DOWNLOAD PDF A RETIX BASED LAN-WAN (IEEE 802.3-X.25 ROUTER

Chapter 1 : What are the differences between LAN and WAN

In this paper we describe our approach to, and experiences in, developing a PC based IEEE LAN - X WAN IP router. The basic router functionality is achieved by integrating a commercially available synchronous serial port card for the PC-AT bus, and our enhancements of public domain or.

Each symptom module is divided into the following sections: Symptom statementA specific symptom associated with WAN connectivity Possible causes and suggested actionsFor each symptom, a table of possible symptom causes and suggested actions for resolving each cause X. The problem scenario that follows explores this kind of situation in the context of a private X. In this case, several problems are uncovered during troubleshooting before a final resolution is achieved. Symptoms No traffic of any kind can pass through a newly installed router used to interconnect an Ethernet-based network segment with a private X. Local-area networks LANs previously interconnected with the X. However, users trying to make connections cannot get through to resources on the new segment. Environment Description Figure illustrates a map of an X. The following list summarizes relevant elements of this internetworking environment: WAN service is provided to geographically separated networks via a private X. A fourth router Router-New has been added to provide WAN interconnection service between a fourth location Site-New and the other three sites. All four sites are connected to the X. The network applications running over the WAN are limited to file transfer, mail, and virtual terminal connections. The following discussion works through the problem isolation process. Isolating Serial Hardware and Media Problems The following procedure illustrates the process of isolating hardware-related problems: Figure illustrates the typical output that the system returns when interfaces are minimally operational, and the system can communicate with them. In this case, the interface of interest is associated with an MCI controller. Figure show version Command Output Step 2 In addition to the basic information provided in the show version output, use the show controllers EXEC command to examine the types of appliques on a router and the status of the appliques. Figure illustrates an example output of the show controllers mci EXEC command. In contrast, a data circuit-terminating equipment DCE applique typically would be required if the router were connecting directly to a host DTE interface. Figure illustrates the output from this command, the first line of which indicates that the serial interface and line protocol are down. These symptoms suggest a router hardware problem or a cabling problem. If the output specifies the line is down, the most likely cause is no Carrier Detect. In new installations, a cabling error is most likely. However, you should check both possibilities. If the command output indicates that line is up and protocol is down, the likely causes are either that the switch is down, or the device is operating in the correct mode. For example, the device might be operating as an X. Consult with your X. Note In general, when using X. Specific tests to determine whether the hardware is operating normally depend on the system type. For other devices, verify that the Carrier Detect is functioning by using the show interface command. For general information about interpreting hardware LEDs and other diagnostics, refer to the " Troubleshooting Router Startup Problems " chapter. For specific information, refer to your hardware installation and maintenance documentation. The cable is the most likely problem candidate. If the line remains down, a bad cable connection is extremely likely. To remedy this problem, replace the cable and inspect the interface. Repeat the show interfaces serial command and assume that you see the output shown in Figure The first line of the output indicates that the interface is operational and that the cable is working properly. Use the following procedure to determine if there is a problem with the LAN interface, the LAN in general, or network hosts: Use the show interfaces command to inspect the condition of the interface and determine whether it is communicating with devices on the Ethernet. Figure illustrates the output from the show interfaces ethernet EXEC command. In this case, the interface is alive and properly connected. Figure show interfaces ethernet Command Output Indicating an Operational Interface Step 2 The output in Figure indicates that the interface is operational and sees traffic on the network. However, the output does not indicate whether the router is able to communicate with specific end nodes on the Ethernet or whether the host configuration allows the host to communicate with the router. To determine whether the host can reach the router, use the ping and clear commands to test connectivity with

the UNIX end system. First, use the ping privileged EXEC command to verify that the router can communicate with each host on the local Ethernet. However, to verify that the host configuration is correctly specified, ping the router from the host. Figure illustrates the successful ping transmission and acknowledgment. Figure illustrates that before the ping transmission, the ARP cache does not include the target host. In the second ping exchange refer to Figure , only 80 percent of the returns are successful. This is the expected behavior. Because the end system is not in the original ARP table, the first ping packet is dropped, and an ARP request is substituted instead. After the station replies, the subsequent pings work. Figure show arp Command Output before Running the ping Command Figure show arp Command Output after Running the ping Command The success of the ping demonstrates that the host can reply to the router. All LAN-related and host configuration problems are now eliminated; however, traffic still is not traversing the router. Isolating Router Software Configuration Problems After eliminating all serial hardware problems, LAN problems, and host configuration problems, a router configuration problem may exist. In fact, there may be more than one problem. Use the following procedure to isolate router software configuration problems: Given the situation, the router is likely to immediately report events. Connection attempts appear as call packets; communication problems can cause clear or reset packets for individual circuits or, in more severe cases, restart or diagnostic packets for the X. The clear, reset and restart packets commonly encode cause and diagnostic codes, and diagnostic packets contain a diagnostic code. See the Debug Command Reference for an explanation of these codes. Call and call confirm packets can encode user facility information, which can also be informative when troubleshooting. There are a number of configurable X. These key parameters, which you must get from your X.

Chapter 2 : Network types at a glance | LAN, MAN, WAN & GAN - 1&1 IONOS

PC based IEEE LAN-X WAN router, that implements the strategies discussed in (Kumar et al., 92]. At the time of this report, we have implemented and successfully tested our.

PANs and WPANs usually only stretch over a few meters, and are therefore not suitable for connecting devices in different rooms or even buildings. In addition to the communication between individual devices, a Personal Area Network also makes it possible to establish a connection to other networks, usually larger ones. This is known as an uplink. Due to the limited range and a comparatively low data transfer rate, PANs are primarily used to connect peripheral devices in the hobby and entertainment sector. Typical examples include wireless headphones, game consoles, and digital cameras. Protocols such as Insteon, Z-Wave, and ZigBee have been specifically designed for smart homes and home automation. Networks like these can include two computers in a private household or several thousand devices in a company. Networks in public institutionsm such as those used by public authorities, schools, or universities, are also implemented as LANs. A widely-used standard for wired Local Area Networks is Ethernet. Data transmission is either electronically based on copper cables or via fiber optic cables. If more than two computers are to be connected in one LAN, additional network components such as hubs, bridges, and switches are needed, which act as coupling elements and distribution nodes. The network type LAN was developed to enable fast transmission of large amounts of data. LANs enable convenient information exchange between the various devices connected to the network. Wireless local networks offer the ability to easily integrate devices into home or corporate networks, and are compatible with wired Ethernet LANs. However, the data throughput is lower than for an Ethernet connection. The range of a LAN depends on the standard and the transmission medium, but can be increased by signal amplifiers, known as repeaters. Regarding gigabit Ethernet via glass fibers, a signal range of several miles is possible. However, Local Area Networks rarely stretch across more than one building complex. As a rule, these are individual establishments in a company that are connected to a MAN via leased lines. High-performance routers and high-performance fiber-based connections are used, which enable a significantly higher data throughput than the internet. The transfer speed between two remote nodes is comparable to that of communication within a LAN. The infrastructure for MANs is provided by international network operators. These are several WiFi access points working together in different locations. The current transmission standard DSL is technically only available where copper cables have been laid. The number of local networks or individual computers connected in a WAN is unlimited, in principle. Wide Area Networks are usually owned by an organization or company, and are operated privately or rented. In addition, internet service providers use WANs to connect local company networks and consumers to the internet. The internet is, however, not the only computer network of its kind. Internationally operating companies also support local networks that comprise of several WANs and connect company computers across the world. GANs use the fiber optic infrastructure from wide area networks and combine these with international undersea cables or satellite transmissions. This can be any of the network types introduced above, however, the internet is the most common transport medium. This connects nearly all computers worldwide and is available free of charge, as opposed to privately operated MANs or WANs. If the public network is used as a transport medium, Virtual Private Networks are generally encrypted to ensure that data stays confidential. VPNs are utilized to link LANs over the internet or to enable remote access to a network or a single computer via public connection.

Chapter 3 : IEEE - Wikipedia

Shop and compare the latest gigabit and gigabit VPN routers. High-capacity, high-performance, with dual and quad WAN ports, and up to 16 LAN ports. Set up a secure office LAN with Cisco Small Business, TRENDnet, D-Link, TP-Link and other leading networking brands.

A LAN local area network is a group of computers and network devices connected together, usually within the same building A WAN wide area network , is not restricted toâ€¦ a geographical location, although it might be confined within the bounds of a state or country. A WAN connects several LANs, and may be limited to an enterprise a corporation or an organization or accessible to the public. The technology is high speed and relatively expensive. The Internet is an example of a worldwide public WAN. A LAN uses transmissions to other devices within the same network segment, whereas a WAN uses point to point transmissions between nodes of the WAN which may be separated by hundreds or thousands of miles. The maximum speed of a LAN can be megabits per second, while the speed of a WAN can go up to â€¦megabits per second. A WAN is usually slower because it has lower bandwidth. On the other hand, a WAN cannot share a printer, so a computer in one country cannot use a printer in another country. A LAN does not need a dedicated computer to direct traffic to and from the Internet, unlike a WAN that needs a special-purpose computer, whose only purpose is to send and receive data from the Internet. WAN comparison is the cost of the network. On the other hand, the equipment needed to connect a WAN to the Internet is a modem and a router. The modem may be a cable modem or a DSL modem that is connected to a wall jack, while the router should be configured so that it can handle the packets traveling between the WAN and the Internet. WAN, there is a difference in the networking standard used. The first WAN protocol was X. You also need to install the driver for the NIC. On the other hand, a WAN is very difficult to set up. There is often an appliance to optimize the WAN. There is also a device to cache WAN data, so workers in the branch office can quickly access documents. The router also has Quality of Service QoS built in, so that it gives priority to certain kinds of traffic. The ring topology is a network in which every node every computer is connected to exactly two other nodes. The star topology is a network in which all the nodes called leaf nodes or peripheral nodes are connected to a central node. If 2 or more computer or communicating devices which are located in a room or on a Floor or in â€¦a building or within a campus if connected are said to be connected on LAN. What is the difference between the lan wan man? Local area network A local area network LAN is a network that connects computers and devices in a limited geographical area such as home, school, computer laboratory, officâ€¦e building, or closely positioned group of buildings. Each computer or device on the network is a node. The defining characteristics of LANs, in contrast to WANs Wide Area Networks , include their higher data transfer rates, smaller geographic range, and no need for leased telecommunication lines. This is the data transfer rate. Some examples of devices that are used in a PAN are personal computers, printers, fax machines, telephones, PDAs, scanners, and even video game consoles. A PAN may include wired and wireless devices. The reach of a PAN typically extends to 10 meters. Home area network A home area network HAN is a residential LAN which is used for communication between digital devices typically deployed in the home, usually a small number of personal computers and accessories, such as printers and mobile computing devices. It can also be referred as an office area network OAN. Wide area network A wide area network WAN is a computer network that covers a large geographic area such as a city, country, or spans even intercontinental distances, using a communications channel that combines many types of media such as telephone lines, cables, and air waves. A WAN often uses transmission facilities provided by common carriers, such as telephone companies. The networking equipments switches, routers and transmission media optical fiber, copper plant, Cat5 cabling etc. In the case of a university campus-based campus network, the network is likely to link a variety of campus buildings including; academic departments, the university library and student residence halls. Metropolitan area network A Metropolitan area network is a large computer network that usually spans a city or a large campus. Sample VPN used to interconnect 3 offices and remote users Enterprise private network An enterprise private network is a network build by an enterprise to interconnect various company sites, e. Virtual private network A virtual

private network VPN is a computer network in which some of the links between nodes are carried by open connections or virtual circuits in some larger network e. The data link layer protocols of the virtual network are said to be tunneled through the larger network when this is the case. One common application is secure communications through the public Internet, but a VPN need not have explicit security features, such as authentication or content encryption. VPNs, for example, can be used to separate the traffic of different user communities over an underlying network with strong security features. Generally, a VPN has a topology more complex than point-to-point. LAN means Local Area Network, as the name implies its used for local areas such as in your home or office for sharing data, informations or play games etc.. But to transfer data globally, across the world internet is used.

Chapter 4 : IEEE - WikiVisually

Aruba RAP-3WNP IEEE n Ethernet Wireless Router. LAN Ports: 3 x Changeable Gigabit WAN/LAN + 1 x Fixed Gigabit LAN/DMZ Port; Wired Routers.

It was commercially introduced in and first standardized in as IEEE Over the course of its history, Ethernet data transfer rates have increased from the original 2. The Ethernet standards comprise several wiring and signaling variants of the OSI physical layer in use with Ethernet, systems communicating over Ethernet divide a stream of data into shorter pieces called frames. As per the OSI model, Ethernet provides services up to, since its commercial release, Ethernet has retained a good degree of backward compatibility. Formal standardization efforts proceeded at the time and resulted in the publication of IEEE Ethernet initially competed with two largely proprietary systems, Token Ring and Token Bus, in the process, 3Com became a major company. Parallel port based Ethernet adapters were produced for a time, with drivers for DOS, by the early s, Ethernet became so prevalent that it was a must-have feature for modern computers, and Ethernet ports began to appear on some PCs and most workstations. This process was sped up with the introduction of 10BASE-T and its relatively small modular connector. Since then, Ethernet technology has evolved to meet new bandwidth, in addition to computers, Ethernet is now used to interconnect appliances and other personal devices 2. Network switch â€" A network switch is a computer networking device that connects devices together on a computer network by using packet switching to receive, process, and forward data to the destination device. Unlike less advanced network hubs, a network switch forwards data only to one or multiple devices that need to receive it, a network switch is a multiport network bridge that uses hardware addresses to process and forward data at the data link layer of the OSI model. Switches for Ethernet are the most common form and the first Ethernet switch was introduced by Kalpana in , Switches also exist for other types of networks including Fibre Channel, Asynchronous Transfer Mode, and InfiniBand. A switch is a device in a network that electrically and logically connects together other devices. Multiple data cables are plugged into a switch to enable communication between different networked devices, Switches manage the flow of data across a network by transmitting a received network packet only to the one or more devices for which the packet is intended. Each networked device connected to a switch can be identified by its network address and this maximizes the security and efficiency of the network. Because broadcasts are still being forwarded to all connected devices, the newly formed network segment continues to be a broadcast domain, an Ethernet switch operates at the data link layer of the OSI model to create a separate collision domain for each switch port. In full duplex mode, each switch port can simultaneously transmit and receive, in the case of using a repeater hub, only a single transmission could take place at a time for all ports combined, so they would all share the bandwidth and run in half duplex. Necessary arbitration would result in collisions, requiring retransmissions. The network switch plays an role in most modern Ethernet local area networks. Mid-to-large sized LANs contain a number of linked managed switches, in most of these cases, the end-user device contains a router and components that interface to the particular physical broadband technology. User devices may include a telephone interface for Voice over IP protocol. Segmentation involves the use of a bridge or a switch to split a larger collision domain into smaller ones in order to reduce collision probability, in the extreme case, each device is located on a dedicated switch port. In contrast to an Ethernet hub, there is a separate collision domain on each of the switch ports and this allows computers to have dedicated bandwidth on point-to-point connections to the network and also to run in full-duplex without collisions. Full-duplex mode has one transmitter and one receiver per collision domain. Switches may operate at one or more layers of the OSI model, including the data link, a device that operates simultaneously at more than one of these layers is known as a multilayer switch. This connectivity can be at any of the layers mentioned, while the layer-2 functionality is adequate for bandwidth-shifting within one technology, interconnecting technologies such as Ethernet and token ring is performed easier at layer 3 or via routing 3. Optical fiber â€" An optical fiber or optical fibre is a flexible, transparent fiber made by drawing glass or plastic to a diameter slightly thicker than that of a human hair. Fibers are also used for illumination, and are wrapped in bundles so that they may be used to carry

images, thus allowing viewing in confined spaces, as in the case of a fiberscope. Specially designed fibers are used for a variety of other applications, some of them being fiber optic sensors. Optical fibers typically include a transparent core surrounded by a transparent cladding material with an index of refraction. Light is kept in the core by the phenomenon of internal reflection which causes the fiber to act as a waveguide. Fibers that support many propagation paths or transverse modes are called multi-mode fibers, multi-mode fibers generally have a wider core diameter and are used for short-distance communication links and for applications where high power must be transmitted. Single-mode fibers are used for most communication links longer than 1, meters, being able to join optical fibers with low loss is important in fiber optic communication. This is more complex than joining electrical wire or cable and involves careful cleaving of the fibers, precise alignment of the cores. For applications that demand a permanent connection a fusion splice is common, in this technique, an electric arc is used to melt the ends of the fibers together. Another common technique is a splice, where the ends of the fibers are held in contact by mechanical force. Temporary or semi-permanent connections are made by means of specialized optical fiber connectors, the field of applied science and engineering concerned with the design and application of optical fibers is known as fiber optics. The term was coined by Indian physicist Narinder Singh Kapany who is acknowledged as the father of fiber optics. Guiding of light by refraction, the principle that makes fiber optics possible, was first demonstrated by Daniel Colladon, John Tyndall included a demonstration of it in his public lectures in London,12 years later. When the ray passes from water to air it is bent from the perpendicular. If the angle which the ray in water encloses with the perpendicular to the surface be greater than 48 degrees, the angle which marks the limit where total reflection begins is called the limiting angle of the medium. Practical applications, such as close internal illumination during dentistry, appeared early in the twentieth century, image transmission through tubes was demonstrated independently by the radio experimenter Clarence Hansell and the television pioneer John Logie Baird in the s. The principle was first used for medical examinations by Heinrich Lamm in the following decade 4. Coaxial cable â€" Coaxial cable, or coax, is a type of cable that has an inner conductor surrounded by a tubular insulating layer, surrounded by a tubular conducting shield. Many coaxial cables also have an outer sheath or jacket. The term coaxial comes from the conductor and the outer shield sharing a geometric axis. Coaxial cable was invented by English engineer and mathematician Oliver Heaviside, Coaxial cable is used as a transmission line for radio frequency signals. Its applications include feedlines connecting radio transmitters and receivers with their antennas, computer network connections, digital audio and this allows coaxial cable runs to be installed next to metal objects such as gutters without the power losses that occur in other types of transmission lines. Coaxial cable also provides protection of the signal from external electromagnetic interference, the cable is protected by an outer insulating jacket. Normally, the shield is kept at ground potential and a signal carrying voltage is applied to the center conductor, the advantage of coaxial design is that electric and magnetic fields are restricted to the dielectric with little leakage outside the shield. Conversely, electric and magnetic fields outside the cable are largely kept from interfering with signals inside the cable, larger diameter cables and cables with multiple shields have less leakage. Common applications of coaxial cable include video and CATV distribution, RF and microwave transmission, the characteristic impedance of the cable is determined by the dielectric constant of the inner insulator and the radii of the inner and outer conductors. A controlled cable characteristic impedance is important because the source and load impedance should be matched to ensure maximum power transfer, other important properties of coaxial cable include attenuation as a function of frequency, voltage handling capability, and shield quality. Coaxial cable design choices affect physical size, frequency performance, attenuation, power handling capabilities, flexibility, strength, the inner conductor might be solid or stranded, stranded is more flexible. To get better performance, the inner conductor may be silver-plated. Copper-plated steel wire is used as an inner conductor for cable used in the cable TV industry. The insulator surrounding the conductor may be solid plastic, a foam plastic. The properties of control some electrical properties of the cable. A common choice is a solid polyethylene insulator, used in lower-loss cables, solid Teflon is also used as an insulator. Some coaxial lines use air and have spacers to keep the conductor from touching the shield. Many conventional coaxial cables use braided copper wire forming the shield and this allows the cable to be flexible, but it also means there are gaps

in the shield layer, and the inner dimension of the shield varies slightly because the braid cannot be flat 5. Power over Ethernet â€" Power over Ethernet or PoE describes any of several standardized or ad-hoc systems which pass electric power along with data on twisted pair Ethernet cabling. This allows a single cable to provide both data connection and electric power to such as wireless access points, IP cameras. There are several techniques for transmitting power over Ethernet cabling. Two of them have been standardized by IEEE Alternative B separates the data and the conductors, making troubleshooting easier. It also makes use of all four twisted pair, copper wires. This is similar to the phantom power technique commonly used for powering condenser microphones, Power may be transmitted on the data conductors by applying a common voltage to each pair. Because twisted-pair Ethernet uses differential signalling, this does not interfere with data transmission, the common mode voltage is easily extracted using the center tap of the standard Ethernet pulse transformer. For Gigabit Ethernet and faster, all four pairs are used for data transmission and this signaling allows the presence of a conformant device to be detected by the power source, and allows the device and source to negotiate the amount of power required or available. Both of these amendments have since incorporated into the IEEE Each twisted pair can handle a current of up to one ampere, additionally, support for 2. Backplane â€" A backplane is a group of electrical connectors in parallel with each other, so that each pin of each connector is linked to the same relative pin of all the other connectors, forming a computer bus. It is used as a backbone to connect several printed circuit boards together to make up a computer system. Backplanes commonly use a circuit board, but wire-wrapped backplanes have also been used in minicomputers. Early microcomputer systems like the Altair used a backplane for the processor, a backplane is generally differentiated from a motherboard by the lack of on-board processing and storage elements. A backplane uses plug-in cards for storage and processing, backplanes are normally used in preference to cables because of their greater reliability. In a cabled system, the cables need to be flexed every time that a card is added or removed from the system, a backplane does not suffer from this problem, so its service life is limited only by the longevity of its connectors. For example, the DIN connectors used in the VMEbus system can withstand 50 to insertions and removals, to transmit information, Serial Back-Plane technology uses a low voltage differential signaling transmission method for sending information. These cable sets have a board located in the computer, an expansion board in the remote backplane. Backplanes have grown in complexity from the simple Industry Standard Architecture or S style where all the connectors were connected to a common bus, due to limitations inherent in the Peripheral Component Interconnect specification for driving slots, backplanes are now offered as passive and active. True passive backplanes offer no active bus driving circuitry, any desired arbitration logic is placed on the daughter cards. Active backplanes include chips which buffer the various signals to the slots, the distinction between the two isnt always clear, but may become an important issue if a whole system is expected to not have a single point of failure. A passive backplane, even if it is single, is not usually considered a SPOF, active backplanes are more complicated and thus have a non-zero risk of malfunction. While there are a few motherboards that offer more than 8 slots, in addition, as technology progresses, the availability and number of a particular slot type may be limited in terms of what is currently offered by motherboard manufacturers. However, backplane architecture is somewhat unrelated to the SBC technology plugged into it, there are some limitations to what can be constructed, in that the SBC chip set and processor have to provide the capability of supporting the slot types. In addition, virtually an unlimited number of slots can be provided with 20, including the SBC slot, as a practical though not an absolute limit. Some backplanes are constructed with slots for connecting to devices on both sides, and are referred to as midplanes and this ability to plug cards into either side of a midplane is often useful in larger systems made up primarily of modules attached to the midplane. Midplanes are often used in computers, mostly in blade servers, where server blades reside on one side, orthogonal midplanes connect vertical cards on one side to horizontal boards on the other side 7. Router computing â€" A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet, a data packet is typically forwarded from one router to another router through the networks that constitute the internetwork until it reaches its destination node. A router is connected to two or more lines from different networks. When a data packet comes in on one of the lines, then, using information in its

routing table or routing policy, it directs the packet to the next network on its journey. The most familiar type of routers are home and small office routers that simply pass IP packets between the computers and the Internet. An example of a router would be the cable or DSL router. Though routers are typically dedicated hardware devices, software-based routers also exist, when multiple routers are used in interconnected networks, the routers can exchange information about destination addresses using a dynamic routing protocol. Each router builds up a table listing the preferred routes between any two systems on the interconnected networks. A router may have interfaces for different physical types of connections, such as copper cables, fibre optic. Its firmware can also support different networking communications protocol standards, each network interface is used by this specialized computer software to enable data packets to be forwarded from one protocol transmission system to another.

Chapter 5 : AC Tri-Band Wireless Gigabit Dual-WAN VPN SMB Router Â– Business Router - TRENDnet T

In this paper we describe our approach to, and experiences in, developing a PC based IEEE LAN - X WAN IP router. The basic router functionality is achieved by integrating a commercially.

Chapter 6 : Troubleshooting WAN Connectivity

2 x Gigabit WAN ports, 8 x Gigabit LAN ports, 1 x USB port, 1 x Console port Tri-Band WiFi Three concurrent WiFi bands maximize device networking speeds: two separate high performance ac networks Mbps (5GHz1) + Mbps (5GHz2) + Mbps (GHz) bands.

Chapter 7 : PPT â€“ LAN and WAN Standards PowerPoint presentation | free to download - id: bYjliZ

networking assignment terms. term for the IEEE networking standard whose value is used to limit the lifespan of a datagram based on the number of.