



**InterSecVM/SG V4.2
for KVM**

セットアップ手順書

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ごあいさつ

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1 はじめに

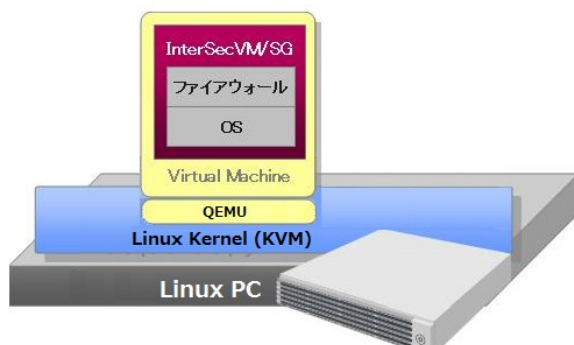
InterSecVM/SGは、Linux標準の仮想化技術であるKVM上で利用可能な、仮想アプライアンス製品です。

仮想アプライアンスとは、オペレーティングシステムと必要なアプリケーションが事前にインストールされた仮想マシンです。

本書では、InterSecVM/SGのKVMへのインポート手順と、初期導入について説明します。

1.1. システム構成

InterSecVM/SGのご利用には、KVM環境をご用意ください。



KVMをインストールしているサーバー

項目	説明
KVMをインストールしているサーバー	<p>KVM上にて InterSecVM/SGを設定、管理します。KVMをインストール済みのLinux PCをご用意ください。</p> <ul style="list-style-type: none">• <code>qemu-kvm</code> : KVM基本構成• <code>virt-manager</code> : 仮想環境GUI管理ツール• <code>virt-top</code> : 仮想環境のCPU利用状況を把握するコマンド群• <code>libvirt-bin</code> : 仮想環境管理用API

1.2. 動作環境

InterSecVM/SGが検証済みのKVMのホストOSは、RHEL7となります。順次拡大予定ですので、これ以降の対応状況は製品サイトを参照ください。

InterSecVM/SGの仮想マシンファイルは以下の諸元に設定しています。

リソース名	必要量
CPU	仮想CPU 1～2個(コア) 推奨2個
メモリ	2GB(初期値) ～ 4GB
ネットワークアダプタ 1～10	br0に接続 ※1
ディスク容量(初期値)	30GB

※1 出荷状態でのネットワークアダプタ(仮想LANインタフェース)は、1～10とも Bridge ‘br0’ に接続するよう設定しています。

ソースデバイス : Bridge ‘br0’
IPアドレス(eth0) : 192.168.250.251
ネットワークマスク : 255.255.255.0
ホスト名 : intersec.domain.local

インポートする際に、KVMに上記のメモリやディスク容量等が確保出来ない場合、InterSecVM/SGのインポートに失敗する、本来の性能を利用することができないなどの問題が発生する場合がございます。

2 InterSecVM/SGのインポートおよびネットワーク設定

2.1. インポートおよびネットワークの設定

この章では、InterSecVM/SG（仮想マシン）を、KVMへインポートする手順について記述しています。

InterSecVM/SGは、ディスクイメージとして提供されます。

以下の手順では、ホストOS「RHEL7.4」にて「Virtual Machine Manager V1.4.3.3」を使用し、「InterSecVM/SG Ver4.2」のインポートを行う例を説明しています。ホストOSの種類やVirtual Machine Managerのバージョンによって、流れが異なる場合がございます。必要な場合は、ホストOS、「Virtual Machine Manager」のマニュアルを参照ください。

- (1) ホストOSのターミナルにて、下記コマンドを実行しインポートします。
 - ① ファイルを解凍する。

```
# tar xzfv InterSecVM_SG_V4.2_GL_forKVM_XXXXXX.tar.gz
```

→ ディスクイメージの格納ファイルを展開する(xml、imgファイルを展開)
 - ② xmlファイルを移動する。

```
# cp InterSecVM_SG_V4.2_GL_forKVM_XXXXXX.xml /etc/libvirt/qemu/
```

※2台目以降の場合は、異なる名前でコピーください。
例)

```
cp InterSecVM_SG_V4.2_GL_forKVM_XXXXXX.xml /etc/libvirt/qemu/InterSecVM_SG_V4.2_GL_forKVM_XXXXXX_2.xml
```
 - ③ img(qcow2)ファイルを移動する。

```
# cp InterSecVM_SG_V4.2_GL_forKVM_XXXXXX.qcow2 /var/lib/libvirt/images/
```

※2台目以降の場合は、異なる名前でコピーください。②の手順参照。
 - ④ 2台目以降の場合は、xmlの編集を行います。
「2.2 複数台インポート時のxml編集」を参照ください。
 - ⑤ xmlファイルから、仮想アプライアンスを管理対象の仮想マシンとして登録。
②のxml名を指定ください。

```
# virsh define /etc/libvirt/qemu/InterSecVM_SG_V4.2_GL_forKVM_XXXXXX.xml
```
- (2) InterSecVM/SGのネットワークの接続を行います。

```
# virt-manager
```

→ 仮想マシンマネージャを起動する

仮想マシンマネージャにてインポートした仮想マシンの「仮想マシンの詳細」を開きます。

「NIC:XX:XX:XX」の上から1番目(eth0)はお客様の内部ネットワークを、上から2番目(eth1)はお客様の外部ネットワークを設定ください。その他NICも適宜設定ください。

2.2. 複数台インポート時のxml編集

- (1) UUIDを取得します。コマンドを実行して表示された値を保存ください。

```
# uuidgen
09e0110f-8c54-48a7-aeb3-*****
```

- (2) xmlを編集します。「2.1 インポート」の(1)②でコピーした/etc/libvirt/qemu/配下のxmlを開き、<name><uuid><source file>を変更します。

```
<domain type='kvm'>
  <name>InterSecVM_SG_V4.2_GL_forKVM_XXXXXX_2</name> →任意の名前に変更ください。
  <uuid>09e0110f-8c54-48a7-aeb3-*****</uuid> →先ほど取得したIDに変更ください。
  <memory unit='KiB'>2097152</memory>
  <currentMemory unit='KiB'>2097152</currentMemory>
  <vcpu placement='static'>2</vcpu>
  <os>
    <type arch='x86_64' machine='pc-i440fx-rhel7.0.0'>hvm</type>
    <boot dev='hd'>
  </os>
  <features>
    <acpi/>
    <apic/>
  </features>
  <cpu mode='custom' match='exact' check='partial'>
    <model fallback='allow'>Broadwell</model>
  </cpu>
  <clock offset='utc'>
    <timer name='rtc' tickpolicy='catchup'>
    <timer name='pit' tickpolicy='delay'>
    <timer name='hpet' present='no'>
  </clock>
  <on_poweroff>destroy</on_poweroff>
  <on_reboot>restart</on_reboot>
  <on_crash>destroy</on_crash>
  <pm>
    <suspend-to-mem enabled='no'>
    <suspend-to-disk enabled='no'>
  </pm>
  <devices>
    <emulator>/usr/libexec/qemu-kvm</emulator>
    <disk type='file' device='disk'>
      <driver name='qemu' type='qcow2'>
      <source file='/var/lib/libvirt/images/ InterSecVM_SG_V4.2_GL_forKVM_XXXXXX_2.qcow2'>
        → 「2InterSecVM/SGのインポート」の(1)③でコピーしたqcom2の名前に変更ください。
    ...中略

    <interface type='bridge'>
      <mac address='52:54:00:cb:1b:d9'> macアドレスの値が、xml内に10箇所ありますので、重複しない値にすべて変更ください。
      <source bridge='br0'>
      <model type='virtio'>
      <address type='pci' domain='0x0000' bus='0x00' slot='0x03' function='0x0'>
    </interface>

    ...中略
  </devices>
</domain>
```

3 InterSecVM/SGの初期導入事前準備

前章で KVMにインポートした InterSecVM/SG は、お客様のネットワーク環境に即した状態にするために、初期導入を行っていただく必要があります。

3.1. InterSecVM/SGの初期導入環境について

InterSecVM/SGの初期導入は、別途用意いただくWindowsクライアントPC（以下、クライアントPC）からWebブラウザを介して行います。

InterSecVM/SG のネットワーク設定は、出荷状態（KVMに追加した直後の状態）では以下の初期設定が行われています。

ソースデバイス	: Bridge 'br0'
IPアドレス	: 192.168.250.251
ネットワークマスク	: 255.255.255.0
ホスト名	: intersec.domain.local

初期導入を行うため、InterSecVM/SGと同じネットワークのIPアドレス（たとえば、192.168.250.1/255.255.255.0）を設定したWeb接続可能なクライアントPCを用意してください。

※ハブを介して接続する場合は、InterSecVM/SGの上記のアドレスと他機器のIPアドレスが重複しないようご注意ください。

※複数のInterSecVM/SGを導入する場合は、初期起動時のIPアドレス（192.168.250.251）が重複しないよう、1つずつ仮想ホストをインポートしてください。その後、初期導入でIPアドレスの変更を行ってください。初期導入前にIPアドレスの変更が必要でしたら、下記の手順にて、InterSecVM/SGのIPアドレスの変更を行うことも可能です。

- ① コンソールを開く。
- ② rootでログインを行う。
- ③ 右記のコマンドを入力する `intersec-init-c`
- ④ 画面に従い必要な情報を入力する。

Management Consoleへ接続する際、ご使用になるWebブラウザは、Internet Explorer（日本語版・Windows版）のバージョン11以上が必要です。

Internet Explorerで下記の設定を行ってください。

- ① [ツール]→[インターネットオプション]で以下のように設定してください。
 - ・ [セキュリティ]→[インターネット]を選択し[レベルのカスタマイズ]を押します。
 - [スクリプト]→[アクティブ スクリプト]→「有効にする」を選択します。
 - [その他]→[ページの自動読み込み]→「有効にする」を選択します。
 - ・ [詳細設定]→[セキュリティ]→「暗号化されたページをディスクに保存しない」のチェックを外します。
 - ・ [プライバシー]→ポップアップブロックの[設定]を「中」以下にします。

② [ツール]→[互換表示設定]にて、InterSecVM/SGが互換性表示の対象とならないように以下のように設定してください。

- “互換表示に追加したwebサイト” にInterSecVM/SGのIPアドレスを含めないようにします。
- “イントラネット サイトを互換性表示で表示する “をチェックしており、InterSecVM/SGがイントラネット サイトに含まれる場合は、InterSecVM/SGに接続時は本チェックを無効にします。

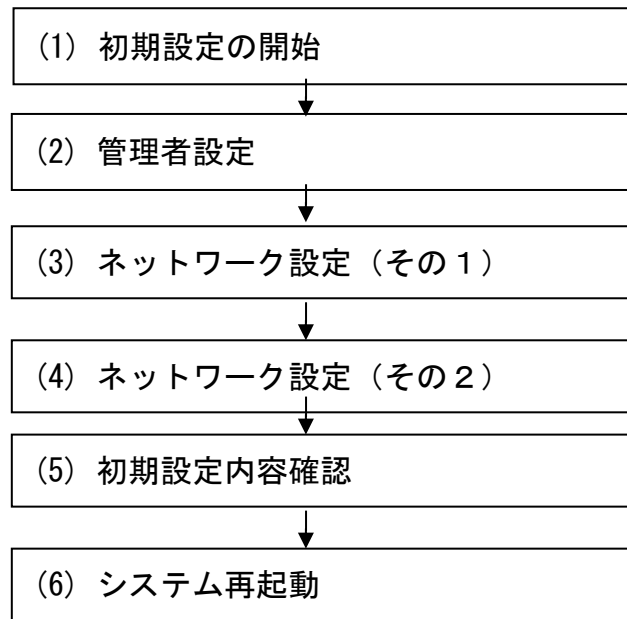
3.2. InterSecVM/SGの起動

InterSecVM/SG とクライアントPCを接続した後、仮想マシンが起動していない場合は仮想マシンマネージャから起動 (Run) してください。

4 InterSecVM/SGの初期導入手順

4.1. 初期導入の流れ

InterSecVM/SGの初期導入の流れは以下のとおりです。運用するネットワーク環境に合わせて初期設定を行ってください。



※正式なサポートライセンスは、初期導入完了後、Management Console画面の[ファイアウォール > ライセンス確認/登録]画面よりご登録ください。詳細は、ヘルプの[ファイアウォール機能の設定方法 > ライセンスの確認と登録]を参照ください。

4.2. 初期導入の実行

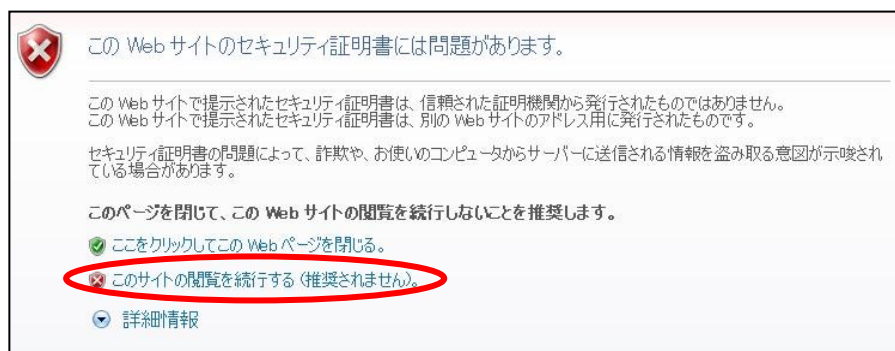
InterSecVM/SGの初期導入実行に際し、別途ご用意いただいたクライアントPCのWebブラウザから InterSecVM/SG への接続、およびログインを行ってください。

■ InterSecVM/SG 初期導入画面への接続

InterSecVM/SG の初期導入画面には、クライアントPCのWebブラウザで以下のURLを指定して接続してください。

<https://192.168.250.251:18000/>

セキュリティの警告が表示されますが、[このサイトの閲覧を続行する]を選択します。なお、IEのバージョンによって表示される画面は異なりますので下記は一例となります。



接続できない場合、クライアントPC側から、ping コマンドなどを使用して通信状態を確認してください。

[実行例] C:¥> ping 192.168.250.251

InterSecVM/SG と通信できない場合は、設定されているネットワークと接続できるよう、クライアントPCやKVMのネットワーク設定を確認してください。

■ InterSecVM/SG 初期導入画面へのログイン

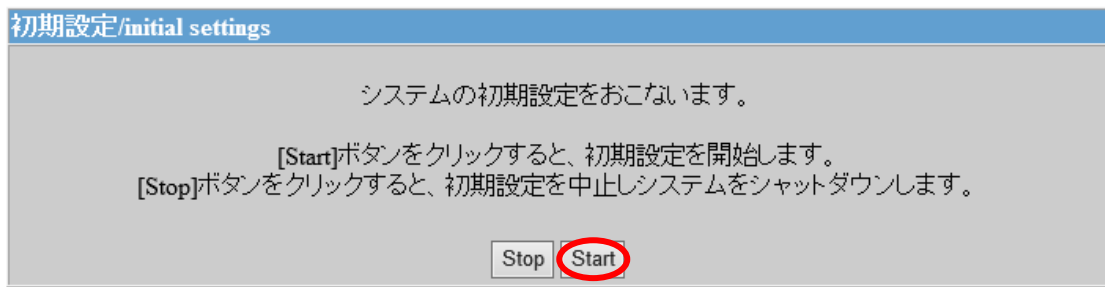
InterSecVM/SGの初期導入画面に接続すると、ユーザー名とパスワードの入力ダイアログが表示されます。

初期導入画面へのログインユーザー名は「root」です。パスワードは製品添付の管理者用パスワード.pdfを参照ください。

※ユーザー名、パスワードは、大文字小文字を区別します。

(1) 初期設定の開始

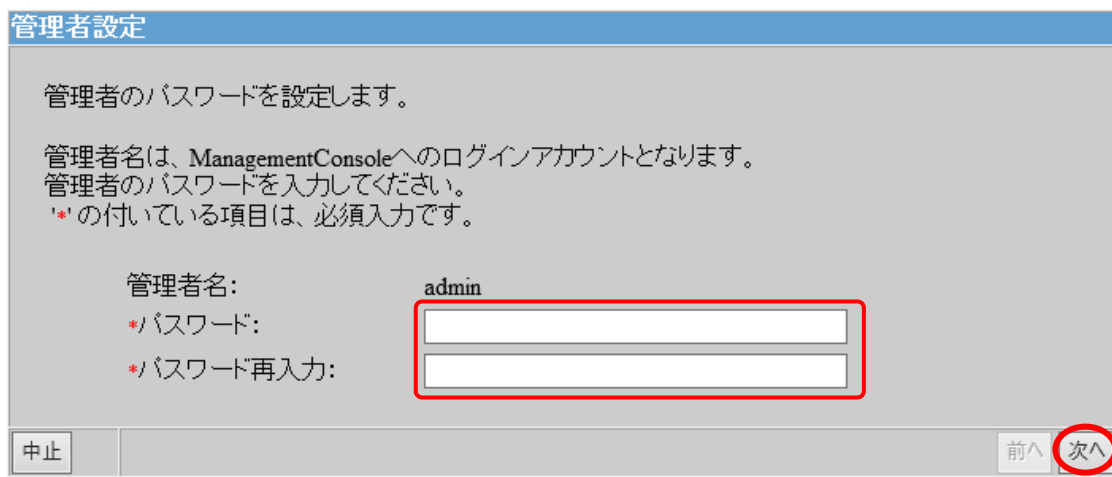
ログインが成功すると以下の画面が表示されます。 [Start] をクリックし、初期導入を実施します。



※初期設定を中断したい場合は、各設定画面の [中止] をクリックします。

(2) 管理者設定

管理者のパスワードの設定を行います。
システム管理者のアカウントは “admin” (固定) です。
システム管理者用のパスワードを「パスワード」「パスワード再入力」に入力して [次へ] をクリックします。 システム管理者名のパスワードの指定は必須です。



※システム管理者のアカウントは、初期導入完了後Management Console画面で変更できます。

(3) ネットワーク設定 (その1)

お客様の内部ネットワークに合わせたネットワーク情報の設定を行います。

「ホスト名(FQDN)」にはセカンドレベル以上のドメイン名を含むホスト名を入力してください。

「ホスト名(FQDN)」、「eth0 IPアドレス」、「eth0 ネットマスク」、「デフォルトゲートウェイ」、「プライマリネームサーバ」、「セカンダリネームサーバ」に設定内容を入力し、[次へ] をクリックします。

※項目名の先頭に「*」があるものは必須入力です

項目名	設定内容
* ホスト名(FQDN)	FQDNを設定します
* eth0 IPアドレス	eth0のIPアドレスを設定します。内部インタフェースのIPアドレスとなります。
* eth0 ネットマスク	ネットワークマスクを設定します
* デフォルトゲートウェイ	デフォルトゲートウェイを設定します
プライマリネームサーバ	プライマリネームサーバを設定します
セカンダリネームサーバ	セカンダリネームサーバを設定します

ネットワーク設定(その1)

システムのネットワーク基本情報を設定します。

eth0のネットワーク、デフォルトゲートウェイ、名前解決(DNS)サーバの設定をおこないます。
*の付いている項目は、必須入力です。

*ホスト名(FQDN):

*eth0 IPアドレス:

*eth0 ネットマスク:

- 255.255.255.128
- 255.255.255.0
- 255.255.128.0
- 255.255.0.0
- 255.128.0.0
- 255.0.0.0
-

*デフォルトゲートウェイ:

プライマリネームサーバ:

セカンダリネームサーバ:

中止 前へ **次へ**

(4)ネットワーク設定 (その2)

お客様の外部ネットワークに合わせたネットワーク情報の設定を行います。
「eth1 IPアドレス」、「eth1 ネットマスク」に設定内容を入力してください。
「管理者メールアドレス」、「操作可能ホスト」は、運用上の設定です。
設定内容を入力し、[次へ] をクリックします。

- ※ 項目名の先頭に「*」があるものは必須入力です。
- ※ 「操作可能ホスト」は、初期導入完了後、Management Console画面の[リモートメンテナンス]より追加することも可能です。
- ※ 外部ネットワークに属するInterSecVM/SGのインタフェース(外部インタフェース)は、初期設定時はeth1固定となります。初期設定後、かんたん設定において外部ネットワークを変更することで他のインタフェースを外部インタフェースとすることも可能です。

項目名	設定内容
* eth1 IPアドレス	eth1のIPアドレスを設定します。外部インタフェースのIPアドレスとなります。
* eth1 ネットマスク	ネットワークマスクを設定します
* 管理者メールアドレス	管理者メールアドレスを設定します
* 操作可能ホスト	運用時にManagement Consoleに接続するクライアントPCのIPアドレスを設定します

ネットワーク設定(その2)

システムのネットワーク基本情報を設定します。

eth1のネットワーク、管理の設定をおこないます。
*の付いている項目は、必須入力です。

*eth1 IPアドレス:
*eth1 ネットマスク:

*管理者メールアドレス:
*操作可能ホスト:

255.255.255.128
● 255.255.255.0
○ 255.255.128.0
○ 255.255.0.0
○ 255.128.0.0
○ 255.0.0.0
○

root@localhost

中止 前へ 次へ

(5) 初期設定内容確認

入力した設定内容を確認してください。

設定内容に間違いがなければ、[次へ] をクリックしてください。

間違いがある場合は、[前へ] をクリックして変更対象画面に戻り修正してください。

初期設定内容確認

初期設定の内容を確認してください。

以下の設定でよろしければ、[次へ]ボタンをクリックしてください。設定をおこないます。
[中止]ボタンをクリックすると、初期設定を中止しシステムをシャットダウンします。

<管理者設定>	
管理者名:	admin
パスワード:	*
<ネットワーク設定(その1)>	
ホスト名(FQDN):	2012r2-176-7524.sg
eth0 IPアドレス:	192.168.10.176
eth0 ネットマスク:	255.255.255.0
デフォルトゲートウェイ:	192.168.10.63
プライマリネームサーバ:	未設定
セカンダリネームサーバ:	未設定
<ネットワーク設定(その2)>	
eth1 IPアドレス:	192.168.1.176
eth1 ネットマスク:	255.255.255.0
管理者メールアドレス:	root@localhost
操作可能ホスト:	10.8.182.215

中止 前へ **次へ**

(6) システム再起動

設定を有効にしてシステムを運用可能な状態にするため、システムを再起動します。

[システムを再起動する] をクリックしてください。[システムを停止する] をクリックした場合、システムは停止状態となります。

システム再起動

初期設定を完了しました。
設定を有効にするために、システムを再起動してください。システム再起動後、必ずかんたん設定を実施してください。

システムを停止する **システムを再起動する**

以上で、初期導入は終了です。

5 かんたん設定の実施

下記の操作を行いましたら、**Management Console**の「ファイアウォール>かんたん設定」を実施ください。かんたん設定の内容に変更がない場合は、「次へ」ボタンを選択して、進めてください。

- ・初期設定。ただしリストアを行う場合は「システム基本情報のリストア」後にのみ実施。
- ・システム基本情報のリストア
- ・基本設定の再起動必須項目を変更しInterSecVM/SGを再起動

6 パッチの適用

下記のHPを参照しパッチを適用ください。

<https://www.support.nec.co.jp/>
【InterSecVM/SG】リリースパッチ一覧 v4.2

7 その他の設定

7.1. ファイアウォールやその他サービスの設定について

ファイアウォール機能やその他サービスの設定については、InterSecVM/SGのManagementConsoleのヘルプをご参照ください。

7.2. ftp複数ポートの設定方法

本節では、InterSecVM/SGに登録するファイアウォールルールに指定するftp通信において、ftpサーバーの制御ポートがデフォルトの21ではないときの設定手順を説明しています。

例として、以下の制御ポートを設定するときの手順を示します。

ftpサーバーの制御ポート番号
21
10021
20021

- (1)[ファイアウォール > 詳細設定 > ルール設定(サービス)]画面で、以下のユーザ定義サービスを追加してください。

名前) FTP

メンバ) tcp/21, tcp/10021, tcp/20021

- (2)システム再起動をすることにより設定が反映されます。

7.3. メモリの追加

InterSecVM/SGのご利用内容(起動するサービス)によっては、初期状態のメモリ容量(2GB)では不足する場合があります。必要であれば最大4GBまでメモリ容量を変更することができます。仮想マシンのメモリの変更方法は、ホストOS、「Virtual Machine Manager」のマニュアル等を参照してください。

※メモリ容量の変更は、InterSecVM/SG をシャットダウンしてから行ってください。

8 注意事項

1. 1台の PC で複数の **Management Console** を同時に開かないでください。
2. 同一アカウントを使用した同時複数ログインは、サポートしておりません。
3. マニュアルに記載されていない **KVM** の設定を行われた場合はサポート対象外となります。

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4. You may copy and distribute the Library (or a portion or derivative of it, under Section 2) in object code or executable form under the terms of Sections 1 and 2 above provided that you accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange.

If distribution of object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place satisfies the requirement to distribute the source code, even though third parties are not compelled to copy the source along with the object code.

5. A program that contains no derivative of any portion of the Library, but is designed to work with the Library by being compiled or linked with it, is called a "work that uses the Library". Such a work, in isolation, is not a derivative work of the Library, and therefore falls outside the scope of this License.

However, linking a "work that uses the Library" with the Library creates an executable that is a derivative of the Library (because it contains portions of the Library), rather than a "work that uses the library". The exe-

cutable is

therefore covered by this License. Section 6 states terms for distribution of such executables.

When a "work that uses the Library" uses material from a header file that is part of the Library, the object code for

the work may be a derivative work of the Library even though the source code is not.

Whether this is true is especially significant if the work can be linked without the Library, or if the work is itself a library. The threshold for this to be true is not precisely defined by law.

If such an object file uses only numerical parameters, data structure layouts and accessors, and small macros and

small inline functions (ten lines or less in length), then the use of the object file is unrestricted, regardless of whether it is legally a derivative work. (Executables containing this object code plus portions of the Library will still fall under Section 6.)

Otherwise, if the work is a derivative of the Library, you may distribute the object code for the work under the terms of Section 6. Any executables containing that work also fall under Section 6, whether or not they are linked directly with the Library itself.

6. As an exception to the Sections above, you may also combine or link a "work that uses the Library" with the Library to produce a work containing portions of the Library, and distribute that work under terms of your choice, provided that the terms permit modification of the work for the customer's own use and reverse engineering for debugging such modifications.

You must give prominent notice with each copy of the work that the Library is used in it and that the Library and its use are covered by this License. You must supply a copy of this License. If the work during execution displays copyright notices, you must include the copyright notice for the Library among them, as well as a reference directing the user to the copy of this License. Also, you must do one of these things:

a) Accompany the work with the complete corresponding machine-readable source code for the Library including whatever changes were used in the work (which must be distributed under Sections 1 and 2 above); and, if the work is an executable linked with the Library, with the complete machine-readable "work that uses the Library", as object code and/or source code, so that the user can modify the Library and then relink to produce a modified executable containing the modified Library. (It is understood that the user who changes the contents of definitions files in the Library will not necessarily be able to recompile the application to use the modified definitions.)

b) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (1) uses at run time a copy of the library already present on the user's computer system, rather than copying library functions into the executable, and (2) will operate properly with a modified version of the library, if the user installs one, as long as the modified version is interface-compatible with the version that the work was made with.

c) Accompany the work with a written offer, valid for at least three years, to give the same user the materials specified in Subsection 6a, above, for a charge no more than the cost of performing this distribution.

d) If distribution of the work is made by offering access to copy from a designated place, offer equivalent access to copy the above specified materials from the same place.

e) Verify that the user has already received a copy of these materials or that you have already sent

this user a copy.

For an executable, the required form of the "work that uses the Library" must include any data and utility programs needed for reproducing the executable from it. However, as a special exception, the materials to be distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

It may happen that this requirement contradicts the license restrictions of other proprietary libraries that do not normally accompany the operating system. Such a contradiction means you cannot use both them and the Library together in an executable that you distribute.

7. You may place library facilities that are a work based on the Library side-by-side in a single library together with other library facilities not covered by this License, and distribute such a combined library, provided that the separate distribution of the work based on the Library and of the other library facilities is otherwise permitted, and provided that you do these two things:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities. This must be distributed under the terms of the Sections above.
- b) Give prominent notice with the combined library of the fact that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

8. You may not copy, modify, sublicense, link with, or distribute the Library except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense, link with, or distribute the Library is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

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If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the

section is intended to apply, and the section as a whole is intended to apply in other circumstances.

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END OF TERMS AND CONDITIONS

How to Apply These Terms to Your New Libraries

If you develop a new library, and you want it to be of the greatest possible use to the public, we recommend making it free software that everyone can redistribute and change. You can do so by permitting redistribution under these terms (or, alternatively, under the terms of the ordinary General Public License).

To apply these terms, attach the following notices to the library. It is safest to attach them to the start of each source file to most effectively convey the exclusion of warranty; and each file should have at least the "copyright" line and a pointer to where the full notice is found.

```
<one line to give the library's name and a brief idea of what it does.>  
Copyright (C) <year> <name of author>
```

```
This library is free software; you can redistribute it and/or  
modify it under the terms of the GNU Lesser General Public  
License as published by the Free Software Foundation; either  
version 2.1 of the License, or (at your option) any later version.
```

```
This library is distributed in the hope that it will be useful,  
but WITHOUT ANY WARRANTY; without even the implied warranty of  
MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU  
Lesser General Public License for more details.
```

```
You should have received a copy of the GNU Lesser General Public  
License along with this library; if not, write to the Free Software  
Foundation, Inc., 59 Temple Place, Suite 330, Boston, MA 02111-1307 USA
```

Also add information on how to contact you by electronic and paper mail. You should also get your employer (if you work as a programmer) or your school, if any, to sign a "copyright disclaimer" for the library, if necessary. Here is a sample; alter the names:

```
Yoyodyne, Inc., hereby disclaims all copyright interest in the  
library `Frob' (a library for tweaking knobs) written by James Random Hacker.
```

```
<signature of Ty Coon>, 1 April 1990  
Ty Coon, President of Vice
```

That's all there is to it!

9.4. GNU LESSER GENERAL PUBLIC LICENSE Version 3

GNU LESSER GENERAL PUBLIC LICENSE Version 3, 29 June 2007
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This version of the GNU Lesser General Public License incorporates the terms and conditions of version 3 of the GNU General Public License, supplemented by the additional permissions listed below.

0. Additional Definitions.

As used herein, “this License” refers to version 3 of the GNU Lesser General Public License, and the “GNU GPL” refers to version 3 of the GNU General Public License.

“The Library” refers to a covered work governed by this License, other than an Application or a Combined Work as defined below.

An “Application” is any work that makes use of an interface provided by the Library, but which is not otherwise based on the Library. Defining a subclass of a class defined by the Library is deemed a mode of using an interface provided by the Library.

A “Combined Work” is a work produced by combining or linking an Application with the Library. The particular version of the Library with which the Combined Work was made is also called the “Linked Version”.

The “Minimal Corresponding Source” for a Combined Work means 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 Application, and not on the Linked Version.

The “Corresponding Application Code” for a Combined Work means the object code and/or source code for the Application, including any data and utility programs needed for reproducing the Combined Work from the Application, but excluding the System Libraries of the Combined Work.

1. Exception to Section 3 of the GNU GPL.

You may convey a covered work under sections 3 and 4 of this License without being bound by section 3 of the GNU GPL.

2. Conveying Modified Versions.

If you modify a copy of the Library, and, in your modifications, a facility refers to a function or data to be supplied by an Application that uses the facility (other than as an argument passed when the facility is invoked), then you may convey a copy of the modified version:

- a) under this License, provided that you make a good faith effort to ensure that, in the event an Application does not supply the function or data, the facility still operates, and performs whatever part of its purpose remains meaningful, or
- b) under the GNU GPL, with none of the additional permissions of this License applicable to that copy.

3. Object Code Incorporating Material from Library Header Files.

The object code form of an Application may incorporate material from a header file that is part of the Library. You may convey such object code under terms of your choice, provided that, if the incorporated material is not limited to numerical parameters, data structure layouts and accessors, or small macros, inline functions and templates (ten or fewer lines in length), you do both of the following:

- a) Give prominent notice with each copy of the object code that the Library is used in it and that the Library and its use are covered by this License.
- b) Accompany the object code with a copy of the GNU GPL and this license document.

4. Combined Works.

You may convey a Combined Work under terms of your choice that, taken together, effectively do not restrict modification of the portions of the Library contained in the Combined Work and reverse engineering for debugging such modifications, if you also do each of the following:

- a) Give prominent notice with each copy of the Combined Work that the Library is used in it and that the Library and its use are covered by this License.
- b) Accompany the Combined Work with a copy of the GNU GPL and this license document.
- c) For a Combined Work that displays copyright notices during execution, include the copyright notice for the Library among these notices, as well as a reference directing the user to the copies of the GNU GPL and this license document.
- d) Do one of the following:
 - 0) Convey the Minimal Corresponding Source under the terms of this License, and the Corresponding Application Code in a form suitable for, and under terms that permit, the user to recombine or relink the Application with a modified version of the Linked Version to produce a modified Combined Work, in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.
 - 1) Use a suitable shared library mechanism for linking with the Library. A suitable mechanism is one that (a) uses at run time a copy of the Library already present on the user's computer system, and (b) will operate properly with a modified version of the Library that is interface-compatible with the Linked Version.
- e) Provide Installation Information, but only if you would otherwise be required to provide such information under section 6 of the GNU GPL, and only to the extent that such information is necessary to install and execute a modified version of the Combined Work produced by recombining or relinking the Application with a modified version of the Linked Version. (If you use option 4d0, the Installation Information must accompany the Minimal Corresponding Source and Corresponding Application Code. If you use option 4d1, you must provide the Installation Information in the manner specified by section 6 of the GNU GPL for conveying Corresponding Source.)

5. Combined Libraries.

You may place library facilities that are a work based on the Library side by side in a single library together with other library facilities that are not Applications and are not covered by this License, and convey such a combined library under terms of your choice, if you do both of the following:

- a) Accompany the combined library with a copy of the same work based on the Library, uncombined with any other library facilities, conveyed under the terms of this License.
- b) Give prominent notice with the combined library that part of it is a work based on the Library, and explaining where to find the accompanying uncombined form of the same work.

6. Revised Versions of the GNU Lesser General Public License.

The Free Software Foundation may publish revised and/or new versions of the GNU Lesser General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Library as you received it specifies that a certain numbered version of the GNU Lesser General Public License "or any later version" applies to it, you have the option of following the terms and conditions either of that published version or of any later version published by the Free Software Foundation. If the Library as you received it does not specify a version number of the GNU Lesser General Public License, you may choose any version of the GNU Lesser General Public License ever published by the Free Software Foundation.

If the Library as you received it specifies that a proxy can decide whether future versions of the GNU Lesser General Public License shall apply, that proxy's public statement of acceptance of any version is permanent authorization for you to choose that version for the Library.

9.5. GNU GENERAL PUBLIC LICENSE Version 3

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Preamble

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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.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must pass on to the recipients the same freedoms that you received. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

Developers that use the GNU GPL protect your rights with two steps: (1) assert copyright on the software, and (2) offer you this License giving you legal permission to copy, distribute and/or modify it.

For the developers' and authors' protection, the GPL clearly explains that there is no warranty for this free software. For both users' and authors' sake, the GPL requires that modified versions be marked as changed, so that their problems will not be attributed erroneously to authors of previous versions.

Some devices are designed to deny users access to install or run modified versions of the software inside them, although the manufacturer can do so. This is fundamentally incompatible with the aim of protecting users' freedom to change the software. The systematic pattern of such abuse occurs in the area of products for individuals to use, which is precisely where it is most unacceptable. Therefore, we have designed this version of the GPL to prohibit the practice for those products. If such problems arise substantially in other domains, we stand ready to extend this provision to those domains in future versions of the GPL, as needed to protect the freedom of users.

Finally, every program is threatened constantly by software patents. States should not allow patents to restrict development and use of software on general-purpose computers, but in those that do, we wish to avoid the special danger that patents applied to a free program could make it effectively proprietary. To prevent this, the GPL assures that patents cannot be used to render the program non-free.

The precise terms and conditions for copying, distribution and modification follow.

TERMS AND CONDITIONS

0. Definitions.

"This License" refers to version 3 of the GNU General Public License.

"Copyright" also means copyright-like laws that apply to other kinds of works, such as semiconductor masks.

"The Program" refers to any copyrightable work licensed under this License. Each licensee is addressed as

“you”. “Licensees” and “recipients” may be individuals or organizations.

To “modify” a work means to copy from or adapt all or part of the work in a fashion requiring copyright permission, other than the making of an exact copy. The resulting work is called a “modified version” of the earlier work or a work “based on” the earlier work.

A “covered work” means either the unmodified Program or a work based on the Program.

To “propagate” a work means to do anything with it that, without permission, would make you directly or secondarily liable for infringement under applicable copyright law, except executing it on a computer or modifying a private copy. Propagation includes copying, distribution (with or without modification), making available to the public, and in some countries other activities as well.

To “convey” a work means any kind of propagation that enables other parties to make or receive copies. Mere interaction with a user through a computer network, with no transfer of a copy, is not conveying.

An interactive user interface displays “Appropriate Legal Notices” to the extent that it includes a convenient and prominently visible feature that (1) displays an appropriate copyright notice, and (2) tells the user that there is no warranty for the work (except to the extent that warranties are provided), that licensees may convey the work under this License, and how to view a copy of this License. If the interface presents a list of user commands or options, such as a menu, a prominent item in the list meets this criterion.

1. Source Code.

The “source code” for a work means the preferred form of the work for making modifications to it. “Object code” means any non-source form of a work.

A “Standard Interface” means an interface that either is an official standard defined by a recognized standards body, or, in the case of interfaces specified for a particular programming language, one that is widely used among developers working in that language.

The “System Libraries” of an executable work include anything, other than the work as a whole, that (a) is included in the normal form of packaging a Major Component, but which is not part of that Major Component, and (b) serves only to enable use of the work with that Major Component, or to implement a Standard Interface for which an implementation is available to the public in source code form. A “Major Component”, in this context, means a major essential component (kernel, window system, and so on) of the specific operating system (if any) on which the executable work runs, or a compiler used to produce the work, or an object code interpreter used to run it.

The “Corresponding Source” for a work in object code form means all the source code needed to generate, install, and (for an executable work) run the object code and to modify the work, including scripts to control those activities. However, it does not include the work’s System Libraries, or general-purpose tools or generally available free programs which are used unmodified in performing those activities but which are not part of the work. For example, Corresponding Source includes 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, such as by intimate data communication or control flow between those subprograms and other parts of the work.

The Corresponding Source need not include anything that users can regenerate automatically from other parts of the Corresponding Source.

The Corresponding Source for a work in source code form is that same work.

2. Basic Permissions.

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You may charge any price or no price for each copy that you convey, and you may offer support or warranty protection for a fee.

5. Conveying Modified Source Versions.

You may convey a work based on the Program, or the modifications to produce it from the Program, in the form of source code under the terms of section 4, provided that you also meet all of these conditions:

- a) The work must carry prominent notices stating that you modified it, and giving a relevant date.
- b) The work must carry prominent notices stating that it is released under this License and any conditions added under section 7. This requirement modifies the requirement in section 4 to "keep intact all notices".
- c) You must license the entire work, as a whole, under this License to anyone who comes into possession of a copy. This License will therefore apply, along with any applicable section 7 additional terms,

to the whole of the work, and all its parts, regardless of how they are packaged. This License gives no permission to license the work in any other way, but it does not invalidate such permission if you have separately received it.

- d) If the work has interactive user interfaces, each must display Appropriate Legal Notices; however, if the Program has interactive interfaces that do not display Appropriate Legal Notices, your work need not make them do so.

A compilation of a covered work with other separate and independent works, which are not by their nature extensions of the covered work, and which are not combined with it such as to form a larger program, in or on a volume of a storage or distribution medium, is called an “aggregate” if the compilation and its resulting copyright are not used to limit the access or legal rights of the compilation’s users beyond what the individual works permit. Inclusion of a covered work in an aggregate does not cause this License to apply to the other parts of the aggregate.

6. Conveying Non-Source Forms.

You 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, in one of these ways:

- a) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by the Corresponding Source fixed on a durable physical medium customarily used for software interchange.
- b) Convey the object code in, or embodied in, a physical product (including a physical distribution medium), accompanied by a written offer, valid for at least three years and valid for as long as you offer spare parts or customer support for that product model, to give anyone who possesses the object code either (1) a copy of the Corresponding Source for all the software in the product that is covered by this License, on a durable physical medium customarily used for software interchange, for a price no more than your reasonable cost of physically performing this conveying of source, or (2) access to copy the Corresponding Source from a network server at no charge.
- c) Convey individual copies of the object code with a copy of the written offer to provide the Corresponding Source. This alternative is allowed only occasionally and noncommercially, and only if you received the object code with such an offer, in accord with subsection 6b.
- d) Convey the object code by offering access from a designated place (gratis or for a charge), and offer equivalent access to the Corresponding Source in the same way through the same place at no further charge. You need not require recipients to copy the Corresponding Source along with the object code. If the place to copy the object code is a network server, the Corresponding Source may be on a different server (operated by you or a third party) that supports equivalent copying facilities, provided you maintain clear directions next to the object code saying where to find the Corresponding Source. Regardless of what server hosts the Corresponding Source, you remain obligated to ensure that it is available for as long as needed to satisfy these requirements.
- e) Convey the object code using peer-to-peer transmission, provided you inform other peers where the object code and Corresponding Source of the work are being offered to the general public at no charge under subsection 6d.

A separable portion of the object code, whose source code is excluded from the Corresponding Source as a System Library, need not be included in conveying the object code work.

A “User Product” is either (1) a “consumer product”, which means any tangible personal property which is normally used for personal, family, or household purposes, or (2) anything designed or sold for incorporation into a dwelling. In determining whether a product is a consumer product, doubtful cases shall be resolved in favor of coverage. For a particular product received by a particular user, “normally used” refers to

a typical or common use of that class of product, regardless of the status of the particular user or of the way in which the particular user actually uses, or expects or is expected to use, the product. A product is a consumer product regardless of whether the product has substantial commercial, industrial or non-consumer uses, unless such uses represent the only significant mode of use of the product.

“Installation Information” for a User Product means any methods, procedures, authorization keys, or other information required to install and execute modified versions of a covered work in that User Product from a modified version of its Corresponding Source. The information must suffice to ensure that the continued functioning of the modified object code is in no case prevented or interfered with solely because modification has been made.

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