

### **C** LEARNING OBJECTIVES

To know the

- Need of Open Source Software.
- NS2 and its Use

### 14.1 Introduction

Free software and compilers were provided with early computer hardware. With these human understandable code the user can modify, add new code and identify the errors.

Can anyone change the codes in open source software?

Open source software has been developed by a variety of programmers. However, to add a new change to the software, the modified code will be submitted to a group of dedicated programmers. These programmers then test the modified codes and if it satisfies the appropriate rules, it will then be distributed to all.

### Why it is called open source?

Open Source simply refers to making the source code of the software freely available for users or other developers to use and make changes into the original repository or fork the project into and build a new

- OpenNMS and Group which created OpenNMS
- OpenSource Hardware

one. Open source software is usually created and updated by many programmers around the world and made freely accessible. Proprietary software is owned by an organization or individual. The makers of proprietary software have not allowed the users or other developers to view or edit the source code. But the advantage of the proprietary software is that it gives more control, support, training, security and stability for user making the software reliable to the users

In a network it is not easy to find problems. Especially when there are more systems are connected, the complexity is more, so we need Network Software to Control, Analyse the Server, System, protocol, Network, Traffic flow and reports about ups and downs of network parts. Notification help the user and administrator easily find working status of network systems and hardware, alert message, give details of faults, where and when it happens.

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### NRCFOSS

National Resource Centre for Free and Open Source Software is an Institution of Government of India. It helps in development of FOSS (Free Open Source Software) in India.

# Organizations related to Open Source

- Apache Software Foundation
- The Document Foundation
- The Eclipse Foundation
- Free Software Foundation
- Linux Foundation
- OpenCourseWare Consortium
- Open Source Initiative

### BOSS

BOSS (Bharat Operating System Solutions) Operating System Developed in India by C-DAC (Centre for Development of Advanced Computing) helps to prompt the use of open source software in India. It supports many Indian Languges.

### Types of open source license

- Apache License 2.0
- BSD 3-Clause "New" or "Revised" license
- BSD 2-Clause "Simplified" or "FreeBSD" license
- GNU General Public License (GPL)
- GNU Library or "Lesser" General Public License (LGPL)
- MIT license
- Mozilla Public License 2.0

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- Common Development and Distribution License
- Eclipse Public License

When you change the source code, OSS requires the inclusion of what you altered as well as your methods. The software created after code modifications may or may not be made available for free.

### Open-Source Software vs. Free Software

Although the terms are often used interchangeably, OSS is slightly different from free software. Both deal with the ability to download and modify software without restriction or charge. However, free software is a concept developed in the 1980s by an MIT computer science researcher, Richard Stallman who defined four conditions - as outlined by the nonprofit Free Software Foundation. These "four freedoms" emphasize the ability of users to use and enjoy software as they see fit.

In contrast, the OSS criteria, which the Open Source Initiative developed a decade later, place more emphasis on the modification of software, and the consequences of altering source code, licensing, and distribution.

Obviously, the two overlap; some would say the differences between OSS and free software are more philosophical than practical. However, neither should be confused with freeware. Freeware usually refers to proprietary software that users can download at no cost, but whose source code cannot be changed.



OSS projects are collaboration opportunities that improve skills and build connections in the field. Domains that developers can contribute to the open source community include:

• Communication tools.

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- Distributed revision control systems.
- Bug trackers and task lists.
- Testing and debugging tools.



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Copyright

Owner

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Project

User

Owner

User

Owner

User

### How Open Source work



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# Benefits of Open Source software and tools

- There are many open source softwares. so, we can select and use any software that suits our needs.
- The complete options of the software can be used without any cost and restrictions.
- We can share our ideas with the team, write the required code and share it with many.
- As we can identify the programming techniques of group members, we can learn many ideas and make our program writing skills more efficient.
- The coding in open source softwares are being groomed by many enthusiastical members of the group. So if we report problems that we have in the program they are quickly mended by the group's effort.
- As we can make changes to the open source softwares, we can add the most required features in the software
- Many open source software are very user friendly.

Like benefits Open source Software also have Some Problems Like Difficult to work for beginners, Exchange of files to other softwares, Some times Lack of Responsibility, service and problems related to hardware compatibility.

# Example of open source Application software

NS2, OPEN NMS, Ubuntu, MySQL, PDF Creator, Open Office, 7zip GNUCASH, GIMP, BLENDER, AUDACITY, VLC, MOZILA FIREFOX, MAGENTO, ANDROID, PHP

# 14.2 Network simulation tool – NS<sub>2</sub>

In computer network, network simulation is a method where a software program models the activities of a network by calculating the communication between the different **network** objects such as(routers, nodes, switches, access points, links etc.). A network simulator is a software program that replicates the functioning of a computer network. In simulators, the computer network is typically demonstrated with devices, traffic etc. and the performance is evaluated. Normally, users can then adapt the simulator to accomplish their precise analysis needs. The network parameters that define the state of the network (node placement, existing links) and the events (data transmissions, link failures, etc.). A significant output of simulation is the trace files. Trace files can document every incident that happened in the simulation and are used for examination.

NS2 is the abbreviation of NETWORK SIMULATOR version 2. It was considered explicitly for exploration in network communication and eventdriven open-source simulator in computer.

OTCL and c++ are used to create and run NS2. NS2 works on Windows and Linux platforms, that supports wired or wireless network and also use the command line interface as a user interface, API is a pure event base software tool with super simulation design, it has more models which help the user to get desired output easily.

### 14.3 Open NMS

Open NMS (Network Management System) is a free and open-source initiative grade network monitoring and management platform. It is established and maintained by a community of users ,developers and by the Open NMS Group, it offering services, training and support. The goal is for Open NMS to be actually distributed, scalable management application platform for all features of the FCAPS (Fault, configuration, accounting, performance, security) network management model. Presently the emphasis is on Fault and Performance Management.

It was intended to cope tens of thousands of devices from a single server as well as achieve unlimited devices using a cluster of servers. OpenNMS comprises of a discovery engine to routinely configure and manage network devices without operator intervention. It is written in Java and is issued under the GNU (General Public License.)

OpenNMS is the Worlds first software for Network monitor and management with opensource options. There are two types of Open NMS -Meridian and Horizon. When we need stability and long term support choose Meridian which is best for Enterprises as well as businesses. Horizon used where innovation occurs frequently. It is Best for IT-ecosystem, new technologie monitoring. OpenNMS was Released in 1999 by Steve Giles, Brian Weaver, and Luke Rindfuss.

In 2004 OpenNMS Group was created by Balog, Matt Brozowski, and David Hustace. It is written in Java and can run on all type of platform. It gives us Event management & Notification, Discovery & Provisioning, service monitoring and Data Collection. It has won lot of awards for best open source software.

# **OpenNMS has three main functional areas:**

- Service monitoring where a number of monitor modules can govern if network-based services (ICMP, HTTP, DNS, etc.) are accessible.
- Data Gathering using SNMP and JMX.
- Event management and notifications

   which comprises of alarm reduction and a robust announcement system with accelerations and duty schedules.

In this period of increased competition and cyber crimes, the

computers used by indivudals or business organisations may have spy hardwares of rivals. Open source hardware technology helps in such threats. In this technique we get the components of the hardware and its circuit diagram, so that we can remove suspicious spyware if found.

### Open Source HardwareRemix

- Remake
- Remanufacture
- Redistribute
- Resell
- Study and Learn



### POINTS TO REMEMBER

• Open Source denotes to some program whose source code is made available for usage or reform as users or other developers see appropriate

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- In simulators, the computer network is typically demonstrated with devices, traffic etc. and the performance are evaluated.
- A significant output of simulation is the trace files. Trace files can document every incident that happened in the simulation and are used for examination.
- NS2 has C++ and Object-oriented Tool Command Language (OTcl) of languages
   2.
- It link together for C++ and the OTcl using TclCL.
- Open NMS (Network Management System) is a free and open-source initiative grade network monitoring and network management platform.
- Network monitoring software notifications help the user/administrator for fixed errors.



NS2	Network Simulation 2
OpenNMS	First Open Source Network Management Software
Trace File	A document file, consists of every incident happens in a simulation
OTCL	Object-oriented Tool Command Language
FCAPS	Fault, configuration, accounting, performance, security
GNU	General Public License
SSFNet	Scalable Simulation Framework Net Models
API	APPLICATION PROGRAM INTERFACE
SOURCE CODE	Set of Instructions that decide, how the software should work
BOSS	Bharat Operating System Solutions
C-DAC	Centre for Development of Advanced Computing

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## What? Men? When? When?



### Part - I Choose the correct answer

- 1. If the source code of a software is freely accessible by the public, then it is known as
  - a) freeware
  - b) Firmware
  - c) Open source
  - d) Public source
- 2. Which of the following is a software program that replicates the functioning of a computer network?
  - a) Network software
  - b) Network simulation
  - c) Network testing
  - d) Network calculator
- 3. Which of the following can document every incident that happened in the simulation and are used for examination?
  - a) Net Exam
  - b) Network hardware
  - c) Trace file
  - d) Net document
- **4.** Which is an example of network simulator?
  - a) simulator
  - b) TCL
  - c) Ns2
  - d) C++

- 5. Fill in the blanks : NS2 comprises of \_\_\_\_\_key languages?
  - a) 13 b) 3 c) 2 d) 4
- 6. Choose the Correct Pair from the following to build NS2
  - a) UNIX & TCL
  - b) UNIX & a. C++
  - c) C++ & OTcl
  - d) C++ & NS2
- 7. Which of the following is not a network simulation software?
  - a) Ns2
  - b) OPNET
  - c) SSFNet
  - d) C++
- 8. Which of the following is a open source network monitoring software?
  - a) C++
  - b) OPNET
  - c) Open NMS
  - d) OMNet++

- 9. Open NMS was released in
  - a) 1999 b) 2000
  - c) 2003 d) 2004
- **10**. OpenNMS Group was created by.....
  - a) Balog
  - b) Matt Brozowski
  - c) David Hustace
  - d) All of them.

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### Part - II

### **Short Answers**

- **1.** Explain the History of open source software
- 2. What is meant by network simulator?
- 3. What is trace file?
- **4.** Write short notes on NS2.
- 5. Explain NRCFOSS.
- 6. Write short note on Open NMS?

### Part - III

### **Explain in Brief Answer**

- 1. What are the uses of Open source Network Software?
- 2. Explain Free software.
- 3. List out the Popular open source software.
- **4.** Write note on open source hardware.
- 5. What are the main functional areas of Open NMS?
- 6. Explain Types of Organisations related to Open Source.

### Part - IV

#### Explain in detail

- 1. Differentiate Proprietary and open source software.
- 2. List out the Benefits of Open Source Software
- 3. Explain various Open Source License.

### STUDENT ACTIVITIES

- 1 Mention Open source software and free software names that not explain in this chapter.
- 2. Mention Software that are accounts related.
- 3. Mention Open Source Developing and maintaining companies

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