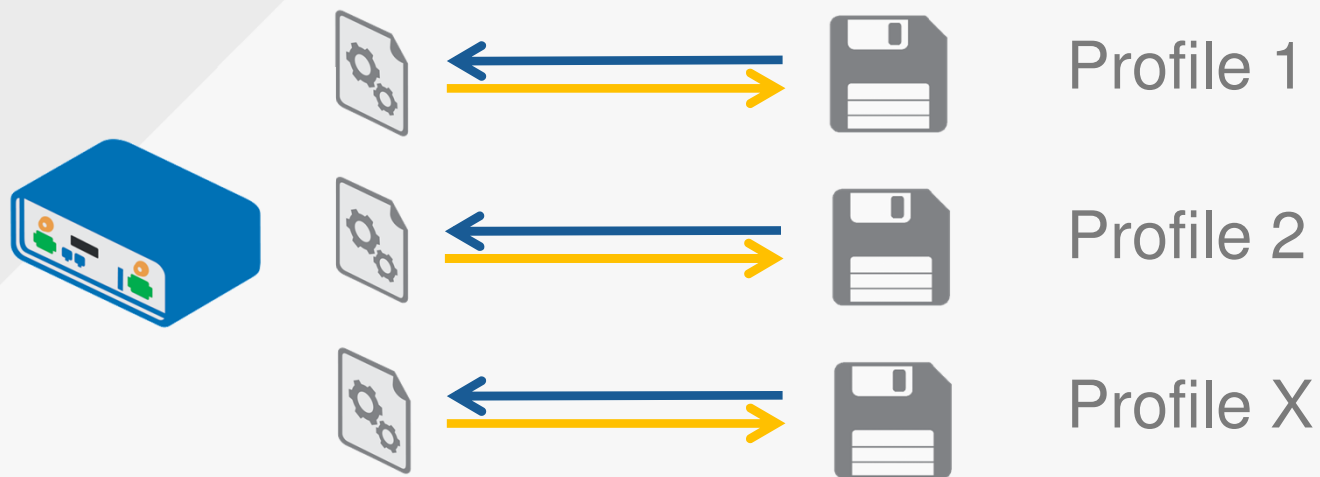
Automatyczna aktualizacja

- Sprawdzanie aktualizacji z określonej lokalizacji HTTP(S) lub FTP(S)
- Po odnalezieniu nowszego software'u automatyczna aktualizacja i restart



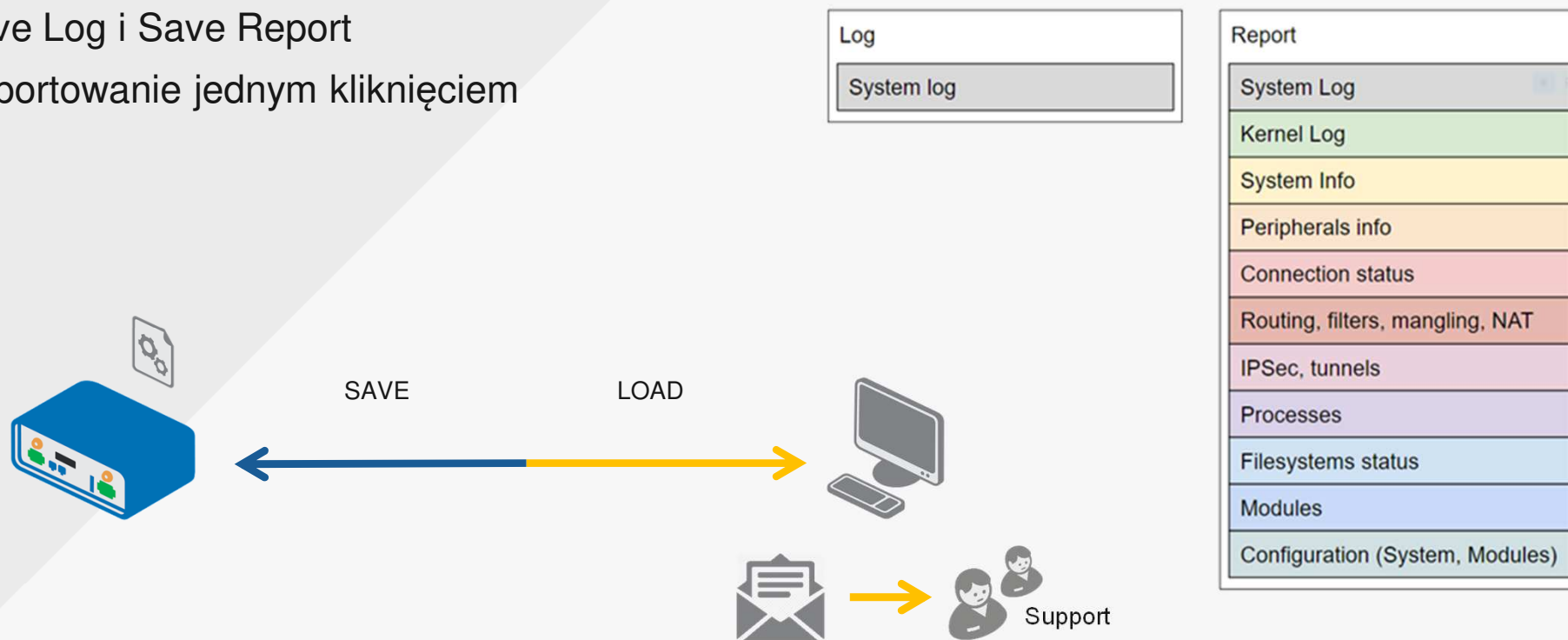
Profile konfiguracji

- Backup/Przywracanie konfiguracji
- Przełączanie pomiędzy profilami



Raportowanie

- Save Log i Save Report
- Raportowanie jednym kliknięciem



Profile użytkowników

- User / Admin
- Backup & Przywrócenie konfiguracji i użytkowników

Root privileges



root



name1



name2

Non-root privileges



name3



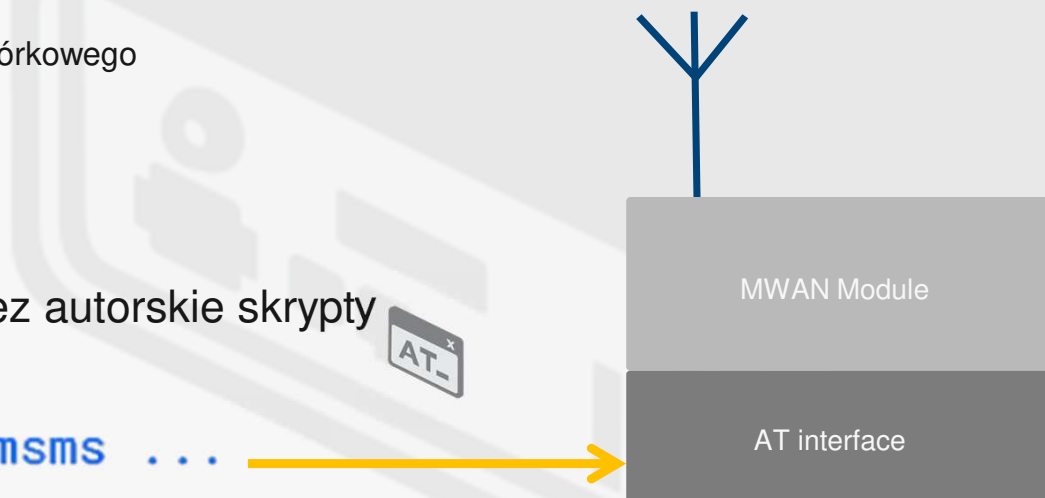
name4



SMS

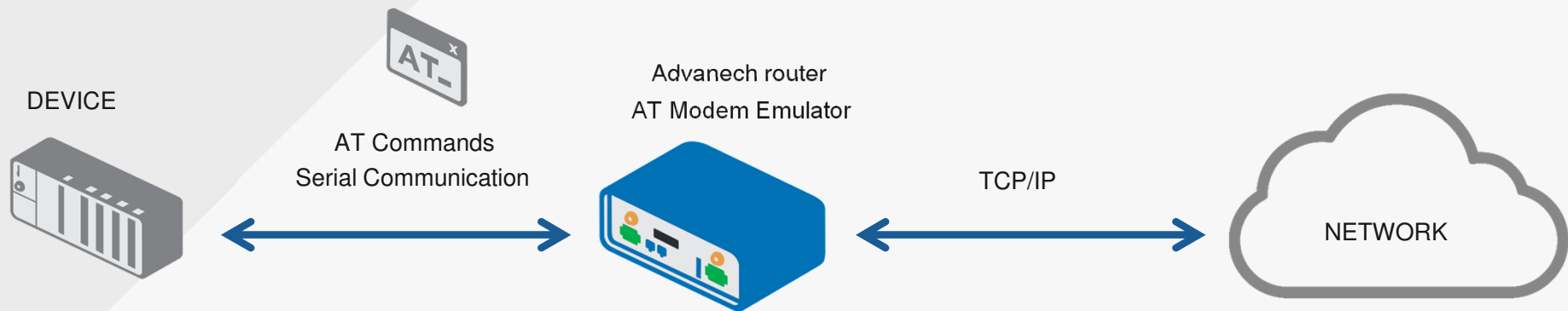
- Wysyłanie / Odbieranie
- Monitoring i kontrolowanie routera
 - Włączanie / Wyłączanie urządzenia
 - Włączanie / Wyłączanie połączenia komórkowego
 - Status wejść cyfrowych
 - Zmiana profilu konfiguracji
 - Restart
- Dodatkowa funkcjonalność poprzez autorskie skrypty

`#!/usr/bin/gsmsms ...`



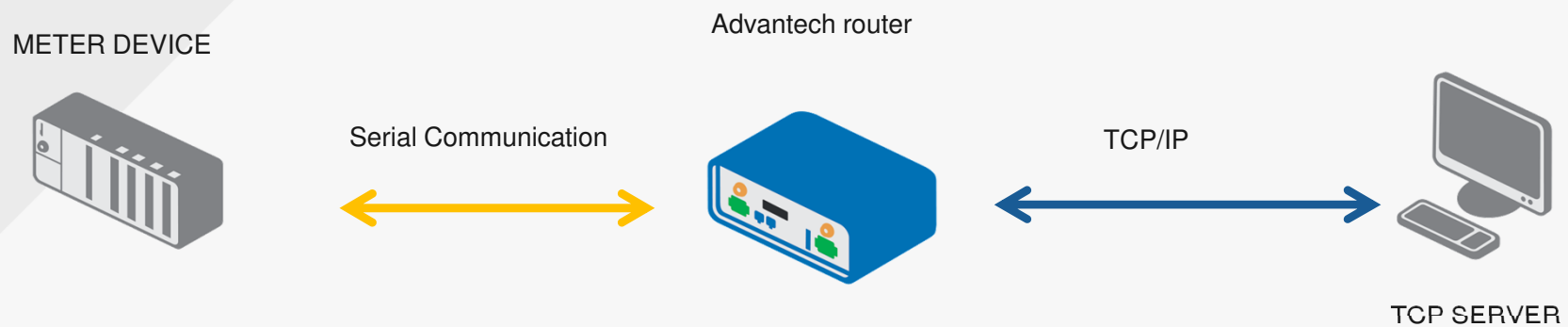
Komendy AT

- Możliwość wykorzystania dedykowanego modułu do obsługi komend AT



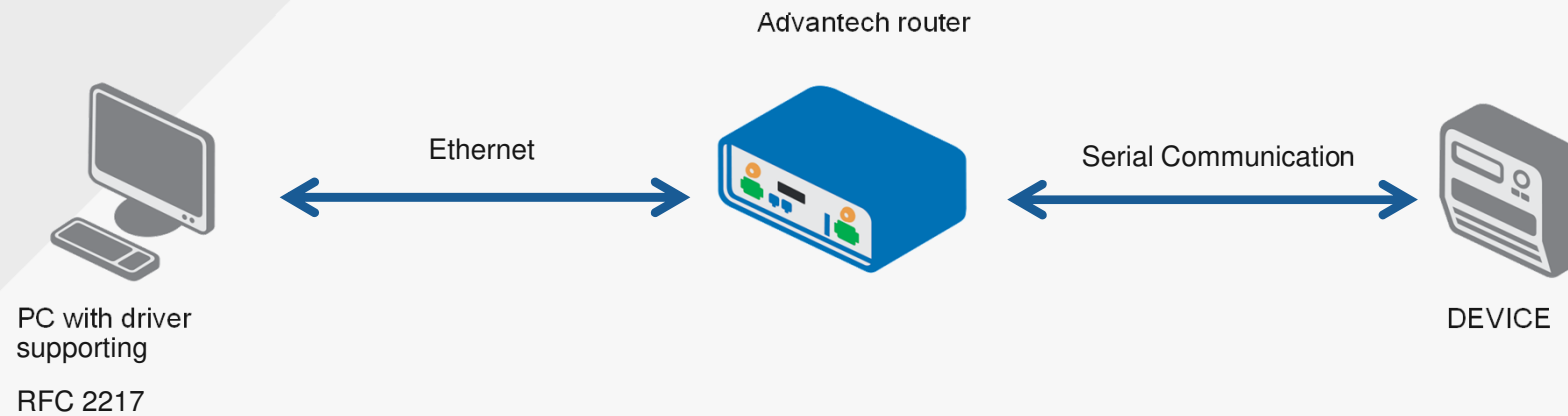
Serial2TCP

- Konwerter łączy szeregowego na Ethernet
- Zdalny dostęp do portu szeregowego



SER2NET

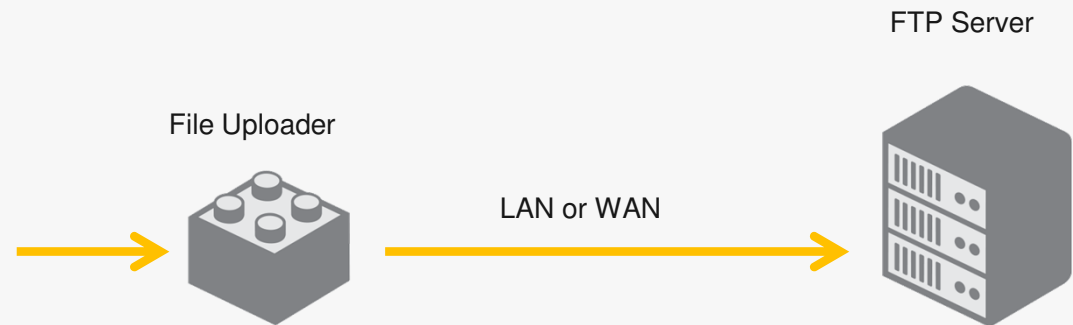
- Wirtualny port COM na urządzeniu w innej lokalizacji
- Kompatybilność z RFC2217



FILE UPLOADER

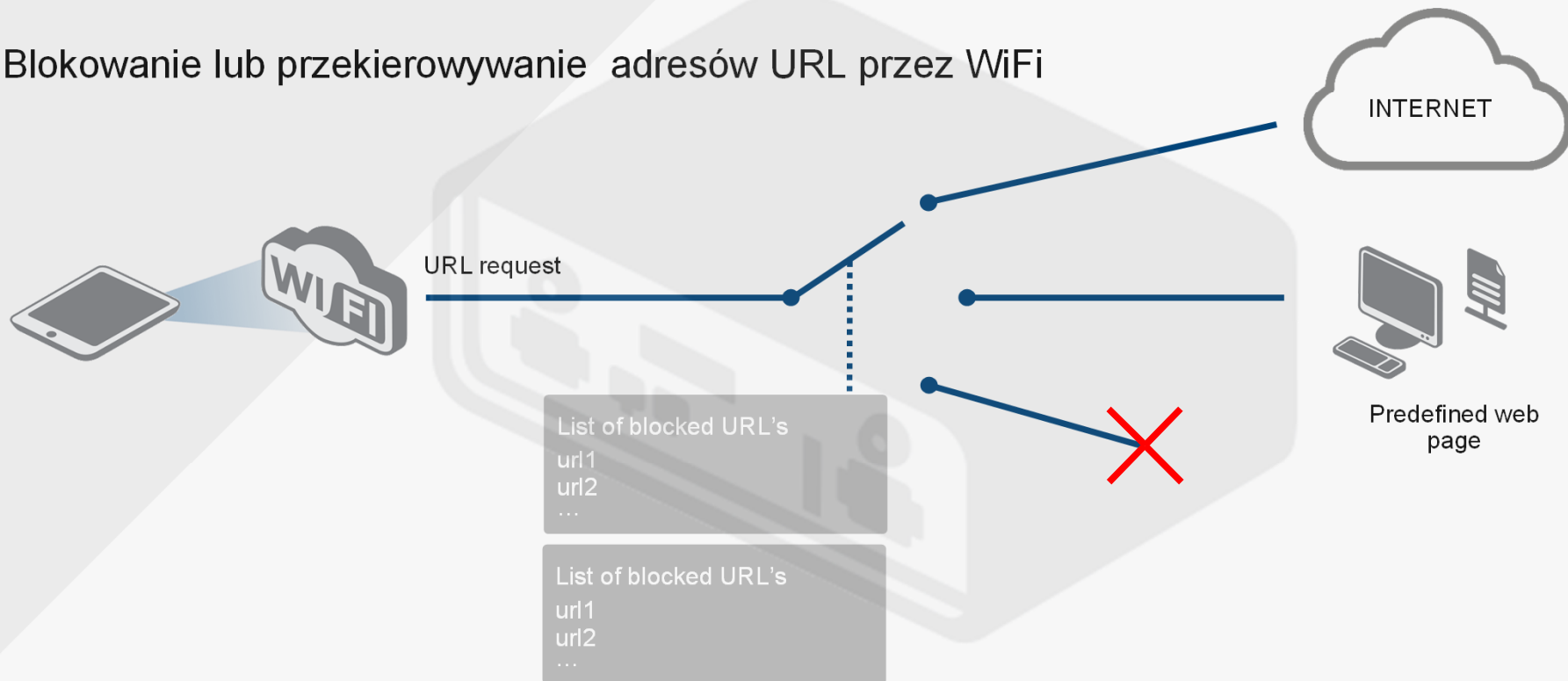
- Konfiguracja lokalizacji
- Wysyłanie na serwer FTP
- Usuwanie starych plików

Left	File	Command	Options	Right
< /				. [^]>
.n	Name		Size	Modify time
/bin			4096	Mar 11 12:12
/boot			2560	Jan 1 1970
/dev			3480	Apr 3 17:01
/etc			4096	Apr 4 07:19
/home			4096	Nov 29 02:22
/lib			4096	Mar 11 12:12
/lost+found			16384	Nov 29 03:35
/media			4096	Nov 29 02:06
/mnt			4096	Nov 29 02:06



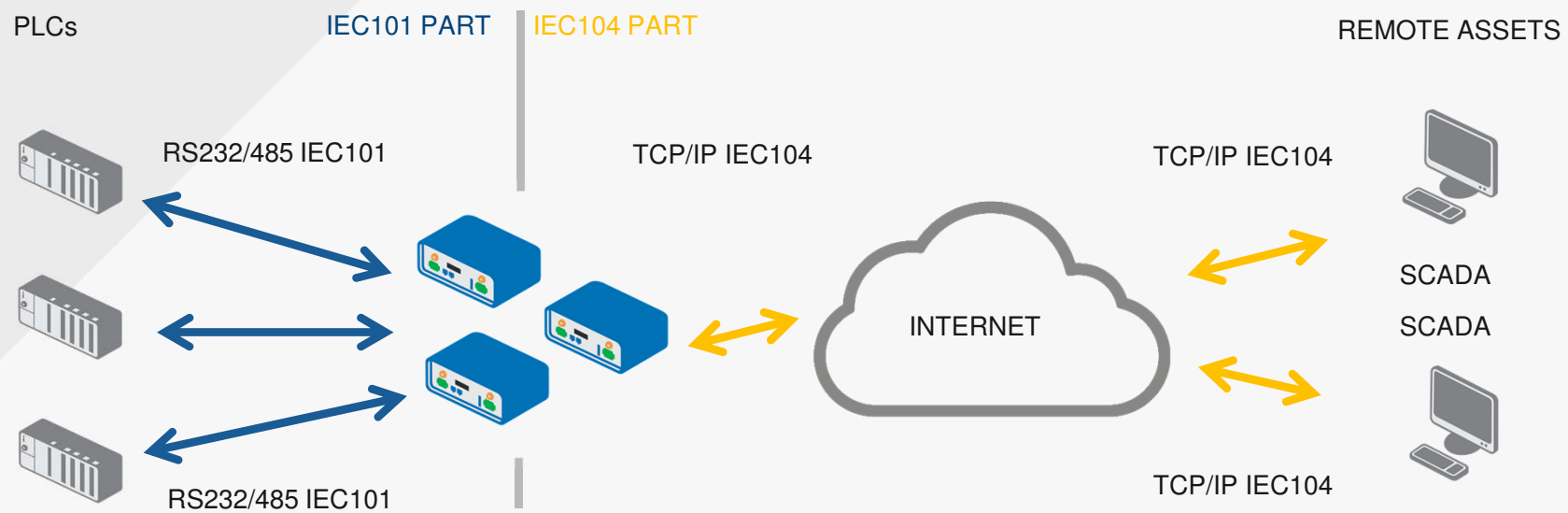
URL Blocker

- Blokowanie lub przekierowywanie adresów URL przez WiFi



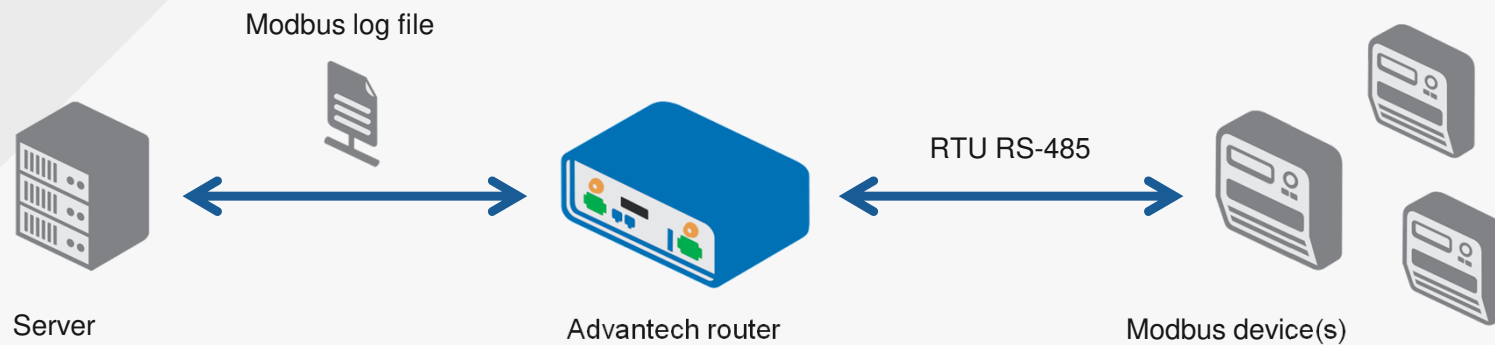
IEC101 - 104

- Konwersja protokołu IEC101 do IEC104
- Podział długich wiadomości



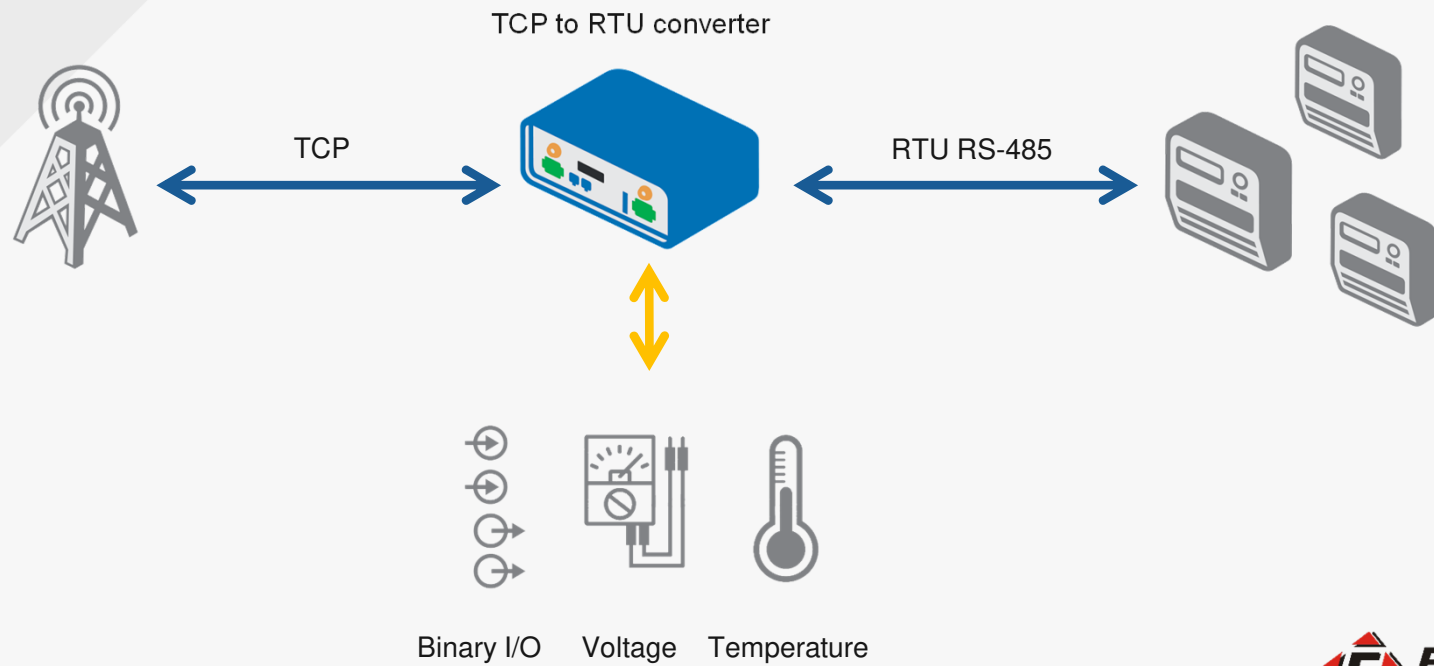
Modbus Logger

- Logowanie danych i wysyłanie na serwer FTP(S)



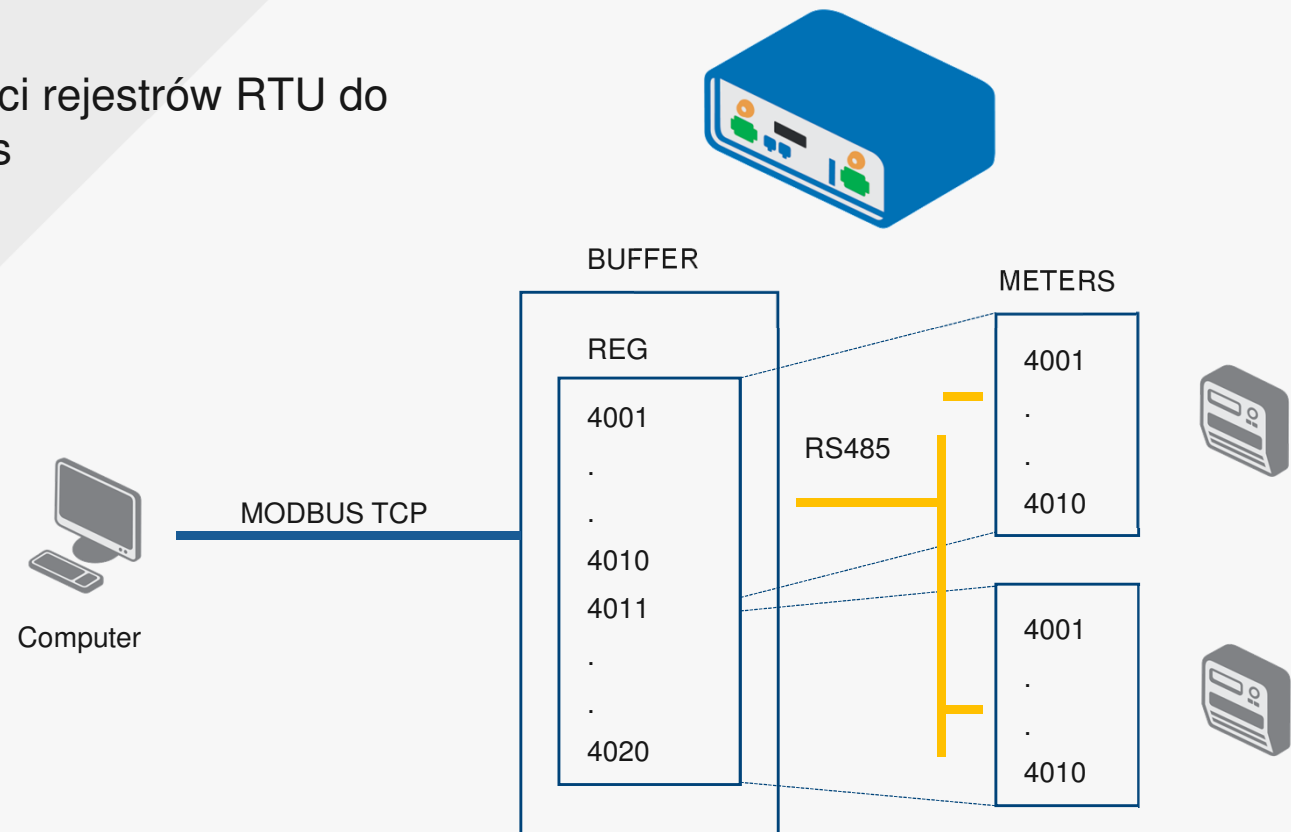
Modbus TCP2RTU

- Konwersja Modbus TCP na Modbus RTU



Modbus RTUMAP

- Mapowanie większej ilości rejestrów RTU do jednego mastera Modbus



OPERATION HOURS COUNTER

- Czas aktywności/nieaktywności wejścia cyfrowego
- Czas pracy systemu
- Monitoring ModbusTCP
- Liczniki resetowalne, bądź nieresetowalne

Binary input



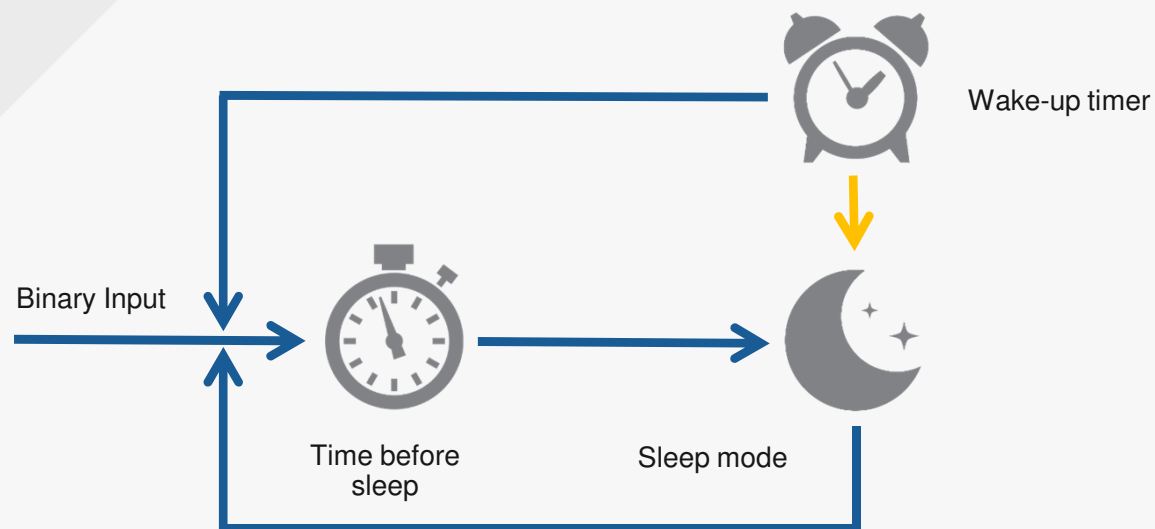
System running counter



Time Counter on BIN0

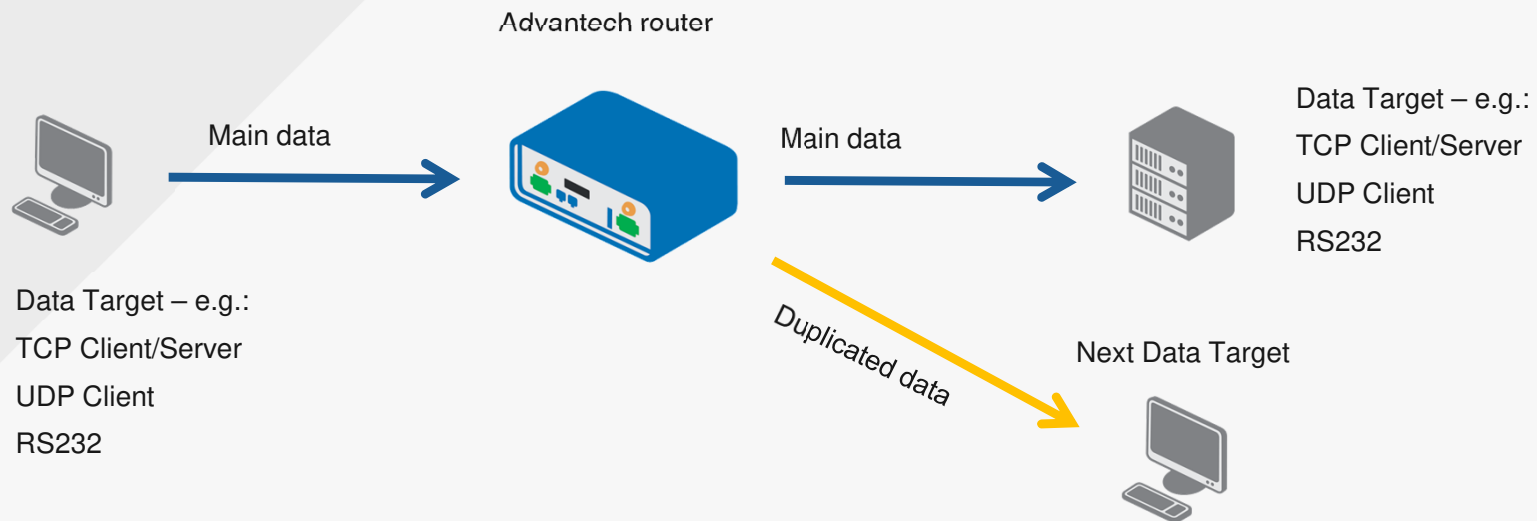
BIN Sleep

- Dostępny dla serii v3
- Wejście cyfrowe kontrolujące przejście routera w stan uśpienia



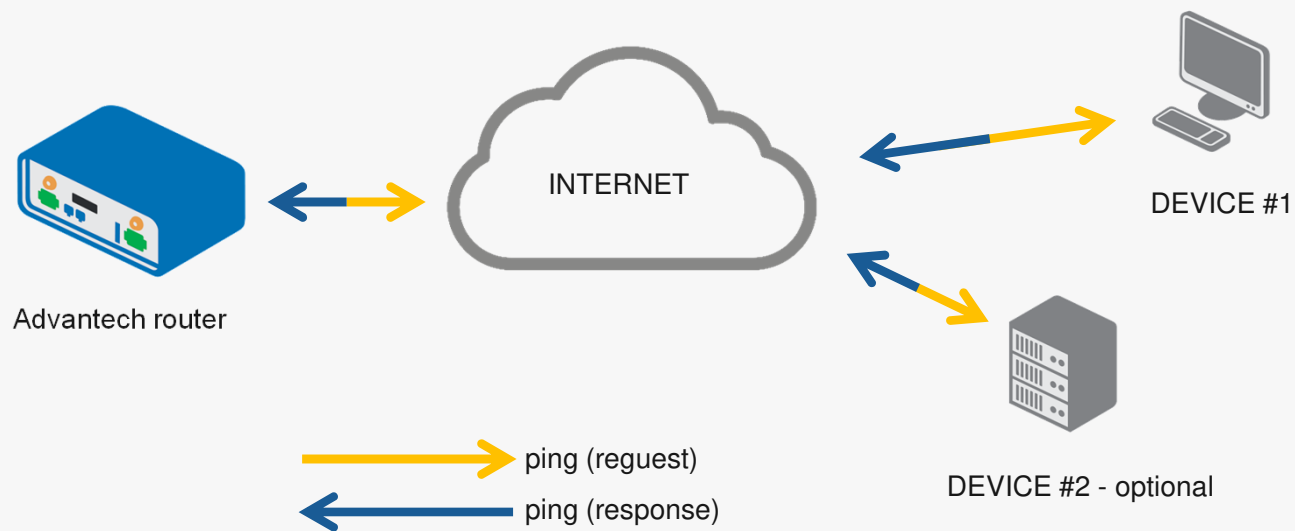
PACKET DUPLICATOR

- Duplikowanie pakietów TCP / UDP



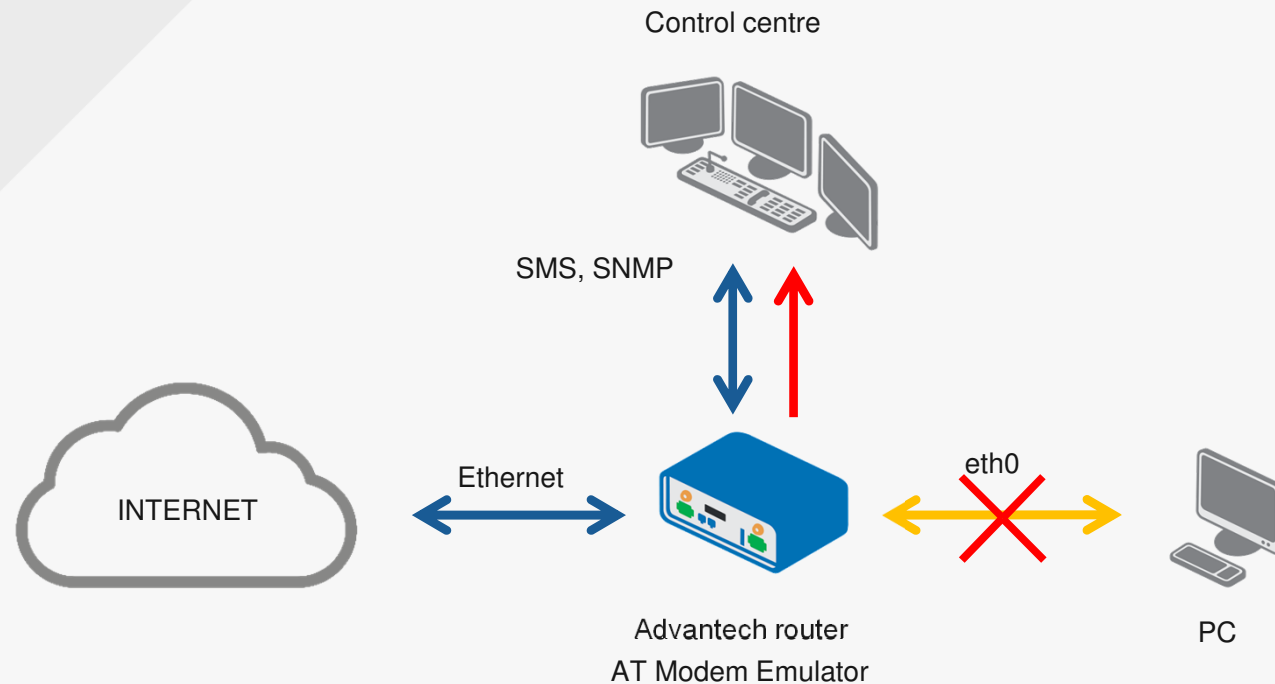
PINGER

- Sprawdzanie połączenia z danym adresem IP
- Reakcje na brak połączenia
 - SNMP
 - E-Mail
 - Restart modułu komórkowego
 - Restart routera



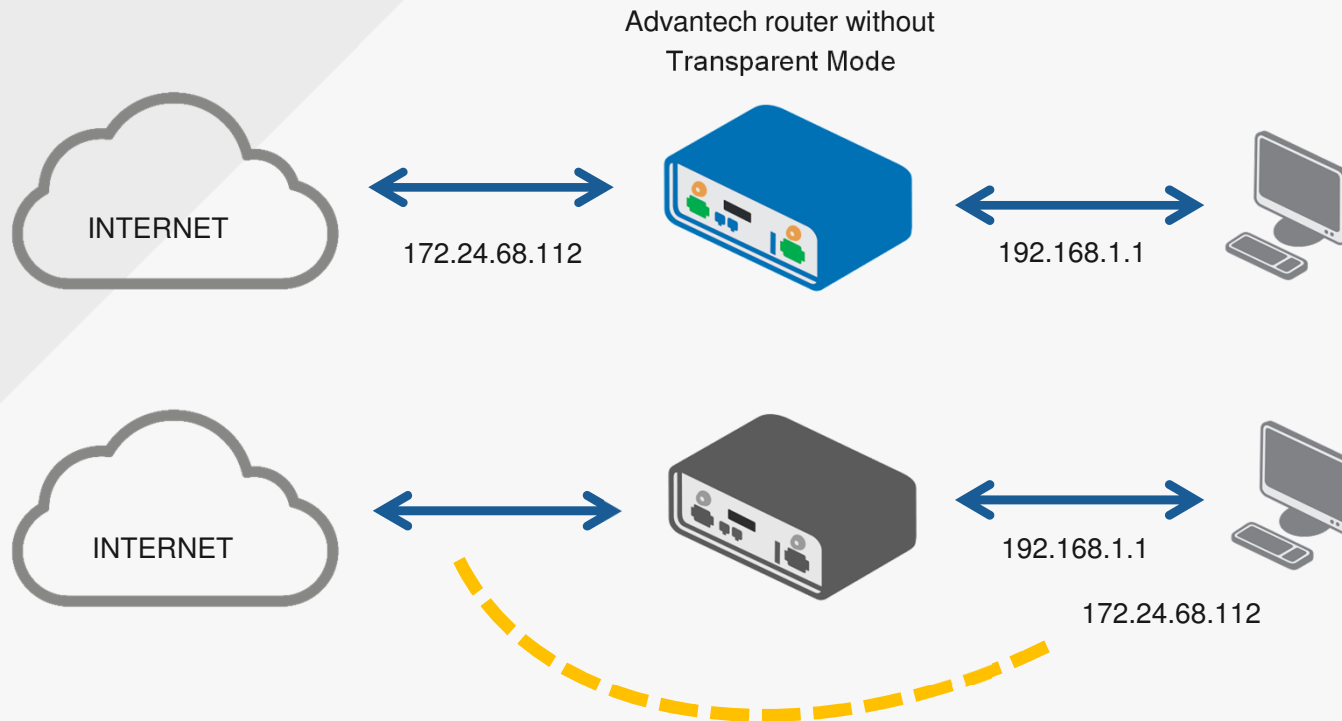
ETHERNET PORT DETECTOR

- Detekcja połączenia Ethernet
- SMS lub SNMP trap



TRANSPARENT MODE

- Tryb przezroczystej pracy urządzenia

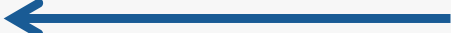


WiFi SSID Switch

- Przełączanie pomiędzy sieciami o różnych SSID na podstawie jakości sygnału
- Priorytety nadawane danym sieciom oraz analiza poziomu sygnału

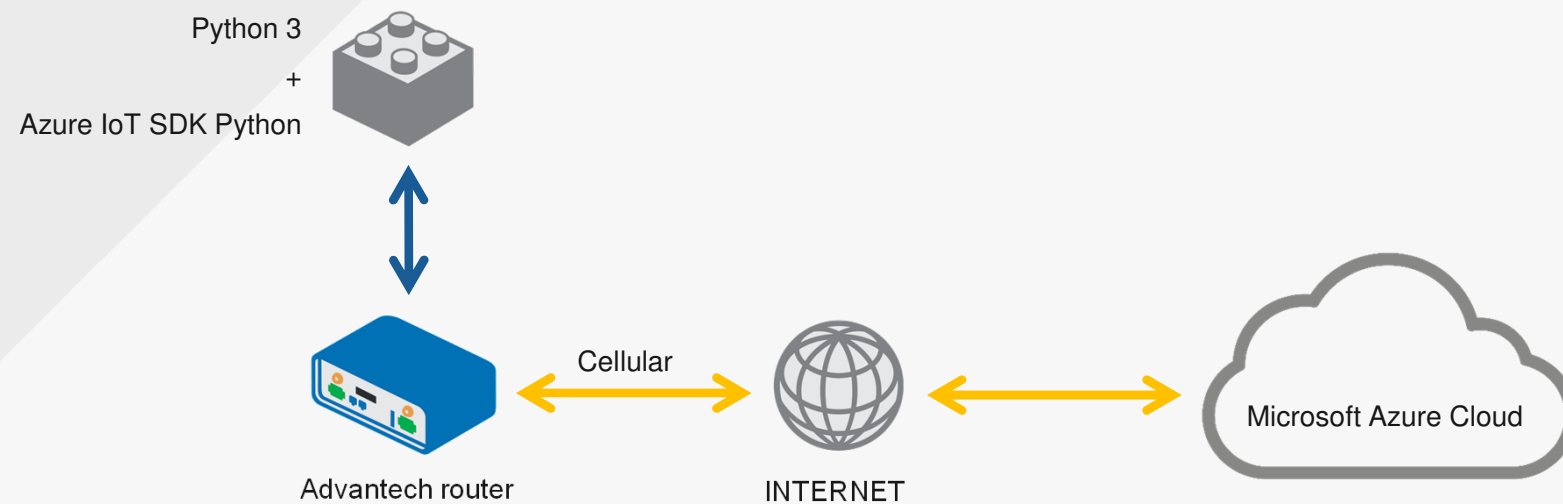
	Signal Level	Priority	
SSID1		Good	3
SSID2		Good	1
SSID3		Good	4
SSID4		Weak	2

Highest priority from „Good signal“ is choosen



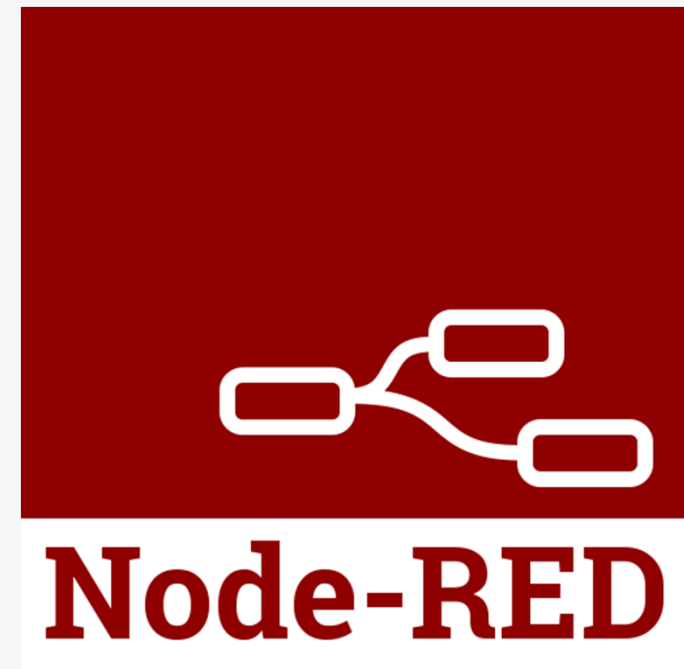
Azure IoT SDK

- Wykorzystanie Python 3 z Azure IoT SDK

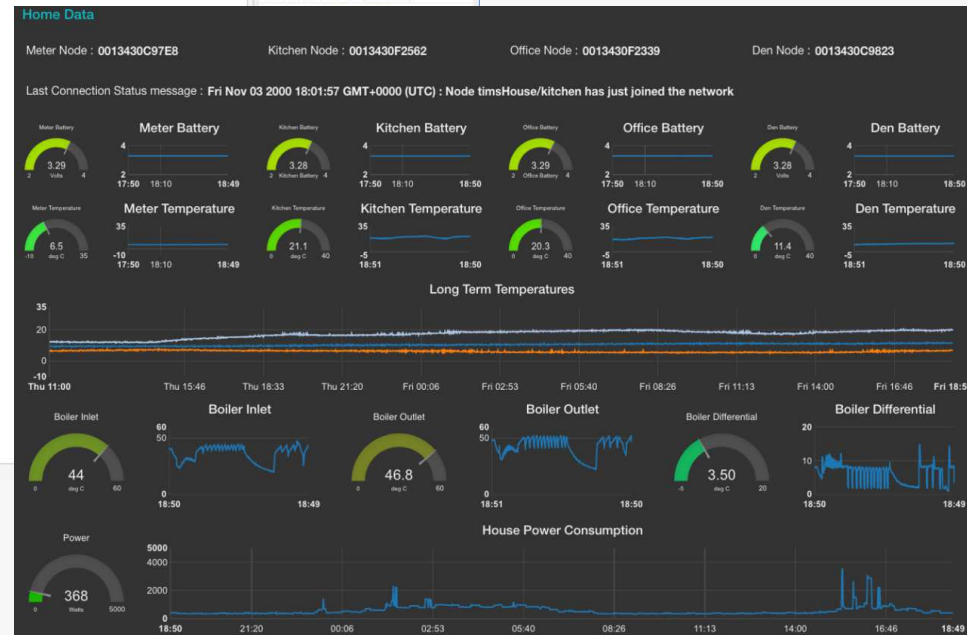
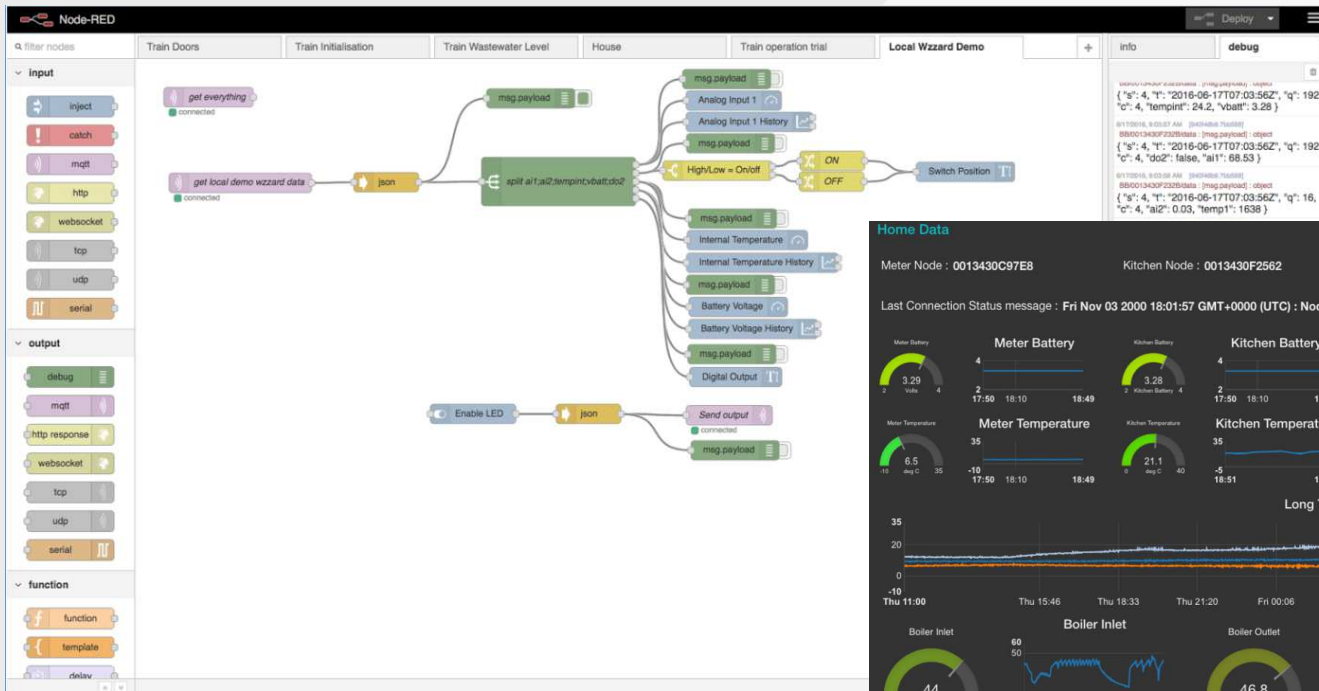


Node-RED

- Moduły użytkownika: Node.js i Node-RED
- Tworzenie algorytmów sterowania
- Budowanie wizualizacji



Node-RED



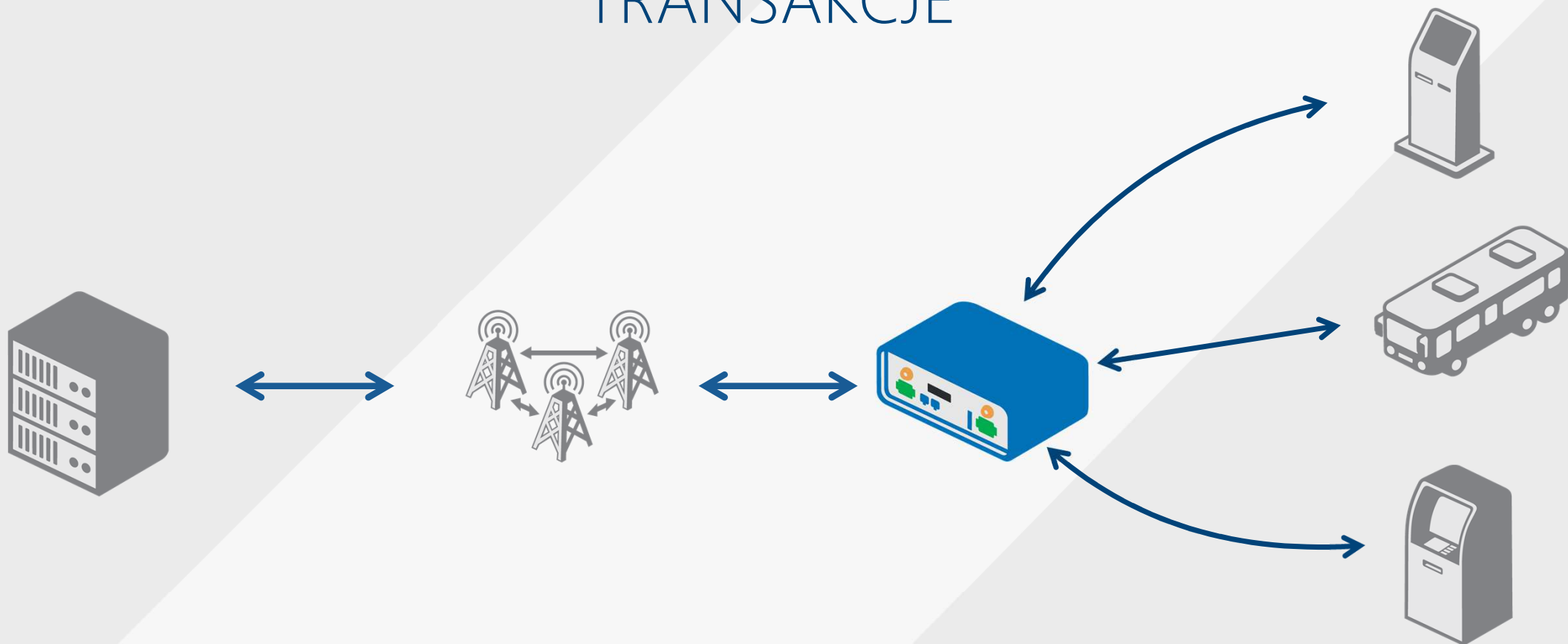
Możliwości jest więcej..

IPv6 | DHCP | NAT | PAT | IP Masquerading | VLAN |
NTP | NHRP | QoS | PPPoE | VRRP | PPTP | GRE |
BGP | IS-IS | RIP | OSPF | PIM-SM | DNP3

..dużo więcej

IPSec | L2TP | Stunel | Easy VPN | Open VPN | SSH |
HTTP Authentication | SCEP Client | Radius

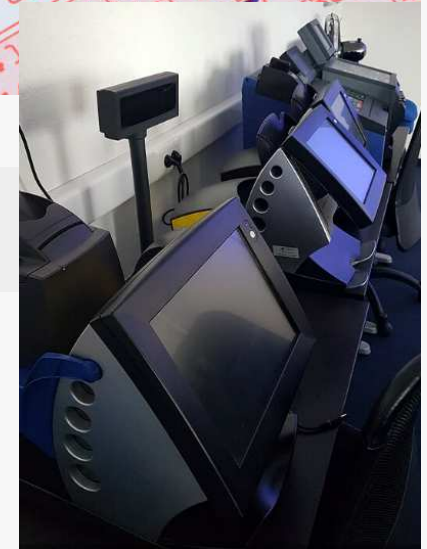
TRANSAKCJE



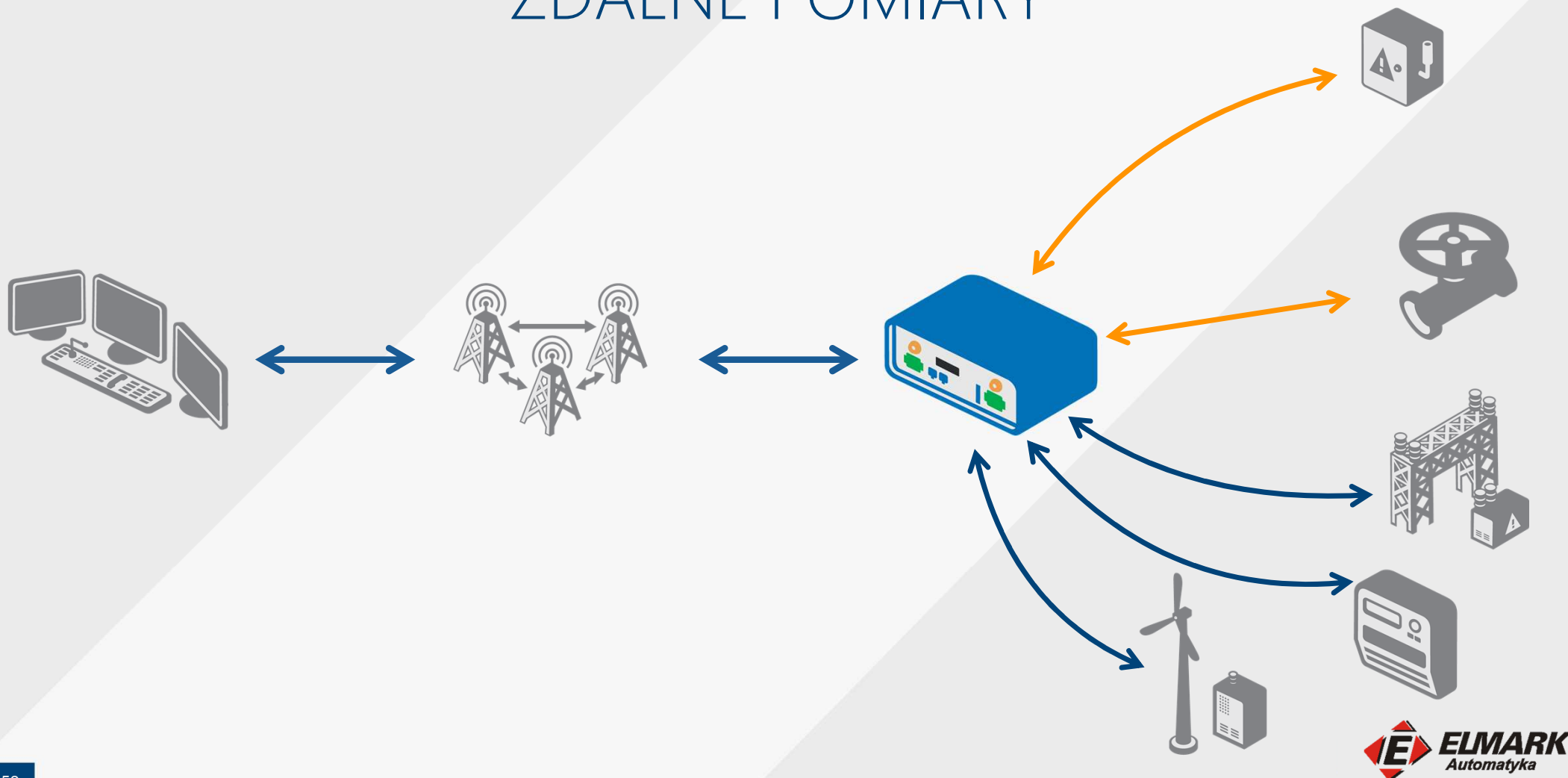
IGT – 3G/4G connection for lottery terminals



Vertical:	Transaction management
Region - Country	Poland, Lithuania, Czech Republic, Slovakia
Product:	HSDPA router UR5 HSPA+ router UR5i vF SWITCH HSPA+ router UR5i v2 Libartum LTE router LR77 v2 Libartum
Volume:	37 000+
Application:	On-line transactional networks for national lotteries
Why Advantech:	+ Reliability of router + Fast delivery + Dual SIM failover capability + Support of Multicast protocols / DMVPN / GRE tunnels + Automatic mass update of configuration and firmware update + R-SeeNet for network performance monitoring



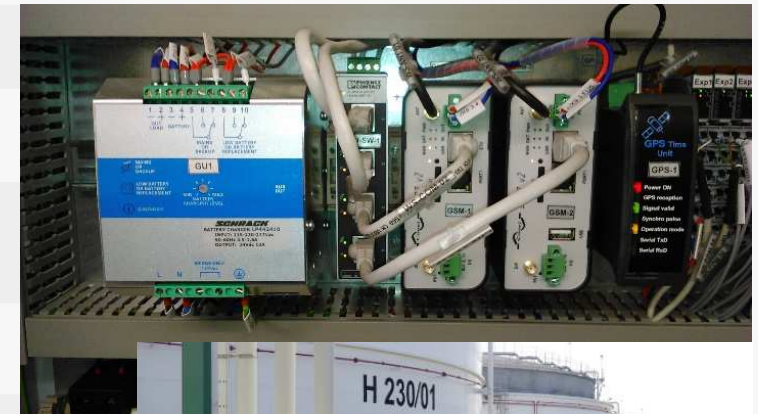
ZDALNE POMIARY



HIMA – Redundant communication for oil pipelines



Vertical:	Oil & Gas distribution
Region - Country	Czech Republic
Product:	4G LTE Router LR77 v2
Volume:	
Application:	Cellular redundant communication for leak detection system
Why Advantech:	+ Experience with mobile carriers + Ability to customize SW functions of routers + Industrial routers convenient for outdoor usage + Creation of technical solution of fully redundant system + VRRP protocol support for seamless switching between two routers



E.ON – Energie Deutschland GmbH



Vertical:	Electricity distribution
Region - Country	Germany
Product:	4G LTE router LR77 v2
Volume:	
Application:	Remote monitoring of electricity meters
Why Advantech:	+ Reliable solution performing well in cellular 4G LTE infrastructure + Possibility to use WIFI for locale connection + VPN capabilities including VPN management systém + Simple remote web management and FW and configuration update options



Pražská teplárenská a.s.
- Monitoring of Prague's Heat Distribution



Vertical:	Energy and Heat Industries
Region - Country	Czech Republic
Product:	UMTS/HSPA+ router UR5i v2 MBUS
Volume:	
Application:	Connecting of heat meters using of single M-bus loop and transmit data to the company's central metering system. Connection of RTUs to SCADA
Why Advantech:	+ Good combination of HW & SW + M-BUS interface + Up to 30 meters to single M-BUS + MODBUS RTU to TCP gateway functionality



Hamilton oiler Engineering

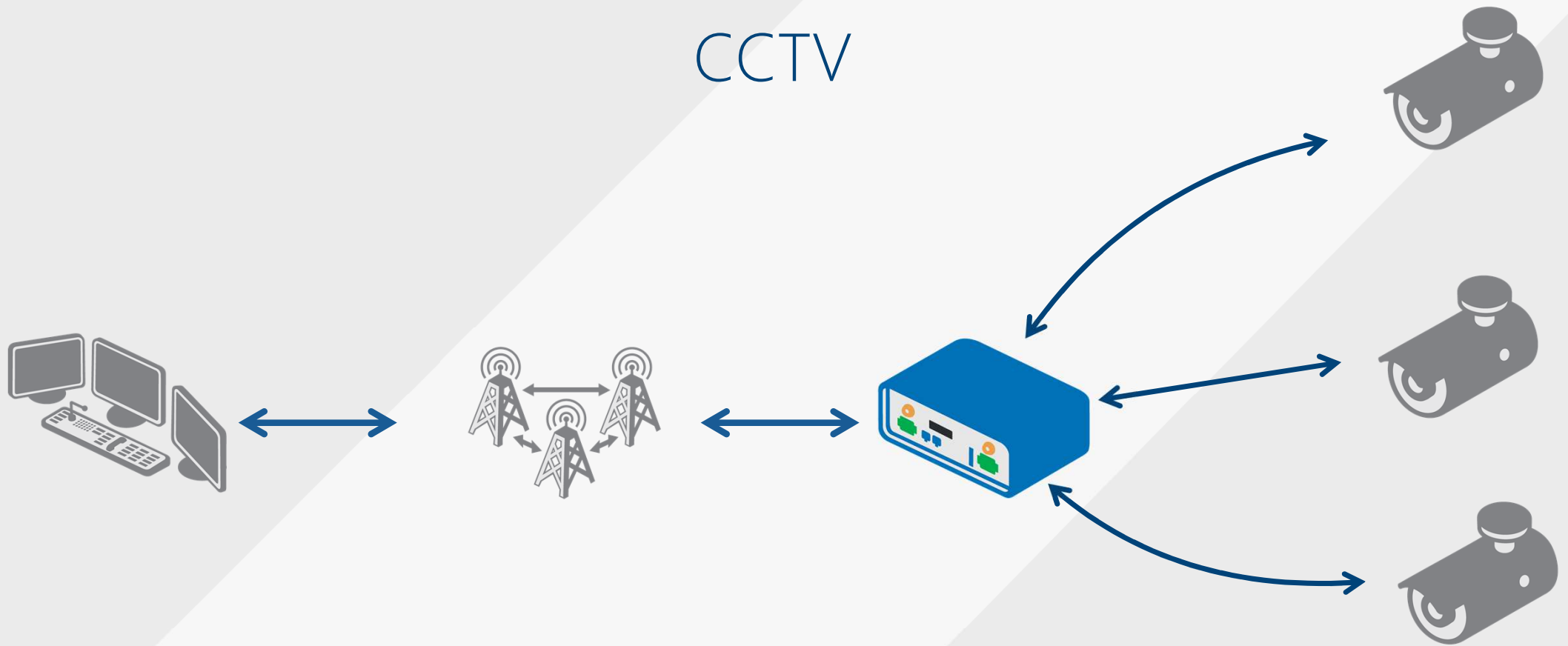
– Monitoring of boiler system



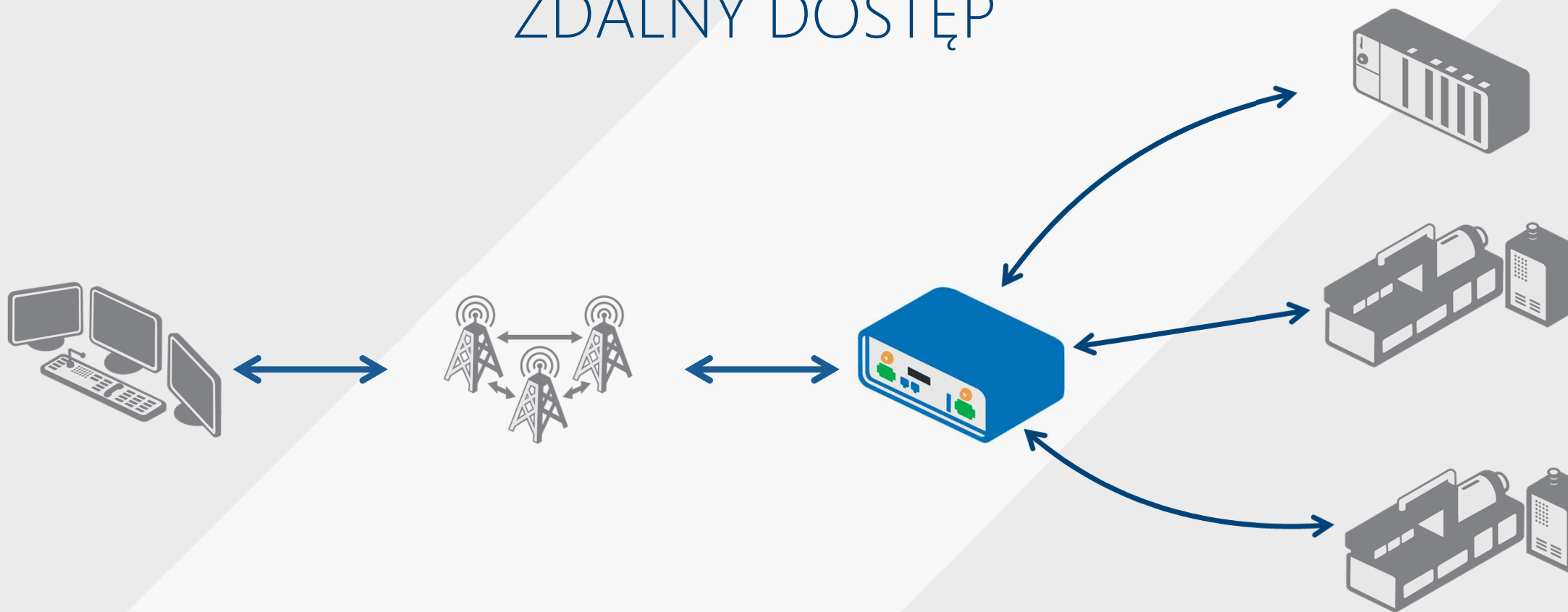
Vertical:	Automation
Region - Country	NAM, LATAM
Product:	4G LTE Router USB port to connect, Flash Disk as extra storage, ETHs, Serial Ports
Volume:	
Application:	Monitoring of boiler system in hospitals, hotels and campuse enviroments
Why Advantech:	+ Custom made User Module + Reduced warranty costs + Dashboard Display for remote monitoring + Alarm notification



CCTV



ZDALNY DOSTĘP



Materna GmbH
– Remote monitoring of vending machine

MATERNA
Information & Communications

Vertical:	POS / vending machines / kiosks
Region - Country	Germany
Product:	Customized GPRS/EDGE router ER75i v2
Volume:	
Application:	Remote monitoring of vending machines

- Why Advantech:
- + Size of the unit and its software capabilities
 - + Direct communication with developer and producer of the router important for customization requests
 - + Reliability proved in various customer tests and high quality components hardware setup
 - + Production support to enable Materna smart deployment and invoicing to customer
 - + High level support in Germany



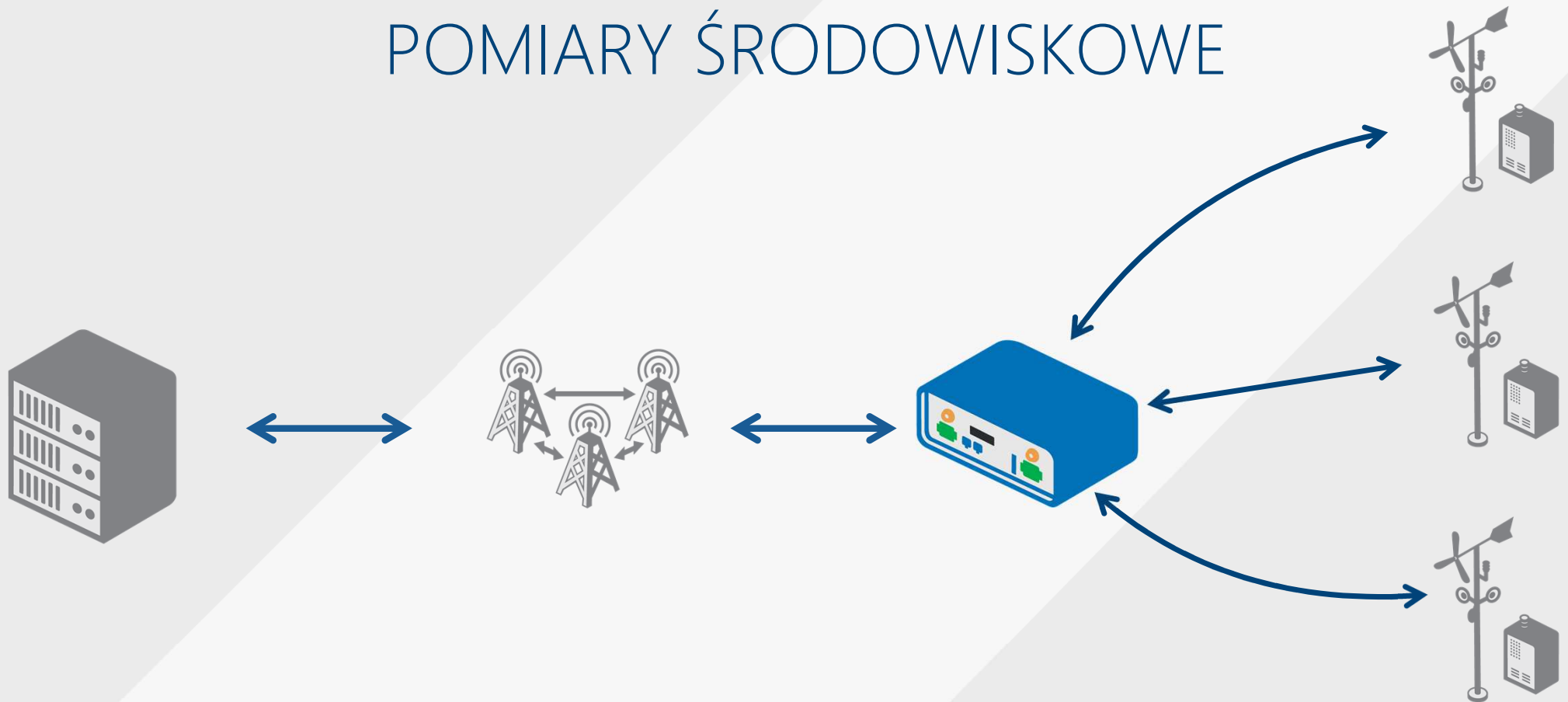
Madison Technologies – Sydney Ferries



Vertical:	Transportation, Shipping of goods
Region - Country	Australia
Product:	4G LTE Router SmartFlex 4G LTE Router LR77 v2
Volume:	
Application:	Real time monitoring of position Sydney Ferries for central information system.
Why Advantech:	+ Multicast support - PIM-SM Software Module + GPS functionality - NMEA reporting + Functionality Iptables + VPN Functionality + R-SeeNet monitoring SW



POMIARY ŚRODOWISKOWE



EMCOM – Norwegian Air Ambulance Foundation



Vertical:	Meteorology
Region - Country	Norway
Product:	4G LTE Router LR77 v2 Libratum
Volume:	
Application:	Real-time Monitoring of small weather stations for Norwegian Air Ambulance
Why Advantech:	+ Robust HW operating from -40 °C + Wide variety of ports - possible to connect + Computers and measurement sensors and too + Remote management



Iceland meteorological institute
- Monitoring of volcano



Vertical: Meteorology

Region - Country Iceland

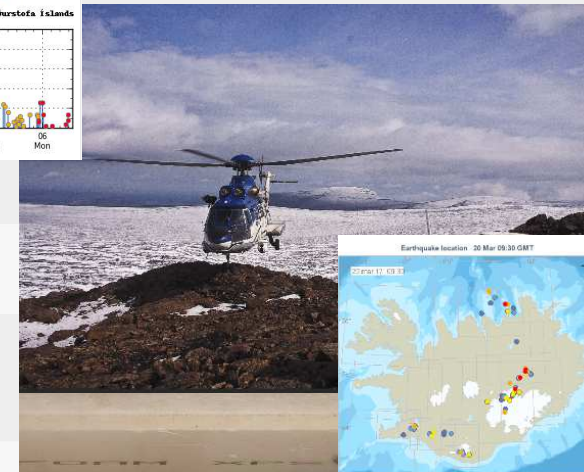
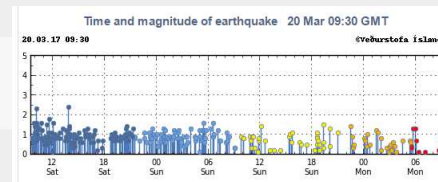
Product: UMTS/HSPA+ router UR5i v2

Volume:

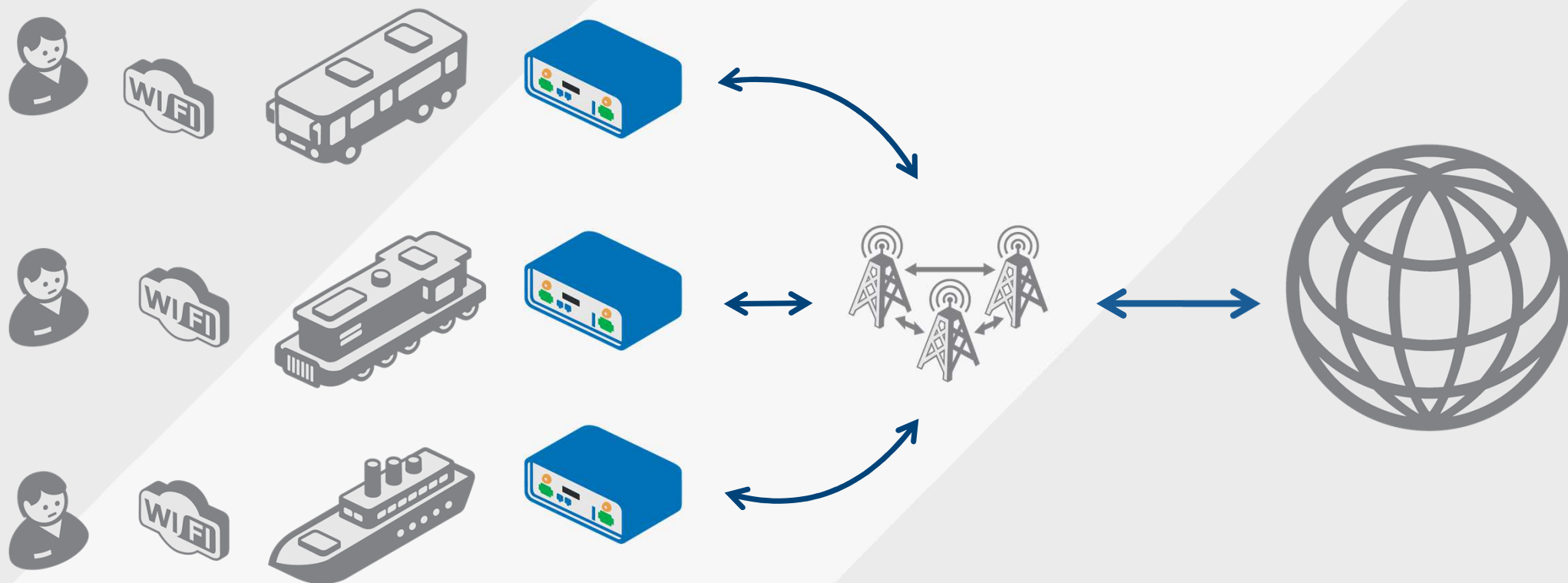
Application: Real-time Monitoring of a Live Volcano

Why Advantech:

- + Easy Interface, reliable solution
- + Fail over support
- + Fast boot
- + Easy remote management
- + 900 MHz UMTS support



PUNKTY DOSTĘPOWE Wi-Fi (TRANSPORT)



Student Agency
- On board Internet connectivity

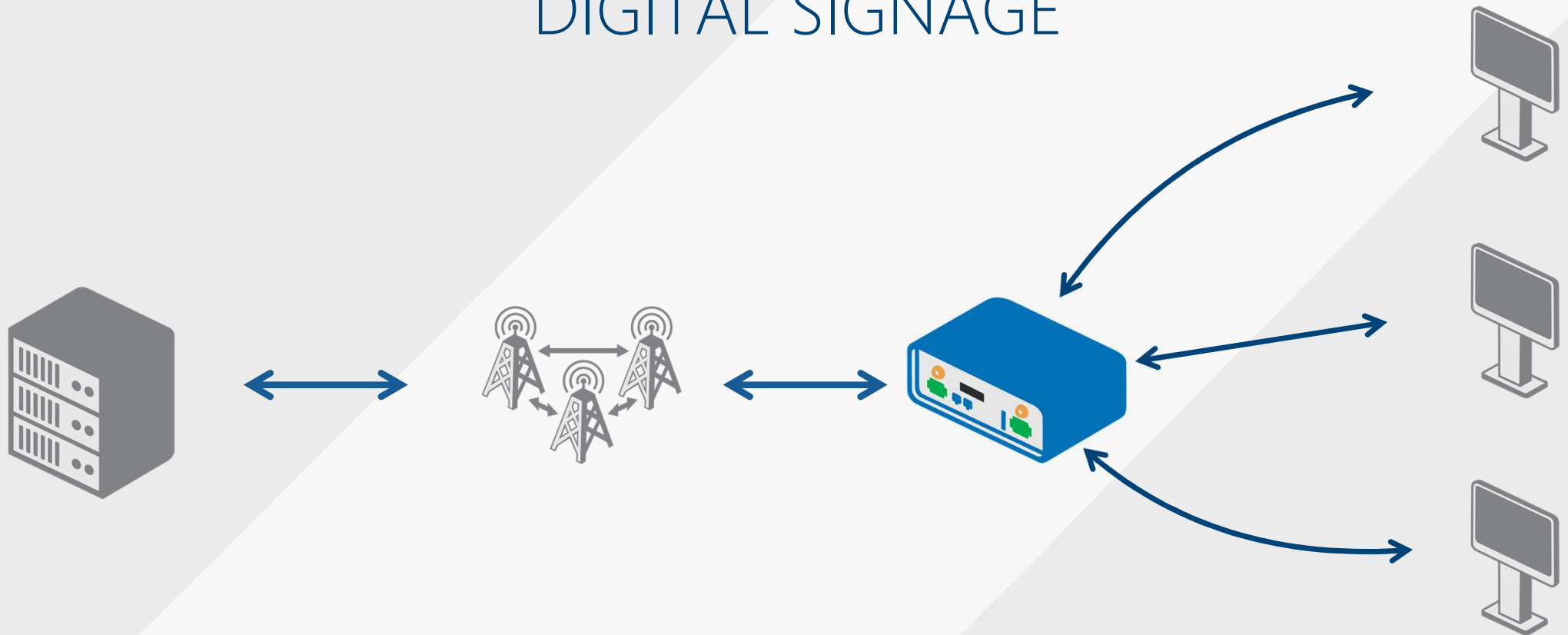
| STUDENT | AGENCY |

Vertical:	Transportation
Region - Country	Czech Republic
Product:	Twin module cellular router SmartMotion
Volume:	
Application:	Routers provide of Internet connectivity to coaches/buses for WIFI Internet for passengers and connection of information system in the bus to company server through VPN tunnel.

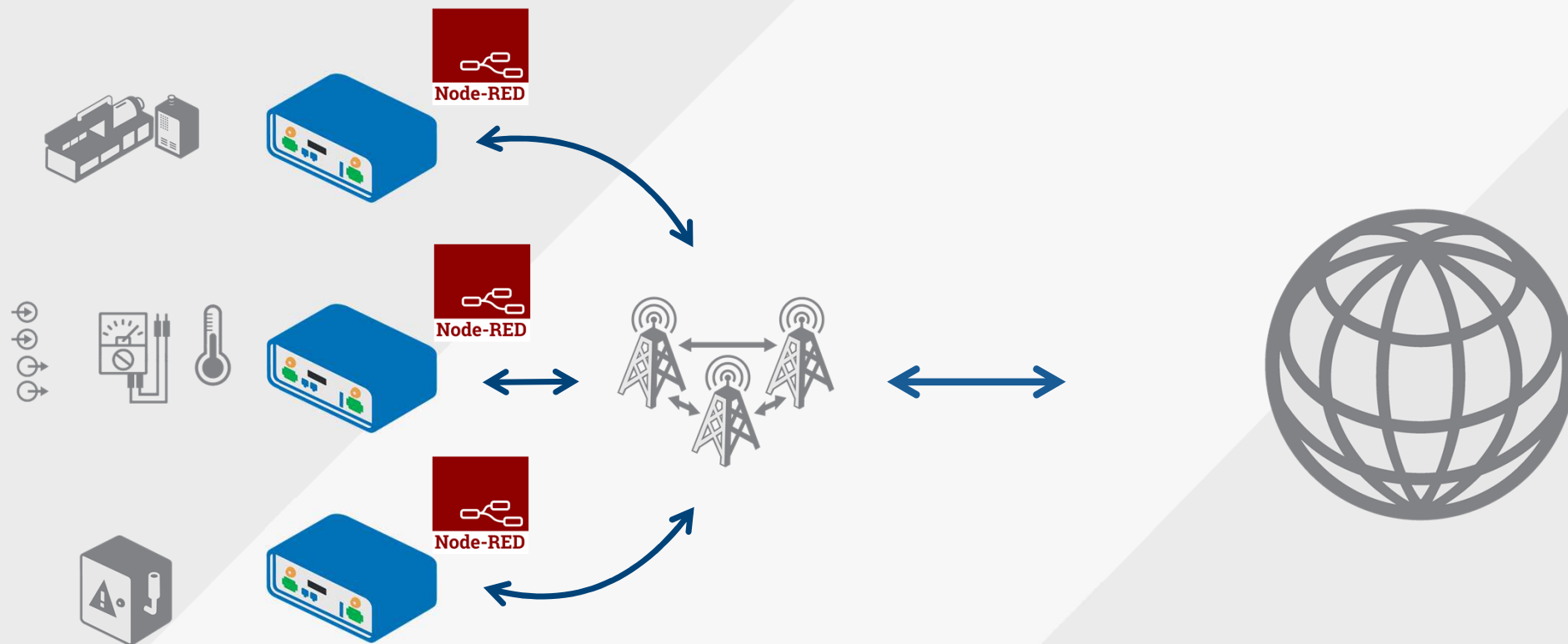


- Why Advantech:
- + Good combination of HW & SW
 - + Elimination of dropouts of connection (switching between two carriers)
 - + Ready for data bonding, VPN Suport
 - + Built-in GPS receiver
 - + Captive portal module - Local advertising

DIGITAL SIGNAGE



IIoT



Dziękuję za uwagę

PRZEMYSŁAW STRZAŁA

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