D			with Python							compari tec
Required	d common install	lation	modules: PIP and II	DLE	Network forensics: F	equired python libraries and scripts			Socket Types	
IP (Python Packa	ge Installer) \$ sudo ap	pt-get	install python-pip		EDDIE Tool	System and network monitoring, security, and performance	SOCK_STREAM		protocols • Reliable transmission • Pac	ket sequence •
DLE (Integrated D	revelopment		(+-1) (d)-		рурсар	analysis agent for python Small packet capture tool based on python and pcap			on-oriented • Bidirectional protocols • Unreliable transmission • N	o sequence of packets •
IDLE (Integrated Development and Learning Environment) \$ sudo apt-get install idle				Paramiko	Implementation of the SSHv2 protocol, providing both	SOCK_DGRAM	Connectionless(UDP) - Not Bidirectional			
Tor	Python Network	k Pro	ramming Libraries		pip	client and server functionality Package installer for python			Create a socket	
Django			for rapid development and prag	matic	The Python Package Index (PyPI)	Repository of software for the Python	import socket	ocket # Imports the socket method		
pycos (formerly Python framework for asynchronous, concurrent, network, distributed						ython Keywords	socket.socket() # Function that creates socket			ot.
asyncoro) programming and distributed computing					٢	sock = socket. socket (socket family, socket type, protocol=value)				
Diesel A clean API for writing network clients and servers. TCP and UDP supported. Bundles clients for HTTP, DNS, Redis, Riak and MongoDB.				supported.	>>> import keyword >>> print(keyword.kwlist)			Socket Family AF_UNIX or AF_INET		
Pulsar	Pulsar Easy way to build scalable network programs								SOCK_STREAM or SOCK_DGRAM for	
Twisted	Event-based framework for internet applications: HTTP clients and servers,				Python 2.7.15+ [and, 'as, 'assert', 'break, 'class', 'continue', 'def, 'def, 'elif, 'else', 'except', 'exec,' 'finally, 'for', 'from', 'global', 'if, 'import', 'in', 'is', 'lambda', 'not', 'or', 'pass', 'print', 'raise', 'return', 'try', 'while', 'with', 'yield']		Socket Type		 e.g. TCP - UDP2 = socket. socket (socket.AF_INET, socket.SOCK_DGRAM) e.g. UDP - TCP2 = socket. socket (socket.AF_INET, socket.SOCK_STREAM) 	
	NADALM Network Automation and Programmability Abstraction Layer with				Python 3.8.0 ['False', 'Non	e', 'True', 'and', 'as', 'assert', 'async', 'await',	Client socket method		connect()	
NAPALM	Multivendor support - For dealing with dvice vendors					def, 'del', 'elif', 'else', 'except', 'finally', 'for', 'from',	Server socket method		bind() • listen(backlog) • accept()	
gevent			rking library that uses greenlet to of the libev or libuv event loop	provide a	'global', 'if', 'import', 'in', 'is', 'lambda', 'nonlocal', 'not', 'or', 'pass', 'raise', 'return', 'try', 'while', 'with', 'yield']		TCP socket methods		s.recv() # Receive TCP packets	
Celery Asynchronous task queue/job queue b				ge passing	ictim, dy, mile, mai, jielej		UDP socket methods		s.send() #Send TCP packets s.recvfrom() # Receives UDP packets	
					dnspython library			ethods	s.sendto() # Transmits UDP	
	a Types		Math Operators			Installation			More Socket Methods	
Text Numeric	str - x = "Hello World" int, float, complex		Exponent 4 ** 2 = 16		\$ (oip install dnspython	close()		Close the socket connection	
Sequence	list, tuple, range	%	Modulus/Remainder $43 \% 5 = 3$ Integer division $11 \# 5 = 2$		120000000000000000000000000000000000000	Basic DNS query	gethostnam	ie()	Returns a string which includes the I	
Mapping	dict	,	Division 11 / 5 = 2.2		import dns.resolver name = 'google.com'		gethostbynar	me()	Returns a string which includes the I the current PC	costname and IP address (
Set Boolean	set, frozenset bool		Multiplication 3 * 3 = 9		for qtype in 'A', 'AAAA'	, 'MX', 'NS', 'TXT', 'SOA':	listen()		Setup and start TCP listener	
Binary	bytes, bytearray,		Subtraction 8 - 3 = 5		answer = dns.resolver.qu if answer.rrset is not No	ery(name,qtype, raise_on_no_answer=False)	bind()		Attach (host-name, port number) to	the socket
and y	memoryview		Addition 2 + 2 = 4		print(answer.rrset)		accept()		TCP client connection wait	
Socket Me	odule (Berkley		Equal to		Get MX	target and name preference	connect(,	Initiate TCP server connection TCP Socket Methods	
API i	nterface)	1= c	Not equal to		import dns.resolver		murocket and	ont/\	Returns a tuple with the remote addr	are that has consected
	ocket() • ind() • listen() •	,	Less than Greater Than		answers = dns.resolver.g	uery('dnspython.org', 'MX')	mysocket.acc mysocket.bind(a		Attach the specified local address to	
inctions and	accept() • connect() • nnect_ex() • send() • recv()	<0	Less than or Equal to		for rdata in answers:		mysocket.connect(Data sent through the socket assign	
Methods	· close()	>=	Greater than or Equal to		print ('Host', rdata.exc	hange, 'has preference', rdata.preference)	mysocket.getpee		Returns the remote address where the	
	Client-side	socke	t example		Server	-side socket example	mysocket.getsoc		Returns the address of the socket's	
Client-side socket example					import socket		mysocket.sendto(data,			note address
									Force a data packet to a specific ren	
Annual Control					unce 11 a c -t -11		address)		Force a data packet to a specific ren	iote douress
host=socket port=1111 myserver.bis	cket(socket.AF_INET,s .gethostname() nd((host,port)) # rep		SOCK_STREAM) yserver and myclient wit	th	PORT = 52542 # Arbitrary s = socket.socket(socket. s.bind((HOST, PORT)) s.listen(1)	meaning all available interfaces non-privileged port AF_INET, socket.SOCK_STREAM)	setblocking setblocking	(1) (0) Get	Force a data packet to a specific ren Socket Blocking Setup block Remove / un-setup block port number using domain na	
s=socket.socket. port=1111 myserver.bis respective: myserver.li: while True: myclient,ade print("Conne myclient.see	<pre>cket(socket.AF_INET,: gethostname() nd((host,port)) # ref IPs sten(5) dr=myserver.accept() ected to {str(addn)} nd(msg.encode("ascii")</pre>	place i		th	PORT = 52542 # Arbitrary s = socket.socket(socket. s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', ad while 1: data = conn.recv(1024) if not data: break conn.sendall(data)	non-privileged port AF_INET, socket.SOCK_STREAM)	setblocking setblocking import soc	(1) (0) Get ket servbyn	Socket Blocking Setup block Remove / un-setup block	
s=socket.socket. port=1111 myserver.bis respective : myserver.li: while True: myclient,ade print("Conne	<pre>cket(socket.AF_INET,: gethostname() nd((host,port)) # ref IPs sten(5) dr=myserver.accept() ected to {str(addn)} nd(msg.encode("ascii")</pre>	place i		th	PORT = 52542 # Arbitrary s = socket.socket(socket. .bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', ad while 1: data = conn.recv(1024) if not data: break	non-privileged port AF_INET, socket.SOCK_STREAM)	setblocking setblocking import soc socket.get import soc	(1) (0) Get ket servbyn ket _ipv6 #	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer is TRUE or FALSE	me
s=socket.som host=socket port=1111 myserver.bin respective myserver.lin while True: myclient,ade print("Conne myclient.sem myclient.sem myclient.cle	<pre>cket(socket.AF_INET,: gethostname() nd((host,port)) # ref IPs sten(5) dr=myserver.accept() ected to {str(addn)} nd(msg.encode("ascii")</pre>	place i	yserver and myclient wit	th	PORT = 52542 # Arbitrary s = socket.socket(socket. s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', ad while 1: data = conn.recv(1024) if not data: break conn.sendall(data)	non-privileged port AF_INET, socket.SOCK_STREAM) dr)	setblocking setblocking import soc socket.get import soc socket.has	(1) (0) Get ket servbyn ket _ipv6 #	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer 1s TRUE or FALSE addrinfo() - Bind Server to a Po	me
s=socket.som host=socket port=1111 myserver.bin respective myserver.lin while True: myclient,ade print("Conne myclient.sem myclient.sem myclient.cle	cket(socket.AF_INET,; gethostname() nd((host,port)) # rep IPs sten(5) dr=myserver.accept() neted to {str(addr)}' nd(msg.encode("ascii" ose()	place i	yserver and myclient wit		PORT = 52542 # Arbitrary s = socket.socket(socket s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', ad while 1: data = conn.recv(1024) if not data: break conn.sendall(data) conn.close() Network Analysis w	non-privileged port AF_INET, socket.SOCK_STREAM) dr)	setblocking setblocking import soc socket.get import soc socket.has	(1) (0) Get ket servbyn ket jipof # get import get None, 'F	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer is TRUE or FALSE addrinfo() Bind Server to a Poetaddrinfo TP', 8, socket.SOCK_STREAM,	me Drt 9, socket.AI_PASSIVE
s=socket.sochost=socket.sochost=socket.port=1111 myserver.bin respective : myserver.lim while True: myserver.lim while True: myclient.ade print("Commemyclient.see myclient.cle Client-sid	cket(socket.AF_INET, sigethostname() and((host,port)) # rep Ps sten(5) dr=myserver.accept() ccted to {str(addr)} ad(msg.encode("ascii" sse() e socket example Comments er program	place i	yserver and myclient wit		PORT = 52542 # Arbitrary s = socket.socket(socket s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', ad while 1: data = conn.recv(1024) if not data: break conn.sendall(data) conn.close() Network Analysis w stall python-nmap	non-privileged port AF_INET, socket.SOCK_STREAM) dr) ith Python	setblocking setblocking import soc socket.get import soc socket.has	(1) (0) Get ket servbyn ket jipof # get import get None, 'F	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer is TRUE or FALSE addrinfo() - Bind Server to a Potestaddrinfo	me Drt 9, socket.AI_PASSIVE
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s=socket.so- host=socket.so- host=socket. port=1111 myserver.bir respective myserver.li: while True: myclient,ade print("Conne myclient.cle Client-sid # Echo serv # Import so- import sock	cket(socket.AF_INET,s gethostname() and() (host,port)) # rep IPs sten(5) dr=myserver.accept() ected to {str(addr)}'n add(msg.encode("ascii" ose() e socket example Comments er program cket module et	place i	Use NMAP with port scanner	\$ pip in:	PORT = 52542 # Arbitrary s = socket.socket(socket s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', ad while 1: data = conn.recv(1024) if not data: break conn.sendall(data) conn.close() Network Analysis w stall python-nmap	non-privileged port AF_INET, socket.SOCK_STREAM) dr) ith Python	setblocking setblocking import soc socket.get import soc socket.has	(1) (0) Get ket servbyn ket jipof # get import get None, 'F	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer is TRUE or FALSE addrinfo() - Bind Server to a Pretaddrinfo TP', 0, socket.SOCK_STREAM, 0.0', 21)), (10, 1, 6, '',	me Drt 9, socket.AI_PASSIVE
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s-socket.son host-socket.son host-socket. port=1111 myserver.bir respective : myserver.liv hile True: myserver.liv hile True: myserver.liv hile True: myserver.liv hile True: myclient.son myclient.son myclient.son # Echo serv myclient.son myclient.son # Create a s = socket. # Define th connect port=1111 # connect to computer s.connect((# receive d print (s.re # close the s.close() Socket exception socket heror exception	cket(socket.AF_INET, egethostname() and()host,port)) # rep Ps sten(5) dr=myserver.accept() ected to {str(addr)}; admsg.encode("ascii" ose() e socket example Comments er program cket module et socket object socket() e port on which you in right and server cv(1024)) connection Errors / Exceptic A deprecated alias of Of raised when a system for returns a fystedm-resident raised for address-relate raised for address-related	place i ") ")) e with want t	Use NMAP with port scanner import nmap nmScan = nmap.Port nmScan.scaninfo() nmScan.scanif(10.1.0.0') nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0']	\$ pip in: Scanner() 0.0', '25-44 # {'tcp': {)].hostname()].state()].all_protoc]['tcp'].key].has_tcp(25].has_tcp(21	PORT = \$2542 # Arbitrary s = socket.socket(socket. s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', adwhile 1: data = conn.recv(1024) if not data: break conn.sendall(data) conn.close() Network Analysis w stall python-nmap Commands to run NA ('services': '25-80', 'meth) NMAP commands used ('services': '25-80', 'meth) cols() ys() # Results -[80, 25, 22 # Result -True/False 1) # Result False/True Parsing Modie e module makes it easy to write user requires, and arpparse will figure ou	non-privileged port AF_INET, socket.SOCK_STREAM) ith Python MAP scan with python od': 'connect')} , 135] Jles Iriendly command-line interfaces. The program defines what thow to parse those out of sys.argv	setblocking setblocking setblocking import soc socket.get import soc socket.has from socket getaddrinfo([(2, 1, 6, ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	(1) (0) Get ket .servbyn ket _ipv6 # get import g None, 'F' ', ('0.0 '['SW1', d': '100 , 'name' notions t oommands(se = [] ss.appen dnds.appen n command _command _command _command _command _command in vlans t('id') get('name'	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer is TRUE or FALSE addrinfo() - Bind Server to a Pietaddrinfo Try', 0, socket.SOCK_STREAM, 10.0', 21)), (10, 1, 6, '', Script Examples Create list of devices 'SW2', 'SW3'] Create VLAN dictionary list ', 'name': 'staff'}, {'id': 'wireless'}] or collect commands and push vlan, name): (('vlan ' + vlan) d('name' + name) list (socketice, commands): ng to device: ' + device) mands: (command: ' + cmd) Is in multiple switches using p e')	ort 9, socket.AI_PASSIVE ('::', 21, 0, 0))] '200', 'name':
s-socket.son host-socket. port-sill myserver.bir respective i myserver.li while True: myserver.li while True: myserver.li while True: myserver.li while True: myclient.sol # Echo serv myclient.sol # Echo serv myclient.sol # Client-sid # Echo serv # Import so import sock # Create a s = socket. # Define th connect port-sill # connect to computer s.connect((# receive d print (s.re s.close() Socket exception socketheror exception	cket(socket.AF_INET, segethostname() agethostname() ad((host,port)) # ref IPs sten(5) dr=myserver.accept() ected to {str(addr)}; adm(msg.encode("ascii") ose() e socket example Comments er program cket module et socket object socket() e port on which you in 172.18.e.1', port)) ata from the server cv(1024)) connection Errors / Exceptic A deprecated alias of Or raised when a system for trained or address-relate raised for address-relate	place i ") ")) e with want t	Use NMAP with port scanner import nmap nmScan = nmap.Port nmScan.scaninfo() nmScan.scaninfo() nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0'] nmScan['10.1.0.0'] cmScan['10.1.0.0']	\$ pip in: Scanner() 0.0', '25-44 # {'tcp': {)].hostname()].state()].all_protoc]['tcp'].key].has_tcp(25].has_tcp(21	PORT = \$2542 # Arbitrary s = socket.socket(socket. s.bind((HOST, PORT)) s.listen(1) conn, addr = s.accept() print ('Connected by', adwhile 1: data = conn.recv(1024) if not data: break conn.sendall(data) conn.close() Network Analysis w stall python-nmap Commands to run NA ('services': '25-80', 'meth) NMAP commands used ('services': '25-80', 'meth) cols() ys() # Results -[80, 25, 22 # Result -True/False 1) # Result False/True Parsing Modie e module makes it easy to write user requires, and arpparse will figure ou	non-privileged port AF_INET, socket.SOCK_STREAM) ith Python MAP scan with python od': 'connect'}}	setblocking setblocking setblocking import soc socket.get import soc socket.has from socket getaddrinfo([(2, 1, 6, ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	(1) (0) Get ket servbyn ket se	Socket Blocking Setup block Remove / un-setup block port number using domain na ame('domain name') Check support for IPV6 Answer is TRUE or FALSE addrinfo() - Bind Server to a Pretaddrinfo Try', 0, socket.SOCK_STREAM, .0.0', 21)), (10, 1, 6, '', Script Examples Create list of devices 'SW2', 'SW3'] Create VLAN dictionary list ', 'name': 'staff'}, {'id': 'wireless')] to collect commands and push valan, name): ('vlan ' + vlan) dd('name ' + name) ls s(device, commands): ng to device: ' + device) mands: ng to device: ' + device) mands: s(device, command: ' + cmd) ls in multiple switches using p c: e') N: ' + id) nds(id, name)	ort 9, socket.AI_PASSIVE ('::', 21, 0, 0))] '200', 'name':
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