Micro Law

Patenting computerized methods of doing business

Richard H. Stern

Ablondi, Foster, Sobin & Davidow

1130 Connecticut Ave., NW, Suite 500

Washington, DC 20036

102503.2466@ compuserve.com

E-Data's patent on the idea of selling merchandise over the Net (see October Micro Law, p. 6), is only one of many ambitious schemes to patent computerized methods of doing business. The October column mentioned another example, involved in a pending appeal before the Federal Circuit (the patent appeals court)—the Boes patent of the *State Street Bank* case. The many ambitious schemes and this pending appeal raise the nonlegal issue (which the court is unlikely to address) of whether it is good public policy to have patents on computerized methods of doing business.

Methods of doing business

The body of law on patenting methods of doing business developed long before computers were invented. For example, one influential decision shortly after the turn of the century involved claims to a method and product for protecting restaurant owners against the attempted "peculations" of waiters. The patent covered a system of chits, which the waiters had to turn over to the kitchen to get food orders and for which they later had to account, so that they could not simply pocket what customers paid. The court held that such a system was not a patentable invention.

Eventually, the case law developed toward a principle that a mechanical device for use in carrying out a method of doing business was patentable, but the method of doing business, as such, was not patentable. For instance, the idea of conducting a self-service cafeteria is not patentable, "however novel, useful, or commercially successful" it may be. But a specific coin-operated, glass-fronted, food-dispensing mechanism, such as that used in the Automat, is in principle patentable.

Algorithms

A parallel legal principle developed for computer algorithms. A machine that operates in accordance with an algorithm is patentable subject matter, but a mathematical algorithm, as such, is not. The legal test for distinguishing between patents claiming machine systems that merely utilize algorithms, on the one hand, and patents claiming algorithms, as such, on the other hand, has not always provided a bright-line distinction. Whenever a special-purpose device was used to carry out the algorithm, it was fairly clear that a patent was allowable. But when the centerpiece of the machine system on which someone sought a patent was a programmed general-purpose digital computer (for example, a programmed microprocessor chip), the law has waffled and flip-flopped. A good deal of meaningless focus has been placed on the distinction between hardware and software, where hardware is supposed to be a plus element conferring patentability.

For a time, it seemed that the legal test was whether the system included one of the following kinds of plus hardware elements:

- a special-purpose transducer at the front end, for example, a thermocouple, EKG machine, or a CAT scanner;
- a special-purpose actuator at the back end, for example, an automatic opening device for a rubber mold or a current generator for a CRT neck coil to control pixel brightness;
- special-purpose hardware in the middle of the system. (But in one case the court thought that a ROM used to store a lookup table of parameter values was hardware. In another case, a court thought that an analog-to-digital converter, as an interface

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device between an analog transducer and a digital signal processing system, was hardware adding a patentable plus to a programmed general-purpose digital computer system.)

At the moment, these criteria seem to be breaking down. The PTO has recently re-evaluated its position on the patentability of a floppy disk (or other memory device) on which a computer program is encoded. It announced that it will now consider that a claim to such a floppy disk has enough hardware "structure" to support a patent on an algorithm that the computer program carries out.

The *State Street Bank* case

The coalescence or interplay between the case law on methods of doing business and that on algorithms is of critical importantance. The reason is that a method of doing business that is economically valuable, and thus worth getting a patent on, is likely to be computerized. The pending *State Street Bank* appeal in the Federal Circuit is such a case. It deals with a patent on a system for operating a partnership of pooled mutual funds. Under IRS regulations, such a pool is considered a partnership (and thus subject to only single taxation at the ultimate investor level, rather than taxation first at the pool entity level and then again at the investor level) only if certain daily allocations are made. Capital gains, capital losses, and expenses must be allocated on a daily basis to each fund in the partnership pool. Otherwise, the pool will itself be a taxable entity, causing the scheme's profitability to plummet, despite the economies of scale in pooling several funds. Daily allocations of this kind can be made only by means of a computer.

The patent claims a general-purpose digital computer system comprising the combination of means for daily allocating pro rata capital gains to each partner pool, means for daily allocating pro rata capital losses, and means for daily allocating pro rata expenses. In other words, the system covers a set of means for performing the accounting steps that define operation of a partnership pool of funds. The trial court accordingly held (and apparently this was the patentee's position, too) that the patent completely covered or preempted the method of doing business, since any appropriate computer program for a general-purpose digital computer would fall within the claims. The effect of the patent was "to foreclose virtually any computer-implemented accounting method necessary to manage this type of financial structure." The court also concluded:

> [P]atenting an accounting system necessary to carry on a certain type of business is tantamount to a patent on the business itself. Because such abstract ideas are not patentable, either when regarded as methods of doing business or as mathematical algorithms, the '056 patent must fail.

Legal analysis issues

We can analyze patents of this kind from either the algorithm side or the method of doing business side. If approached analytically from the algorithm side, the patents may be questioned as efforts to get a patent on a method of doing numerical calculations (crunching numbers). A strong body of law holds that methods of doing calculations cannot be patented. However, patent lawyers try (as in the *State Street Bank* case) to avoid that principle by claiming the calculation method as a machine system (set of means) for performing the calculation.

Some courts have thought that a programmed general-purpose digital computer "becomes a new machine" whenever you load a new computer program into it. Under this theory, claiming a series of means for allocating profits, losses, and expenses is magically different from claiming the series of steps of allocating the same things as a process or method, that is, as an algorithm. In a linguistic or rhetorical sense, a programmed general-purpose digital computer is a machine and thus is to be distinguished from performing a series of steps, which is a process. That legal fiction is not helpful, however, in determining whether something is patentable.

Not all processes (in a dictionary sense) are patentable; the question is whether a given process is the *kind* of process that is patentable under our law. Similarly, not every article of manufacture is the kind of article of manufacture that is patentable. Consider a concededly otherwise conventional CD-ROM on which a novel and unobvious song is conventionally recorded, or a concededly otherwise conventional book in which a new novel is conventionally printed. These are each articles of manufacture, in that CD-ROMs and books are articles of manufacture, but they are not the *kind* of article of manufacture that is patentable. In short, a conventional general-purpose digital computer conventionally programmed with a new accounting program is not the kind of machine that is patentable, for it is still abstract and lacking in physicality, whether claimed in a process format or an apparatus format.

That is the kind of legal analysis that you could make by approaching the issue from the algorithm side. That analysis tends to be based on legal doctrine, more than on policy. One reason for this is that the precedents against patenting numerical calculations appear to be quite strong, inviting reliance on doctrinal analysis. The kind of analysis that one would make when approaching the issue from the method of doing business side, however, would be more policy oriented. Here, the legal precedents to defeat patents on business methods are old, and they probably provide less emphatic support, which may suggest an alternative mode of argument. The policy argument against patentability of methods of doing business could be phrased in the following terms.

One such as Boes does not even claim to have created the method of doing business he seeks to patent. Nonetheless, he or his company seeks to preempt all others from engaging in that business, simply by being first to stake out a patent claiming any and all computer-implemented means for doing that kind of business. Under this scenario, vast areas of commerce—both "the advancing wave" and that which was hitherto the subject of free and open competition—will be blocked off by speculators who claim them as their private preserves.

Patents concerning scientific ideas

and business ideas alike must be tied to specific, nongeneric machinery used to implement the ideas, or to some other concrete anchor. Otherwise, one who discovers one way of implementing a scientific or business idea could receive a patent so broad that it would stifle the creativity and competitive enterprise of later innovators. That would happen even though they might develop other, perhaps better, ways of implementing the idea. That would hinder and discourage, rather than promote and stimulate, technological progress, commerce, and business enterprise. Yet, the Constitution states that the purpose of the patent system is to promote the progress of science and useful arts.

Reappraising the policy argument

But say we put aside the present patent system and ignore legal precedent for the moment. Consider instead how we might write on a clean slate. What policy toward business patents would we adopt to maximize the public interest? Are we lacking in business creativity, and would a regime of intellectual property rights in business ideas bring forth an increased amount of needed business innovation in the field of computerized methods of doing business? Would it be wise for Congress to legislate in favor of such business-idea intellectual property rights?

It would be easy to write legislation doing this (although whether it is wise is the real question). For instance, the definition of "process" in section 100 of the patent law could be expanded by a new sentence at the end:

> The term "process" further includes a method of doing business by means of a programmed general-purpose digital computer.

Alternatively (more broadly):

> The term "process" further includes a method of doing business, irrespective of whether the method is carried out by means of conventional apparatus.

Returning to the issue of the wisdom of such a proposal, perhaps we may use the factual context of the *State Street Bank* case as a laboratory setting. The context is the banking industry, or perhaps we should consider it the financial services industry. Banking has been a dynamic business over the recent past (as contrasted with its once stodgy image). The industry now depends to a considerable extent on programmed general-purpose digital computers to offer the public an ever more varying range of financial services. Many of these services would be impossible without computers. Clearly, the pooled-fund partnership of the *State Street Bank* case is an example. Such a pool can be operated in a way that would meet tax regulatory requirements only by means of a computer. Other examples are such new banking services as various forms of home banking, which depend on new computer programs.

What policy toward business patents would we adopt to maximize the public interest?

What would be the impact of patents on the business of banking? To some extent, patents would necessarily erect new barriers to entry into new financial services niches; that is how patents work. By the same token, patents would create new litigation risks in the development of new and improved banking services and financial products that depend on use of programmed general-purpose computers. That too is how patents work, but until now they have not been a factor in the financial services industry, and their effects are thus unfamiliar in the industry.

One possible reaction to this is to say, "pay the man the money and move on." Pay patent owners a royalty for a license and add it into the cost of doing business. Presumably, the patented invention will add new value not previously available, and if the new value justifies the royalty—pay it. Otherwise, don't use the invention. In those instances where the patent owner refuses to license the invention, and prefers to make money by monopolizing the new niche, forget about it and provide some other financial service.

That is perhaps an optimistic view. Another response might be to worry. What about the long-term effects of creating new property rights and litigation over what are essentially ideas for calculating numbers that the banking business uses to perform accounting steps that define a new financial service? Until now, the banking industry has thrived, and the public has benefited, under the traditional rule of law that new methods of doing banking business are not patentable. Would a decision to have patents reverse that? Would it mire future such business innovations in costly patent infringement disputes? Would the result be to hamper severely competing banks' ability to offer the public the benefits of new, more efficient computerized financial services?

These are very hard questions to answer. How do you balance or trade off the apples and oranges? It is all speculative.

Maybe we should approach it from the other end. (I call this the "Who's in command of the status quo?" game. Each side likes to insist that it is the incumbent king of the hill.) Would patents be socially redundant in this field? Does the public now enjoy an insufficient amount of business innovation, so that it needs to stimulate such innovation by a new incentive not hitherto in play? Or should we just let well enough alone and not rock the boat?

Presumably, both sides would agree that we are all committed to the encouragement of progress in computer technology and computer-implemented services; to vigorous competition in providing new banking services and financial products to the public; and to providing reasonable and adequate rewards to creators and owners of valuable technological advances. Further, to the extent that these factors may compete with one another and compel trade-offs among them, we should all acknowledge that a proper balancing process should recognize that the interest of the public is paramount in the

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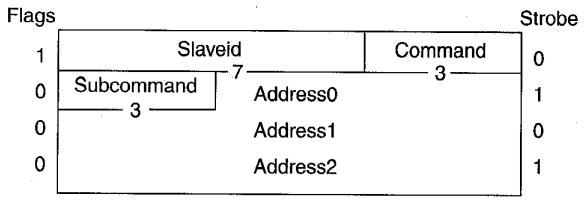

Figure 1. SyncLink packet.

address in the packet greatly simplifies pipelining to the same or another device.

Operation

The basic DRAM architecture has not changed for years. It includes bit lines and word lines, rows and columns, sense amplifiers, and capacitors that need recharging to keep their associated transistors on or off. The basic physics prevents the internal DRAM from becoming as fast as straight logic circuits. Therefore, all high-speed DRAMs need innovative techniques to achieve high-speed I/O.

Basic timings typical of today's DRAM with external I/O include row activation, which takes between 30 and 40 ns. In addition, column access takes from 13 to 20 ns. Getting into the device takes 3 to 4 ns, and getting out takes 3 to 4 ns. Thus, getting information to the outside world from a new row address, assuming the row is ready (no precharge), requires 49 to 68 ns. If we are in a row, we can get data out in 19 to 26 ns. This is the best case and the one we will use for demonstration.

Let's say we can get new data to the outside every 20 ns. This means that for a 16-bit-wide part operating at 800 Mbits per pin, we need data available for output every 1.25 ns. This data rate would require a 256-bit-wide internal bus, and the user would have to access and use 16 times the external bus width, which in SyncLink is 16 bits.

Since this DRAM is primarily a main memory used mainly for cache fill lines, and the typical cache fill is 64 bytes, SyncLink will work quite nicely. The SyncLink-DRAM could even be used with data I/O in parallel to give a 32-bit-wide path at a 3.2-Gbyte/s data rate. Expanding the number of internal banks and using the pipelining capability could allow gapless bursts.

SyncLink's future

Keeping DRAMs the most inexpensive memory is still a high priority. SDRAM would satisfy the needs of systems with large banks of memory for a long time to come. SyncLink's real advantage is that its granularity and speed will continue to evolve with processor demands. SDRAM, of course, can use the same I/O technology as SyncLink. Currently, SDRAM needs 11 to 15 address pins, one or more bank select pins, and four or five control pins. SyncLink has address, bank, control, and other functions on a single 10-bit-wide control bus.

SyncLink will give consumers and manufacturers the speed to move ahead in 3D graphics and system processing power. If your devices and pins are limited, SyncLink will be your choice for the future. If you have large system memories and are not as concerned about controller or device pin count, SDRAM would fill the bill. But even in this situation, SyncLink can keep volumes high for all memory components.

Direct questions about SyncLink, IEEE P1596.7, to Bill Vogley, w-vogley@ti.com.

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administration of the patent system.

How do we apply those principles to this problem? Perhaps, no matter how admirable those principles sound, they do not help us to balance incommensurable factors. It may well be impossible to decide whether patenting computerized methods of doing business is beneficial or harmful to society. We have neither the information necessary to decide it nor a sound methodology even if we had the information.

If you accept that, then perhaps you will want to try to answer a different question—one that may have a more attainable answer. A wise and patient legislature could devise a system of legal protection for such methods of doing business that was less absolute than the patent system. For example, an alternative system could permit fair use (which copyright law does and patent law does not permit) and other fair dealing. It might have additional safeguards to protect the public interest in competitive access to new technology, which traditional intellectual property law lacks. In other words, patents may not be the right answer, but "nothing at all" is not the right answer either.

An appropriately tailored system of specialized legal protection might well be more useful to society than either regular patents on such methods of doing business or else no legal protection at all. (The European Union and the World Intellectual Property Organization are currently pursuing efforts to devise such a nonpatent, noncopyright system to protect databases from unfair appropriation. That issue raises similar challenges.) Whether and, if so, how to devise that kind of system may well be a more useful question to address than whether computerized methods of doing business should be patented.