Patent Protection for Computer Software in China

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Along with the rapid development of software industry, the kernel position of software in IT innovation becomes more conspicuous, and the relationship between software and hardware is profoundly revolutionized, with more and more innovative technologies achieved with innovations made in software. Whether and how to accord them the patent protection have long been a heatedly discussed issue in various countries, especially in recent years. In this article, an overview is presented on the present situation of patent protection accorded to computer software in China in relation to such aspects of requirements of technicality, types of protectable claims; and forms of drafted claims, examination is made as to the confusions about the patent protection of computer software in China and issues stemming therefrom, with our reflections given on how to address the confusions and issues.

IP protection for computer software in China

What is computer software? Under Articles 2 and 3 of the Computer Software Protection Regulations, the computer software as mentioned in these Regulations refers to computer programmes and their relevant files or documents. A computer programme refers to a coded instruction sequence that may be implemented by devices with informa-

tion processing capabilities, such as computers, or a symbolic instruction sequence or symbolic statement sequence which may be automatically converted into a coded instruction sequence for the purpose of achieving certain expected results. A file refers to literal description and chart used to describe the content, structure, design, functional performance, historical development, test findings and usage, such as programme design instructions, flowcharts, and users' manuals. Computer software is defined in the same way in Chapter 9 of Part II of the Guidelines for Patent Examination. In this article will be mainly discussed the protection of computer programmes in computer software, without distinguishing the two from one another.

Computer software includes underlying ideas, mathematical algorithm, processing steps and operation process, as well as upper lying expressions, such as source programmes, target programmes, and related files.

In China, a piece of computer software is susceptible to a variety of forms of IP protection as a patent, copyright, and trade secret.

The upper lying expressions of computer software are subject matter of copyright protection[2]. Under Articles 2 and 3 of the Computer Software Protection Regulations, the copyright protects source programmes, target programmes or related files. Meanwhile, Article 6 of the Computer Software Protection Regulations provides that "the protection of copyright in software under this Regulations shall not be extended to ideas, processing processes, operational methods or mathematical concepts for developing the software".

Underlying ideas, processing processes and operational methods are protected by patent. Article 2, paragraph two, of the Patent Law provides: "the 'Invention' refers to a new technical solution developed for a product, process or the improvement thereof". Chapter 9 of Part II of the Guidelines for Patent Examination has set forth special provisions in respect of examination of applications for patent for inventions relating to computer programmes, wherein only applications for patent for inventions relating to computer programmes constituting technical solutions are subject matter of patent protection. Specifically, if an application for patent for an invention relating to computer programme solves a technical problem by using technical means, and accordingly achieves corresponding technical effect, then the solution meets the technicality requirements, and is a technical solution mentioned in Article 2, paragraph two, of the Patent Law, so a subject matter susceptible to the patent protection. A computer programme defined by source or binary code is viewed as a rule and method of mental activity under Article 25, paragraph one (2), of the Patent Law, so not a subject matter under the patent protection.

Meanwhile, computer software, be it an expression of computer software *per se* or an idea, processing process, or an operational method embodied thereby, are susceptible to the protection as trade secret under the Unfair Competition Law so long as it meets the requirements for trade secret.

There is a view that it is enough for computer software to be protected under the Copyright Law and Unfair Competition Law, and it is unnecessary to put it under the patent protection. For us, the protection accorded to software innovations under the Copyright Law and Unfair Competition Law is by no means sufficient for the following reasons:

The Copyright Law protects only expressions of computer software, and the protection is not extended to ideas underlying it[3]. Any computer software a software developer independently developed without access to any other person's software does not constitute infringement of a copyrighted work even if the underlying idea is identical or the expressions are identical with or similar to another person's software. If a developer, having access to and knowledge of another person's software and the underlying ideas thereof, uses a programme language and structure different from said software, and achieves processing steps identical with the software, he does not infringe the person's copyright as he uses different expressions. This being the case, the protection accorded to innovative computer software under the Copyright Law is incomplete and weak.

What's more, it is often difficult to protect software innovations as trade secrets. For some software innovations, it is easy to discover the innovative underlying idea of computer software merely through watching the operation of the software programme without the need to look into the source or target code. Or the idea as embodied in software is made known by using the target code of the software through reverse engineering. Even if reverse engineering can be prohibited by virtue of a contract, the effect or validity of such contractual terms is, in most cases, uncertain within the legal framework in China, and rather limited in practial enforcement. Furthermore, it is often difficult to prove acts violating trade secret protection according to the current evidence rules in China.

Therefore, neither the Copyright Law nor Unfair Competition Law can effectively protect ideas underlying computer

software, and patent protection is indispensible for inventions relating to computer software.

Present situation of patent protection of inventions relating to computer software

1. Requiring three technical elements

To be susceptible to the patent protection, a subject matter is required to possess three technical elements: solving a technical problem, using technical means, and achieving technical effect. Chapter 9 of Part II of the Guidelines for Patent Examination provides: if the solution of an invention application relating to computer programmes involves the execution of computer programmes in order to solve technical problems, and reflects technical means in conformity with the laws of nature by computers running programmes to control and process external or internal objects, and thus technical effects in conformity with the laws of nature are obtained, the solution is a technical solution as provided for in Article 2, paragraph two, of the Patent Law and is the subject matter of patent protection. Otherwise, not.

It needs to be specially pointed out that Chapter 9 of Part II of the Guidelines for Patent Examination clearly provides that a solution relating to computer programme is not required to cover change of computer hardware. In other words, an innovative solution of pure software technology is susceptible to the patent protection in China, and it is not required for a claim to define the use of hardware. What's more, while clear basis is absent in the Guidelines for Patent Examination, the Patent Office, in its current practical examination, disallows a claim to be drafted in such a way as to cover combination of both software and hardware features. Also, an innovative solution of software, not meeting the three-technical-element requirement and being added with hardware device to execute the software in the patent application, does not constitute a "technical solution" as mentioned in Article 2, paragraph two, of the Patent Law.

For the technicality determination, it is generally believed that features relating to hardware, physics, physical effect (such as speed, power, dissipation or consumption), and logical expressions of physical entities are technical features while features related to commerce, currency, mathematics, display and ascethetics are non-technical features. However, determination of technical or non-technical features in invention-creations relating to computer programmes is by no means simple, precise, and in black and white contrast.

Take a solution for managing batches of money for example, the solution is to put certain fixed amount of cash on a weighing sensor to be recorded and displayed by a computer. When the amount of cash changes, the output electric signal of the sensor changes with it, the changed output electric signal is transmitted to the computer and recorded. The computer analyzes and processes the received signal, and outputs the results of process to a peripheral unit of the computer. This solution covers both features related to commerce (cash management), currency (cash), mathematics (amount of cash), and features related to hardware (weighing sensor), physical parameter (electric signal related to weight of cash). In this case, different examiners are found in our discussion to have made diametrically different determinations as to whether the solution has solved a technical or commercial problem and achieved a technical or commercial effect.

While examples are given in the Guidelines for Patent Examination as to whether applications for patents for inventions relating to computer programmes are subject matter of patent protection[4], a consistent workable way for determining the presence of technicality is lacking in the current examination and judicial practice. In the examination practice, examiners follow very different standards. Some examiners consider a solution void of technicality so long as any commerce-related expressions are used in claims; applicants often have to repeatedly communicate and argue with them on the matter.

2. Types of protectable claims

In China, there are two allowable forms of protectable claims relating to computer software: process claims to method of using software to operate computer and device or apparatus claim to computer device or system implementing software, and they are typically drafted in the forms as follows:

"a … method, …, characterized in that it comprises step A, step B and step C."

"a … device, …, characterized in that it comprises a device implementing step A, a device implementing step B, and a device implementing step C."

By contrast, in many other countries and regions, besides the process and apparatus claims, for inventions relating to computer software, computer software product claims are also allowable.

Following are different forms of drafted claims to com-

puter programme products:

Type A: a computer programme, when operating on a computer, orders the computer to implement step A, step B and step C.

Type B: a computer-readable medium storing computer programme code, wherein said computer-readable medium storing computer programme code , when operating on a computer, orders the computer to implement the following steps: step A…; step B…; and step C. (mainly referring to tangible media, such as CD, DVD or magnetic tape)

Type C: a computer programme product comprising computer programme order, wherein said computer programme order makes said computer implement step A, step B and step C. (A product can be a tangible or intangible carrier.)

Type D: a dataflow indicating computer programme product, wherein said computer programme product comprises a first computer programme code segment for implementing step A; a second computer programme code segment for implementing step B; and a third computer programme section for implementing step C. (also known as "signal claims")

For the above types of computer programme product claims, different countries have set forth different provisions. For example, types B and C are allowable in the United States[5]; types A and B are allowable in Japan[6]; and all the four preceding types are allowed in Europe[7] and Australia[8]. But all the above types of claims to computer programme products are not allowable in China, and computer programme products can only be protected in the form of process or apparatus claims.

To be specific, it is provided in Chapter 9 of Part II of the Guidelines for Patent Examination that "if a claim merely relates to an algorithm, or mathematical computing rules, or computer programmes *per se*, or computer programmes recorded in mediums (such as tapes, discs, optical discs, magnetic optical discs, ROM, PROM, VCD, DVD, or any other computer-readable medium), or rules or methods for games, etc., it falls into the scope of the rules and methods for mental activities and does not constitute the subject matter for which patent protection may be sought. … For example, a computer readable medium or a computer programme product only defined by recorded programme, … as it essentially merely relates to rules and methods for mental activities, does not constitute a subject matter of patent protection".

3. Functional module defined apparatus claims

For a computer-software-implemented invention, the Patent Office often requires that apparatus claims are drafted in such a way that each claim corresponds to each process claim, and they are generally referred to in the industry as "mirror apparatus claims", "virtual apparatus claims" or "functional module apparatus claims".

Specifically, regarding the drafting of claims in an application for patent for invention relating to computer programme, Chapter 9 of Part II of the Guidelines for Patent Examination provides that "if an apparatus claim is drafted on the basis of computer programme flow completely and according to the way exactly identical with and corresponding to each step in the said computer programme flow, or according to the way exactly identical with and corresponding to the process claim reflecting said computer programme flow, i.e., each component in the apparatus claim completely corresponds to each step in said computer programme flow or each step in said process claim, then each component in the apparatus claim shall be regarded as function modules which are required to be built to realize each step in the said computer programme flow or each step in the said process. The apparatus claim defined by such a group of function modules shall be regarded as the function module architecture to realize said solution mainly through the computer programme described in the description rather than entity devices to realize the said solution mainly through hardware."

According to the current examination practice in the Patent Office, computer software-related apparatus claims are first examined, in terms of the drafted form as to whether they meet the two requirements that "they are all drafted according to the computer programme flow" and "they correspond to the process claims in a one-to-one manner".

If yes, they are construed as functional module apparatus claims mentioned in Chapter 9 of Part II of the Guidelines for Patent Examination, not as product claims in the ordinary sense. Besides, they are no longer examined, as a means-plus-function claim is, to see whether they are supported by the description. So long as the corresponding process claims are supported by the description, the functional module apparatus claims are also viewed as supported by the description even if the description does not mention any specific apparatus at all.

If any one of the above two requirements is not met, the claims are then treated as ordinary product claims, and, un-

der Article 26, paragraph four, of the Patent Law, are examined as to whether they are supported by the description. When examined as a means-plus-function claim, a functional module feature defined by flow steps is still considered not to have met the "support" requirement under Article 26, paragraph four, of the Patent Law even if the flow steps *per se* are clear and supported by the description.

The result of this examination practice is that while the Guidelines for Patent Examination do not set forth express provisions, the Patent Office, as the current practice shows, disallows apparatus claims drafted with software and hardware combined and claims combining virtual software functional module with hardware features. For such claims, examiners either determine that the claims are unclear as they contain both expressions of structural feature and those of process or steps, or examine the functional module therein as the ordinary functional defined features. If a claim is examined this way, it is found not supported by the description on the grounds that the description has only disclosed embodiments where computer flow is used to perform said function, and a person skilled in the art is not clear that the function can be performed by any alternative way not mentioned in the description, for example by way of hardware or combination of software and hardware.

In the court decision made in *Nokia v. Huaqin*[9], even if the apparatus claims were drafted on the basis of the flow of computer programme with all the apparatus claims corresponding to the process claims, the Shanghai court still considered them to be means-plus-function claims, and concluded, under Article 4 of the Supreme People's Court's Interpretation of Several Issues Relating to Application of Law to Adjudication of Cases of Dispute over Patent Right Infringement (No. Fashi 21/2009)[10], that embodiments describing process or steps in the description could not constitute support of the features in the apparatus claim, which is obviously inconsistent with the Guidelines for Patent Examination and the Patent Office's practice.

Confusions and reflections

1. Construction of functional module apparatus claims

As the above overview of functional module apparatus claims shows, the current examination and judicial practice are likely to give rise to a contradiction: in the examination procedure before the Patent Office, a computer-process-step defined feature is clear and supported by the description if in a process claim, and it is so if in a purely functional module apparatus claim, but it is considered not supported, not clear and not allowable if in an apparatus claim combining software and hardware. As the Shanghai court's reasoning in the Nokia case shows, it is clearly supported by the description if in a process claim, but it is not clear, or not supported by the description if in a purely functional module apparatus claim or in an apparatus claim combining software and hardware.

It is pointed out in the Introduction of Chapter 9 of Part II of the Guidelines for Patent Examination that "the invention relating to computer programmes said in this Chapter refers to solutions for solving the problems of the invention which are wholly or partly based on the process of computer programmes and control or process the external or internal objects of a computer by the computer executing the programmes according to the above mentioned process".

It is provided in Section 5.1, Chapter 9 of Part II of the Guidelines for Patent Examination that "if an invention application relating to computer programmes includes contents concerning changing the hardware structure of computer devices, the hardware entity structure graph of the said computer devices shall be presented in the drawings of the description, and the component parts of the hardware of the said computer devices and the mutual relationships thereof shall be described in the description, based on the said hardware entity structure graph, in clear and complete manner so as to enable a person skilled in the art to carry out the invention".

It is thus shown that the provisions of Chapter 9 of Part II of the Guidelines for Patent Examination are not limited to computer software implemented inventions. The Patent Office's initial aim of the design to draft functional module apparatus claim for inventions all based on computer programme flow according to "full correspondence" of programme flow and steps is to address the request of some applicants who only describe software programme steps in the description, but seek to protect corresponding apparatus claims. They are only special provisions and teaching in relation to applications for patent for inventions relating to computer programmes in Chapter 9 of Part II of the Guidelines for Patent Examination. However, we are sorry to see that the special provisions have been extended to the only form of apparatus claims the Patent Office allows since the time we are not very clear about, causing great confusions on the part of applicants.

What the determination of functional module or functional definition is directed to should be features in the claims, not the whole claims. Features realized with computer software in a technical solution can be defined with functional module, and features that can be achieved with hardware in a technical solution can be defined with hardware structure or functional definition. This being the case, functional module defined technical features in a claim can be construed, under Chapter 9 of Part II of the Guidelines for Patent Examination, to be features realized with the corresponding steps in the computer flows presented in the description, while technical features that are not defined with functional module are construed as ordinary technical features, so that technical solutions that are achieved by pure software, or with combined software and hardware could be claimed in a proper form. In their examination of apparatus claims in computer programme-implemented inventions, be it a purely software-implemented or software-and-hardware implemented, examiners of the Patent Office should avoid formally making "non-support" conclusion; they should examine the substantial contents disclosed in the description.

Likewise, finding infringement, the court should also distinguish functional module features from function defined ones described with computer programme steps in a claimed technical solution. So long as the corresponding process steps are sufficiently described in the description and the corresponding steps in the process claims are supported by the description, said technical features in the form of functional module are supported by the description. Non-functional module-defined technical features are construed as ordinary function defined features.

2. Absence of some types of protectable claims

As aforementioned, computer programme product claims are not allowed in China. However, in infringement-finding phase, it is now uncertain whether the present allowable apparatus claims and process claims can fully protect a computer-programme-related patent against infringement.

As for the process claims, only operation of all the steps therein would infringe the patent right therefor. As for an invention relating to computer software, only after the computer programme is uploaded to a computer is it possible to realize all the steps of process claim, and often, only end users can do it. A software manufacturer, seller or distributer does not need to upload software to a computer and operate the computer programme *per se* to complete the manufacturing, reproducing or distributing process, and his or its manufacture or distribution would not directly infringe the patent right in process claims.

An apparatus claim, only if it comprises the computer or system of the computer programme, infringes the patent right. However, a software manufacturer, seller or distributer often distributes software alone, and they do not do so together with a computer programme. Distribution can be done in the forms of floppy discs, CD-ROM or DVD, or directly through or on the internet. In this event, only when a computer manufacturer pre-installs computer programme on the computer and sells it, all software manufacturers, sellers and distributers do not manufacture, sell and use an allegedly infringing product, and only the end user who has bought computer software and installed it on a computer would possibly directly infringe the apparatus claim.

However, it is not easy for a patentee to claim against end users. As software is so widely distributed that it is very difficult for a patentee to locate them. End users, though located, do not infringe the patent if they do not act for "the manufacturing or business purposes" as mentioned in Article 11 of the Patent Law[11]. Furthermore, even if they indeed act for "the manufacturing or business purposes", it is extraordinarily expensive and inefficient to claim on, and sue, so many different end users. More importantly, end users are often clients or potential clients of a patentee, and the patentee is reluctant to claim on their clients considering the client relationship or business reputation.

Thus, as is clearly shown, the current types of protectable claims are insufficient to accord patents targeted protection against infringement of patents relating to computer programmes. This is exactly why a variety of computer programme product claims are allowed in many other countries. Computer programme product claims make it possible for patentees to act against software manufacturers' and distributers' infringement by way of making, reproducing and distributing computer programmes through medium or downloads on the internet.

The Patent Office now holds a view that, in Chapter 9 of Part II of the Guidelines for Patent Examination, a functional module apparatus claim is construed as: "the apparatus claim defined by such a group of function modules shall be regarded as the function module architecture to realize said solution mainly through the computer programme described in the description rather than entity devices to realize said solution mainly through hardware", and the functional module apparatus claims are possibly equivalent to the computer

programme product claims allowable in many other countries, and enforceable against infringement by software manufacturers and distributors.

On the one hand, this view is yet to be widely understood and accepted, and, on the other, it is now not certain how the courts would determine this type of claims in finding infringement. Besides, considering functional module apparatus claims as completely equivalent to computer programme product claims would result in loss of the conventional computer system or apparatus claims, and would not meet patentees' request to fully, efficiently and purposefully enforce their patent rights in the field, which is not compatible with the international practice.

There is no obstacle in the Patent Law and the Implementing Regulations of the Patent Law to introduce computer programme product claims, and this possibly only involves amending the relevant sections of Chapter 9 of Part II of the Guidelines for Patent Examination, so as to incorporate computer programme product claims of a computer programme that meet the three technicality requirements.

Alternatively, if the Patent Office now finds it difficult to amend the Guidelines for Patent Examination, the Patent Office may address the absence of the type of protectable claims by interpreting the "functional module apparatus claim" as both comprising pure software product claims and computer apparatus claims present in software operating in general computer devices, to address the issue of absence of the class of protectable claims as mentioned above, so as to avoid causing another problem when addressing one for applicants.

Conclusion

In conclusion, the current patent system in China has accorded sound patent protection to technical innovations made in the computer software industry. If express provisions are set forth and guidelines given in relation to some specific practices, such as technicality determination, and proper types of the protectable claims and the forms to draft them are provided in line with the characteristics of the software industry, applicants and the general public would be helped to make better use of the patent protection available for software innovations to further spur software innovation. ■

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[1] This article presents the authors' personal views, not views or position of the corporation they are now working for.

[2] Article 5 of the Computer Software Protection Regulations: "in respect of a piece of software developed by a Chinese citizen or entity, regardless of whether said software has been made public, he or it shall enjoy the copyright in accordance with these Regulations."

[3] Article 6 of the Computer Software Protection Regulations: "the protection of software under these Regulations cannot be extended to cover the ideas, process and operating methods or mathematic concepts used in software development."

[4] See Section 3, Chapter 9 of Part II of the Guidelines for Patent Examination.

[5] See the USPTO, MPEP, 2106.

[6] See Chapter 1 of Part VII of the JPO' Examination Guidelines for Patent and Utility Model in Japan.

[7] See Chapter IV-5 of Part F of the EPO' Guidelines for Examination in the European Patent Office as of 2012.

[8] See the IP Australia Patent Manual of Practice & Procedure> 2.9.2.7.

[9] See the Shanghai No. 1 Intermediate People's Court's Civil Judgment No. Huyizhongminwu (zhi)chuzi 47/2011, and the Shanghai Higher People's Court's Civil Judgment No. Hugaominsan (zhi)zhongzi 96/2013.

[10] Article 4 of the Supreme People's Court's Interpretation of Several Issues Relating to Application of Law to Adjudication of Cases of Dispute over Patent Right Infringement (No. Fashi 21/2009): "the People's Court shall determine the contents of technical features expressed in terms of function or effect of a claim according to the embodiment of said function or effect described in the description and the appended drawings and the equivalents thereof."

[11] Article 11, paragraph one, of the Patent Law: "after the grant of the patent right for an invention or utility model, except where otherwise provided for in this Law, no entity or individual may, without the authorisation of the patentee, exploit the patent, that is, make, use, offer to sell, sell or import the patented product, or use the patented process, and use, offer to sell, sell or import the product directly obtained by the patented process, for production or business purposes."