



Reciprocity under the GNU General Public Licenses

by Pessi Honkasalo

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## 1. Introduction

### Forming the Question

The GNU General Public Licenses are the most widely used open source software licenses worldwide. According to a license breakdown statistics from freshmeat.net, one of the largest software repositories, some 70 percent of applications that are released under an open source license carry that of GNU<sup>1</sup>. Here, the reference to the GNU General Public Licenses is made in plural, for there are in all three GNU software licenses:

- a) the GNU General Public License (GPL),
- b) the GNU Lesser General Public License (LGPL) and
- c) the GNU Affero General Public License (AGPL)<sup>2</sup>.

Of these, the GPL is far and away the most popular. The prevalence of the LGPL is approximately one tenth thereof, and the latest entrant, AGPL, is still rather marginal, albeit increasingly used latterly.<sup>3</sup> Each of the licenses has, however, its intended use and, in that regard, particular contractual provisions and effects, which naturally influence the potential penetration. Such elements form the very research problem of this study, so that at this stage it suffices to say that, on average, the GPL is used for programs, the LGPL for libraries and the AGPL for software that is commonly run over a network.

Notwithstanding the fact that most projects licensed under the GNU software licenses are unquestionably of minor importance or intended for a limited audience, the great social significance of these licenses stems from the other fact that some of the most widely used computer software is GNU-licensed, as well. Examples of such programs include, among others, the Linux kernel, the GCC compiler collection, MySQL database server, Perl programming language, OpenOffice.org productivity suite, Java development kit, Samba file and print services, Qt development framework, iptables filter control tool, the CVS concurrent versioning

<sup>1</sup> Freshmeat.net 2008b. By the time of writing, the exact number was 70.88% equalling 31,538 branches out of 44,539.

<sup>2</sup> Hereafter, the abbreviated versions of the names are used when referring to any separate license. Due to the technical nature of the subject matter, this study includes quite a few abbreviations and acronyms, all of which are explained in the list of abbreviations on p. 119 *supra*. Furthermore, unshortened names are used where the terms are figured for the first time in the text.

<sup>3</sup> Palamida 2008.

system and Launchpad code hosting platform, which are all licensed under a GNU software license<sup>4</sup>.

Many factors can drive a decision about technology architecture, information management, systems integration or software licensing in general. History, legacy systems, internal politics and the location of key people within an organisation may all be relevant, as well as other commercial motives, such as cost considerations and offerings of competing vendors. What tends to be on a lower level of priority, if indeed is properly considered at all, is the legal or regulatory impact of such a decision.<sup>5</sup> However, since various contractual restraints contained in proprietary and open source licenses, respectively, may at a later time be proven to mean a significant effect on the contemplated use or even the dilution of the whole investment, judicial risk analysis ought to constitute an essential part of the planning work of a licensing strategy.

Now, therefore, the purpose of this work is to interpret the reciprocity clauses included in the GNU software licenses, *viz.* which obligations they impose on the licensee and what sort of activity triggers such commitments. Looking at prior studies, one can find many general statements in the literature that characterise the GPL as possessing something called the ‘viral effect’<sup>6</sup>, the LGPL as being ‘persistent’<sup>7</sup> and the AGPL as offering a plug for the ‘application service provider (ASP) loophole’<sup>8</sup> in the ordinary GPL. However, the more precise meaning of such effects and the demarcation between various forms of combinations and modifications—as well as defining which acts constitute derivatives of functional relevance with regard to reciprocally licensed software—have been subject to unfortunately diminutive analysis in our jurisdiction<sup>9</sup>.

My aim is to systematise the mechanisms of reciprocity under the doctrine of GNU software licenses. First, I seek to offer, from the legal point of view, the intellectual readiness for making strategic licensing decisions in relation to the GPL and its derivatives for undertakings that are directly or indirectly conducting business in the computing industry. It is fundamental for developers to appreciate how the licenses affect the extent to which they can adapt the licensed software, and under what restrictions. Nevertheless, secondly, the factual audience is much wider. According to the statistics from a recent survey, more than half of the enterprises are

<sup>4</sup> Freshmeat.net 2008a; Canonical 2009.

<sup>5</sup> Millard 2008.

<sup>6</sup> See Manner 2001, 15; Dixon 2004, 24–25.

<sup>7</sup> See Lerner and Tirole 2005, 23; Ghosh and Soete 2006, 930.

<sup>8</sup> See Välimäki 2002, 854 fn. 27; Babcock 2007, 42.

<sup>9</sup> Välimäki’s seminal research being a welcome exception. The perceptions built into his doctoral thesis have proffered fertile ground for this author’s further interpretations and systematisations. See Välimäki 2005, 123–138.

using open source applications in their organisations today, and an additional ten percent plan to do so during this year<sup>10</sup>. Further, by 2012, research firm Gartner, Inc. believes that 80 percent of all commercial software applications will include open source components<sup>11</sup>. Inasmuch as the GNU software licenses hold the lion's share of the open source market, it is highly probable that one wishes to be conscious of one's risk position in such arrangements to eschew being legally exposed for violations of the license requirements.

## Exclusions

As stated above, this study focuses on the reciprocity obligations contained in the GNU software licenses, also known as 'copyleft'<sup>12</sup>. Such reciprocity can be further divided into three more precise, albeit not exact, categories, depending on the terms of the license agreement<sup>13</sup>:

- a) Standard reciprocity obligation means that the distribution terms of the source code must be maintained so that, should the program be further developed, the license terms cannot be changed or the program made proprietary. Nonetheless, should the source code be combined with another source code in order to create a new work, standard reciprocity obligation does not apply to the combined work.
- b) Under strong reciprocity obligation, the same basic rule applies, but also adaptations and compilations of any kind whatsoever must keep the license terms intact. In spite of all, the obligation is not triggered preparatory to the time of distribution of the software.
- c) Network reciprocity obligation is an augmented version of strong reciprocity, as far as the mere use over a network of a piece of software covered by such a license is interpreted as distribution, whereas in the former two brands the interpretation of the term encompasses only a downloadable or fixed software package.

For the purposes of research, it is not the core areas of provisions that are especially interesting but, rather, fringes and overlaps; their interconnection. In order to be able to particularise the pith and functionality of each category within the set-down limit for the number of pages with

<sup>10</sup> CIO 2008.

<sup>11</sup> Ars Technica 2008.

<sup>12</sup> All the technical terms used herein will be explicated in the respective sections of text, where their meanings are further elaborated. For example, as regards 'copyleft', see ch. 0 *infra*.

<sup>13</sup> Välimäki 2005, 117-119. Välimäki uses only notions of standard and strong reciprocity, while considers the third class merely as a modification of the latter; he speaks of a 'network use obligation'. I deem it appropriate to make a clearer distinction, for the functional difference is rather significant, and there are also three separate GNU software licenses, respectively.

an adequate precision, I have delimited the research task into the above-mentioned specific form. In that regard, this study contains the following exclusions.

At the time of writing, there are overall 62 open source licenses that have undergone the approval process of the Open Source Initiative (OSI), and several more are currently seeking approval<sup>14</sup>. Many of them share common characteristics and functionalities, differing only in some nuances. Some, for one, are clearly aimed for special purposes<sup>15</sup>. However, because the GNU software licenses constitute a block possessing over two thirds of the market, I have deemed it well-grounded to limit the dissection hereunder to the member licenses of the GNU phalanx. But on the other hand, I consider the inclusion of the AGPL in this work, in spite of its relatively low penetration, justifiable inasmuch as the license in question forms together with the GPL and LGPL a coherent system, which is expedient to be studied *en bloc*. In addition, according as the demand for the ASP model increases, there is a strong possibility that the AGPL's significance will rise accordingly.<sup>16</sup>

Further, within the system of GNU software licenses, all but the latest versions of the licenses have been excluded. Hence, this study discusses the reciprocity obligations under versions 3 of the GNU General Public Licenses, namely GPLv3, LGPLv3 and AGPLv3 for short. The final versions of the former two were released on 29 June 2007 and that of the latter on 18 November 2007, each preceding a thorough revision process and several draft versions. The previous version of the GPL, GPLv2, originates from June 1991; the predecessor of the LGPLv3, LGPLv2.1, is effective as of February 1999; and the original AGPL, AGPLv1, is dated March 2002. Each of these, and indeed even the more antecedent versions, can still be referred to in the license grant but the Free Software Foundation (FSF), the publisher of the GNU software licenses, recommends using the latest versions<sup>17</sup>. Thus far some 3,800 projects have explicitly converted to version 3 and nearly 6,900 projects are licensed under a certain other version of the GNU software licenses 'or any later version' of it<sup>18</sup>. Pursuant to s. 14 of the

<sup>14</sup> OSI 2006.

<sup>15</sup> See, e.g., the Educational Community License (EPL), the NASA Open Source Agreement (NOSA) and the Open Group Directory Test Suite License (OGDTSL).

<sup>16</sup> For more information regarding the AGPL, see ch. 0 *infra*.

<sup>17</sup> Stallman 2007.

<sup>18</sup> Palamida 2008.

GPLv3, in that event the licensee has the option of following the terms and conditions either of that numbered version or of any later version<sup>19</sup>.

The older versions of the GNU software licenses are similar in spirit to the present ones, but differ in detail as the later editions have addressed some new problems and concerns. All text has completely been rewritten for versions 3; used terms have been altered widely and new definitions are given. In view of these facts, I find it consistent not to analyse the legal state against two contractual subtexts, but that of the more recent one. That being said, it is still probable that the comments provided hereafter will apply *mutatis mutandis* to the prior versions as well, for the updates did not remarkably affect the reciprocity proper<sup>20</sup>.

The third contextual exclusion is the express concentration on the provisions of reciprocal nature. The GNU software licenses are thoroughbred licensing agreements containing terms with regard to, among others, the rights of the contracting parties, acceptance, downstream licensing, patents licenses, the warranty disclaimer and limitation of liability. This study covers only the first-mentioned. Thus, emphasis is laid not so much on the licensing issues of a new system that is devised from scratch but rather on matters related to the use and distribution of a product that includes source code covered by the GNU software licenses, version 3.

In consequence, the perspective adopted here is that of copyright law. Copyright is—for the moment, at least—both nationally and internationally the predominant form of protection for computer programs<sup>21</sup>. As regards patent protection, s. 1(2)(3) of the Patents Act (550/1967) and art. 52(2)(c) of the European Patent Convention (EPC; SopS 8/1996) exclude software from patentability to the extent that a patent application relates to a computer program ‘as such’. However, although a literal interpretation might suggest on the contrary, patents have been granted to software also in the European patent practice, insomuch as the invention makes a contribution in a technical field<sup>22</sup>. As an answer to this trend, s. 11 of the GPLv3 provides an

<sup>19</sup> Consequently, if the new license version gives additional permissions, those permissions are available immediately to all users of the program, but if the license imposes tighter requirements, it will not restrict the use of the current version of the program, because the program can still be used under the present license version. Developers, for their part, are not obliged to release subsequent modifications of their programs under any later license version. Moreover, the additional permission users may have does not require the licensor to fulfil any corresponding terms herself, since no additional obligations are imposed on any author or copyright holder as a result of the licensee’s choosing to follow a later version (GPLv3, s. 14, para. 4).

<sup>20</sup> Compare, e.g., GPLv3, s. 5 with GPLv2, s. 2.

<sup>21</sup> See s. 1(2) of the Copyright Act; art. 1(1) of the Council Directive 91/250/EEC; art. 4 of the WIPO Copyright Treaty (WCT); art. 10(1) of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). On the history of the legal protection of software, see WIPO 1985, 147–149.

<sup>22</sup> PRH 2003; EPO 2008.

explicit patent license<sup>23</sup>. The whole patenting scheme, however, would require plenty of space for a profound analysis, whereupon it is not covered here.

Another risk factor in respect of open source software in general, and that covered by the GNU software licenses as well, has to do with the division of risks among the contracting parties pertaining to infringements on intellectual property rights (IPR) by third parties<sup>24</sup>. It differs radically from the liability distribution applied commonly in the licensing of proprietary, closed source software. Whereas the suppliers of conventional software engineering normally agree to indemnify the customer and hold it harmless against claims made by infringed third parties, the GNU software licenses start from the premise that the liability for IPR infringements is shifted onwards in the licensing chain onto the licensee. This stems from the general endeavours of OSI and the related licenses to promote the distribution of software; they aim to lower the threshold of a licensor for granting rights to the source code it has developed.<sup>25</sup> Without proper intellectual preparedness as to the functionalities of the licenses, the risk position of a licensee may become substantially insecure where she affiliates a software component licensed under one of the GNU software licenses to her own end product. Again, this study tries to set up that informational framework, but to the questions related to warranties and liabilities only cursory references can be devoted in respective chapters.

Finally, I shall make a remark about the adjective exclusions: Some software packaging systems require the would-be licensees to click through or otherwise indicate assent to the terms of a GNU software license. In the legal literature, these kinds of arrangements are called ‘click wrap’ agreements. Such agreements and their corporeal predecessors, ‘shrink wrap’ agreements, have been subject to wide-ranging academic debate<sup>26</sup>. No Finnish legal praxis is on hand, but in a United States (US) case *ProCD, Inc. v Zeidenberg*<sup>27</sup> such contracts were held enforceable and, at any rate, one can argue that since the methods have been utilised in software licensing for

<sup>23</sup> In this author’s view, the said provision means—in all but mere pass-through distribution, where no patent license is granted—that in the distribution of a GPLv3-covered work, the copyright of which one owns in part, patent license is granted to the work on whole, not just to the particular component. However, the license does not cover the changes made by subsequent actors in the chain of distribution.

<sup>24</sup> For further classification to that effect, see Anniina Huttunen’s laudable master’s thesis *Lähdekoodin lisensointi GPL-lisenssillä ja lisenssiantajan vastuu kolmansien patenttioikeuden loukkauksista* [Turku] 2007, where the licensor’s liability for infringements of patent rights by third parties is discussed.

<sup>25</sup> The open source definition and the philosophy of the free software movement are pinned down more in chs. 0–0 *infra*.

<sup>26</sup> See Gringras 1996, *passim*; Germanowski 1998, *passim*; Rowland and Campbell 2002, 28–32; Hemmo 2003a, 156–157.

<sup>27</sup> 86 F.3d 1447 (7th Cir. 1996). There is a line of cases that follows *ProCD, Inc. v Zeidenberg*, see, e.g., *Brower v Gateway 2000, Inc.*, 676 N.Y.S.2d 569 (N.Y. App. Div. 1998).

decades<sup>28</sup>, they have become in accordance with the customs of the trade. Therefore, the problem of accession and other issues with regard to the standard conditions of contracts are not in focus hereafter, but are taken for granted<sup>29</sup>.

Furthermore, except for this mention, virtually nothing will be said on the advantages and weaknesses of software development itself based on open source software *vis-à-vis* the traditional, proprietary model of software development. It is certain that open source does under no circumstances guarantee comprehensive documentation, especially as regards the origins of the software<sup>30</sup>. Collaborative development also generates technical challenges in respect of revision control and compatibility of systems<sup>31</sup>, so that each actor must decide against or in favour of open source on the grounds of individual needs; this work is merely an objective description of the prevailing legal status.

### Source Material

The jurisdictional starting point for this study is that of the substantive law of Finland. However, as the subject matter is distinctively universal, it seems justifiable that also observations about other jurisdictions are made to the appropriate extent. There are at least three valid reasons for this.

First, the GNU software licenses have been released by an American organisation, the FSF. The interconnectedness of the licenses and title 17 of the United States Code (USC), which in its chapters 1 through 8 and 10 through 12 contains the US copyright law, were writ large especially regarding the terminology of the previous versions<sup>32</sup>. During the last license revision process a more globalised approach was taken by defining more terms in the license texts, and comments were welcomed from all ready quarters so that, consequently, altogether four discussion drafts of the GPLv3 were framed on the grounds of the received feedback.

<sup>28</sup> Välimäki 2009, 145–146.

<sup>29</sup> However, it should also be noted that the GNU software licenses do not require anyone to accept them in order to receive and run software so licensed (GPLv3, s. 9). Hence, the licenses do not have to be accepted until modification or redistribution of a covered work takes place. Since these actions would infringe copyright, were no permission to the contrary granted in the license, the argument of indicated acceptance is arguably extraordinarily plausible with regard to GNU software licenses.

<sup>30</sup> Bradbury 2004, 6.

<sup>31</sup> Fogel 2001, 10–12.

<sup>32</sup> Välimäki 2007, 15. The GPLv2 uses terms such as ‘distribution’ and to ‘use’ that are defined in 17 USC 101, whereas the corresponding terms in the GPLv3 are to ‘convey’ and to ‘propagate’ that carry no such linkages.

Nevertheless, the interpretation of the licenses is still ultimately conditional on the national copyright law<sup>33</sup>.

Second, the GNU software licenses have not yet been subject to any legal proceedings in Finland. As a matter of fact, even worldwide there is very little case law in this area<sup>34</sup>. Therefore, one has to utilise all the available trial documents in order to discover, to the appropriate extent, the underlying principles and common denominators<sup>35</sup>. I have worked on the basis that systematisations, no matter how consistent or coherent they are, must also be justified, and that justification is only achievable by building it upon legal usage as well<sup>36</sup>. In respect of theories regarding the sources of law, the said approach is trouble-free for if an applicable legal principle can be derived from foreign case law, it is practicable unless certain contraindications exist. Comparative legal arguments may suggest feasible constructions for the problems of interpretation and are, as a result, permitted sources of law.<sup>37</sup>

Third, the bulk of the earlier research has been carried out in other jurisdictions, notably under the Anglo-Saxon legal order. Hence, most of the literature addressing the subject matter is of foreign origin. However, it is important to take cognisance of the quality of the Copyright Act (404/1961) related to the private international law, according to which only works of Finnish origin are under s. 63 thereof protected by the Act. Protection for other, non-Finnish works is granted by means of international treaties, to wit the Berne Convention for the Protection of Literary and Artistic Works (SopS 79/1986); the Rome Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations (SopS 56/1983); the WIPO Treaties (823–824/2005) and the TRIPS (SopS 4–5/1995). In an industry extremely global, the significance of this is that if an open source software project were on the grounds of jurisdictional basis deemed to be of foreign origin—as the case often might be—the secondary sources referred to at the beginning of this paragraph turn out rather relevant.<sup>38</sup>

<sup>33</sup> GPLv3 Process Definition.

<sup>34</sup> See Welte 2008.

<sup>35</sup> The situation is comparable with the principles of interpretation under the law of transport. See Selvig 1986, 7–19; Sisula-Tulokas 2007, 42–46, 55–56.

<sup>36</sup> Cf. Pöyhönen 2003, 68–69.

<sup>37</sup> Aarnio 1989, 235–236. See also Tolonen 2003, 126–132.

<sup>38</sup> An example: The copyright holders of GPLv3-licensed software file a suit against a Finnish company in Helsinki District Court for copyright infringement. If the court finds that the program in question is not of Finnish origin, the judgement will be passed by virtue of the law that, according to the connecting factor rules of the private international law, is deemed bound up with the software, the programmers of which each might hail from a different country.—Art. 3 of the Berne Convention includes the principle of ‘national treatment’ and TRIPS, art. 4 the clause of most favoured nation (MFN).

This study is a contribution to the ongoing scholarly debate concerning the GNU software licenses. It is founded on the theoretical frames of reference and the phrasing of questions expressed in pre-existing studies and leads up to offer a disquisition as to the essence of the reciprocity obligations under versions 3 by charting the functionalities as they are represented at present moment in a Nordic judicial system.<sup>39</sup> The object is achieved by making the most of the available sources of law, including the legislative history. In this context the content of substantive law is predominantly reduced to national legislation, European Union (EU) directives and international conventions governing copyright.

Nonetheless, because the research problem pertains to the interpretation of the terms and conditions of civil licensing agreements, the very text of the licenses is of considerable relevance to the matter where mandatory legislation related to the law of copyright does not provide to the contrary. In private law, dispositions made by the parties within the limits of discretionary legal provisions constitute the prevailing legal relationship between them. The form of the arrangement is thus mainly for the contracting parties to decide. In this respect, if the meaning of a contractual clause is not obvious but necessitates interpretation, the interpreter must attempt to discover the purposes of the parties on the grounds of preliminary works and other relevant circumstances.

As mentioned above, the revision of the latest GNU software licenses involved a public comment process with two to four discussion drafts and an accompanying rationale document for each license. Ordinarily we cannot know in retrospect the foundations or the *raison d'être* of any solution opted in an agreement, but these preliminary works that are open and accessible to all on the web make an exception. The interpretative effect of such transparent material is deemed analogous to the role of a bill in the interpretation of the corresponding law and, accordingly, is brought hereunder to bear on if needs be<sup>40</sup>.

## Methodology

Methodologically this study follows the approach of legal dogmatics. For the reasons stated above, in addition to sheer *scientia iuris* also the methods of comparative law are utilised on the appropriate connections. As to dogmatics, I have assumed an ideology of interpretation that applies the prevailing law in a manner of speaking the viewpoint of a judge. Thereby, the focus

<sup>39</sup> In order for readers influenced by other legal traditions, mainly Continental and common law systems, to actually understand the contents, I have chosen to write this thesis in English, which has been the *lingua franca* of science, too, since the end of the Second World War.

<sup>40</sup> Hemmo 2003a, 583–590. See also art. 5:102 of the Principles of European Contract Law, art. 4.3 of the UNIDROIT Principles of International Commercial Contracts and art. II.–8:102(1) of the Draft Common Frame of Reference (DCFR).

is hereunder the analysis of the semantic meaning of stipulatory texts, both legislative and contractual, the purposes and intentions of the draftsmen and the established practices of the case law.<sup>41</sup>

The rationale behind such an approach is the informational interest to find out, what is the stand of the substantive law on various ways of exploiting computer programs that have been published under a GNU software license. I find that eliciting noteworthy matters with regard to those circumstances is best done by using said methods and being objectively disposed towards the research subject.

The progression of the study is as follows: This first chapter provides an overview of the work's thematic structure. It is followed by a concise chapter offering the relevant background information, which presents the statutory frame of reference and conventions regarding software licensing, the open source software development method as an antithesis of the first-mentioned as well as the fundamentals of the philosophical outlook behind the FSF and how this historical baggage has influenced the formation of the GNU software licenses.

Thereafter, attention is paid to the rôle that the GNU software licenses have in the exchange of software. In the conflict of assignments, licenses and pledges with regard to IPR, time priority forms the basis for collision resolution; protection provided by good faith is not thinkable in this area<sup>42</sup>. However, as the GNU software licenses are of non-exclusive nature, more important than cogitating *erga omnes* principles is defining the rights and obligations in the contractual relation. This is done in the third chapter by interpreting the contractual stipulations contained in the GPLv3, LGPLv3 and AGPLv3 as to reciprocity.

Basing on the findings and *prima facie* risk analysis of the preceding part, the fourth chapter then expresses the system of various forms of modifications under this doctrine. The GNU software licenses rely heavily on the functionalities and characteristics of copyright law, whereupon the guidelines for decision-making bestowed by such institutional support ultimately constitute the definite legal statuses. The idea-expression divide that prevails the reasoning related to the law of copyright provides for the test of substantial similarity, which can be utilised in demarcating the territories of independent, combined and modified works.

The last chapter contains a *précis* of the arguments and discusses matters that especially ought to be taken into account where decisions relating, directly or indirectly, to the GNU software licenses are made. Full texts of the terms and conditions contained in the licenses have been appended at the back.

<sup>41</sup> Siltala 2001, 121-123.

<sup>42</sup> Tuomisto 1993, 118-119; Millqvist 2006, 129.

## 2. Background

### Conventions of Software Licensing

#### *Legal Protection of Computer Programs*

In accordance with s. 1(2) of the Copyright Act, computer programs are protected by copyright as literary works. Copyright does not protect the mere ideas and principles, which underlie any element of software, but the protection applies to the expression of a computer program, be it in any form whatsoever<sup>43</sup>. Article 1(3) of the Council Directive 91/250/EEC on the legal protection of computer programs (hereinafter referred to as the ‘Software Directive’) further provides that a computer program is protected if it is original in the sense that it is the author’s own intellectual creation; no other criteria are to be applied to determine the eligibility for protection. By virtue of s. 43 of the Copyright Act, protection is granted for the life of the author and for 70 years after her death or after the death of the last surviving author<sup>44</sup>.

As to the authorship of computer programs, the Copyright Act starts from the premise that the person who has created a work has copyright therein (s. 1[1]). In consequence, the author of a computer program is the natural person or group of natural persons who has created the program. However, in accordance with s. 40b(1) of the Copyright Act, where a computer program is created by an employee in the execution of her duties or following the instructions given by her employer, the employer is exclusively entitled to exercise all economic rights in the program so created, unless otherwise provided by contract (s. 27[3])<sup>45</sup>.

Subject to certain exceptions, the exclusive rights of the copyright holder include the right to do or to authorise, first, the permanent or temporary reproduction of a computer program by any means and in any form, in part or in whole. Accordingly, insofar as loading, displaying, running, transmission or storage of the computer program necessitates this kind of reproduction; such acts are subject to authorisation by the copyright holder. In the second place, without prejudice to the rights of a person who alters the program, the translation, adaptation, arrangement and any other alteration of a computer program and the reproduction of the results thereof are restricted acts as well. Thirdly, the copyright holder has the exclusive right to authorise any form of distribution to the public, including the rental, of the original

<sup>43</sup> Strömholm 1970, 88 ff.; Haarmann 2005, 96–98.

<sup>44</sup> Where the computer program is an anonymous or pseudonymous work, the term of protection is 70 years from the time that the computer program is first lawfully made available to the public (s. 44[1]).

<sup>45</sup> HE 161/1990 vp, 54.

computer program or of copies thereof<sup>46</sup>. (Copyright Act, s. 2; see also Software Directive, art. 4.)

As mentioned above, however, the protection provided by copyright is not absolute by any means but is subject to various limitations included in c. 2 of the Copyright Act. Sections 25j and 25k therein provide special provisions concerning computer programs. To begin with, in the absence of specific contractual provisions, the reproduction of software does not require authorisation by the copyright holder where it is necessary for the use of the computer program by the lawful acquirer in accordance with its intended purpose, including for error correction<sup>47</sup>.

Moreover, the making of a back-up copy by a person who has a right to use the computer program cannot be prevented by contract insofar as it is necessary for that use. Also, the person having a right to use a copy of a computer program is entitled, without the authorisation of the copyright holder, to observe, study or test the functioning of the program in order to determine the ideas and principles which underlie the elements of the program, if she does so while performing any of the acts of loading, displaying, running, transmitting or storing the program that she is entitled to do. In accordance with s. 25j(4) of the Copyright Act, any contractual provision on the contrary is automatically null and void.

In addition, detailed rules in respect of decompilation exist. Decompilation is a term for the process of obtaining source code from compiled, machine-readable object code<sup>48</sup>. In this respect, the authorisation of the copyright holder is not required where the reproduction of the source code is indispensable to obtain the information necessary to achieve interoperability of an independently created computer program with other programs. However, decompilation is permitted only provided that the following conditions are met:

- a) the decompiler must have a license to use the program to be decompiled,
- b) the information necessary to achieve interoperability must not previously have been readily available in the public domain and

<sup>46</sup> Subject to the first-sale doctrine. See s. 19 of the Copyright Act, according to which the first sale in the European Community (EC) of a copy of a program by or with the consent of the copyright holder exhausts the distribution right within the EC of that copy, with the exception of the right to control further rental of the program or a copy thereof.

<sup>47</sup> As regards error correction, however, recital 18 of the Software Directive provides conversely by stating that '[...] the acts of loading and running necessary for the use of a copy of a program which has been lawfully acquired, and the act of correction of its errors, may not be prohibited by contract' (emphasis added). Välimäki (2009, 52–53) argues that a technical error has occurred in the finishing of the Directive and that the user's right in that regard was intended non-discretionary. Cf. Takki 2002, 182.

<sup>48</sup> Rowland and Campbell 2002, 35 fn. 39. See also Freedman 2000, 43–44.

- c) the decompilation process must be confined to the parts of the target program relevant to interoperability.<sup>49</sup>

It should be noted that by virtue of s. 25k(2) of the Copyright Act the above-mentioned provision does not permit the information obtained through its application to be (1) used for goals other than to achieve the interoperability; (2) to be given to others; (3) to be used for the development, production or marketing of a computer program substantially similar in its expression or (4) to be used for any other act that infringes copyright.

In general, property is composed of interests having a net asset value<sup>50</sup>. Common law countries make use of a concept called the reification of relations, which means treating rights as if they were things by applying, as far as possible, the same principles and terms to intangible assets as to corporeal things<sup>51</sup>. For example, in the United Kingdom (UK) *goods* are defined by s. 61(1) of the Sale of Goods Act (1979 c. 54) as personal chattels other than things in action and money, whereas the Finnish Sale of Goods Act (355/1987) applies, under s. 1(1) thereof, to the sale of *property* other than real property.

Such conceptual definitions and divergences therein amount, however, functionally very little to the subject matter. Whilst it is not semantically valid under the Finnish legal system to speak of an 'owner' of a copyright, in our jurisdiction copyright as an IPR constitutes a form personal property that enjoys protection relating to the law of property; pursuant to s. 15(1) of the Constitution of Finland (731/1999), the property of everyone is protected. The Government proposal regarding the revision of the basic rights and liberties contained in the constitutions provides that, in addition to proprietary rights, the constitutional protection of property encompasses for instance limited rights *in rem*, rights to a claim, delinquent obligations for money payment by government officials and IPR having a net asset value as well<sup>52</sup>.

In a computer program, the copyright is concentrated particularly upon its source code, which is a collection of statements and declarations written in a computer programming language that allows the programmer to communicate with the computer using a reserved number of instructions. Once the source code has for processing purposes been converted into an

<sup>49</sup> See HE 211/1992 vp, 10-11.

<sup>50</sup> Kartio 2004, va111.33149.

<sup>51</sup> Lawson and Rudden 2002, 81-82. *E.g.*, s. 655 of the Civil Code of the State of California provides that '[t]here may be ownership of all inanimate things which are capable of appropriation or of manual delivery; of all domestic animals; of all obligations; of such products of labor or skill as the *composition of an author*, the good will of a business, trade marks and signs, and of rights created or granted by statute.' (Emphasis added.)

<sup>52</sup> HE 309/1993 vp, 62.

executable object file by a compiler, the file is encoded in binary form and is composed merely of sequences of two symbols, 0 and 1.<sup>53</sup>

Decompilation of an executable program in order to generate source code, where the copyright holder has wanted to keep it secret, constitutes an infringement of copyright, except for when it is necessary to achieve interoperability<sup>54</sup>. Therefore, the computing industry has traditionally appreciated the intellectual property contained in code modules and subroutines to be their biggest competitive advantage and asset, which must be kept out of the reach of outsiders at full stretch in order to prevent adaptation of the program. This, for its part, has had a significant impact on the used licensing practices.

### *Standard Patterns*

A unique thing connected with computer programs, which differentiates them from other literary or artistic works, is the fact that each and every time a program is being used, copies thereof are unavoidably made along with it<sup>55</sup>. Pursuant to s. 11a(1) of the Copyright Act, temporary acts of reproduction are exempted from the exclusive reproduction right of the author<sup>56</sup>. However, subsection 2 of the same section provides that such an exemption does not apply to computer programs<sup>57</sup>, whereupon for all practical purposes the use of software necessitates a permission derived from the copyright holder<sup>58</sup>, which normally occurs in the format of a license agreement.

Retail software is hence sold as licensed products. Software licensing means the utilisation of the exclusive rights of the copyright holder, that is to say the right to copy, distribute and alter the software<sup>59</sup>. The pecuniary value underlying a computer program is thus actualised by

<sup>53</sup> Takki 2002, 61–63; Elo and Hasu 2003, 2–6; Oksanen 2004, 28–29. Cf. Kempainen 2006, 235–236.

<sup>54</sup> Castrén 2006b, yj111.48303.

<sup>55</sup> Bainbridge 1999, 90–93.

<sup>56</sup> The provision further requires the reproduction in question to (1) be transient or incidental, (2) be an integral and essential part of a technological process, (3) have as its sole purpose the enabling of a transmission in a network between third parties by an intermediary or a lawful use of a work to be made and (4) have no independent economic significance.

<sup>57</sup> Article 1(2)(a) of the Directive 2001/29/EC of the European Parliament and of the Council on the harmonisation of certain aspects of copyright and related rights in the information society (hereinafter referred to as the 'Copyright Directive'), which is the legal basis for the national provision at issue, provides that the Directive leaves the existing Community provision relating to the legal protection of computer programs, *i.e.*, the Software Directive, intact (HE 28/2004 vp, 84–85).

<sup>58</sup> See KKO 1998:91; software offered using an ASP model being a remarkable exception. That model of software deployment and its relevance to the subject matter are elaborated in ch. 0 *infra*.

<sup>59</sup> In terms of information technology (IT), also the right of correction and further development.

offering a copy of the work to quarters taking an interest therein<sup>60</sup>. In accordance with s. 27(2) of the Copyright Act, the transfer of a copy does not constitute a transfer of the copyright. Thereby, the foundation of the licensing of both open source software and its antipode, proprietary software, is that in neither case does the granting of a—more or less permissive—license to a licensee mean an assignment of the copyright as a whole but rather limited components thereof. The authorisation is normally effective only insofar as the licensee adheres to the terms and conditions of the license<sup>61</sup>.

It is a common practice that the licenses of proprietary software restrict the rights of a licensee to the fullest extent permitted by the peremptory provisions contained in the legislation. To that end, the licensee is typically granted a non-exclusive, non-transferable limited right to make a certain amount of copies and to use the program within internal business operations, without the right to correct errors, develop the program and further distribute it. Moreover, most such license agreements include an express prohibition to decompile the program or otherwise cause or permit reverse engineering or disassembly that aims at disentangling the source code, unless required by imperative law for interoperability.<sup>62</sup>

The potential for allocation as to proprietary licensing agreements is often very small: a license belongs to a certain person to whom it is initially granted. The prohibition of transferring a license without a prior written assent by the licensor stems from the commercial patterns of conventional software development and is built into the licenses in order to avoid price erosion.<sup>63</sup> Therefore, the right to transfer a license even within a consolidated corporation, in context of business assignments or in case of contemplated outsourcing or subcontracting must be reserved, if possible, by means of additional negotiations.

Finally, irrespective of the cause of termination, proprietary licensing agreements generally start from the assumption that the user is in that event obliged to destroy the copies of the software currently in its possession. This means in practice that in case the licensor of the computer program, *inter alia*, is declared bankrupt, closes down its operations or is a target of a corporate acquisition, the availability of the source code or an extension of the contract is not a foregone conclusion.<sup>64</sup> In order to avoid such a compulsory replacement of the product and to assure the possibility to purchase substitutive maintenance from another supplier, licensing agreements may contain an escrow provision where the licensor agrees to hold a copy of the application,

<sup>60</sup> Välimäki 2009, 143–150.

<sup>61</sup> Takki 2002, 96–97, 169. Provided that the breach of contract is substantial, the licensing agreement can be dissolved also without a specific stipulation thereof (Hemmo 2003b, 349–350).

<sup>62</sup> See Adobe 2008; Apple 2008; Corel 2007; IBM 2008; Microsoft 2008; Oracle n.d.

<sup>63</sup> Takki 2002, 106–110, 168.

<sup>64</sup> Morgan 2007, 89.

with the source code, that the client can access should the vendor fail to perform its contractual obligations.<sup>65</sup>

### *Open Source Software*

Already since the 1970s computer software has also been licensed under models where the copyright holder waives a part of the entitlements belonging to it on the grounds of copyright; as opposed to for example the record industry the maxim of reserving all possible rights was proven not always to be the most successful method in the computing industry<sup>66</sup>. Exponents of the open source development method argue that making human-readable source code available to all licensees exploits the possibilities of distributed peer review and transparency of process, which ultimately leads to more powerful, reliable and inexpensive software<sup>67</sup>.

Nevertheless, open source does not merely mean access to the source code. OSI has published a ten-clause open source criteria that the distribution terms of an open source license must meet in order to gain their quasi-official approval. The definition contains *sine qua non* as follows:<sup>68</sup>

**Table 1. Open source definition**

| #  | Criterion                       | Specification  |
|----|---------------------------------|--|
| a) | Free redistribution             | The license cannot restrict the licensee from either selling the software or giving it away for free   |
| b) | Access to the source code       | The source code of the program must be readily available and must not impede subsequent development by being intentionally obfuscated  |
| c) | Modified versions               | The license must allow adaptation of the work and allow modified versions to be redistributed under the same license   |
| d) | Code integrity                  | The license may require modified versions to be distributed as the original base source code plus separate patches in order to ensure that modifications are readily distinguishable from the original |
| e) | Non-discrimination              | The license cannot discriminate against any group or individual  |
| f) | Commercialisation               | Fields of application, such as commercial use, cannot be restricted  |
| g) | License distribution            | The license rights automatically apply to anyone to whom the software is redistributed without requiring another license   |
| h) | No product restrictions         | The license cannot make the rights depend on the software remaining a part of a particular software distribution   |
| i) | No co-distribution restrictions | The license cannot restrict what software it is allowed to be distributed with   |

<sup>65</sup> Vapaavuori 2002, 1068–1070. In Finland, for instance the Helsinki Region Chamber of Commerce acts as an escrow agent for source code deposits; see Helsinki Region Chamber of Commerce 2005.

<sup>66</sup> Välimäki 2009, 146.

<sup>67</sup> Raymond 2000, passim.

<sup>68</sup> OSI 2004. Cf. Rosen 2004, 8–11.

- j) Technology independence                      The license cannot require gestures like click wrap to establish a contract between the licensor and the licensee

Open source licenses use the essence of copyright law—the power to exclude and its inherent analogue, the equally large power to authorise<sup>69</sup>—by not focusing on how to prohibit others from using works so licensed but, instead, granting the licensees some of the copyright holders’ exclusive powers. That is to say, they subtract from copyright rather than add to it.<sup>70</sup> Open source licenses that contain reciprocal obligations further refine the perspective by laying stress not merely on *prima facie* freedoms but also on preserving the subsequent open distribution of works. Thus, it seems that the fundamental purpose of this so-called doctrine of copyleft, which allows others to modify and redistribute ‘copylefted’ works, is to deny anyone the right to *exclusively* exploit the results of a creation<sup>71</sup>.

Lack of exclusive powers, however, does not render any party’s economic possibilities unfeasible since pure open source products can be capitalised either offensively by providing value adding support, training and consultation services or defensively by means of cost avoidance. The trade-off between the decision to disclose technology and the ability to appropriate the returns from that technology is ultimately a managerial issue, for which the science of law can only offer the juridical case.<sup>72</sup>

## GNU Software Licenses

### *Free Software Foundation*

The FSF publishes the GPL, the LGPL and the AGPL. Whereas open source in general can be seen as a pragmatic development model free from moral attitudes, the FSF is a political movement, equipped with ethical and social values, that campaigns for computer users’ freedom. Their idea of free software is not sold strictly on business-case grounds but it builds upon the notion of unrestricted freedom to run, to study and to change computer programs, as well as to redistribute copies thereof, with or without changes.<sup>73</sup>

<sup>69</sup> See s. 27(1) of the Copyright Act.

<sup>70</sup> Working group on Libre Software 2000, 20–21.

<sup>71</sup> Laurent 2004, 4. See also Vaidhyanathan 2001, 153–159.

<sup>72</sup> See Deek and McHugh 2008, 265–293, and the references therein, for an analysis concerning the economics of open source. West (2003, 1278–1280) provides a discussion as to shifting from proprietary to open source strategies. Cf. COM (88) 172 final, 173.

<sup>73</sup> FSF 2008b. The philosophy of open source considers proprietary software as a suboptimal solution; as against for the free software movement, proprietary programs are a social problem, if anything.

In 1984 the FSF launched the development of the free operating system GNU, which is nowadays used by millions and known by the name of GNU/Linux. The first version of the GNU General Public License was written for use with programs released as part of the GNU project. It was designed specifically to protect freedom for all users of a program.<sup>74</sup> It is important to notice, nonetheless, that distributing copies of a program for a fee is by no means restricted either in the open source definition or under the GNU software licenses, the point being that whilst charging is permitted, users are according to their freedom not obliged to pay the distribution fee in order to use the software<sup>75</sup>.

#### *GNU General Public License*

Initially each GNU program was licensed under its own general public license mentioning the name of the program it applied to. Version 1 of the GNU General Public License was published on February 1989 in order to allow any program to refer to it without the need for separate modifications.<sup>76</sup> The GPLv1 provided that any vendor distributing binaries must also make the human readable source code available under the same licensing terms and that modified versions, as a whole, had to be distributed under the terms and conditions thereof<sup>77</sup>.

The GNU General Public License, version 2 was published on June 1991, introducing fairly small changes. Arguably the most significant innovation was the new section 7, according to which a licensee who is imposed by circumstances contradicting the conditions of the GPLv2 may not, as a consequence, distribute GPL-covered software at all<sup>78</sup>. The following 17 years witnessed the increasing popularity of open source software and the GPL becoming the principal license in that regard. Nevertheless, also the technological and legal environments were naturally evolved by leaps.

To that end, in order to respond to various development trends, the latest version of the GNU General Public License addresses three challenges in particular that are, according to the FSF, facing the ecosystem of open source<sup>79</sup>. First, s. 6 requires the distributor to provide the licensee

<sup>74</sup> FSF 2008c.

<sup>75</sup> GPLv3, s. 4. As always, the pricing strategies are dependent upon the characteristics of the marketplace. It is often so that enterprise software itself is free and customers pay for ongoing support, maintenance and integration assistance. See Kotler, et al. 1999, 678–709 and more specifically McAllister 2006, 36.

<sup>76</sup> FSF 1989.

<sup>77</sup> GPLv1, ss. 2(b) and 3.

<sup>78</sup> For instance, should a patent license not permit the royalty-free redistribution of a program by all parties receiving copies directly or indirectly through the patent licensee, the only way she can satisfy both it and the GPLv2 is to refrain entirely from distribution.

<sup>79</sup> Smith 2007; Stallman 2007.

with whatever information or data is necessary to install modified software on a device running programs licensed under the GPLv3. Second, in accordance with s. 3, no covered work is deemed part of an effective technological measure under any applicable law fulfilling obligations under art. 11 of the WCT<sup>80</sup>. Third, s. 11 provides that along with the distribution of software covered by GPLv3, the licensor must provide every recipient with any patent licenses necessary to exercise the rights granted in the present license, and should a licensee institute patent proceedings against other users, the license of the former is automatically terminated<sup>81</sup>.

#### *GNU Lesser General Public License*

In computing, collections of standard programs and subroutines, which are stored and available for immediate use by means of a technological procedure known as linking, are called software libraries<sup>82</sup>. They basically provide a range of modules to serve as building blocks in new programs<sup>83</sup>.

The LGPL is a set of additional permissions on top of the GPL, originally intended specifically for software libraries<sup>84</sup>. In accordance with ss. 2 through 4 of the LGPLv3, the license places reciprocal obligations on the program itself but does not apply those restrictions to other software that merely links with the program. Modification of the portions of the LGPL-covered component contained in the combined work and reverse engineering for debugging such modifications, however, must not be effectively restricted. As a consequence, libraries licensed under the LGPL may rather freely be combined also with proprietary applications<sup>85</sup>.

<sup>80</sup> Examples of such legal provisions being on the domestic front c. 5a of the Copyright Act, which implements c. III of the Copyright Directive, and in the US s. 103 of the Digital Millennium Copyright Act (DMCA) 112 Stat. 2860 (1998).

<sup>81</sup> The formulation of the patents clause is largely caused by the patent cooperation agreement between Microsoft Corporation and Novell, Inc. regarding patent coverage for their respective users, which was announced on 2 November 2006; see Microsoft 2006.—By contrast, Red Hat, Inc., a major Linux and open source technology provider, entered on 6 June 2008 into a patent litigation settlement agreement with DataTern, Inc. and Amphion Innovations PLC that protects not only the company but also the upstream and downstream members of the Red Hat community, as defined in the agreement. The whole text of the settlement is made publicly available. (Red Hat 2008.)

<sup>82</sup> WordNet 2006.

<sup>83</sup> Jaeger and Metzger 2006, 38–39.

<sup>84</sup> Stallman 1998. Additional permissions contained in the LGPLv3 except some of the requirements of the host license, *viz.* the GPLv3, by virtue of s. 7 thereof.

<sup>85</sup> Turner 2004.

### *GNU Affero General Public License*

In the past few years there has been a rising interest in on-demand software, which is provided by an ASP to customers over a network, a model also known as ‘software as a service’ (SaaS). From the perspective of a SaaS consumer, IT-related capabilities provided as a service mean access to technology-enabled facilities without knowledge of, expertise with or control over the very technology infrastructure that supports them.<sup>86</sup>

The ordinary GPL does not require anyone to accept it in order to acquire, install, use or inspect software. It obliges the licensee only if the latter distributes software made from GPL-covered code and needs to be accepted only when redistribution occurs.<sup>87</sup> However, as regards ‘distribution’ of application programs through web services or computer networks, no factual publication in the sense related to the law of copyright occurs, since the interaction happens only over a network, with no transfer of a copy<sup>88</sup>. The GPL thus permits making a modified version and letting the public access it on a server without releasing its source code. To that end, s. 13 of the AGPLv3 expressly requires the operator of a network server to provide the source code of the modified version running there to the users of that server.

## 3. Reciprocity

### Theoretical Bases

Anglo-Saxon jurisdictions draw a clear distinction between a copyright license and a contract concerning a copyrighted work; licenses are unilateral permissions to use someone’s property, whereas contracts are exchanges of obligations<sup>89</sup>. In the US, a license is enforced under copyright law at the federal level but a contract, instead, is enforceable under contract law, which varies from state to state<sup>90</sup>. Furthermore, with regard to licenses, provisions contained in the legal document and thus forming the essence of a transaction may under common law be either conditions or covenants. Conditions are based directly on copyright, but covenants are

<sup>86</sup> Ford 2007, 15; Kaiserwerth 2008, 2-9.

<sup>87</sup> Moglen 2001.

<sup>88</sup> Vedenkannas 2002, 866-867. See also, a more theoretical approach, Kivimäki 1948, 256-259.—The earning logic of SaaS is not founded on making and administering copies of the work but on controlling the access to the service (Kulmala 2003, 58).

<sup>89</sup> Collin 2004, 68, 179-180.

<sup>90</sup> See Jones 2003. The remedies available are not the same. In the event of copyright infringement, the relevant possible devices for redress are (1) actual or statutory damages and (2) an injunction prohibiting infringing distribution. Cf. Kumar 2006, 24-35.

added above and beyond any such conditions—*i.e.*, they are merely contractual—and only the violation of the first-mentioned constitutes copyright infringement.<sup>91</sup> The US Court of Appeals for the Federal Circuit recently ruled in *Jacobsen v Katzer*<sup>92</sup> that open source licenses create conditions on the scope of the license, and failure to comply with those conditions may amount to a breach of copyright. The ruling denotes in practice that also the reciprocity obligations contained in the GNU software licenses can hardly be characterised as mere contractual covenants, for the subject matter thereof and language therein are similar to what was upheld by the court as conditional.<sup>93</sup>

In our jurisdiction, no such subtle separation of concepts exists, but licenses are simply contracts. Available remedies, however, vary depending on whether copyright infringement or breach of contract is the case. There are special legal provisions concerning the systems of contractual (s. 26 of the Copyright Act) and forced licenses (ss. 17 to 19a of the Copyright Act), but when it comes to the voluntary agreement on authorising use of copyright to a licensee, any specific sources of law governing them are not available. Domestic legal literature represents licensing agreements as a *sui generis* type of contract that is being administered mainly by the standard theories of law of obligations and that can case-specifically also be influenced by the analogical interpretation of the special regulation regarding other types of contracts<sup>94</sup>.

Consequently, from the Finnish point of view, the matters of form amount to very little in respect of analysing the legal positions derived from a license in force between the parties thereto. It is the factual content of the juristic act that is of the essence. Nonetheless, the competence of a licensor originates from the exclusive rights conferred upon her by virtue of copyright law. It means that copyright defines the framework against which the possibilities of disposition are to be dissected and that the final result is the product of both contractual and statutory factors.

The discussion hereunder follows said premises. In this chapter 3 I shall first untangle the substance of the different categories of reciprocity contained in the GNU software licenses and then, by implication, elucidate what the consequences of non-compliance are. This is done predominantly by means of interpreting the license texts themselves and assessing the justifications found in various preparatory documents, where necessary. Chapter 4 then

<sup>91</sup> Gomulkiewicz 2009, 10–14. See also Rosen 2008, 4–5.

<sup>92</sup> 535 F.3d 1373 (Fed. Cir. 2008).

<sup>93</sup> The case in question concerned with the Artistic License 1.0. The Artistic License uses the traditional language of conditions by noting that the rights to copy, modify and distribute are granted *provided that* the conditions are met, which the court found to be of considerable relevance. This same phrasing is contained in the GNU software licenses; see, *e.g.*, GPLv3, ss. 2 and 4 to 7.

<sup>94</sup> See Vuorijoki 2004, va111.56753.

discusses the systematic outcome of said analysis, to wit the different groups of subsequent works based on their relationship with the original ones and how to differentiate between them. Here the matter is examined on the grounds of national and Community legislation, further refined by legal praxis, as well as relevant forms of legislative history, for the contents of the classes is ultimately a question of copyright law.<sup>95</sup>

As regards definitions, it was mentioned above that the original GNU software licenses were drafted with specific attention to the US legal order. The wordings contained several terms that were taken directly from title 17 of the USC. By so doing, versions 2 of the licenses were by definition dependent upon the details of US copyright law. However, in the course of time, practical experiences with the international use of license texts so formulated revealed certain variations in copyright laws that lead to substantial differences among jurisdictions in the effective requirements and, ultimately, the consequences of the licenses. The GPLv3 Process Definition therefore started from the premise that, to the extent possible, versions 3 of the GNU software licenses ought to reduce the difficulties of internationalisation<sup>96</sup>.

The greatest complexity pertained to the notion of ‘distribution’, a US legal term of art (17 USC 101) and a well-established non-legal term describing commercial transfers of software. Section 2(1) of the Finnish Copyright Act speaks of ‘making available to the public’, which is the closest counterpart to distribution in many other countries as well<sup>97</sup>. The problem of using terms defined by categories drawn from some particular national copyright statute in a global license is that it easily leads to variations in meaning. Distribution, for instance, reportedly in some jurisdictions would not include network transfers of software but might include interdepartmental transfers of physical copies within an organisation<sup>98</sup>.

To that end, versions 3 of the GNU software licenses no more contain any references to distribution but use factually-based terminology instead. This is achieved by introducing two new terms, ‘propagation’ and ‘conveying’, which are defined by behaviour, not by statutory categories. In consequence, to propagate a work means to do anything with it that, without permission, would make one liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy (GPLv3, s. 0). To convey a work, for its part, means any kind of propagation that enables other parties to make or receive copies (*ibid.*).

<sup>95</sup> License terms themselves are contractual stipulations, but the substantive rights granted by the GNU software licenses are defined under applicable local copyright law.

<sup>96</sup> GPLv3 Process Definition.

<sup>97</sup> See, e.g., ss. 2(1) of *lag (1960:729) om upphovsrätt till litterära och konstnärliga verk* (Sweden), *lov om opphavsrett til åndsverk m.v.* (Norway) and *bekendtgørelse af lov om ophavsret* (Denmark) as well as s. 18 of the Copyright, Designs and Patents Act 1988 (c. 48) (UK). Cf. s. 17 of *Gesetz über Urheberrecht und verwandte Schutzrechte* (Germany).

<sup>98</sup> Opinion on Denationalization of Terminology – GPLv3.

Propagation, therefore, includes by virtue of s. 2(1) of the Copyright Act (1) making copies of the work and (2) making the work available to the public, with or without modification. In other jurisdictions it may include, as a consequence of the definition, other actions as well. Activities that constitute propagation of copies to others, then, are conveying. *Argumentum e contrario* would provide that, for instance, giving a copy of GPLv3-covered software to a colleague is propagation, not conveying, as long as the officials use the program in their work within an organisation, rather than personally, because the organisation as a legal entity is not making copies available to others. Other examples of propagation that does not enable other parties to make or receive copies is making personal copies of a program or privately viewing it.

For the sake of simplicity, term propagation will be used to describe the exclusive rights of the copyright holder to dispose of the work and transfer of copies of software will be referred to as conveying throughout the remaining, GNU software license specific parts of this study.

## Standard Reciprocity

### *Central Idea*

The focus of reciprocity, core legal mechanism of the GNU software licenses, has been expressed in the preamble of the GPLv3:

To protect your rights, we need to prevent others from denying you these rights or asking you to surrender the rights. Therefore, you have certain responsibilities if you distribute copies of the software, or if you modify it: *responsibilities to respect the freedom of others.*<sup>99</sup>

Despite a somewhat belletrist manner of representation, the idea is clear: users are free to modify and share software contributions but only under the same terms. This ensures that improvements to software remain available to previous contributors, thus providing them an incentive to make the initial contributions at the outset, and to future contributors alike. Aigrain suggests that this method leads up to ensuring the sustainability of innovation in the software, which takes place, as he calls it, in a ‘protected commons’<sup>100</sup>.

Manifestos aside, the proper reciprocity conditions of legally binding nature are set forth in s. 5 of the GPLv3, which provides that any licensee of a program covered by the GPLv3 may convey a work based on the program contingent upon certain conditions being met. The most important one is subsection 5c, according to which the conveyor is under an obligation to

<sup>99</sup> Emphasis added.

<sup>100</sup> Aigrain 2002, 3. See also Deek and McHugh 2008, 250–251.

license the entire work, as a whole, under the GPLv3 to anyone who comes into possession of a copy. The GPLv3 thus applies to the whole of the work and all its parts regardless of how they are packaged. This is the very essence of reciprocity.

The reciprocity obligation contained in the GPLv3 is of strong nature, for the license does not recognise any exceptions on the grounds of the proportion of the original program to the material attached to it—or to which it is attached. Strong reciprocity obligation is triggered once and for all where conveying occurs and a portion, which by its characteristics possesses relevance related to copyright law, of GPLv3-licensed code is involved<sup>101</sup>.

By contrast, the LGPLv3 embodies a slightly more moderate form of compulsion, so-called standard reciprocity. It loosens the obligation in respect of combined works by providing that a licensee of a program licensed under it may convey a work produced by combining or linking software with the program governed by the LGPLv3 under terms of her own choice. This additional permission shall be scrutinised first.

#### *Combining Work with Code Released under LGPLv3*

Should the licensee *modify* a copy of a covered work governed by the LGPLv3, she may convey a copy of the modified version under either the same license or the GPLv3 (LGPLv3, s. 2). If she chooses the latter, none of the additional permissions of the LGPLv3 apply to that copy.<sup>102</sup> The provision represents reciprocity par excellence.

*Combinations*, instead and subject to particular conditions, are not covered by the standard reciprocity. In accordance with s. 0 of the LGPLv3, a combined work can be produced by means of combining or linking. In modern software development, there is a tendency of separating parts of the software into distinct modules that can contain code and data providing services to independent programs<sup>103</sup>. The common mechanism for achieving this is the use of libraries, *i.e.*, collections of subroutines and classes. The specification of the communication between libraries and applications that use them is called an interface, definitions of which make it possible to use the library by combining it to other programs. This combination, in turn, can generally be achieved by either static linking, where the library is copied into a target application at compile time and a stand-alone executable file is produced, or dynamic linking,

<sup>101</sup> Cf. ch. 0 *infra*.

<sup>102</sup> This ensues already from s. 7 of the GPLv3, which provides that a conveyor of a GPLv3-covered work may at her option remove any additional permission, such as those contained in the LGPLv3, from that copy or from any part of it.

<sup>103</sup> McDermid 1991, 20/14–15.

where the contents of the library are loaded into an application program at runtime and remain separate files on disk.<sup>104</sup>

Hence, combining referred to in the LGPLv3 comes down to making some sort of use of an interface provided by a library module, but not being otherwise based on it<sup>105</sup>. Were the latter provision fulfilled, it would be a question of modification, not combination, and the normal reciprocity obligation of s. 2 of the LGPLv3 would apply<sup>106</sup>. Linking an external component into a work covered by LGPLv3 is thus an instance of modification, wherefore the LGPLv3 or GPLv3, alternatively, will override.

If LGPLv3-covered code is linked into a main program, the license terms of that main program have no obligations from the LGPLv3. Consequently, combined works recognised by the LGPLv3 may be conveyed under terms up to the individual, if certain conditions are met. First, s. 4 of the LGPLv3 provides that the license terms must allow any kind of modification of the LGPLv3-covered software components contained in the combined work and reverse engineering for the search and procurement of defects in such modifications. Second, the conveyor must take care of attaching prominent copyright and license notices and references to the work (LGPLv3, sub-ss. 4a-4c). Third, pursuant to subsection 4e of the LGPLv3, the conveyor is obliged to provide the necessary installation information for installing and executing a modified version of the combined work produced by recombination with altered LGPLv3-covered code, if she would otherwise be required to provide such information under s. 6 of the GPLv3<sup>107</sup>.

Finally, in accordance with subsection 4d of the LGPLv3, the conveyor of combined works must accomplish one of the two alternatives. She may either (1) use a suitable shared library mechanism for linking with the LGPLv3-covered program or (2) convey any LGPLv3-licensed source code of the combined work under the LGPLv3 and the dependent work under such license terms and in such re-linkable form that a user is able to produce a modified combined work without any technological or legal barriers to doing so.

Subsubsection 4d1 of the LGPLv3 further provides that an appropriate shared library mechanism is one that uses at run time a copy of the library already present on the user's

<sup>104</sup> Daintith 2004, 268, 298, 419. See also McDermid 1991, 46/3-8.

<sup>105</sup> In accordance with s. 0 of the LGPLv3, defining a subclass of a class defined by the library is deemed a mode of using an interface provided by the library. It is not obvious, however, whether this specification applies to all cases of data type inheritance, or is merely an exception.

<sup>106</sup> The demarcation between separate, combined and modified works is in greater detail reverted to in ch. 4 *infra*.

<sup>107</sup> The requirement relates to systems that incorporate reciprocally licensed software, but use hardware to prevent users from running modified versions of the software on that hardware. The creation of systems of this kind is known as 'tivoisation'; see ch. 0 *infra* and further Brooks 2007, 56.

computer system, and will operate properly with a modified version of the library that is interface-compatible with the particular version of the library with which the combined work was made in the first place. Thus, in order to satisfy these requirements, the combining must occur dynamically, and the proprietary parts of the combined work must not refuse to function irrespective of the internal operations of the library as long as the features of the interface remain similar to the original one.

If the conveyor chooses to link the LGPLv3-licensed library to the combined work statically, the combining occurs at compile time and the library cannot be utilised independently on runtime requests. Therefore, the conveyor must provide her licensees with any code, data and utility programs needed for reproducing the combined work; any details about the internals of the main program are not required. This corresponding application code may be in object code or source code form, but in any event the LGPLv3 provides that it must be suitable for the user to produce a modified combined work by editing the library and then recombining or re-linking the result. (LGPLv3, subsub-s. 4d0.) The users' right for this cannot be denied in the license of the combined work, for otherwise the work might not be conveyed at all (*arg.* GPLv3, s. 12).

Consequently, it seems that linking is permitted where users are able to modify the library themselves and are provided with the necessary source code and instructions for so doing. The architecture of the main program must, of course, be designed in a way that makes the re-linking with LGPLv3-covered source separately from the main program possible, and the license terms of the combined work must allow reverse engineering to debug the new versions of the library that are linked with the main program<sup>108</sup>. The factual term for the 'linking' operation is dependent upon the characteristics of particular programming languages and other technological circumstances. Such variance, however, carries no legal relevance with regard to the LGPLv3, for the combination that forms a single work is not limited to linking. Instead, combined works are defined with references to both linking and combining in general, and these terms are used invariably together throughout the license text. For example, traditional linking and its counterpart in object-oriented programming languages, inheritance, are both instances of combining, and the result in both cases is a combined work, not a modification, that can be licensed any way the conveyor sees fit.<sup>109</sup>

As a result of dynamic linking, it is also possible to combine not the entire library, but only parts of it. Pursuant to s. 3 of the LGPLv3, the object code form of an application may

<sup>108</sup> Under the EC legal order, this requirement stems to a great extent already from the provisions of the Software Directive, art. 6. See s. 25k of the Copyright Act.

<sup>109</sup> Cf. Slashdot 2003.

incorporate material from a header file that is part of the LGPLv3-covered program<sup>110</sup>. Such object code can be conveyed under whichever license, if the incorporated material is limited to numerical parameters and comparable quantities, or small code snippets<sup>111</sup>. Should the incorporation cover more material, the conveyor is obliged to give prominent notice with each copy of the object code that a program licensed under the LGPLv3 is used in it and that the particular program and its use are covered by the present license (LGPLv3, sub-s. 3a). The obligation is thus substantially milder than where a work that uses the library is conveyed together with the latter, as no requirements in respect of source code, installation information or copyright notices are set upon the conveyor.

#### *Corresponding Source and Conveying Thereof*

As regards legal instruments requiring that beneficiaries receive a program in source code form or can obtain it in such form should they wish, the meaning and content of the very term are an issue of great substance. In the context of GNU software licenses, the source code for a work means the preferred form of a program for making modifications to it (GPLv3, s. 1). The definition is not bound to technical epithets but functional convenience. Correspondingly, object code is in s. 1 of the GPLv3 defined to mean any non-source form the work. Object code, therefore, includes any kinds of transformed versions of the source code, and the definition also means that intentionally shrouded or obfuscated source does not qualify for the reciprocity obligation<sup>112</sup>.

All versions of the GNU software licenses require the conveyor to provide the entire source code necessary to build the piece of software that is governed by such license, including supporting libraries, compilation scripts, etc. (GPLv3, s. 1). Providing source merely of the latest development code does not fulfil the requirement, but users must be offered the chance to obtain the source code for the exact object code they have received. Thus, the definition of *corresponding* source means that the provided sources must correspond precisely to the conveyed binaries; the licensor is obliged to make sure that she possesses the source code form for each version of the program that has been conveyed for as long as s. 6 of the GPLv3 provides.

<sup>110</sup> This provision can be criticised for using a somewhat vague terminology, for it is not apparent what the license means by 'header file'; no definition is on hand. Header files are typically files that are automatically included in another source file by the compiler, but some programming languages use different naming schemes instead.

<sup>111</sup> With regard to the last-mentioned, to wit macros, inline functions and templates, the license text sets a limit of ten or fewer lines in length. However, many programming languages do not constrain the length of the code lines by any means, whereupon it would have been more consistent to have set the restriction on the number of characters instead.

<sup>112</sup> GPLv3-DD1, 8-9. See Deek and McHugh (2008, 241) for more information.

However, s. 1 of the GPLv3 draws the line of corresponding source code at system libraries, so that the provision of certain core components of operating systems is not required. By definition, system libraries also include software that may not come directly with the operating system, but that all users of the GNU-licensed program can reasonably be expected to possess. The formulation arguably means that standard libraries of common programming languages, also GPLv3-incompatible ones, would be included therein.<sup>113</sup> The preliminary works of the GPLv3 suggest that the more low-level the functionality provided by such a library is, the more likely it is to be qualified for the system library extension<sup>114</sup>. If the library meets the criteria, the requirement to convey source for the whole program will not include it, even if a linked executable containing it is conveyed<sup>115</sup>.

Moreover, under the fifth paragraph of s. 1 of the GPLv3, the corresponding source need not include anything that users can regenerate automatically from other parts of the conveyed source code. In addition to the requirement of no manual intervention, the provision does not contain any additional modifiers. From the process for public comment, the problematic nature of the paragraph's wording as it now stands emerged, for the automatic regeneration can in some cases be extremely time-consuming or even unachievable in practice. Various techniques that require integer factorisation of large numbers or use of external dependencies are available, whereupon it was suggested that the text ought to read 'regenerate automatically and conveniently', or suchlike.<sup>116</sup> The concerns expressed by the commentators did not, however, touch a chord among the drafters. It would be, therefore, still possible for a *mala fide* conveyor to try to escape her obligation to provide source code by means of resorting to such manipulation and argue that users can indeed regenerate the rest of the source automatically, even if it took several years.

As a supplement to the terms and conditions contained in the GPLv3, s. 0 of the LGPLv3 speaks, in addition, of the minimal corresponding source for a combined work. The term is defined to mean the corresponding source for the combined work, excluding any source code for portions of the combined work that, considered in isolation, are based on the work that

<sup>113</sup> Section 1 of the GPLv3 provides that the system libraries of an executable work include anything, other than the work as a whole, that is included in the normal form of packaging a major essential component of a specific operating system, but which is not part of such a component, and serves only to enable the use of the work with such a component, or to implement an interface that is an official standard or that is widely used among developers working in a particular programming language, for which an implementation is available to the public in source code form.

<sup>114</sup> GPLv3-DD1, 9.

<sup>115</sup> Consequently, it is possible to use a proprietary module or one that is licensed under an incompatible license in programs that are governed by a GNU software license, insofar as the present module can be deemed to count as a 'system library'.

<sup>116</sup> See GPLv3 comments in file 'gplv3-draft-4'.

uses the library, and not on the library proper with which the combined work was made<sup>117</sup>. Hence, depending on the way of production of the combined work<sup>118</sup>, the conveyor of a work produced by combining material under her control with an LGPLv3-covered software component is not necessarily obliged to provide her licensees with any of the source code that is not based on the component in question.

How, then, should the corresponding source be conveyed and what should be the charge for this? Section 6 of the GPLv3 specifies several manners for providing the necessary source code depending on the way of the conveyance of the object code form of the covered work. The available options can be summarised as follows:

**Table 2. Ways of conveying corresponding source**

| Sub-s. | Form of Conveyance                      | Providing the Source Code   | Price                                      | Supplementary Conditions   |
|--------|---|---|--|--|
| 6a     | Physical product or medium              | Accompanied on a physical medium  | No further charge                          |  |
| 6b     | Physical product or medium              | Written offer to give anyone who possesses the object code<br>1) on a physical medium<br>2) access from a network server <sup>119</sup> | 1) Reasonable direct costs<br>2) No charge | Offer must be valid for<br>1) 3 years minimum<br>2) as long as the conveyor offers support for the product model |
| 6c     | Individual copies                       | Copy of the written offer   | Pursuant to sub-s. 6b                      | Allowed only<br>1) occasionally<br>2) non-commercially<br>3) if received the object with such an offer           |
| 6d     | Offering access from a designated place | Equivalent access   | No further charge                          | Conveyor is obligated to ensure that the source is available as long as the object code is being offered         |
| 6e     | Peer-to-peer transmission               | Informing other peers where is being offered under sub-s. 6d <sup>120</sup>   | No charge                                  |  |

<sup>117</sup> See also LGPLv3-DD2, 6.

<sup>118</sup> Static linking requires the conveyance of the corresponding application code (which does not necessarily have to be in source code form) whereas dynamic linking necessitates, subject to the quantity and quality of the incorporated material, the use of a shared library mechanism. Cf. ch. 0 *supra*.

<sup>119</sup> The provision varies from the corresponding subsection of preceding license versions, according to which the conveyor was specifically required to provide the source on physical media by mail, if any user would prefer that method to an access from a network server; see GPLv2, sub-s. 2b.

Irrespective of the chosen way of conveying, the corresponding source must under the first and seventh paragraphs of s. 6 of the GPLv3 always (1) be in machine-readable form, (2) be in a format that is publicly documented and (3) require no special password or key for unpacking, reading or copying. Thus, the conveyor of object code is prevented from purporting to satisfy her obligations under the section by providing source code in some private, locked or digitally-restricted form.

### *Measures against Circumvention*

The continuous development and growing accessibility of IT have rendered copying and distribution of data exceedingly fast and affordable<sup>121</sup>. In response, copyright holders have begun to make use of so-called technological measures that provide access control for digital media<sup>122</sup>. Those, in turn, have given impetus to activists to take counter-measures by designing tools that enable hacking of different access controls. Finally the WIPO Copyright Treaty, adopted in 1996, established the international background for the anti-circumvention regulation of technological measures.<sup>123</sup> The contracting parties to the WCT are pursuant to art. 11 thereof obliged to provide adequate legal protection and effective legal remedies against the circumvention of effective technological measures that are used by authors in connection with the exercise of their rights under the WCT or the Berne Convention and that restrict acts, which are not authorised by the authors or permitted by law.

The prohibition of circumventing technological measures applies, nonetheless, merely to measures that are classified 'effective'. Article 11 of the WCT avoids any definition in respect of effectiveness, presumably in view of the resistance to its draft version, so that the exact content of the class is ultimately a question of applicable national law<sup>124</sup>. In accordance with s. 3 of the GPLv3, however, works licensed under GPLv3 are not under any circumstances to be deemed

<sup>120</sup> Those who do not obtain the object code from the conveyor who has chosen option 6d are outside the scope of that particular provision. Therefore, the conveyor in question does not need to give them any access to the source code. Consequently, a licensee is in compliance with subsection 6e so long as she knows and informs other peers where the object code and its corresponding source are publicly available at no charge. Cf. Opinion on BitTorrent Propagation - GPLv3.

<sup>121</sup> KM 1987:8, 25-26, 156, 195; HE 161/1990 vp, 16.

<sup>122</sup> See Opinion on Digital Restrictions Management - GPLv3.

<sup>123</sup> Hietanen, Oksanen and Välimäki 2007, 15-23. For more information about the legal framework concerning technological measures, see Gasser 2006, 6-21.

<sup>124</sup> See CRNR/DC/55, art. 13(3) and further Lai 1999, 80-81. Under art. 6(3) the Copyright Directive, technological measures are deemed effective where the use of a protected work or other subject matter is controlled by the copyright holders through application of an access control or protection process, such as encryption, scrambling or other transformation of the work or other subject matter or a copy control mechanism, which achieves the protection objective. Cf. HelHO 22.5.2008 1427 (final judgement).

part of an effective technological measure under whichever applicable law fulfilling obligations under the article concerned. Further, the second paragraph of the same section contains a waiver, according to which a conveying party relinquishes the power to forbid the circumvention of technological measures. The waiver, however, applies only to the extent that such circumvention is accomplished through the exercise of rights granted in the GNU software licenses with respect to the covered work.

Consequently, the GPLv3 does not prohibit the use digital rights management (DRM). By contrast, the license allows one to use code released under the GPLv3 in order to develop a DRM technology, but if that technology is at a later time circumvented and the present software then further conveyed without any such technological measures, no remedies related to the law of copyright are at disposal, for pursuant to s. 3 of the GPLv3 the DRM technology that was circumvented was not such an effective measure that would enjoy protection under, for instance, c. 5a of the Copyright Act.

The LGPLv3 instead, as a standard reciprocity license, provides that combined works may be conveyed without the need to be bound by s. 3 of the GPLv3 (LGPLv3, s. 1). Thus, the conveyor of an LGPLv3-covered work has the right to assert that the work is protection against copying without having to waive any right, which the GPLv3 would otherwise require, to forbid the circumvention of technological measures. Moreover, she is not obliged to disclaim any intention to limit operation or modification of the work but may do so against the users thereof as a means of enforcing her or third parties' statutory rights (*arg. GPLv3, s. 3 i.f.*).

## Strong Reciprocity

### *Modifying Works Released under GPLv3*

The functionality of strong reciprocity is founded on the rule that modifications of software that is governed by the GPLv3 can by all means remain private and do under no circumstances have to be conveyed, but—this is essential—if they are in fact conveyed then the conveyance must be done under the same license. Whilst the license explicitly precludes the inclusion of software licensed under the GPLv3 in publicly conveyed proprietary programs, this does not affect programs used only internally within an organisation; unless conveying occurs, the licensees are free to make a modified version and use it in any way they see fit without ever releasing it outside the organisation<sup>125</sup>. Thus, strong reciprocity does not mean that one is obliged to convey the modifications she has made to the software, only that if she does so, the

<sup>125</sup> Other persons are not allowed to demand any GPLv3-licensee to deliver a copy of a program such licensed that has not been conveyed. The same applies to using a program or a modification thereof on a public web site to operate the said service. The AGPLv3 makes an exception in this regard, see ch. 0 *infra*.

modifications and modified versions must be licensed exclusively under the terms of the GPLv3.

The conveyance of software that is affected by the GPLv3 is stipulated in sections 4 through 6 of the license. In short, the GPLv3 requires that no one is allowed to change the license terms of a GPLv3-covered program or a modified work thereof, otherwise conveying is not allowed; actions to the contrary constitute an infringement of copyright. Section 12 of the GPLv3 expressly states that any conditions otherwise imposed on the licensee contradicting the conditions of the said license do not excuse her from the provisions of the GPLv3. If one cannot convey covered software so as to satisfy simultaneously the obligations under the GPLv3 and any other pertinent obligations, then as a consequence one may not convey it at all.

Under s. 4 of the GPLv3, the licensee is permitted to convey *verbatim copies* of the source code of any work licensed under the license as she received it, provided that she (1) publishes on each copy a copyright notice, (2) keeps intact all notices stating that the GPLv3 and any non-permissive terms added in accordance with s. 7 thereof apply to the code, (3) keeps intact all notices of the absence of any warranty and (4) gives all recipients a copy of the GPLv3 along with the source code. For the avoidance of doubt, the second paragraph of the section provides that, for each copy that is conveyed, any price or no price may be charged, and support or warranty protection may be offered for a fee<sup>126</sup>.

The propagation or *modification* of a GPLv3-covered work is not permitted except as expressly provided (GPLv3, s. 8). Modification, in this context, is in s. 0 of the GPLv3 defined to mean copying from or adapting all or part of the work in a fashion that requires copyright permission, other than the making of an exact copy; the resulting work is called a 'modified version' of or a 'work based on' the earlier work. To that end, in accordance with s. 5 of the GPLv3, conveying a work based on the GPLv3-covered program, or the modifications to produce it from the program, is allowed under the terms of section 4, provided that certain conditions are met. Of these, the provision contained in subsection 5c is the most significant one, as it constitutes the legal core of strong reciprocity.

Modified versions of GPLv3-covered software must be licensed entirely under the GPLv3. The license will therefore apply to the work as a whole, which *in situ* is the incorporeal aggregate derived from the definitions contained in the license texts and the rules set out in the present

<sup>126</sup> By contrast, s. 10 of the GPLv3 provides that one is not permitted to impose any further restrictions on the exercise of the rights granted or affirmed under the license. The prohibition means that license fees or royalties may under no circumstances be effectively imposed, since users cannot under the system of GPLv3 be required to pay when they receive a copy of a program. Anyone who conveys GPLv3-covered software for a fee is not obliged to make it also available to the public without a charge, but any licensee who has paid the fee and therefore received a copy, may under the same section release it to the public with or without a fee.

doctrines of copyright law, as discussed in chapter 4 below. Subsection 5c of the GPLv3 expressly provides that the requirement to license all the material that constitutes a work concerns all parts thereto, regardless of how they are packaged. Conveyors may not use some artificial packaging constructions of a modified work to evade the reciprocity obligation. Similarly, a component that is conveyed separately but is designed only to be used in combination with and as a part of a specific GPLv3-covered program should according to the license be considered a part of that program and not as a separate work, whereupon it, too, should be licensed under the GPLv3.

It stems from the definition of the corresponding source contained in the fourth paragraph of s. 1 of the GPLv3 that it includes, among others, interface definition files associated with source files for the work, and the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require. With regard to the GPLv2, it was not completely clear whether dynamic linkage would constitute the creation of a modified work<sup>127</sup>. By contrast, under the GPLv3 it seems apparent that an administrator of justice may, by virtue of the license text, start from the premise that a licensee cannot avoid complying with the requirements of the GPLv3 by dynamically linking an add-on component to the original version of a program, with the exception of meeting the criteria for a system library (*arg.* GPLv3, s. 1, para. 3). Similarly, since the license text speaks of modules with which the program is 'specifically designed' to work, if one can interchange the GPLv3-licensed module for another one, which is not governed by that license, the precondition does not appear fulfilled. In that case, the module would not form a part of the overall work, whereupon the program itself would not be governed by the GPLv3.

#### *Conveying to Outside Contractors*

Notwithstanding anything to the contrary, s. 2 of the GPLv3 gives an explicit permission for a client to provide a copy of its modified software to a contractor exclusively for that contractor to modify it further, or run it, on behalf of the client. Those making or running the software must do so exclusively on the user's behalf as well as under the user's direction and control. The position of the contractor is thus comparable with that of the user's employees in how they are limited to act<sup>128</sup>.

<sup>127</sup> Rosen 2001, 2; Curran 2008, 43. Cf. Jaeger 2005, 75–76; FSF 2008a.

<sup>128</sup> Cf. s. 2(1) of the Employment Contracts Act (55/2001), according to which employment consists of an employee agreeing personally to perform work for an employer under the employer's direction and supervision in return for pay or some other remuneration.

Nonetheless, the control permitted under s. 2 of the GPLv3 can only be exercised over each client's own copyrighted changes to the GPLv3-covered program. The parts of the program obtained from other contributors must be provided for the contractor abiding by the above-described procedure. This supplementary condition has been included in order to prevent the exception concerning the conveyance to outside contractors to be converted into a device of making a program available to users or customers without meeting the requirements set forth in ss. 4-6 of the GPLv3<sup>129</sup>.

Consequently, within the limits of the provision, the users of GPLv3-covered software are permitted to contract with non-employee developers working offsite to make modifications intended for the client's private or internal use<sup>130</sup>. Similarly, they are permitted to make an arrangement with a third party to operate their data centres or suchlike. The contractor agrees in a non-disclosure agreement (NDA) not to release the modified version developed by her unless she is advised to the contrary by the client. Such arrangements do not conflict with the general system of the GNU software licenses, for no GPLv3-covered code is being conveyed under a NDA outside the relationship on assignment between the client and the contractor. The client maintains her right to convey the modified version further, albeit she will probably choose not to exercise that right.

#### *Entity Transactions*

Mergers, acquisitions, buyouts and other corporate control transactions inevitably entail a certain level of uncertainty with regard to the rights and liabilities being transferred<sup>131</sup>. At present, these transactions increasingly involve organisations with assets that are governed by a GNU software license<sup>132</sup>. Accordingly, concerns have appeared about whether and to what extent such transactions activate the conveying-related requirements of said licenses for programs that previously have been used and modified internally or by outside contractors, pursuant to s. 2 of the GPLv3<sup>133</sup>. Versions 3 of the license texts are now giving an explicit answer to the question.

Transfers of organisational assets as well as other types of control transactions are referred to in s. 10 of the GPLv3 as 'entity transactions'. The second paragraph of the section in question automatically causes any propagation resulting from these entity transactions to have the same

<sup>129</sup> See GPLv3-DD4, 12.

<sup>130</sup> Cf. ch. 0 *supra*.

<sup>131</sup> Lajoux and Elson 2000, 161-162. See also Howson 2003, 14-29.

<sup>132</sup> See the statistics contained in the final paragraph of ch. 0 *supra*.

<sup>133</sup> GPLv3-DD2, 23.

effect as though conveying had occurred under the terms of substantial sections concerning conveyance.<sup>134</sup> The definition arguably means that, for all practical purposes, parties to an entity transaction seem not to be able to avoid the consequences of the GNU software licenses, irrespective of how the details of the deal have been structured. For instance, should an operative entity of an undertaking be sold, the seller that has been using GPLv3-covered software internally is not allowed to keep control of a trade secret embodied in its improvements by keeping the source code for itself and assigning only the binaries, for each party receives automatically whatever licenses to the work the predecessor in interest had or could give.

In practice, the licenses that are received by the successor in interest are comprised of all upstream licenses in the chain of propagation and the license and a right to possession of the corresponding source of the software that has been used internally, modified or unmodified. The predecessor in interest might not, however, always be able to obtain the corresponding source. For example, a three-year written offer to provide the corresponding source might have expired by the time of the entity transaction<sup>135</sup>. Therefore, the right to possession of the source code is subject to the predecessor having it or being able to obtain it with reasonable efforts (GPLv3, s. 10, para. 2 *i.f.*).

#### *Technical Barriers to Modification*

The GPLv3 also introduced provisions that respond to the practice of conveying programs that are covered by a GNU software license in devices that employ technical means to restrict users from installing and running modified versions<sup>136</sup>. In accordance with s. 6 of the GPLv3, the right to convey object code in a defined class of user products is conditional upon providing whatever information is required to enable a recipient to replace the object code embodied in the product with a functioning modified version. A ‘user product’ is in the license defined to mean (1) any tangible personal property that is normally used for personal, family or household purposes and (2) anything designed or sold for incorporation into a dwelling.

Pursuant to GPLv3, s. 6, para. 3, ambiguities are to be resolved in favour of coverage under the definition. Moreover, the words ‘normally used’ in the consumer product definition must be deemed to refer to a typical or common use of a class of the product, rather than the status of a

<sup>134</sup> The provision was introduced in Draft 2 of the GPLv3 to establish a default background rule to reduce costs caused by the performance of due diligence investigations in connection with business transactions, where potential acquirers evaluate the target company or its assets for acquisition (GPLv3-DD2, 23).

<sup>135</sup> See table 2 on p. **Virhe. Kirjanmerkkiä ei ole määritetty.**

<sup>136</sup> GPLv3-DD1, 9; GPLv3-DD2, 7-9; GPLv3-DD3, 9-12. See also the Preamble of the GPLv3.

particular user, or expected or actual uses by a particular user. Finally, the existence of substantial non-consumer uses of a product does not negate a determination that it is a consumer product, unless such non-consumer uses represent the only significant mode of use of that product.<sup>137</sup> Under s. 3 of the Consumer Protection Act (38/1978), consumer goods are defined as goods that are offered to natural persons or which such persons acquire, to an essential extent, for their private households. According to the Government proposal concerning the amendment of the Consumer Protection Act, as regards marketing, the target group, not the object thereof, constitutes the deciding factor of the judgement<sup>138</sup>. As a consequence, the definition of user products in the GNU software licenses is appreciably concordant with the Finnish practice of interpretation.

For products so defined, the corresponding source must be accompanied by the necessary installation information, should the conveying occur as part of a transaction where the right of possession and use of a user product is transferred to the recipient in perpetuity or for a fixed term (GPLv3, s. 6, para. 5). The particular characterisation of the transaction is immaterial; it is the subject matter, not the form that is of determining relevance. Installation information, for its part, refers under the fourth paragraph of the section to any information that is required to install and execute a covered work from a modified version of its corresponding source. Installation information would therefore include, for instance, the necessitated signing keys, with which the hardware of a user product authenticates the software against a valid cryptographic signature before functioning<sup>139</sup>. The information must suffice to ensure that the continued operation of the modified object code is in no case interfered with or prevented solely because modifications have been made<sup>140</sup>.

It is good to note that the requirement to provide installation information does not include a requirement to continue to offer support service, warranty, or updates for a modified work or for the user product where it has been installed (GPLv3, s. 6, para. 6). The same bears upon warranty that is being provided in accordance with s. 4 of the GPLv3. No explicit provision is on hand, but I deem that the possibility to offer a guarantee engagement, which is voided if the user modifies the software it applies to, is an implicit quality of the license, since the licensor

<sup>137</sup> Until Draft 4 of the GPLv3, the draft versions of the license document contained a reference to the Magnusson-Moss Warranty Act (15 USC 2301 *et seq.*), a federal consumer protection statute in the US. As a response to the objection to country-specific legal references in the license text (see GPLv3 comments in file 'gplv3-draft-3'), it was replaced later on with an encapsulation of the judicial and administrative principles established over the past three decades in the US concerning the Magnusson-Moss consumer product definition. (GPLv3-DD4, 11.)

<sup>138</sup> HE 360/1992 vp, 45–46.

<sup>139</sup> FSF 2008a.

<sup>140</sup> Naturally, the requirement will not apply if no party retains the ability to install modified object code on the user product for instance on the grounds that the work has been installed in read-only memory (GPLv3, s. 6, para. 5 *i.f.*).

cannot be presupposed to provide a warranty that covers all feasible activities with regard to a program governed by a GNU software license.

### Network Reciprocity

Making software available only in binary executables is merely one way of keeping it secret. Another variety, which is currently receiving much attention in the software industry, is simply allowing an access to the functionality of a piece of software over a network without the availability of executables whatsoever. Pursuant to ss. 2(3)(1) and (3) of the Copyright Act, a work is made available to the public, *inter alia*, when it is communicated to the public by wire or wireless; or when copies of it are offered for sale, rental or lending, or are otherwise distributed to the public. As per this definition, it is not always obvious whether a computer program has been made available to the public<sup>141</sup>. It seems clear that copies of a work may as well be distributed in physical distribution media as by offering access to them in a network server (KKO 1999:115)<sup>142</sup>. However, an application that is accessed via web browser over a network such as the Internet arguably does not meet the threshold of publication, unless a copy of the application is transferred to the client. In other words, running web-based applications and suchlike programs provided by an ASP, is comparable to the mere use of a work, which lies outside the scope of application of the copyright law.<sup>143</sup>

To that end, one of the most controversial issues during the drafting process of the GPLv3 was whether to add an obligation to make the source code available for software licensed under the GPLv3 if an access to it was provided over a network<sup>144</sup>. Eventually, no requirements about the public use on network servers of modified versions of programs that are governed by the GPLv3 were added in that particular license. By contrast, s. 0 of the GPLv3 explicitly states that mere interaction with a user through a computer network, with no transfer of a copy, is not conveying under the framework of the GNU software licenses. The FSF decided to provide the option of controlling modified network use through an alternative license, the AGPLv3.

<sup>141</sup> See also KM 1987:8, 181–182.

<sup>142</sup> Cf. Niiranen and Tarkela 1998, 170–171, which precedes the judgement of the Supreme Court.

<sup>143</sup> Välimäki 2009, 41–42. See also Reed 2004, 102 ff.

<sup>144</sup> See GPLv3 comments in file 'gplv3-draft-1' and GPLv3 comments in file 'gplv3-draft-2'. Drafts 1 and 2 of the GPLv3 allowed in their clause 7b4 licensors to add a requirement to publish source to users interacting with modified versions remotely through a network. However, some commentators considered that requirement to be too burdensome and expressed concern about the administrative costs of checking code for it. Publishing the AGPLv3 as a separate license made it easier to determine which code has the source publication requirement. (GPLv3-DD2, 29–31.)

The AGPLv3 embodies the text of the GPLv3, slightly adapted for the new name, and an additional paragraph in s. 13 that requires people who modify the software to publicly provide source code when users interact with the software over a network. The modified version is obliged to ‘prominently offer’ the corresponding source, which means that anyone who modifies the software is not compelled to assure herself that every user of the software receives a copy of the source code, but it must be readily available to users. The requirement is corresponding to that in GPLv3, subsection 6d.

The AGPLv3 speaks of ‘network interaction’ without any additional qualifiers. A literal interpretation of the section therefore suggests that the method of present interaction includes not only traditional graphical user interfaces (GUIs) that users manipulate for web applications, but also employing other kinds of communications protocols, such as sending requests for e-mail or hypertext retrieval. The scope of the definition encompasses any interaction now known or later developed for use over a group of interconnected computers, for it is not dependent upon the technological methods of implementation. That was also the author’s intent in drafting the license<sup>145</sup>. However, the interpretation of interaction cannot arguably be extended to software that is not designed to interact with users through a network, but happens to do so where it is being run over some network protocol. Virtually any program can be used remotely through specialised tools that support logging into remote machines and executing commands therein, but such environmental factors cannot be decisive rather than the design solutions made by the author.

Section 13 of the GPLv3 grants, as an exception to the rest of its terms, licensees thereof the permission to link or combine any covered work with a work licensed under the AGPLv3 into a single combined work, and to convey the resulting work. The terms of the GPLv3 will continue to apply to the part that is the covered work, but the special requirements of s. 13 of the AGPLv3 will appertain to the combination as it is. The compatibility is one-way for works licensed under the AGPLv3 cannot as such be reverted back to the GPLv3 (*arg.* GPLv3, s. 13)<sup>146</sup>. AGPLv3, s. 13, para. 1 provides that the corresponding source of the resulting work, which must be held available to users, includes also any GPLv3-covered code that is incorporated into it. The provision ensures that licensees cannot escape their obligations by placing their modifications into GPLv3-licensed modules that carry no requirements concerning interaction through a network<sup>147</sup>.

<sup>145</sup> ‘The [AGPLv3] needs to cover all the various protocols and means for network interaction in order to fully achieve its purpose’ (AGPLv3-DD2).

<sup>146</sup> Naturally, if the modified version does no more support the network interaction presumed by the AGPLv3, the obligation is not triggered in that regard.

<sup>147</sup> See GPLv3-FIN, 19.

As noted above, the use of a work covered by copyright, as such, is not a part of the exclusive economic rights belonging to the copyright holder<sup>148</sup>. Therefore, it would *prima facie* appear that the network use obligation would constitute, according to the common law terminology, a covenant to, not a condition of, the AGPLv3, since the obligation would not be something that must be satisfied in order for the licensee to be licensed at all but merely a term that the licensee agrees to when she accepts the license. Nonetheless, ‘using’ a computer program normally means, also in all cases that are relevant in respect of s. 13 of the AGPLv3, running it. By definition, a computer operates by running a program that is loaded into its memory, and every time a program is being run, a copy of it is made in the operating memory.<sup>149</sup> That is an instance of making copies of a work which, for one, belongs to the exclusive rights of disposition enjoyed by copyright holders.<sup>150</sup>

In accordance with s. 25j(1) of the Copyright Act, any person who has legally acquired a computer program is entitled to make such copies of the program as may be necessary for its use for the intended purpose. Section 25j(5) moreover provides that any contractual provision limiting the use of a computer program in accordance with subsections 2 through 4 of the present section is void. However, since subsection 1 is not included in the prohibition, contracting parties are by law free to stipulate even the right to temporary acts of reproduction<sup>151</sup>. If the licensee oversteps the limits of use permitted by the license, the activity constitutes a breach of contract, not copyright infringement<sup>152</sup>. Nevertheless, nothing other than the license grants someone who is not the copyright holder a permission to modify any covered work, since under art. 4(b) of the Software Directive the exclusive rights of the copyright holder include the right to do or to authorise any alteration of a computer program<sup>153</sup>. Moreover, in accordance with s. 28 of the Copyright Act, in the absence of agreement to the contrary, the person to whom copyright has been transferred may not alter the work or transfer the copyright to others.

Consequently, running as an ASP an altered version of AGPLv3-covered software that does not offer users interacting with it remotely an opportunity to receive the source code effectively

<sup>148</sup> Haarmann 2005, 111. In accordance with s. 2(1) of the Copyright Act, copyright includes, subject to the limitations stated in c. 2 of the Act, the exclusive right to dispose of the work by (1) making copies of it and by (2) making it available to the public. Pursuant to s. 2(3), a work is made available to the public when (1) it is communicated to the public by wire or wireless; (2) it is performed in public; (3) copies of it are offered for sale, rental or lending, or are otherwise distributed to the public; or (4) it is displayed in public.

<sup>149</sup> KM 1987:8, 38.

<sup>150</sup> HE 161/1990 vp, 12, 52–53.

<sup>151</sup> See also KM 1987:8, 270–271.

<sup>152</sup> HE 211/1992 vp, 9.

<sup>153</sup> Section 2(1) of the Copyright Act provides in effect for the same.

means that the modification has not occurred in accordance with the license. The entitlement provided by s. 25j(1) of the Copyright Act encompasses only situations where the actions are necessary for using a program for its 'intended purpose'. If a program licensed under the AGPLv3 has been modified by maintaining the support for remote access but removing the possibility to receive the source code, the program is no more utilised within the scope of the license provisions, whereupon the result is not merely a breach of contract but has to be deemed as infringing copyright (*cf.* KKO 2008:45). This, in turn, possesses some significant effects with regard to the enforcement of the license.

## Enforcement of Reciprocity Obligations

### *Fundamentals*

Since the GNU software licenses are copyright licenses in character, the copyright holders of the software are the ones who have the power to enforce them<sup>154</sup>. Traditionally, however, the enforcement of the license requirements has been handled privately through negotiation and out of court agreements. The social pressure related to the consequences of non-compliance—detrimental publicity, loss of goodwill, *etc.*—has assisted in reaching amicable settlements.<sup>155</sup> However, if taking legal action becomes necessary, the licenses themselves and ultimately the copyright law offer a somewhat solid basis for bringing a suit against the infringer<sup>156</sup>. In Europe, the District Court of Munich I confirmed in 2004 that the GPL can effectively become part of an agreement and is enforceable under the German law<sup>157</sup>. On the other side of the Atlantic the first, as far as is known, lawsuits for violations of the GPL were filed in 2007<sup>158</sup>.

<sup>154</sup> Section 6 of the Copyright Act provides that, if a work has two or more authors whose contributions do not constitute independent works, the copyright belongs to the authors jointly. However, each one of them is entitled to bring an action of infringement. See KM 1953:5, 51.

<sup>155</sup> FSF 2005; Vetter 2006, 244; Välimäki 2009, 212–213. *Cf.* Kumar 2006, 4–5, who sees the settling of lawsuits as a consequence of uncertainty with regard to the legal groundwork.

<sup>156</sup> If a computer program is not original enough (see ch. 0 *infra*) to be copyrighted but still possesses a certain amount of originality, which differentiates it from other products and expresses its commercial source, it is also conceivable that the Unfair Business Practices Act (1061/1978) applies (Sorvari 2007, 395). In such a case, should a breach of a GNU software license incur a risk of interference as to the commercial source, the breaching entrepreneur may under s. 6(1) of the present Act be prohibited from continuing or repeating such practice, which prohibition may be reinforced through a conditional fine.

<sup>157</sup> Az: 21 O 6123/04; see Welte 2004. The precedent was upheld in 2006 through a judgement issued by the District Court of Frankfurt am Main (Geschäftsnr.: 2-6 O 224/06), which confirmed the validity of GNU software licenses in respect of German legal order (Welte 2006).

<sup>158</sup> SFLC 2007.

What is said about termination and remedies for copyright infringement in this chapter 0 apply equally to all the GNU software licenses, for the LGPLv3 incorporates the terms and conditions of the GPLv3, supplementing them by some additional permissions, and the AGPLv3 consists of the text of the GPLv3 plus an additional paragraph in s. 13 concerning remote network interaction, which alterations do not modify the functionality thereof in respect of enforcement. For that reason, references to license sections are here made only to the GPLv3, but the same legal basis pertains to each license.

In accordance with s. 2 of the GPLv3, the license does not control the right of the licensee to run the program in any way (cf. GPLv3, s. 9). By contrast, section 8 provides that any attempt to propagate or modify in contravention of the license is void and will automatically terminate the licensee's rights under the GPLv3. Thus, the right to exercise even internal or private propagation and modification is perpetual only as long as one's rights have not been terminated. Section 10 of the GPLv3 contains a provision of automatic licensing, but violators are barred from claiming the benefit of that functionality and thus avoiding the termination of rights for certain software by simply obtaining a new copy of that piece of software by virtue of GPLv3, s. 8, para. 4.

Nevertheless, in exchange for the automatic nature of the termination, the license from a particular copyright holder will be reinstated, should the licensee cease the violation of the GPLv3 in its entirety. This reinstatement of rights can be either (1) provisional, unless and until the copyright holder explicitly and finally terminates the license, or (2) permanent, if the copyright holder fails to notify the licensee of the violation by some reasonable means prior to 60 days after the cessation. (Para. 2.) Moreover, a violator who has never received notice of a GPLv3 violation from a particular copyright holder with respect to *any* GPLv3-covered software is eligible for permanent reinstatement, should she cure the violation prior to 30 days after her receipt of the notice (para. 3). Thus, the termination procedure involves a 60-day period of repose and a 30-day cure opportunity for first-time violators. It is noteworthy that the provision regarding first-time violators, which was added for the purpose of someone who accidentally runs afoul of the rules<sup>159</sup>, may entail difficult questions concerning necessitated evidence<sup>160</sup>.

Those parties who fail to adhere to the stipulated time limits or cure the violations in aggregate ultimately forfeit all rights under the license; except for the permission to run the unmodified program (see GPLv3, s. 2). Should they wish to reinstate their rights to propagate and modify,

<sup>159</sup> See GPLv3-DD3, 33.

<sup>160</sup> If no concentrated database of license violations, that is both real time and dependable, exists, it is rather simple for the violator to profess to qualify for the exception of the third paragraph of s. 6 of the GPLv3.

they must request an explicit reinstatement of rights from the copyright holders, who are free to condition the reinstatement upon optional requirements.<sup>161</sup>

### *Remedies for Copyright Infringement*

Chapter 49 of the Penal Code (39/1889) and ss. 56a–56f of the Copyright Act set forth criminal sanctions for the infringements of copyright. The discussion hereunder, however, omits the questions of criminal responsibility and solely focuses on civil remedies available for the copyright holders, in this case the licensor of GNU-covered software<sup>162</sup>.

To start with, when a judicial decision is taken finding an infringement of copyright, a court of justice may under s. 56g of the Copyright Act issue against the infringer an injunction aimed at prohibiting the continuation of the infringement<sup>163</sup>. The injunction may also be issued as a preliminary injunction in accordance with c. 7, s. 3 of the Code of Judicial Procedure (4/1734)<sup>164</sup>. Liability for an infringement actualises regardless of the degree of negligence and irrespective of the infringer acting in *bona* or *mala fide*. Copyright does not recognise protection provided by good faith, except for cases where a copy of a work has been made for private use.<sup>165</sup>

Moreover, s. 57(1) of the Copyright Act provides that any person who uses a work in violation of the Act is obliged to pay the author fair compensation for such use. If the use is made wilfully or through negligence, the infringer must, in addition to the mere fair compensation, pay damages for any other loss, including for mental suffering and other injury (s. 57[2] of the Copyright Act). As regards fair compensation in respect of computer programs, it is an established practice of the Supreme Court that the amount of it is considered equal to that of the normal license fee, unless the special characteristics of the case presume otherwise (KKO 1998:91, KKO 1999:115); the compensation contains no punitive element. Liability for

<sup>161</sup> Kuhn, Williamson and Sandler 2008, 11–12. In *Progress Software Corporation v MySQL AB*, 195 F. Supp. 2d 328 (D. Mass. 2002), the judge implied in her order to grant partial summary judgement that a breach of the GPLv2 by failure to include the corresponding source could be cured by conveying it in later versions. Given that the GPLv3 contains provisions as to the automatic reinstatement of rights, the statement appears inaccurate at least under the framework of versions 3.

<sup>162</sup> For the special characteristics of criminal responsibility, see Sorvari 2007, 191 ff.

<sup>163</sup> See also the Act Concerning the Securing of Evidence Production in Civil Actions Pertaining to Intellectual Property Rights (344/2000).

<sup>164</sup> HE 26/2006 vp, 20. In such cases, the petitioner must be able to establish a probability that she has an enforceable right and that there is a danger that the opposing party hinders or undermines the realisation of that right or decreases essentially its value or significance; see Norrgård 2002, 177–186.

<sup>165</sup> Sections 57(1) *i.f.* and 58(1) *i.f.* of the Copyright Act.

compensation is related to the infringement of the financial interest belonging to the copyright holder, and if no valid tariff is available, the court must appraise the amount on a case-by-case basis by taking cognisance of the purpose, scale and harmfulness of the unauthorised use (KKO 2007:63)<sup>166</sup>. Therefore, although in the GNU software license context programs are often licensed without charge and thereupon establishing economic loss is troublesome, a court that recognises the business models and income formation channels related to the open source software paradigm may arguably arrive at a reasonable quantum of compensation.

Infringement that is proved to result from negligence on the infringing party's side leads up also to passing judgement with regard to damages for any other loss. Pursuant to s. 57(4) of the Copyright Act, the provisions of the Tort Liability Act (412/1974) are also applicable to the damages referred to in the second subsection. Accordingly, liability for damages follows the general principle of full compensation<sup>167</sup>. In addition to forfeited profits, examples of coverable loss would be expenses caused by the detection of the infringement as well as supervisory acts related to the law of copyright<sup>168</sup>. If no evidence concerning the amount of loss is available or evidence can only be presented with difficulty, the court has the power to assess the amount, within reason (c. 7, s. 6 of the Code of Judicial Procedure). Liability for legal costs is determined by the common rules contained in c. 21 of the Code of Judicial Procedure.

Apart from injunction, compensation and damages, the Copyright Act also contains provisions as to forfeiture (s. 58), publication of a ruling (s. 59a), prevention of material's supply (s. 60a) and decision on interruption (s. 60c), which are available within the limits enacted. Of these, especially the possibility of forfeiture appears interesting with regard to the GNU software licenses, for a court may, at the request of the injured party, prescribe, according to what it deems reasonable, that (1) a copy of a work that has been produced, made available to the public or altered in a manner contrary to the Copyright Act, as well as (2) any instrument intended for the making of copies, are to be destroyed, altered in specific ways, delivered to the injured party against compensation corresponding to the cost of manufacture, or rendered incapable of unauthorised use.

<sup>166</sup> See also Lehtonen 1998, 206–207.

<sup>167</sup> The foundation of c. 2, s. 1 of the Tort Liability Act is that a person who deliberately or negligently causes injury or damage to another is liable for damages in full. However, the damages may be adjusted if the liability is deemed unreasonably onerous in view of the financial status of the person causing the injury or damage and the person suffering the same, and the other circumstances. Nonetheless, if the injury or damage has been caused deliberately, full damages are to be awarded unless it is deemed that there are special reasons for a reduction in the damages.

<sup>168</sup> Sorvari 2007, 312–315.

### *Assessment of Risk Position*

One of the most famous characterisations of the GNU software licenses was expressed by Craig Mundie, Microsoft Senior Vice President, in his speech given on the commercial software model at the New York University Stern School of Business in 2001, where he said:

Some of the most successful [open source software] technology is licensed under the [...] GPL. The GPL mandates that any software that incorporates source code already licensed under the GPL will itself become subject to the GPL. When the resulting software product is distributed, its creator must make the entire source code base freely available to everyone, at no additional charge. This viral aspect of the GPL *poses a threat to the intellectual property* of any organization making use of it.<sup>169</sup>

Congruently, some have expressed contentions that inadvertent incorporation of code governed by a GNU software license into a proprietary product can necessitate coercion to release one's proprietary code under the present license<sup>170</sup>. Section 11 of the GPLv3 is indeed designed to prevent patents from being used to render a GPLv3-covered program proprietary *de facto*, but copyright-wise the IPR cannot be said to be threatened. As mentioned in the preceding chapter, copyright holders whose interests are affected by an infringing activity can bring an action for compensation and possibly damages as well as apply for an injunction and, where appropriate, the other remedies referred to in c. 7 of the Copyright Act. What they are not able to do, by virtue of copyright law, is to require the conveying of an infringing work on altered terms, since the Copyright Act carries no provisions for that regard.

Consequently, should a defendant be found to have wrongfully included code that is covered by a GNU software license in its own proprietary work, she can be condemned to pay compensation for the conveyance that has already occurred, and prevented from conveying her product further. What about forfeiture; can the court prescribe the source code of the whole product be delivered to the injured party against compensation corresponding to the cost of manufacture? Section 58(1) of the Copyright Act refers to any 'typographical material, printing

<sup>169</sup> Mundie 2001, emphasis added. He continued, 'It also fundamentally undermines the independent commercial software sector because it effectively makes it impossible to distribute software on a basis where recipients pay for the product rather than just the cost of distribution.' The argument is not completely accurate, for s. 4 of the GPLv3 provides that the conveyor may charge any price for each copy that she conveys, and offer support or warranty protection for a fee.

<sup>170</sup> See Henry 2003; Epstein 2004.

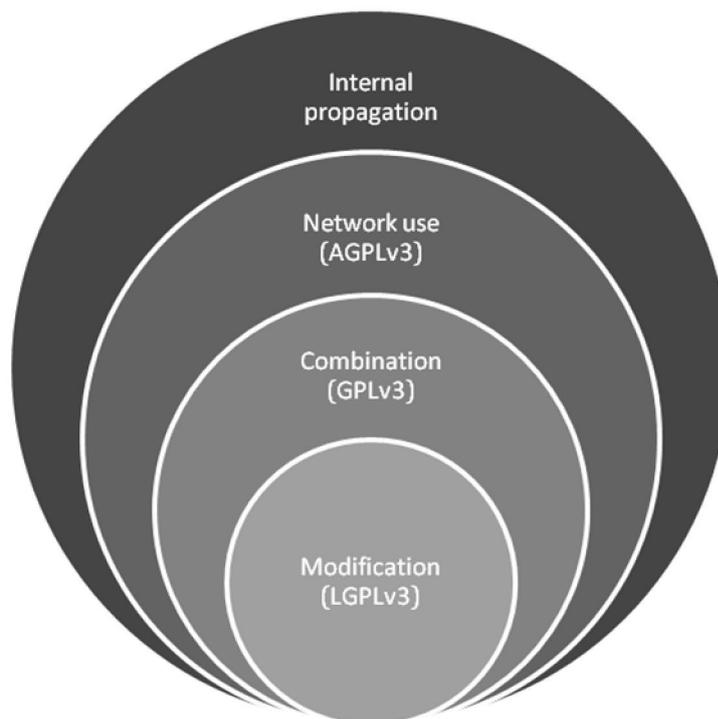
block, mold and other instrument or device'.<sup>171</sup> It seems probable that the provision encompasses only tangible objects, and an expansive interpretation, which would cover even the source code of a computer program, appears unfounded<sup>172</sup>. In any event, in accordance with s. 4(1) of the Copyright Act, a person who has adapted a work has copyright in that work in its new form. Her right to dispose of it is subject to the copyright in the original work, but the right to exclude and the consequent power to license remain exclusively at the discretion of the copyright holder.

The reciprocity obligations under different GNU software licenses can be outlined in a way expressed by illustration 1 below. The outer limit of each circle delineates the boundary unto which the reciprocity obligations of the license that is restricted to its area extend. Each circle also incorporates all the other circles and obligations that are situated within it. Consequently, the reciprocal requirements of the LGPLv3 apply only to the conveyance of modifications, those of the GPLv3 to the conveyance of modifications and combinations alike, and the AGPLv3 covers both the conveyance and network use of modifications as well as combinations. None of the current GNU software licenses makes reciprocal demands with regard to internal propagation<sup>173</sup>, but such obligation is conceivable and would constitute the strictest form of reciprocity. All the relevant actions related to the law of copyright that occur in the scope of the license trigger the reciprocity obligation described in chapters 0 through 0 of this thesis, respectively.

<sup>171</sup> Cf. 17 USC 506(b), which provides that when a person is convicted of a criminal infringement, as defined in subsection (a), the court in its judgement of conviction shall, in addition to the penalty therein prescribed, order the forfeiture and destruction or other disposition of all infringing copies and all implements, devices, or equipment used in the manufacture of such infringing copies.

<sup>172</sup> See also Kivimäki 1966, 186–187; Sorvari 2007, 329–333.

<sup>173</sup> See GPLv3 comments in file 'gplv3-draft-4', where it was suggested that the current scope of propagation, as defined in s. 0 of the GPLv3, without conveying includes a possible weakness with regard to some trade and membership associations with a significant number of members, since internal propagation in such organisations would be equivalent of conveying in all but name.



**Illustration 1. Imaginable and actual scopes of reciprocity within the system of GNU software licenses**

All rights granted under the GNU software licenses are granted for the term of copyright on the program, and are irrevocable provided the stated conditions are met (GPLv3, s. 2). That said, developers who are interested in utilising code so licensed and whose intended use would trigger the reciprocity obligation are given principally two options by the licenses<sup>174</sup>. First, since copyright protects only the tangible implementation or expression of an idea, not the idea itself, she could produce herself a similar software component that provides the same functionality. Second, she may use the code governed by a GNU software license and abide by the terms thereof. If one chooses neither, it is a question of copyright infringement, which can be discontinued and redressed by means of the above-mentioned remedies. The infringing source code, however, cannot be forced to be released under a GNU software license, or any license

<sup>174</sup> See also Kumar 2006, 17.

for that matter, but it stays with the proprietor<sup>175</sup>. Since the license has been terminated under s. 8 of the GPLv3, earning financial benefit by making copies of that work or making it available to the public is not possible before entering into an agreement with the copyright holder of the original work, if the proprietary software cannot be deemed as a new and independent work in the meaning of s. 4(2) of the Copyright Act but falls into the category of the first subsection, where its copyright is subject to the right in the original work.

Szattler, however, argues that the reciprocal requirements of the GNU software licenses might be regarded as consideration rather than just as limitations of granted rights and, if that were the case, a claimant could in the event of infringement file a suit for a breach of contract. Consequently, a court could oblige the infringer to publish the code at issue.<sup>176</sup> Consideration is a common law term for a legal fact that is required from a promise in order to meet the requirements for the formation of a contract; the claimant must be able to show that she has bought the defendant's promise either by doing some act in return for it or by offering a counter-promise.<sup>177</sup> By contrast, at civil law the question is not whether a promise is supported by consideration, but a contract is made where two or more parties willingly bind themselves into a legal act that arouses obligations and corresponding rights between the contracting parties<sup>178</sup>. Under common law, it can be concluded that the GNU software licenses do not form a contract, since the license texts do not evidence the necessitated meeting of minds with regard to consideration<sup>179</sup>. However, the total legal obligations of the parties arising out the agreement governed by a GNU software license might in a civil law jurisdiction lead to a conclusion that such a document is deemed a regular contract rather than a proper copyright license<sup>180</sup>.

<sup>175</sup> Cf. the action by the FSF to recover damages and to enjoin future infringement arising from the infringement of its copyrights by Cisco Systems, Inc. submitted to the US District Court of Southern District of New York on 11 December 2008, available at <http://www.fsf.org/licensing/complaint-2008-12-11.pdf>. The prayer for relief includes requests as follows: '(1) That the Court issue injunctive relief against Defendant, and that Defendant, its directors, principals, officers, agents, representatives, servants, employees, attorneys, successors and assigns, and all others in active concert or participation with Defendant, be enjoined and restrained from copying, modifying, distributing or making any other infringing use of Plaintiff's software; (2) That the Court order Defendant to pay Plaintiff's actual and consequential damages incurred, in an amount to be determined at trial or, in the alternative, statutory damages as set forth in 17 USC 504(c); (3) That the Court order Defendant to account for and disgorge to Plaintiff all profits derived by Defendant from its unlawful acts; (4) That the Court order Defendant to pay Plaintiff's litigation expenses, including reasonable attorney's fees and costs of this action; and (5) That the Court grant Plaintiff any such further relief as the Court may deem just and proper.'—In this regard, the complaint makes no source code no reference whatsoever.

<sup>176</sup> Szattler 2007, 72–73.

<sup>177</sup> Furmston 1991, 70–73. See also Rudanko 1998, 72–73.

<sup>178</sup> Hemmo 2003a, 10–15; Tolonen 2004, va111.4995. Cf. Zitting 1989, 472–474.

<sup>179</sup> Kumar 2006, 16–24, who argues that the licenses are enforceable by the *licensee* through a promissory estoppel action. For the introduction to that doctrine, see Spencer Bower and Turner 1966, 332–358.

<sup>180</sup> Cf. Nimmer 2005.

The contractual approach has an impact on the connecting factor rules and the applicable law<sup>181</sup>, but it would also betoken a significant concern in respect of enforcement. The general effects of obligations involve specific performance, which can be fulfilled by execution, where necessary<sup>182</sup>. Were, for example, the provision to convey also the corresponding source, where conveying a GPLv3-covered work in object code form occurs in accordance with s. 6 of the GPLv3, deemed as a contractual obligation, a court of justice would in principle be entitled to order proprietary source code to be published as a consequence of a breach of contract.

Under Finnish law, however, liability for specific performance is confined by restrictions founded on characteristics of the obligation, obstacles to performance and the impracticality of the specific performance; secondary obligations and obligations of the obligee do not entitle to discrete specific performance<sup>183</sup>. Due to the special construction of reciprocal open source licenses, it could be argued that the requirement to provide source code is comparable with a secondary obligation, for practically the GNU software licenses specify limitations to the licensor's grant of rights, not burdens to the licensee<sup>184</sup>. A prayer to release all the source code on account of a minor breach could also constitute hardship. An interpretation analogous to s. 23(1) of the Sale of Goods Act would suggest that the licensee is not obliged to perform the obligation if the performance would require sacrifices that are disproportionate to the licensor's interest in performance, as the case might arguably be.

Specific performance is impractical where other legal remedies offer an adequate legal protection to the obligee. If the licensor is able to seek reimbursement and a restraining order in the form of injunction, the need for a claim for specific performance seems dubious.<sup>185</sup> That is especially the case where only small amounts of code governed by a GNU software license have been incorporated into a proprietary product or where the code utilised in a violating manner forms only a diminutive portion of the end product; *de minimis non curat lex*. Such a finding would also be congruent with the solutions adopted in the international collections of principles with regard to contract law. In accordance with the UNIDROIT Principles of International Commercial Contracts, where a party who owes an obligation other than one to pay money does not perform, the other party may require performance, unless the party entitled to performance may reasonably obtain performance from another source (UNIDROIT,

<sup>181</sup> See Szattler 2007, 73–77.

<sup>182</sup> Hakulinen 1958, 49.

<sup>183</sup> Aurejärvi 1988, 82–83.

<sup>184</sup> Hakulinen 1958, 56. E.g., s. 6 of the GPLv3 provides that '[y]ou may convey a covered work in object code form under the terms of sections 4 and 5, *provided that* you also convey the machine-readable Corresponding Source under the terms of this License' (emphasis added).

<sup>185</sup> Arg. Saarnilehto 2005, 100–101.

art. 7.2.2(c)). The Principles of European Contract Law provide for essentially the same in art. 9:102(2)(d) thereof<sup>186</sup>.

Perhaps the most convincing argument against specific performance stems, nonetheless, from the license texts themselves. Under s. 8 of the GPLv3 any attempt to propagate or modify a covered work will automatically terminate the license. The provision is subject to certain possibilities to reinstatement referred to above, but if they are not resorted, the license—or contract—is terminated. Moreover, even a permanent reinstatement under subsection 8b of the GPLv3 does not affect the judgement, for it necessitates ceasing *all violation of the license*. Any action to the contrary will trigger the provision of automatic termination anew. Accordingly, all contractual commitments expire upon the termination of a contract. If the termination is induced by a contracting party, liability for occurred damages may ensue, but specific performance is not available any longer.

In the aforementioned cases the liability for damages follows the principles of contractual liability, whereupon the damages constitute compensation also for economic loss that is not connected to personal injury or damage to property<sup>187</sup>. However, with regard to the GNU software licenses there might often be situations where the mileage aspired after by the licensor consists merely of future reciprocal paybacks and has thereby no economic value at all, since software has been licensed without charge<sup>188</sup>. Taking legal policy into account, it would *de lege ferenda* appear justifiable in connection with gross license violations for a court to order the infringing code to be released through specific performance in place of unsubstantial compensation. By contrast, such real argument ought not to appertain to occurrences of minor negligence, for causing a complete loss in value of a proprietary program would there be disproportionate and thus ungrounded.

## 4. Demarcation

### Institutional Support

#### *Legislation*

The Copyright Act entered into force on 1 September 1961. Under s. 73 thereof, it repealed the Act on Copyright in Products of Intellectual Activity (174/1927; hereinafter referred to as

<sup>186</sup> The Draft Common Frame of Reference, by contrast, recognises no such exception; see DCFR, art. III.-3:302(3).

<sup>187</sup> Cf. c. 5, s. 1 of the Tort Liability Act.

<sup>188</sup> See *Jacobsen v Katzer*, n. 92 *supra*.

the 'Old Copyright Act'). Prior to the force of the last-mentioned statute, the copyright regime of the Grand Duchy of Finland and, as of 1917, the Republic of Finland was regulated by the Decree Relating to the Rights of Writers and Artists in Respect of the Products of Their Labour (8/1880; hereinafter referred to as the 'Decree of 1880').

Already the gracious proposal of the Imperial Majesty concerning the Decree of 1880 proposed in its s. 7 that the translator of a literary work should enjoy to her translation a right identical to what is accorded to the author of the original work<sup>189</sup>. Furthermore, with regard to independent works, s. 8(2) of the proposal provided that unauthorised reformation of a literary work by means of adaptation, modification or addition were to be deemed to constitute a copyright infringement, unless the new work could be interpreted as forming an independent work<sup>190</sup>. The Decree of 1880 contained no provisions as to combining works or parts thereof and whether such creation of compilations would constitute a separate object of copyright.

The Legislative Council published its proposal for the Old Copyright Act in 1920. Under s. 4(1) of the proposal, it was propounded that the author ought to receive the same exclusive rights that she has in respect of her work also to translation and adaptation thereof. It stems reputedly from the very character of copyright that the work created by an author deserves protection in both the original and an altered form<sup>191</sup>. However, in accordance with s. 5, also a work based on the original one deserves to be an object of legal protection, so that the author of the translation or adaptation was to have copyright in the present work in that new form. This derivative copyright maintains the copyright in the original work infrangible. The stipulation was commensurate with art. 2(3) of the Berne Convention, which provides that translations, adaptations, arrangements of music and other alterations of a literary or artistic work shall be protected as original works without prejudice to the copyright in the original work.—Creating a substantially original work, which only loosely pertains to the underlying work, was not to be considered as alteration (s. 4[3] of the proposal).<sup>192</sup> What, then, makes a work substantially original? The preliminary works for the Swedish copyright legislation provide that such alteration must affect the 'inner form' of a work. Consequently, since copyright does not protect the underlying ideas, the concept may be borrowed but the manner of representation must be substantially original.<sup>193</sup>

<sup>189</sup> HE 3/1876 vp, 3.

<sup>190</sup> HE 3/1876 vp, 4. The Law Committee considered in its report subsection 2 as possibly misleading and in any event unnecessary for the courts, whereupon it recommended the removal thereof (LaVM 8/1876 vp, 14).

<sup>191</sup> Legislative Council 1920, 28–29.

<sup>192</sup> Legislative Council 1920, 1–2, 29.

<sup>193</sup> SOU 1956:25, 136–137.

The proposal of the Legislative Council also touched upon the question of combination. Section 6 thereof provided that, if a work was to be compiled of separate works by several contributors, each one would have copyright in her own contribution. Moreover, if also the work that concerns the consolidation of separate contributions could be deemed to constitute a form of creative intellectual work, the performing party ought to have copyright in the combined work.<sup>194</sup> In the latter case, the combiner was to be justified in deciding in favour of making the combined work available to the public by herself, irrespective of the contributors<sup>195</sup>.

The resultant Government proposal and thereupon the Old Copyright Act differed from the stand of the Legislative Council predominantly with regard to the general structure; the provisions concerning independent, combined and modified works were more verbose but substantively concordant<sup>196</sup>. The same applies in many respects to the report of the Commission concerning the proposal for the current Copyright Act, which is an essential preliminary work in respect of Finnish copyright law<sup>197</sup>. The report describes alteration as not exactly achieving a new creation but rather giving the original work a new form. Therefore, the copyright of the altering party is secondary in respect that her right is dependent upon the assent by the copyright holder of the original work.<sup>198</sup> As sections 4 and 5 of the Copyright Act have remained unamended since the coming into force thereof, characterisations concerning the demarcation of various derivative works expressed during the lengthy legislative history have remained valid<sup>199</sup>.

In 1991, the Copyright Act was amended by Act 34/1991 to include specific rules governing computer programs. Prior to the amendment, the Copyright Commission had published its fourth preliminary report concerning, *inter alia*, the legal protection of software. In the report, the Commission reiterates the fact that a computer program enjoys protection also in an altered

<sup>194</sup> Legislative Council 1920, 2, 21–22. Cf. art. 2(5) of the Berne Convention: ‘Collections of literary or artistic works such as encyclopaedias and anthologies which, by reason of the selection and arrangement of their contents, constitute intellectual creations shall be protected as such, without prejudice to the copyright in each of the works forming part of such collections.’

<sup>195</sup> Legislative Council 1920, 30. Nonetheless, her right of disposal was only to be in connection with the combined work as a whole.

<sup>196</sup> HE 89/1926 vp, 3–7. Unlike the proposal of the Legislative Council, the Government proposal contained only one bill common to all intellectual works, excluding photographs. The reading of the matter in Committees involved various comments on different directions; see LaVM 13/1926 vp; SuVM 108/1926 vp; EV 89/1926 vp.

<sup>197</sup> KM 1953:5, 8, 44. The report of the Commission contains rather few objective amendments *vis-à-vis* the Old Copyright Act. The main reason for passing a new law was the tendency towards uniform statutes in each Nordic country. (KM 1953:5, 42–43.)

<sup>198</sup> KM 1953:5, 49–50.

<sup>199</sup> HE 23/1960 vp does contentually not depart much from the results of the Nordic preparation. Cf. KM 1953:5, 6–35.

form but, if the input of the altering party is creative and original, the latter has derivative copyright in the altered work in accordance with s. 4(1) of the Copyright Act. However, adapting software from one programming language to another is more often than not a technical operation that does not call for creative effort, whereupon the adapting party is not granted copyright.<sup>200</sup> The Government proposal regarding the amendment provides some guidance as to applying the provision of drawing freely on a computer program. It states that employing the system, logic, algorithms, principles and concepts of an existing work would constitute a first-hand copyright in accordance with s. 4(2) of the Copyright Act, if the new form of expression was independent enough.<sup>201</sup>

At the Community level, it is similarly clear that while programs are accorded protection, underlying logic or algorithms thereof are not copyrightable subject matter. Accordingly, software having essentially the same functions of existing programs is still, despite superficial resemblance, considered as an independent invention insofar that the development has been carried out without 'undue' inspiration.<sup>202</sup> If similarities in the source code that implement the ideas, rules and principles of the program occur as between inter-operative software, where the constraints of an interface are such that in the circumstances no different implementations are possible, then no copyright infringement will normally occur<sup>203</sup>.

In conclusion, copyright in respect of computer programs is concentrated particularly upon the source code thereof. Therefore, conventional alteration that does not involve the complete rewriting of the code base implicates *prima facie* that the modification has occurred in the sense of s. 2 of the Copyright Act. If the conducted acts, however, are rather insignificant or lacking originality, it is pursuant to Kivimäki's nomenclature an instance of 'non-proper' modification, whereupon no new form of the original work has emerged but copyright-wise the program remains unaltered<sup>204</sup>. Such non-proper modification does not require a permission of the copyright holder and cannot, in proportion, be forbidden by the last-mentioned<sup>205</sup>.

<sup>200</sup> KM 1987:8, 178.

<sup>201</sup> HE 161/1990 vp, 16-17, 50.

<sup>202</sup> COM (88) 172 final, 182-183. In its proposal for the Software Directive, the Commission describes the algorithms from which a program is built up being 'the equivalent of the words by which the poet or the novelist creates his work of literature, or the brush strokes of the artist or the musical scales of the composer' (COM (88) 816 final - SYN 183, 5). Cf. Europarl 1990, 81.

<sup>203</sup> COM (88) 816 final - SYN 183, 8. See also EESC 1989, 5. In such circumstances it is said that the idea and expression have merged (Hass 2007, 388).

<sup>204</sup> Kivimäki 1948, 103-104.

<sup>205</sup> Välimäki 2009, 37.

### Case Law

As mentioned above, there is no Finnish case law concerning computer programs released under the GNU software licenses<sup>206</sup>. Furthermore, the precedents decided heretofore by the Supreme Court related to the law of copyright in general are not pertinent to the present phrasing of the question. However, guidelines for decision-making with regard to delimiting the dividing line between permitted and prohibited copying and altering, respectively, can be derived from some judgements issued by the Courts of Appeal. In practise, the decision is made comparing the similitude of two programs: expert witnesses present evidence as to what extent the original work and the alleged copy are similar under the framework of the Copyright Act and the court then assesses what sort of legal relevance ought to be merited to the points of resemblance<sup>207</sup>.

The third versions of the GNU software licenses are bound up with the principles of copyright law even more than before. Whereas the GPLv2 applies in accordance with s. 0 thereof to any program or other work that contains a notice stating it may be distributed under the terms of the present license, under s. 0 of the GPLv3 the program only refers to works that are copyrightable. Furthermore, it is the specific intention of the draftsmen that the GNU software licenses are pure copyright licenses, plus a patent grant, which contain no contractual elements whatsoever<sup>208</sup>. Therefore, the scope of the licenses and, ultimately, risk positions of the licensees are dependent upon the definitions of applicable copyright law, whereupon the threshold of originality and other relevant factors related to the law of copyright must be discussed with the intention of analysing definitive legal statuses.

In order to be accorded the exclusive rights provided by the Copyright Act in the first place, the program must hold a certain level of originality<sup>209</sup>. Since there are no requirements—or possibilities, for that matter—for registering the copyright in Finland, everything written creates an *ex ante* assumption of copyright protection from the occasion it is put in fixed form<sup>210</sup>; under art. 5(2) of the Berne Convention, the enjoyment and the exercise of copyright shall not be subject to any formality. However, literary works including computer programs are protected

<sup>206</sup> This author is aware of one case tried before the Helsinki Court of Appeal that concerned a *manual* licensed under the GPL, where the court considered that the license terms had no relevance to the dispute between the author and the publisher. See HelHO 14.6.2007 1963 (final judgement).

<sup>207</sup> Välimäki 2009, 66.

<sup>208</sup> Moglen 2001; GPLv3-DD2, 20. This stand was especially apparent in Draft 1 of the GPLv3, where the title of s. 9 was 'Not a Contract'; see GPLv3-DD1, s. 17.

<sup>209</sup> KM 1953:5, 44. According to the report of the commission, such a requirement stems from the 'very nature' of the subject matter.

<sup>210</sup> Cf. 17 USC 408 *et seq.* Registration of copyright betokens substantial procedural advantages in respect of enforcement; see Ginsburg 1992, 162–163.

only insofar as they are original in the sense that they are their author's own intellectual creations (see, explicitly, art. 1[3] of the Software Directive). When applied to software, the principle means that in order to enjoy these rights a program must represent such individual character that it excludes the possibility of someone else arriving at a nearly uniform outcome<sup>211</sup>. Accordingly, in case RHO 13.10.1992 1128 (final judgement) it was not demonstrated that the applications subject to *prima facie* unauthorised copying would be results of such creative work that would embody the protected contribution of individual labour in the sense of the Copyright Act<sup>212</sup>.

The issue of similitude does not actualise until it has been established *ex post* that a computer program outruns the necessitated threshold of originality. Once it has been proven that the work as such enjoys copyright protection, the next phase follows. The landmark decision in that regard is that of HelHO 28.12.1999 3571 (final judgement). In the case, the appellant demanded the defendants' conviction for copyright offence and misuse of a business secret, because they had apparently copied parts of the appellant's source code and made software so constructed available to the public. According to the appellant, the copied parts covered 40 percent of the whole program: allegedly some 90 percent of the code for the memory segment of the communicative portion and approximately 25 percent of the code for the application program were copied.

The court commenced by elucidating that whilst the appellant's computer program meets the minimal standards of originality *en bloc*, it does not necessarily mean that each part of the program is protected in accordance with the Copyright Act as well. Also the separate portions must, in order to enjoy copyright protection, meet the criterion of originality<sup>213</sup>. The evidence was that between 10 and 15 percent of the total quantity of the source code of the defendants' software had been copied from appellant's prior code. However, the facts that the programs were constructed by the same programmers, the programs implemented the same functionality, the GUIs were similar, the used programming language enabled the programmers to vary rather little and the structure of the payment terminal reduced to implement certain matters in certain fashion could all account for the resemblances. Moreover, the functionality of certain identical modules was defined by the standards for banking and telecommunications so that the formulations therein were to be considered as simple routine code. Consequently, the court

<sup>211</sup> Copyright Council 2008:13, 8.

<sup>212</sup> Pursuant to the judgement of the District Court of Frankfurt am Main concerning the validity of the GPL (see n. 157 *supra*), '*nur eine gänzlich banale Programmierleistung*' is not sufficiently original to warrant copyright protection.

<sup>213</sup> The court build on the disquisition provided by computer science professors in their expert opinions, according to which it is customary to exploit parts from existing software in the programming work of a new product. Such exploitation may infringe copyright, should the existing parts be creative to the extent that they meet the minimum standards of originality.

deemed the copied parts to be either inconsequential or insignificant, whereupon the complaint of the appellant was dismissed.

Therefore, the copyright protection is absent not only from the parts of the code that are so trivial that the functionality intended therein can be effectively implemented in only one way, but also where ideas are merged into their expressions in such a way that it is impossible to give to the same idea a differing form of appearance<sup>214</sup>. For instance, if the purpose of a program sets imperative boundary conditions on the source code through, say, confines of an operating environment, sets of technical standards or exigencies of compatibility, then, to that extent, copyright protection will be denied from those modules<sup>215</sup>.

The relevance of the above-mentioned decision by the Helsinki Court of Appeal is that it essentially approved of the principles on how to establish copyright infringement for software developed first in the leading US case *Computer Associates International, Inc. v Altai, Inc.*<sup>216</sup>, where the court proposed the so-called substantial similarity test<sup>217</sup>. The test consists of three phases: First, the structure of the code is abstracted. Second, the parts that are not protected by copyright are filtered out. Third, the protected parts are set against each other in order to detect the similarities.<sup>218</sup> The criterion of substantial similarity arguably provides the authority applying the law with a workable method of drawing a distinction between the tangible implementation or expression of an idea and the idea itself. Under this approach, the ideas of a computer program are comparable to the purposes thereof, but due to the dynamic abstraction process, each module is given its own purpose. Should the purpose be implementable only in one way, it does not suffice for crossing the threshold of originality.

Prior to the aforementioned decision, the prevailing US test for copyright infringement was established in the *cause célèbre* case of *Whelan Associates, Inc. v Jaslow Dental Laboratory, Inc.*<sup>219</sup>, in which the choice of the abstraction level was deemed a static operation and, to that end, a low standard was elected<sup>220</sup>. The result was an attempt to apply the classic idea-expression dichotomy, where the purpose of the whole program was defined as its idea. Consequently, any part of the software package that was not absolutely necessary for the purpose would constitute

<sup>214</sup> Ang 1994, 112.

<sup>215</sup> Välimäki 2009, 67.

<sup>216</sup> 982 F.2d 693 (2nd Cir. 1992).

<sup>217</sup> Klami and Neejärvi 1997, 593–594.

<sup>218</sup> Mylly 2005, 761; Diver 2008, 128–129. Accordingly, the method is also known as ‘abstraction–filtration–comparison’.

<sup>219</sup> 797 F.2d 1222 (3rd Cir. 1986).

<sup>220</sup> Hass 2007, 387–388.

the protected expression.<sup>221</sup> The problem of the said analysis lies in the fact that software can serve for numerous purposes. Such static abstraction operation would effectively lead to a situation where the dichotomy becomes obsolete; expression so defined would be accorded too strong a protection.<sup>222</sup>

As far as I can see, the substantial similarity test is an approach to break down the copyright protection of computer programs into smaller components. Instead of using the monolithic notion of a 'work', which can inflict distortions on the scope of protection, one can analytically identify and assort non-protectable elements. Consequently, computer programs are protected primarily as a code, but the protection does not necessarily cover all parts thereof. Under the present test, a program is first examined in terms of its structure rather than the specific sequences of code. The purpose of the operation is to resolve the functionality of each procedure and subroutine (paras. 75–82). Against this knowledge, following elements are to be sifted out from the protectable core: (1) elements dictated by efficiency, (2) elements dictated by external factors and (3) elements taken from the public domain (paras. 83–107). Finally the remaining parts can be compared for substantial similarity (para. 108). Therefore, the main criterion in respect of the comparison is that resemblances are located in those factually relevant parts.

The substantial similarity test has been used in the UK as well. In *Ibcos Computers Ltd v Barclays Mercantile Highland Finance Ltd*<sup>223</sup> the High Court of Justice approved of the method that copyright infringement analysis required in respect of computer programs multiple levels of abstraction and comparison.<sup>224</sup> To that end, the court outlined a four-part approach that can be expressed as follows<sup>225</sup>:

- a) What are the works or works in which the claimant claims copyright?
- b) Is each such work 'original' in the sense of art. 1 of the Software Directive?
- c) Has copying from that work occurred?
- d) Has a substantial part of that work been reproduced?

The criterion of a substantial part was further refined in *Cantor Fitzgerald International v Tradition (UK) Ltd*<sup>226</sup>, according to which not only the program as a whole but also the

<sup>221</sup> Diver 2008, 128.

<sup>222</sup> Ang 1994, 145.

<sup>223</sup> [1994] FSR 275.

<sup>224</sup> Hass 2007, 390–391.

<sup>225</sup> See Freedman 2000, 38.

<sup>226</sup> [2000] RPC 95.

individual modules and techniques used therein ought to be examined, but the definite judgement on substantiality is to be made in relation to the aggregate of the work; it has no relevance to the matter, whether or not the copied part is necessary for the technological functioning<sup>227</sup>. Moreover, since the allegedly copied sections must be original and not dictated by external factors in order to be protectable, the focus of the assessment should accordingly lie in the quality, not the quantity of the code.<sup>228</sup> The creativity perceived in components that have been exploited in an infringing manner constitutes a more significant factor in judicial appraisal than some rigid numerical limits.

In Finland, a recent decision by the Vaasa Court of Appeal follows the international development trends. In VHO 17.5.2005 712 (final judgement) computer programs that had been made using a software development environment (SDE) were not deemed original enough, since the SDE itself, the used programming language, the purposed use of the software and the process equipment that the software was designed to control each necessitated certain implementations by the software development. Consequently, the programmers' freedom of design choice, and thereby possibilities to conduct original and creative programming, was circumscribed by external consideration, which led to a non-protectable set of operations in the end product. The essentials of the assessment concerning similitude and the resultant conclusion of the comparison follow rather closely the principles set forth in the above-mentioned foreign proceedings on establishing software copyright infringements with regard to the source code. Thus, even an obvious similarity will not constitute an infringement of copyright if it is a corollary of determining extrinsic factors<sup>229</sup>.

In accordance with s. 55(1) of the Copyright Act, the Council of State appoints the Copyright Council, the purpose of which is to assist the Ministry of Education in the handling of matters pertaining to copyright and to issue opinions regarding the application of the present Act<sup>230</sup>. The opinions of the Copyright Council are merely of recommendatory nature and do not legally bind neither the applicant nor her adverse party. Despite the absence of judicial power, nonetheless, the Copyright Council is a *de facto* organ for legal protection, since the parties ordinarily conform to its opinions by not taking further legal action thereafter. Again, the

<sup>227</sup> Hass 2007, 391 fn. 96.

<sup>228</sup> Freedman 2000, 38–39.

<sup>229</sup> In *Computer Associates International, Inc. v Altai, Inc.*, the court mentioned (1) the mechanical specifications of the computer on which a particular program is intended to run, (2) the compatibility requirements of other programs with which a program is designed to operate in conjunction, (3) computer manufacturers' design standards, (4) demands of the industry being serviced, and (5) widely accepted programming practices within the computer industry as instances of such factors.

<sup>230</sup> For the composition and decision-making process of the Council, see ss. 18–23 of the Copyright Decree (547/1995).

Copyright Council is also an organ acquainted with the specific concerns in the sector of copyright, whereupon the opinions issued by it are often utilised during litigation.<sup>231</sup>

The Copyright Council has discussed the matters interrelated to the law of copyright and computer programs in several of its opinions. In opinion 1996:3, the Council took the view that an application was not original and creative enough so as to attain the threshold of originality. The routine in question was formed predominantly according to the manual and by utilising the features of the parent program. The choices made in order to dispose of the data processing problem did not attest to such originality that someone else could not have concluded equally in solving the same problem. Therefore, according to the Copyright Council, the determinations conducted were rather dictated by the outcome and thus mainly constituted a testimony to mechanical unravelling.<sup>232</sup>

By contrast, in opinion 1997:12 the Council looked upon a computer program, which contained 140 command lines, as a literary work. The program was implemented with a programming language of a logic unit that controls the manufacture of bakery products and it dovetailed the functions of the production equipment.<sup>233</sup> The view of the Council was subsequently accepted by the Supreme Court in KKO 2008:45, according to which the software in question fulfilled the requirement of originality and was thereby copyrighted pursuant to s. 1(2) of the Copyright Act. The Copyright Council has assessed the threshold of originality in respect of computer programs also in its opinions 2005:7, 2006:5, 2006:12 and 2008:13. In all of these, the programs were deemed to outrun the minimum and receive copyright protection<sup>234</sup>.

In summary, the Copyright Council is also of the opinion that the bases of a computer program as well as the circumstances necessary to implement the idea thereof are not copyrighted as such. In order to identify such necessities, the software must be conceptually divided into smaller functional divisions, and certain divisions that merely employ standard techniques do not enjoy protection although the program as a whole would do so. However, the Council can be criticised for occasionally pitching the threshold of originality on too low a level. For instance, in Copyright Council's opinion 2003:10 it regarded utilities that solved a small data processing problem in diverging environments as protectable works. The Council justified its assessment by arguing that each utility had required from its author possibly several days' work

<sup>231</sup> Lappalainen 2007, pr111.12314. See also Haarmann 2006, 42.

<sup>232</sup> Copyright Council 1996:3.

<sup>233</sup> Copyright Council 1997:12.

<sup>234</sup> See Copyright Council 2005:7, 9–10; Copyright Council 2006:5, 10–11; Copyright Council 2006:12, 9; Copyright Council 2008:13, 16.

contribution, whereupon they count as the results of individual labour.<sup>235</sup> The case went afterwards before the Vaasa Court of Appeal (VHO 17.5.2005 712), where the court traversed the opinion of the Copyright Council on the grounds that the source code of the programs contained only elements that were dictated by external factors, expressions which are not copyrightable<sup>236</sup>.

## Separate and Independent Works

### *Limitations and Exceptions to Copyright*

The exclusive rights granted to authors or their assignees under copyright law do not apply to all situations but are subject to certain limitations and exceptions<sup>237</sup>. Under art. 13 of the TRIPS, for example, the member states shall confine limitations and exceptions to exclusive rights to certain special cases on two conditions. Such instances must not (1) conflict with a normal exploitation of the works and (2) unreasonably prejudice the legitimate interests of the rights holder<sup>238</sup>. In the US, the limited use of copyrighted material without requiring permission from the copyright holder has been implemented by means of the fair use doctrine (17 USC 107), whereas some other common law jurisdictions operate under the notion of fair dealing (e.g., ss. 29–31 of the Copyright, Designs and Patents Act 1988)<sup>239</sup>. By contrast, continental European civil law copyright systems tend to avoid such open-ended provisions but favour the principle of *numerus clausus* instead. To that end, in Finland the limitations on copyright are placed in c. 2 of the Copyright Act. Nevertheless, irrespective of the divergences as to the flexibility of the restrictions under national copyright laws, it can be noted that basically all such concepts exclude the operations of commercial nature—more or less according to rule—from the scope of application<sup>240</sup>.

Other more fundamental boundaries of copyright are begotten by the idea-expression divide. Since copyright protects the form in which ideas are expressed rather than the ideas themselves, software can as a consequence be developed to achieve the same results to the extent that the

<sup>235</sup> Copyright Council 2003:10, 12–13.

<sup>236</sup> Cf. Oksanen 2004, 30.

<sup>237</sup> Haarmann 2005, 154. Whether such limitations and exceptions are seen reducing some idealised form of copyright or providing a balance to the rights of copyright in the form of ‘user rights’, is a matter of philosophy of copyright; see NRC 2000, 136–139.

<sup>238</sup> See also art. 9(2) of the Berne Convention and art. 10 of the WCT for other embodiments of this ‘three-step test’.

<sup>239</sup> Senftleben 2004, 162–166.

<sup>240</sup> KM 1980:12, 87; Rowland and Campbell 2002, 35; Senftleben 2004, 65; Landau 2006, 26–27.

basic concepts can be expressed differently.<sup>241</sup> Accordingly, although algorithms are essential to the way computers process information as software is written by specifying an algorithm using declarations, expressions and statements, from the copyright's point of view they merely represent certain ideas behind the system design<sup>242</sup>. Algorithms are ultimately expressed in the form of source code, which together with a possible GUI is the only directly perceivable and thereby copyrightable part of a program<sup>243</sup>.

However, the UK case *Cantor Fitzgerald International v Tradition (UK) Ltd* referred to above makes for interesting reading also as to the extent of copyright protection. 'Software architecture' alludes to two important characteristics of a computer program, to wit the hierarchical structure of procedural components and the structure of data<sup>244</sup>. Such characteristics are not directly perceivable from the source code but the High Court of England and Wales nevertheless took the view that the software architecture is capable of protection if a substantial part of the programmer's skill, labour and judgement had gone into it<sup>245</sup>. Already in *Ibcos Computers Ltd v Barclays Mercantile Highland Finance Ltd* it had been held that copyright can subsist in the software architecture where the modular components are combined in a way that can be deemed to form a copyrightable compilation. In accordance with *Nova Productions Ltd v Mazooma Games Ltd and Bell Fruit Games Ltd*<sup>246</sup>, also a GUI can fulfil the UK requirements for copyright protection, but as an artistic work, not a computer program.

In the US, the attitudes towards bestowing copyright protection upon software architecture have been more reserved. In *Whelan Associates, Inc. v Jaslow Dental Laboratory, Inc.*, the court held that copyright protection of computer programs might extend beyond the programs' literal code to their structure, sequence, and organisation. However, the court deciding the case of *Computer Associates International, Inc. v Altai, Inc.* disapproved. According to it, analysing the scope of copyright protection in terms of 'structure' was ambiguous and identifying structure with 'sequence' and 'organisation' fallacious. Consequently, copyright may be infringed even if no literal code is copied but the analysis ought to follow the test of substantial similarity. As regards GUIs, it is arguably settled case law that the functionalities thereof are non-protectable in the US. It stems already from art. 9(2) of the TRIPS and art. 2 of the WCT that copyright

<sup>241</sup> COM (88) 172 final, 182.

<sup>242</sup> KM 1987:8, 177-178.

<sup>243</sup> See Välimäki 2009, 15, who speaks of the 'surface' of software.

<sup>244</sup> Pressman 1994, 327-328.

<sup>245</sup> Freedman 2000, 38-39. The court considered the overall structure of the system at a high level of abstraction and the allocation of functions between various programs as analogous to a plot of a novel or play. Under the Anglo-Saxon legal order, taking a plot even without plagiarising any part of the particular manner of expression might be sufficient to amount to copyright infringement (Rebikoff 2001, passim).

<sup>246</sup> [2007] EWCA Civ. 219.

protection does not extend to the methods of operation as such. Nonetheless, it seems conceivable that under special circumstances a GUI could enjoy copyright protection through the doctrine of compilations.<sup>247</sup>

All the cases under discussion have been tried before an Anglo-Saxon court, which is primarily due to the geographical and financial distribution of the software industry<sup>248</sup>. Domestic precedent courts have yet to pass a ruling on these matters, so that the legal state in Finland is somewhat unclear. However, the multilateral conventions concerning copyright have been entered into with a view to create a system that guarantees protection meeting certain minimum requirements for authors in all the member states<sup>249</sup>. This congruent international background provides for the assumption that the foundations described above were applicable to Finland as well, unless valid contraindications exist.

In any event, granted that the software architecture or the GUI would suffice to enjoy copyright protection, anyone can draw freely on the structural design or the graphical methods of operation to create a new and independent work, copyright in which is not subject to the rights in the original program. For instance, copyright in a technological standard that defines what sort of architectural solutions must be used in interfaces in order to guarantee the compatibility of different systems does not set any limitations upon the implementer of the standard based on copyright law, since art. 1(2) of the Software Directive protects the original expression of interface specifications, not specifications as such<sup>250</sup>. The decision of VHO 17.5.2005 712 confirms the meagre protection of interfaces by noting that since the programming alternatives available in respect of such abstractions are often limited, it is difficult for these portions of software to outrun the threshold of originality<sup>251</sup>. However, if the architecture specifies certain things on source code level, copyright may again have relevance to the matter, for it is the concrete written form of a computer program that copyright ultimately covers.

#### *Independence from Licenses*

The final paragraph of s. 5 of the GPLv3 provides that a compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered

<sup>247</sup> See Lai 1999, 77-79; Mylly 2005, 763. Cf. Välimäki 2009, 22-24.

<sup>248</sup> Forbes 2007.

<sup>249</sup> Haarmann 2005, 26.

<sup>250</sup> Band and Katoh 1995, 242-243. The European Commission takes the view that implementation of a specification does not constitute copying, but leads to a clearly distinct work; see Case T-201/04 R *Microsoft Corporation v Commission of the European Communities* [2004] ECR II-4463, para. 168 *et seq.*

<sup>251</sup> Mylly 2005, 756.

work and which are not combined with it with the intention of forming a larger program, is called an aggregate. Inclusion of a covered work in an aggregate does not cause the GPLv3 to apply to the other parts of the aggregate, if the compilation and its resulting copyright are not used to limit the access or legal rights belonging to the users of the compilation beyond what the individual works permit.

It is a foregone conclusion that if, broadly speaking, neither of two programs is a modified version of the earlier one or otherwise based on it, they are separate and independent works. For example, proprietary software may be bundled with an installer program that is licensed under a GNU software license without there being a need to assess, whether the terms of that license apply to the installed software. The answer is in the negative as the installer and the files it installs remain unconnected, for the copyright status of data does not change regardless of programmatic processing<sup>252</sup>. Unless substantial parts of the output are copied from the processing program, the exclusive rights conferred by copyright law do not extend to output, but the latter inherits the qualities of the input.<sup>253</sup>

Under s. 1 of the GPLv3 the corresponding source for a work in object code form includes the source code for shared libraries and dynamically linked subprograms that the work is specifically designed to require. Thus, even a separately-conveyed component that can be reasonably considered an independent and separate work in itself but is designed specifically for use in combination with a work governed by a GNU software license must according to the license be, on account of this dependence, licensed under compatible terms<sup>254</sup>. However, such independent modules that are by no means derived from the original program and are not conveyed only to be used in combination with and as a part of a specific program licensed under a GNU software license are not affected by the license terms in question<sup>255</sup>. Thus, software covered by a GNU software license can be conveyed in conjunction with proprietary systems, provided that the instances of both classes are not combined in a way that would make them effectively a single program.

By contrast, as regards programs lacking such independence, subsection 5c of the GPLv3 is unconditional in its language by stating that works based on a GPLv3-covered program may be conveyed exclusively on condition that the entire work, as a whole, is licensed under the present license to anyone who comes into possession of a copy. However, notwithstanding any contractual stipulations to the contrary and as a consequence of the principles referred to

<sup>252</sup> See also s. 2 of the GPLv3.

<sup>253</sup> KM 1987:8, 65 ff.

<sup>254</sup> GPLv3-DD1, 12; GPLv3-DD2, 13.

<sup>255</sup> GPLv3-DD3, 46–47. Drafts 1 and 2 of the GPLv3 contained an explicit provision in that regard, but the fact is still inherent in other sections of the license.

above, use of the idea or inclusion of elements of a program governed by a GNU software license that are either

- a) unoriginal,
- b) dictated by efficiency,
- c) dictated by external factors or
- d) taken from the public domain<sup>256</sup>

does not cause the license in question to apply to the new program. Instead, the last-mentioned is to be deemed a separate work for copyright law purposes and, therefore, may be licensed under whichever terms.

This is due to the fact that copyright offers computer programs general *erga omnes* protection, which nevertheless, in contrast to patents, encompasses merely the form of expression thereof<sup>257</sup>. The legislator has deemed it good legal policy to motivate competition by enabling anyone to exploit the well-known techniques and methods of software industry in order to create and further develop economic substitutes that are founded on the same idea and perform the same tasks as the original products<sup>258</sup>. If these new programs have been implemented in an original way without having recourse to the protectable elements of the primary work, they are both protected irrespective of each other<sup>259</sup>. Thus, a work must be licensed under a GNU software license only as long as any substantial portion of parts so covered is present in the subsequent version<sup>260</sup>.

It has been defined in s. 0 of the GPLv3 that “the Program” refers to any *copyrightable* work licensed under this License<sup>261</sup>. Since the licensed subject matter is determined against the system of copyright law, incorporating non-protectable elements in a work that is being licensed

<sup>256</sup> The public domain is a range of abstract materials that are not owned or controlled by anyone, thus making them available to be used for any purpose without any requirements of permission (Välimäki 2002, 856). In our jurisdiction, the author may waive her *droit d'auteur* with binding effect only in relation to use that is limited in character and extent (s. 3[3] of the Copyright Act) and the waiver of financial rights must occur separately for each function of exclusive rights (Kivimäki 1948, 322–323). For discussion with regard to placing a work in the public domain in the US, see Samuels 1993, 158–162.

<sup>257</sup> See Castrén 2006a, yj111.50906.

<sup>258</sup> HE 161/1990 vp, 16.

<sup>259</sup> KM 1987:8, 178.

<sup>260</sup> See also GPLv3-DD1, 16.

<sup>261</sup> Emphasis added. In that regard, the section additionally provides that ‘copyright’ also means copyright-like laws that apply to other kinds of works. Further to n. 156 *supra*, it is an interesting question whether the Unfair Business Practices Act could be considered as a copyright-like law. The topic, however, is too broad to be discussed here and is better explored in a separate study.

under terms that are not compatible with those of the present GNU software license does not arguably constitute even a breach of contract. Since non-protectable elements are by definition not copyrightable, I find it implicit in the license texts that the reciprocal license grant does not encompass elements that, considered in isolation, do not enjoy copyright protection but such parts are exempted from the scope of the licenses and may, therefore, be freely utilised. The interpretation is concordant with the takings of attitude by the FSF, as they have accentuated that the GNU software licenses are not contracts and have expressly approved of my reading in respect of parts taken from the public domain<sup>262</sup>. It is difficult to see how the construction could differ as regards other forms of non-protectable elements.

Naturally, figuring out which parts of a program are presumably non-protectable is a case-specific operation that necessitates application of the substantial similarity test by the party wishing to separate such parts from the rest. In the end, only the court of final instance is competent to pronounce on the validity of the demarcation once and for all. It is noteworthy that whilst, for instance, comments with the same contents, similar indentations and other suchlike circumstances do not render two separate computer programs into copies of the same work, the same applies *vice versa*: ostensible alteration such as line division, indentation, information embedded in the source code or operating with upper and lower case does not affect the judicial comparison test, since it cannot transfigure a copy into a modification or independent work<sup>263</sup>.

### Combined Works

Subject to the exceptions set forth above, LGPLv3-covered software can be incorporated in a proprietary system merely on certain boundary conditions. The GNU software licenses start from the premise that a work incorporating material covered by such a license forms an extended version of the latter. Section 2 of the LGPLv3 provides that if the licensee modifies a copy of a program so licensed, the modified copy may not be conveyed under terms other than those of either LGPLv3 or GPLv3, if it is conveyed at all.

However, the specific class of combined works may pursuant to s. 4 of the LGPLv3 essentially be conveyed under terms of one's own choice<sup>264</sup>. In the framework of LGPLv3, a combined work means a product that is produced by combining or linking an application with an LGPLv3-covered library. An application, for its part, is defined as any work that makes use of an interface provided by such a library, but which is not otherwise based on it. (LGPLv3, s. 0.)

<sup>262</sup> See Moglen 2001; FSF 2008a.

<sup>263</sup> Copyright Council 1998:16, 9-10.

<sup>264</sup> See ch. 0 *supra* with regard to the requirements concerning different ways of incorporation and combination.

Section 5 of the Copyright Act provides that a person who, by combining works or parts of works, creates a literary compilation has copyright therein, but her rights do not restrict the rights in the individual works. These compilations must, in order to enjoy copyright protection, be intellectual creations as such, which denotes that the selection and articulation of the works contained in the compilation have occurred according to a certain original scheme<sup>265</sup>. Combined works referred to in the LGPLv3 may, therefore, be literary compilations in the sense of the present section. Whether the operation is in respect of the Copyright Act classified to fall into the category of s. 4(1) or s. 5 bears, however, no particular relevance, since they both necessitate the permission of the person holding copyright in the original work<sup>266</sup>. It stems from the explication of an application that only such combining that can be deemed a mode of using an interface provided by the library can produce a combined work and thereby entitle to the exception as to reciprocity<sup>267</sup>.

Combining that forms a single work is not limited to static or dynamic linking, which is meaningful only in certain technological circumstances, so that modules may form a combined program even if they are not linked *sensu stricto*<sup>268</sup>. Therefore, LGPLv3-covered programs that provide one or more interfaces can be used through those interfaces in proprietary applications irrespective of the licenses thereof. The only legal restriction that the LGPLv3 imposes in such situations is that users cannot be prevented from running debuggers on the combined works (s. 4 of the LGPLv3). As a consequence, only if the library itself is being modified, the assessment follows the principles discussed in the following chapter<sup>269</sup>.

<sup>265</sup> KM 1953:5, 50.

<sup>266</sup> Koktvedgaard and Levin 2007, 73.

<sup>267</sup> It is not obvious whether the present provision, or the GNU software licenses in general, ought to be interpreted *in dubio contra proferentem*. The licenses have been drafted by the FSF, which could be characterised as an interest group, but in all cases except where that organisation itself acts as a licensor neither party has formulated the terms rather than merely adheres thereto. Furthermore, the advantage of size may case-specifically exist on either the licensor's or licensee's side. Since the documented revision and update process of the GNU software licenses from version 2 to version 3 makes the objective interpretation of the contractual relation possible, verbatim reading of the licenses appears well-founded; see KM 1990:20, 342–343; Hemmo 2003, 581; Wilhelmsson 2008, 97 ff.

<sup>268</sup> See GPLv3-FIN, 18.

<sup>269</sup> The program licensed under the LGPLv3 needs not necessarily be a subroutine library. For instance, the OpenOffice.org office application suite is governed by the present license so as to ensure that the published improvements to the software itself become available for everyone but, at the same time, enable the commercial conveyance of add-ons and plug-ins that make use of the interfaces provided by the application suite (OpenOffice.org 2008).

## Modified Works

### *Communications Based Analysis*

Under s. 0 of the GPLv3, to modify a work means to copy from or adapt all or part of a work in a fashion requiring copyright permission, other than the making of an exact copy. By such definition, linking or combining a protectable GPLv3-covered code with other material appears to form a single modified work, conveying of which must occur exclusively under the present license (GPLv3, sub-s. 5c). As regards the functional scope affected by reciprocity, it stems from the elucidation of corresponding source contained in s. 1 of the GPLv3 that the cumulative modified work is to include also those dynamically linked subprograms that the work is specifically designed to require, 'such as by intimate data communication or control flow between those subprograms and other parts of the work'.

The license text contains no further definition on what is meant by such intimate data communication or control flow<sup>270</sup>. The rationale documents, instead, provide that the notion is intended to describe interaction and knowledge so intricate and detailed that it implies a module being particularly produced to depend upon a GPLv3-covered element<sup>271</sup>. The FSF's opinion has been further elaborated on its web page that contains answers to commonly-asked questions concerning the GNU software licenses<sup>272</sup>. In response to a query about the difference between an 'aggregate' and other kinds of 'modified versions', they state to believe that a proper criterion for demarcating the line between two separate programs and one program with two parts is ultimately conditional upon communication, both the mechanism thereof and what kinds of information are interchanged.

Under this view, including modules in the same executable file would betoken that they are certainly combined in one program. The same would apply to modules that are designed to run linked together in a shared address space and make function calls to each other<sup>273</sup>. By contrast, if two programs use for communication a mechanism that is normally used between separate programs, it creates a *prima facie* assumption of separateness<sup>274</sup>. Nonetheless, should the

<sup>270</sup> The wording of the provision was similar in Draft 1 of the GPLv3. In Draft 2, 'complex' was substituted for 'intimate', which some readers had found unclear (GPLv3-DD2, 7). However, 'intimate' was restored in Draft 3 anew, following from further public discussion; see GPLv3 comments in file 'gplv3-draft-2'.

<sup>271</sup> GPLv3-DD3, 42.

<sup>272</sup> FSF 2008a.

<sup>273</sup> According to the FSF, using shared memory to communicate with complex data structures is somewhat equivalent to dynamic linking. On the contrary, were a module invoked by a function that creates a separate address space for the child, it would arguably be a separate program.

<sup>274</sup> The FSF lists pipelines, inter-process sockets and command line arguments as examples of such communication mechanisms.

programs exchange complex internal data structures, the semantics of the communication would then be intimate enough to refute the assumption and constitute a basis to consider two parts as combined into a larger program. Pursuant to this interpretation, if a library is released under the GPLv3, any program that uses it must, too, be under the same or a compatible license, because the program as it is actually run includes the library<sup>275</sup>. Since the GPLv3 refers to dynamically linked subprograms that the work is specifically designed to require, communication limited to invoking the primary function of a module with few options forms, however, a borderline case<sup>276</sup>.

The interpretation assumed by the FSF is supported by case *Micro Star v FormGen Inc.*<sup>277</sup>, where the US Court of Appeals for the Ninth Circuit took the view that map files were relevant adaptations of the original game in respect of copyright law. The map files did not copy any code or graphics of the game but were linked to the graphics library thereof. As a consequence, the files generated new audiovisual displays when the game was run. According to the court, although these displays came entirely out of the source art library of the game, the incorporation of copyright protected expression was evidenced by the fact that the map files could only be used with the present game. A rather low premium was placed on technological details. Instead, the court construed the infringement on the basis of the outcome that results from the use of the map files.<sup>278</sup>

Worldwide, there is apparently no record that anyone would have circumvented a strongly reciprocal GNU software license by means of dynamic linking and subsequently contested when threatened by the copyright holder with the institution of legal proceedings, which suggests that the industry *de facto* approves of the FSF's interpretation. As regards static linking, there has been one litigation where the issue was almost taken under *de jure* analysis. In 2001 was filed the case of *Progress Software Corporation v MySQL AB*<sup>279</sup>, where proprietary software was allegedly compiled inside the binary distribution of a GPL-covered database management system<sup>280</sup>. In the preliminary injunction, the court stated that whether a program linked to software governed by the GPL can be considered a derivative work of that software raises a

<sup>275</sup> As regards object-oriented languages, the FSF are of the opinion that 'subclassing' is creating a work based on the earlier work. LGPLv3, s. 0 specifically provides that, for the purposes of the present license, defining a subclass of a class defined by an LGPLv3-covered library is deemed a mode of using an interface of the library.

<sup>276</sup> FSF 2008a.

<sup>277</sup> 154 F.3d 1107 (9th Cir. 1998).

<sup>278</sup> See Välimäki 2009, 40.

<sup>279</sup> See n. 161 *supra*.

<sup>280</sup> Välimäki 2005, 134-135.

factual dispute<sup>281</sup>. The case was, however, settled before judgement was passed, so that the issue still forgoes an authoritative opinion.

### *Critique of Communicative Interpretation*

The reasoning of *Micro Star v FormGen Inc.* ensues from the prevailing practice amongst Anglo-Saxon jurisdictions, according to which the original elements in the plot of a copyrightable literary work may be considered a substantial part of the work and, therefore, copyright in the original work may be infringed even if the actual language has not been copied at all<sup>282</sup>. In view of that, the court in question held that the infringed work was the *story itself*, whereby the stories ‘told’ in the map files were sequels, the subject matter of which belonged to the exclusive rights of the copyright holder. Under Finnish legal order, however, plots cannot be copyrighted<sup>283</sup>. As a result, the finding of copyright infringement presumes that protected material from a pre-existing work has been substantially incorporated into a subsequent work.

To that end, relying on another case concerning runtime alteration tried before the same Ninth Circuit seems more legitimate. In *Lewis Galoob Toys, Inc. v Nintendo of America, Inc.*<sup>284</sup>, the concurrent altering of digital information that originated in a data storage device was not deemed copyright infringement, since the infringing work would have to incorporate a portion of the copyrighted work in some form. Jaeger and Metzger argue that, if software components are loaded into the memory of a computer simultaneously and thereafter linked, they practically become a single executable, so that the legal assessment of the arrangement ought not to differ from physical incorporation<sup>285</sup>. In principle, the argument appears justified for law should address itself to the essence of matters. However, copyright is by definition protection for the format, in this case literal code, whereupon the interpretation cannot be accepted; the coverage of functionality would require the backing of institutional support.

The definitions of modification and propagation contained in the GNU software licenses are strongly connected with the exclusive rights conferred upon the copyright holder under the applicable copyright law<sup>286</sup>. Making of an exact copy, executing a work on the computer and modifying a private copy (*cf. s. 25j* of the Copyright Act) are all specifically excluded from their

<sup>281</sup> Majerus 2003.

<sup>282</sup> See Rebikoff (2001) and the cases referred to therein.

<sup>283</sup> Copyright Council 1986:8; Copyright Council 1994:9.

<sup>284</sup> 964 F.2d 965 (9th Cir. 1992).

<sup>285</sup> Jaeger and Metzger 2006, 39–40.

<sup>286</sup> They refer to a ‘fashion requiring copyright permission’ and ‘infringement under applicable copyright law’, respectively.

scope, which leaves actions referred to in ss. 2, 4(1) and 5 of the Copyright Act remaining<sup>287</sup>. Any attempt to propagate or modify a GPLv3-covered work *except as expressly provided* in the license document terminates the rights under the license (GPLv3, s. 8). Therefore, a product that uses the functionality of a GPLv3-covered component without incorporating any portions of the latter cannot, in our jurisdiction, arguably be said to propagate or modify in contravention of the license. As a result, dynamically linking applications to libraries licensed under the GPLv3 would not trigger reciprocity, since such applications ought to be deemed separate and independent works, barring where the source code of the GPLv3-covered software component *per se* has been altered.

By contrast, the significance of intimate data communication or control flow actualises in situations where also the material governed by the GPLv3 has been modified in a way that would, without permission, make the licensee liable for copyright infringement. For example, a licensee could attempt to escape the requirement of subsection 5c of the GPLv3 by placing all her improvements in a separate subprogram and merely modifying the main program to dynamically link thereto. Now, if she conveys the main program in accordance with the GPLv3 but does not include the source code of the runtime component, will it satisfy the license? No. Addition of modules and other parts to a program results in a new program based on the old program, if the alteration physically affects the literal code of the latter. The definition of the corresponding source means that irrespective of the method of combination all non-system libraries, subprograms and suchlike that the work is designed to require must also be licensed under a GPLv3-compatible license, at the risk of the conclusion that modification, propagation or both have occurred contrary to the license and therefore s. 2 of the Copyright Act<sup>288</sup>. In the present case, the licensee has designed the work to require the external component and, since such alteration requires the permission of the copyright holder, the licensee's right to dispose of the improved version, as a whole, is subject to the copyright in the original work (see art. 4[b] of the Software Directive)<sup>289</sup>.

Only if the component meets the criteria for a system library set forth in the third paragraph of s. 1 of the GPLv3, the conveyance of combinations formed by GPLv3-covered and proprietarily licensed software products is possible, since the corresponding source does not include the system libraries of the work (GPLv3, s. 1). System libraries are by definition core components of the operating system that may not necessarily come directly with it but that all users of the software in question can reasonably be expected to have (see *ibid.*). Programs governed by the

<sup>287</sup> Cf. art. 4 of the Software Directive.

<sup>288</sup> See also GPLv3-FIN, 10.

<sup>289</sup> The rule has not been expressed unequivocally in the Copyright Act, but the interaction of ss. 2, 4(1) and 5 thereof leads to the conclusion that the copyright holder has the exclusive right to exploit the new works formed by modifying of the original; see Haarmann 2006, 103.

GPLv3 may therefore be combined with such GPLv3-incompatible components and conveyed in one.<sup>290</sup> However, the definition of major components has been drafted using relatively objective terminology, so that the expected degree of success of an effort to invoke the provision without strong factual grounds appears rather low.

### Remote Network Interaction

Irrespective of the assessment whether a work is an original or a modified version, strong reciprocity is not triggered until transfer of copyrightable material occurs or is enabled (GPLv3, s. 0)<sup>291</sup>. This is where the AGPLv3 comes in. Section 13 of the AGPLv3 provides that if the licensee modifies an AGPLv3-covered program, the modified version must offer all users interacting with it remotely through a computer network an opportunity to receive the corresponding source of the present version<sup>292</sup>. The material scope of the reciprocity follows the rules set forth in the preceding chapter, but already remote network interaction activates the obligation.

Remote network interaction is not one of the exclusive rights of the copyright holder referred to in s. 2 of the Copyright Act or art. 4 of the Software Directive<sup>293</sup>. However, since alteration is, the copyright holder may on her license grant authorise such action in general, but impose certain boundary conditions<sup>294</sup>. As this is the case with regard to the AGPLv3, a licensee who consequently oversteps the license grant renders herself guilty of copyright infringement for committing a restricted act without authorisation<sup>295</sup>. Thus, the advantage of the AGPLv3 for an author who designs software for network server use is obvious: she is able to receive the benefit of any modifications to her original work the same as conventional developers may exploit any improvements on conveyed software.

In accordance with s. 13 of the AGPLv3, network reciprocity extends to all interacting users only. Therefore, use in private computer networks securely sharing any part of an organisation's information or operational systems with its members does not require the organisation to

<sup>290</sup> See Smith 2007.

<sup>291</sup> Cf. GPLv3-DD3, 40.

<sup>292</sup> Provided, naturally, that the modified version supports such interaction.

<sup>293</sup> See n. 148 *supra*. Under the latter section of law, restricted acts include (1) the permanent or temporary reproduction; (2) the translation, adaptation, arrangement and any other alteration; and (3) any form of distribution to the public of a computer program.

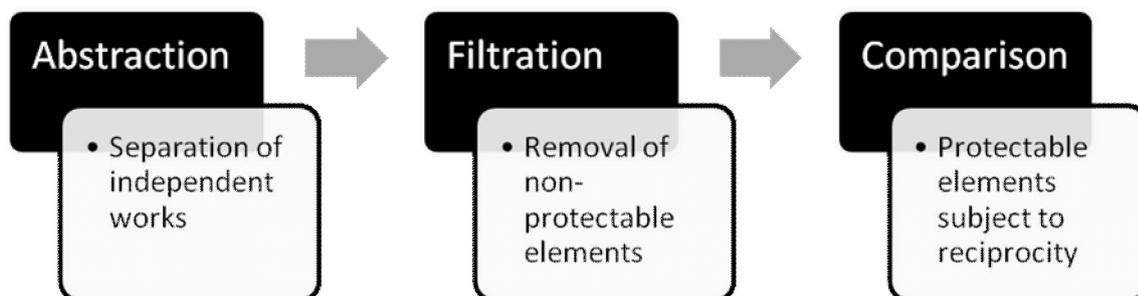
<sup>294</sup> Cf. s. 2(1) of the Copyright Act; art. 4(b) of the Software Directive.

<sup>295</sup> Such modification does not, for the reasons discussed in ch. 0 *supra*, entitle to the exception of s. 25j(1) of the Copyright Act either.

release the corresponding source to any third parties<sup>296</sup>. Outside intranet environments, an ASP affected by the AGPLv3 can naturally control and limit use of the service by agreement<sup>297</sup>. However, in line with other GNU software licenses, anyone who has access to the service and chooses to receive the corresponding source thereof may under conditions stated in ss. 4 through 6 and 13 of the AGPLv3, respectively, freely release it to the public, with or without a fee.

## 5. Conclusive Remarks

On account of the analysis explicated in chapter 4 above, we are now able to refine the scope of reciprocity contained in the GNU software licenses. In view of that, the respective reciprocity obligations are triggered as of the moment when (1) protected material from a program licensed under a GNU software license has been substantially incorporated into a subsequent work in accord with illustration 2 below and (2) the activity referred to in the present license—conveyance or remote network interaction—has taken place.



**Illustration 2. Process of identifying protectable elements of GNU-covered software**

It should be noted that, unless the first-mentioned criterion has been met, such software components that only dynamically link to a program governed by a GNU software license should arguably be separated *de lege lata* as independent works. Granted that in such cases the

<sup>296</sup> As regards occurrences of unauthorised use, such users are not probably first in line demanding their opportunity to receive the source code. At any rate, it could be argued that the concept of ‘interaction’ necessitates certain two-way effect that objects have upon one another, which is conceptually absent from unauthorised use.

<sup>297</sup> See, in that regard, Lampola, et al. 2003, 27–30.

program as it is actually run includes also the dynamically linked module, no alteration occurs in concrete or permanent form. Copyright comprises the right to dispose of a work in specific functions, none of which pertains to factual usage. Neither applicable legislation nor legislative history or legal usage supports the interpretation that would extend to the protection of functionality; teleological arguments alone cannot justify the extension beyond literal code. Construction of the framework for assessing the conditions according to which dynamic linking could nevertheless be construed as alteration in the sense of copyright law is a task that must be performed by subsequent research.

Having said that, the complex connecting factor rules of private international law betoken that even purely domestic actors cannot be lulled into certainty as to the legal state concerning their software. As *Micro Star v FormGen Inc.* evidences, there are jurisdictions and circumstances under which developers ought to be cautious, especially where the work is designed to considerably rely upon other software. Another solution is to deploy software by way of the SaaS method. The GNU software licenses do not place any conditions on licensees that merely make copies of programs so covered and run them. Moreover, s. 0 of the GPLv3 permits anyone the freedom to make modifications and use them privately, without ever conveying them to third parties. Placing the program on a server machine for the public to interact to is under the present section not conveying. In such cases, therefore, the ASP is not obliged to release the modified sources in the first place, whereupon the issue of dynamic linking does not actualise at all, unless the vendor has utilised protectable material licensed under the AGPLv3.

If the licensee decides to be bound by a GNU software license, the license under which she licenses her modifications does not necessarily need to be the particular license that governs the code being utilised. Two licenses are compatible if they permit the use of the licensed material in the prospective way. For instance, a program that is combined with a GPLv3-covered program must be released under a license compatible with the present one, so that the combination itself is consequently available under the GPLv3. License terms are compatible with those of the GPLv3 where code released under them can be combined with GPLv3-covered code to form a larger program, which is then conveyed under the GPLv3. Therefore, the alterations made by a subsequent developer may be licensed under a permissive or standard reciprocity license *per se*, but the outcome as a whole is governed by the more restrictive one. However, only reciprocally licensed modifications by parties who do not hold copyright in the original work are able to prohibit the original author from converting the product's license into proprietary at a later time, barring the complete rewrite of protectable subsequent elements. That is the core of reciprocity.

Technologically speaking, open source software allows developers to recycle existing code to fill specific needs rather than write new software from scratch. Such development approach offers the potential for more flexible technical procedures and quicker innovation, thus helping to produce reliable, high quality software in an economic manner. For this reason, detailed legal analysis as to the risks and benefits associated with the licenses governing the legal relationships pertaining to open source software enables the market actors to make reasoned decisions thereof, and ultimately decreases the transaction costs of migrating thereto.

## Appendices

### Appendix 1. GNU General Public License, Version 3, 29 June 2007

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#### Preamble

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The licenses for most software and other practical works are designed to take away your freedom to share and change the works. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change all versions of a program—to make sure it remains free software for all its users. We, the Free Software Foundation, use the GNU General Public License for most of our software; it applies also to any other work released this way by its authors. You can apply it to your programs, too.

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## Bibliography

### Literature

#### Aarnio 1989

Aarnio, Aulis. *Laintulkinnan teoria. Yleisen oikeustieteen oppikirja*. Porvoo: WSOY, 1989.

#### Ang 1994

Ang, Steven. “The Idea-Expression Dichotomy and Merger Doctrine in the Copyright Laws of the U.S. and the U.K.” *International Journal of Law and Information Technology* 2, no. 2 (1994): 111-153.

#### Aurejärvi 1988

Aurejärvi, Erkki. *Velvoiteoikeuden oppikirja*. Helsinki: Condictio, 1988.

#### Babcock 2007

Babcock, Charles. “What Will Drive Open Source?” *InformationWeek*, 19 March 2007: 36-44.

#### Bainbridge 1999

Bainbridge, David. *Software Licensing*. 2nd edition. Herts: CLT Professional Publishing, 1999.

**Band and Katoh 1995**

Band, Jonathan, and Masanobu Katoh. *Interfaces on Trial: Intellectual Property and Interoperability in the Global Software Industry*. Boulder, CO: Westview Press, 1995.

**Bradbury 2004**

Bradbury, Danny. "Documentation dearth undermines open source security." *Infosecurity Today* 1, no. 5 (2004): 6.

**Brooks 2007**

Brooks, Jason. "Free software folly." *eWeek*, 9 July 2007: 56.

**Castrén 2006a**

Castrén, Martti. "Patenttioikeus." In *Yritysoikeus*, by Kirsti Rissanen, et al. Helsinki: WSOYpro, 2006. Available: <http://www.wsoypro.fi/wsoypro.aspx?page=selain&pos=yj111.50627>.

**Castrén 2006b**

Castrén, Martti. "Tekijänoikeus." In *Yritysoikeus*, by Kirsti Rissanen, et al. Helsinki: WSOYpro, 2006. Available: <http://www.wsoypro.fi/wsoypro.aspx?page=selain&pos=yj111.48448>.

**Collin 2004**

Collin, P. H. *Dictionary of Law*. Fourth edition. London: Bloomsbury, 2004.

**Curran 2008**

Curran, Franck. "GPLv3: What the new version of the General Public License means for software developers." *The Rational Edge*, 15 March 2008: 42–44.

**Daintith 2004**

Daintith, John, ed. *A Dictionary of Computing*. Fifth edition. Oxford: Oxford University Press, 2004.

**Deek and McHugh 2008**

Deek, Fadi P., and James A. M. McHugh. *Open Source: Technology and Policy*. New York, NY: Cambridge University Press, 2008.

**Diver 2008**

Diver, Laurence. "Would the current ambiguities within the legal protection of software be solved by the creation of a sui generis property right for computer programs?" *Journal of Intellectual Property Law & Practice* 3, no. 2 (2008): 125–138.

**Dixon 2004**

Dixon, Rod. *Open Source Software Law*. Boston: Artech House, 2004.

**Draft Common Frame of Reference**

*Principles, Definitions and Model Rules of European Private Law*. Interim Outline Edition. Edited by Christian von Bar, et al. Prepared by the Study Group on a European Civil Code and the Research Group on EC Private Law (Acquis Group). Munich: Sellier, 2008.

**Elo and Hasu 2003**

Elo, Tommi, and Tero Hasu. "Detecting Co-Derivative Source Code – An Overview." In *Teknis-juridinen selvitys tekijänoikeudesta tietokoneohjelman lähdekoodiin Suomessa ja Euroopassa*, by Markus Oksanen, Tommi Elo and Tero Hasu, 1–48. Helsinki: Helsinki Region Chamber of Commerce, 2003.

**Epstein 2004**

Epstein, Richard A. "Why open source is unsustainable." *Financial Times*, 9 November 2004. Available: <http://www.ft.com/cms/s/2/78d9812a-2386-11d9-ae5-00000e2511c8.html>.

**Fogel 2001**

Fogel, Karl. *Open Source Development with CVS*. 2nd edition. Scottsdale, AZ: Paraglyph Press, 2001.

**Ford 2007**

Ford, Ian. "It's all about the service." *ITNOW* 49, no. 6 (2007): 14-15.

**Freedman 2000**

Freedman, C. D. "The Protection of Computer Software in Copyright and the Law of Confidence: Improper Decompilation and Employee-Poaching." *International Journal of Law and Information Technology* 8, no. 1 (2000): 25-47.

**Furmston 1991**

Furmston, M. P. *Cheshire, Fifoot and Furmston's Law of Contract*. Twelfth Edition. London: Butterworths, 1991.

**Gasser 2006**

Gasser, Urs. "Legal Frameworks and Technological Protection of Digital Content: Moving Forward Towards a Best Practice Model." *Berkman Center Research Publication*, no. 04 (2006): 1-58.

**Germanowski 1998**

Germanowski, Glen. "Is the 'Shrinkwrap' Licence Worth the Paper Envelope it's Printed On?" *International Journal of Law and Information Technology* 6, no. 3 (1998): 313-326.

**Ghosh and Soete 2006**

Ghosh, Rishab, and Luc Soete. "Information and intellectual property: the global challenges." *Industrial and Corporate Change* 15, no. 6 (2006): 919-935.

**Ginsburg 1992**

Ginsburg, Jane C. "Copyright in the U.S. since Berne Accession." *Nordiskt Immateriellt Rättskydd* 61 (1992): 159-186.

**Gomulkiewicz 2009**

Gomulkiewicz, Robert W. "Conditions and Covenants in License Contracts: Tales from a Test of the Artistic License." *Texas Intellectual Property Law Journal*, no. 17 (2009): 1-32.

**Gringras 1996**

Gringras, Clive. "The Validity of Shrink-Wrap Licences." *International Journal of Law and Information Technology* 4, no. 2 (1996): 77-107.

**Haarmann 2005**

Haarmann, Pirkko-Liisa. *Tekijänoikeus ja lähioikeudet*. Kolmas, uudistettu painos. Helsinki: Talentum, 2005.

**Haarmann 2006**

Haarmann, Pirkko-Liisa. *Immateriaalioikeus*. 4., uudistettu painos. Helsinki: Talentum, 2006.

**Hakulinen 1958**

Hakulinen, Y. J. *Velvoiteoikeus I. Yleiset opit*. Helsinki: Pellervo-Seura, 1958.

**Hass 2007**

Hass, Douglas A. "Uneasy détente: strengthening the market's adaptation of the GNU General Public License in common law jurisdictions." *Journal of Intellectual Property Law & Practice* 2, no. 6 (2007): 382–396.

**Hemmo 2003a**

Hemmo, Mika. *Sopimusoikeus I*. Helsinki: Talentum, 2003.

**Hemmo 2003b**

Hemmo, Mika. *Sopimusoikeus II*. Helsinki: Talentum, 2003.

**Henry 2003**

Henry, Steven. 'Viral' Open-Source License Can Destroy Software's Value. Press release, Boston, MA: Wolf, Greenfield & Sacks, P.C., 2003.

**Hietanen, Oksanen and Välimäki 2007**

Hietanen, Herkko, Ville Oksanen, and Mikko Välimäki. *Community Created Content: Law, Business and Policy*. Helsinki: Turre Publishing, 2007.

**Howson 2003**

Howson, Peter. *Due Diligence: The Critical Stage in Mergers and Acquisitions*. Aldershot: Gower, 2003.

**Jaeger 2005**

Jaeger, Till. "Ziffer 2 GPL." In *Die GPL kommentiert und erklärt*, by Institut für Rechtsfragen der Freien und Open Source Software, 57–77. Köln: O'Reilly, 2005.

**Jaeger and Metzger 2006**

Jaeger, Till, and Axel Metzger. *Open Source Software: Rechtliche Rahmenbedingungen der Freien Software*. 2. Auflage. München: Verlag C.H. Beck, 2006.

**Kaiserwerth 2008**

Kaiserwerth, Matthias. "Barriers to the Cloud – Opportunities to Pave the Way with New Legal Frameworks." *International Technology and Communications Law Forum*. Versailles, 2008.

**Kartio 2004**

Kartio, Leena. "Esineet ja omaisuus." In *Varallisuusoikeus*, by Ari Saarnilehto, Mika Hemmo and Leena Kartio. Helsinki: WSOYpro, 2004. Available: <http://www.wsoypro.fi/wsoypro.aspx?page=selain&pos=va111.32208>.

**Kemppinen 2006**

Kemppinen, Jukka. *Digitaaliongelma. Kirjoitus oikeudesta ja ympäristöstä*. Lappeenranta: Acta Universitatis Lappeenrantaensis 242, 2006.

**Kivimäki 1948**

Kivimäki, T. M. *Tekijänoikeus. Tutkimus kirjailijan, taiteilijan ja tiedemiehen oikeudesta teokseensa*. Porvoo: Suomalaisen Lakimiesyhdistyksen julkaisuja B-sarja n:o 27, 1948.

**Kivimäki 1966**

Kivimäki, T. M. *Uudet tekijänoikeus- ja valokuvauslait*. Porvoo: Suomalaisen Lakimiesyhdistyksen julkaisuja B-sarja n:o 129, 1966.

**Klami and Neejärvi 1997**

Klami, Hannu Tapani, and Jukka Neejärvi. "Teos vai keksintö? Tietokoneohjelmien tekijän- ja patenttioikeudellisesta suojasta oikeusvertailun kannalta." *Lakimies*, no. 4-5 (1997): 585-606.

**Koktvedgaard and Levin 2007**

Koktvedgaard, Mogens, and Marianne Levin. *Lärobok i immaterialrätt: upphovsrätt, patenträtt, mönsterrätt, känneteckensrätt – i Sverige, EU och internationellt*. Nionde upplagan. Stockholm: Norstedts Juridik, 2007.

**Kotler, et al. 1999**

Kotler, Philip, Gary Armstrong, John Saunders, and Veronica Wong. *Principles of Marketing*. Second European Edition. London: Prentice Hall, 1999.

**Kuhn, Williamson and Sandler 2008**

Kuhn, Bradley M., Aaron Williamson, and Karen M. Sandler. *A Practical Guide to GPL Compliance*. New York, NY: Software Freedom Law Center, 2008.

**Kulmala 2003**

Kulmala, Tatu. *Ohjelmistovuokraussopimukset*. Turku: Turun yliopiston oikeustieteellisen tiedekunnan julkaisuja. Yksityisoikeuden julkaisusarja A:108, 2003.

**Kumar 2006**

Kumar, Sapna. "Enforcing the GNU GPL." *University of Illinois Journal of Law, Technology & Policy*, no. 1 (2006): 1-36.

**Lai 1999**

Lai, Stanley. "Recent Developments in Copyright, Database Protection and (Online) Licensing." *International Journal of Law and Information Technology* 7, no. 1 (1999): 73-94.

**Lajoux and Elson 2000**

Lajoux, Alexandra Reed, and Charles Elson. *The Art of M&A Due Diligence: Navigating Critical Steps & Uncovering Crucial Data*. New York, NY: McGraw-Hill, 2000.

**Lampola, et al. 2003**

Lampola, Markku, Thomas Lemström, Carl Löfberg, Tatu Kulmala, Petri Einovaara, Anssi Sampo, and Pekka Koskinen. *ASP käsikirja. ASP-toiminnan arvoverkko ja juridiset mallit*. Tampere: Tampereen teknillinen yliopisto. Tuotantotalouden osasto, tutkimusraportti 5/2003.

**Landau 2006**

Landau, Michael. "'Fair Use' under U.S. Copyright Law: The Need for Clarity and Consistency." *IPRinfo*, September 2006: 25-31.

**Lappalainen 2007**

Lappalainen, Juha. "Erytistuoimioistuimet ja eräät lautakunnat." In *Prosessioikeus*, by Juha Lappalainen, et al. Helsinki: WSOYpro, 2007. Available: <http://www.wsoypro.fi/wsoypro.aspx?page=selain&pos=pr111.11845>.

**Laurent 2004**

Laurent, Andrew M. St. *Understanding Open Source and Free Software Licensing*. Sebastopol, CA: O'Reilly, 2004.

**Lawson and Rudden 2002**

Lawson, F. H., and Bernard Rudden. *The Law of Property*. 3rd edition. Oxford: Oxford University Press, 2002.

**Lehtonen 1998**

Lehtonen, Asko. "Kohtuullisen hyvityksen arviointi tietokoneohjelmaa koskevassa tekijänoikeuden loukkaustapauksessa." In *Juhlajulkaisu Leena Kartio 1938–30/8–1998*, by Anne Kumpula. Turku: Turun yliopiston oikeustieteellisen tiedekunnan julkaisuja A. Juhlajulkaisu n:o 7, 1998.

**Lerner and Tirole 2005**

Lerner, Josh, and Jean Tirole. "The Scope of Open Source Licensing." *The Journal of Law, Economics, & Organization* 21, no. 1 (2005): 20–56.

**Manner 2001**

Manner, Mikko. "Avoin lähdekoodi ohjelmistotaloudessa." *IPRinfo*, no. 3 (2001): 14–15.

**McAllister 2006**

McAllister, Neil. "How to Buy Free Software." *InfoWorld*, 4 March 2006: 33–37.

**McDermid 1991**

McDermid, John A., ed. *Software Engineer's Reference Book*. Oxford: Butterworth–Heinemann, 1991.

**Millard 2008**

Millard, Christopher. "Cloud Computing: Some Issues for Lawyers." *International Technology and Communications Law Forum*. Versailles, 2008.

**Millqvist 2006**

Millqvist, Göran. *Sakrättens grunder. En lärobok i sakrättens grundläggande frågeställningar avseende lös egendom*. Fjärde upplagan. Stockholm: Norstedt, 2006.

**Morgan 2007**

Morgan, Russell. "Protect Your Code." *PC Magazine*, 17 July 2007: 89.

**Mylly 2005**

Mylly, Ulla-Maija. "Tietokoneohjelmien rajapintojen tekijänoikeussuoja." *Lakimies*, no. 5 (2005): 746–767.

**Niiranen and Tarkela 1998**

Niiranen, Valtteri, and Pekka Tarkela. *Tekijänoikeuden tietosanakirja*. Porvoo: WSLT, 1998.

**Norrgård 2002**

Norrgård, Marcus. *Interimistiska förbyd i immaterialrätten*. Helsingfors: Kauppakaari, 2002.

**NRC 2000**

National Research Council. *The Digital Dilemma: Intellectual Property in the Information Age*. Washington, DC: National Academy Press, 2000.

**Oksanen 2004**

Oksanen, Markus. "Ohjelmakoodi tekijänoikeussuojan kohteena." *IPRinfo*, no. 3 (2004): 28–30.

**Pressman 1994**

Pressman, Roger S. *Software Engineering: A Practitioner's Approach*. Third Edition, European Adaptation. Adapted by Darrel Ince. London: McGraw-Hill, 1994.

**Principles of European Contract Law**

Commission on European Contract Law. *Principles of European Contract Law*. 1999. Available: [http://frontpage.cbs.dk/law/commission\\_on\\_european\\_contract\\_law/PECL%20engelsk/engelsk\\_partI\\_og\\_II.htm](http://frontpage.cbs.dk/law/commission_on_european_contract_law/PECL%20engelsk/engelsk_partI_og_II.htm).

**Pöyhönen 2003**

Pöyhönen, Juha. *Uusi varallisuus oikeus*. Helsinki: Talentum, 2003.

**Raymond 2000**

Raymond, Eric S. *The Cathedral and the Bazaar: Musings on Linux and Open Source by an Accidental Revolutionary*. Rev. ed. Sebastopol, CA: O'Reilly, 2000.

**Rebikoff 2001**

Rebikoff, Stephen. "Restructuring the Test for Copyright Infringement in Relation to Literary and Dramatic Plots." *Melbourne University Law Review* 25, no. 2 (2001): 340-373.

**Reed 2004**

Reed, Chris. *Internet Law: Text and Materials*. Second edition. Cambridge: Cambridge University Press, 2004.

**Rosen 2001**

Rosen, Lawrence. "The Unreasonable Fear of Infection." *Open Magazine*, 2001. Available: <http://rosenlaw.com/html/GPL.PDF>.

**Rosen 2004**

Rosen, Lawrence. *Open Source Licensing: Software Freedom and Intellectual Property Law*. New Jersey: Prentice Hall, 2004.

**Rosen 2008**

Rosen, Lawrence. "Bad Facts Make Good Law: The Jacobsen Case and Open Source." *Open Source Software 2008: Benefits, Risks and Challenges for Software Users, Developers and Investors*. New York, NY: Practising Law Institute, 2008. 1-6.

**Rowland and Campbell 2002**

Rowland, Diane, and Andrew Campbell. "Supply of Software: Copyright and Contract Issues." *International Journal of Law and Information Technology* 10, no. 1 (2002): 23-40.

**Rudanko 1998**

Rudanko, Matti. "Kauppaoikeuden kehityssuuntauksia II. Kaupallisten oikeussuhteiden teoria." *Lakimies*, no. 1 (1998): 68-89.

**Saarnilehto 2005**

Saarnilehto, Ari. *Pääasiat velvoitteesta*. Helsinki: WSOYpro, 2005.

**Samuels 1993**

Samuels, Edward. "The Public Domain in Copyright Law." *Journal of the Copyright Society of the U.S.A.*, no. 41 (1993): 137-182.

**Selvig 1986**

Selvig, Erling. "Tolkning etter norsk eller annen skandinavisk rett av certepartier og andre standardvillkår utformet på engelsk." *Tidsskrift for Rettsvitenskap*, 1986: 1-26.

**Senftleben 2004**

Senftleben, Martin R. F. *Copyright, Limitations and the Three-Step Test: An Analysis of the Three-Step Test in International and EC Copyright Law*. The Hague: Kluwer Law International, 2004.

**Siltala 2001**

Siltala, Raimo. *Johdatus oikeusteoriaan*. Helsinki: Forum Iuris, 2001.

**Sisula-Tulokas 2007**

Sisula-Tulokas, Lena. *Kuljetusoikeuden perusteet*. Helsinki: Talentum, 2007.

**Sorvari 2007**

Sorvari, Katariina. *Tekijänoikeuden loukkaus*. Helsinki: WSOYpro, 2007.

**Spencer Bower and Turner 1966**

Spencer Bower, George, and Alexander Kingcome Turner. *The Law Relating to Estoppel by Representation*. London: Butterworths, 1966.

**Strömholm 1970**

Strömholm, Stig. *Upphovsrättens verksbegrepp*. Stockholm: Panorstedt & Söners Förlag, 1970.

**Szattler 2007**

Szattler, Eduard. "GPL - "Viral" License or "Viral" Contract." *Masaryk University Journal of Law and Technology* 1, no. 1 (2007): 67-79.

**Takki 2002**

Takki, Pekka. *IT-sopimukset – käytännön käsikirja*. Helsinki: Talentum, 2002.

**Tolonen 2003**

Tolonen, Hannu. *Oikeuslähdeoppi*. Helsinki: WSOY Lakitieto, 2003.

**Tolonen 2004**

Tolonen, Hannu. "Siviilioikeuden yleiset periaatteet." In *Varallisuus oikeus*, by Ari Saarnilehto, Mika Hemmo and Leena Kartio. Helsinki: WSOYpro, 2004. Available: <http://www.wsoypro.fi/wsoypro.aspx?page=selain&pos=va111.4959>.

**Tuomisto 1993**

Tuomisto, Jarmo. *Tyyppipakosta aikaprioriteettiin. Näkökohtia esineoikeudellisen sivullissuojan perusteista*. Helsinki: Suomalaisen Lakimiesyhdistyksen julkaisuja. A-sarja n:o 192, 1993.

**UNIDROIT**

International Institute for the Unification of Private Law. *UNIDROIT Principles of International Commercial Contracts 2004*. Rome, 2004. Available: <http://unidroit.org/english/principles/contracts/principles2004/integralversionprinciples2004-e.pdf>.

**Vaidhyanathan 2001**

Vaidhyanathan, Siva. *Copyrights & Copywrongs: The Rise of Intellectual Property and How It Threatens Creativity*. New York, NY: New York University Press, 2001.

**Vapaavuori 2002**

Vapaavuori, Tom. "Tietokoneohjelmiston lähdekoodin escrow-talletus." *Defensor Legis*, no. 6 (2002): 1068-1074.

**Vedenkannas 2002**

Vedenkannas, Matti. "Tietokoneohjelman luovutuksen luonne: tekijänoikeuden, käyttöoikeuden vaiko teoskappaleen luovutus." *Defensor Legis*, no. 5 (2002): 826-879.

**Vetter 2006**

Vetter, Greg R. "Exit and Voice in Free and Open Source Software Licensing: Moderating the Rein over Software Users." *Oregon Law Review* 85, no. 1 (2006): 183-273.

**Vuorijoki 2004**

Vuorijoki, Jari. "Yhteistoimintasopimukset." In *Varallisuus oikeus*, by Ari Saarnilehto, Mika Hemmo and Leena Kartio. Helsinki: WSOYpro, 2004. Available: <http://www.wsoypro.fi/wsoypro.aspx?page=selain&pos=va111.56096>.

**Välimäki 2002**

Välimäki, Mikko. "Avoimen lähdekoodin ohjelmistolisensseistä." *Defensor Legis*, no. 5 (2002): 851-861.

**Välimäki 2005**

Välimäki, Mikko. *The Rise of Open Source Licensing: A Challenge to the Use of Intellectual Property in the Software Industry*. Helsinki: Turre Publishing, 2005.

**Välimäki 2007**

Välimäki, Mikko. "GPL-lisenssin uusi versio on vaikealukuinen." *IPRinfo*, no. 3 (2007): 14-16.

**Välimäki 2009**

Välimäki, Mikko. *Oikeudet tietokoneohjelmistoihin. 2., uudistettu painos*. Helsinki: Talentum, 2009.

**West 2003**

West, Joel. "How open is open enough? Melding proprietary and open source platform strategies." *Research Policy* 32, no. 7 (2003): 1259-1285.

**Wilhelmsson 2008**

Wilhelmsson, Thomas. *Vakiosopimus ja kohtuuttomat sopimusehdot*. Kolmas, uudistettu painos. Helsinki: Talentum, 2008.

**WIPO 1985**

Group of Experts on the Copyright Aspects of the Protection of Computer Software. "Report." *Copyright* (World Intellectual Property Organization), April 1985: 146-149.

**Zitting 1989**

Zitting, Simo. "Sopimuksen käsitettä koskevia näkökohtia." In *Juhlakirja Jaakko Pajula I. Ihminen ja yhteiskunta*, by Heikki Karapuu, 467-474. Helsinki: Kansaneläkelaitos, 1989.

## Official Sources

**COM (88) 172 final**

*Green Paper on Copyright and the Challenge of Technology – Copyright Issues Requiring Immediate*

*Action*. Communication from the Commission, Brussels: Commission of the European Communities, 1988.

**COM (88) 816 final – SYN 183**

“Proposal for a Council Directive on the legal protection of computer programs.” *Official Journal of the European Communities*, no. C 91 (1989): 4–16.

**Copyright Council 1986:8**

Copyright Council. *Suojan kohde, hahmo, repliikki*. 1986:8.

**Copyright Council 1994:9**

Copyright Council. *Tekijänoikeus televisiosarjan käsikirjoitukseen*. 1994:9.

**Copyright Council 1996:3**

Copyright Council. *Tietokoneohjelman tekijän tekijänoikeus*. 1996:3.

**Copyright Council 1997:12**

Copyright Council. *Tietokoneohjelman tekijänoikeus*. 1997:12.

**Copyright Council 1998:16**

Copyright Council. *Tekijänoikeus tietokoneohjelmiin*. 1998:16.

**Copyright Council 2003:10**

Copyright Council. *Tekijänoikeus tietokoneohjelmiin*. 2003:10.

**Copyright Council 2005:7**

Copyright Council. *Tietokoneohjelman teostaso ja suoja*. 2005:7.

**Copyright Council 2006:5**

Copyright Council. *Tietokoneohjelman suoja*. 2006:5.

**Copyright Council 2006:12**

Copyright Council. *Tietokoneohjelman teostaso ja suoja*. 2006:12.

**Copyright Council 2008:13**

Copyright Council. *Tekijänoikeus soittosovellukseen*. 2008:13.

**CRNR/DC/55**

“Partly Consolidated Text of Treaty No 1.” *Diplomatic Conference on Certain Copyright and Neighboring Rights Questions*. Geneva: World Intellectual Property Organization, 1996.

**EESC 1989**

Economic and Social Committee. “Opinion on the proposal for a Council Directive on the legal protection of computer programs.” *Official Journal of the European Communities*, no. C 329 (1989): 4–9.

**Europarl 1990**

European Parliament. “Legal protection of computer programs – Proposal for a directive COM (88) 816 final – SYN 183.” *Official Journal of the European Communities*, no. C 231 (1990): 78–83.

**EV 89/1926 vp**

*Eduskunnan vastaus hallituksen esitykseen tekijänoikeutta sekä oikeutta valokuviiin koskeviksi laeiksi*.

**HE 3/1876 vp**

*Keisarillisen majesteetin armollinen esitys Suomenmaan säädylle ehdoituksen kanssa asetukseen kirjailijan ja taiteilijan oikeudesta työnsä tuotteisiin.*

**HE 89/1926 vp**

*Hallituksen esitys eduskunnalle tekijänoikeutta sekä oikeutta valokuviin koskeviksi laeiksi.*

**HE 23/1960 vp**

*Hallituksen esitys eduskunnalle laiksi tekijänoikeudesta kirjallisiin ja taiteellisiin teoksiin ja laiksi oikeudesta valokuvaan.*

**HE 161/1990 vp**

*Hallituksen esitys eduskunnalle laeiksi yksinoikeudesta integroidun piirin piirimalliin sekä tekijänoikeuslain, oikeudesta valokuvaan annetun lain ja patenti- ja rekisterihallituksesta annetun lain muuttamisesta.*

**HE 211/1992 vp**

*Hallituksen esitys eduskunnalle laiksi tekijänoikeuslain ja tekijänoikeuslain muuttamisesta annetun lain voimaantulosäännöksen 2 momentin muuttamisesta.*

**HE 360/1992 vp**

*Hallituksen esitys eduskunnalle laiksi kuluttajansuojalain muuttamisesta ja eräksi siihen liittyviksi laeiksi.*

**HE 309/1993 vp**

*Hallituksen esitys eduskunnalle perustuslakien perusoikeussäännösten muuttamisesta.*

**HE 28/2004 vp**

*Hallituksen esitys eduskunnalle laeiksi tekijänoikeuslain ja rikoslain 49 luvun muuttamisesta.*

**HE 26/2006 vp**

*Hallituksen esitys eduskunnalle laeiksi teollis- ja tekijänoikeuksia koskevan lainsäädännön muuttamisesta.*

**KM 1953:5**

*Ehdotus laiksi tekijänoikeudesta kirjallisiin ja taiteellisiin teoksiin. Komiteanmietintö, Helsinki: Valtioneuvoston kirjapaino, 1953.*

**KM 1980:12**

*Vuoden 1976 tekijänoikeuskomitean I osamietintö. Yksityinen käyttö, valokopiointi ja nauhoitus opetustoiminnassa. Komiteanmietintö, Helsinki: Valtion painatuskeskus, 1980.*

**KM 1987:8**

*Tietotekniikka ja tekijänoikeus. Tekijänoikeuskomitean IV osamietintö. Teosten luominen ja käyttö tietokoneen avulla; tietokoneohjelmien, tiedostojen ja tietokantojen sekä integroitujen piirien suoja. Komiteanmietintö, Helsinki: Valtion painatuskeskus, 1987.*

**KM 1990:20**

*Oikeustoimilakitoimikunnan mietintö. Komiteanmietintö, Helsinki: Valtion painatuskeskus, 1990.*

**LaVM 8/1876 vp**

*Lakivaliokunnan mietintö n:o 8 keisarillisen majesteetin armollisesta esityksestä, joka sisältää ehdoituksen asetukseen kirjailijan ja taiteilijan oikeudesta työnsä tuotteisiin.*

**LaVM 13/1926 vp**

*Lakivaliokunnan mietintö n:o 13 hallituksen esityksen johdosta tekijänoikeutta sekä oikeutta valokuviiin koskeviksi laeiksi.*

**Legislative Council 1920**

Legislative Council. *Lainvalmistelukunnan ehdotus laiksi tekijänoikeudesta kirjallisiin ja sävelmäteoksiin sekä laiksi tekijänoikeudesta kuvaamataiteiden teoksiin ja valokuviiin ynnä perustelut.* Helsinki: Valtioneuvoston kirjapaino, 1920.

**SOU 1956:25**

*Upphovsmannarätt till litterära och konstnärliga verk. Lagförslag av Auktorrättskommittén.* Statens offentliga utredningar, Stockholm: Iduns tryckeriaktiebolag, 1956.

**SuVM 108/1926 vp**

*Suuren valiokunnan mietintö n:o 108 hallituksen esityksen johdosta tekijänoikeutta sekä oikeutta valokuviiin koskeviksi laeiksi.*

## Online Material

**Adobe 2008**

Adobe Systems Incorporated. *Adobe product license agreements.* 2008. <http://www.adobe.com/products/eulas/> (accessed October 30, 2008).

**Aigrain 2002**

Aigrain, Philippe. *A framework for understanding the impact of GPL copylefting vs. non copylefting licenses.* 2002. Available: <http://opensource.mit.edu/papers/aigrain2.pdf>.

**APGLv3-DD2**

Free Software Foundation, Inc. *Rationale for the second draft of the GNU Affero GPL version 3.* 14 August 2007. Available: <http://gplv3.fsf.org/agplv3-dd2-rationale.html>.

**Apple 2008**

Apple Inc. *Hardware & Software Product Agreements.* 2008. <http://www.apple.com/legal/sla/> (accessed October 30, 2008).

**Ars Technica 2008**

Ars Technica, LLC. *Gartner: 80% of commercial apps to use open source by 2012.* 5 February 2008. <http://arstechnica.com/news.ars/post/20080205-gartner-80-percent-of-commercial-software-programs-will-include-open-source-by-2012.html> (accessed October 9, 2008).

**Artistic License 1.0**

The Perl Foundation. *Artistic License 1.0.* [http://www.perlfoundation.org/artistic\\_license\\_1\\_0](http://www.perlfoundation.org/artistic_license_1_0) (accessed January 3, 2009).

**Canonical 2009**

Canonical Limited. *OpenSourcing – Launchpad Development.* 3 February 2009. <https://dev.launchpad.net/OpenSourcing> (accessed February 17, 2009).

**CIO 2008**

CXO Media Inc. *Open Source is Entering the Enterprise Mainstream, Survey Shows.* 30 May 2008. [http://cio.com/article/375916/Open\\_Source\\_is\\_Entering\\_the\\_Enterprise\\_Mainstream\\_Survey\\_Shows](http://cio.com/article/375916/Open_Source_is_Entering_the_Enterprise_Mainstream_Survey_Shows) (accessed October 9, 2008).

**Corel 2007**

Corel Corporation. *End User License Agreement – Legal Information*. November 2007.  
<http://www.corel.com/servlet/Satellite/gb/en/Content/1166553879115> (accessed October 30, 2008).

**EPL**

*Educational Community License, Version 2.0*. April 2007. <http://www.osedu.org/licenses/ECL-2.0/> (accessed October 11, 2008).

**EPO 2008**

European Patent Office. *Patents for software?* 9 October 2008.  
<http://www.epo.org/topics/issues/computer-implemented-inventions.html> (accessed October 11, 2008).

**Forbes 2007**

Forbes.com LLC. *The Global 2000*. 3 March 2007.  
[http://www.forbes.com/lists/2007/18/biz\\_07forbes2000\\_The-Global-2000\\_IndName\\_17.html](http://www.forbes.com/lists/2007/18/biz_07forbes2000_The-Global-2000_IndName_17.html) (accessed February 11, 2009).

**Freshmeat.net 2008a**

SourceForge, Inc. *Browse project tree – License: OSI Approved: GNU General Public License (GPL)*. 8 October 2008. <http://freshmeat.net/browse/15/> (accessed October 8, 2008).

**Freshmeat.net 2008b**

SourceForge, Inc. *Statistics and Top 20*. 8 October 2008. <http://freshmeat.net/stats/#license> (accessed October 8, 2008).

**FSF 1989**

Free Software Foundation, Inc. “The General Public License as a Subroutine.” *GNU’s Bulletin* 1, no. 6 (January 1989). Available: <http://www.gnu.org/bulletins/bull6.html>.

**FSF 2005**

Free Software Foundation, Inc. *Negotiating Compliance*. 2 March 2005.  
<http://www.fsf.org/licensing/dealt.html> (accessed January 28, 2009).

**FSF 2008a**

Free Software Foundation, Inc. *Frequently Asked Questions about the GNU Licenses*. 14 November 2008. <http://www.gnu.org/licenses/gpl-faq.html> (accessed January 28, 2009).

**FSF 2008b**

Free Software Foundation, Inc. *The Free Software Definition*. 20 March 2008.  
<http://www.gnu.org/philosophy/free-sw.html> (accessed November 6, 2008).

**FSF 2008c**

Free Software Foundation, Inc. *The GNU Operating System*. 4 November 2008.  
<http://www.gnu.org/> (accessed November 6, 2008).

**GPLv1**

Free Software Foundation, Inc. *GNU General Public License v1.0*. February 1989.  
<http://www.gnu.org/licenses/old-licenses/gpl-1.0.html> (accessed November 6, 2008).

**GPLv2**

Free Software Foundation, Inc. *GNU General Public License v2.0*. June 1991.  
<http://www.gnu.org/licenses/gpl-2.0.html> (accessed October 11, 2008).

**GPLv3 comments in file 'gplv3-draft-1'**

<http://gplv3.fsf.org/comments/rt/readsay.html?Query=%20'CF.NoteUrl'%20LIKE%20'gplv3-draft-1'&Order=DESC> (accessed January 27, 2009).

**GPLv3 comments in file 'gplv3-draft-2'**

<http://gplv3.fsf.org/comments/rt/readsay.html?Query=%20'CF.NoteUrl'%20=%20'gplv3-draft-2'&Order=DESC> (accessed January 27, 2009).

**GPLv3 comments in file 'gplv3-draft-3'**

<http://gplv3.fsf.org/comments/rt/readsay.html?Query=%20'CF.NoteUrl'%20LIKE%20'gplv3-draft-3'&Order=DESC> (accessed January 27, 2009).

**GPLv3 comments in file 'gplv3-draft-4'**

<http://gplv3.fsf.org/comments/rt/readsay.html?Query=%20'CF.NoteUrl'%20LIKE%20'gplv3-draft-4'&Order=DESC> (accessed January 20, 2009).

**GPLv3 Process Definition**

Free Software Foundation, Inc. *GPLv3 Process Definition*. 28 March 2007.

<http://gplv3.fsf.org/original-process-definition> (accessed October 15, 2008).

**GPLv3-DD1**

Free Software Foundation, Inc. *GPLv3 First Discussion Draft Rationale*. 16 January 2006.

Available: <http://gplv3.fsf.org/gpl-rationale-2006-01-16.pdf>.

**GPLv3-DD2**

Free Software Foundation, Inc. *GPLv3 Second Discussion Draft Rationale*. 27 July 2006. Available:

<http://gplv3.fsf.org/gpl3-dd1to2-markup-rationale.pdf>.

**GPLv3-DD3**

Free Software Foundation, Inc. *GPLv3 Third Discussion Draft Rationale*. 28 March 2007.

Available: <http://gplv3.fsf.org/gpl3-dd3-rationale.pdf>.

**GPLv3-DD4**

Free Software Foundation, Inc. *GPLv3 Final Discussion Draft Rationale*. 31 May 2007. Available:

<http://gplv3.fsf.org/rationale>.

**GPLv3-FIN**

Free Software Foundation, Inc. *GPLv3 Final Rationale*. 29 June 2007. Available:

<http://www.gnu.org/licences/gpl3-final-rationale.pdf>.

**Helsinki Region Chamber of Commerce 2005**

Helsinki Region Chamber of Commerce. *Service Description*. 2005.

<http://helsinki.chamber.fi/index.phtml?s=338> (accessed November 2, 2008).

**IBM 2008**

International Business Machines Corp. *IBM Software license agreements*. 2008. <http://www-03.ibm.com/software/sla/sladb.nsf> (accessed October 30, 2008).

**Jones 2003**

Jones, Pamela. "The GPL Is a License, not a Contract." *LWN*, 3 December 2003. Available:

<http://lwn.net/Articles/61292/>.

**LGPLv3-DD2**

Free Software Foundation, Inc. *LGPLv3 Second Discussion Draft Rationale*. 3 April 2007.  
Available: <http://gplv3.fsf.org/lgpl3-dd2-rationale.pdf>.

**Majerus 2003**

Majerus, Laura A. *Court Evaluates Meaning of "Derivative Work" in an Open Source License*. 2003.  
<http://library.findlaw.com/2003/Jun/16/132811.html> (accessed February 16, 2009).

**Microsoft 2006**

Microsoft Corporation. *Patent Cooperation Agreement – Microsoft & Novell Interoperability Collaboration*. 2 November 2006.  
[http://www.microsoft.com/interop/msnovellcollab/patent\\_agreement.mspx](http://www.microsoft.com/interop/msnovellcollab/patent_agreement.mspx) (accessed November 7, 2008).

**Microsoft 2008**

Microsoft Corporation. *Retail Software License Terms*. 2008.  
<http://www.microsoft.com/about/legal/useterms/> (accessed October 30, 2008).

**Moglen 2001**

Moglen, Eben. *Enforcing the GNU GPL*. 10 September 2001.  
<http://www.gnu.org/philosophy/enforcing-gpl.html> (accessed November 11, 2008).

**Mundie 2001**

Mundie, Craig. *The Commercial Software Model – Speech Transcript*. 3. May 2001.  
<http://www.microsoft.com/presspass/exec/craig/05-03sharesource.mspx> (accessed January 29, 2009).

**Nimmer 2005**

Nimmer, Raymond T. *Is the GPL license a contract? The wrong question*. 6 September 2005.  
<http://www.ipinfoblog.com/archives/licensing-law-issues-is-the-gpl-license-a-contract-the-wrong-question.html> (accessed January 30, 2009).

**NOSA**

National Aeronautics and Space Administration. *NASA Ames Open Source Software – NOSA Software Agreement*. <http://opensource.arc.nasa.gov/page/nosa-software-agreement/> (accessed October 11, 2008).

**OGDTSL**

The Open Group. *The Open Group Directory Test Suite License*. 14 April 2003.  
<http://opengroup.org/dif/blitpub/license.htm> (accessed October 11, 2008).

**OpenOffice.org 2008**

OpenOffice.org. *License Page*. March 2008. <http://www.openoffice.org/license.html> (accessed February 15, 2009).

**Opinion on BitTorrent Propagation – GPLv3**

Free Software Foundation, Inc. *Opinion on BitTorrent Propagation*. 3 October 2006.  
<http://gplv3.fsf.org/bittorrent-dd2.html> (accessed January 27, 2009).

**Opinion on Denationalization of Terminology – GPLv3**

Free Software Foundation, Inc. *Opinion on Denationalization of Terminology*. 3 August 2006.  
<http://gplv3.fsf.org/denationalization-dd2.html> (accessed January 9, 2009).

**Opinion on Digital Restrictions Management – GPLv3**

Free Software Foundation, Inc. *Opinion on Digital Restrictions Management*. 3 August 2006. <http://gplv3.fsf.org/drm-dd2.html> (accessed January 27, 2009).

**Oracle n.d.**

Oracle Corporation. *Oracle License and Service Agreements*. <http://www.oracle.com/corporate/license/agreements.html> (accessed October 30, 2008).

**OSI 2004**

Open Source Initiative. *The Open Source Definition*. 2004. <http://opensource.org/docs/osd> (accessed November 3, 2008).

**OSI 2006**

Open Source Initiative. *Licenses by Name*. 18 September 2006. <http://opensource.org/licenses/alphabetical> (accessed February 19, 2009).

**Palamida 2008**

Palamida, Inc. *GPLv3 and LGPLv3 Information Site*. 4 October 2008. <http://gpl3.palamida.com:8080/> (accessed October 8, 2008).

**PRH 2003**

National Board of Patents and Registration of Finland. *Tietokoneohjelmat ja patentointi*. 14 February 2003. <http://www.prh.fi/fi/uutiset/111.html> (accessed October 11, 2008).

**Red Hat 2008**

Red Hat, Inc. *Settlement Agreement*. 6 June 2008. [http://www.redhat.com/f/pdf/blog/patent\\_settlement\\_agreement.pdf](http://www.redhat.com/f/pdf/blog/patent_settlement_agreement.pdf) (accessed November 7, 2008).

**SFLC 2007**

Software Freedom Law Center. *On Behalf of BusyBox Developers, SFLC Files First Ever U.S. GPL Violation Lawsuit*. 20 September 2007. <http://www.softwarefreedom.org/news/2007/sep/20/busybox/> (accessed February 5, 2009).

**Slashdot 2003**

SourceForge, Inc. *LGPL is Viral for Java*. 17 July 2003. <http://slashdot.org/developers/03/07/17/2257224.shtml> (accessed January 20, 2009).

**Smith 2007**

Smith, Brett. *A Quick Guide to GPLv3*. 2007. <http://www.gnu.org/licenses/quick-guide-gplv3.html> (accessed November 11, 2008).

**Stallman 1998**

Stallman, Richard. *Copyleft: Pragmatic Idealism*. 1998. <http://www.gnu.org/philosophy/pragmatic.html> (accessed November 9, 2008).

**Stallman 2007**

Stallman, Richard. *Why Upgrade to GPLv3*. 2007. <http://www.gnu.org/licenses/rms-why-gplv3.html> (accessed October 11, 2008).

**Turner 2004**

Turner, David. *The LGPL and Java*. November 2004. <http://www.gnu.org/licenses/lgpl-java.html> (accessed November 9, 2008).

**Welte 2004**

Welte, Harald. *netfilter/iptables project enforces GPL once again*. 19 May 2004. <http://gpl-violations.org/news/20040519-iptables-sitecom.html> (accessed February 5, 2009).

**Welte 2006**

Welte, Harald. *gpl-violations.org project prevails in court case on GPL violation by D-Link*. 22 September 2006. [http://gpl-violations.org/news/20060922-dlink-judgement\\_frankfurt.html](http://gpl-violations.org/news/20060922-dlink-judgement_frankfurt.html) (accessed February 5, 2009).

**Welte 2008**

Welte, Harald. *GPL Violations*. 2008. <http://gpl-violations.org/> (accessed October 15, 2008).

**WordNet 2006**

WordNet. "Library." In *Wordnet: An Electronic Lexical Database*, edited by Christiane Fellbaum. Princeton, NJ: Princeton University, 2006. Available: <http://wordnet.princeton.edu/perl/webwn?s=Library>.

**Working group on Libre Software 2000**

Working group on Libre Software. *Free Software / Open Source: Information Society Opportunities for Europe?* Information Society and Media Directorate-General, 2000. Available: <http://eu.conecta.it/paper.pdf>.

**Table of Cases**

## European Union

Case T-201/04 R *Microsoft Corporation v Commission of the European Communities* [2004] ECR II-4463 71

## Finland

KKO 1998:91 17, 50  
 KKO 1999:115 43, 50  
 KKO 2007:63 50  
 KKO 2008:45 47, 68  
 HelHO 28.12.1999 3571, Record No. R99/661 63  
 HelHO 14.6.2007 1963, Record No. S06/2434 61  
 HelHO 22.5.2008 1427, Record No. R07/2622 36  
 RHO 13.10.1992 1128, Record No. R91/351 62  
 VHO 17.5.2005 712, Record No. R03/124566, 68, 71

## Germany

Landgericht Frankfurt am Main, Record No. 26 O 224/06 47, 63  
 Landgericht München I, Record No. 21 O 6123/04 47

## United Kingdom

*Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 66, 70  
*Ibcos Computers Ltd v Barclays Mercantile Highland Finance Ltd*  
 [1994] FSR 275 65, 70  
*Nova Productions Ltd v Mazooma Games Ltd and Bell Fruit Games Ltd*  
 [2007] EWCA Civ. 219 70

## United States of America

*Brower v Gateway 2000, Inc.*, 676 N.Y.S.2d 569 (N.Y. App. Div. 1998) 7  
*Computer Associates International, Inc. v Altai, Inc.*,  
 982 F.2d 693 (2nd Cir. 1992) 64, 67, 70  
*Jacobsen v Katzer*, 535 F.3d 1373 (Fed. Cir. 2008) 24, 57  
*Lewis Galoob Toys, Inc. v Nintendo of America, Inc.*, 964 F.2d 965 (9th Cir. 1992) 79  
*Micro Star v FormGen Inc.*, 154 F.3d 1107 (9th Cir. 1998) 78, 79, 84  
*ProCD, Inc. v Zeidenberg*, 86 F.3d 1447 (7th Cir. 1996) 7  
*Progress Software Corporation v MySQL AB*,  
 195 F. Supp. 2d 328 (D. Mass. 2002) 49, 78  
*Whelan Associates, Inc. v Jaslow Dental Laboratory, Inc.*,  
 797 F.2d 1222 (3rd Cir. 1986) 64, 70

## 6. Abbreviations

AGPL = GNU Affero General Public License  
 ASP = application service provider  
 c. = chapter [of statutes]  
 ch. = chapter  
 COM = Commission document for other institutions  
 CVS = Concurrent Versions System  
 DCFR = Draft Common Frame of Reference  
 DD = discussion draft  
 DMCA = Digital Millennium Copyright Act  
 DRM = digital rights management  
 EC = European Community  
 ECR = European Court Reports  
 EEC = European Economic Community  
 EESC = European Economic and Social Committee  
 EPC = Convention on the Grant of European Patents (European Patent Convention)

|          |   |   |
|----------|---|---|
| EPO      | = | European Patent Office                                |
| EU       | = | European Union  |
| Europarl | = | European Parliament                                   |
| EV       | = | response of Parliament                                |
| EWCA     | = | Court of Appeal of England and Wales                  |
| ff.      | = | following   |
| fn.      | = | footnote [external to the thesis]                     |
| FSF      | = | Free Software Foundation, Inc.                        |
| FSR      | = | Fleet Street Reports                                  |
| HE       | = | Government proposal                                   |
| HelHO    | = | Helsinki Court of Appeal                              |
| IPR      | = | intellectual property rights                          |
| IT       | = | information technology                                |
| LaVM     | = | report of the Law Committee                           |
| LGPL     | = | GNU Lesser General Public License                     |
| GCC      | = | GNU Compiler Collection                               |
| GNU      | = | GNU's Not Unix [recursive acronym]                    |
| GPL      | = | GNU General Public License                            |
| GUI      | = | graphical user interface                              |
| KKO      | = | Supreme Court of Finland                              |
| KM       | = | report of a commission                                |
| MFN      | = | most favoured nation                                  |
| n.       | = | footnote [internal to the thesis]                     |
| n.d.     | = | no date   |
| NDA      | = | non-disclosure agreement                              |
| no.      | = | number  |
| NRC      | = | National Research Council                             |
| OSI      | = | Open Source Initiative                                |
| para.    | = | paragraph   |
| PRH      | = | National Board of Patents and Registration of Finland |
| RHO      | = | Rovaniemi Court of Appeal                             |
| ROM      | = | read-only memory                                      |
| RPC      | = | Reports of Patent Cases                               |

|          |   |  |
|----------|---|--|
| s.       | = | section  |
| SaaS     | = | software as a service  |
| SDE      | = | software development environment                                   |
| SopS     | = | Treaty Series of the Statute Book of Finland                       |
| SOU      | = | Swedish Government Official Reports                                |
| sub-s.   | = | subsection   |
| SuVM     | = | report of the Grand Committee                                      |
| SYN      | = | cooperation procedure  |
| TRIPS    | = | Agreement on Trade-Related Aspects of Intellectual Property Rights |
| UK       | = | United Kingdom of Great Britain and Northern Ireland               |
| UNIDROIT | = | International Institute for the Unification of Private Law         |
| US       | = | United States  |
| USC      | = | United States Code   |
| v        | = | version; versus  |
| VHO      | = | Vaasa Court of Appeal  |
| vp       | = | parliamentary session  |
| WCT      | = | WIPO Copyright Treaty  |
| WIPO     | = | World Intellectual Property Organization                           |