

IN THE UNITED STATES DISTRICT COURT FOR THE EASTERN DISTRICT OF TEXAS MARSHALL DIVISION

CISCO	SYSTEMS,	INC.	AND
CISCO	TECHNOL	OGY,	INC.

Plaintiffs,

v.

HUAWEI TECHNOLOGIES, CO., LTD., HUAWEI AMERICA, INC. AND FUTUREWEI TECHNOLOGIES, INC.,

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CIVIL ACTION	I NO.	L		
COMPLAINT	AND	JURY	DEM	ANI

For its complaint against Defendants Huawei Technologies Co., Ltd. ("Huawei"), Huawei America, Inc. ("Huawei America") and FutureWei Technologies, Inc. ("FutureWei") (collectively "Defendants"), Plaintiffs Cisco Systems, Inc. ("Cisco Systems") and Cisco Technology, Inc. ("Cisco Technology") (collectively "Cisco") allege as follows:

I. NATURE OF THE ACTION

1. This is an action arising from Defendants' systematic and wholesale infringement of Cisco's intellectual property. Huawei, a Chinese company, and its wholly owned United States subsidiaries, Huawei America and FutureWei, manufacture and offer for sale a line of network routers designed to compete with Cisco's network routers. Unlike Cisco, however, which invested substantially in the development of its own proprietary router technology and software, Huawei has chosen to misappropriate and infringe Cisco's intellectual property in an attempt to develop a cheaper, inferior router which Huawei claims is compatible with Cisco's routers. In doing so, Huawei and its U.S. subsidiaries have shown a complete disregard for Cisco's intellectual property rights and the laws which protect those rights. The extent of Defendants' copying and misappropriation of Cisco's intellectual property is

staggering. Defendants have copied Cisco's patented technologies; they have copied the copyrighted user interface for Cisco's routers; they have made verbatim copies of whole portions of Cisco's user manuals; and there is overwhelming evidence that they unlawfully gained access to Cisco's source code and copied it as the basis for the operating system for their knock-off routers. Cisco brings this action to enjoin this wholesale theft of its valuable intellectual property and recover the substantial damages it has incurred from Defendants' illegal conduct.

II. PARTIES

- 2. Cisco Systems is a California corporation with its principal place of business in San Jose, California. It is a worldwide leader in the development, manufacture and sale of computer networking products.
- 3. Cisco Technology is a California corporation with its principal place of business in San Jose, California. Cisco Technology is a wholly-owned subsidiary of Cisco Systems.
- 4. On information and belief, Huawei is a foreign corporation with its principal place of business in the Peoples Republic of China. It is a multi-billion dollar company that conducts business throughout the world in the manufacture and sale of network and telecommunications equipment. On information and belief, Huawei conducts business in this judicial district through FutureWei and/or Huawei America.
- 5. FutureWei is a corporation organized and existing under the laws of the State of Texas with its principal place of business at 1700 Alma Drive, Plano, Texas. On information and belief, FutureWei is a wholly owned subsidiary of Huawei. FutureWei is present in and conducts business in this judicial district. In addition to its Plano office, FutureWei also maintains offices in San Jose, California and Reston, Virginia. FutureWei's registered agent is:

Rongxin Chong 1700 Alma Drive, Suite 500 Plano, Texas 75075 6. Huawei America is a corporation organized and existing under the laws of the State of California with its principal place of business in San Jose, California. On information and belief, Huawei America is a wholly owned subsidiary of Huawei. Huawei America is present in and conducts business in this judicial district. In addition to its San Jose office, Huawei America also maintains a sales office in Plano, Texas. Huawei America's registered agent is:

James Yan 3772 Sun West Terrace Fremont, CA 94555

III. JURISDICTION AND VENUE

- 7. Defendants transact business and are found in this judicial district through regular business conduct and activity that includes, among other things, the following:
- a. Huawei offers for sale in this district the network routers and related software which are alleged in this action to infringe Cisco's intellectual property rights.
- b. Huawei already has made commercial sales in the United States of the network routers which are alleged in this action to infringe Cisco's intellectual property rights, including sales originated from the sales office in Plano, Texas.
- c. Huawei and FutureWei each operate a website for the purpose of promoting Huawei products, including the network routers, switches and other network products that use the software alleged to infringe Cisco's intellectual property rights. The Huawei and FutureWei websites can be accessed by customers, potential customers and others located in this district for information about the allegedly infringing routers and other Huawei products, as well as employment opportunities with Huawei's interests in the United States. The infringing computer software created by Defendants through the violation of Cisco's rights, referred to as "VRP," and the infringing user manuals created by Defendants through the violation of Cisco's rights can be downloaded by residents of this district through the Huawei website.

- d. Huawei operates a research and development facility in this district, in Plano, and has actively recruited residents of this district and elsewhere for employment at that facility.
- e. Huawei has incorporated a subsidiary in Texas (FutureWei) for the purpose of doing business in the United States. The FutureWei sales office in Plano, Texas promotes and sells the infringing routers which are the subject of this action and otherwise conducts business in this judicial district.
- f. Huawei has created a California subsidiary (Huawei America) for the purpose of doing business in the United States. Huawei America also maintains a sales office in Plano, Texas, through which it regularly engages in activities to promote and sell the infringing routers and otherwise conducts business in this judicial district.
- g. Huawei, FutureWei and Huawei America are accused of committing a number of illegal acts and infringements of Cisco's intellectual property, the harmful effect of which is felt in this judicial district where Cisco sells a substantial volume of products and maintains a substantial research and development facility.
- 8. The Court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331, 1338(a) and (b), and 1367 and the doctrine of supplemental jurisdiction.
- 9. Venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391 and 1400 because (1) Huawei is a foreign corporation subject to personal jurisdiction in this district, (2) Defendants reside and may be found in this judicial district, (3) the acts of infringement and misappropriation alleged herein were committed in this judicial district, (4) Defendants have a regular and established place of business in this district, and/or (5) a substantial part of the events giving rise to the claims occurred in this judicial district.

IV. FACTUAL BACKGROUND

10. Cisco provides a broad line of hardware and software solutions for transporting data, voice, and video over networks and throughout the Internet. Included in the equipment Cisco provides are network routers, switches, and devices that enable data and

information to be transported from one network to another – locally, regionally and internationally. Routers and switches are the backbone of Internet traffic, routing packets of data as they are transported from sender to recipient. For example, the transmission of an email message from Dallas, Texas to Hong Kong will pass through multiple routers or switches as the packets of information comprising the message pass from one network to another. The science of routing packets of data through networks is complex and challenging and requires tremendous innovation and technological development to assure that messages are sent quickly and securely and arrive at their intended destination. As a pioneer in this area, Cisco has achieved widespread renown for the technological superiority, convenience and security of its routers, which in turn has facilitated the amazing growth of computer networks and the Internet.

- substantial research and development investment. As a result of its endeavors, Cisco has created valuable intellectual property in the form of patents, copyrights, trademarks and trade secrets that protect the valuable technology it has created. Cisco is the owner of a number of key patents covering the operation of its routers and the particularized manner in which they function. One of the core technologies contained in every Cisco router is called the Cisco Internetwork Operating System ("IOS Software Programs"), a proprietary computer program that manages the routing of packets through the router or switch. The IOS Software Programs are the product of countless man-hours of software design and programming by Cisco employees and contractors.
- 12. Defendants recently introduced for sale in the United States a line of routers referred to as "Quidway routers" which, on information and belief, it has promoted as operating virtually identically as Cisco routers but costing less than Cisco routers. On information and belief, Huawei sells the same or similar infringing routers in a number of foreign countries, the exact identities of which Cisco expects to learn through discovery. On information and belief, Defendants promote their Quidway routers by claiming they can replace a Cisco router without any loss of performance or security. While Defendants' claim of interoperability are dubious, it is apparent that in their attempt to produce a Cisco "clone," Defendants engaged

in wholesale theft of Cisco's intellectual property. That theft includes the adoption of Cisco's patented processes, the systematic copying of Cisco's copyrighted Command Line Interface, the copying of Cisco's proprietary IOS source code, and the systematic copying of Cisco's user manuals. Huawei's Vice President, Fei Min, recently admitted that "all the world's leading equipment suppliers are our learning models." The evidence shows unequivocally that the "learning" was in fact blatant copying and misappropriation, undertaken in complete disregard of Cisco's intellectual property rights.

Cisco's Copyright Protection.

- registrations protecting Cisco's IOS Software Programs, its Command Line Interface, and its User Manuals. Cisco Technology is the owner of the registered copyrights in each of the following computer programs and their corresponding user manuals, each of which substantially consists of original material (hereafter referred to as "Cisco's Copyrighted Works"). The following Cisco's Copyrighted Works consist of their respective computer code ("IOS Software Programs"), the Command Line Interface and corresponding screen displays ("CLI"), and the corresponding IOS user manuals ("IOS Manuals"):
 - a. Cisco Internetwork Operating System Version 11.0, Reg. No.
 TXu-1-036-057 (Ex. A)
 - b. Cisco Internetwork Operating System Version 11.1, Reg. No. TXu-1-048-569 (supplementing TX-5-531-435) (Ex. B)
 - c. Cisco Internetwork Operating System Version 11.2, Reg. No. TXu-1-036-063 (Ex. C)
 - d. Cisco Internetwork Operating System Version 11.3, Reg. No.
 TXu-1-036-062 (Ex. D)
 - e. Cisco Internetwork Operating System Version 12.0, Reg. No. TXu-1-036-064 (Ex. E)

- f. Cisco Internetwork Operating System Version 12.1, Reg. No. TXu-1-036-066 (Ex. F)
- g. Cisco Internetwork Operating System Version 12.2, Reg. No. TXu-1-036-065 (Ex. G)
- 14. For each of the foregoing works, Cisco Technology complied in all respects with the Copyright Act and all other laws of the United States governing copyrights, and has received Certificates of Registration from the Register of Copyrights.

Copying of Command Line Interface.

- "Command Line Interface" or "CLI." The CLI is the user interface by which users of Cisco routers communicate with the routers. Just as a computer user must communicate instructions to a computer (e.g., copy a file), the Information Technology ("IT") manager must communicate with routers in order to configure and manage them. For Cisco routers the interaction between the IT manager and the router is facilitated by a unique Command Line Interface, an elaborate structure of textual commands that the IT manager must learn in order to "talk" to the router. Each command corresponds to a function that can be performed by the router. When the command is entered by the human operator, the router performs the function associated with that particular command.
- many years of creative endeavor. Other manufacturers of network routers have their own command line interfaces that differ from Cisco's, both in terms of the particular commands and in the organization of those commands. When developing a router interface, the software developer has a range of creative choices in deciding what textual commands to compose, the definitions assigned to the commands, and the overall structure of the interface. Cisco's CLI represents its own original expression of one way to provide this communication.
- 17. Defendants have engaged in wholesale copying of Cisco's CLI. Because the CLI can be visually observed during the operation of a router and is published in Cisco's user

manuals, Defendants would have had no difficulty in gaining access to the CLI. A comparison of the command line interface of the operating system for the Quidway routers, switches and other products that use VRP, and Cisco's CLI reveals repeated incidents of slavish copying. For example, the following chart shows two of the many areas in which commands were copied by Defendants.

CISCO'S IOS HSRP Commands	DEFENDANTS' VRP HSRP Commands
standby authentication	standby authentication
standby ip	standby ip
standby preempt	standby preempt
standby priority	standby priority
standby timers	standby timers
standby track	standby track
standby use-bia	standby use-bia
standby mac-address <address></address>	standby use-ovmac
show standby	show standby
debug standby	debug standby
PQ Commands	PQ Commands
priority-group	priority-group
priority-list default	priority-list default
priority-list interface	priority-list interface
priority-list protocol	priority-list protocol
priority-list queue-limit	priority-list queue-limit
show queuing priority	show queuing priority
debug priority-queue	debug priority

an IT manager familiar with the Cisco CLI would not have to be re-trained in order to operate one of Huawei's Quidway routers, switches or products that use VRP. As a result of its extensive copying of the Cisco CLI, Defendants can promote their Quidway routers, switches and products that use VRP by convincing Cisco customers that they will not have to learn a new command line interface if they purchase Defendants' products. On information and belief, Defendants have informed customers that IT managers familiar with Cisco routers will not need additional training to manage Defendants' products. As one Huawei distributor declared, he was "impressed by the ability of a Cisco-trained engineer to take a Huawei product out of the box and use it." By choosing copyright infringement over independent development, Defendants are attempting to compete with Cisco by stealing Cisco's innovations instead of creating their own as well as avoiding the process of training potential users in a separate interface.

Copying of IOS Source Code.

- 19. Cisco is informed and believes and therefore alleges that Defendants have copied substantial portions of the IOS Software Programs source code. The operating system for the Quidway routers is known as "VRP," which stands for Versatile Routing Platform. The VRP program contains telltale similarities to the IOS Software Programs indicating that Defendants had access to the proprietary IOS Software Programs source code and used some or all of the source code in the creation of VRP.
- 20. The IOS Software Programs source code contains thousands of "text strings," distinctive textual statements written into the software by the programmers to convey information about the tasks to be performed by the software. Software which is independently developed will have unique text strings organized in a unique sequence or order. An analysis of Defendants' VRP code reveals that it contains large portions of text strings that are identical or substantially similar to the text strings from the IOS Software Programs, both in terms of the phrasing of the text strings and the sequence in which they appear. This level of identicality cannot be explained by either coincidence or independent development on the part of Huawei. It

points inescapably to one conclusion: Defendants had access to Cisco's proprietary IOS source code and copied that source code in the creation of Defendants' VRP.

- 21. At various points in time, the IOS Software Programs have had minor bugs that do not affect the fundamental functions of the program but represent idiosyncratic ways in which the program was written. Because they stand as unusual anomalies, these bugs serve as telltale fingerprints if they appear in other computer programs. Just as a school teacher can determine copying from the existence of a shared mistake among student papers, Cisco has discovered the presence of a "bug" in the Defendants' VRP software, which can only be explained by Defendants' unlawful access to and use of the IOS Software Programs source code.
- 22. Cisco has never made its IOS source code available to Defendants nor has it ever authorized anyone else to do so. Cisco is informed and believes and therefore alleges that Defendants obtained access to Cisco's IOS source code or portions thereof by improper means, that Defendants had reason to know that the source code was confidential to Cisco, and that Defendants had reason to know that their access to the source code was not authorized by Cisco. On information and belief, Defendants have exercised dominion and control over Cisco's IOS source code, which is in the form of one or more computer files (i.e., one or more documents), in an unlawful and unauthorized manner to the exclusion of and inconsistent with Cisco's rights. Defendants' possession of Cisco's IOS source code is tantamount to a refusal after demand.

Copying of Cisco's User Manuals.

- 23. Cisco provides the IOS Manuals to its customers to assist them in the operation of Cisco's routers. These manuals describe in detail the operation of the Cisco routers, the CLI and how to configure the routers for use in network operation. Cisco has invested thousands of man-hours in the preparation of the IOS Manuals, each of which is protected from unlawful copying under the Copyright Laws of the United States and other countries.
- 24. Defendants make available to customers and prospective customers user manuals that explain the function of its Quidway routers, switches, and other products that use VRP. In creating Defendants' user manuals, Defendants have copied extensively from the IOS

Manuals. In many cases, Defendants have copied whole paragraphs of text from the IOS Manuals, sometimes changing a word here or there in an attempt to mask their flagrant plagiarism. Defendants also have copied the organization and structure of the IOS Manuals so that the overall appearance of Defendants' manuals is substantially similar to the IOS Manuals. Attached as Exhibit H is an example of Defendants' copying of Cisco's copyrighted user manuals.

Patent Infringement.

25. In addition to the unlawful conduct described above, Defendants also have infringed Cisco's patented processes and methods in their attempt to create a router that replicates the functionality of Cisco's routers. In particular, Defendants have infringed no less than five Cisco patents through their incorporation of patented and proprietary Cisco technology in Quidway routers, switches, and other network devices that use VRP. These infringements were blatant and willful and were part of Defendants' overall plan to misappropriate Cisco's technology.

Adoption of Cisco's Nomenclature and Model Numbers.

- 26. In addition to the theft of Cisco's technology, Defendants have taken steps to mislead customers into believing that their Quidway routers are comparable to and completely interchangeable with Cisco routers.
- 27. Defendants have adopted a product numbering scheme for their router products that is substantially the same as Cisco's numbering scheme. Defendants have adopted other Cisco nomenclature as well, such as Cisco's acronym for its security products (i.e., "SAFE"). Huawei refers to its security products as SAFE. The title Cisco applies to engineers who are certified in operating Cisco's routers, "Certified Cisco Internetworking Experts" or "CCIE" has also been appropriated by Defendants in their use of the term "Huawei Certified Internetworking Experts" or "HCIE." Given the wide range of model numbers and nomenclature from which Defendants could have chosen, their decision to mimic Cisco's naming conventions is further evidence of Defendants' unlawful scheme to knock off Cisco's technology and mislead

customers into believing that the products are interchangeable without any loss of performance, security or reliability.

V. COUNT ONE

(Patent Infringement—'032 Patent)

- 28. Plaintiff Cisco realleges and repeats the allegations of paragraphs 1 through 27 above.
- 29. On February 11, 1992, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 5,088,032 (the "'032 patent") entitled "METHOD AND APPARATUS FOR ROUTING COMMUNICATIONS AMONG COMPUTER NETWORKS." Cisco Technology holds legal title to the '032 patent. By virtue of a license, Cisco Systems has all substantial rights in the '032 patent, including the right to sue for infringement of the '032 patent.
- 30. Defendants have been and are infringing the '032 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '032 patent.
- 31. Defendants are contributorily infringing the '032 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in the United States materials and/or apparatus for use in practicing the inventions set forth in the '032 patent, that they know to be especially made or especially adapted for use in infringement of the invention embodied in the '032 patent. On information and belief, these materials and/or apparatus have no substantial non-infringing use in commerce.
- 32. Defendants are inducing infringement of the '032 patent within this district and elsewhere in the United States by instructing in the use of materials and/or apparatus that infringe one or more of the claims of the '032 patent.

VI. COUNT TWO

(Patent Infringement—'599 Patent)

- 33. Plaintiff Cisco realleges and repeats the allegations of paragraphs 1 through 32 above.
- 34. On December 5, 1995, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 5,473,599 (hereinafter the "'599 patent"), entitled "STANDBY ROUTER PROTOCOL." Cisco Technology holds legal title to the '599 patent. By virtue of a license, Cisco Systems has all substantial rights in the '599 patent, including the right to sue for infringement of the '599 patent.
- 35. Defendants have been and are infringing the '599 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '599 patent.
- 36. Defendants are contributorily infringing the '599 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in the United States materials and/or apparatus for use in practicing the inventions set forth in the '599 patent, that they know to be especially made or especially adapted for use in infringement of the inventions embodied in the '599 patent. On information and belief, these materials and/or apparatus have no substantial non-infringing use in commerce.
- 37. Defendants are inducing infringement of the '599 patent within this district and elsewhere in the United States by instructing in the use of materials and/or apparatus that infringe one or more of the claims of the '599 patent.

VII. COUNT THREE

(Patent Infringement—'704 Patent)

- 38. Plaintiff Cisco realleges and repeats the allegations of paragraphs 1 through 37 above.
- 39. On May 21, 1996, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 5,519,704 (hereinafter the "'704 patent"), entitled

"RELIABLE TRANSPORT PROTOCOL FOR INTERNETWORK ROUTING." Cisco Technology holds legal title to the '704 patent. By virtue of a license, Cisco Systems has all substantial rights in the '704 patent, including the right to sue for infringement of the '704 patent.

- 40. Defendants have been and are infringing the '704 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '704 patent.
- 41. Defendants are contributorily infringing the '704 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in the United States materials and/or apparatus for use in practicing inventions set forth in the '704 patent, that they know to be especially made or especially adapted for use in infringement of the inventions embodied in the '704 patent. On information and belief, these materials and/or apparatus have no substantial non-infringing use in commerce.
- 42. Defendants are inducing infringement of the '704 patent within this district and elsewhere in the United States by instructing in the use of materials and/or apparatus that infringe one or more of the claims of the '704 patent.

VIII. COUNT FOUR

(Patent Infringement—'718 Patent)

- 43. Plaintiff Cisco realleges and repeats the allegations of paragraphs 1 through 42 above.
- 44. On August 1, 2000, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 6,097,718 (hereinafter the "'718 patent"), entitled "SNAPSHOT ROUTING WITH ROUTE AGING." Cisco Technology holds legal title to the '718 patent. By virtue of a license, Cisco Systems has all substantial rights in the '718 patent, including the right to sue for infringement of the '718 patent.
- 45. Defendants have been and are infringing the '718 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '718 patent.

- 46. Defendants are contributorily infringing the '718 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in the United States materials and/or apparatus for use in practicing the inventions set forth in the '718 patent, that they know to be especially made or especially adapted for use in infringement of the inventions embodied in the '718 patent. On information and belief, these materials and/or apparatus have no substantial non-infringing use in commerce.
- 47. Defendants are inducing infringement of the '718 patent within this district and elsewhere in the United States by instructing in the use of materials and/or apparatus that infringe one or more of the claims of the '718 patent.

IX. COUNT FIVE

(Patent Infringement—'251 Patent)

- 48. Plaintiff Cisco realleges and repeats the allegations of paragraphs 1 through 47 above.
- 49. On December 4, 2001, the United States Patent and Trademark Office duly and legally issued United States Letters Patent No. 6,327,251 (hereinafter the "'251 patent"), entitled "SNAPSHOT ROUTING." Cisco Technology holds legal title to the '251 patent. By virtue of a license, Cisco Systems has all substantial rights in the '251 patent, including the right to sue for infringement of the '251 patent.
- 50. Defendants have been and are infringing the '251 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale products that infringe one or more of the claims of the '251 patent.
- 51. Defendants are contributorily infringing the '251 patent within this district and elsewhere in the United States by making, using, selling, importing, distributing or offering for sale in the United States materials and/or apparatus for use in practicing the inventions set forth in the '251 patent, that they know to be especially made or especially adapted for use in infringement of the inventions embodied in the '251 patent. On information and belief, these materials and/or apparatus have no substantial non-infringing use in commerce.

52. Defendants are inducing infringement of the '251 patent within this district and elsewhere in the United States by instructing in the use of materials and/or apparatus that infringe one or more of the claims of the '251 patent.

X. COUNT SIX

(Copyright Infringement – IOS source code and CLI)

- 53. Cisco alleges and incorporates by reference the allegations in paragraphs 1 through 52 above.
- 54. Defendants have infringed and, unless enjoined in this action, will continue to infringe Cisco's Copyrighted Works by, among other things:
 - (a) Copying substantial portions of the code of the IOS Software Programs;
 - (b) Copying substantial portions of the CLI;
 - (c) Distributing works containing material copied from the IOS Software Programs and CLI; and
 - (d) Creating derivative works based on the IOS Software Programs and CLI.
- CLI and the creation of unauthorized derivative works constitute willful infringement under the Copyright Act. By reason of Defendants' acts of infringement, Cisco has suffered and will continue to suffer, unless Defendants' infringement is enjoined, irreparable injury that cannot be adequately remedied at law. Because of such willful infringement, Cisco is entitled to enhanced damages and an award of its attorneys fees and costs pursuant to the Copyright Act.
- Programs and CLI and the creation of unauthorized derivative works constitute willful infringement under the copyright laws (or laws extending similar protection) of the foreign countries in which Defendants have copied, sold or distributed their infringing works. By reason of these acts of infringement, Cisco has suffered and will continue to suffer, unless Defendants'

infringement is enjoined, irreparable injury that cannot be adequately remedied at law. The exact foreign countries in which defendants have copied, sold or distributed their infringing works, and the extent of that illegal conduct, are not presently known to Cisco and can be learned only upon appropriate discovery from defendants. Cisco reserves the right, upon obtaining relevant discovery from defendants on their infringing conduct in foreign countries, to amend this Complaint to assert claims for violations of foreign copyright laws (or laws extending similar protection) and obtaining appropriate remedies for defendants' violations of those laws.

XI. COUNT SEVEN

(Copyright Infringement – IOS Manuals)

- 57. Cisco alleges and incorporates by reference the allegations in paragraphs 1 through 56 above.
- 58. Defendants have infringed and, unless enjoined in this action, will continue to infringe Cisco's Copyrighted Works by, among other things:
 - (a) Copying substantial portions of the IOS Manuals;
 - (b) Distributing works containing material copied from the IOS Manuals; and
 - (c) Creating derivative works based on the IOS Manuals.
- 59. Defendants' copying and distribution of the IOS Manuals and the creation of derivative works are not authorized by Cisco and constitute willful infringement under the Copyright Act. By reason of Defendants' acts of infringement, Cisco has suffered and will continue to suffer, unless Defendants' infringement is enjoined, irreparable injury that cannot be adequately remedied at law. Because of such willful infringement, Cisco is entitled to enhanced damages and an award of its attorneys' fees and costs pursuant to the Copyright Act.
- 60. Defendants' unauthorized copying and distribution of the IOS Manuals and the creation of derivative works constitute willful infringement under the copyright laws (or laws extending similar protection) of the foreign countries in which Defendants have copied, sold or distributed their infringing works. By reason of these acts of infringement, Cisco has

suffered and will continue to suffer, unless Defendants' infringement is enjoined, irreparable injury that cannot be adequately remedied at law. The exact foreign countries in which defendants have copied, sold or distributed their infringing works, and the extent of that illegal conduct, are not presently known to Cisco and can be learned only upon appropriate discovery from defendants. Cisco reserves the right, upon obtaining relevant discovery from defendants on their infringing conduct in foreign countries, to amend this Complaint to assert claims for violations of foreign copyright laws (or laws extending similar protection) and obtaining appropriate remedies for defendants' violations of those laws.

XII. COUNT EIGHT

(Trade Secret Misappropriation)

- 61. Cisco alleges and incorporates by reference the allegations of paragraphs 1 through 60 above.
- 62. Cisco maintains the source code to its IOS Software Programs as trade secrets and has taken reasonable measures to preserve the secrecy of the source code. The source code derives independent economic value from not being generally known to the public or to other persons who can obtain economic value from its disclosure or use.
- of Cisco's IOS source code through improper means and/or a breach of a confidential relationship. Defendants gained such access with knowledge, or at least reason to know, that the source code is confidential to Cisco. Defendants lacked authorization to use the source code for any purpose.
- 64. On information and belief, Defendants misappropriated Cisco's trade secrets by making use of the IOS Software Programs source code in order to create their VRP operating system by, among other things, using the confidential source code to learn confidential information about the structure and operation of the IOS Software Programs, patterning their own development of VRP on what they learned from Cisco's confidential information, and copying portions of the source code for incorporation into the VRP operating system.

Defendants further misappropriated Cisco's trade secrets by, on information and belief, copying portions of the IOS Software Programs source code for incorporation into their VRP operating system.

- the laws of other states in which acts of misappropriation have occurred. As a direct and proximate result of Defendants' misappropriation of Cisco's trade secrets, Defendants have been unjustly enriched and Cisco has sustained damages in an amount to be proved at trial. Cisco has also suffered irreparable injury as a result of Defendants' misappropriation and will continue to suffer irreparable injury that cannot be adequately remedied at law unless Defendants are enjoined from utilizing the fruits of their misappropriation or engaging in further acts of misappropriation.
- 66. Each of the acts of misappropriation was done willfully and maliciously by Defendants, entitling Cisco to punitive damages to be proved at trial.
- of those laws protecting trade secrets in foreign countries in which Defendants have taken, used, disclosed or profited from Cisco's trade secrets. The identity of those foreign countries in which defendants have taken, used, disclosed or profited from Cisco's trade secrets, and the extent of such illegal conduct, are not presently known to Cisco and can be learned only through appropriate discovery from Defendants. Cisco reserves the right, upon obtaining relevant discovery from Defendants, to amend this complaint to assert claims for trade secret misappropriation and/or theft under the laws of foreign countries, and to obtain appropriate remedies for Defendants' illegal acts under the laws of foreign countries.

XIII. COUNT NINE

(Common Law Misappropriation)

68. Cisco alleges and incorporates by reference the allegations of paragraphs 1 through 67 above.

- 69. The CLI is a critical component of Cisco's business and represents enormous commercial value to the company. Cisco has invested substantial time and expense in the development of the CLI, a development effort that has entailed thousands of man hours of work spread over an extended period of time. Cisco also has invested substantial time and expense in training its customers on the use of the CLI.
- 70. By replicating the structure, organization and commands of CLI, Defendants have misappropriated the substantial commercial value of the CLI without the consent or authorization of Cisco.
- 71. By this misappropriation, Defendants are attempting to reap the benefits of Cisco's effort without committing the time and resources to independently develop an interface. Because they have avoided the expense of creating their own user interface, Defendants are able to price their routers at levels that would not be possible if Defendants were not obtaining a free ride on the basis of Cisco's efforts.
- 72. As a direct and proximate result of Defendants' misappropriation, Cisco has sustained damages in an amount to be proved at trial. Defendants' misappropriation has caused, and unless enjoined, will continue to cause, substantial competitive injury to Cisco.

XIV. COUNT TEN

(False Representation – Lanham Act § 43(a))

- 73. Cisco repeats and incorporates the allegations in paragraphs 1 through 72 above.
- 74. On information and belief, Defendants have represented to customers and prospective customers that their Quidway routers are interoperable with Cisco routers without any loss or performance, security or convenience. Such representations constitute a false and misleading characterization of the qualities and characteristics of Defendants' products in violation of Section 43(a) of the Lanham Act, 15 U.S.C. § 1125(a).

- 75. As a direct and proximate result of Defendants' misrepresentations of fact, Cisco has suffered and will continue to suffer irreparable injury unless Defendants are enjoined from engaging in their unlawful conduct.
- 76. As a direct and proximate result of Defendants' passing off, Cisco has suffered and will continue to suffer irreparable injury unless Defendants are enjoined from engaging in their unlawful conduct.

XV. COUNT ELEVEN

(Unfair Competition - Texas Common Law and Lanham Act § 44)

- 77. Cisco repeats and incorporates the allegations in paragraphs 1 through 76 above.
- 78. Defendants have engaged in unfair competition under Texas common law and under Lanham Act § 44 by, among other things, misappropriating Cisco's trade secrets, misappropriating the commercial value of the CLI, making false representations regarding the qualities and characteristics of their Quidway routers, making claims of "full intellectual property rights" under Cisco IP and mimicking Cisco's nomenclature and product numbering system to mislead customers and potential customers regarding the alleged interoperability of Quidway routers.
- 79. As a direct and proximate result of Defendants' acts of unfair competition, Defendants have been unjustly enriched and Cisco has sustained damages in an amount to be proved at trial. Cisco has also suffered irreparable injury as a result of Defendants' unfair competition and will continue to suffer irreparable injury unless Defendants are enjoined from utilizing the fruits of their unfair competition or engaging in further acts of unfair competition.
- 80. Each of the acts of unfair competition were done willfully and maliciously by Defendants, entitling Cisco to punitive damages to be proved at trial.

XVI. COUNT TWELVE

(Conversion)

- 81. Cisco repeats and incorporates the allegations in paragraphs 1 through 80 above.
- by unlawfully acquiring possession of one or more computer files (i.e., one or more documents) containing Cisco's computer source code and exercising dominion and control over the computer source code in an unlawful and unauthorized manner to the exclusion of and inconsistent with Cisco's rights, tantamount to a refusal after demand.
- As a direct and proximate result of Defendants' acts of conversion, Cisco has sustained damages in an amount to be proved at trial. Cisco has also suffered irreparable injury as a result of Defendants' conversion and will continue to suffer irreparable injury unless Defendants are enjoined from utilizing the fruits of their conversion.
- 84. Each of the acts of conversion were done willfully and maliciously by Defendants, entitling Cisco to punitive damages to be proved at trial.

XVII. DEMAND FOR TRIAL BY JURY

85. Cisco hereby demands a jury trial for all issues deemed to be triable by jury.

XVIII. PRAYER FOR RELIEF

WHEREFORE, Cisco respectfully requests that this Court enter judgment in its favor and against Defendants and grant the following relief:

- A. A judgment that Defendants have infringed the patents in suit.
- B. A judgment that Defendants' infringement of the patents in suit has been willful.
- C. A preliminary and permanent injunction, pursuant to 35 U.S.C. § 283, enjoining Defendants, and all persons in active concert or participation with them, from any

further acts of infringement, contributory infringement or inducement of infringement of the patents in suit.

- D. An order, pursuant to 35 U.S.C. § 284, awarding Cisco damages adequate to compensate Cisco for Defendants' infringement of the patents in suit, in an amount to be determined at trial, but in no event less than a reasonable royalty.
- E. An order, pursuant to 35 U.S.C. § 284, trebling all damages awarded to Cisco based on Defendants' willful infringement of the patents in suit.
- F. An order, pursuant to 35 U.S.C. § 285, finding that this is an exceptional case and awarding to Cisco its reasonable attorneys fees incurred in this action.
- G. A preliminary and permanent injunction enjoining Defendants, and all persons in active concert or participation with them, from infringing or contributorily infringing Cisco's copyrights in the IOS Software Programs, CLI or IOS Manuals.
- H. An order requiring Defendants to account for all gains, profits and advantage derived from their infringement of Cisco's Copyrighted Works.
- I. An order awarding Cisco damages against Defendants equal in amount to the damages sustained by Cisco and the profits earned by Defendants from their infringement pursuant to 17 U.S.C. § 504(b).
- J. An order awarding Cisco statutory damages pursuant to 17 U.S.C. § 504(c).
- K. An order awarding Cisco its attorneys fees and costs on account of Defendants' infringement pursuant to 17 U.S.C. § 505.
- L. An order requiring the impoundment and destruction of all routers, computer programs and manuals, or any version or modification thereof, found to constitute an infringement of Cisco's copyrights or trade secrets.
- M. A preliminary and permanent injunction enjoining Defendants, and all persons in active concert or participation with them, from misappropriating or threatening to misappropriate Cisco's trade secrets or misappropriating the commercial value of the CLI.

- N. A preliminary and permanent injunction enjoining Defendants, and all persons in active concert or participation with them, from making false and misleading statements regarding the performance, characteristics or interoperability of Defendants' Quidway routers.
- O. A preliminary and permanent injunction enjoining Defendants, and all persons in active concert or participation with them, from using, selling, offering for sale, marketing, distributing or placing in interstate commerce their Quidway routers, switches, or other products that use VRP, and the VRP operating system itself.
- P. An order awarding Cisco damages in an amount to be determined at trial arising from Defendants' trade secret misappropriation, common law misappropriation, false and misleading representations regarding their Quidway routers, switches, or other products that use VRP, and Defendants' unfair competition.
- Q. An order requiring Defendants to disgorge all ill-gotten profits earned from their unlawful conduct, together with restitution to plaintiffs arising from Defendants' unlawful conduct.
- R. An order awarding Cisco the unjust enrichment gained by Defendants from their unlawful conduct.
- S. An order awarding Cisco punitive damages in an amount to be determined at trial on account of Defendants' wanton, willful and malicious tortious conduct.
 - T. An order awarding Cisco its attorneys fees and costs in this action.
 - U. Such other and further relief as this Court may deem just and proper.

Dated: January 22, 2003

Respectfully submitted,

Sam F. Baxter

Attorney-In-Charge for Plaintiff State Bar No. 01938000

McKool Smith, P.C. P.O. Box O 505 East Travis Street, Suite 105 Marshall, TX 75670 Telephone: (903) 927-2111

Facsimile: (903) 927-2622

Jeffrey R. Bragalone State Bar No. 02885775

McKool Smith, P.C. 300 Crescent Court, Suite 1500 Dallas, TX 75201 Telephone (214) 978-4000 Facsimile: (214)978-4044

OF COUNSEL:

ORRICK, HERRINGTON & SUTCLIFFE LLP Chris R. Ottenweller (Ca. State Bar No. 73649) G. Hopkins Guy (Ca. State Bar No. 124811) 1000 Marsh Road Menlo Park, CA 94025 Telephone: (650) 614-7400 Facsimile: (650) 614-7401

EXHIBIT A

CERTIFICATE OF REGISTRATION



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This Certificate issued under the seal of the Copyright Office in accordance with title 17, United States Code, attests that registration has been made for the work identified below. The information on this certificate has been made a part of the Copyright Office records.

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- If at all possible, try to fit the information called for into the spaces provided on the basic form. If you do not have enough space for all the information you need to give on the basic form, use
- this Continuation Sheet and submit it with the basic form.
- If you submit this Continuation Sheet, clip (do not tape or staple) it to the basic form and fold the two together before submitting them.
- Space A of this sheet is intended to identify the basic application.

Space B is a continuation of Space 2 on the basic application. Space B is not applicable

Space C (on the reverse side of this sheet) is for the continuation of Spaces 1, 4, or 6 on the basic application or for the continuation of Space 1 on any of the three Short Forms PA, TX, or VA.

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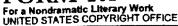
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Exhibit H:

Manual Comparison

Huawei "ip address" Command (1 of 2)

User Manual – Command Reference (Volume 1) Versatile Routing Platform

Chapter 1

IP Address Configuration Commands

ip address

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1.1.1 ip address

To set a primary or secondary IP address for an interface, use the **ip address** command. To remove an IP address or disable IP processing, use the **no** form of this command.

ip address ip-address mask [secondary]

no ip address [ip-address]

Syntax Description

ip-address IP address.

net-mask mask for the associated IP subnet. It is all in decimal format divided by dots. If there is no *ip-address* in the command **no ip address**, delete all the ip-address of the interface.

secondary specifies that the configured address is a secondary IP address. If this keyword is omitted, the configured address is the primary IP address.

Default

No IP address is defined for the interface

Huawei Command Reference, Version 1.5, Volume 1, Module 04, pp. 1-1 to 1-2

http://datacomm.huawei.com/english/index.html

[Select "Document Center" link; then select "VRP Command and Configuration Manual" link; then select "Command ReferenceV1.5"; then select "Command Reference(V1.5)-Volume 1" link.]

Cisco "ip address". Command (1 of 2)

ip address

To set a primary or secondary IP address for an interface, use the **ip address** interface configuration command. To remove an IP address or disable IP processing, use the **no** form of this command.

ip address ip-address mask [secondary]

no ip address ip-address mask [secondary]

Syntax Description

ip-address P address.

mask Mask for the associated IP subnet.

secondary (Optional) Specifies that the configured address is a secondary IP address.

If this keyword is omitted, the configured address is the primary IP address.

Default

No IP address is defined for the interface.

Cisco Network Protocols Command Reference, Part 1, Version 11.2, IP Commands, pp. V-57 to V-58

 $http://www.cisco.com/en/US/products/sw/iosswrel/ps1824/products_command_reference_chapter09186a0080080d98.html$

[Select "ip address" link or select PDF file for entire document and go to cited pages]

Huawei "ip address". Command (2 of 2)

Cisco "ip address". Command (2 of 2)

User Manual – Command Reference (Volume 1) Versatile Routing Platform

Chapter 1

IP Address Configuration Commands

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ip address

Command Mode

Interface configuration mode

Usage Guideline

An interface can have one primary IP address and multiple secondary IP addresses. Packets generated by the software always use the primary IP address. Therefore, all routers and access servers on a segment should share the same primary network number.

Hosts can determine subnet masks using the Internet Control Message Protocol (ICMP) Mask Request message. Routers respond to this request with an ICMP Mask Reply message.

You can disable IP processing on a particular interface by removing its IP address with the no ip address command. If the software detects another host using one of its IP addresses, it will print an error message on the console.

The optional keyword secondary allows you to specify an unlimited number of secondary addresses. Secondary addresses are treated like primary addresses, except the system never generates datagrams other than routing updates with secondary source addresses. IP broadcasts and ARP requests are handled properly, as are interface routes in the IP routing table.

Huawei Command Reference, Version 1.5, Volume 1, Module 04, pp. 1-1 to 1-2

http://datacomm.huawei.com/english/index.html

[Select "Document Center" link; then select "VRP Command and Configuration Manual" link; then select "Command ReferenceV1.5"; then select "Command Reference(V1.5)-Volume 1" link.]

Command Mode

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Interface configuration

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

An interface can have one primary IP address and multiple secondary IP addresses. Packets generated by the Cisco IOS software always use the primary IP address. Therefore, all routers and access servers on a segment should share the same primary network number.

Hosts can determine subnet masks using the Internet Control Message Protocol (ICMP) Mask Request message. Routers respond to this request with an ICMP Mask Reply message.

You can disable IP processing on a particular interface by removing its IP address with the **no ip address** command. If the software detects another host using one of its IP addresses, it will print an error message on the console.

The optional keyword **secondary** allows you to specify an unlimited number of secondary addresses. Secondary addresses are treated like primary addresses, except the system never generates datagrams other than routing updates with secondary source addresses. IP broadcasts and ARP requests are handled properly, as are interface routes in the IP routing table.

Secondary IP addresses can be used in a variety of situations. The following are the most common applications:

- There may not be enough host addresses for a particular network segment. For example, your
 subnetting allows up to 254 hosts per logical subnet, but on one physical subnet you need to have
 300 host addresses. Using secondary IP addresses on the routers or access servers allows you to
 have two logical subnets using one physical subnet.
- Many older networks were built using Level 2 bridges. The judicious use of secondary addresses
 can aid in the transition to a subnetted, router-based network. Routers on an older, bridged
 segment can be easily made aware that there are many subnets on that segment.

Cisco Network Protocols Command Reference, Part 1, Version 11.2, IP Commands, pp. V-57 to V-58

http://www.cisco.com/en/US/products/sw/iosswrel/ps1824/products_command_reference_chapter09186a0080080d98.html

[Select "ip address" link or select PDF file for entire document and go to cited pages]

Huawei "ip unnumbered" Command (1 of 2)

User Manual – Command Reference (Volume 1) Versatile Routing Platform

Chapter 1

IP Address Configuration Commands

ip unnumbered

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1.1.4 ip unnumbered

To enable IP processing on a serial interface without assigning an explicit IP address to the interface, use the **ip unnumbered** command. To disable the IP processing on the interface, use the **no** form of this command.

ip unnumbered interface-type interface-number

no ip unnumbered

Syntax Description

interface-type type of another interface on which the router has an assigned IP address.

interface-number number of another interface on which the router has an assigned IP address.

Default

Disabled

Command Mode

Interface configuration mode

Huawei Command Reference, Version 1.5, Volume 1, Module 04, pp. 1-3 to 1-4

http://datacomm.huawei.com/english/index.html

[Select "Document Center" link; then select "VRP Command and Configuration Manual" link; then select "Command ReferenceV1.5"; then select "Command Reference(V1.5)-Volume 1" link.]

Cisco "ip unnumbered" Command (1 of 2)

ip unnumbered

To enable IP processing on a serial interface without assigning an explicit IP address to the interface, use the **ip unnumbered** interface configuration command. To disable the IP processing on the interface, use the **no** form of this command.

ip unnumbered type number

no ip unnumbered type number

Syntax Description

type number

Type and number of another interface on which the router has an assigned IP address. It cannot be another unnumbered

Default

Disabled

Command Mode

Interface configuration

Cisco Network Protocols Command Reference, Part 1, Version 11.2, IP Commands, pp. V-147 to V-148

http://www.cisco.com/cn/US/products/sw/iosswrel/ps1824/products_command_reference_chapter09186a00800800498.html

Select "ip unnumbered" link, or select PDF icon for entire document and go to cited pages]

Huawei "ip unnumbered" Command (2 of 2)

Jser Manual - Command Reference (Volume 1) Versatile Routing Platform

Chapter 1

IP Address Configuration Commands

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Usage Guideline

Mhenever the unnumbered interface generates a packet (for example, for a routing packet. It also uses the address of the specified interface in determining which routing processes are sending updates over the unnumbered interface. Restrictions include update), it uses the address of the specified interface as the source address of the IP the following:

- interfaces can be unnumbered. It is not possible to use this interface configuration Serial interfaces using HDLC, PPP, Balanced (LAPB), and Frame Relay encapsulations, as well as Serial Line Internet Protocol (SLIP) and tunnel command with X.25 or Switched Multimegabit Data Service (SMDS) interfaces.
 - You cannot use the ping command to determine whether the interface is up, because the interface has no address. Simple Network Management Protocol (SNMP) can be used to remotely monitor interface status.
 - You cannot netboot a runnable image over an unnumbered serial interface.
 - You cannot support IP security options on an unnumbered interface. დ. ₹

The interface you specify by the type and number arguments must be enabled (listed as "up" in the show interfaces command display).

The interface-type interface-number cannot be another unnumbered interface.

Example

Allow IP unnumbered from Ethernet 0 encapsulated with PPP.

Quidway(config-if-Serial0)# ip unnumbered ethernet 0

Related Command

ip proxy-arp

Huawei Command Reference, Version 1.5, Volume 1, Module 04, pp. 1-3 to 1-4

http://datacomm.huawei.com/english/index.html

[Select "Document Center" link; then select "VRP Command and Configuration Manual" link; then select "Command ReferenceV1.5"; then select "Command Reference(V1.5)-Volume 1" link.]

Cisco "ip unnumbered" Command (2 of 2)



ip unnumbered

Usage Guidelines

This command first appeared in Cisco IOS Release 10.0.

Whenever the unnumbered interface generates a packet (for example, for a routing update), it uses the address of the specified interface as the source address of the IP packet. It also uses the address of the specified interface in determining which routing processes are sending updates over the unnumbered interface. Restrictions include the following:

- Serial interfaces using HDLC, PPP, Link Access Procedure, Balanced (LAPB), and Frame Relay encapsulations, as well as Serial Line Internet Protocol (SLIP) and tunnel interfaces can be unnumbered. It is not possible to use this interface configuration command with X.25 or Switched Multimegabit Data Service (SMDS) interfaces.
- You cannot use the ping EXEC command to determine whether the interface is up, because the interface has no address. Simple Network Management Protocol (SNMP) can be used to remotely monitor interface status.
- You cannot netboot a runnable image over an unnumbered serial interface.
- You cannot support IP security options on an unnumbered interface.

The interface you specify by the type and number arguments must be enabled (listed as "up" in the show interfaces command display).

unnumbered. This allows you to conform with RFC 1195, which states that IP addresses are not If you are configuring IS-IS across a serial line, you should configure the serial interfaces as required on each interface. Cisco Network Protocols Command Reference, Part 1, Version 11.2, IP Commands, pp. V-147 to V-148 http://www.cisco.com/en/US/products/sw/iosswrel/ps1824/products_command_reference_ chapter09186a0080080d98.html Select "ip unnumbered" link, or select PDF icon for entire document and go to cited pages

Huawei "ip tcp header-compression" Command (1 of 2)

Cisco "ip tcp header-compression" Command (1 of 2)

User Manual - Command Reference (Volume 1) Versatile Routing Platform

Chapter 2

IP Performance Configuration Commands

ip tcp header-compression

2.7 ip tcp header-compression

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To enable TCP header compression, use the ip tcp header-compression command. To disable compression, use the no form of this command.

To enable TCP header compression, use the ip tcp header-compression interface configuration

ip tcp header-compression

command. To disable compression, use the no form of this command.

ip tcp header-compression [passive]

ip tcp header-compression

no ip tcp header-compression

Default

Disabled

Command Mode

Interface configuration mode

packets on the same interface are compressed. If you do not specify the (Optional) Compresses outgoing TCP packets only if incoming TCP no ip tcp header-compression [passive] Syntax Description passive

Default

passive keyword, the Cisco IOS software compresses all traffic.

Disabled

Command Mode

Interface configuration

Huawei Command Reference, Version 1.5, Volume 1, Module 04, pp. 2-4 to 2-5

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Cisco Network Protocols Command Reference, Part 1, Version 11.2, IP Commands, pp. V-142 http://www.cisco.com/en/US/products/sw/iosswrel/ps1824/products_command_reference_ chapter09186a0080080d98.html Select "ip tcp header-compression" link, or select PDF file for entire document and go to cited page]

Huawei "ip tcp header-compression" Command (2 of 2)

User Manual – Command Reference (Volume 1) Versatile Routing Platform

Chapter 2

IP Performance Configuration Commands

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Usage Guideline

When running PPP in the lines of low speed WAN, the TCP header accounts for a large proportion in all the transmitting data, so TCP header-compression can be used to improve the efficiency of data transmission.

You can compress the headers of your TCP/IP packets in order to reduce the size of your packets. TCP header compression is supported on serial lines using Frame Relay, HDLC or Point-to-Point (PPP) encapsulation. You must enable compression on both ends of a serial connection. RFC 1144 specifies the compression process. Compressing the TCP header can speed up Telnet connections dramatically. In general, TCP header compression is advantageous when your traffic consists of many small packets, not for traffic that consists of large packets. Transaction processing (usually using terminals) tends to use small packets while file transfers use large packets. This feature only compresses the TCP header, so it has no effect on UDP packets or other protocol headers.

When compression is enabled, fast switching is disabled. This means that fast interfaces like T1 can overload the router. Consider your network's traffic characteristics before using this command.

Example

Enable TCP header-compression at the PPP interface Serial0.

Quidway(config-if-Serial0)# ip tcp header-compression

Related Command

encapsulation ppp

Huawei Command Reference, Version 1.5, Volume 1, Module 04, pp. 2-4 to 2-5

http://datacomm.huawei.com/english/index.html

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Cisco "ip tcp header-compression" Command (2 of 2)

ip tcp header-compression

Usage Guidelines



This command first appeared in Cisco IOS Release 10.0.8

You can compress the headers of your TCP/IP packets in order to reduce the size of your packets. TCP header compression is supported on serial lines using Frame Relay, HDLC or Point-to-Point (PPP) encapsulation. You must enable compression on both ends of a serial connection. RFC 1144 specifies the compression process. Compressing the TCP header can speed up Telnet connections dramatically. In general, TCP header compression is advantageous when your traffic consists of many small packets, not for traffic that consists of large packets. Transaction processing (usually using terminals) tends to use small packets while file transfers use large packets. This feature only compresses the TCP header, so it has no effect on UDP packets or other protocol headers.

When compression is enabled, fast switching is disabled. This means that fast interfaces like T1 can overload the router. Consider your network's traffic characteristics before using this command.

Example

In the following example, the first serial interface is set for header compression with a maximum of ten cache entries:

interface serial 0

ip tcp header-compression ip tcp compression-connections 10

To combression-connections

Related Command

ip tep compression-connections

n tep compression-connections

Cisco Network Protocols Command Reference, Part 1, Version 11.2, IP Commands, pp. V-142

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