



mission-critical communications

**ROHILL**

**TetraNode**



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mission-critical  
communications

# mission-critical



## MISSION-CRITICAL COMMUNICATIONS

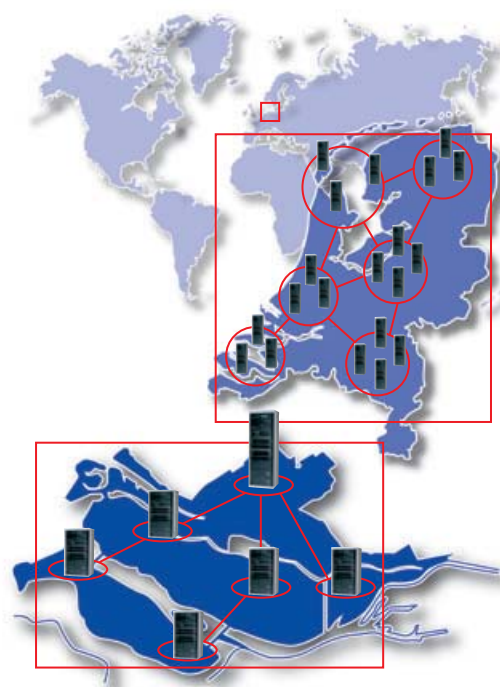
Building on a heritage of knowledge and experience accumulated over the past 3 decades, Rohill has emerged as a leading supplier of TETRA infrastructure solutions serving a wide range of security-conscious customers from around the world. TetraNode is the result of years of dedicated research and development focused on providing the best possible and most comprehensive solution for mission-critical communications users working in the most demanding environments. TetraNode incorporates many of the latest industry trends to offer a truly revolutionary, next-generation, future-proof network design based on TETRA with a surprisingly large number of unique features.

Mission-critical communications sectors, such as military and public safety organizations, are increasingly requesting systems put together with COTS (Commercial Off The Shelf) components and open interfaces. Simply ordering an infrastructure based on open standards - i.e. TETRA - is no longer sufficient. TetraNode is designed to make the most of open, widely available, multiple source hardware and software. This leads to considerable cost savings compared to other suppliers' systems containing a higher proportion of proprietary elements.

Economies of scale due to component support by major IT manufacturers, ease of migration aided by the unique multi-protocol concept and the scalability afforded by the optimized IP-based networking concept inherent to TetraNode, allow our suppliers to offer perfect solutions at the best prices.

TetraNode is fully compliant with the TETRA standard, keeping call set-up times and speech delays to a minimum across wide area networks. TetraNode supports the full range of voice and data services and applications specified by the TETRA standard.

Network security is enhanced to new levels by a complete package of authentication, encryption and remote enabling and disabling facilities. Innovative redundancy and fallback features practically eliminate the possibility of a network being unavailable when users need it most. This can be a common and frustrating limitation of a number of existing digital communications systems, which put commercial needs before security. For these reasons and many more, TetraNode is the best total solution for mission-critical communications.





# the power of tetranode



## THE POWER OF TETRANODE

TetraNode uses standard hardware and software components to create the most economical and powerful system currently available on the market. Important physical characteristics of the CompactPCI-based TetraNode include low-power consumption, the ability to operate safely in a wide temperature range and excellent protection against dust and vibration. The Plug-and-Play characteristics significantly reduce the time required to roll out the infrastructure.

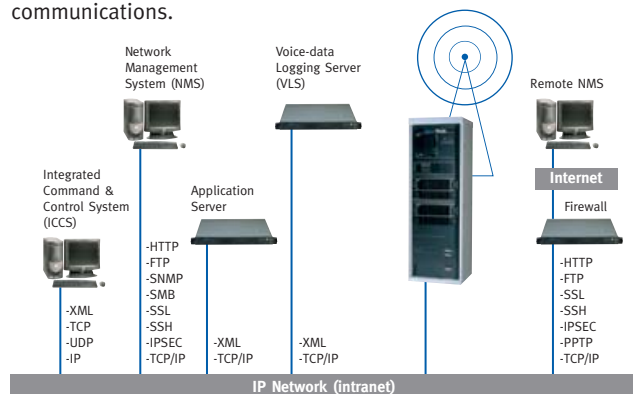
TetraNode's flat network architecture based on nodes - hence the name TetraNode - challenges the traditional hierarchical way of building centralized communications networks as intelligence is allowed to flow freely throughout the system. The principles of IP-networking are adopted in order to generate flexible network designs, which adapt to customers' demands for cost-effective systems and are scalable from single sites right up to nationwide. Nodes and base stations can be connected in a ring or meshed formation to offer full redundancy. Open system interfaces are extensively used for full connectivity and interoperability.

TetraNode supports all main networking links and system interfaces by way of either IP, for seamless integration with IP networks, or the TNSP (optimized IP) protocol developed by Rohill for low-bandwidth applications offering low delays and fast operation.

TetraNode applies the latest, flexible soft-switch technology - switching of voice streams via software - together with the most open, reliable Real-Time Linux operating system to produce a TETRA system where all functionality is implemented in software. This eliminates the need for expensive hardware migration needs

and makes the system much easier to install, configure and maintain as well as running faster. The well-defined software architecture allows specific customer requirements to be catered for swiftly and efficiently. The software-based Network Management System (NMS) is equally extremely flexible. Distributed databases provide system resilience, speed of operation and accessibility on multiple levels.

This powerful, innovative software-based solution guarantees that TetraNode provides the fullest range of digital mobile radio functionality, including advanced voice and data services with circuit and packet-switched data. Database capacity is also provided for an almost limitless number of subscribers and fleets. TetraNode permits group calling from fixed telephones. It is one of the few systems, which currently allows remote software uploads. It also allows seamless handovers between sites. The increasingly popular concept of Virtual Private Networking (VPN) is also made available for the optimization and pooling of resources for multiple user groups who are clearly and securely separated from each other, with complete control over their own communications.





## TOTAL CONTROL - NETWORK MANAGEMENT SYSTEM

Network management is a central task for any organization operating a communications system. Constant network expansions and upgrades, the registration of new units on the system, connections to other networks and a multiplicity of other tasks, all need to be managed expertly and promptly. System integrity must be protected and it must be ensured that all available resources are being used in the most efficient manner.

The TetraNode Network Management System (NMS) fulfils these comprehensive requirements in a flexible way. It operates via a user-friendly interface on the familiar Windows operating system, connecting to the TetraNode eXchange (TNX) through an IP network. Communication is based on a number of well-known protocols - TCP/IP, HTTP, SNMP, PPTP - to provide fully transparent communications over a wide range of physical interfaces and networks, including LANs, WANs and the public Internet. The NMS provides access to a wide range of parameters on all levels of the TetraNode system regarding configuration and operation with multi-level password protection. Several system monitoring functions are provided for, which generate alarms when critical failures occur.

The TetraNode NMS offers certain unique features such as the setting of priority levels for radios without needing to re-programme them and the fixing of call durations and time-outs for the whole or parts of the system. As in the case of Line Dispatcher Stations in the section below, the NMS also provides much appreciated, multi-language support as another unique feature.

## TOTAL CONTROL - LINE DISPATCHER

TetraNode's revolutionary design uses standard PCs, together with middleware and software development tools. These elements extend TetraNode network performance and functionality by tapping into major sources of value-added applications, all of which can be combined and adapted to satisfy real user requirements.

A prime example of such a critical application is the Line Dispatcher Station (LDS). This gives mission-critical communications providers working in modern Command & Control Centres vastly improved options for monitoring and responding to potentially life-saving calls in an efficient and dynamic fashion.

TetraNode allows a virtually unlimited number of LDSs to be connected to the network at any one time. As never before, it is possible to monitor calls as they take place and dispatchers can even intervene in ongoing communications according to criteria determined by the organization. Services such as digital speech storage, playback facilities and voice retrieval are all possible.

The LDS can combine with the TetraNode Voice-data Logging Server in an integrated applications environment to provide additional call-recording facilities. Touch-screen support is also provided for added ease of use of the service. The implementation of multi-language databases provides Line Dispatchers with on-screen menus in their native language so that they are able to carry out their tasks in a familiar environment. TetraNode provides yet another unique application.

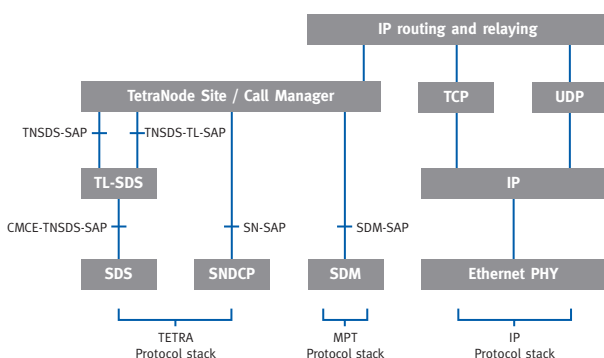
# total flexibility/recording



## TOTAL FLEXIBILITY - TETRANODE IP GATEWAY

TetraNode is more than just another radio communications system. It is an open platform for building powerful, customized applications that enhances the manner in which organizations work by offering them the opportunity to create and develop entirely new working practices. The TetraNode IP Gateway (TIG) is the foundation and key component used for building these applications, as the trend towards data becomes more pronounced.

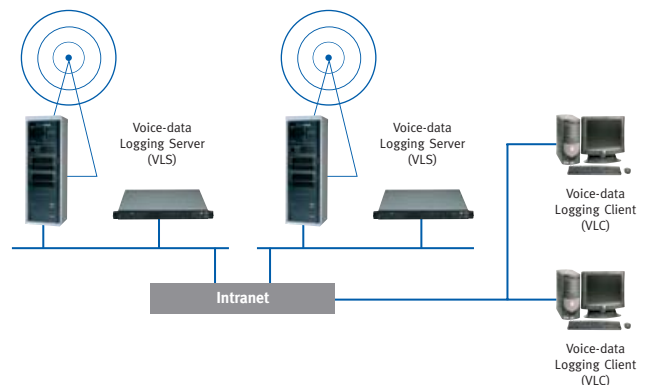
The TetraNode IP Gateway is an integral part of the TetraNode network based entirely on software which makes the most efficient use of existing network resources for data - and voice - services and applications. The IP networking model implemented using Extended Markup Language (XML), allows it to work with the full range of TETRA services - status messages, Short Data Service (SDS) and packet data - as well as with speech calls. The number of applications that can be handled by the IP Gateway is only limited by the customer's imagination. The IP Gateway has been particularly successful in the development of several value-added applications for airports and public transportation authorities.



## TOTAL RECORDING - VOICE-DATA LOGGING SERVER

In today's security and public safety-related environments, it is imperative that records are kept of all transactions and communications. This guarantees best practice and provides the means to analyse the effectiveness of the communication during major incidents. This demand for information from most existing communications systems is likely to lead to enormous and expensive hardware requirements, not to mention the human resources required to sift through large amounts of tape. The TetraNode Voice-data Logging Server (VLS) effectively removes these requirements.

The VLS records TETRA coded speech and data messages. Due to the fact that it is a digital, integrated application, voice quality is always perfectly reproduced, regardless of the number of times messages are retrieved for analysis. Also, due to the small disk-space required, several months of TETRA communications can be stored on disk. The Voice-data Logging Server provides a precise time-stamp of all communications, and complete events can be reconstructed, eliminating any uncertainty regarding the calling-party's identity or the time of the event.



# ▶▶ totally open



## TOTALLY OPEN

It is important to take a closer look at the open-standards approach adopted in the TetraNode development process so the user can begin to appreciate the dramatic consequences of this decision for the future of the industry.

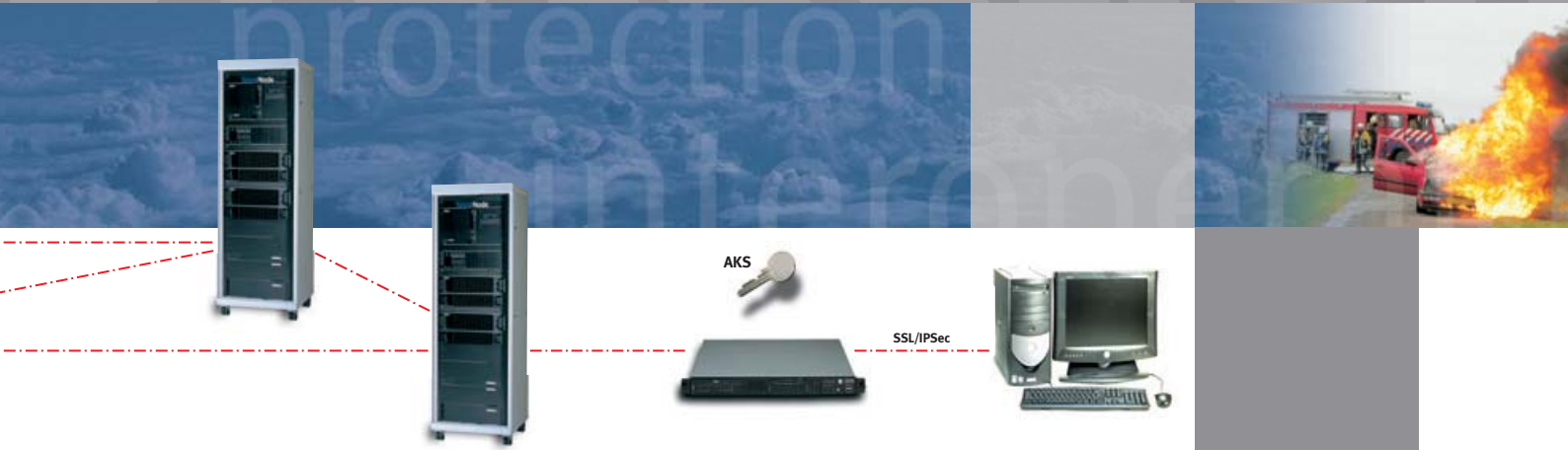
From the outset, Rohill sought to avoid the “black-box” image portrayed by many TETRA system suppliers. These suppliers evidence a general tendency towards embedding proprietary components and software in their designs so that their control over applications development can be maintained, extending customer dependency on the original supplier. Rohill, in the spirit of TETRA, developed its TetraNode product line with the aim in mind of handing control and access of the communications system to the customer.

Accordingly, TetraNode is based on CompactPCI, which is the de facto standard for building highly reliable, secure telecommunications systems. CompactPCI is supported by a large number of suppliers including Intel, Hewlett Packard and Sun Microsystems. This means very significant economies of scale and guaranteed local support. CompactPCI is subject to ongoing technical migration consisting of constant performance upgrades, which safeguard the initial investment, made by the customer for many years to come. TetraNode employs the minimum amount of hardware, meaning that there are fewer components required and fewer points of failure on the network. The simplicity and elegance of the TetraNode hardware platform means that it is also easy and cost-effective to install and maintain.

TetraNode supports a number of common operating systems. Real-Time Linux is the preferred operating system as it offers the best compromise between stability and security and is well supported by major IT industry players. It is highly suitable for IP-centric systems and products of the present and future and well supported by the CompactPCI hardware mentioned above. Real-Time Linux is also championed by a growing number of telecommunications equipment manufacturers (Nokia, Alcatel, Siemens etc.), IT leaders (IBM, Sun, Oracle etc.) and governments from around the world.

The TetraNode system complies with a number of IT and telecommunications standards, providing customer and user with an even greater degree of system access than could be expected from other systems available on the market. SNMP (Simple Network Management Protocol) is a standard protocol used by TetraNode for reporting faults. The common FTP (File Transfer Protocol) protocol is used for transferring files in the system such as uploading software to base station sites. The Network Management System interfaces with the TetraNode system using standard HTTP over an IP network. A Windows file-sharing facility is adopted in order to allow any authenticated Windows PC to browse and work on TetraNode’s Linux-based file system. These facilities are supplemented by a number of standards-based security mechanisms such as PPTP, IPSec, SSL and SSH.

# total protection/interoperability



## TOTAL PROTECTION

All communications networks must be protected from external threats and unauthorised access. It is clear that mission-critical networks by their nature are more likely to be subjected to such attacks and will therefore demand a higher level of protection as a basic requirement of their design solution. One of the strengths of the TETRA standard from the beginning of its development has been the work conducted on security issues. However, not all TETRA-based systems offer the same degree of security. This is why mission-critical communications users must be careful to choose a fully secure system such as TetraNode.

The TetraNode system fully supports all major types of authentication, encryption and remote enabling & disabling of terminal units to provide a full range of secure features for the most demanding customer. Air interface encryption can be implemented over TetraNode using static key (SCK) or dynamic key (DCK) encryption. An open platform is provided to achieve end-to-end encryption solutions designed and controlled by the owner.

The Authentication Key Server (AKS) provides the means of implementing security solutions to protect the entire TetraNode network. The Real-Time Linux operating system itself provides full network security so that the TetraNode system and communication over IP links are protected against denial-of-service attacks and other malicious attempts to access or destabilise the system. In summary, TetraNode offers a highly secure communications environment that customers can trust.

## TOTAL INTEROPERABILITY

TETRA-based communications systems are intended to meet customer expectations for interoperability as an industry standard, supported by multiple vendors. Rohill fully supports the philosophy behind such a healthy, multi-vendor environment. The TetraNode design ensures interoperability for any mix of terminals complying with the TETRA standard. The operational testing between the TetraNode system and TETRA terminals is not confined to a limited number of features in a controlled environment, but extended in scope by the embedded translation of supplier-specific formats of SDS and status messages.

Interoperability and migration are greatly enhanced by one of TetraNode's strongest features - the implementation of different protocols on one communications platform. TetraNode systems are capable of handling more than one radio protocol - i.e. MPT 1327 and TETRA, as well as APCO 25 and other non-proprietary solutions. This is a powerful but simple, revolutionary concept included as an integral part of the design of the TetraNode system.

The implementation of a multi-protocol air interface guarantees a smooth migration from analogue to digital solutions, i.e. MPT 1327 to TETRA. The dual operation of such radio protocols allows a cost-effective deployment of radio resources in both rural and urban areas together with the extended use of existing mobile and hand-portable units. A single-system solution allows seamless, fast communications including all available advanced functionality. Alias numbering is used so that the network users will not distinguish radio units using different protocols.





**Rohill Technologies B.V.**

P.O. Box 373

NL-7900 Al Hoogeveen

The Netherlands

Telephone +31 528 263 355

Fax +31 528 271 844

Internet [www.rohill.com](http://www.rohill.com)

**Your System partner:**



Via Nazionale, 13 – 10060 Pinasca (TO) Italy

Telephone +39 0121 800 669

Fax +39 0121 800 381

Internet [www.bpg.it](http://www.bpg.it)