

Geographic Information Systems
Dr. Bharath Haridas Aithal
Ranbir and Chitra Gupta School of Infrastructure Design and Management
Indian Institute of Technology – Kharagpur

Lecture – 57
Open Source GIS Softwares

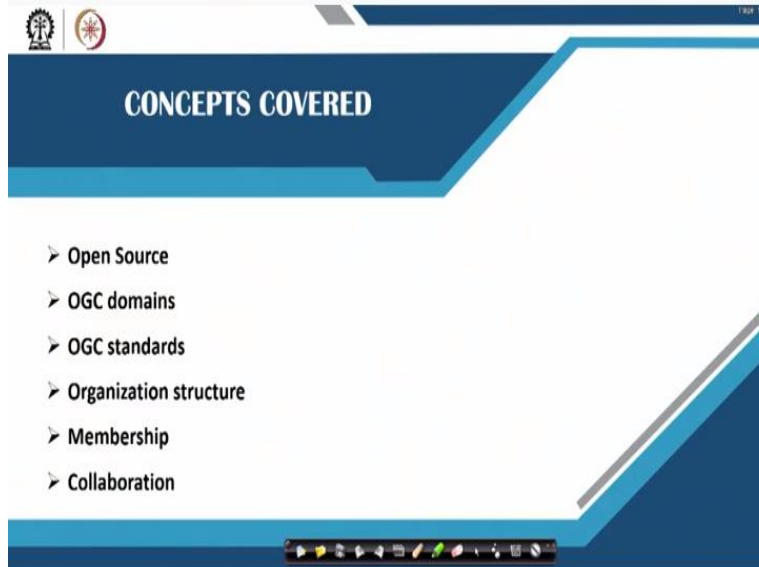
Hello namaste welcome back to the last module of geographic information system. This module is basically consider basically done in keeping in mind two things one is to make the users or the people like you to understand how well open-source software is designed and how it actually compares with then proprietary software and then to give you an a kind of idea that how an open source standard is already being built and how India is actually becoming a greater game.

I mean it is having a greater strength in terms of developing an open source standard by itself so that we can even share data among us and also keep the data in an open platform. So this module is maybe also enrapturing some of the aspects that we have already thought for example the software's, but I would deal with it in a very simpler and non-detailed manner. But I but this is to just give you an entire view of what is open source software and how it can be used by you.

So every researcher who is actually understanding this course can use this open source software for whatever research he or she is doing so they did not use any proprietary software look at aspects that is really proprietary set we are behind only one specific tool so they can develop their own science that is what is a basic I mean background of open source. So that that is what I am trying to give you in this particular set of slide.

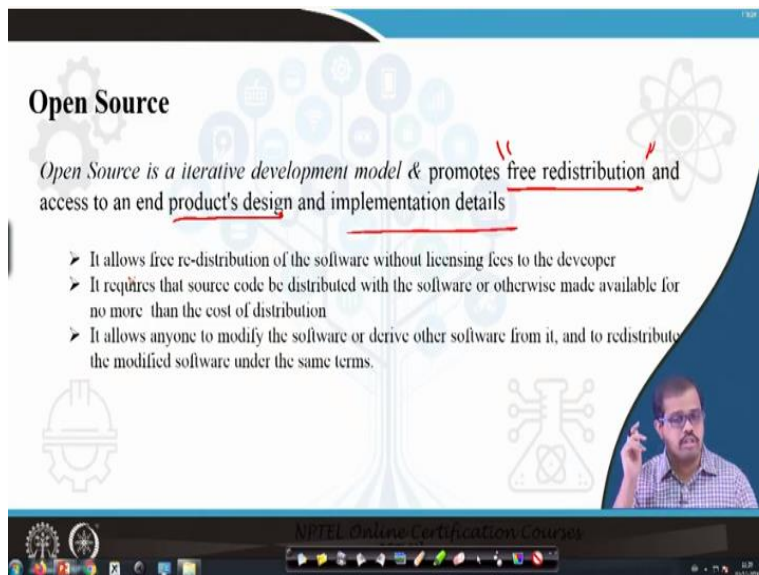
This has nothing to do with GIS software, GIS as a software but it is an overall thing for which includes GIS okay so that is what it means. So let us in the first lecture, let us learn about what do you actually mean about open source software.

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So in this slide in this particular lecture I would cover what do you mean by open source, what are different domains for example open geospatial consortium is there then what are the standards in an open source if you look at, then what are the organization structure, then membership and collaboration. So these are some of the things that you would look into.

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So when I say open source so whenever people speak that open source what is source, source is where you have built the science that science behind a tool right. So now if you say open source which means the science that is in the form of a programming language that has been written as a coded language is now open for anyone to modify and use by their own for their own applications that is called an open source.

So literally when I say open source, open source is an iterative development model promotes free redistribution. Please be careful here when I am saying it promotes free distribution okay, right and access to end products design and implementation details. So now when I say free distribution, free distribution is the code that would have been written by a developer who is who or who he or she wants to share their code their output towards for a good will of the society.

Then, it is also to access the end product design for example there are many researchers who will be looking at the end product design so they may not need the entire flow of the code, but the end code of design is very essential so how it is arrived at. So that is what matters and most as I said how it is arrived at the implementation details all these 3 forms if you can get it at no cost then it is called an open source software.

A source that is open to everyone to modify redistribute and use for good academic purposes then all societal needs then it is called an open source. So when we define open source, we define it in terms of like this it allows a free distribution of the software without license fee from the developer okay. So please keep in mind, so it is someone says that it is free of cost, it is not free of cost, it is without licensing fee.

Whatever you buy a software, whenever you buy a software, you are actually buying a licensing fee but not you are not buying, you are not paying for that software. The science behind the software is same as that effect as I said open-source software, but you are paying for the design and the way that software has been built for you okay. So whichever field you taken today in today's scenario, you have an open source software which is capable of handling any kind of data information whatever is necessary for a researcher and has every capability as that of an proprietary software.

Now when we say open source, it requires that source code could be distributed as I said it can be distributed with a software or otherwise made available for no more than the cost of distribution. So sometimes for example, there are open source software that have been

developed. In a today scenario, we have easy access to Internet. So you just download it from the internet.

But in the previous days when there was thing that the internet was so not sufficiently available to everyone at every nook and corner of the country what people used to do is that they used to charge a small distribution fee very less okay for example if you want a Linux distribution Linux started with a small distribution fee so that when it reaches to you it is I mean it reaches to you in a more easier and more probabilistic in a better way.

So in that case they used to charge what are such parcel charges that can be not a development charge or the licensing fees but only the cost for it to travel from its headquarters to your home or your office. so that is what can be used okay but in today's scenario you have internet access at least 90% of the India's nook and corner. So at this point of time everything is easily downloadable from the world wide web okay.

So it allows anyone to modify a software so keep this in mind this is very important because for example if there is a particular open source software it is in case let us say that someone wants to build his or own platform the way he wants, or she wants to showcase her work or her research impact. So it will help them to modify the such software or to derive other software's from it. So that is very essential whenever you are researching then the people ask for you for an end product either on the ground or a product that is evolved over a period of time.

So open source software helps in modifying this kind of information and it helps you I mean whenever you want to develop a tool. If you have an open source its actually easy scratch, you start with something that has been built over a period of time tested by various huge number of pool of users. Then you will take it forward you will test your own code you will test your own method of analysis then put it out to the entire community where community tests it.

And there is a huge pool of open source community where everyone tests it and gives you the meaningful results or maybe a critic. So once you have a critic you will keep on improving that is how you build an software in terms of the best available software's that is how people have

been doing all these years and to redistribute the modified software under the same terms. The only thing is that whenever you are using an open-source software and modifying its code, you have to redistribute in the terms of the same terms as per the author who has built this particular software. You cannot use your own terms; you cannot use it for your commercial gains okay. It has to be only in the terms of what the developer has tried to do.

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- Open Source is a licensing distribution model
 - In many ways similar to commercial software
 - Users need to understand the restrictions and obligations
- There are many kinds of Open Source licensing models
 - GNU General Public License (“GPL”)
 - GNU Lesser General Public License (“LGPL”)
 - BSD, MIT, Apache
 - Mozilla, IBM, Apple, Sun

Now coming back to open source, open source has different licensing distribution model. Whenever we are looking at this, it is actually similar to your commercial software and also different from your commercial software okay licensing the way we look at licenses is similar to their commercial software. But it is different in terms of whatever the monetary requirements are required for buying your licensing software.

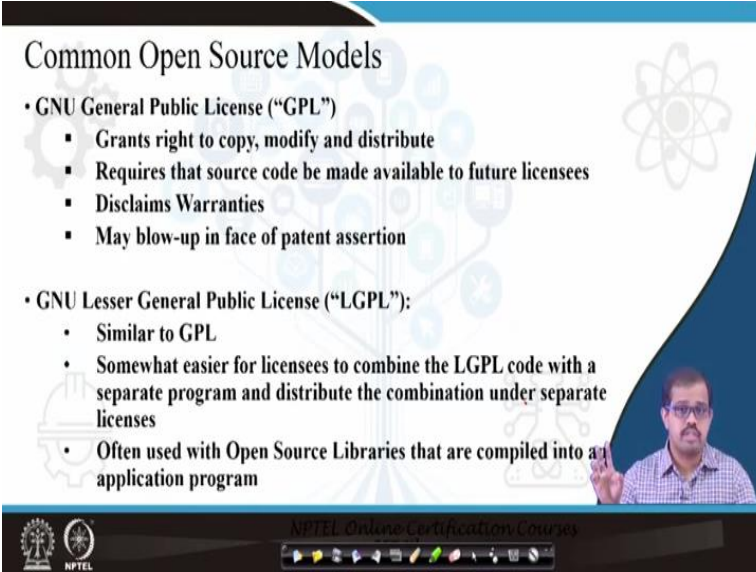
So users need to understand the restriction and obligation. Please keep this in mind, whenever you are downloading any open-source software, please read the agreement and the restrictions and obligations carefully, okay. Why it is? There is nothing offensive that would have been put here but it tells you the terms that in case, you modify it how do you redistribute or how you can actually use the same thing for your research.

So it is a good practice that always whenever you use certain things it has put to acknowledge that you have used it ok ay. So that the author who has actually developed it will really get the

credit okay. So like that there are certain things that you have to look at in the entire what are the obligations and restrictions are there. There are many kinds of open-source software licensing models for example the very well-known is the GNU general public license okay.

This is very well known and mostly used in many platforms and across many software's there is something called as GNU lesser general public license okay there is BSD, MIT and Apache license. So Apache is one of those licenses which is widely being used now also then you have Mozilla you have IBM ,Apple and Sun who have their own licensing models okay.

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The slide is titled "Common Open Source Models" and features a list of two license types. The first is the GNU General Public License ("GPL"), which includes four bullet points: "Grants right to copy, modify and distribute", "Requires that source code be made available to future licensees", "Disclaims Warranties", and "May blow-up in face of patent assertion". The second is the GNU Lesser General Public License ("LGPL"), which includes three bullet points: "Similar to GPL", "Somewhat easier for licensees to combine the LGPL code with a separate program and distribute the combination under separate licenses", and "Often used with Open Source Libraries that are compiled into an application program". The slide also contains a small inset image of a man speaking, the NPTEL logo, and a navigation bar at the bottom.

Common Open Source Models

- GNU General Public License ("GPL")
 - Grants right to copy, modify and distribute
 - Requires that source code be made available to future licensees
 - Disclaims Warranties
 - May blow-up in face of patent assertion
- GNU Lesser General Public License ("LGPL"):
 - Similar to GPL
 - Somewhat easier for licensees to combine the LGPL code with a separate program and distribute the combination under separate licenses
 - Often used with Open Source Libraries that are compiled into an application program

Now let us look at some of those licenses because when you are actually going through any of these software's the first thing that you will get is what kind of licensing, they are their model they are actually putting up to the first model that we consider today is a GNU general public license. So when I say a GNU general public license it grants a right to copy, modify and distribute. So requires the source code be available to future licenses okay so for example there is someone who has built this particular software okay so he or she is sharing it over the web.

So you take that software, you modify it but this the same license continues to be overhead and when you actually put it out to anyone the same licensing effect will come that is what is called a GNU model okay GNU public license mall it is a publicly available license then you it disclaims

any warranties okay no warranties applicable then may blow up I mean whenever you are looking at patents.

So there are there are people who have I mean there are ways of looking at patent you need you have patent you do not need to have patent but when you are looking at a public good so it is easier for a researcher to always try to share the thing so that other researcher is benefited and maybe it reaches a society at the end. So it help us in the patent assertion in a longer goal and when you look at GNU lesser general public license that is called LGPL, it is nothing.

But a GPL but the rider here is it is much easier to license to combine the LGPL code with the separate program and distribute it okay. Whereas in a GPL code they are the same licensing effect has to be taken but here you can I mean club 2 software's or the club the software's that you have developed with the another open source software and redistribute okay that is very important here and redistribute.

The combination under the separate licenses so when I look at LGPL you can have your own license but only thing is that it cannot be again for commercial users it has to be for the use by any other public for good and you have open this particular licenses especially the LGPU this often be used with the saw open source libraries. Nowadays people have developed a huge number of libraries whenever you are using either Python whenever you are using R whenever you are using any other software huge number of libraries have been developed.

So most of these libraries are under LGPL. So when I say LGPL so you have a right to combine modify whatever but the finally it has to reach the next person who may be benefited by this so and it is compiled into an application and can be compliant compiled to an application program that is very important in terms of using a software. Only thing is that you cannot do it with the commercial purpose.

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- BSD/MIT/Apache Style License:
 - More permissive licenses
 - Generally allow free distribution, modifying, and license change; much like public domain software
 - No future open source requirement
 - May require attribution
 - Variants may include non-standard restrictions
 - E.g., no military use – but not OSI-compliant
 - Disclaims Warranties
 - Subject to third-party patent claims

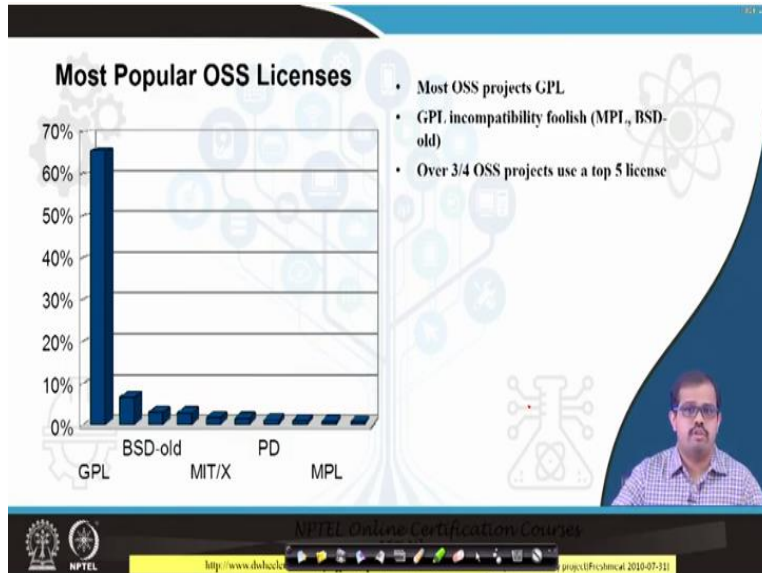
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The third one is you have a BSD, MIT, Apache style license. So this style licenses are a bit complicated than both of the previous ones, so these are more pervasive license it needs more I mean ways of looking at that particular licensing meet. For example the how the licensing is done what kind of licensing has to be there, how the code has been coming into the software so how the interactions happen.

So all these needs different types of licensing. Generally these allow free distributions modifying and license changes much like the public domain software okay. But when you are looking at this it may even stop a future open source requirement at a particular point of time. The source can be closed so that it may not be modified. So there is no requirement of taking it forward unlike the LGPL okay there you have to take it forward. Whereas here it may not be going forward in terms of redistribution.

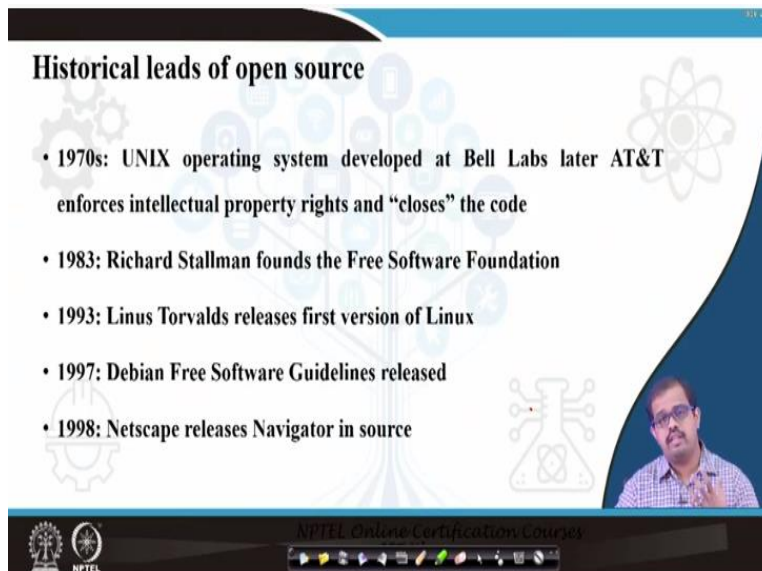
Then it requires it may require an attribution various variants may include non-standard restrictions also so it is up to the user do you have what kind of restrictions he or she wants to put into that particular software a user or any kind of restrictions that he or she wants to get in so that that is where these licenses are a bit permissive and more complex. And yeah it disclaims warranty as such and subject to third party patent claims. So you can have written claims but even by third party.

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And when you look at open source software licensing needs most of the open source software's are licensed under the GPL based license. So when you look at BSD and MITX they have less than 10% of the total contribution worldwide whereas GPL contributes to almost close to 65 to 70% of the licenses that are built today okay. Whereas when you look at the source code or the libraries that have been built for various analysis that has been built with terms of LGPLs okay. Whereas the software's are built in the libre terms of GPL licenses okay.

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Now where now how did this open source so now you understood why the licensing is important what do you mean by open source. But why did we start an open source so open sources basically to give a user a powerful thing without any cost okay the cost of any GIS proprietary

software is too high when you have to handle it. So to give the same feel and same professionalism in terms of normal user and academic user or any user who may not be able to afford a proprietary software.

And most importantly a user who can academically or who can research on various needs of the society by using the code that has been already developed and need not put another effort in developing the code. So similarly the first thing that a word was in 1970 where the UNIX operating system most of could not have seen it but if you have use it was an wonderful operating system in terms of the way it used to handle data.

So UNIX operating system was developed at Bell Labs later it, so AT and T enforces the intellectual property rights and closes the code. So that was the first thing but unfortunately the code was closed by AT and T now. In 1983 the Church Stallman founds the Free Software Foundation this is considered to be the first and the foremost turning point where the open source software evolution started okay.

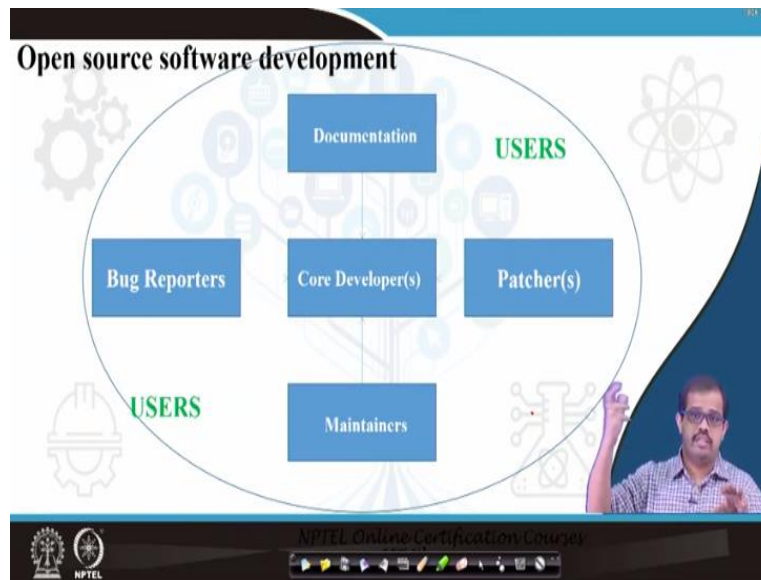
Then we had Linux Torvalds this is the first version of Linux and today if you see at least most of the servers 99% of the servers in the world are with the Linux operating system okay. Most of them do not use a Windows software okay Windows or any other kind of software it is mostly Linux okay. So that is how it started evolving. It was the first Linux; it was developed; it was completely in terms of no GUI.

But today, if you look at it as extremely user friendly and can boot and can do any kind of work that any of the other operating system. Can do whether it is Mac, whether it is Windows or any other operating system that you name so. Then in 1997, Debian free software guidelines was released. This was the first in terms of guidelines where how the software can be developed, what kind of licenses can be used by those software and most importantly the Debian sources extension, how it can be used in order to redistribute such software was first put forward it was.

And if you belong to 1980s, 1990s where you were born, you would have surely heard about the Netscape Navigator, excellent browser that was first introduced which was hugely used by

everyone whether it has Windows, Linux or UNIX operating system. So that was started in 1998, so that source was also released to the user communities I mean it evolved to a very large extent until you had a lot of other open source software which was more competent released somewhere in 2006, 2007 and so on. Until then it was Netscape Navigator which actually had a real flavor of the first form of usage in terms of software or and browser.

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So when we look at the entire open-source development the first thing starts with the documentation. So when you have okay labs and documentation, let us say a core developers. First in the core development happens okay then you have people who will document it and people who will actually patch it okay. There are certain documentation that has to be done when the core development happens.

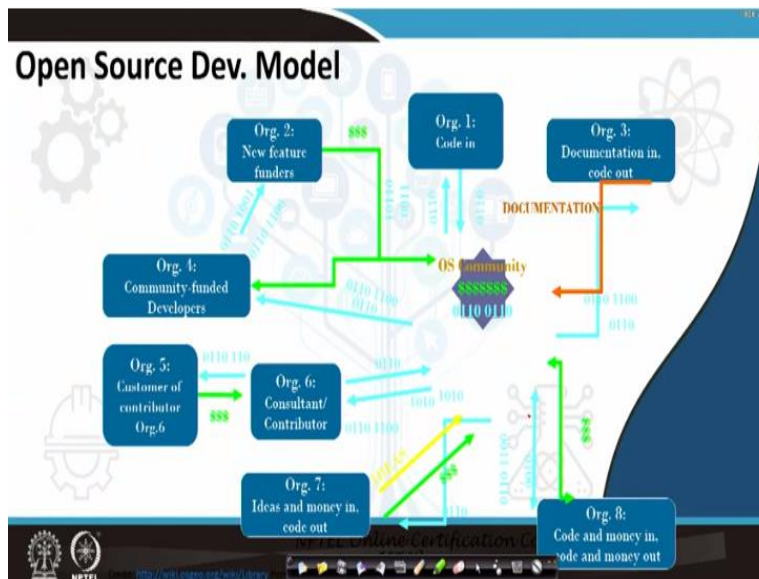
So that will be done by other set of people so then they will have patchers who actually look at what may be the issues in your software like for example there are bug reporters who report the bug they will test first the beta version is released it is tested. So that will be reported if there are certain bugs when the when users use it and that is reported to the that I mean a core developers where are the patchers who actually release patchers so that this bugs are addressed or if there are issues that are addressed.

Then once it is addressed you have also a stable releases which means to say that is the newer version if you have used Firefox, Chrome etc. maybe every 15 days or 30 days you get a new version of the Chrome it means to say that there are bugs reporters who are reporting the bugs in that particular version then there are patchers who are actually patching it. So once the patching is either a patchers are released directly or it is evolved into a newer version where the maintenance happens.

So you will have the Newer version of the your browser installed in maybe in 30 days or 15 days so that is where the entire maintenance of an open-source software development happens. Then finally at the end is the user okay outside this particular development circle is the user where the user uses it, he or she may also have critic about it, or they may give out bug reporting. So it may be user who not also normally reports a bug.

Also there are users who just use it for their own good and there are users who are basically looking at the software as an source okay. So this is how normally an open source development happens.

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Now when we look at the entire model okay this was from the wiki that I could get this model it struck me it is quite interesting in terms of the development model. So when we look at it the first thing or the first thing is the coded the particular software is coded properly this software

will have Neo feature funders what are the different Neo features that this software has already with the existing software.

Then once that is done there is a documentation of this particular software what are the different ways the software works, what are the extension it can carry, what are the different I mean the support that it has all of these okay can come in terms of that then you have a community-funded developers. For example there are a community of people who actually develop a particular software and that will be used then you have a consumer of this contributor okay.

Then you may have a consultant or a contributor some many a times it is consultant but many a times it is contributor who is actually developing this software then you have ideas and money in the code out in case you are looking at that part then there is a code and the money in which means to say that the better the code you have a better the money in. So this is the entire development model that was proposed that is actually running.

So I tried to I have put this in terms for you to understand that it is not just you are developing the code it is also becomes your own idea maybe on a longer run once it has developed completely revolutionized in terms of Neo software. So it may also give you some aspect in terms of the profitability okay. The model that you adopt will have its own ways of looking at it so that is why I have used this particular slide.

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Recent advances in the world in last 6 years

- Indian govt (CDAC, NCST) release Linux in 12 languages
- Red Hat and fedora have been extremely profitable
- Sun releases Java Desktop System
- Virus fear could hurt Windows (WSJ headline, 2014)
- China, Korea, Japan working on open-source Asian OS
- Brazil and many governments across the world recommends Linux in government
- Munich shifts 14,000 desktops to Linux
- Nutch(and many more): an open-source search engine under development
- Lindows PCs for USD 169-199

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And then you have when you look at the recent advances very recently if we take last one decade there has been a huge growth in terms of open source software users. But if you want to point out a very few things the first thing was Indian government that is CDAC and NCST released Linux in almost 12 languages now it has 28 languages. So it has increased now most of the Indian languages are being translated and Linux is almost available in most of the languages.

And Redhat and fedora have been extremely profitable in last couple of years which means to say that there has been a interest towards developing the open-source software Redhat and Fedora to Linux distributions 2 types of Linux distributions and both of these companies have been extremely profitable. Then you have Sun which is which released a Java desktop system okay. So that was a kind of revolution but later it really died down.

And most important thing is that the virus whenever you are a window user the first thing people ask us how many virus is affected to your window. If you do not have a proper the software which checks this virus and keeps it out virus or a trojan or any of those kind of things that actually affect your maybe any anything that you store in your system. So this also has a certain effect. So that was removed by an open source software because this is not for profit.

So normally an open source software when it is distributed is concerned to be and virus free normally virus free. Then China, Korea, Japan are working on an open source Asian OS in the

previous year you could have seen the first version of it but yet the full-blown version has to be released. Then Brazil and many governments across the world recommends Linux in the government including India.

So now in India is closed early looking at shifting its environment in the Linux environment. So that it is much easier for so that it maintains the security standards across its government offices then you had in probably in 2016 or 17 Munich shifts about 14000 desktops to its Linux. So it shifted completely towards Linux then you had Nutch an open source search engine. Now you have a lot of open source as a search engine which is parallel to even Google.

So you can have open you have parallels with Google which is just giving you an open source search and you have Lindows PCs for almost closer to USD 169 dollars okay Lindows is an alternative to Windows but had an affair had an open source and combined the effectivity of the Linux okay. So that was released for about 169 dollars and various flavor came up to 199 dollars or maybe 200 dollars when compared to other operating system the entire PC was costing much lesser than what other operating system were.

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The slide is titled "Top corporate open source developer(s)" and lists two companies: Sun and Apple. Sun is noted for using Linux and supporting open source development efforts, specifically mentioning the Forte IDE for Java and the Mozilla web browser. Apple is noted for releasing core layers of Mac OS X Server as an open source BSD operating system called Darwin, and for open sourcing the QuickTime Streaming Server and the OpenPlay network gaming toolkit. The slide features a blue and white color scheme with various icons and a small video inset of a speaker in the bottom right corner. The NPTEL logo is visible in the bottom left corner.

Top corporate open source developer(s)

- Sun
 - uses Linux; supports some open source development efforts
 - Forte IDE for Java and the Mozilla web browser
- Apple
 - released core layers of Mac OS X Server as an open source BSD operating system called Darwin; open sourcing the QuickTime Streaming Server and the OpenPlay network gaming toolkit

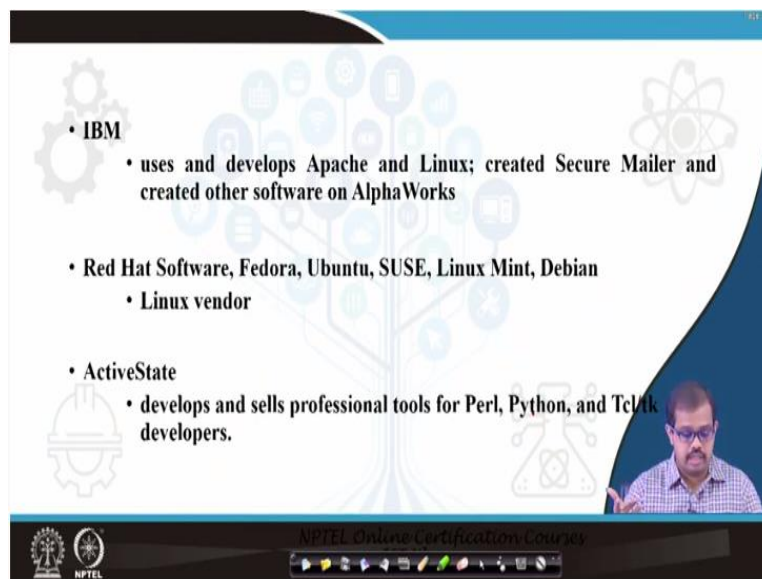
Then when you look at top developers so first, we have a community of users which is actually smaller for any software open source software. But there are corporate developers who are also developing an open source software for their users. The very top developer one of the top

developer is Sun, Sun by default uses Linux supports some open source development efforts for example Forte ID for Java and the Mozilla web browser is from Sun.

So when you are looking at such things you can see that there are corporate developers who are actually developing it for their own good, for own good and the community good and the similar if it has taken to the user if the interest is shown so it can be much useful for any development of the society and you have Apple it released its core layers of Mac OS server as an open source BSD operating system called Darwin okay.

Open sourcing the quick times streaming service so now all the time string services open source service and the open play network gaming toolkit also is available with the Mac OS X. So with this Apple has started with providing an open source normally Apple is considered to be very close proprietary in terms of whatever software terms it develops or the hardware it develops. But it has come out the after Mac OS X it is trying to open it up. So that the open source is available to the user and maybe it can be developed in a much better way.

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The slide features a background with a stylized tree of icons representing various software and hardware components. The text on the slide is as follows:

- IBM
 - uses and develops Apache and Linux; created Secure Mailer and created other software on AlphaWorks
- Red Hat Software, Fedora, Ubuntu, SUSE, Linux Mint, Debian
 - Linux vendor
- ActiveState
 - develops and sells professional tools for Perl, Python, and Tcl/Tk developers.

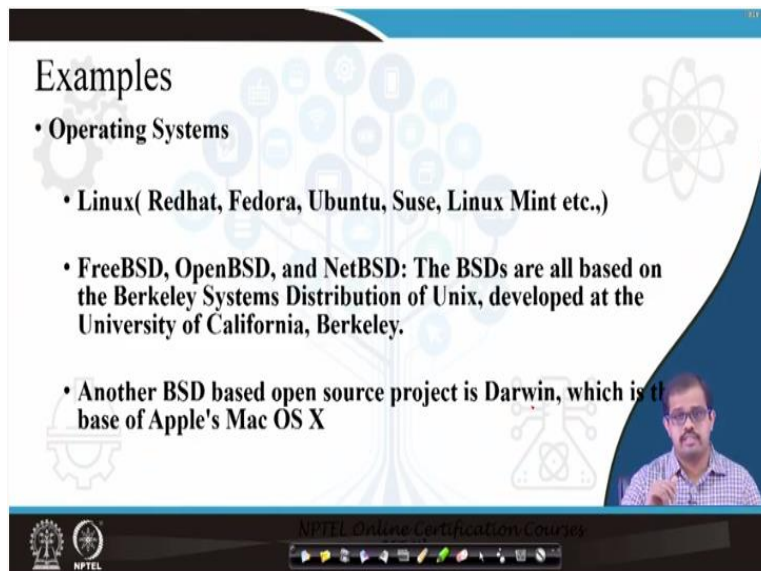
The slide also includes the NPTEL logo in the bottom left corner and a video player interface at the bottom with the text "NPTEL Online Certification Courses".

Then you have IBM which uses and develops Apache very well-known server and Linux also that is called as and created the secure mailer. So if you have used secure mailer it is quite very good and created the software on Alpha works okay. So these are some of those open-source

things that you can come across in your if you are looking at various sources then you have Redhat software fedora, ubuntu, SUSE, Linux, Mint, Debian, centOS.

So all of these are Linux vendors okay Linux operating system vendors then you have active state which develops and sells professional tools for Perl Python and tcltk developers. So all of these are actually in the open source domain.

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Examples

- **Operating Systems**
 - Linux(Redhat, Fedora, Ubuntu, Suse, Linux Mint etc.,)
 - FreeBSD, OpenBSD, and NetBSD: The BSDs are all based on the Berkeley Systems Distribution of Unix, developed at the University of California, Berkeley.
 - Another BSD based open source project is Darwin, which is the base of Apple's Mac OS X

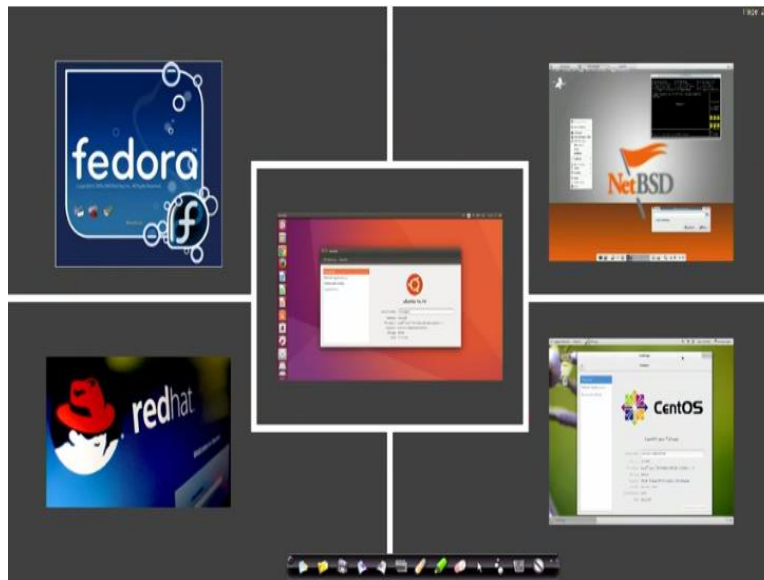
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So these are the commercial players who make commercial players in fact who are looking at the open source domain and we look at open source software systems basically operating systems. So the best thing that can come to your mind always when if you have used if you started using open source operating system somewhere in 2008, 2009 it was Redhat and so everyone started with Redhat and Fedora, Fedora was one extremely the I mean a good operating system in terms of whatever the academic needs are there its easier as an environment.

Whereas Redhat had a flexibility to work with various tools and maybe develop also as a developing tool and you had later it was with the advent of Ubuntu Linux saw a growth huge growth in terms of people using an open source software. Then Linux Mint and now it is CentOS which is actually powering a lot of systems. So both Ubuntu and CentOS have been very capable into getting into deeper markets in terms of how open source software's are used.

When you look at other things it as FreeBSD, OpenBSD, NetBSD. So these are the BSDs that are all based on Berkeley system distribution of UNIX developed at the University of California Berkeley. So these this has usage, but it is quite not as far with the Linux usages that are already there so another BSD based open source project is Darwin which I have already spoke and it is the base of Apple Mac OS X. So Mac OSX uses it so yeah as I said after Mac OS X it is this BSD, we ended this BSD license they have been putting forward some of their own software's for the public good.

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And to give you just an feel of what are the different Linux that is available today you can see that you have and Ubuntu you have Fedora you have Redhat you have CentOS you have net BSD. So if in case you guys are really interested it is very easy to even install it probably if you just browse in some of your YouTube videos you will be able to see although all of these software so and you can download it and install it wherever you need.

And probably this is the best thing that you can do with your maybe if you are an academician are an student doctoral student or a master student it's easier for you to look at the code develop the code and also use as an operating system much easier, much lightweight and more professional.

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Programming Tools

- PHP is a very popular engine behind the "live content" on the World Wide Web.
- Languages: Perl, Python, Tcl/Tk
- GNU compilers and tools: GCC, Make, Autoconf, etc.,

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And when you look at programming tools you have PHP, PHP is a very popular engine behind the live content on the World Wide Web. So there is normally I mean very widely used in terms of programming tool then you have programming languages Python, Perl, Tcltk, Tcltk powers the best GS software's in terms of raster operations whereas when you are looking at python, python today it has an extremely good programming language both for GIS for even for image processing or even for any other activity that you are trying to look at.

Python is capable of looking at every research activity that you can think of then you have GNU compilers and tools for example it is GCC, Make, Autoconf. So all of these are different tools they are programming tools that are there out today which is open source.

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Open Office

Leading open-source office software suite

- for word processing/ spreadsheets/ presentations/ graphics/ databases

Other features:

- Available in many languages
- Stores all your data in an international open standard format
- Read and write files from other office software packages (MS Office, King soft)
- You can download and use it completely free of charge for any purpose.

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The slide features a background with various icons representing office software functions like word processing, spreadsheets, presentations, graphics, and databases. A presenter is visible in the bottom right corner of the slide frame.

And when we look at the software's Open Office is one of those software's which are probably every one of you have to look at Open Office is equivalent to your Microsoft Office where open office also has word it also has excel sheets is it also has graphics it also has databases which you can use it can do anything that a Microsoft Office can do okay but only thing is that it is free and open source okay.

And as we compare it is available in all the languages that even your Microsoft Office is available stores all your data in an international open standard format okay it is an ODF format dot ODF you can also save in dotdoc or dotdocs. So that is also there any extension it actually supports stores all then reads and writes from other OpenOffice software whether it is MS Office Kingsoft it can read from all of these extensions and also store at all of these extensions and most importantly it is available free of charge for any purposes. So I would suggest if in some case if you guys are interested please look at OpenOffice as one software which you can look at.

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Neo Office

Most popular open source office application for Mac OS X.

- Word Processing
- Spreadsheet
- Presentation
- Drawing
- Database

Based on the OpenOffice.org office suite, NeoOffice has integrated dozens of native Mac features and can import, edit, and exchange files with other popular office programs such as Microsoft Office.

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Other one is Neo office. Neo office is also similar to open office but open office as much I would say user-friendly and more stronger in terms of handling anything that is thrown at it okay. So Neo office is another one so which can be used it is similar this has an application towards Mac OS x basically, but I would suggest an OpenOffice in terms in replacement with the Neo office okay.

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OPALS
(Open-source Automated Library System)

A cooperatively developed, Web-based, open source program providing Internet access to information databases and library collections.

There is no need to install software or purchase expensive computer hardware for this powerful Internet accessed system.


- Sample Catalogs <http://www.mediaflex.net/resources.jsp>
- Vestal Senior High School <http://opalsvla.stier.org/bin/home>

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So then the last one is Opals where it has an open source automated library system when I say when open-source operated by a library system it is an comparatively developed web-based open-source program that is actually providing an internet access to information databases and

library collections. So I have given some of the catalogs here so you can even look at those catalogs it is quite helpful if someone is trying to develop this in a bigger context.

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The slide features a white background with a blue header and footer. The title 'OpenBiblio' is in the top left. Below it is the URL 'http://obiblio.sourceforge.net/'. A paragraph describes the system as an easy-to-use, automated library system written in PHP, containing OPAC, circulation, cataloging, and staff administration functionality. Below this is the 'OpenBiblio Support' section with the URL 'http://sourceforge.net/services/project_services.php?project_id=50071'. The slide is decorated with various icons like a tree, a gear, and a network diagram. A presenter is visible in the bottom right corner, and the NPTEL logo is in the bottom left. A navigation bar is at the very bottom.

There is open Biblio this gives you an easy to use an automated library system written in basically in PHP, so you do not need to rewrite the entire library system that is containing the OPAC okay circulation cataloging and staff administration functionality. So if in case you are using it for your office you can better use an open web layer than buying a software that you will not have a control on.

Open Biblio library administration offers an intuitive interface with broad category tabs and sidebars so that you can even customize the way you need okay so that is much easier and more I mean friendly to you in terms of maintenance.

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Open Source Software

Web Browser and Email

- Mozilla -- <http://www.mozilla.com/en-US/>
- Firefox and Thunderbird

Digital Collections Management

- DSpace - <http://www.dspace.org/>
- Greenstone - <http://www.greenstone.org/>

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Web browsers and email I have spoke about Mozilla then you have Firefox you have thunderbird. Thunderbird is extremely good in terms of handling most of your email the communications that you can have then you have digital collection management like DSpace and Green Stone which is also widely used. Now Dspace is one of those widely used in terms of open source software.

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Blogs and Content Management Systems

- WordPress - <http://wordpress.org/download/>
- Joomla - <http://www.joomla.org/download.html>
- Plone - <http://plone.org/products/plone>
- ModX - <http://modx.com/>
- Drupal - <http://drupal.org/project/drupal>
- Atutor - <http://atutor.ca/>

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So many of you may like how the blogs or the content management systems so you have WordPress you have Joomla you have Plone, you have Mod X, Drupal, Drupal if you Drupal is one of those extensively used content management system and if someone wants to conduct a course online course then people may look at Atutor. Atutor can help you develop the entire

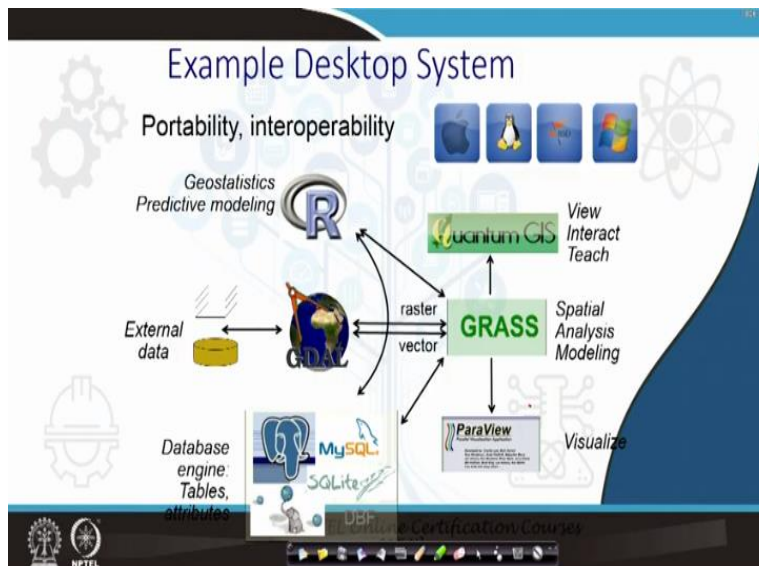
module without much hassle so that is one of the content management system that is available or as an open source software.

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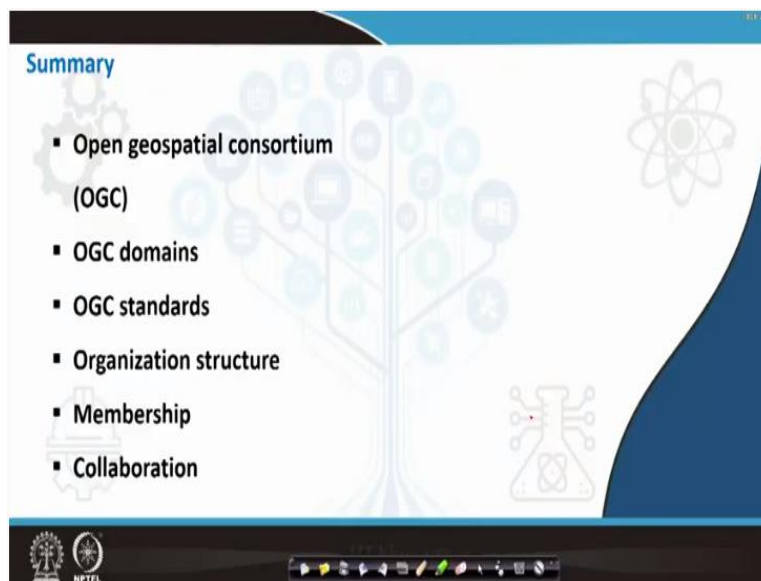
Then these are these are some of those which are there I will speak so with each of these for example I in my next class I would speak about OSSIM then GRASS then GeoServer would be I would one of my TS would speak about the GeoServer probably give you a flavor of GeoServer because in today's context it forms a very important aspect of how you handle a data then you have GDAL I will speak about GDAL in my next slides and Q GIS which we have been speaking in the last 2,3 sessions.

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Then these are the some of the example of desktop systems you may have heard about our R.R is extremely good capable software for statistical analytical or any kind of programming its extremely good background you know I mean R is a good software then you have a database engine like for example MySQL is SQLite then the DBF. So all of these are quite good in terms of when open source software and this most importantly is available in most of the operating systems okay. So whenever you have time so you can explore all of these okay.

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So coming to the last part the summary so we spoke about what do you mean by an open source. So I will speak about open so I open space I mean open Geospatial consortium I just said about OGC but I will speak about more about open space open Geospatial consortium then we looked at standards the organization structures and most importantly we looked at different software's that an open source has and licenses that this particular software offers then it is the rest probably I will take it up in the next class as it comes.

So we will meet in the next class we will look at OGC etc in a much better way and also some of those software's which have not touched here I will give you an introduction to that also some of the software's which are used as an urban analytical tools I will give an example of all of these. Thank you very much.