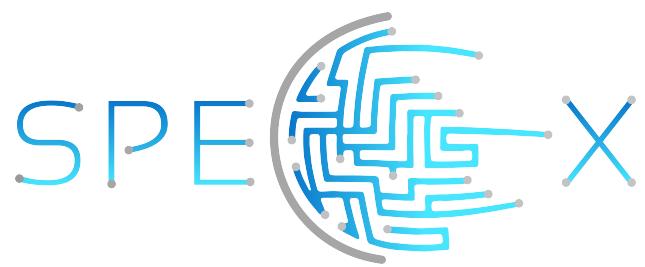

SPECX v3.1

User Guide



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Team SpecX, 2017-2020

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SpecX v3.1 User Guide

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About SpecX

Abstract

SpecX is a free, easily distributable software installation package for freeware tools for electrical/electronic and computer engineering (ECE) students.

SpecX is a Linux-based software package that facilitate easy download and installation of a wide range of tools for programming, circuit analysis, printed circuit board design, mathematical and numerical analysis, network analysis. It also downloads the dependencies prior to the tools for which they are required. SpecX provides an interactive graphical user interface which is easily understandable for users unaware of UNIX-shell language.

SpecX is free and effective alternative to the existing costly and copyrighted software packages and it attempts to reduce the duplication of efforts on building software workstations in laboratories and is intended to serve as a good teaching resource in a classroom setting.

Purpose

The basic purpose of this document is to provide the complete description about the installation of SpecX. Running SpecX on Microsoft Windows through Virtualization is also explained.

Intended Audience

SpecX is aimed at universities and students as it represents a cohesive environment integrating more than 200 software all catering to undergraduate and graduate coursework offered in ECE and Computer Science (CS) programs.

Required Background

Team SpecX has made every attempt to make this a step by step guide. However, some familiarity with Linux operating system as well as software and hardware requirements of SpecX are assumed.

How This Guide is Organized

This guide is organized into sections grouped according to the intended use by the user:

- About This Guide (Chapter 1) describes this document's purpose and intended audience
- SpecX Package (Chapter 2) has tables for Software Categorization Scheme, Selection Criteria and Included Tools
- Software Installation Process (Chapter 3) describes how to install SpecX
- Microsoft Windows Support (Chapter 4) describes a step by step procedure to configure a virtual OS for SpecX on Windows

Contact

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SpecX Package

SpecX ECE Curriculum based Categorization Scheme

SpecX Categorization is done on the basis of software grouping. To make it easier for bachelor students to locate their relative category. Table gives a detailed categorization of SpecX with respect to standard ECE Curriculum.

SpecX Category	ECE Course
Mathematical and Numerical Analysis	Calculus
	Multivariate Calculus
	Linear Algebra
	Discrete Mathematical Structures
	Numerical Methods
	Differential Equations
	Applied Probability and Statistics
	Signal and Systems
	Digital Signal Processing
Programming	Digital Image Processing
	Computer Fundamentals
	Programming Fundamentals
	Object Oriented Programming
	Data Structures and Algorithms
	Operating Systems
	Machine Learning

Programming (contd.)	Artificial Intelligence
	Database Engineering
	Project Management
Circuit Analysis & PCB Design	Electric Circuit Theory
	Semiconductor Devices
	Analog and Digital Electronic Circuits
	Integrated Electronic Circuits
	Digital System Design
	Introduction to VLSI Design
	Power Electronics
Power Systems	Electric Machines
	Power Transmission and Distribution
	Power System Analysis and Design
	High Voltage Engineering
	Power System Operation and Control
Embedded Systems	Microprocessor Systems
	Control Systems
	Introduction to Robotics
	Computer Architecture
Networking	Computer Networks
Communication Systems	Electromagnetic Thoery
	Analog and Digital Communications
	Antenna Systems
	Microwave Engineering
	Wireless Communications
Technical Writing and Presentation	Communication Skills
	Technical Writing and Presentation Skills
	Thesis Writing (Capstone Project)
Utilities and Plug-ins	Other Necessary Utilities

Software Selection Criteria

A specific criteria is used for enclosure of tools in SpecX. Table shows this selection criteria. Softwares which are included are due to these specific reasons:

- Publication Date (later then 2010)
- Freeware License
- Linux based
- Offline

Sr. no	Software Tool Name	Pub. Date (2010-)	Offline	Linux based	Free	Installed
Mathematical and Numerical Analysis						
Mathematical Analysis						
1	GNU Octave [1]	✓	✓	✓	✓	✓
2	Maple [2]	✓	✓	✓		
3	wxMaxima [3]	✓	✓	✓	✓	✓
4	Mathematica [4]	✓		✓		
5	GraphMonkey [5]		✓	✓	✓	
6	Mathworks MATLAB [6]	✓	✓	✓		
7	SageMath [7]	✓	✓	✓	✓	✓
8	mathomatic [8]		✓	✓	✓	
9	Kig [9]		✓	✓	✓	
10	Scilab [10]	✓	✓	✓	✓	✓
11	OpenEuclide [11]		✓	✓	✓	
12	gretl [12]	✓	✓	✓	✓	✓
13	GeoGebra [13]	✓	✓	✓	✓	✓
14	PSPP [14]	✓	✓	✓	✓	✓
15	Frink [15]		✓		✓	
16	SMathStudio [16]	✓	✓	✓	✓	✓
17	Tilp [17]	✓	✓	✓	✓	✓
18	OenEPI [18]	✓	✓	✓	✓	✓
19	Shogun [19]	✓	✓	✓	✓	✓
20	HippoDraw [20]		✓	✓	✓	
Finite Element Analysis						
21	Agros2D [21]	✓	✓	✓	✓	✓
22	Analysis3D [22]	✓	✓		✓	
23	Calculix [23]	✓	✓	✓	✓	✓
24	CodeAster [24]	✓	✓	✓	✓	✓
25	DIANAFEA [25]	✓	✓	✓		
26	deal.II [26]	✓	✓	✓	✓	✓
27	DUNE [27]	✓	✓	✓	✓	✓
28	Elmer [28]	✓	✓	✓	✓	✓
29	F Enics Project []	✓	✓	✓	✓	✓
30	FEA Tool Multiphysics [29]	✓	✓	✓		
31	Femap [30]	✓	✓			
32	FreeFem++ [31]	✓	✓	✓	✓	✓
33	GiD [32]	✓	✓	✓	✓	✓
34	Get FEM++ [33]	✓	✓	✓	✓	✓
35	Hermes Project [34]	✓	✓	✓	✓	✓
36	Julia FEM [35]	✓	✓	✓	✓	✓
37	MFEM [36]	✓	✓	✓	✓	✓
38	MoFEM JosePH [37]	✓	✓	✓	✓	✓
39	OO嫵EM [38]	✓	✓	✓	✓	✓
40	OpenFOAM [39]	✓	✓	✓	✓	✓
41	OpenSees [40]	✓	✓	✓		
42	Range Software [41]	✓	✓	✓	✓	✓
43	288/288 Aurora [42]		✓	✓	✓	
44	Abaqus [43]	✓	✓		✓	

45	CONSELF [44]	✓	✓		✓	
46	Free CAD [45]	✓	✓	✓	✓	✓
47	HyperMesh [46]		✓	✓		
48	Advance Design [47]	✓	✓			
49	Autodesk Simulation[48]	✓	✓		✓	
50	ANSYS [49]	✓	✓			
51	KEY CREATER Analysis [50]	✓	✓		✓	
52	COMSOL Multiphysics [51]	✓	✓	✓		
53	Cosmos Works [52]		✓		✓	
54	Quick Field [53]	✓	✓		✓	
55	LS-DYNA [54]	✓	✓	✓		
56	MecWay [55]	✓	✓		✓	
57	Nastran [56]	✓	✓	✓		
58	RFEM [57]	✓	✓		✓	
59	SimScale [58]	✓	✓		✓	
60	Visual FEA [59]	✓	✓		✓	
61	JCM suite [60]	✓	✓	✓		
62	CAEplex [61]	✓	✓		✓	
63	JMAG [62]	✓	✓	✓		
Programming						
Programming Development - C/C++						
64	Microsoft Visual Studio (C/C++) [63]	✓	✓		✓	
65	Code::Blocks [64]	✓	✓	✓	✓	✓
66	NetBeans C/C++ pack [65]	✓	✓	✓	✓	✓
67	Qt Creator[66]	✓	✓	✓	✓	✓
68	C++Builder [67]	✓	✓			
69	CodeLite [68]	✓	✓	✓	✓	✓
70	Dev-C++ [69]		✓		✓	
71	Eclipse IDE for C/C++ Developers [70]	✓	✓	✓	✓	✓
72	GNAT Programming Studio [71]	✓	✓	✓		
73	Oracle Solaris Studio [72]	✓	✓	✓		
74	JetBrains Clion [73]	✓	✓	✓		
75	Kdevelop (C/C++) [65]	✓	✓	✓	✓	✓
76	Rational Software Architect [74]	✓	✓	✓		
77	Ultimate++ the IDE [75]	✓	✓	✓	✓	✓
78	Understand (C/C++) [76]	✓	✓	✓		
79	Anjuta [77]	✓	✓	✓	✓	✓
Programming Development - C# and Visual Basic						
80	Microsoft Visual Studio (C# and VB)[78]	✓	✓		✓	
81	MonoDevelop [79]	✓	✓	✓	✓	✓
82	Sharp Develop [80]	✓	✓		✓	
83	Understand (C#)[81]	✓	✓	✓		
84	Xamarin Studio[82]	✓	✓	✓		
85	Rider [83]	✓	✓	✓		
Programming Development - JAVA						
86	BlueJ[84]	✓	✓	✓	✓	✓
87	NetBeans JAVA pack[85]	✓	✓	✓	✓	✓
88	Dr Java [86]	✓	✓	✓	✓	✓
89	Eclipse IDE for JAVA Developers[87]	✓	✓	✓	✓	✓
90	Greenfoot[88]	✓	✓	✓	✓	✓
91	IntelliJ IDEA Community Edition[89]	✓	✓	✓	✓	✓
92	JBuilder [90]		✓	✓		
93	JCreator [91]	✓	✓		✓	
94	Oracle Jdeveloper[92]	✓	✓	✓		
95	jGRASP [93]	✓	✓	✓	✓	✓
96	MyEclipse[94]	✓	✓	✓		
97	Servoy[95]	✓	✓	✓		
98	Understand (JAVA)[96]	✓	✓	✓		
Scripting Development - Python						
99	IDLE [97]	✓	✓	✓	✓	✓
100	PyCharm [98]	✓	✓	✓	✓	✓
101	Wing Python IDE[99]		✓	✓	✓	

I02	Eric [I00]	✓	✓	✓	✓	✓
I03	Komodo IDE (Python) [I01]	✓	✓	✓		
I04	KDevelop (Python) [I02]	✓	✓	✓	✓	✓
I05	NINJA-IDE [I03]	✓	✓	✓	✓	✓
I06	PyDev (Eclipse Plugin)[I04]	✓	✓		✓	
I07	Anaconda [I05]	✓	✓	✓	✓	✓
I08	Pyzo [I06]	✓	✓	✓	✓	✓
I09	PyScripter[I07]	✓	✓		✓	
I10	Thonny [I08]	✓	✓	✓	✓	✓
I11	Understand (Python)[I09]	✓	✓			
Scripting Development - Ruby						
I12	Aptana Studio 3 [I10]	✓	✓	✓	✓	✓
I13	RubyMine [I11]	✓	✓	✓		
I14	Ruby DLTK (Eclipse Plugin) [I12]	✓	✓		✓	
I15	Komodo IDE (Ruby)[I12]	✓	✓	✓		
I16	NetBeans (Ruby) [I13]	✓	✓	✓	✓	✓
Scripting Development - Tcl/Tk						
I17	Eclipse DLTK[I14]	✓	✓		✓	
I18	Komodo IDE[I15]	✓	✓	✓		
I19	VTCL [I16]	✓	✓	✓	✓	✓
Scripting Development - Perl						
I20	Eclipse EPIC[I17]		✓	✓	✓	
I21	KomodoDE [I15]	✓	✓	✓		
I22	NetBeans (Perl) [85, ?]	✓	✓	✓	✓	✓
I23	Padre - the Perl IDE"[I18]		✓	✓	✓	
I24	PerlEdit [I19]		✓	✓	✓	
Web Development - HTML/CSS/Javascript/PHP (Frontend)						
I25	Adobe Dreamweaver [I20]	✓	✓		✓	
I26	Brackets [?]	✓	✓	✓	✓	✓
I27	WebStorm [I21]	✓	✓	✓		
I28	Aptana Studio 3 [I10]	✓	✓	✓	✓	✓
I29	Eclipse WTP [I22]	✓	✓	✓	✓	✓
I30	NUVU[I23]		✓	✓	✓	
I31	Sea Monkey [I24]	✓	✓	✓	✓	✓
I32	Amaya [I25]	✓	✓	✓	✓	✓
I33	KompoZer [I26]	✓	✓	✓	✓	✓
I34	BlueGriffon [I27]	✓	✓	✓	✓	✓
I35	Quanta Plus [I28]		✓	✓	✓	
I36	NetBeans packs [85]	✓	✓	✓	✓	✓
Web Development - PHP						
I37	Eclipse PDT[I29]	✓	✓	✓	✓	✓
I38	Microsoft Visual Studio (Xamarin)[I30]	✓	✓			
I39	PhpED Professional[I31]	✓	✓		✓	
I40	PHPStorm [I32]	✓	✓	✓		
I41	Rad PHP [I33]		✓		✓	
I42	ZendStudio [I34]	✓	✓	✓		
Web Development - MySQL						
I43	MySQL Workbench [I35]	✓	✓	✓	✓	✓
I44	phpMy Admin [I36]	✓	✓	✓	✓	✓
I45	HeidiSQL [I37]	✓	✓		✓	
I46	Adminer [I38]	✓	✓	✓	✓	✓
I47	Navicat [I39]		✓	✓		
I48	Oracle SQL Developer [I40]	✓	✓	✓		
I49	DBeaver [I41]	✓	✓	✓	✓	✓
I50	Maria DB [I42]	✓	✓	✓	✓	✓
I51	SQLite [I43]	✓	✓	✓	✓	✓
I52	Client for MySQL by EngInSite[I44]	✓	✓			
I53	dbForge Studio[I45]	✓	✓		✓	
I54	DBTools Manager[I46]	✓	✓			
I55	Percona Toolkit[I47]	✓	✓	✓	✓	✓
I56	SQLyog [I48]	✓	✓			
I57	DBVisualizer[I49]	✓	✓	✓	✓	✓

158	Jack DB [150]	✓	✓	✓		
159	Datazenit [151]	✓	✓	✓		
160	xBaseView Database Explorer [152]	✓	✓			
161	SQL Examiner Suite [153]	✓	✓			
162	MyDB Studio [154]	✓	✓		✓	
163	Razor SQL [155]	✓	✓			
164	Sequel Pro [156]	✓	✓		✓	
Other Development - GNU CLISP						
165	Portacle [157]	✓	✓	✓	✓	✓
166	Vanilla Lisp Shell [158]		✓	✓	✓	
167	Lispbox [159]	✓	✓	✓	✓	✓
168	LispWorks [160]	✓	✓	✓		
169	GNU Emacs (CLISP) [161]	✓	✓	✓	✓	✓
170	Lispstick [162]	✓	✓		✓	
171	SLIME [163]		✓	✓	✓	
172	Quick Lisp [164]		✓	✓	✓	
173	SBCL [165]	✓	✓	✓	✓	✓
174	GNU Zile [166]	✓	✓	✓	✓	✓
175	Xemacs [167]	✓	✓	✓	✓	✓
176	Emacspeak [168]	✓	✓	✓	✓	✓
177	JOVE [169]		✓	✓	✓	
Other Development - R						
178	RStudio [170]	✓	✓	✓	✓	✓
179	RKWard [171]	✓	✓	✓	✓	✓
Code Editors						
180	Sublime Text [172]	✓	✓	✓	✓	✓
181	Notepad++ [173]	✓	✓		✓	
182	Atom [P]	✓	✓	✓	✓	✓
183	Coda [174]	✓	✓		✓	
184	Visual Studio Code [175]	✓	✓	✓	✓	✓
185	Vim [176]	✓	✓	✓	✓	✓
186	jEdit [177]	✓	✓	✓	✓	✓
187	Araneae [178]	✓	✓		✓	
188	UltraEdit [179]	✓	✓	✓		
189	BlueFish [180]	✓	✓	✓	✓	✓
190	Brackets [181]	✓	✓	✓	✓	✓
191	Komodo Edit [182]	✓	✓	✓	✓	✓
192	TextWrangler [183]	✓	✓		✓	
193	Geany [184]	✓	✓	✓	✓	✓
194	SlickEdit [185]	✓	✓	✓		
195	JED [186]	✓	✓	✓	✓	✓
196	GNU nano [187]	✓	✓	✓	✓	✓
197	GNU Emacs [188]	✓	✓	✓	✓	✓
Compilers						
198	GCC GNAT (ADA) [189]	✓	✓	✓	✓	✓
199	Netwide Assembler (Intel *86) [190]	✓	✓	✓	✓	✓
200	FreeBASIC (BASIC) [191]	✓	✓	✓	✓	✓
201	GNU Compiler Collection (C/C++) [192]	✓	✓	✓	✓	✓
202	Mono (C#) [193]	✓	✓	✓	✓	✓
203	GnuCOBOL (COBOL) [194]	✓	✓	✓	✓	✓
204	javac (JAVA) [195]	✓	✓	✓	✓	✓
205	ActivePerl interpreter (Perl) [196]	✓	✓	✓	✓	✓
206	python (Python) [197]	✓	✓	✓	✓	✓
207	ActiveTcl (Tcl/TK) [198]	✓	✓	✓	✓	✓
208	ruby (Ruby) [199]	✓	✓	✓	✓	✓
209	r-base [200]	✓	✓	✓	✓	✓
Circuit Analysis and PCB Design						
Schematic and PCB Design						
210	Altium [201]	✓	✓			
211	Eagle [202]	✓	✓	✓		
212	FidoCadJ [203]	✓	✓	✓	✓	✓
213	Visolate [204]		✓	✓	✓	

214	gerbv [205]	✓	✓	✓	✓	✓
215	kicad [206]StepUp	✓	✓	✓	✓	✓
216	Printed Circuit Board Layout Tool [207]		✓	✓	✓	
Protoboard Viewer						
217	Fritzing [208]	✓	✓	✓	✓	✓
Schematic and Circuit Simulator						
218	Proteus Design Suite [209]	✓	✓			
219	SimulIDE [210]	✓	✓	✓	✓	✓
220	gEDA [211]	✓	✓	✓	✓	✓
221	Quite Universal Circuit Simulator (QUCS) [212]		✓	✓	✓	
222	ktechlab [213]		✓	✓	✓	
Integrated Synthesis Environment (ISE)						
223	Xilinx ISE [214]	✓	✓			
224	ModelSim [215]	✓	✓	✓		
225	Icarus Verilog [216]	✓	✓	✓	✓	✓
226	HADES [217]	✓	✓	✓	✓	✓
Very-large-scale integration (VLSI)						
227	Electric[218]	✓	✓	✓	✓	✓
228	Magic VLSI [219]	✓	✓	✓	✓	✓
Simulation Program with Integrated Circuit Emphasis (SPICE)						
229	NI Multisim[220]	✓	✓			
230	OrCAD PSpice[221]	✓	✓		✓	
231	Oregano [222]	✓	✓	✓	✓	✓
232	ngspice[223]	✓	✓	✓	✓	✓
233	LTS spice[224]	✓	✓		✓	
234	gspiceui[225]	✓	✓	✓	✓	✓
235	GNU-Cap [226]	✓	✓	✓	✓	✓
236	Gwave [227]	✓	✓	✓	✓	✓
237	GTKWave[228]	✓	✓	✓	✓	✓
238	Tina-TI[229]	✓	✓			
239	QSapecNG [230]	✓	✓	✓	✓	✓
240	NetlistViewer[P]	✓	✓	✓	✓	✓
241	Eniac [231]		✓	✓	✓	
242	Spice+[232]		✓	✓	✓	
243	LCSIM - Laboratory Circuit Simulator [233]		✓	✓	✓	
244	SpiceX [234]		✓	✓	✓	
Power System Analysis						
245	ETAP [235]	✓	✓			
246	GridLAB-D[236]	✓	✓	✓	✓	✓
247	PyPSA [237]	✓	✓	✓	✓	✓
248	PowerWorld [P]	✓	✓		✓	
249	GridSim: A Grid Simulation Toolkit [238]		✓	✓	✓	
250	Penthode [239]	✓	✓	✓	✓	✓
251	RAPSIM - Microgrid Simulator [240]	✓	✓	✓	✓	✓
252	Python Power Electronics [241]	✓	✓	✓	✓	✓
253	Power System Toolbox [242]		✓	✓	✓	
Embedded Systems						
PIC Development Tools						
254	MPLAB [243]	✓	✓	✓	✓	✓
255	SDCC - Small Device C Compiler [244]	✓	✓	✓	✓	✓
256	mikroC for PIC [245]	✓	✓			
257	PICSimLab [246]	✓	✓	✓	✓	✓
258	gputils [247]	✓	✓	✓	✓	✓
259	Flowcode for PIC [248]	✓	✓		✓	
ARM Development Tools						
260	Keil uVision MDK-ARM [249]	✓	✓		✓	
261	mikroC for ARM[250]	✓	✓			
262	Code Composer Studio (CCS) IDE[251]	✓	✓	✓	✓	✓
263	Eclipse MCU [252]	✓	✓	✓	✓	✓
264	DENX ELDK[253]		✓	✓	✓	
265	Flowcode for ARM [254]	✓	✓		✓	

Arduino Development Tools						
266	Arduino IDE [255]	✓	✓	✓	✓	✓
267	Processing IDE [256]	✓	✓	✓	✓	✓
AVR Development Tools						
268	AVR toolchain [257]	✓	✓	✓	✓	✓
269	simuavr [258]	✓	✓	✓	✓	✓
270	KontrollerLab [259]		✓	✓	✓	
8051 Development Tools						
271	Keil uVision CS1 [260]	✓	✓		✓	
272	MCU 8051 IDE [261]	✓	✓	✓	✓	✓
273	GNU 8085 Simulator [262]	✓	✓	✓	✓	✓
274	SDCC - Small Device C Compiler [244]	✓	✓	✓	✓	✓
Texas Instruments Development Tools						
275	Energia[263]	✓	✓	✓	✓	✓
RISC-V Development Tools						
276	RISCV-VP [264]	✓	✓	✓	✓	✓
277	FireSim [265]	✓	✓	✓		
278	Imperas [266]	✓	✓	✓		
279	jorlk [267]	✓	✓	✓		
280	jupiter [268]	✓	✓	✓	✓	✓
281	renode [269]	✓	✓	✓	✓	✓
282	rars [270]	✓	✓	✓	✓	✓
283	pqse [271]	✓	✓	✓		
284	VLAB Works [272]	✓	✓	✓		
285	Eclipse MCU [273]	✓	✓	✓	✓	✓
MIPS Development Tools						
286	MARS [274]	✓	✓	✓	✓	✓
287	spim [275]	✓	✓	✓	✓	✓
Networking						
Network Design Software						
288	Solarwinds Network Topology Mapper [276]	✓	✓	✓		
289	Edraw Network Diagram Software [277]	✓	✓	✓	✓	✓
Network Simulation Software						
290	Packet Tracer [278]	✓	✓	✓	✓	✓
291	Gns3 [279]	✓	✓	✓	✓	✓
292	Wireshark [280]	✓	✓	✓	✓	✓
293	Dynamips[281]		✓		✓	
294	tcpdump [282]	✓	✓	✓	✓	✓
295	WinPcap [283]	✓	✓		✓	
Network Monitoring Software						
296	Solarwinds Network Performance Monitor[284]	✓	✓		✓	
297	Paessler PRTG [285]	✓	✓		✓	
298	Icinga 2 [286]	✓	✓	✓	✓	✓
299	Nagios Core [287]	✓	✓	✓		
300	Spiceworks[288]	✓	✓		✓	
301	Zenoss Core[289]	✓	✓	✓		
302	Zabbix [290]	✓	✓	✓	✓	✓
Communication Systems						
Electromagnetic (EM) Simulation						
303	Momentum 3D Planar EM Simulator [291]	✓	✓			
304	Altair FEKO [292]	✓	✓			
305	Advanced Design System (ADS)[293]	✓	✓			
306	gprMax [294]	✓	✓	✓	✓	✓
307	Angora[295]	✓	✓	✓	✓	✓
308	emGine Environment [296]	✓	✓		✓	
Antenna Design and Simulation						
309	ANYSYS HFSS [297]	✓	✓			
310	4nec2 [298]	✓	✓		✓	
311	NEC2[299]	✓	✓		✓	
312	MMANA-GAL [300]	✓	✓		✓	
313	EMCoS Antenna VLab [301]	✓	✓		✓	

314	Meep [302]	✓	✓	✓	✓	✓
315	openEMS [303]	✓	✓	✓	✓	✓
316	MaxFEM [304]	✓	✓	✓	✓	✓
317	FEMM [305]	✓	✓		✓	
Technical Writing and Presentation Skills						
Document Preparation Systems						
318	TeX Live [306]	✓	✓	✓	✓	✓
319	TeXstudio [307]	✓	✓	✓	✓	✓
320	TeXmaker[308]	✓	✓	✓	✓	✓
321	Gummi [309]	✓	✓	✓	✓	✓
322	Lyx [310]	✓	✓	✓	✓	✓
323	GNU TeXmacs [311]	✓	✓	✓	✓	✓
324	Halibut [312]	✓	✓	✓	✓	✓
325	Notabene [313]	✓	✓	✓		
Word Processor						
326	Microsoft Office Word [314]	✓	✓		✓	
327	LibreOffice Writer [315]	✓	✓	✓	✓	✓
328	WPS Office Writer [316]	✓	✓	✓	✓	✓
329	AbiWord [317]	✓	✓	✓	✓	✓
330	Scrivener [318]	✓	✓	✓		
331	CalligraWords [319]	✓	✓	✓	✓	✓
Spreadsheet Editor						
332	Microsoft Office Excel [320]	✓	✓		✓	
333	LibreOffice calc [321]	✓	✓	✓	✓	✓
334	WPS Office Spreadsheets [322]	✓	✓	✓	✓	✓
335	Gnumeric[323]	✓	✓	✓	✓	✓
336	Pyspread[324]	✓	✓	✓	✓	✓
337	CalligraSheets []	✓	✓	✓	✓	✓
Presentation Program						
338	Microsoft Office Powerpoint[325]	✓	✓		✓	
339	LibreOffice Impress[326]	✓	✓	✓	✓	✓
340	WPS Office Presentations [316]	✓	✓	✓	✓	✓
341	Beamer [327]	✓	✓	✓		
342	Whyte Board [328]		✓	✓	✓	
343	CalligraStage [319]	✓	✓	✓	✓	✓
Diagram/Flowchart						
344	Microsoft Office Visio [329]	✓	✓			
345	LibreOffice Draw [330]	✓	✓	✓	✓	✓
346	Dia [331]	✓	✓	✓	✓	✓
347	yEd [332]	✓	✓	✓	✓	✓
348	Edraw Flowchart Software [333]	✓	✓	✓	✓	✓
Reference and Citation						
349	Zotero [334]	✓	✓	✓	✓	✓
350	JabRef [335]	✓	✓	✓	✓	✓
351	KBibTeX [336]	✓	✓	✓	✓	✓
352	BibDesk [337]	✓	✓		✓	
353	Referencer [338]	✓	✓	✓	✓	✓
Project Management						
354	Git [339]	✓	✓	✓	✓	✓
355	GitKraken [340]	✓	✓	✓	✓	✓
356	TaskJuggler [341]	✓	✓	✓	✓	✓
357	Gantt Project [342]	✓	✓	✓	✓	✓
358	mishra2013software[343]		✓	✓	✓	
359	Jira [344]	✓	✓	✓		
Printable Schematic Design						
360	CircuiTikZ [345]	✓	✓	✓	✓	✓
361	XCircuit [346]	✓	✓	✓	✓	✓
Utilities and Plugins						
Virtual Machines (VMs)						
362	VirtualBOX [347]	✓	✓	✓	✓	✓
363	Vmware [348]	✓	✓		✓	
364	Parallels Desktop [349]	✓	✓	✓		

365	QEMU [350]	✓	✓	✓	✓	✓
Other Virtualization						
366	tryOtty [351]	✓	✓	✓	✓	✓
367	socat [352]	✓	✓	✓	✓	✓
Serial Monitor						
368	TeraTerm Pro [353]	✓	✓		✓	
369	PuTTY [354]	✓	✓	✓	✓	✓
Calculator						
370	SpeedCrunch [355]	✓	✓	✓	✓	✓
371	Generic Mapping Tools[356]	✓	✓	✓	✓	✓
372	Qalculate [357]	✓	✓	✓	✓	✓
373	GNOME Calculator [358]	✓	✓	✓	✓	✓
Unit Converter						
374	Convert[]	✓	✓	✓	✓	✓
375	ConvertAll []	✓	✓	✓	✓	✓
376	MultiConvert []	✓	✓	✓	✓	✓
377	Convert for Windows[359]	✓	✓		✓	
Help and Learning Resources						
378	Golden Dict [360]	✓	✓	✓	✓	✓
379	Artha [361]	✓	✓	✓	✓	✓
380	Resistor Color Calculator [362]	✓	✓	✓	✓	✓
381	StarDict [360]	✓	✓	✓	✓	✓

NOTE The Authors have relaxed the selection criteria and have included 207 tools out of 381 in SpecX. The remaining tools either does not lie on the basic selection criteria or have following notable issues:

- Software is free but its dependencies are paid
- Obsolete or not available
- Credentials or Subscription needed to avail the software

SpecX Packaged Tools

List of software tools and plugins included in SpecX package are shown in the following table. Software which are recommended are also mentioned in the table. Download size, version and Latest update of each software is mentioned for user convenience.

Sr. no	Software Tool Name	Version	Ubuntu Size (MB)	openSUSE Size (MB)	Fedora Size (MB)	Latest Update
Mathematical and Numerical Analysis						
Mathematical Analysis						
1	GNU Octave [1]	5.2.0	13.0	28.4	122	2020
2	SageMath [7]	9.0.0	1900	1024	1126	2020
3	Scilab [10]	6.0.2	88.9	116	253	2019
4	gretl [12]	1.9.90	10.1	6.2	19.0	2019
5	GeoGebra [13]	5.0.51	5.7	58.6	80.4	2020
6	PSPP [14]	1.2.0	4.7	4.9	4.3	2018
7	SMathStudio [16]	0.99.7	1.0	1.0	1.0	2018
8	Tilp [17]	1.19.1	0.5	0.5	0.7	2016
9	Shogun [19]	3.2.0	250	250	133	2017
Finite Element Analysis						
10	Agros2D [21]	3.2.0	0.06	0.066	591	2017
11	Calculix [23]	0.23.0	130.6	130.6	130.6	2019
12	CodeAster [24]	1.13.1	3.7	286	286	2019
13	deal.II [26]	8.5.1	116	39.5	39.5	2019
14	DUNE [27]	2.7.0	0.54	0.54	0.54	2020
15	Elmer [28]	8.4.0	76.6	76.6	76.6	2019
16	F Enics Project[363]	1.1.0	1.1	1.1	1.1	2019
17	FreeFem++ [31]	4.5.0	210	210	210	2020
18	GiD [32]	14.0.3	166	166	166	2019
19	Get FEM++ [33]	4.2.1	4.8	4.8	4.8	2018
20	Julia FEM [35]	1.0.5	85.0	66.3	44.0	2020
21	MFEM [36]	4.0.0	5.1	4.4	4.4	2018
22	MoFEM JosePH [37]	0.9.1	20.0	20.0	20.0	2020
23	OO嫵EM [38]	2.5.0	3.8	3.8	3.8	2016
24	Open FOAM [39]	7.0.0	258	258	37	2020
25	Range Software [41]	3.2.3	8.3	25.6	9.6	2019
26	FreeCAD [45]	0.18.0	67.9	249	251	2019
Programming						
Code Editors						
27	Sublime Text [172]	3.2.2	9.8	13.5	13.0	2019
28	Atom [364]	1.44.0	106	162	162	2020
29	Visual Studio Code[175]	1.42.1	55	79.0	85	2020
30	Vim [176]	8.0.0	8.39	3.1	8.0	2019
31	jEdit [177]	5.5.0	4.4	2.0	2.5	2018
32	BlueFish [180]	2.2.0	0.2	3.9	4.3	2020
33	Brackets[181]	1.13.0	58.5	64.7	4.3	2019
34	Geany [184]	1.34.1	3.2	2.0	3.7	2019
35	JED [186]	0.99.0	0.6	1.1	1.6	2019
36	GNU nano [187]	2.5.3	0.2	0.2	0.6	2020
37	GNU Emacs [188]	46.1.0	1.0	27.3	43.0	2019
Compilers						
38	GCC GNAT (ADA) [189]	-	4.7	4.7	21	2016
39	Netwide Assembler (Intel *86) [190]	2.11.08	1.5	0.3	0.4	2018
40	FreeBASIC (BASIC) [191]	1.07.1	6.0	6.0	6.0	2018
41	GNU Compiler Collection (C/C++)[192]	7.3.5	4.7	4.7	6.0	2019
42	Mono (C#) [193]	6.8.0	83.7	34.4	30.0	2020
43	GnuCOBOL (COBOL)[194]	2.2.0	1.0	1.0	2.0	2018
44	javac (JAVA) [195]	11.0	0.99	0.99	32.0	2019

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45	ActivePerl interpreter (Perl)[196]	5.28.1	48.8	48.8	2.0	2017
46	python3 (Python)[197]	3.5.1	8.0	8.0	8.0	2020
47	ActiveTcl (Tcl/Tk)[198]	8.6.9	24	24	24	2019
48	ruby (Ruby)[199]	1.2.3	5.8	5.8	4.1	2019
49	r-base[200]	3.6.2	24.6	24.6	241	2019
Programming Development - C/C++						
50	Code::Blocks [64]	17.12.1	13.1	17.2	21	2017
51	NetBeans C/C++ pack [65]	11.2.0	184.8	184.8	184.8	2019
52	Qt Creator [66]	5.14.1	1228	1228	1228	2020
53	CodeLite [68]	13.08.0	47.3	28.2	32.8	2019
54	Eclipse IDE for C/C++ Developers[70]	4.14.0	249.8	259.8	249.8	2019
55	Kdevelop (C/C++)[65]	4.4.7	90.9	50.0	52.0	2020
56	Ultimate++ the IDE [75]	10.3.4	49.2	249.8	116	2019
57	Anjuta[77]	3.18.2	6.1	95.7	95.7	2018
Programming Development - C# and Visual Basic						
58	MonoDevelop [79]	5.10.0	159	84.9	15.0	2020
Programming Development - JAVA						
59	BlueJ [84]	4.2.2	16.0	13.9	10	2019
60	NetBeans JAVA pack[85]	11.2.0	184.8	184.8	184.8	2019
61	Dr Java [86]	1.0.0	19.3	19.3	19.3	2016
62	Eclipse IDE for JAVA Developers[87]	4.14.0	197	197	197	2019
63	Greenfoot [88]	3.6.1	197	197	197	2019
64	IntelliJ IDEA Community Edition [89]	19.3.3	643	643	643	2019
65	jGRASP [93]	2.0.6	210	210	210	2020
Scripting Development - Python						
66	IDLE [97]	3.5.1	0.1	0.1	8.6	2020
67	PyCharm [98]	19.3.3	373	373	373	2019
68	Anaconda[105]	19.10.0	506	506	506	2019
69	Eric []	20.2.0	146.4	146.4	146.48	2018
70	Kdevelop (Python)[]	4.4.7	90.9	50.0	52.0	2020
71	NINJA-IDE []	2.3.0	12.0	12.0	16.0	2018
72	Pyzo[106]	4.0.1	5.5	5.5	5.5	2020
73	Thonny[108]	3.2.7	1.1	1.1	1.1	2020
Scripting Development - Ruby						
74	Aptana Studio 3[110]	3.6.1	123	123	123	2018
75	NetBeans (Ruby) [113]	11.2.0	184.8	184.8	184.8	2019
Scripting Development - Tcl/Tk						
76	VTCL [116]	8.6.0	6.6	6.6	6.6	2013
Scripting Development - Perl						
77	NetBeans (Perl)[85]	11.2.0	184.8	184.8	184.8	2019
Web Development - HTML/CSS/Javascript/PHP (Frontend)						
78	Brackets[365]	1.13.0	5.0	64.7	64.7	2018
79	Aptana Studio 3 [110]	3.6.1	123	123	123	2018
80	Eclipse WTP [122]	19.12.0	195	195	195	2019
81	Sea Monkey [124]	2.0.0	56.7	41.3	55.0	2020
82	Amaya [125]	11.4.4	18.5	18.5	36.9	2013
83	KompoZer [126]	0.8.0	7.5	12.3	40	2016
84	BlueGriffon [127]	3.1.0	210	270	270	2019
85	NetBeans packs [85]	11.2.0	184.8	184.8	184.8	2019
Web Development - PHP						
86	Eclipse PDT [129]	19.12.0	218	218	218	2019
Web Development - DBMS						
87	MySQL Workbench [135]	0.8.15	34.7	24.8	34.0	2020
88	phpMyAdmin [136]	4.5.4	26.0	12.8	23	2020
89	Adminer [137]	4.2.1	0.3	0.4	1.2	2019
90	DBeaver [141]	6.3.5	56.2	56.2	56.2	2020
91	Maria DB [142]	10.0.38	15.4	19.0	1.9	2020
92	SQLite [143]	3.28.0	0.2	0.2	0.2	2020
93	Percona Toolkit	2.2.0	0.7	0.7	8.2	2019
94	DBVizualizer [149]	10.0.26	50.2	50.2	50.2	2020
Other Development - GNU CLISP						
95	Portacle [157]	1.4.0	81.8	81.8	81.8	2020

96	Lispbox [159]	0.7.0	81.0	81.0	81.0	2012
97	GNU Emacs (CLISP) [161]	249.0	8.4	8.4	9.9	2019
98	SBCL[165]	1.4.1	9.9	9.9	16.0	2020
99	GNU Zile [166]	2.4.13	0.27	0.27	0.1	2016
100	Xemacs[167]	21.5.34	4.4	28.9	18.0	2013
101	Emacspeak [168]	41.0.0	25.8	25.8	57.0	2019
Other Development - R						
102	RStudio[170]	1.2.5		105	272	2019
103	RKWard [171]	0.7.0	89.0	76.8	309	2020
Circuit Analysis and PCB Design						
Schematic and PCB Design						
104	FidoCadJ[203]	0.24.7	0.6	0.6	0.6	2017
105	gerbv [205]	2.7.0	1.6	0.2	2	2019
106	kicad StepUp[206]	5.1.5	273	425	121	2018
Protoboard Viewer						
107	Fritzing[208]	0.9.2	16.5	7.2	19	2019
Schematic and Circuit Simulator						
108	SimulIDE [210]	0.3.12	3.0	3.0	3.0	2019
109	gEDA [211]	1.10.0	6.7	10.0	10.2	2013
Integrated Synthesis Environment (ISE)						
110	Icarus Verilog [216]	10.2.0	1.9	1.8	2.1	2019
111	HADES [217]	1.0.0	4.9	4.7	4.7	2015
Very-large-scale integration (VLSI)						
112	Electric [218]	9.07.0	28.3	20.3	20.3	2016
113	Magic VLSI [219]	8.0.2	1.3	1.3	3.1	2017
Simulation Program with Integrated Circuit Emphasis (SPICE)						
114	Oregano [222]	0.70.3	3.3	3.3	2.0	2018
115	ngspice [223]	26.1	2.0	2.0	5.6	2019
116	gspiceui[225]	1.1.0	2.5	2.5	13	2018
117	GNU-Cap [226]	1.0.36	0.9	0.9	1.1	2017
118	Gwave [227]	9.2.13	0.4	0.4	0.4	2015
119	GTKWave [228]	3.3.10	2.4	2.2	4.2	2020
120	QSpiceNG[230]	2.1.1	1.8	42.6	1.7	2015
121	NetlistViewer[366]	0.2	1.1	1.1	1.1	2017
Printable Schematic Design						
122	CircuiTikZ [345]	-	0.8	0.8	70	2020
123	XCircuit [346]	3.8.63	0.8	0.5	2.2	2018
Power Systems						
124	GridLAB-D[236]	4.0.0	45.4	45.4	45.4	2019
125	PyPSA [237]	0.16.1	0.1	0.1	0.1	2020
126	Penthode [239]	1.11.0	0.2	0.2	0.2	2018
127	RAPSIm - Microgrid Simulator[240]	0.95.0	6.9	6.9	6.9	2016
128	Python Power Electronics [241]	4.2.3	0.1	0.1	0.1	2020
Embedded Systems						
PIC Development Tools						
129	MPLAB [243]	5.35.0	932.4	695	695	2020
130	SDCC - Small Device C Compiler [244]	4.0.0	16.6	2.9	2.9	2020
131	PICSimLab - PIC Simulator Laboratory [246]	0.7.5	146.9	70.8	70.8	2018
132	gptools [247]	1.5.0	369.71	1.6	1.2	2019
ARM Development Tools						
133	Code Composer Studio (CCS) IDE [251]	9.3.0	1136	1136	1136	2019
134	Eclipse IDE for MCU[252]	4.7.2	247	247	247	2017
Arduino Development Tools						
135	Arduino IDE [255]	1.8.10	125	125	125	2020
136	Processing IDE [256]	3.5.4	132	132	132	2020
AVR Development Tools						
137	AVR toolchain [257]	5.4.0	18.9	18.1	18.1	2018
138	simuavr [258]	1.2.0	1.7	15.1	15.1	2016
8051 Development Tools						
139	MCU 8051 IDE [261]	1.4.10	3.6	3.99	3.6	2014
140	GNU 8085 Simulator [262]	1.4.1	0.01	0.3	0.8	2016
141	SDCC - Small Device C Compiler[244]	4.0.0	16.6	2.9	4.3	2020

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Texas Instruments Development Tools						
142	Energia [263]	1.8.10	147	147	147	2015
RISC-V Development Tools						
143	RISCV-VP[264]	1.0.1	27.6	27.6	27.6	2019
144	jupiter[268]	3.1.0	40	40	40	2013
145	renode [269]	1.8.2	6.0	6.0	6.0	2020
146	rars [270]	1.4.0	1.73	1.73	1.73	2013
147	Eclipse IDE for RISCV [273]	4.7.2	247	247	247	2017
MIPS Development Tools						
148	MARS [274]	4.5.0	4.2	4.2	4.2	2020
149	spim [275]	9.1.21	38.0	38.0	0.6	2020
Networking						
Network Design Software						
150	Edraw Network Diagram Software[277]	9.4.0	282	315	315	2019
Network Simulation Software						
151	Packet Tracer [278]	7.3.0	165	297	297	2019
152	Gns3 [279]	2.2.5	36.7	36.7	36.7	2019
153	Wireshark [280]	3.2.2	21.5	22.0	27.0	2019
154	tcpdump[282]	4.9.3	354	2.6	1.2	2019
Network Monitoring Software						
155	Icinga 2 [286]	2.7.2	11.5	6.0	3.8	2019
156	Zabbix[290]	4.4.4	0.04	0.5	0.3	2020
Communication Systems						
Electromagnetic (EM) Simulation						
157	gprMax[294]	3.1.5	33	52.13	52.13	2020
Antenna Design and Simulation						
158	Meep[302]	1.9.0	4.7	11.5	11.5	2020
159	openEMS [303]	0.0.35	40.6	1.2	16.2	2020
160	MaxFEM[304]	0.3.5	110	110	110	2018
Technical Writing and Presentation						
Document Preparation Systems						
161	TeX Live [306]	1.0.0	734	994	184	2019
162	TeXstudio [307]	2.12.10	384	1008.7	199	2020
163	TeXmaker [308]	5.0.3	845	1003.8	196	2018
164	Gummi [309]	0.6.6	293	293	71	2020
165	Lyx [310]	2.1.4	809	809	213	2020
166	GNU TeXmacs [311]	1.99.12	42.9	1064.96	224	2019
167	Halibut[312]	1.2.15	1.0	0.7	0.6	2020
Word Processor						
168	LibreOffice Writer [315]	6.3.3	7.29	211.4	11	2019
169	WPS Office Writer [316]	11.1.0	195	195	194	2019
170	AbiWord [317]	3.0.2	8.1	8.1	12	2019
171	CalligraWords [319]	3.1.0	157	34.7	21.0	2018
Spreadsheet Editor						
172	LibreOffice calc [321]	6.3.3	6.2	211.4	11	2020
173	WPS Office Spreadsheets[322]	11.1.0	195	195	194	2019
174	Gnumeric[323]	1.12.28	18.8	18.8	16	2019
175	Pyspread[324]	2.0	1.76	1.76	1.76	2020
176	CalligraSheets [319]	3.1.0	157	34.7	24	2018
Presentation Program						
177	LibreOffice Impress [326]	6.3.3	0.9	211.4	11	2020
178	WPS Office Presentations [316]	11.1.0	195	195	194	2019
179	CalligraStage [319]	3.1.0	157	34.7	29	2018
Diagram/Flowchart						
180	LibreOffice Draw [330]	6.3.3	2.3	211.4	11	2020
181	Dia [331]	0.97.3	4.6	5.1	4.1	2019
182	yEd [332]	3.19.1	133.5	123	123	2020
183	Edraw Flowchart Software [333]	9.4.0	282	315	315	2020
Reference and Citation						
184	Zotero [334]	5.0.82	57.4	46.3	57.4	2020
185	JabRef [335]	4.3.1	54.2	132.1	291	2018
186	KBibTeX [336]	0.4.4	167	4.6	59.0	2020

187	Referencer [338]	1.22	0.6	0.6	0.6	2018
Project Management						
188	Git [339]	216.4	2.93	2.93	0.3	2020
189	GitKraken[340]	6.5.3	70.9	101	101	2020
190	TaskJuggler[341]	3.6.0	0.8	0.01	0.01	2020
191	Gantt Project [342]	2.8.10	17.2	16.8	0.8	2019
Utilities and Plugins						
Virtual Machines (VMs)						
192	VirtualBOX [347]	6.0.8	24.4	37.5	100	2020
193	QEMU[350]	4.2.0	59.3	29.0	82	2019
Other Virtualization						
194	ttyOtty [351]	1.2.0	0.02	0.04	0.04	2018
195	socat [352]	1.7.3	0.3	0.2	0.3	2015
Serial Monitor						
196	PuTTY [354]	0.73.0	0.6	0.9	1.1	2019
Calculator						
197	SpeedCrunch [355]	0.12.0	0.4	0.8	1.0	2015
198	Generic Mapping Tools [356]	5.4.5	153	92.9	80	2019
199	Qalculate [357]	3.7.0	1.0	1.9	1.8	2020
200	GNOME Calculator [358]	3.26.0	0.32	1.6	1.1	2020
Unit Converter						
201	Convert []	0.2.39	0.1	0.1	9.7	2016
202	ConvertAll[]	0.7.5	0.1	22.3	22.3	2020
203	MultiConvert[]	1.8.0	3.0	1.9	1.9	2013
Help and Learning Resources						
204	Golden Dict [360]	1.5.0	3.0	3.0	22	2019
205	Artha [361]	1.0.3	0.2	0.2	8.1	2019
206	Resistor Color Calculator [362]	0.1.3	0.01	0.01	9.7	2016
207	StarDict [360]	3.0.1	0.01	0.01	13	2016

Software Installation Process

Installing SpecX software

For downloading of SpecX, visit its website:

<https://github.com/mominaj/SpecX-bin>

1. SpecX can also be downloaded from the following command through git:

```
$ git clone https://github.com/mominaj/SpecX-bin
```

2. Now run the following command on terminal:

```
$ chmod +x SpecX_setup_enUS
$ sudo ./SpecX_setup_enUS
```

3. Enter your credentials to start SpecX.

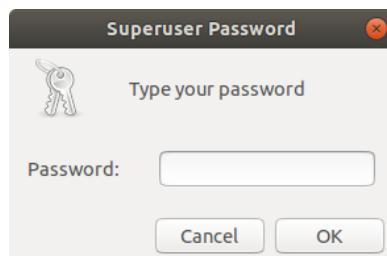


Figure 1: Password Screen

4. Click **OK** to proceed and confirm the internet connection.

NOTE Installation of SpecX require a proper internet connection to proceed, otherwise the installation terminates.



Figure 2: Internet Connection Successful Screen

5. Installation is **terminated** if there is no internet connection.



Figure 3: Internet Connection failed Screen

6. Installation wizard of SpecX will start.



Figure 4: Splash Screen

7. Select you want to install, uninstall or exit SpecX. Uninstallation wizard is identical to installation wizard.



Figure 5: Installer Selection Screen

8. Click **Next** to proceed with the installation.

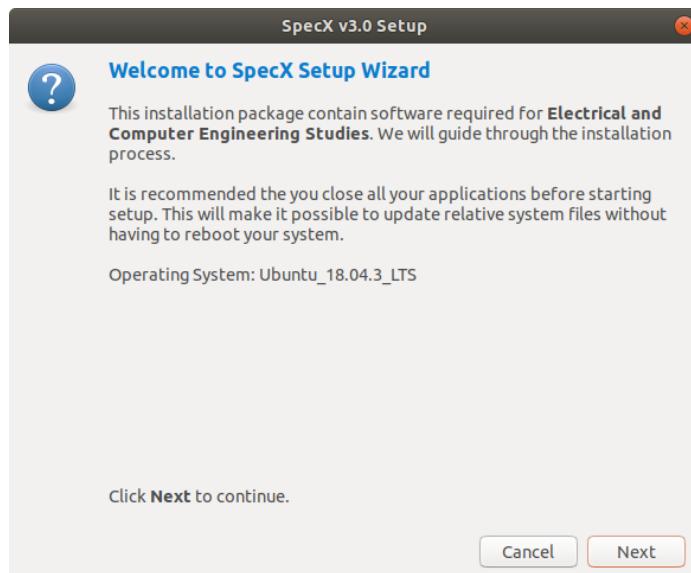


Figure 6: Installation Welcome Screen

9. **Dependencies** related to software will start installing.

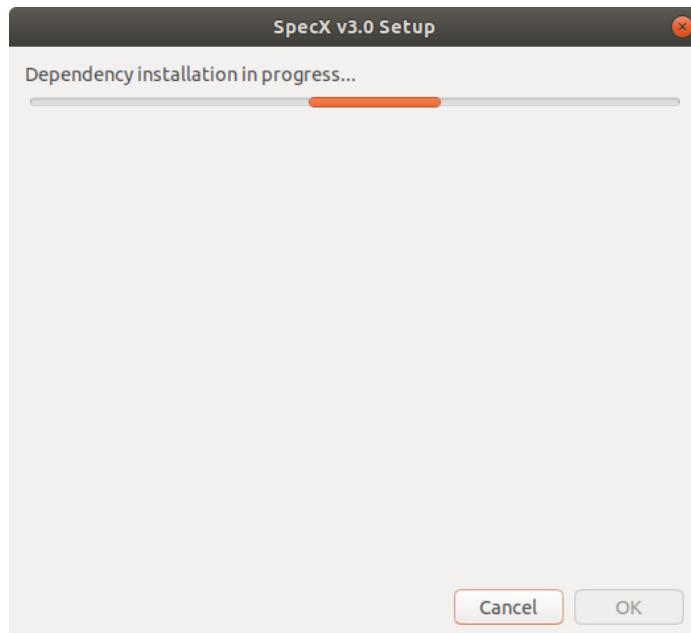


Figure 7: Installation Screen

10. All the dependencies which are installed are displayed at the end of the installation. Click **Ok**.

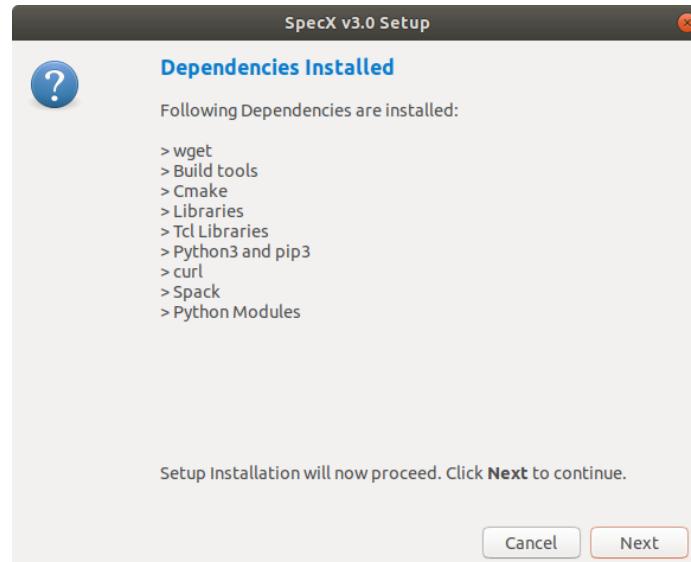


Figure 8: Dependencies installation finished screen

11. SpecX pipeline detail screen is displayed. It has the information about which software you want to install. Click **Next** to Proceed.



Figure 9: Pipeline information screen

12. Selection screen for Mathematical and Numerical Analysis Tools is displayed. Select the required tools and Click **Next**.

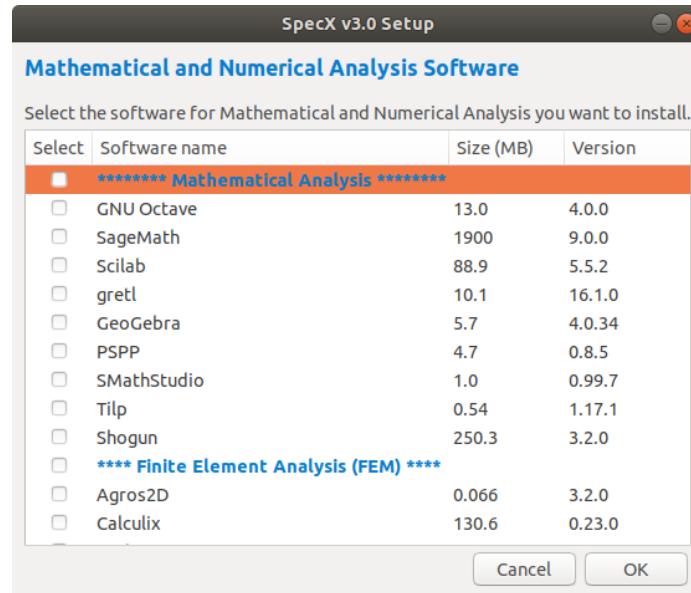


Figure 10: Mathematical and Numerical Analysis tools selection screen

13. Selection screen for Programming Tools is displayed. Select the required tools and Click **Next**.

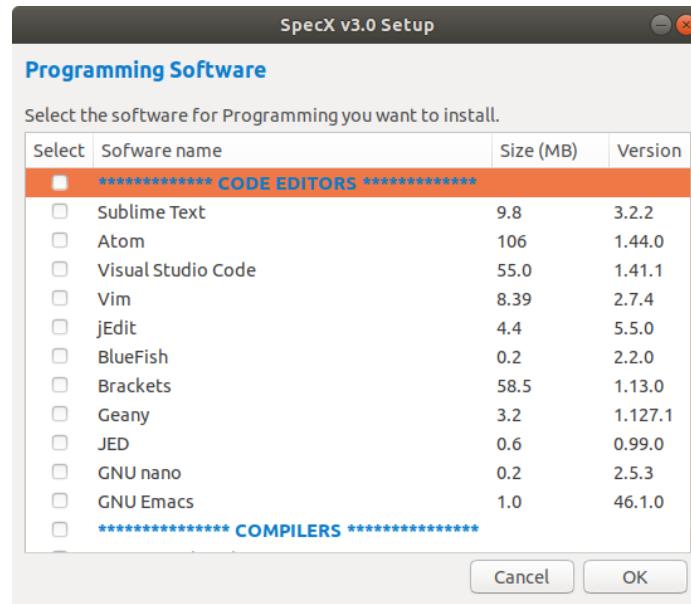


Figure 11: Programming tools selection screen

14. Selection screen for Circuit Analysis and PCB Design tools is displayed. Select the required tools and Click **Next**.

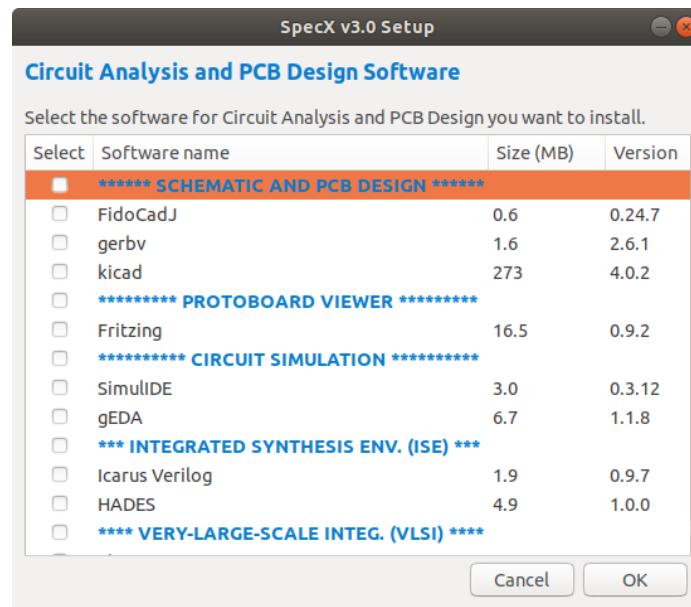


Figure 12: Circuit Analysis and PCB Design tools selection screen

15. Selection screen for Power Systems tools is displayed. Select the required tools and Click **Next**.

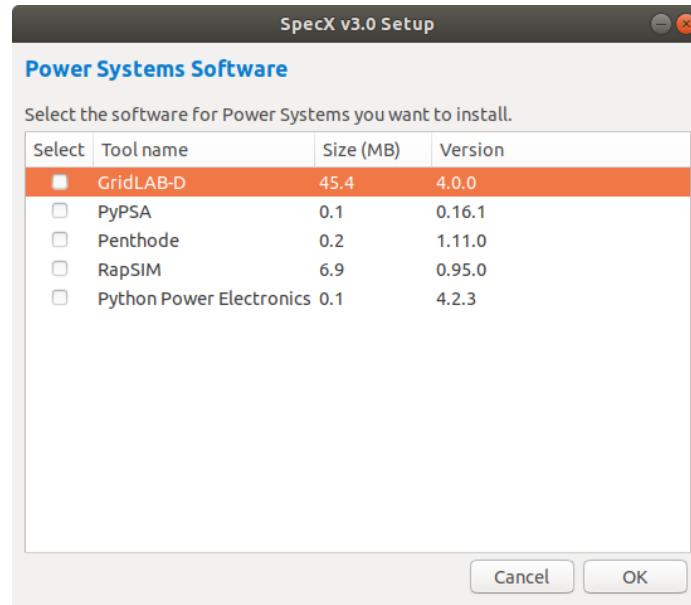


Figure 13: Power Systems tools selection screen

16. Selection screen for Embedded Systems tools is displayed. Select the required tools and Click **Next**.

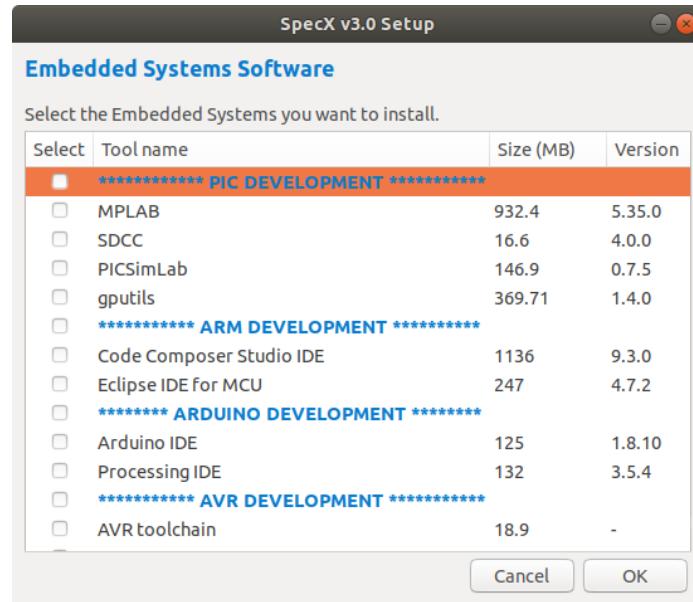


Figure 14: Embedded Systems tools selection screen

17. Selection screen for Networking tools is displayed. Select the required tools and Click **Next**.

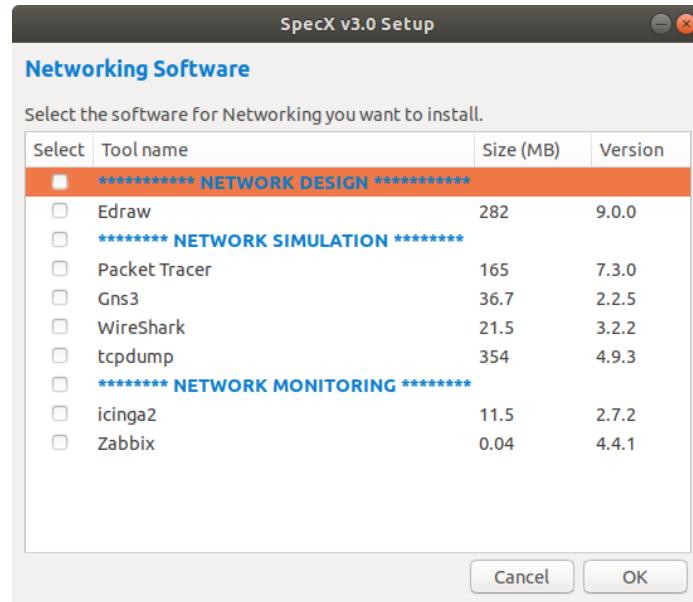


Figure 15: Networking tools selection screen

18. Selection screen for Communication Systems tools is displayed. Select the required tools and Click **Next**.

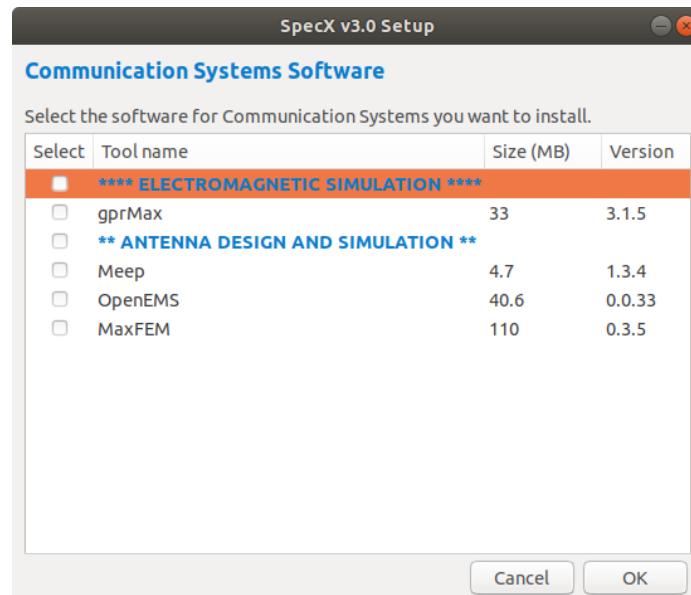


Figure 16: Communication Systems tools selection screen

19. Selection screen for Technical Writing and Presentation tools is displayed. Select the required tools and Click **Next**.

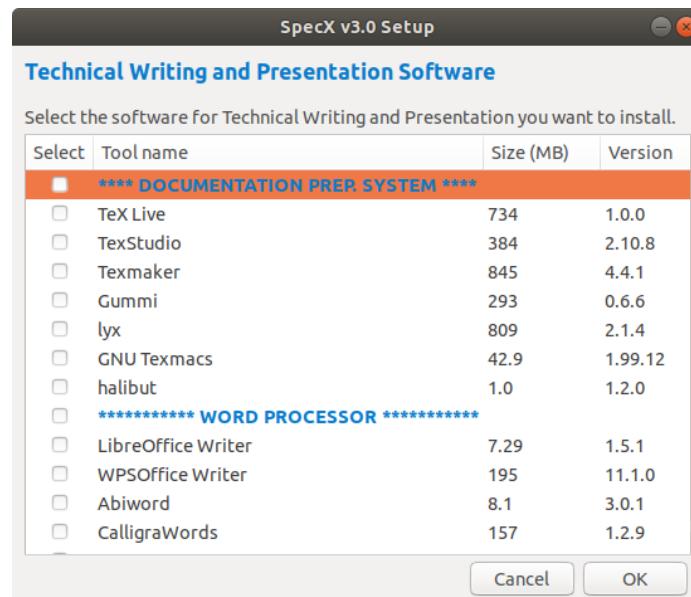


Figure 17: Technical Writing and Presentation tools selection screen

20. Selection screen for Utilities and Plugins tools is displayed. Select the required tools and Click **Next**.

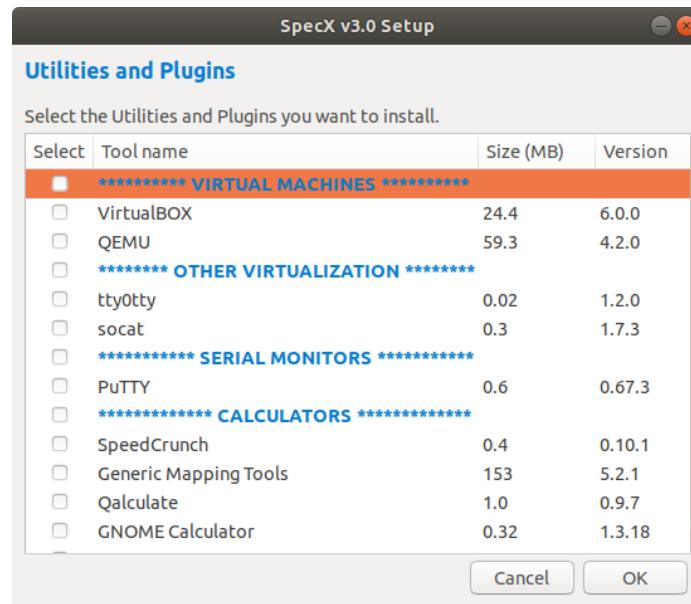


Figure 18: Utilities and Plugins tools selection screen

21. Click **Next** to proceed with the installation.

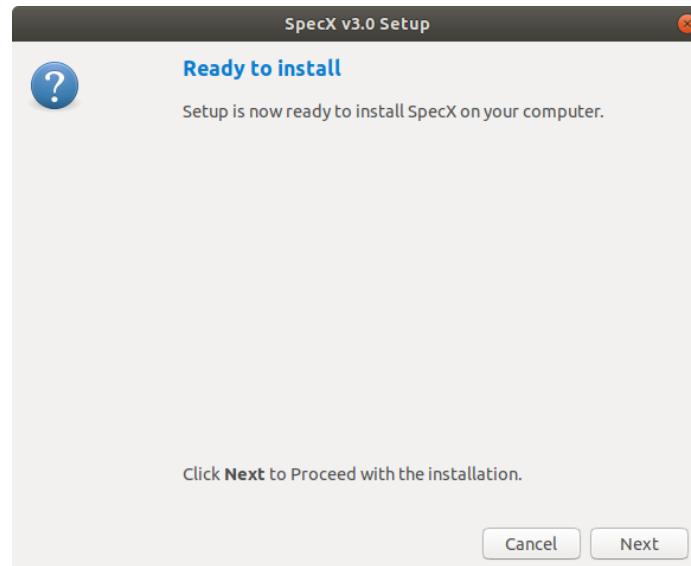


Figure 19: Ready to Install Screen

22. Downloading is in progress.

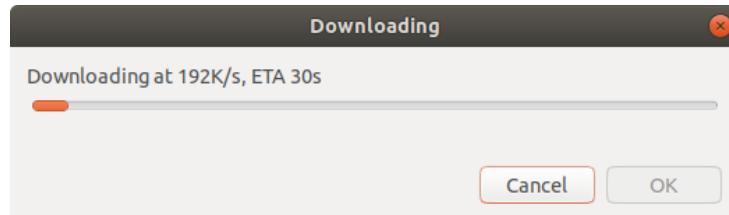


Figure 20: Downloading Screen

23. SpecX will notify you if the software size is more than 200MB and will ask your confirmation.

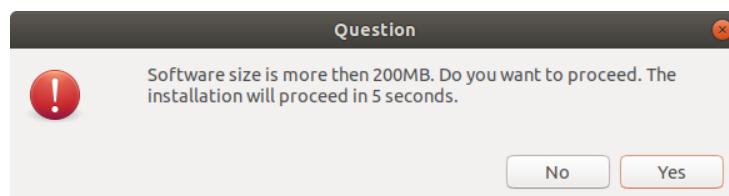


Figure 21: Warning Screen

24. Tool installation will **continue**. Some tools **install** as standalone installation and will be called automatically.

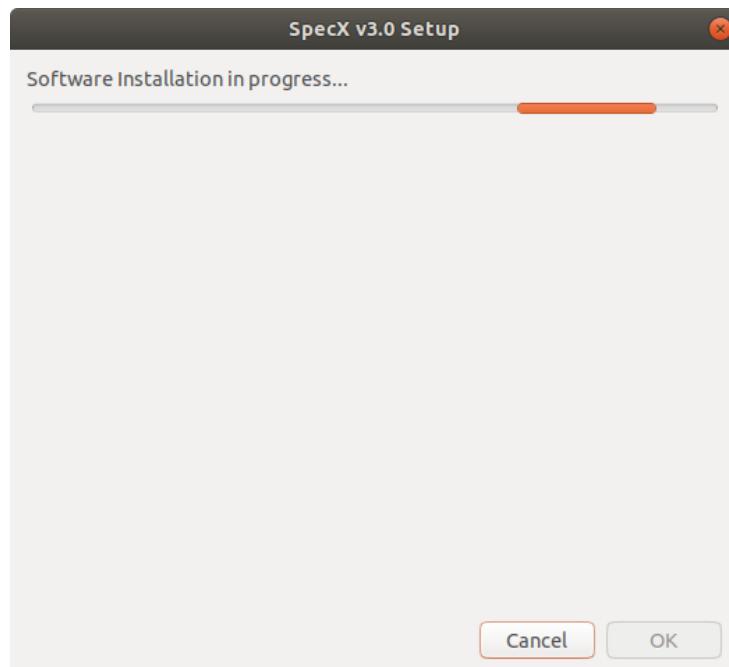


Figure 22: Tools installation progress screen

25. Installation of SpecX is now finished. Click **Finish** to use the tools.

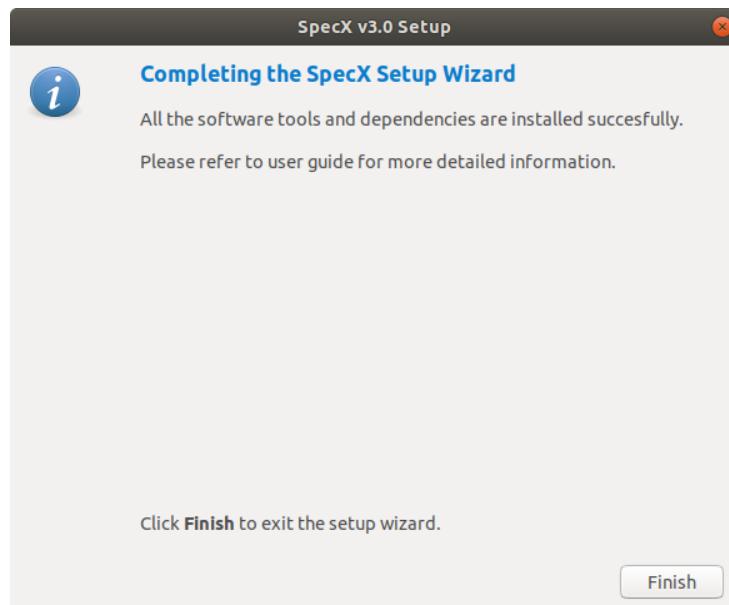


Figure 23: Finishing Installation Screen

Microsoft Windows Support

Installing SpecX software on Microsoft Windows

SpecX is software package for Linux, but Windows users can use SpecX using a Virtual Machine. Follow these steps to initialize a Virtual Machine on your Windows host.

NOTE SpecX support a 64bit Windows host. Microsoft Windows XP and Vista support is discontinued.

1. First you have to **download** the image file of the required OS (Ubuntu) from its website or use the following link:

<http://releases.ubuntu.com/18.04.3/ubuntu-18.04.3-desktop-amd64.iso>

2. **Download** the virtualization software (Oracle VM VirtualBox) from the following link:

<http://download.virtualbox.org/virtualbox/6.0.10/VirtualBox-6.0.10-132072-Win.exe>

3. **Install** this software in Windows OS host.

4. **Start** Virtual Box, and click on the **New** symbol.

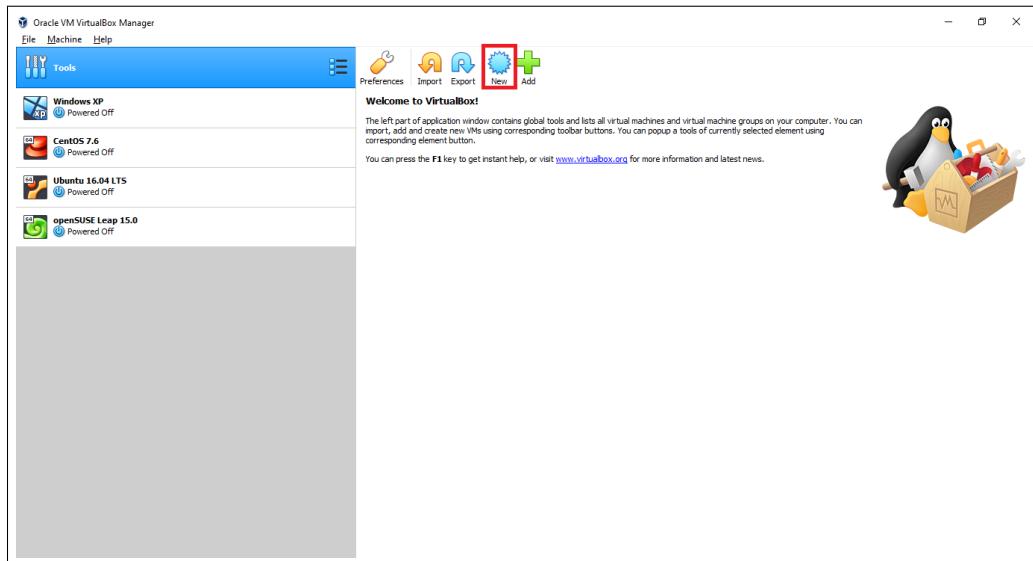


Figure 1: New Virtual OS

5. Give the virtual OS a relevant **Name**. Select the **Type** (Linux) and **Version** (Ubuntu 64-bit) and Click **Next**.

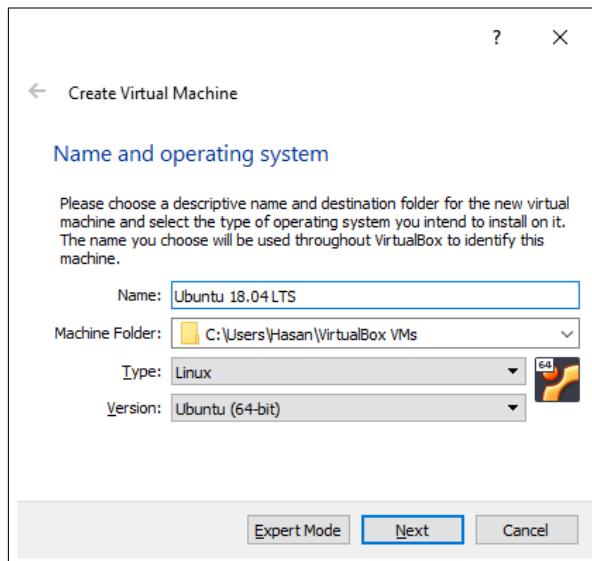


Figure 2: Assigning Name

6. Allocate RAM to the virtual OS. Following system has 8GB of RAM so 2GB of RAM is allocated. You can use more RAM if your system has enough extra RAM.

NOTE Allocate about half of the RAM to the virtual OS. Click Next.

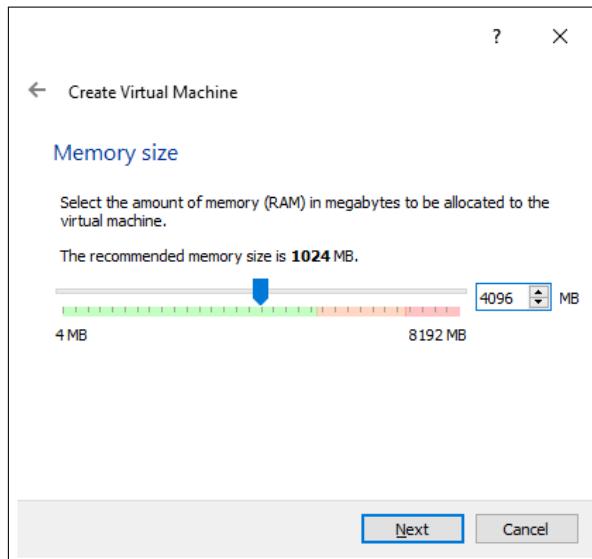


Figure 3: Memory Allocation

7. **Create** a virtual disk. This works as the hard disk of the virtual Linux system. This is where the virtual system will store its files. Click **Create**.

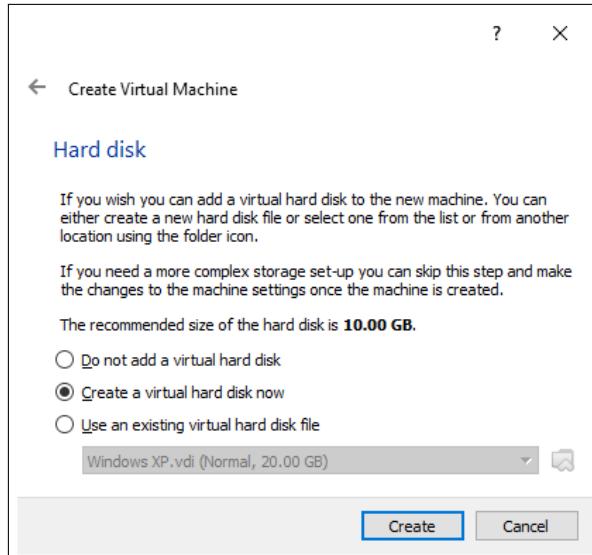


Figure 4: Creating a virtual hard disk

8. Select **VDI file type** here (recommended). Click **Next**.

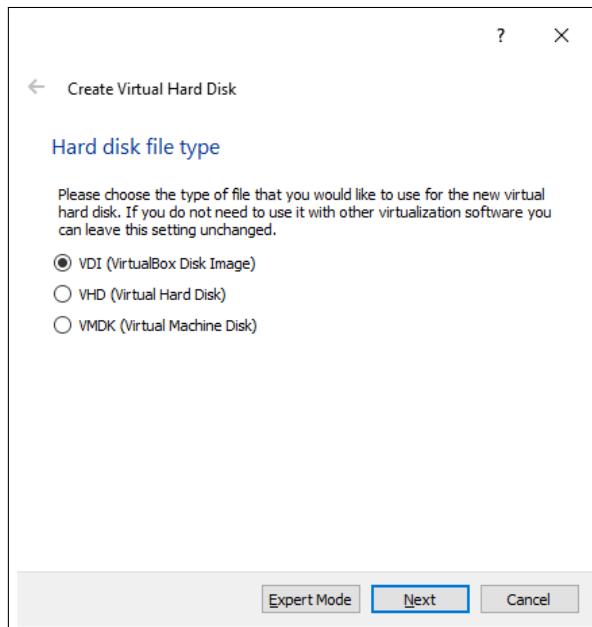


Figure 5: Hard disk file type

9. You can choose either of Dynamically allocated or Fixed size option for creating the virtual hard disk. Choose **Dynamically allocated**. (recommended). Click **Next**.

NOTE *Dynamic allocation is allocated as time passes and data is increased whereas fixed is allocated instantly.*

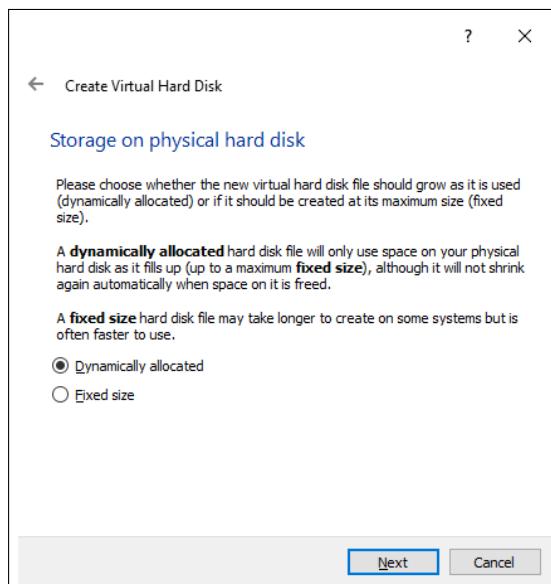


Figure 6: Storage type

10. Select **VDI file type** here (recommended) and Select the **Hard Disk size**. (recommended size: 100 GB). Click **Create**.

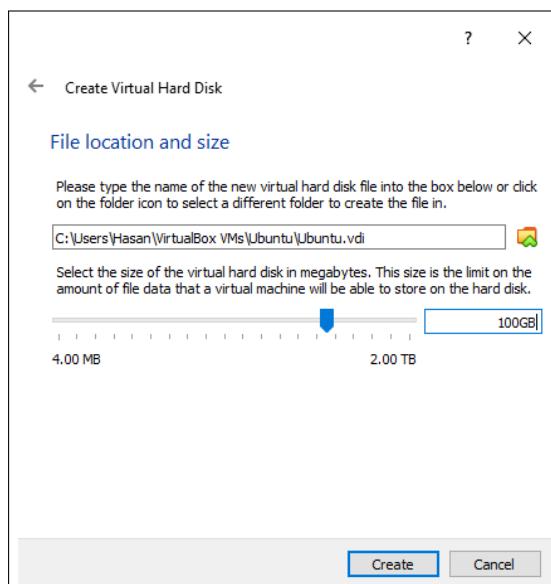


Figure 7: Hard disk size

11. Click **Next**. Now, Select **Settings** to assign the image file of respective OS to VB.

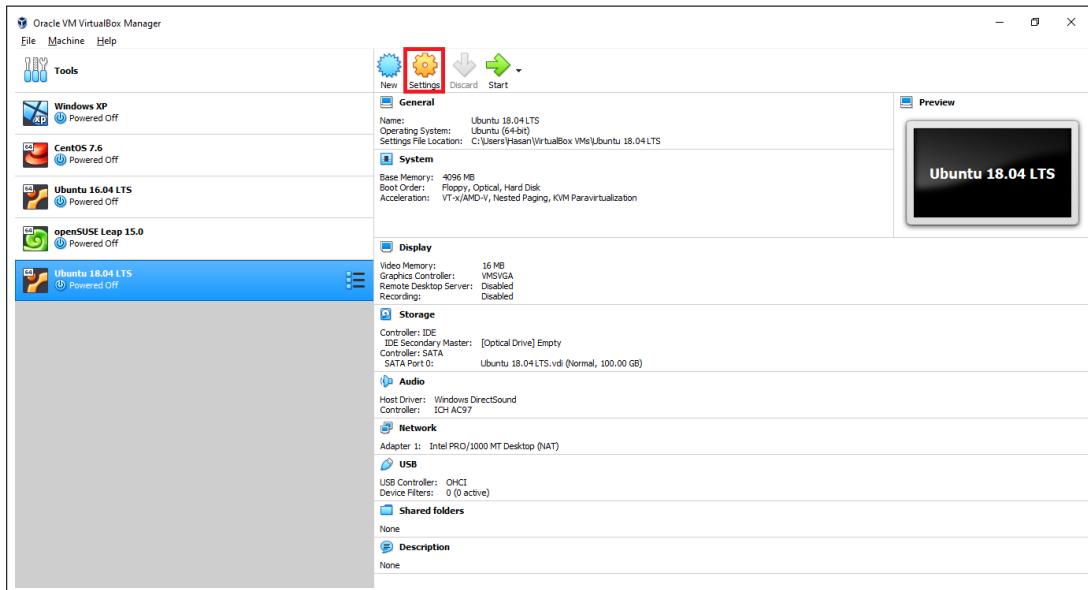


Figure 8: Select Settings

12. Select **General → Advanced**. Now, select the **Shared Clipboard** and Drag'n'Drop option to **Bidirectional**.

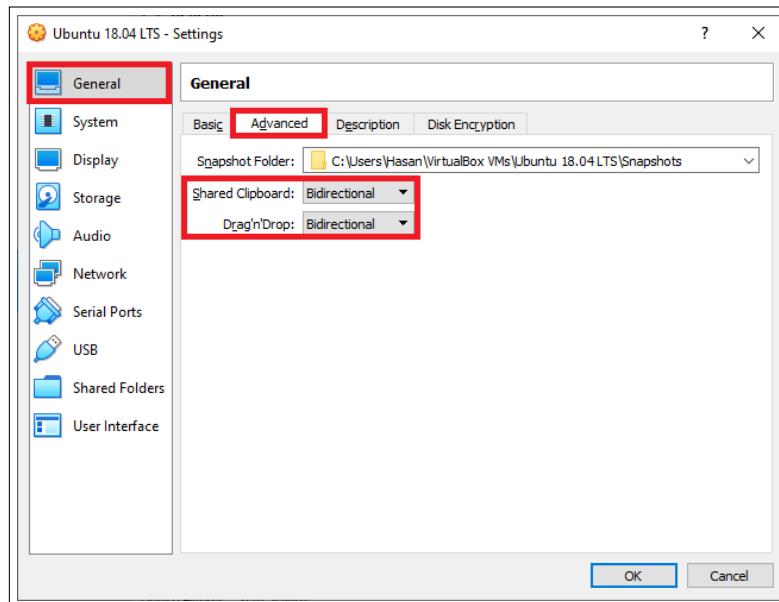


Figure 9: Advanced Settings

13. Select **Settings** to assign the image file of respective OS to VB. Select **Storage → Controller : IDE → Empty**. Now, in the **Attributes** tab, click on **New Disk** and provide the path of downloaded image file of Ubuntu OS. Click **OK**.

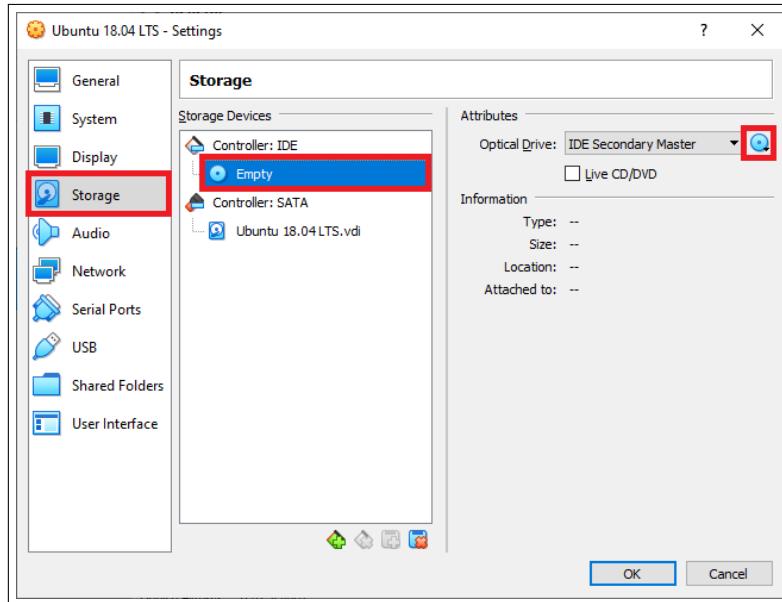


Figure 10: Providing Image file

14. Once everything is in place, it's time to boot that ISO and install Linux as a virtual operating system. Click **Start**.

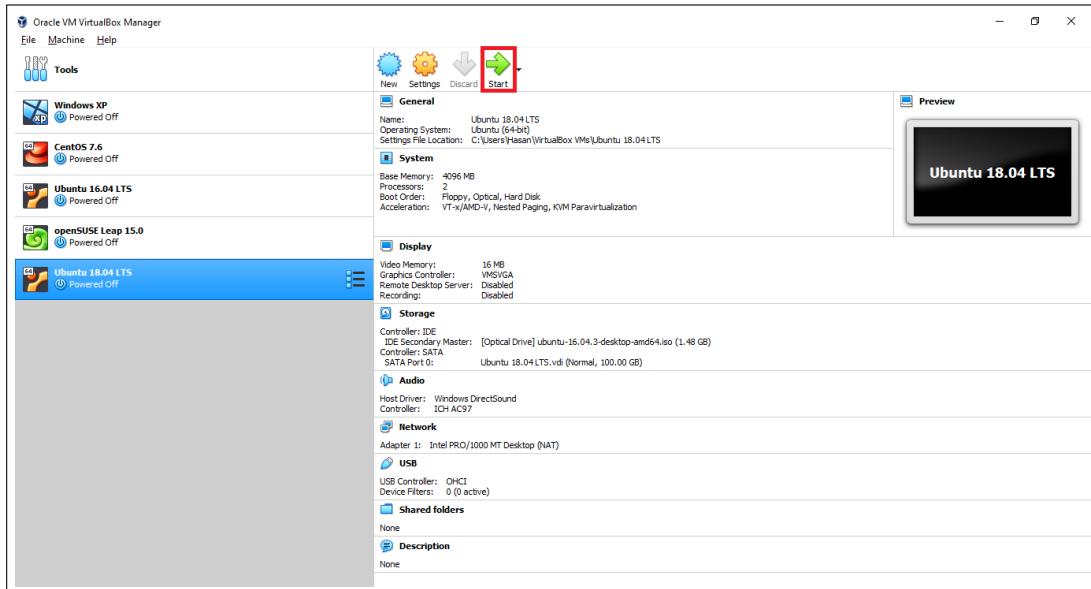


Figure 11: Starting Virtual OS

15. Virtual OS will boot into Linux Installation process. You should be presented with the option to install it. Click **Install Ubuntu**.

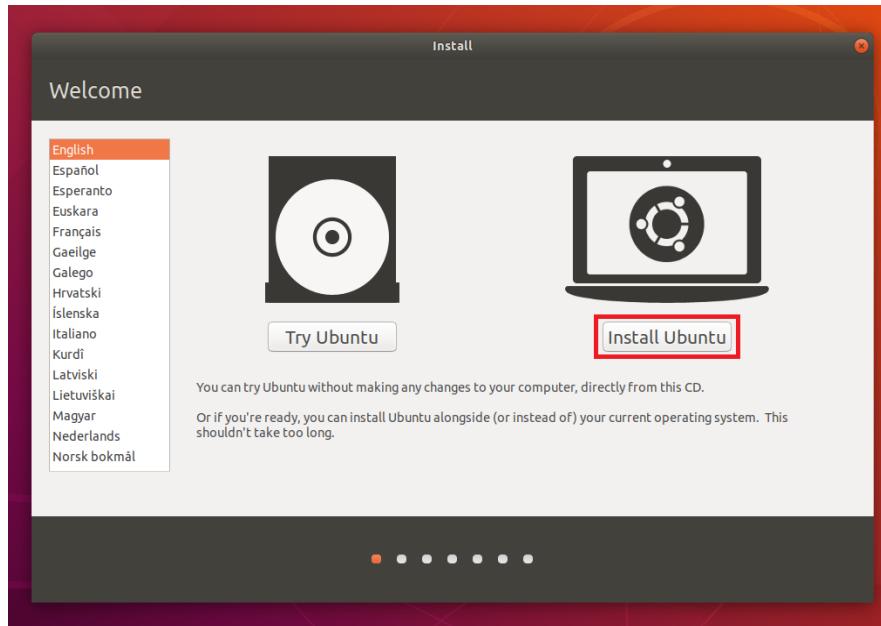


Figure 12: Installing Ubuntu

16. Continue with Normal Installation.

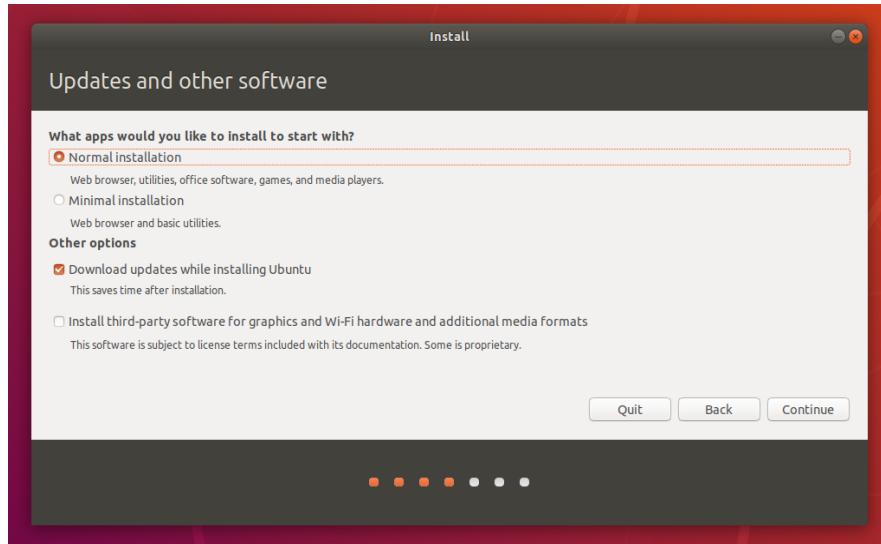


Figure 13: Update Screen

17. In Installation type screen, select **Erase disk** and **Install Now** option.

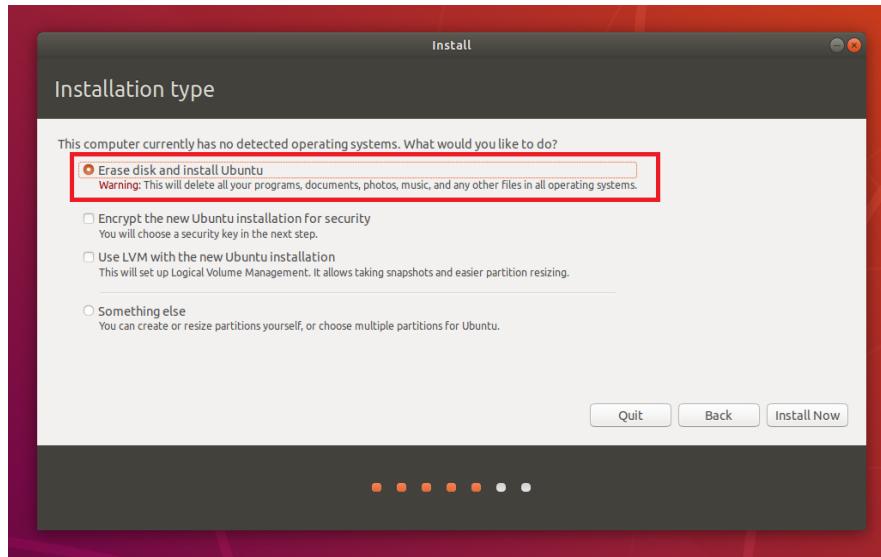


Figure 14: Installation type Screen

18. Select Continue.

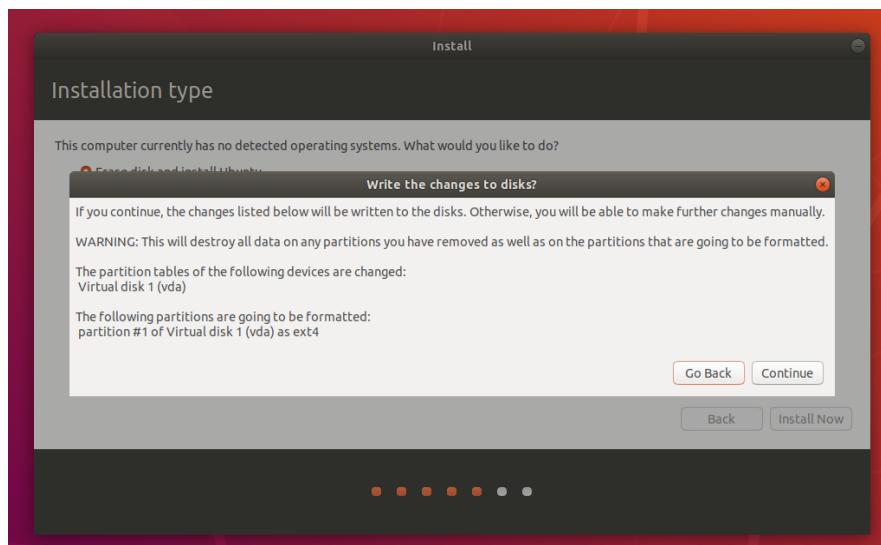


Figure 15: Confirmation Screen

19. Select your **Current Location** and Continue. Select **Continue**.

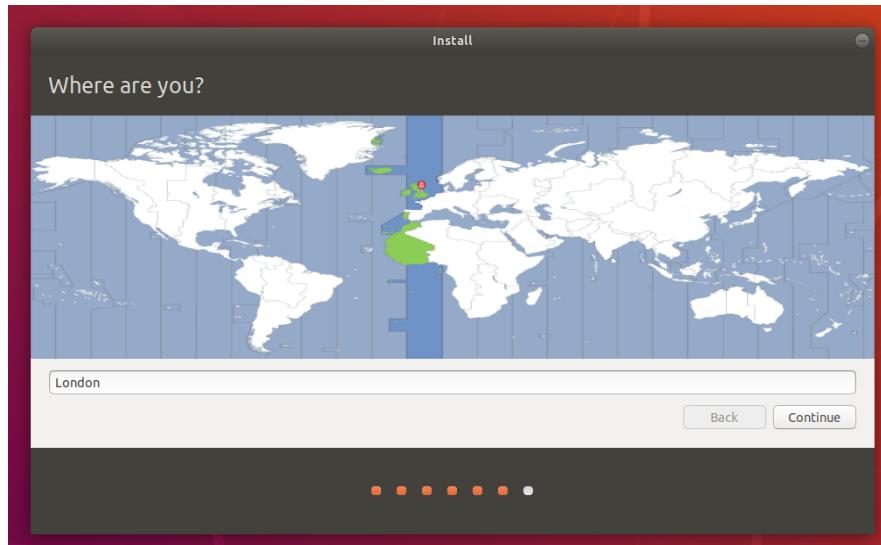


Figure 16: Location selection screen

20. Fill your Info and click **Continue**.

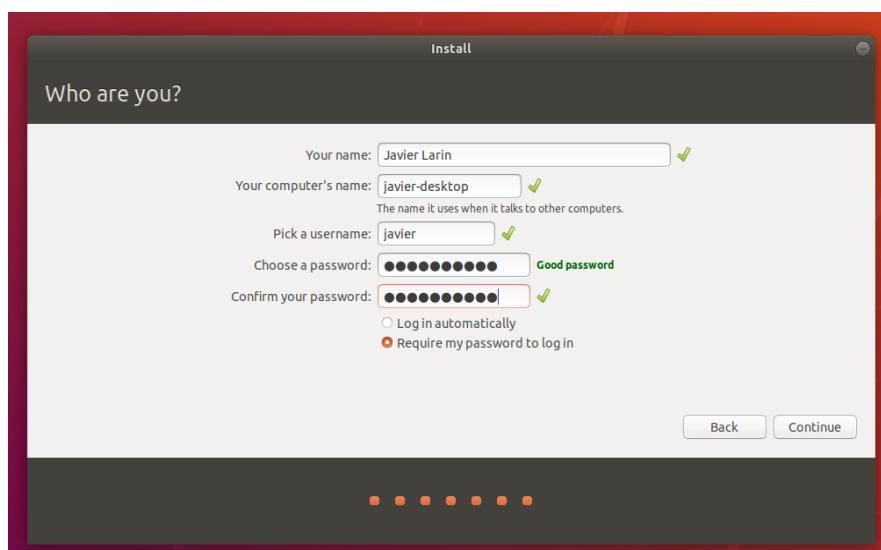


Figure 17: Intro Screen

21. Installation will Continue.

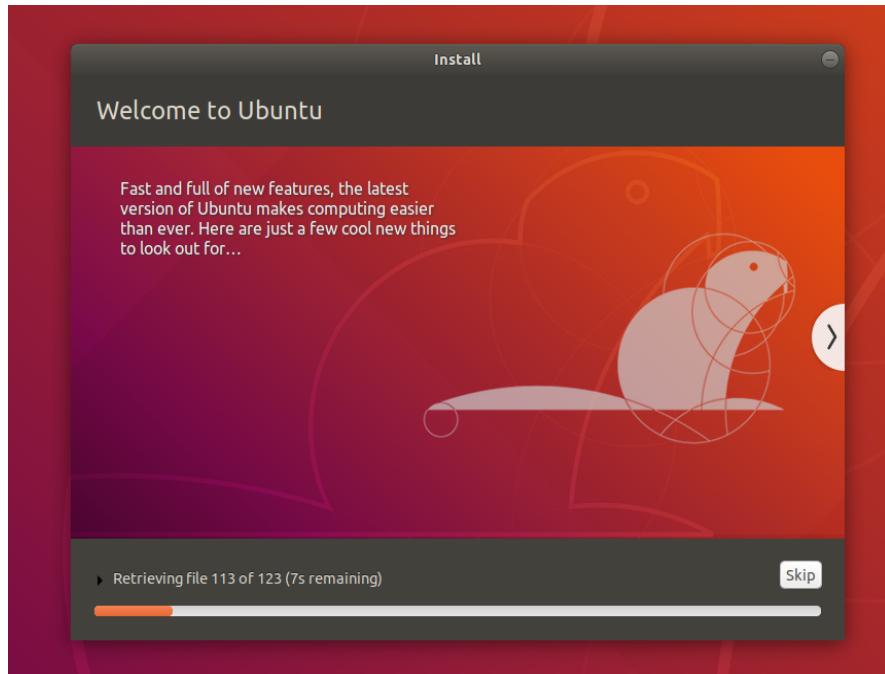


Figure 18: Installation Screen

22. Installation is Complete. Click **Restart Now**.

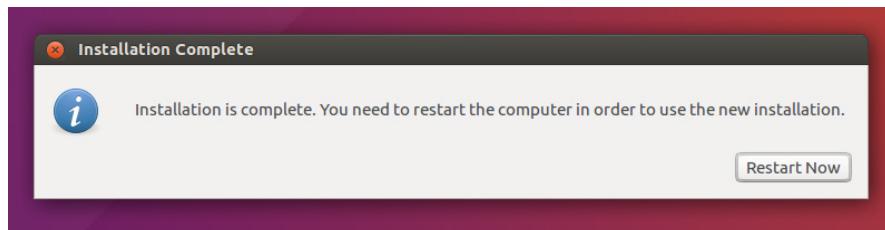


Figure 19: Complete Installation Screen

SpecX can be installed in the Virtual Linux OS normally as described in the previous chapter.

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