Lenovo Network

Developer's Guide

for Lenovo Network Development Toolkit for Chef, Version 1.0

Lenovo™

Note: Before using this information and the product it supports, read the general information in the *Safety information and Environmental Notices and User Guide* documents on the Lenovo *Documentation* CD and the *Warranty Information* document that comes with the product.

First Edition (January 2018)

© Copyright Lenovo 2018
Portions © Copyright IBM Corporation 2014.

LIMITED AND RESTRICTED RIGHTS NOTICE: If data or software is delivered pursuant a General Services Administration "GSA" contract, use, reproduction, or disclosure is subject to restrictions set forth in Contract No. GS-35F-05925.

Lenovo and the Lenovo logo are trademarks of Lenovo in the United States, other countries or both.

Preface

The *Lenovo Network Development Toolkit for Chef Developer's Guide* describes how to install, configure, and use the Lenovo Network Development Toolkit for Chef.

Intended Audience for This Guide

This guide is intended for network installers and system administrators engaged in configuring and maintaining a network. The administrator is expected to be familiar with Ethernet concepts, IP addressing, and Spanning Tree Protocol. The user of this book is also expected to be familiar with the Ruby programming language.

© Copyright Lenovo 2018

Typographic Conventions

The following table describes the typographic styles used in this book.

Table 1. *Typographic Conventions*

Typeface or Symbol	Meaning	Example
`ABC123`	This type is used for names of commands, files, and directories used within the text. It also depicts on-screen computer output and prompts.	View the `readme.txt` file. `Main#`
`ABC123`	This bold type appears in command examples. It shows text that must be typed in exactly as shown.	`Main#` **`sys`**
<ABC123>	This italicized type appears in command examples as a parameter placeholder. Replace the indicated text with the appropriate real name or value when using the command. Do not type the brackets. This also shows book titles, special terms, or words to be emphasized.	To establish a Telnet session, enter: `host#` **`telnet`** *<IP address>* Read your *User's Guide* thoroughly.
[ ]	Command items shown inside brackets are optional and can be used or excluded as the situation demands. Do not type the brackets.	`host#` **`ls`** [**`-a`**]
|	The vertical bar (|) is used in command examples to separate choices where multiple options exist. Select only one of the listed options. Do not type the vertical bar.	`host#` **`set left|right`**
AaBbCc123	This block type depicts menus, buttons, and other controls that appear in Web browsers and other graphical interfaces.	Click the **Save** button.

Contents

© Copyright Lenovo 2018

Chef Concepts

Chef is a Ruby-based configuration management tool designed to streamline the tasks of configuring and maintaining your servers. Chef can integrate with cloud-based platforms to automatically provision and configure new machines. Chef contains solutions for both small- and large-scale systems.

This chapter discusses the following topics:

Chef Overview

The Chef system configuration files are called *recipes*. Collections of recipes are stored in a *cookbook*. One cookbook relates to a single task but can have multiple server configurations involved. For example a web application with a database can have two recipes, one for each part, stored together in a cookbook.

Recipes and cookbooks are the heart of the configuration management. They are written using the Ruby programming language, however, the domain specific language used by Chef is designed to be able to be understood by everyone.

There is a Chef server that stores each of these cookbooks. When a new chef client node checks in with the server, recipes are sent to tell the node how to configure itself.

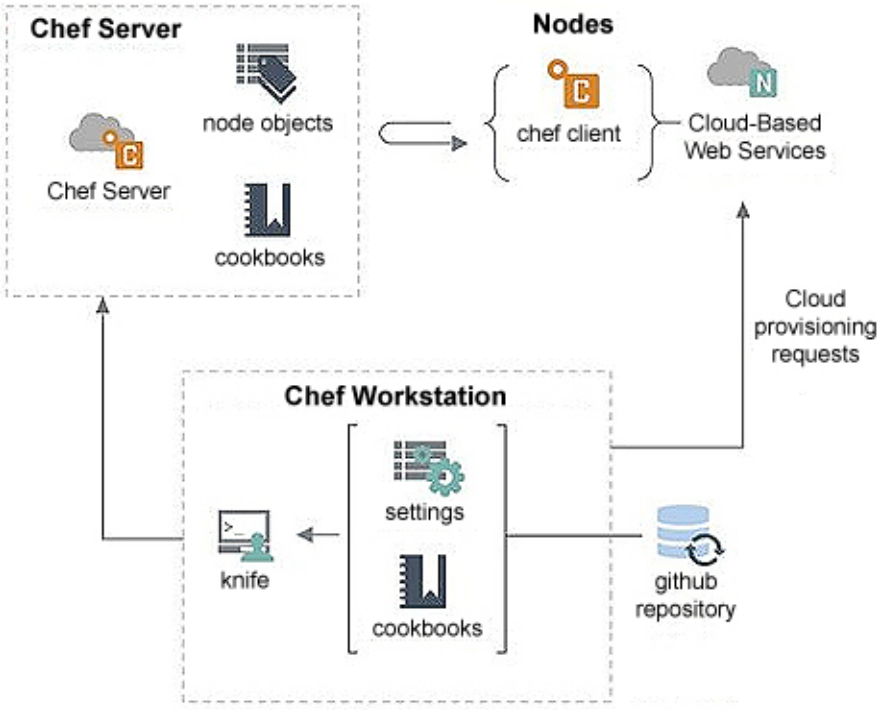
The client then checks the server occasionally to see if any changes have been made. If so, the client deals updates itself. By changing a recipe, you can roll out patches and updates over your entire infrastructure, rather than having to do so on each machine individually.

© Copyright Lenovo 2018

Chef Architecture

Figure 1 illustrates the Chef architecture.

Figure 1. Chef Architecture



Chef is comprised of the following components:

- Chef Server
- Chef Workstation
- Nodes

Chef Server

The Chef server is the primary mode of communication between the workstations where your infrastructure is coded and the nodes where it is deployed. All configuration files, cookbooks, metadata, and other information are stored on the server. The Chef server also keeps information regarding the state of all nodes at the time of the last Chef client run.

Any changes made must pass through the Chef server to be deployed. Prior to accepting or pushing changes, the Chef server verifies that the nodes and workstations are paired with the server through the use of authorization keys, and then allows communication between the workstations and nodes.

Chef Workstation

The Chef workstation is where you create, test, and maintain cookbooks and policies that will be pushed to nodes. Cookbooks created on workstations can be used privately by one organization or uploaded to the Chef Supermarket for others to use. You can also download cookbooks created by other Chef users from the Supermarket to the Chef workstation.

Workstations are set up to use the Chef Development Kit (ChefDK), and can be located on virtual servers or on physical computers. Workstations only interact with one Chef server, and most work is done in the Chef repository on the workstation.

Chef Repository

The Chef repository is where cookbooks are written and maintained. It is located in the directory:

`~/chef-repo`

Chef communicates with the server using the `knife` command, which is part of the ChefDK.

Knife

The `knife` command tool communicates between the Chef repository and the Chef server.This tool is automatically installed when you install the Chef workstation.

The `knife.rb` file contains `knife` configuration details:

```
log_level                :info
log_location             STDOUT
node_name                'username'
client_key               '~/chef-repo/.chef/username.pem'
validation_client_name   'shortname-validator'
validation_key           '~/chef-repo/.chef/shortname.pem'
chef_server_url          'https://123.45.67.89/organizations/shortname'
syntax_check_cache_path  '~/chef-repo/.chef/syntax_check_cache'
cookbook_path [ '~/chef-repo/cookbooks' ]
```

The following properties are defined in the `knife.rb` file:

Property	Description
`log_level`	The amount of logging that will be stored in the log file. The default value, `:info`, notes that any informational messages will be logged. Other values include `:debug`, `:warn`, `:error`, and `:fatal`.
`log_location`	The location of the log file. The default value is standard output logging. If set to another value, standard output logging will still be performed.
`node_name`	The username of the person using the workstation. This user must have a valid authorization key located on the workstation.

© Copyright Lenovo 2018

Property	Description
`client_key`	The location of the workstation user's authorization key.
`validation_client_name`	The name of the server validation key that will determine whether a node is registered with the Chef server. These values must match during a Chef client run.
`validation_key`	The path to your organization's validation key.
`chef_server_url`	The URL of the Chef server, with `shortname` being the defined shortname of your organization. This can also be an IP address, but the directory path `/organizations/`*shortname* must be part of the URL.
`syntax_check_cache_path`	The location in which `knife` stores information about files that have been checked for appropriate Ruby syntax.
`cookbook_path`	The path to the cookbook directory.

For more information about `knife` and the `knife.rb` file, see the following links:

- Documentation: https://docs.chef.io/knife.html
- Quick Reference: https://github.com/chef/quick-reference/blob/master/qr_knife_web.png
- The `knife.rb` file: https://docs.chef.io/config_rb_knife.html

Nodes

A *node* is a system configured to run the Chef client. This can be any system, as long as it is being maintained by Chef.

Nodes are validated through the `validator.pem` and `client.pem` certificates that are created on the node when it is bootstrapped. All nodes must be bootstrapped over SSH as either the `root` user or another user with elevated privileges.

Nodes are kept up-to-date through the use of the Chef client. The cookbooks and roles the node will use depend on the run list and environment set for the node in question.

Chef Client

The Chef client checks the current configuration the node against the recipes and policies stored in the Chef server and updates the node to match. The `chef-client` checks the node's run list, loading the cookbooks required, then checks and synchronizes the cookbooks with the current configuration of the node.

The Chef client must be run with elevated privileges to properly configure the node, and must be run periodically to ensure that the server is always up to date. This is often achieved through a `cron` job or by setting up the Chef client to run as a service.

Run Lists

Run lists define which cookbooks a node will use. The run list is an ordered list of all cookbooks and recipes that the Chef client needs to pull from the Chef server to run on a node. Run lists are also used to define roles, which are used to define patterns and attributes across nodes.

Ohai

Ohai is a tool that collects system configuration data, which is provided to the Chef client for use within cookbooks. Ohai is run by the Chef client at the beginning of every Chef run to determine the system state. Ohai includes many built-in plugins to detect common configuration details, as well as a plugin model for writing custom plugins.

The types of attributes Ohai collects include:

- operating system
- network
- memory
- disk
- CPU
- kernel
- host names
- fully qualified domain names
- virtualization
- cloud provider metadata

Attributes collected by Ohai are automatic level attributes; these attributes are used by the Chef client to ensure that these attributes remain unchanged after the Chef client is done configuring the node.

Chef Environments

Chef environments mimic real-life workflow, enabling you to organize nodes into different groups that define the role the node plays. This allows you to combine environments and for versioned cookbooks to have different attributes for different nodes. For example, if testing a shopping cart, you may not want to test any changes on a live website, but with a "development" set of nodes.

Environments are saved as Ruby files and are stored in:

```
~/chef-repo/environments/environame.rb
```

© Copyright Lenovo 2018

The environment file has the following format:

```
name "environmentname"
description "environment_description"
cookbook_versions  "cookbook" => "cookbook_version"
default_attributes "node" => { "attribute" => [ "value", "value", "etc."
] }
override_attributes "node" => { "attribute" => [ "value", "value", "etc."
] }
```

Upon boostrap, all nodes are automatically set to the default environment as defined *on the nodes* in the file:

`/etc/chef/client.rb`

Cookbooks

Cookbooks are the main component of configuring nodes on a Chef infrastructure. Cookbooks contain values and information about the desired state of a node. Chef determines how to get to that state through its extensive libraries.

Cookbooks are comprised of recipes, metadata, attributes, files libraries, resources, templates, and anything else that assists in creating a functioning system. Recipes and attributes are the two core parts of creating a cookbook. We recommend that components of a cookbook be modular, keeping recipes small and related.

Cookbooks can be version controlled; we recommend you do this. Versions can help when using environments and allow for easier tracking of changes that have been made to a cookbook.

Recipes

Recipes are written in Ruby and contain information regarding everything that needs to be run, changed, or created on a node. Recipes work as a collection of resources that determine the configuration or policy of a node, with resources being a configuration element of the recipe. For a node to run a recipe, it must be on that node's run list.

Attributes

Attributes define specific values about a node and its configuration. These values are used to override default settings and are loaded in the order cookbooks are listed in the run list. Attributes are often used in conjunction with templates and recipes to define settings.

Files

Static files can be uploaded to nodes. They can be configuration and setup files, scripts, or website files—anything that does not need to have different values on different nodes.

Libraries

Although Chef comes with built-in libraries, you can define additional libraries. If a recipe is the desired state of a node, added libraries contain the behind-the-scenes information Chef needs for the nodes to reach this state. Libraries are written in Ruby and can be used to expand on any of the functionalities Chef already has.

Resources and Providers

Resources and providers can also define new functionality for use in Chef recipes. A *resource* defines a set of actions and attributes; a *provider* tells the Chef client how to commit each action.

Templates

Templates are embedded Ruby files (`.erb`) that allow for content based on the node itself and other variables generated. When the Chef client is run, the template is used to create or update a file.

Making Ruby Gems

To create Ruby gems for use with the Lenovo Network Development Toolkit for Chef, follow the instructions at:

http://guides.rubygems.org/make-your-own-gem/

© Copyright Lenovo 2018

Installing the Lenovo Network Development Toolkit for Chef

The Lenovo Network Development Toolkit for Chef has the following requirements:

- Lenovo CNOS 10.4 or later
- Ruby 2.2.3 or later
- Chef 13 or later

The Lenovo Chef Library is a series of Ruby Gem wrappers around Lenovo REST calls. You can download it from:

https://rubygems.org/gems/lenovo-rbapi

Lenovo has also supplied some sample cookbooks that use the API. They are located at:

https://supermarket.chef.io/cookbooks/chef-cnos

To run recipes from the cookbook:

1. Install the Chef client on the node.
2. Either install the Lenovo CNOS Ruby Gem files on the same node or include them in the default recipe.
3. Create a `switch.yml` file on the workstation for each device to be configured using the workstation. The `switch.yml` file contains the following information:

```
transport : '<protocol>'
port : '<port>'
ip : '<IP>'
user : '<user>'
password : '<password>'
```

where:

Parameter	Description
protocol	Either `http` or `https`.
port	The port being used for the connection; either `8090` or `443`.
IP	The switch IP address (String).
user	The user name (String).
password	The password for the user (String).

4. Using `knife`, add the required recipe to the node run-list.
5. Run the Chef client on the node.

Product Support

This is a free and open source product from Lenovo. There are no support entitlements available for this plugin. Alternatively, you can file an issue or request via the GitHub repository at:

https://github.com/lenovo/chef-cnos/issues

© Copyright Lenovo 2018

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area.

Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
1009 Think Place - Building One
Morrisville, NC 27560
U.S.A.

Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION “AS IS” WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties.

Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary.

Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Trademarks

Lenovo, the Lenovo logo, Flex System, System x, NeXtScale System, and X-Architecture are trademarks of Lenovo in the United States, other countries, or both.

Intel and Intel Xeon are trademarks of Intel Corporation in the United States, other countries, or both.

Internet Explorer, Microsoft, and Windows are trademarks of the Microsoft group of companies.

Linux is a registered trademark of Linus Torvalds.

Other company, product, or service names may be trademarks or service marks of others.

Important Notes

Processor speed indicates the internal clock speed of the microprocessor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as total bytes written (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

© Copyright Lenovo 2018

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Recycling Information

Lenovo encourages owners of information technology (IT) equipment to responsibly recycle their equipment when it is no longer needed. Lenovo offers a variety of programs and services to assist equipment owners in recycling their IT products. For information on recycling Lenovo products, go to:

http://www.lenovo.com/recycling

Particulate Contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility..

Contaminant	Limits
Particulate	• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. • Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. • The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. • The room must be free of conductive contamination such as zinc whiskers.

Contaminant	Limits
Gaseous	• Copper: Class G1 as per ANSI/ISA 71.04-1985[3] • Silver: Corrosion rate of less than 300 Å in 30 days

[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.

[2] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

Telecommunication Regulatory Statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic Emission Notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Federal Communications Commission (FCC) Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Properly shielded and grounded cables and connectors must be used to meet FCC emission limits. Lenovo is not responsible for any radio or television interference caused by using other than recommended cables and connectors or by unauthorized changes or modifications to this equipment. Unauthorized changes or modifications could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that might cause undesired operation.

Industry Canada Class A Emission Compliance Statement

This Class A digital apparatus complies with Canadian ICES-003.

© Copyright Lenovo 2018

Avis de Conformité à la Réglementation d'Industrie Canada

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Australia and New Zealand Class A Statement

Attention: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

European Union - Compliance to the Electromagnetic Compatibility Directive

This product is in conformity with the protection requirements of EU Council Directive 2004/108/EC (until April 19, 2016) and EU Council Directive 2014/30/EU (from April 20, 2016) on the approximation of the laws of the Member States relating to electromagnetic compatibility. Lenovo cannot accept responsibility for any failure to satisfy the protection requirements resulting from a non-recommended modification of the product, including the installation of option cards from other manufacturers.

This product has been tested and found to comply with the limits for Class A equipment according to European Standards harmonized in the Directives in compliance. The limits for Class A equipment were derived for commercial and industrial environments to provide reasonable protection against interference with licensed communication equipment.

CE Lenovo, Einsteinova 21, 851 01 Bratislava, Slovakia

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Germany Class A Statement

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:

Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Nach der EN 55022: “Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.”

Nach dem EMVG: Dieses Produkt entspricht den Schutzanforderungen der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) zur Angleichung der Rechtsvorschriften über die elektromagnetische Verträglichkeit in den EU-Mitgliedsstaaten und hält die Grenzwerte der EN 55022 Klasse A ein.

Um dieses sicherzustellen, sind die Geräte wie in den Handbüchern beschrieben zu installieren und zu betreiben. Des Weiteren dürfen auch nur von der Lenovo empfohlene Kabel angeschlossen werden. Lenovo übernimmt keine Verantwortung für die Einhaltung der Schutzanforderungen, wenn das Produkt ohne Zustimmung der Lenovo verändert bzw. wenn Erweiterungskomponenten von Fremdherstellern ohne Empfehlung der Lenovo gesteckt/eingebaut werden.

Deutschland:

Einhaltung des Gesetzes über die elektromagnetische Verträglichkeit von Betriebsmittein
Dieses Produkt entspricht dem “Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln” EMVG (früher “Gesetz über die elektromagnetische Verträglichkeit von Geräten"). Dies ist die Umsetzung der EU-Richtlinie 2004/108/EG (früher 89/336/EWG) in der Bundesrepublik Deutschland.

Zulassungsbescheinigung laut dem Deutschen Gesetz über die elektromagnetische Verträglichkeit von Betriebsmitteln, EMVG vom 20. Juli 2007 (früher Gesetz über die elektromagnetische Verträglichkeit von Geräten), bzw. der EMV EG Richtlinie 2004/108/EC (früher 89/336/EWG), für Geräte der Klasse A.

Dieses Gerät ist berechtigt, in übereinstimmung mit dem Deutschen EMVG das EG-Konformitätszeichen - CE - zu führen. Verantwortlich für die Konformitätserklärung nach Paragraf 5 des EMVG ist die Lenovo (Deutschland) GmbH, Gropiusplatz 10, D-70563 Stuttgart.

Informationen in Hinsicht EMVG Paragraf 4 Abs. (1) 4:
Das Gerät erfüllt die Schutzanforderungen nach EN 55024 und EN 55022 Klasse A.

Nach der EN 55022: “Dies ist eine Einrichtung der Klasse A. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen; in diesem Fall kann vom Betreiber verlangt werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen."

Nach dem EMVG: “Geräte dürfen an Orten, für die sie nicht ausreichend entstört sind, nur mit besonderer Genehmigung des Bundesministers für Post und Telekommunikation oder des Bundesamtes für Post und Telekommunikation betrieben werden. Die Genehmigung wird erteilt, wenn keine elektromagnetischen Störungen zu erwarten sind.” (Auszug aus dem EMVG, Paragraph 3, Abs. 4). Dieses Genehmigungsverfahren ist nach Paragraph 9 EMVG in Verbindung mit der entsprechenden Kostenverordnung (Amtsblatt 14/93) kostenpflichtig.

Anmerkung: Um die Einhaltung des EMVG sicherzustellen sind die Geräte, wie in den Handbüchern angegeben, zu installieren und zu betreiben.

© Copyright Lenovo 2018

Japan VCCI Class A Statement

この装置は、クラス A 情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。 VCCI–A

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.

Japan Electronics and Information Technology Industries Association (JEITA) Statement

高調波ガイドライン適合品

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines (products less than or equal to 20 A per phase)

高調波ガイドライン準用品

Japan Electronics and Information Technology Industries Association (JEITA) Confirmed Harmonics Guidelines with Modifications (products greater than 20 A per phase).

Korea Communications Commission (KCC) Statement

이 기기는 업무용(A급)으로 전자파적합기기로
서 판매자 또는 사용자는 이 점을 주의하시기
바라며, 가정외의 지역에서 사용하는 것을 목
적으로 합니다.

This is electromagnetic wave compatibility equipment for business (Type A). Sellers and users need to pay attention to it. This is for any areas other than home.

Russia Electromagnetic Interference (EMI) Class A statement

ВНИМАНИЕ! Настоящее изделие относится к классу А.
В жилых помещениях оно может создавать радиопомехи, для снижения которых необходимы дополнительные меры

People's Republic of China Class A electronic emission statement

中华人民共和国“A类”警告声明

声 明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

Taiwan Class A compliance statement

警告使用者:
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

© Copyright Lenovo 2018