

## JOHN FIJOLEK PUBLICATIONS

### US Patents

#### System And Method For Managing Channel Usage In A Data Over Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6510162 <i>Jan 21, 2003</i> Filed: May 27, 1998	<b>John G. Fijolek</b> (Naperville, IL) <b>Nurettin B. Beser</b> (Evanston, IL)	09/090593	3Com Corporation (Santa Clara, CA)

International Classification: H04J 316 U.S. Classification: 370432, 370469, 370486, 709223, 709239, 709225

#### Abstract:

A system and method for managing the data channel usage in a data over cable system having more than one data channel. The system includes network devices, which are cable modems connected in at least a downstream connection to one of the data channels in a cable network. The upstream connection to the cable modem may be to the cable network or to alternative networks such as, the public switched telephone network. During initialization, the cable modems attempt to communicate over a channel designated for it in the configuration parameters provided for the cable modems. If unable to use the channel, or if no channel has yet been defined for it, the cable modem scans the bandwidth for an available data channel. The cable modem may lock on the first found data channel. The cable modems register with the cable network and are assigned to a cluster.

#### Claim:

We claim: 1. A system for managing a network comprising: a plurality of network devices connected to the network and arranged as clusters of network devices, wherein each network device of said plurality of network devices is arranged within one of the clusters of network devices, each of said clusters of network devices being addressable by a respective multicast address; a plurality of data channels, each said data channel being operable to provide communications to at least one of said plurality of network devices; and the plurality of network devices being connected to a server for monitoring the data channel on which each of said plurality of network devices are communicating and for each given cluster of network devices, the server assigning network devices of the given cluster to one of the plurality of data channels using the given cluster's multicast address. 2. The system of claim 1 wherein each of said network devices includes a plurality of configuration parameters for defining communications information about said network devices wherein one of said configuration parameters includes the multicast address. 3. The system of claim 2 further comprising a Dynamic Host Configuration Protocol (DHCP) server for providing configuration parameters. 4.

#### Method And System For Virtual Network Administration With A Data-Over Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6577642 <i>Jun 10, 2003</i> Filed: Jan 15, 1999	<b>John G. Fijolek</b> (Naperville, IL) <b>Nurettin B. Beser</b> (Evanston, IL) <b>Philip T. Robinson</b> (Lake Barrington, IL) <b>Levent Gun</b> (Lake Forest, IL)	09/232762	3Com Corporation (Santa Clara, CA)

International Classification: H04J 316 U.S. Classification: 370465

#### Abstract:

A method and system for virtual network administration with a data-over-cable system. A virtual networking tag and a network address (e. g. , an Internet Protocol address) assigned by a network other than a data-over-cable system is used to provide a virtual network to one or more network devices, such as cable modems via a data-

over-cable system. The virtual networking tag may also be used to request a desired service class (e. g. , Class-of-Service, Quality-of-Service, Type-of-Service, Service Level Agreements, etc. ), for a desired end-to-end networking service (e. g. , Voice over Internet Protocol). The virtual networking tag can be mapped to a data-over-cable service class. The data-over-cable service class can be mapped into a transport service class for a transport network. The virtual networking tag is used to provide a desired end-to-end networking service from a network device on a first external network (e. g. , an Ethernet Local Area Network), through the data-over-cable system, through a transport network (e. g.

Claim:

We claim: 1. In a data-over-cable system including a plurality of network devices, a method for providing virtual network administration, comprising the following steps: receiving a plurality of first messages on a second network device on a data-over-cable system from a plurality of first network devices, wherein selected first messages from selected first network devices include a virtual networking tag and a network address, wherein the virtual networking tag is used to request a desired networking service on a virtual network, and wherein the network address is assigned to a first network device by a network other than the data-over-cable system; determining whether a first message includes a virtual networking tag and a network address, and if so, storing the network address and the virtual networking tag in virtual networking table associated with the second network device; grouping one or more of the network addresses into a virtual network indicated by a virtual networking tag, wherein the virtual networking tag allows the second network device to provide selected first network devices a desired networking service on the virtual network via the data-over-cable system. 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the plurality of first network devices are cable modems and the second network device is a cable modem termination system. 4.

## System And Method For Network Address Maintenance Using Dynamic Host Configuration Protocol Messages In A Data-Over-Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6697862 Feb 24, 2004 Filed: May 21, 1999	<a href="#">Nurettin B. Beser</a> (Evanston, IL) <a href="#">John G. Fijolek</a> (Naperville, IL)	09/316488	3Com Corporation (Santa Clara, CA)

International Classification: G06F 15177 U.S. Classification: 709226, 709224, 709221, 709250

Abstract:

A method for network address maintenance in a data-over-cable system. The method includes receiving a message containing a first network address, such as an Internet Protocol address, to be stored in a network address table, such as an Address Resolution Protocol table. If the first network address equates to a second network address stored in the network address table, one or more network addresses associated with the second network address are deleted from the network address table. A third network address is then stored in the network address table. The method provides for the removal of stale network addresses, freeing memory space and increasing security in the data-over-cable system.

Claim:

We claim: 1. In a data-over-cable system, a method for network address maintenance, comprising the steps of: receiving a message on a second network device, wherein the message contains a first network address associated with a first network device, and wherein the message is used to acknowledge the first network address on the data-over-cable system; and determining whether the first network address equates to a second network address stored in a network address table associated with the second network device, and if so, deleting from the network address table one or more network addresses associated with the second network address; and storing in the network address table a third network address. 2. A computer readable medium having stored therein instructions for causing a processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the message is a Dynamic Host Configuration Protocol acknowledgement message. 4.

## Method And Apparatus For Pppoe Bridging In A Routing Cmts

United States Patent	Inventor	Appl. No.	Assignee
#7039049 <i>May 2, 2006</i> Filed: Dec 22, 2000	<a href="#">Ali Akgun</a> (Chicago, IL) <b>John G. Fijolek</b> (Naperville, IL) <a href="#">Matthew Tooley</a> (Chicago, IL) <a href="#">Vikram Swamy</a> (Chicago, IL) <b>John Hamrick</b> (Hoffman Estates, IL)	09/748588	3Com Corporation (Marlborough, MA)
International Classification:	H04L 12/56	U.S. Classification:	370389, 3703951, 370401 370475

Abstract:

A routing Cable Modem Termination System (CMTS) configured to enable Point-to-Point Protocol over Ethernet (PPPoE). The routing CMTS may bridge Ethernet frames related to a PPPoE connection from a first network to a second network. Bridging Ethernet frames allows terminals in different networks to establish a PPPoE connection. A routing CMTS may also collect state information regarding PPPoE connections. The routing CMTS may use the state information to only bridge Ethernet frames related to valid PPPoE connections. It may act as a firewall to prevent spoofing attacks.

### Method And System For Integrating Ip Address Reservations With Policy Provisioning

United States Patent	Inventor	Appl. No.	Assignee
#7107326 <i>Sep 12, 2006</i> Filed: Nov 27, 2000	<b>John G. Fijolek</b> (Naperville, IL) <a href="#">Irene Gilbert</a> (Palatinem, IL) <a href="#">Jaideep Kulkarni</a> (Schaumburg, IL)	09/722939	3Com Corporation (Marlborough, MA)
International Classification:	G06F 15/177	U.S. Classification:	709220, 709223

Abstract:

A method and system for policy provisioning and access managing on a data-over-cable system. One method includes receiving a first message on a first network device such as a CMTS from a second network device and marking the first message with an identifier of a network access device. The method further includes intercepting the first message on a third network device prior to a first protocol network server such as a Dynamic Host Configuration Protocol ("DHCP") server receives the first message. When the third network device intercepts the first message, the third network device determines the identity of the second network device. Based on the identity of the second network device and using the identifier of the network access device, the third network device manages an assignment of configuration parameters for the second network device.

### Identity And Payment Modem Module For Handsets

United States Patent	Inventor	Appl. No.	Assignee
#2008006 <i>Mar 13, 2008</i> Filed: Sep 11, 2006	<a href="#">Russell Boltwood</a> (Piedmont, CA) <a href="#">Charles MacKinnon</a> (Northbrook, IL) <b>John Fijolek</b> (Naperville, IL)	11/530586	UTSTARCOM, :INC. (Alameda, CA)
International Classification:	H04B 1/38, H04M 1/00	U.S. Classification:	455558

Abstract:

A miniaturized form factor card provides a communications system for mobile information devices having an applications processor and user interface components. A receiving frame is provided in the mobile information device and an insertable miniaturized form factor card incorporating means for RF transmission and reception and

a wireless modem and having an indexing connector which is received in a mating moiety in the receiving frame. The applications processor and the user interface components in the mobile information device are interconnected to digital functions of the wireless modem and means for RF transmission and reception through the connector. Additionally, the miniaturized form factor card further includes a power management function interfacing with the applications processor and user interface components through the connector.

## Method And System For Addressing Network Host Interfaces From A Cable Modem Using Dhcp

United States Patent	Inventor	Appl. No.	Assignee
#6058421 <i>May 2, 2000</i> Filed: Feb 4, 1998	<b>John G. Fijolek</b> (Naperville, IL) <a href="#">Nurettin B. Beser</a> (Evanston, IL) <a href="#">Philip T. Robinson</a> (Barrington, IL)	9/018784	3Com Corporation (Santa Clara, CA)
International Classification:	G06F 15173	U.S. Classification:	709225

### Abstract:

A method and system are provided to allow a cable modem to discover an address of a network host interface on a cable television network to connect the cable modem to a data network (e. g. , the Internet). The cable modem is used in a data-over-cable system with telephony return. The cable modem is connected to a cable television network over a downstream cable data channel and connected to a public switched telephone network over a serial telephone line. The method provides a way for the cable modem to determine the address of network host interfaces (e. g. , Internet Protocol hosts) available on the cable television system via the upstream channel connected to public switched telephone network. The method includes using existing Dynamic Host Configuration Protocol ("DHCP") messages and message fields to discover network host interfaces available on the cable television system even though the cable modem only has downstream connection from the cable television network. The method and are used without changes to DHCP and can also be used in a data-over-cable system without telephony return.

## Method And System For Providing Quality-Of-Service In A Data-Over-Cable System Using Configuration Protocol Messaging

United States Patent	Inventor	Appl. No.	Assignee
#6223222 <i>Apr 24, 2001</i> Filed: May 14, 1998	<b>John G. Fijolek</b> (Naperville, IL) <a href="#">Nurettin B. Beser</a> (Evanston, IL)	9/079322	3Com Corporation (Santa Clara, CA)
International Classification:	G06F 1516	U.S. Classification:	709227

### Abstract:

A method and system for quality-of-service in a data-over-cable system using configuration protocol messaging is provided. The method and system include determining whether a cable modem termination system has enough available bandwidth to provide a quality-of-service connection requested by a cable modem from a quality-of-service server. The quality-of-service server uses Dynamic Host Configuration Protocol ("DHCP") messaging to send and receive quality-of-service identifiers indicating that the cable modem termination system has enough available bandwidth to provide a quality-of-service connection requested by a cable modem. The cable modem termination system creates a quality-of-service connection to a cable modem based on the quality-of-service identifiers returned from the quality-of-service server. The quality-of-service server using DHCP messaging provides a standard and efficient process to reserve bandwidth for quality-of-service connections in a data-over-cable system. The quality-of-service server is also used to distribute quality-of-service connection requests from cable modems among multiple cable modem termination system in a data-over-cable system.

## Methods For Restricting Access Of Network Devices To Subscription Services In A Data-Over-Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6351773 <i>Feb 26, 2002</i> Filed: Dec 21, 1998	<b>John G. Fijolek</b> (Naperville, IL) <b>Levent Gun</b> (Lake Forest, IL) <b>Ronald B. Lee</b> (Northbrook, IL) <b>Philip T. Robinson</b> (Barrington, IL)	09/217534	3Com Corporation (Santa Clara, CA)

International Classification: G06F 1100 U.S. Classification: 709228, 709222, 370 19

### Abstract:

Methods for providing restricted access for a network device such as a cable modem or customer premise equipment on a data-over-cable system. An unknown or new network device is assigned a restricted network address such as a restricted Internet Protocol address. The restricted network address allows the network device to access less than all of the available features on the data-over-cable system. A connection timer is started on the data-over-cable system for a restricted connection to the network device. The connection timer restricts access to the data-over-cable system over a timed interval. A restricted connection is created between the data-over-cable system and the network device including the temporary restricted network address and the connection timer, thereby providing restricted access to the data-over-cable system over a timed interval. The methods may allow a data-over-cable system to provide restricted connections to unknown or new network devices without a long delay, yet provide security to the data-over-cable system.

### Claim:

We claim: 1. In a data-over-cable system including a plurality of network devices, a method of restricting access for a network device, comprising the following steps: receiving a connection request from a first network device on a second network device on the data-over cable system for a subscription service on the data-over-cable system; determining from the second network device, whether information about the first network device is available on the data-over-cable system, and if not, assigning a temporary restricted network address for a restricted connection to the first network device on the data-over-cable system from pre-determined list of restricted network addresses, wherein the temporary network address from the pre-determined list of restricted network addresses provides restricted access to subscription services on the data-over-cable system; starting a connection timer on the data-over-cable system for a restricted connection to the first network device, wherein the connection timer restricts access to subscription services on the data-over-cable system over a timed interval; and creating a restricted connection between the data-over-cable system and the first network device including the temporary restricted network address and the connection timer, thereby providing restricted access to subscription services the data-over-cable system. 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the first network device is any of a cable modem or customer premise equipment. 4.

## Stackable Slide Mount System For Modem Devices

United States Patent	Inventor	Appl. No.	Assignee
#6574110 <i>Jun 3, 2003</i> Filed: May 31, 2000	<b>Dan Budinger</b> (Arlington Heights, IL) <b>Irene Gilbert</b> (Palatine, IL) <b>John G. Fijolek</b> (Naperville, IL)	09/584928	3Com Corporation (Santa Clara, CA)

International Classification: H05K 700 U.S. Classification: 361729, 361790, 361801, 361727, 439 74, 439260, 439257

### Abstract:

The present invention relates to an improved mounting for stacking modem devices. Each mounting includes stacking feet and stacking slots that permit the mountings to be securely stacked on top of one another. Each

mounting is configured to receive a modem device. Each mounting also includes connectors configured to interconnect with corresponding connectors of the modem device. For instance, each mounting and the modem have interconnecting power connections, RJ-45 connections, cable connections, and serial data connections. The modem devices can be slid into place for testing, initialization or installation without disassembling the stack. The present invention also provides configuring the mountings so the multiple modem devices can be connected back to back and communicating without a hybrid fiber/coax network connection.

Claim:

What is claimed is: 1. An improved mounting for stacking modem devices, the modem devices having a back panel, a rectangular bottom, two opposite side panels connected to the two sides of the rectangular bottom, a first connector on the back panel and two slide mount slots along the sides, the improved mounting comprising: (g) a bottom conforming to said rectangular bottom of said modem device; (h) two side panels opposite each other along bottom of said mounting; (i) stacking feet extending from said bottom of said mounting; (j) stacking slots along top of said side panels to receive stacking feet connected to a second mounting stacked on top of the mounting; (k) a slide mount guide on said two side panels to fit said slide mount guide of said modem device; and (l) a back connected to said bottom and said two side panels, the back having a second connector corresponding to said first connector, said second connector positioned to fit into the first connector to attach said modem device. 2. The mounting according to claim 1, wherein said stacking feet fit into said stacking slots for securely stack said modem devices. 3. The mounting according to claim 1, wherein said second connector of said mounting comprises a power socket. 4.

## Method And System For Provisioning Network Addresses In A Data-Over-Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6657991 <i>Dec 2, 2003</i> Filed: Dec 21, 1998	<a href="#">Ali Akgun</a> (Evanston, IL) <b>John G. Fijolek</b> (Naperville, IL) <a href="#">Steven W. Sangston</a> (Bartlett, IL) <a href="#">Nurettin B. Beser</a> (Evanston, IL)	09/218793	3Com Corporation (Santa Clara, CA)
International Classification:	H04L 1266	U.S. Classification:	370352, 370389, 370401, 375222, 709218

Abstract:

A method and system for provisioning network addresses in a data-over-cable system. Provisioning of network addresses allows multiple "always-on" network devices with multiple associated devices to be used on a data-over-cable system with a limited public network address pool. The "always-on" network devices provide services, such as, Voice over Internet Protocol ("VoIP"), that typically require instant access to data-over-cable system. Network devices such as "always-on" cable modems may allocated private network addresses (e. g. , Internet Protocol addresses) on the data-over-cable system. The private network addresses are not addressable outside the data-over-cable system. Other network devices associated with the cable modems, such as customer premise equipment, may be allocated public network addresses (e. g. , Internet Protocol Addresses) on the data-over-cable system.

Claim:

We claim: 1. In a data system with a plurality of network devices, a method for using network address provisioning, comprising the following steps: receiving a first message with a first configuration protocol on a second network device from a network device to request a network address for the network device on the data system; determining whether the network device is to receive a private network address on the data system with a network address table associated with the second network device, and if so, obtaining a private network address marker on the second network device, wherein the private network address marker indicates that a private network address is to be selected for the network device, and wherein the private network address is not addressable outside of the data system, and setting a first network address field in the first message with the private network address marker; and if the network device is not to receive the private network address, obtaining a public network address marker on the second network device, wherein the public network address marker indicates that a public network address is to be selected for the network device, and wherein the public network address is addressable outside of the data system, and setting the first network address field in the first message with the public network address marker; and forwarding the first message to a network address server associated with the data system, wherein the first network address field in the first message is used by the network address server to allocate a network

address on the data system. 2. computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the network device is any of a cable modem or customer premise equipment. 4.

### Method And System For Dynamic Service Registration In A Data-Over-Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6986157 <i>Jan 10, 2006</i> Filed: Dec 21, 1998	<b>John G. Fijolek</b> (Naperville, IL) <b>Ali Akgun</b> (Evanston, IL) <b>Rita Shammas</b> (Lincolnwood, IL) <b>Matthew Harper</b> (Arlington Heights, IL)	09/217347	3Com Corporation (Marlborough, MA)
International Classification:	H04N 7/173	U.S. Classification:	725111, 709229, 3703952

**Abstract:**

A method and system for dynamic service registration, activation and deactivation on a data-over-cable system. A first network device, such as a cable modem with associated service devices (e. g. , Voice over Internet Protocol telephones) sends a first message to another network device, such as a cable modem termination system. The first message includes multiple service parameters for a desired service requested by a service device associated with the first network device. The multiple service parameters are extracted from the first message. A service session profile is created for the desired service. The service session profile includes one or more of the extracted service parameters required by the desired service. The service session profile is used by a service server associated with the cable modem termination system to provide a desired service. The service session profile is associated with a deferred inactive service identifier for the cable modem.

### System And Method For A Multi-Frequency Upstream Channel In A Computer Network

United States Patent	Inventor	Appl. No.	Assignee
#7085306 <i>Aug 1, 2006</i> Filed: Oct 30, 2001	<b>Mikhail Voldman</b> (Northbrook, IL) <b>Dan Budinger</b> (Arlington Heights, IL) <b>Ali Akgun</b> (Chicago, IL) <b>John G. Fijolek</b> (Naperville, IL) <b>Mark O. Vogel</b> (Hampshire, IL) <b>Kris Kelkar</b> (Camarillo, CA)	10/013321	3Com Corporation (Marlborough, MA)
International Classification:	H04B 1/713	U.S. Classification:	375132, 375133, 370431, 370436, 370341, 370329

**Abstract:**

System and method for providing a multi-frequency upstream transmission channel to a network device. When a headend network entity generates an upstream channel descriptor message, the descriptor message includes at least two upstream frequencies available for upstream transmission, and a frequency hopping descriptor with a frequency-hopping pattern associated with the available frequencies for determining an upstream frequency for upstream transmission. The headend provides a timing reference for determining upstream transmission periods on the frequencies available on the network device. When the headend receives upstream transmission on one of the available upstream frequencies, the headend network entity determines frequency distortions. If the distortions exceed a threshold level, the headend may send a new upstream channel descriptor message that excludes the upstream frequency associated with the high frequency distortions, add a new upstream frequency, or defines a new frequency-hopping pattern.

### Method And Apparatus To Facilitate Use Of Cable Television Coaxial Cable For Local Area Network Services

United States Patent	Inventor	Appl. No.	Assignee
#2007022 <i>Sep 27, 2007</i> Filed: Mar 21, 2006	<a href="#">Ali Akgun</a> (Seattle, WA) <b>John Fijolek</b> (Naperville, IL) <a href="#">Bill Huang</a> (San Ramon, CA) <a href="#">Rick Flint</a> (Zion, IL) <a href="#">Dawei Zhang</a> (Saratoga, CA)	11/385470	UTStarcom, Inc. (Alameda, CA)
International Classification:	H04N 7/173, H04Q 7/24, H04L 12/56	U.S. Classification:	370338000, 370447000, 725131000, 370401000

Abstract:

A wireless local area network access point () has a data communication network input () (to provide, for example, broadband access via a digital subscriber line modem, a cable modem, or the like). The access point also has a wireless local area network output () to provide wireless access to this broadband resource and a hard-wired local area network output () to provide wired access. In a preferred approach the latter couples to a cable television coaxial cable () that carries a plurality of cable television service provider channels within a predetermined frequency band (). Access to the broadband resource comprises use of a carrier () that is out of band with respect to that predetermined frequency band.

Video View Selection By A Chairperson

United States Patent	Inventor	Appl. No.	Assignee
#5473367 <i>Dec 5, 1995</i> Filed: Jun 30, 1993	<a href="#">Bruce M. Bales</a> (Louisville, CO) <a href="#">Ted M. Fidler</a> (Broomfield, CO) <b>John G. Fijolek</b> (Naperville, IL) <a href="#">Donald D. Gallagher</a> (Boulder, CO) <a href="#">Robert L. Lien</a> (Batavia, IL) <a href="#">Stephen M. Thieler</a> (Boulder, CO) <a href="#">Vojislav V. Vucetic</a> (Holmdel, NJ)	8/085997	AT&T Corp. (Murray Hill, NJ)
International Classification:	H04N 714, H04N 715	U.S. Classification:	348 16

Abstract:

A switching system for allowing any one conferee on a video conference to assume the role of manually manipulating the video picture that will be seen by all conferees (chair view). In addition, each individual conferee is allowed to determine their own video picture content or to select the chair view. Further, anyone of conferees can assume the role of determining the chair view. In addition, for the video classroom, a chair view video picture is composed such that the picture displays the visual aid with an insert for an instructor and an insert for a student asking a question. Further, the instructor selects by using a button or mouse which student is to be displayed in the student insert, and the video picture automatically displays that student. In another embodiment of the system, the students request permission to ask a question by actuation of a switch on their telephone set, and the names of students asking questions are displayed on a computer display screen. The instructor then can select the student by manipulating the cursor on the computer display to select the desired student.

Method And System For Managing Addresses For Network Host Interfaces In A Data-Over-Cable System



**United States Patent****Inventor****Appl. No.****Assignee**#6240464 *May 29, 2001*

Filed: Feb 4, 1998

**John G. Fijolek** (Naperville, IL)  
**Nurettin B. Beser** (Evanston, IL)

9/018780

3Com Corporation (Santa Clara, CA)

International Classification: G06F 1516, G06F 15173

U.S.  
Classification:

709250

## Abstract:

A method and system for managing addresses of network host interfaces in a data-over-cable system such as Internet Protocol interfaces. The method allows network host interfaces addresses to be removed from routing tables on network devices such as cable modems or customer premise equipment when their lease expires. This helps prevent the data-over-cable system from exhausting available network host interface addresses of the data-over-cable system. In addition, the method helps ensure that transactions are not conducted on a network host interface address in the data-over-cable system unless it has a valid lease in the one or more routing tables on network devices.

**Methods And Systems For Service Level Agreement Enforcement On A Data-Over Cable System****United States Patent****Inventor****Appl. No.****Assignee**#6553568 *Apr 22, 2003*

Filed: Sep 29, 1999

**John G. Fijolek** (Naperville, IL)  
**Phillip T. Robinson** (Lake Barrington, IL)  
**Irene M. Gilbert** (Palatine, IL)  
**Daniel M. Budinger** (Arlington Heights, IL)  
**Narij Jain** (San Jose, CA)

09/407337

3Com Corporation (Santa Clara, CA)

International Classification: H04N 7173

U.S.  
Classification: 725111, 725100, 725 86, 709218

## Abstract:

Methods and system for service level agreement enforcement on a data-over-cable system. One or more service level agreements are created including one or more class-of-service or quality-of-service parameters. A pool of Internet Protocol addresses is allocated for the one or more service level agreements. Configuration files including service level agreement parameters are used to initialize cable modems or customer premise equipment. When a cable modem or customer premise equipment requests use of a service level agreement, an Internet Protocol address from the pool of Internet Addresses associated with a desired service level agreement is assigned. The service level agreements are enforced using the Internet Protocol address from a cable modem termination system including an integral switch cable access router and a bandwidth manager. The cable modem termination system with integral components are duplicated to provide a "hot back" up in case of failure and increase reliability for using service level agreements. The cable access router enforces maximum rate limits for service level agreements.

## Claim:

We claim: 1. In a data-over-cable system with a plurality of network devices, a method for requesting a service level agreement, the method comprising the steps of: requesting on a network device, a service level agreement with a desired class-of-service or quality-of-service from a cable modem termination system; providing a data-link layer address for the network device on the data-over-cable system to the cable modem termination system to identify the network device; reserving statically a network address for the network device on the data-over-cable system from the cable modem termination system, wherein the statically reserved network address is reserved from a pool of network addresses associated with the requested service level agreement; requesting dynamically a network address on the network device during a boot sequence, wherein a network address server associated

with the cable modem termination system allocates the statically reserved network address to the network device from the pool of network addresses associated with the requested service level agreement; receiving dynamically the statically reserved network address on the network device agreement in response to the dynamic request for a network address; receiving a configuration file on the network device in response to the boot sequence, wherein the configuration file is used to initialize a network device with a desired service level agreement on the data-over-cable system; and initializing the network device with the configuration file, wherein loading the configuration file includes setting a plurality of parameters for class-of-service or quality-of-service for the desired service level agreement on the network device. 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the data-link layer address is a Medium Access Control protocol address and the network address is an Internet Protocol address. 4.

## Method For Changing Type-Of-Service In A Data-Over-Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6560203 <i>May 6, 2003</i> Filed: May 27, 1998	<b>Nurettin B. Beser</b> (Evanston, IL) <b>John G. Fijolek</b> (Naperville, IL)	09/085905	3Com Corporation (Santa Clara, CA)
International Classification: H04L 1226		U.S. Classification:	370252, 370352, 370401, 370465, 725111

### Abstract:

A method and system for changing type-of-service with an associated quality-of-service in a data-over-cable system is provided. The method and system allow a cable modem or a cable modem termination system to dynamically override the statically assigned type-of-service supplied to the cable modem in a Dynamic Host Configuration Protocol (DHCP) initialization sequence. A selection input can request a second type-of-service that may or may not be supported by the cable modem on the cable modem termination system. If the requested second type-of-service with an associated second quality-of-service is permitted on the cable modem, the cable modem termination system dynamically changes the first type-of-service to the requested second type-of-service. Allowing a cable modem and cable modem termination system to change the statically assigned type-of-service to a second type-of-service allows the user greater flexibility for configuration cable modems in a data-over-cable system.

### Claim:

We claim: 1. In a data-over-cable system including a plurality of network devices, a method for changing a type-of-service, the method comprising of the following steps: monitoring a connection on a first network device between the first network device and a second network device, wherein the first connection has a first type-of-service associated with a first quality-of-service; determining the first type-of-service on the connection with the associated first quality-of-service, wherein the first type-of-service is statically assigned with a configuration file during a Dynamic Host Configuration Protocol initialization sequence; receiving a selection input requesting a second type-of-service with an associated second quality-of-service on the first connection; and changing dynamically the first type-of-service to the second type-of-service with the associated second quality-of-service. 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the steps of the method of claim 1. 3. The method of claim 1 wherein the first network device is a cable modem and the second network device is a cable modem termination system. 4.

## Method And System For Providing Quality-Of-Service In A Data-Over-Cable System

United States Patent	Inventor	Appl. No.	Assignee
#6636485 <i>Oct 21, 2003</i> Filed: May 14, 1998	<b>John G. Fijolek</b> (Naperville, IL) <b>Nurettin B. Beser</b> (Evanston, IL)	09/079323	3Com Corporation (Santa Clara, CA)
International Classification: H04L 1264		U.S. Classification:	370252, 370468, 725105

### Abstract:

A method and system for quality-of-service in a data-over-cable system is provided. A cable modem in a data-over-cable system makes a connection request to a cable modem termination system with a requested quality-of-service. The requested quality-of-service includes class-of-service, quality-of-service and other related parameters. The connection request is sent from a cable modem or a cable modem termination system to a Quality-of-Service (QoS) server. The QoS server determines if the cable modem termination system has enough bandwidth to make the connection to the cable modem with the requested quality-of-service. If the cable modem termination system has enough bandwidth, a quality-of-service identifier is returned to the cable modem termination system. The cable modem termination system uses the quality-of-service identifier to make a connection to the cable modem with the requested QoS to the cable modem. The QoS server reduces the computational burden and complexity of software on the cable modem termination system.

Claim:

We claim: 1. In a data-over-cable system with a plurality of network devices, a method for providing quality-of-service, the method comprising the following steps: receiving a request on a first network device from a second network device to establish a connection between the second network device and a third network device with a specific quality-of-service, wherein the request for a quality-of-service connection request includes class-of-service and quality-of-service parameters; determining on the first network device whether the second network device has enough available bandwidth to establish the quality-of-service connection to the third network device with the specific quality-of-service requested, and if so, subtracting a bandwidth required for the specific quality-of-service requested from the available bandwidth for the second network device; assigning a quality-of-service identifier to the required quality-of-service bandwidth; storing the assigned quality-of-service identifier on the first network device; and sending the assigned quality-of-service identifier to the second network device, wherein the assigned quality-of-service identifier indicates that the second network device has enough bandwidth to establish the connection to the third network device with the specific quality-of-service requested. 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute steps of the method of claim 1. 3. The method of claim 1 wherein the first network device is a quality-of-service server, the second network device is a cable modem termination system, and the third network device is a cable modem. 4.

## Method For Network Address Table Maintenance In A Data-Over-Cable System Using A Network Device Registration Procedure

United States Patent	Inventor	Appl. No.	Assignee
#6654387 Nov 25, 2003 Filed: May 21, 1999	<b>Nurettin B. Beser</b> (Evanston, IL) <b>John G. Fijolek</b> (Naperville, IL)	09/316614	3Com Corporation (Santa Clara, CA)
International Classification:	G06F 1516	U.S. Classification:	370485, 709250, 725111

Abstract:

A method and system for network address maintenance in a data-over-cable system. The method includes determining whether a network device, such as a cable modem, registers in a timely manner. When updating network address tables, such as Address Resolution Protocol tables, a time value is associated with an address, such as an Internet Protocol (IP) address, of a network device. If a time between two registration events exceeds this time value, the network address is deleted from the network address table. The deletion of the network address ensures that the device is isolated from the network. The method and system provide for the rapid removal of stale network addresses, freeing valuable memory space, and increasing security in a data-over-cable system.

Claim:

We claim: 1. In a data-over-cable system, a method of network address maintenance, comprising the steps of: receiving a first message including a first network address from a second network device on a first network device, wherein the first message includes information for communicating with the second network device in said data-over-cable system; storing the first network address in a network address table associated with the first network device; associating a time value with the first network address; and determining whether a second message is received from the second network device within the time value, and if not, deleting the first network address from the network address table; wherein the second message includes identification information from the first message to identify the second network device on the first network device. 2. A computer readable medium

having stored therein instructions for causing a central processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the network address table is an Address Resolution Protocol table. 4.

## Method For Network Address Table Maintenance In A Data-Over-Cable System Using Destination Reachability

United States Patent	Inventor	Appl. No.	Assignee
#6754622 <i>Jun 22, 2004</i> Filed: May 24, 1999	<b>Nurettin B. Beser</b> (Evanston, IL) <b>John G. Fijolek</b> (Naperville, IL)	09/317588	3Com Corporation (Marlborough, MA)
International Classification:	G06F 15177	U.S. Classification:	704226, 709245, 370485

### Abstract:

A method and system for network address maintenance in a data-over-cable system. The method includes determining whether a network device, such as a cable modem, responds to a request in a timely manner. When updating network address tables, such as Address Resolution Protocol tables, an Internet Control Message Protocol (ICMP) echo message is generated and sent to the Internet Protocol (IP) address of a network device. If an ICMP echo reply message is not detected within a pre-determined time, the network address is deleted from the network address table. The deletion of the network address ensures that the device is isolated from the network. The method and system provide for the rapid removal of stale network addresses, freeing valuable memory space, and increasing security in a data-over-cable system.

### Claim:

We claim: 1. In a data-over-cable system, a method of network address maintenance, comprising the steps of: reading a first network protocol address, for a protocol other than a data link layer protocol, from a network address table associated with a first network device; sending a first request message from the first network device to a second network device associated with the first network protocol address to determine if the second network device is active; and determining whether the first network device receives a second reply message from the second network device within a pre-determined amount of time, and if not, deleting the first network protocol address from the network address table. 2. A computer readable medium having stored therein instructions for causing a central processing unit to execute the method of claim 1. 3. The method of claim 1 wherein the first request message and the second reply message are network management messages. 4.

## Method And Apparatus For Performing System Diagnostics On A Cable Modem Termination System Using A Hand Held Computing Device

United States Patent	Inventor	Appl. No.	Assignee
#6802032 <i>Oct 5, 2004</i> Filed: May 31, 2000	<b>Dan Budinger</b> (Arlington Heights, IL) <b>Irene Gilbert</b> (Palatine, IL) <b>John G. Fijolek</b> (Naperville, IL)	09/584926	UTStarcom, Inc. (Alameda, CA)
International Classification:	G06F 1100	U.S. Classification:	714 46, 714 45, 714 57, 709221

### Abstract:

The present invention provides a method for testing and diagnosing a cable modem termination system, using a hand-held computing device. The hand-held computing device establishes a connection with the cable modem termination system through a wireless infrared and radio frequency connection, a serial, or a local area network connection. After the connection is established, a set of commands residing in the hand-held device are transmitted to configure the cable modem termination system. The cable modem termination system sends back a response that is displayed on a command screen of the hand-held device to identify status and error messages. A cable modem termination system operator can send a set of configuration instructions to the cable modem termination system by utilizing stored sets of configuration instructions. Using the hand-held device allows easy accessibility in remote locations with limited space for diagnostics and equipment.

Claim:

What is claimed is: 1. A method for testing and diagnosing a cable modem termination system using a hand-held device comprising the steps of: (a) connecting said hand held device to said cable modem termination system; (b) transmitting a set of command line interface commands residing in said hand-held device to said cable modem termination system; (c) receiving a response from said cable modem termination system; (d) displaying said response on a command screen of said hand-held device; (e) showing a selection to send a set of configuration instructions to said cable modem termination system; and (f) sending said set of configuration instructions to said cable modem termination system, wherein the set of configuration instructions alter cable modem termination system parameters that are used in the operation of the cable modem termination system after the hand held device is disconnected from the cable modem termination system. 2. The method of claim 1, wherein connecting said hand-held device to said cable modem termination system includes a wireless connection, a serial connection, or a local area network connection. 3. The method of claim 2, wherein said wireless connection includes an infrared connection or a radio frequency connection to said cable modem termination system. 4.

### System And Method For Automatic Load Balancing In A Data-Over-Cable Network

United States Patent	Inventor	Appl. No.	Assignee
#7068597 <i>Jun 27, 2006</i> Filed: Nov 27, 2000	<b>John G. Fijolek</b> (Naperville, IL) <b>Irene Gilbert</b> (Palatinem, IL) <b>Ali Akgun</b> (Evanston, IL) <b>Shahidur Khan</b> (Schaumburg, IL) <b>Vikram Swamy</b> (Chicago, IL)	09/722980	3Com Corporation (Marlborough, MA)
International Classification:	H04L 1/00	U.S. Classification:	370230, 370485, 370401, 370235, 455453

Abstract:

A method and system for load balancing in a network system such as a data-over-cable system. One method includes receiving a first message on a first network device such as a cable modem termination system ("CMTS") from a second network device and marking the first message with an identifier of a network access device. The method further includes intercepting the first message on a third network device such as a provisioning/access manager prior to any first protocol server such a Dynamic Host Configuration Protocol server receives the first message. When the third network device intercepts the first message, the third network device determines capabilities of the second network device and applies a set of rules to load balance any requests between a plurality of channel pairs. Each channel pair is associated with at least one capability of a network device and also has a load factor parameter and a threshold value defining a capacity of a channel pair. The third network device assigns the second network device to a predetermined channel pair based on the capabilities of the second network device, a load factor of the channel pair and a capacity of the channel pair.

### System And Method For Resolving Network Addresses For Network Devices On Distributed Network Subnets

United States Patent	Inventor	Appl. No.	Assignee
#7072337 <i>Jul 4, 2006</i> Filed: Jan 25, 2002	<b>Yuri Arutyunov</b> (Barrington, IL) <b>John G. Fijolek</b> (Naperville, IL) <b>Ronald Lee</b> (Northbrook, IL) <b>William Necka</b> (Bloomington, IL)	10/056886	3Com Corporation (Marlborough, MA)
International Classification:	H04L 12/28, H04L 12/56, G06F 15/16	U.S. Classification:	370389, 709245, 370401

Abstract:

A system and methods for traffic gating in a computer network comprising a plurality of subnets are developed. One of the methods implemented in a data-over-cable system includes, responsive to receiving a first address resolution request message on a cable modem from a first host to a second host, generating a second address

resolution request message on the cable modem and sending it to the second host. If the second host does not respond with an address resolution protocol reply message to the second request message, the cable modem determines a network subnet associated with the first host. Based on the network subnet, the cable modem determines a network address of a network element arranged to provide routing services to hosts on the subnet associated with the first host. Next, the cable modem generates an address resolution reply message including the network address of the network element and sends it to the first host.

### Method For Remote Service Forwarding (Rsf) Between Dissimilar Systems With Operator, Service And Location Portability

United States Patent	Inventor	Appl. No.	Assignee
#7340047 <i>Mar 4, 2008</i> Filed: Dec 6, 2004	<b>John Fijolek</b> (Rolling Meadows, IL) <b>Guanglu Wang</b> (Buffalo Grove, IL)	11/005534	UTStarcom, Incorporated (Alameda, CA)

International Classification: H04M 7/00  
U.S. Classification: 37921102, 37922002

**Abstract:**

A remote service forwarding (RSF) system allows the telephone service user to access the subscribed services via different access devices without the loss of service. The system allows a user to access different systems or uses dissimilar phone devices or different service providers by porting services over an IP connection. The user may access subscribed services such as Centrex or PBX services over a mobile IP connection.

### Method And Apparatus To Facilitate Communication Resource Usage Control

United States Patent	Inventor	Appl. No.	Assignee
#2007021 <i>Sep 20, 2007</i> Filed: Mar 16, 2006	<b>Shankar Jayaraman</b> (Palatine, IL) <b>Michael Borella</b> (Naperville, IL) <b>John Fijolek</b> (Naperville, IL)	11/377067	UTStarcom, Inc. (Alameda, CA)

International Classification: H04J 1/16, H04L 12/56  
U.S. Classification: 370235000, 370395400, 370252000

**Abstract:**

A network element can monitor () communication resource usage by, for example, a first end user. A determination () can then be had as to whether this first end user's communication resource usage exceeds a predetermined individual level of usage for that first end user (as distinguished, for example, from an upper limit as might be generically applied across an entire user population). When the first end user's communication resource does exceed this predetermined individual level of usage, automatic limitations regarding the first end user's communication resource usage can be imposed () while nevertheless continuing to facilitate the end user's communication resource usage.

### System And Method For Extending Communications Features Using Generic Management Information Base Objects

United States Patent	Inventor	Appl. No.	Assignee
#6275853 <i>Aug 14, 2001</i> Filed: May 27, 1998	<b>Nurettin B. Beser</b> (Evanston, IL) <b>John G. Fijolek</b> (Naperville, IL)	9/090595	3Com Corporation (Santa Clara, CA)

International Classification: G06F 1300  
U.S. Classification: 709223

Abstract:

A system and method for managing a network using generic objects in a network device management information base (MIB). The generic objects may be used to communicate commands that perform tasks that are not addressed by the specific device objects in the MIB. The generic objects include a command script object for sending commands to a device. The generic objects also include a status object for retrieving a status of the commands and a results object for retrieving the results of the command. The generic object uses device commands that may include commands and features that have been added or updated since the MIB was defined. The generic objects provide the network manager with flexibility in extending network management tasks to include features and capabilities that are not supported by the specific device MIB.

### Method And System For Managing Subscription Services With A Cable Modem

United States Patent	Inventor	Appl. No.	Assignee
#6018767 <i>Jan 25, 2000</i> Filed: Feb 24, 1998	<b>John G. Fijolek</b> (Naperville, IL) <b>Ronald B. Lee</b> (Northbrook, IL) <b>Philip T. Robinson</b> (Barrington, IL) <b>Levent Gun</b> (Lake Forest, IL)	9/028404	3Com Corporation (Santa Clara, CA)

International Classification: G06F 1300, H04N 7173      U.S. Classification: 709218

Abstract:

A method and system for managing network services such as subscription services from a cable modem in a data-over-cable system. The cable modem receives an initialization message on a cable television connection indicating what services are available on a data network. The cable modem uses a connection to a public switched telephone network in the data-over-cable system to send requests to and receive responses from the data network. A telephony remote access concentrator on the public switched telephone network provides an additional security mechanism by not allowing a cable modem to subscribe to unauthorized services. Using the public switched telephone network does not compromise the security of the cable television network. In addition, the public switched telephone network is used to provide administrative support to the cable television network on lower bandwidth connections by providing an administrative pathway outside of the higher bandwidth cable television connections.

### Method And System For Resolving Addresses For Network Host Interfaces From A Cable Modem

United States Patent	Inventor	Appl. No.	Assignee
#6065049 <i>May 16, 2000</i> Filed: Feb 4, 1998	<b>Nurettin B. Beser</b> (Evanston, IL) <b>John G. Fijolek</b> (Naperville, IL) <b>Philip T. Robinson</b> (Barrington, IL)	9/018814	3Com Corporation (Santa Clara, CA)

International Classification: G06F 1300      U.S. Classification: 709218

Abstract:

A method and system are provided to allow a cable modem to resolve addresses for a selected network host interface on a cable television network to connect the cable modem to a data network (e. g. , the Internet). The cable modem is used in a data-over-cable system with telephony return. The cable modem is connected to a cable television network over a downstream cable data channel and connected to a public switched telephone network over a serial telephone line. The method provides a way for the cable modem to resolve an address for a selected network host interface (e. g. , Internet Protocol host) available on the cable television system via the upstream channel connected to public switched telephone network. The method includes using existing Dynamic Host Configuration Protocol messages and message fields to discover network host interfaces available on the cable television system even though the cable modem only has downstream connection from the cable television network. The method and system can also be used on a data-over-cable system without telephony return.

# Method And System For Cable Modem Management Of A Data-Over-Cable System

**United States Patent**

**Inventor**

**Appl. No.**

**Assignee**

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#6185624 *Feb 6, 2001*

**John G. Fijolek** (Naperville, IL)

9/018404

3Com Corporation (Santa

Filed: Feb 4, 1998

**Nurettin B. Beser** (Evanston, IL)

Clara, CA)

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International Classification: G06F 15173, G06F 1516

U.S.

709239

Classification:

Abstract:

A method and system for providing management functionality with a cable modem with telephony return is provided. The cable modem with telephony return is used for providing management functionality such as maintenance and signaling via the lower bandwidth telephony return path, leaving more higher bandwidth cable television channels free for data transmission. Since routine management functions such as maintenance are completed on the cable television channels via the telephony return path, the overall costs of maintaining the higher bandwidth cable television channels are reduced. In addition, since routine management functions are carried out via the telephony return path, fewer overall maintenance functions need to be carried out on the higher bandwidth cable television channels, requiring less down time and generating more revenues for the cable television network providers.