

M2M

TAINY HMOD-L1-IO

Connection for closed user groups in wireless networks

Dr. Neuhaus Product World - July 2009



Dr. Neuhaus



Introducing: TAINY HMOD-L1-IO



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- IP connection for closed user groups in wireless networks with the TAINY HMOD-L1-IO
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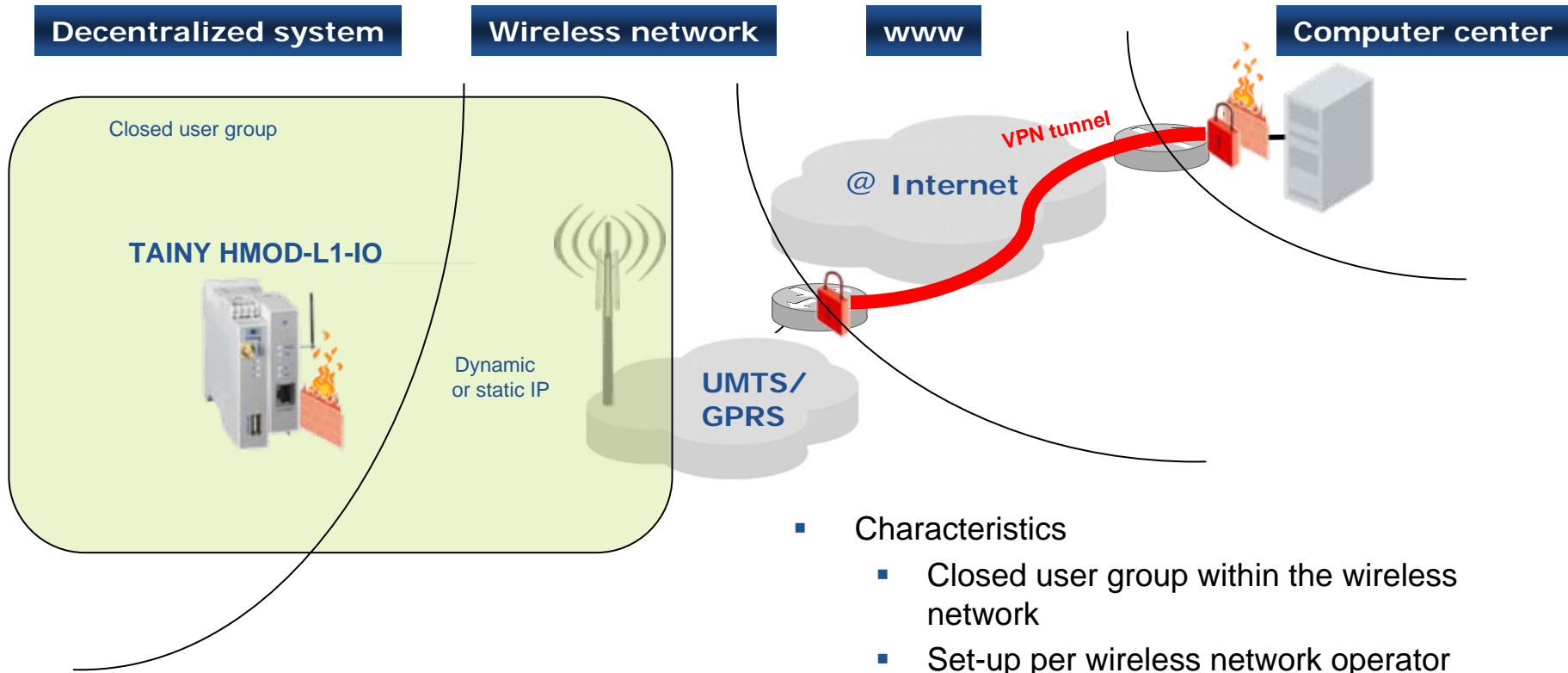


Introduction:

System topologies in wireless networks

System topology: Closed user group in wireless network

- Integration via closed user group within the wireless network
 - Use of a private APN and gateway
 - Secure data transmission between wireless network and customer network using VPN/IPSec



**IP connection for a closed user group
in a wireless network**

with the

TAINY HMOD-L1-IO

Equipped to handle any connection

- **HSDPA** VPN router and firewall combined in a single device
 - **Automatic and interruption-free** choice of the connection technology **available**
 - **HSDPA**: Up to **3.6 MBit/s** download / Up to 384 KBit/s upload;
 - **UMTS**: Up to 384 KBit/s download & upload
 - **EDGE (EGPRS)**: Class 10; up to 237 KBit/s download / up to 118 KBit/s upload;
 - **GPRS**: Class 10; up to 85.6 KBit/s download / up to 42.8 KBit/s upload;
 - **Dial-up option** via **GSM/CSD for remote configuration**
non-transparent 2.4, 4.8, 9.6, 14.4kbps; SMS (TX): Point-to-point
- Frequency bands for **international use**
 - Quad-band: GSM 850/900/1800/1900 MHz
 - Tri-band: UMTS/HSDPA (WCDMA/FDD) 850/1900/2100 MHz
- Antenna connection
 - Nominal impedance: 50 ohms; jack: SMA
 - Diverse antennas available; depending on requirement and installation location
- Application interface
 - **10/100 Base-T** (RJ45 jack); Ethernet IEEE802; 10/100 Mbit/s; **Auto Cross Over**

The “firewall” – Protection from attacks

- HSDPA router with **firewall** combined in a single device
 - The TAINY HMOD-L1-IO is equipped with firewall functions **to protect** the local network and itself from attacks from the outside:
 - As a dynamic packet filter, the **Stateful Inspection Firewall** examines data packets on the basis of the original and the destination address. Data packets that cannot be allocated to specific criteria or that might belong to a DoS attack are rejected.
 - And **anti-spoofing** blocks undesired data traffic
 - **Port forwarding**: Depending on the configuration, it is possible to forward the data traffic coming in at certain ports to defined IP addresses (devices) in the local network connected, e.g. data from Port 4711 always goes to 172.25.15.222

High availability and stable connections

- Intelligent **connection monitoring**
 - **Monitoring** of the availability of the **internet/intranet connection**
 - Dispatch of ping packets (ICMP) to up to **four receivers** in the external network
 - **Time interval** for connection check and **number** of failed attempts **can be adjusted**
 - **Action** for defective connection **can be selected** between
 - **Renew** UMTS/GPRS connection
 - **Restart** device
 - 24h reset; time can be selected freely

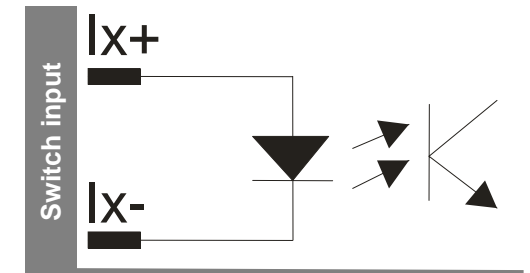
Being on the safe side

- Dispatch of an **alarm text message** via GSM network
 - **2 different events**
 - Signal of incoming message,
 - No UMTS/GPRS connection made
 - Entry of own **call numbers** and free **text** on each of the two events

- Incoming message
 - Connection of a digital sensor (e.g. door switch)
 - **Galvanic** separation between the TAINY HMOD and the application, input voltage 5...30V
 - Application: e.g.: Monitoring a control cabinet door



I1+ I1- O1a O1b



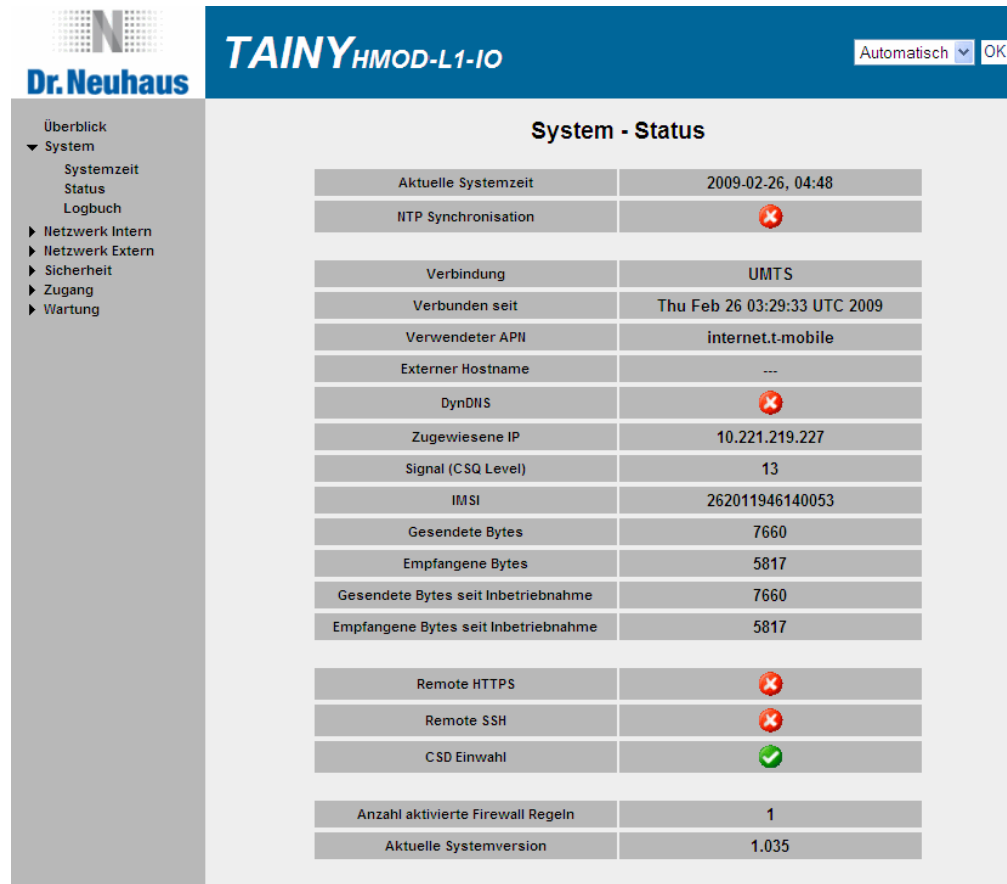
Not limited to industrial applications

- **Large** input voltage range:
 - Voltage: 12-60 VDC
 - Power input: I_{In} 365 - 92mA; I_{Burst} 1.26A at full transmitting power
Power consumption _(typical): 4-4 W @ 12 V, 4.0 W @ 24 V, 5.5 W @ 60 V
- **Large** temperature range:
 - Operation from -20 °C to +60 °C; humidity 0-95 %, non-condensing
- **Mechanics**
 - **Top-hat rail** mounting
 - Plastic enclosure; protection type/class: IP20
 - Dimensions: approx. 114.5 x 45 x 99 mm (L x W x H)
 - Weight: approx. 280 g
 - SIM card
 - accessible **from the outside**
 - but nevertheless **protected** from direct access








Everything via remote control

- Easy configuration of all functions on WEB interface
- Also accessible via GSM/CSD, even when there is no data connection



The screenshot shows the web interface for the TAINY HMOD-L1-IO device. The header includes the Dr. Neuhaus logo, the device name 'TAINY HMOD-L1-IO', and a dropdown menu set to 'Automatisch' with an 'OK' button. A left sidebar contains a navigation menu with options like 'Überblick', 'System', 'Systemzeit', 'Status', 'Logbuch', 'Netzwerk Intern', 'Netzwerk Extern', 'Sicherheit', 'Zugang', and 'Wartung'. The main content area is titled 'System - Status' and displays a table of system parameters.

System - Status	
Aktuelle Systemzeit	2009-02-26, 04:48
NTP Synchronisation	
Verbindung	UMTS
Verbunden seit	Thu Feb 26 03:29:33 UTC 2009
Verwendeter APN	internet.t-mobile
Externer Hostname	---
DynDNS	
Zugewiesene IP	10.221.219.227
Signal (CSQ Level)	13
IMSI	262011946140053
Gesendete Bytes	7660
Empfangene Bytes	5817
Gesendete Bytes seit Inbetriebnahme	7660
Empfangene Bytes seit Inbetriebnahme	5817
Remote HTTPS	
Remote SSH	
CSD Einwahl	
Anzahl aktivierte Firewall Regeln	1
Aktuelle Systemversion	1.035

Everything via remote control

- **Secure remote access** to the TAINY HMOD via SSH and HTTPS
 - **System status**
 - Connection: Indicates whether and which **wireless connection** is in effect
 - Allocated **IP address**: Indicates the IP address of the TAINY HMOD in the UMTS/GPRS
 - Signal (CSQ level): Indicates the **strength of the wireless signal** as CSQ value
 - **Bytes sent/bytes received**: Indicates the number of bytes sent or received in the UMTS/GPRS network
 - **Logbook**
 - **Important events** in the operating process are stored in the logbook: e.g.: reboot, changes in the configuration, connection dial-ups, connection interruptions, signal strength, ...
 - The logbook can be sent to an FTP server **automatically** once a day via FTP (= File Transfer Protocol).
 - **Updates**
 - New device software can be uploaded **immediately** or at any **previously specified time**

Compliance

- CE
- R&TTE (GSM) - Guideline 99/05/EC Standard used: EN301 511 v.9.0.2
- HSDPA/UMTS/ GSM/EGPRS Module - GCF, PTCRB
- EMV/ESD - Guideline 2004/108/EG Standards used: EN 55022:2006 Class A, EN 55024: 1998 + A1:2001 + A2:2003, EN 61000-6-2:2001
- Electrical safety - Guideline 2006/95/EG Standard used : EN 60950-1:11-2006
- Environment - The device complies with the European ROHS and WEEE guidelines.

System Components & Accessories

System components for operation

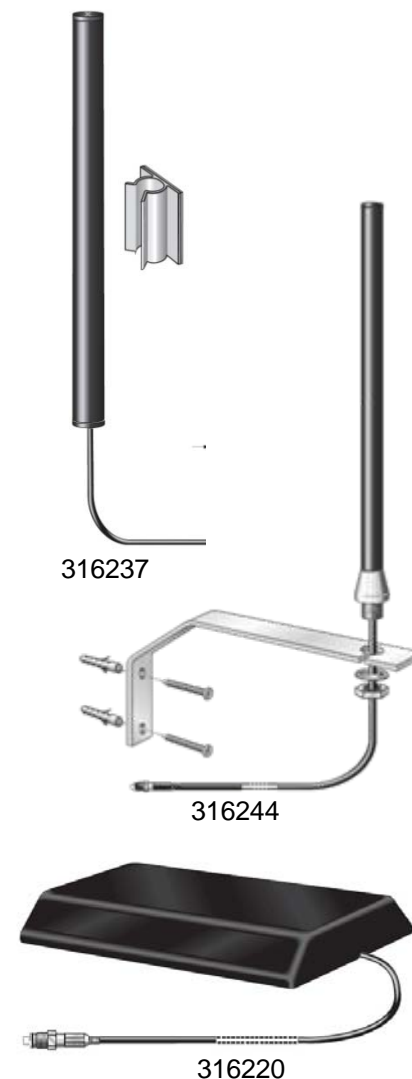
- Antenna
 - Antenna, adjusted to the frequency bands of the GSM network you have selected: 850 MHz, 900 MHz, 1800 MHz, 1900 MHz or 2100 MHz.
 - We recommend the use of antennas we have approved – see [Accessories for the TAINY HMOD-L1-IO](#).

- Power supply
 - A power supply with a voltage of between 12 VDC and 60 VDC that can deliver sufficiently power
 - The nominal power consumption is approximately 365 mA at 12V and 92 mA at 60V.

- SIM card
 - Prepared for HSDPA / UMTS / EGPRS / GPRS
The SIM card should be prepared by the GSM network operator for the following data services: HSDPA, UMTS, EGPRS, GPRS.
 - Connection with dial-up via GSM/CSD
The SIM card has to be prepared by your wireless network operator for CSD service, if you want to take advantage of remote access via a data dial-up connection.

Accessories for the TAINY HMOD-L1-IO

Product, designation	Article number
Wall power supply SA07 100-240 VAC/24VDC 1A	316459
Top-hat rail power supply DR45 85-265VAC/24VDC 2A	316411
Dual-band device antenna (900/1800 MHz) Mounted directly on device; Gain -5 dB, SMA connection	316213
Tri-band flat antenna (900/1800/1900 MHz) Mounting location: Indoor/outdoor; Gain: 0dB, Connection: SMA, cable length: 3m	316220
Dual-band rod antenna (900/1800 MHz) Mounting location: Indoor, clip fastening; Gain: 2dB, Connection: SMA, cable length: 1.5m	316237
Tri-band rod antenna (900/1800/1900 MHz) Mounting location: In/outdoor, bracket fastening; Gain: 2dB; connection: SMA; cable length 5m	316244
Antenna adapter, SMA - FME	316299
Antenna adapter, SMA - SMA, 90° angled	316442
Serial connection cable RJ45 <-> DB9 0.5m	316268



Applications

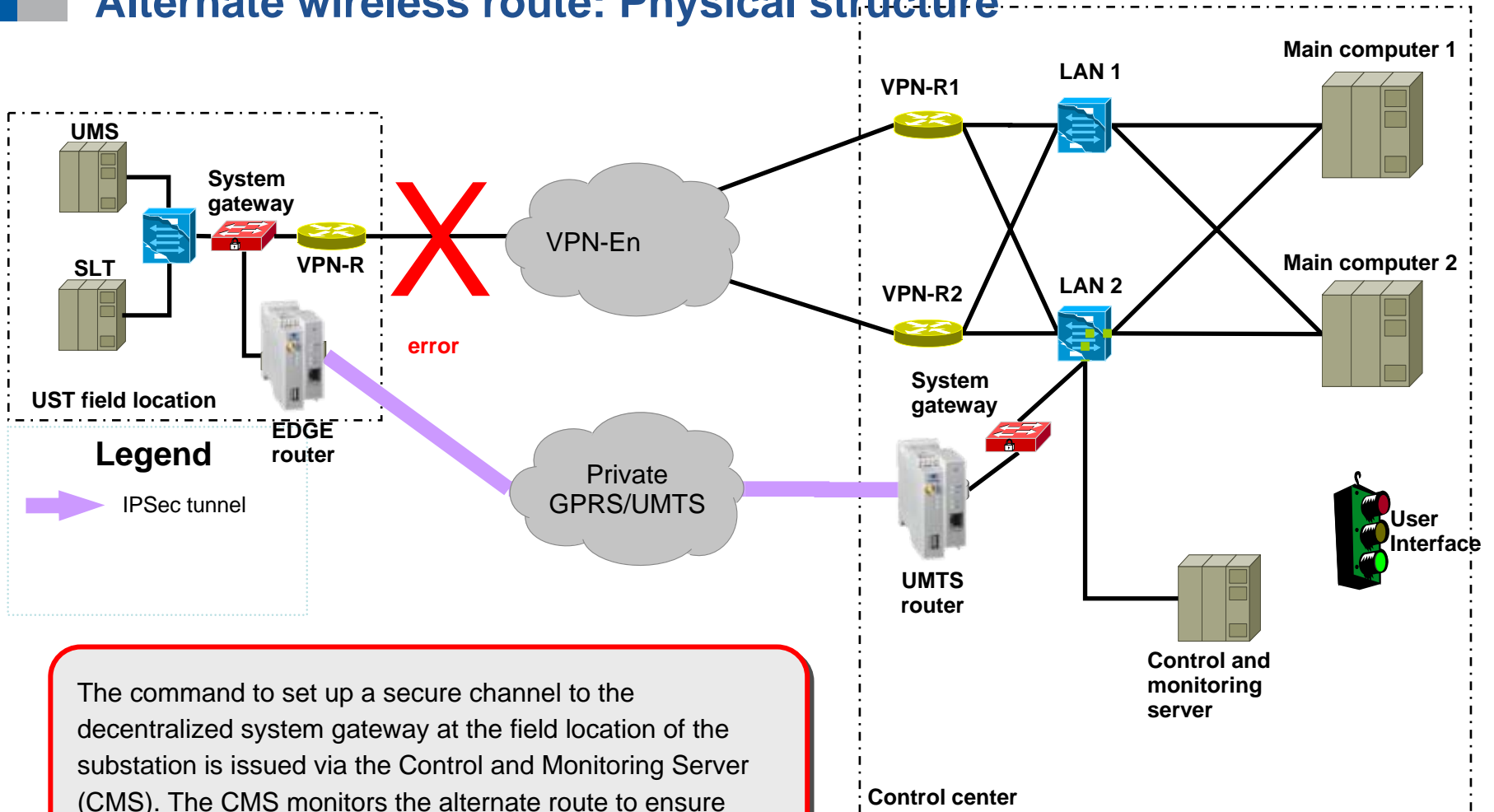
Alternate wireless route for process data integration with IEC 60870-5-104

- Customer requirement:
 - Integration of approx. 500 stations nationwide
 - Transmission of the measured values spontaneously and at minute intervals

- Previously:
 - Locations in the field are serviced by sub-suppliers
 - Service Level Agreement in the field not 7 x 24 (due to costs)
 - Worst-case scenario: Malfunction at a location in the field lasts for >96 hours (Good Friday to Easter Monday)
 - There are two redundant process data connections from every central computer to the terminal device. An interruption or malfunction in the VPN results in the failure of all four process data connections.

- Requirement:
 - It should be possible to equip all locations (computer center and field) with a wireless connection.
 - Wireless transmission behavior must be compatible with transmission via the VPN.
 - It must be possible to retrofit existing locations with a minimum of time and expense.
 - Wireless route and VPN must be non-reactive and independent.
 - An alarm is issued in the event of any malfunctions in the transmission route after 15 seconds.

Alternate wireless route: Physical structure



The command to set up a secure channel to the decentralized system gateway at the field location of the substation is issued via the Control and Monitoring Server (CMS). The CMS monitors the alternate route to ensure availability.





Alternate wireless route for process data connection with IEC 60870-5-104

- Advantages and benefits for the customer:
 - Reduction of downtimes thanks to redundant communication route
 - Average availability measured considerably increased to 99.41%
 - Simple expansion of field locations
 - Reduction of maintenance costs

Tickets



- Customer requirement:
 - Connection of 65 ticket vending machines

- Previously:
 - Vending machines were connected via a leased line

- Requirement:
 - Individual installation location
 - Malfunction and status monitoring
 - Integration in existing infrastructure

- Customer's decision:
 - Implementation of an HSDPA TAINY HMOD-L1-IO router in the vending machines

Tickets

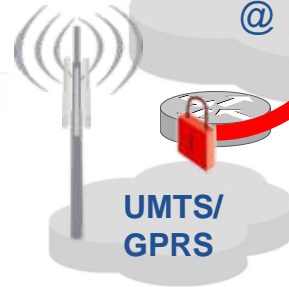
Remote terminal unit



TAINY HMOD-L1-IO



LAN



@ Internet

VPN router



Computer Center

Intranet



Computer Center

LAN



Console

LAN



Console

Tickets

- Advantages and benefits for the customer:
- Easy choice of location
- Low installation costs
 - No digging required for leased line
 - Easy, quick start-up on location
- Reduction of maintenance costs
- Reduction of downtimes thanks to remote monitoring
- Low operating costs

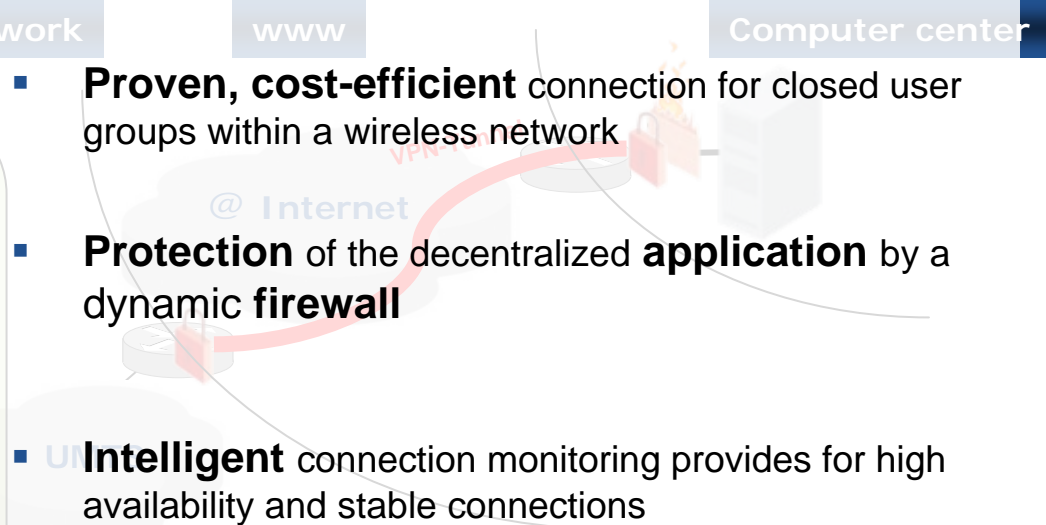


Good reasons to choose the TAINY HMOD-L1-IO

TAINY HMOD-L1-IO: Closed user group in wireless network

Wireless router for industrial Ethernet network

- **High band width** to transmit **large data volumes** (e.g.: video, images) thanks to **HSDPA router**
- **Proven, cost-efficient** connection for closed user groups within a wireless network
- **Protection** of the decentralized **application** by a dynamic **firewall**
- **Intelligent** connection monitoring provides for high availability and stable connections



TAINY HMOD-L1-IO: Closed user group in wireless network

Wireless router for industrial Ethernet network

- **Easy, clear-cut** configuration; by remote or on location



- **OTA (Update over The Air)**-enabled
- **Bi-directional** communication
- **Ethernet** application interface
- Designed to satisfy **industrial** requirements
- **SMS signaling / signaling contact**



Summary

- Dr. Neuhaus products are based on open standards and proven “**state-of-the-art**” **technologies**
 - TCPIP, IPsec
 - 3DES, AES, DES
 - Ethernet, HSDPA, UMTS, GPRS, ...
- Clear requirement:
 - Once installed – **Never be out in the field again!**
- Takes into account the requirements of the users
 - through the use of an **open, flexible platform**
 - by focusing on **reliability**
 - by providing **interactive** solutions
- **The technology** follows the **application**

Please ask any questions you might have !

Contact:



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Appendix: Comparison of wireless communication

	Connection	Technology	Transfer rates (theoretical)		Signal run times	Always on
			Download	Upload		
 <p>GSM 850/900 MHz (2W) 1800/1900 MHz (1W)</p>	Circuit switched	CSD	9,6...14,4 kBit/s	kBit/s		No
	Circuit switched	HSCSD	38,4...57,6 kBit/s	kBit/s		No
	Package oriented	GPRS	62,4 kBit/s	31,2 kBit/s	800-1200ms	Yes
	Package oriented	EDGE	236,8 kBit/s	118,4 kBit/s	300-500ms	Yes
 <p>UMTS 850/1900/2100 MHz (0,25W)</p>	Package oriented	UMTS	384 kBit/s	128 kBit/s	200-300ms	Yes
	Package oriented	HSDPA	max. 7,2 MBit/s	384 kBit/s	100-200ms	Yes
	Package oriented	HSUPA	max. 7,2 MBit/s	max 3,6 MBit/s	100-200ms	Yes

- The actual values of mobile service providers may differ from these values.

Appendix: Please note !!

- Safety-related applications
 - Emergency systems with 100% availability
(0.1 % failure rate per year translates as approx. 9 hours)
 - 99.7 % availability reached with redundant wireless communications solution (Kayser-Threde solution)
- Protocol requirements for communication
 - Time-critical protocols
Network runtime behavior (e.g. GPRS approx. 800ms; see Appendix: A comparison of wireless communication)
- Never operate GPRS/EDGE/UMTS without data pricing rate
 - Pulsing is otherwise very high (e.g. 100 kBytes per login)
 - Costs per MB otherwise very high (e.g. € 7.74/MB)
(For tests or long-term testing, amazing data volumes can be run up very quickly by high pulsing alone)
- Pulsing / billing units
 - Choose 1 kByte for low data volumes (1-10 MBytes) if possible
 - Choose ≤ 10 kBytes for medium data volumes (10...100 MBytes) if possible
- Choose a larger volume option in the introductory or test phase