

```
In [43]: ipv4Addrs = generateIPv4Addresses(100)
ipv6Addrs = generateIPv6Addresses(100)
MACv4 = generateMACaddresses(100, padding = True)
MACv6 = generateMACaddresses(100, eui48 = False, padding = True)
timeStamps = [str(100*x + time.time()) for x in range(100)]
```

```
In [44]: bindings = list(zip(ipv4Addrs, ipv6Addrs, MACv4, MACv6, timeStamps))
print(len(bindings))
```

```
100
```

```
In [45]: routerMAC_db = {}
def router2MACBinding(router, ipv4 = None, ipv6 = None, MACv4 = None, MACv6 = None, timestamp = str(timestamp())):
    if router not in routerMAC_db.keys():
        routerMAC_db[router] = list(filter(lambda x: x != None, [ipv4, ipv6, MACv4, MACv6, timestamp]))
    else:
        routerMAC_db[router].append(list(filter(lambda x: x != None, [ipv4, ipv6, MACv4, MACv6, timestamp])))
```

```
In [46]: keyId = 0
for event in bindings:
    router2MACBinding(keyId, event[0], event[1], event[2], event[3], event[4])
    keyId += 1
```

```
In [47]: print(routerMAC_db.items())
```

```
dict_items([(0, ['24.253.186.222', '8b:e1:a5:698:d480:503:a000:b9', '84:ba:e5:74:24:4c:27:60:2c:1c:7f:61', 'e4:37:ae:18:9c:0e:15:e1:68:18:26:1d:28:a6:85:e3', '1616265894.7086337']), (1, ['19.0.0.7', '5:5a7:5:08:16cc:d68:71:0f2e', '53:60:26:70:f6:58:3e:d2:7a:a3:48:dd', 'a9:ec:ec:0d:27:f3:d3:43:6c:4e:43:f7:24:9c:bf:dc', '1616265994.7086337']), (2, ['21.204.1.0', '0024:d6:5a07:4:8:3:d:13c', '42:27:71:c:b2:26:d2:4c:74:73:bd:e9:0d', '24:4b:b2:c2:48:74:id:cfc:3c:01:c8:fe:64:15:98:13', '1616266094.7086337']), (3, ['253.1.2.23', '8eea:9:c4:5e:1:b4:b51:b95b', '62:aa:af:a9:76:18:68:1d:15:2f:21:ce', '86:44:65:c7:da:66:0:b29:e0:02:0b:6c:47:06:53:d8', '1616266194.7086337']), (4, ['1.16.193.1', 'af34:99bd:8d0:2:c71:9e:6:653:2:f5:a', '4c:ee:0b:be:31:21:60:2a:ac:ea:79:9a', 'c4:af:79:64:22:f4:ab:45:23:5d:45:a1:b4:f4:d6:35', '1616266294.7086337']), (5, ['0.1.20.0', '3c8:8:cf:9:0f:7:9:9:926', 'd1:66:9c:82:04:99:7a:5b:45:c1:2c:44', '72:42:e9:e6:84:a6:5a:a3:3d:e6:5c:a9:a5:d4:bf:5a', '1616266394.7086337']), (6, ['1.59:4.8', 'e:9:74:f:642:3d:76:8', '52:86:ff:0:a:56:1c:67:01:55:3c:b7:8b', '23:dc:f6:59:95:c3:3c:89:51:f:d:52:56:40:68:21:da', '1616266494.7086337']), (7, ['65.0.1.198', '53:a7:882:c916:3:38:a4:1:8d0e', '7f:d9:e9:14:05:30:a6:7d:40:fa:9d:68', 'b0:ac:63:79:84:c1:1a:31:a0:5d:57:85:ef:c7:b9:6c', '1616266594.7086337']), (8, ['25.237.2.2', '6c:cb:8:b2b1:1:2c:50d0:5df:5374', 'e0:0c:a7:38:d8:9d:4:c:db:fa:14:a1:6a:', 'a5:15:09:6d:f6:df:51:77:ad:f1:9d:49:87:f9:d9:ef', '1616266694.7086337']), (9, ['8.1.137.1', '424:831:d:6:f:763:22f:2:3:5', '2c:60:f8:d7:ce:fa:50:78:f5:5c:3f:6c', '40:90:c5:da:23:f5:5a:e6:d9:45:6a:77:16:08:13:65', '1616266794.7086337']), (10, ['7.23.18.152', 'a1:2:c:90e2:70:03fb:5:2141', '11:32:d8:d0:28:25:af:4b:c9:22:23:00', 'be:55:3e:6a:ae:74:d6:bc:37:ef:0:a:7f:aa:88:82:cd', '1616266894.7086337']), (11, ['50.17.0.0', 'e5:b:6886:98d:8c:03:ee:d72', 'c4:e7:6d:12:fa:f1:22:f1:ff:7d:ba:37', 'cd:1c:79:e2:a5:9d:da:70:81:1d:9d:e2:a4:58:82:2a', '1616266694.7086337']), (12, ['2.134.240.2', 'b:47:a:17:b4:01:f1:3:70:9:1b8e', '7d:5:a:50:e5:34:4d:1f:aa:2:a:b5:18:f6', '89:a:8:ba:03:1b:fa:48:a7:59:d4:74:ef:ff:28:f3:c5', '1616267094.7086337]), (13, ['19.128.224.32', 'f480:f:54:78b:72ec:a3:a260:d8f', '9d:da:56:61:14:f4:21:5d:c5:07:ff:f5', '43:3:ac:cb:e3:5e:0:c:be:92:46:7d:ed:59:69:cf:a5:2e', '1616267194.7086337]), (14, ['2.4.251.240', 'a71:75cf:883:52:a0:8a:694:50b8:45', '1b:89:18:94:e3:9d:e1:a9:7:f5:e2:71', 'ca:0f:48:bb:1:bb:6a:de:33:29:f6:8e:84:96:d9:73', '1616267294.7086337]), (15, ['144.18.0.25', '705e:5b:d29:032:e:c94:2acc:90:0f', 'e3:c5:e3:1b:49:3c:8:a:d3:ad:45:7f:ac', 'be:c2:88:32:e4:63:11:dd:af:c1:d6:3b:8a:07:45:dc', '1616267394.7086337]), (16, ['0.0.24.2', 'd:8d:82:e5:2:726:cd6:bf7a:60', '29:2d:2c:a8:f7:8d:c2:58:45:cd:a1:05', 'c4:fb:25:2c:e1:b9:98:8a:0:d:0:a:20:0:c:a7:06:6b', '1616267494.7086337]), (17, ['10.2.0.1', '6:59:3b1:e:1:884:a:10:7387', '33:bc:17:fc:05:4c:d5:fd:45:6:e9:98', '58:1e:1:c:28:07:5e:47:ce:a1:58:72:d2:32:88:ea:1b', '1616267594.7086337]), (18, ['46.1.24.62', 'b:d7:c:7c:b7e0:59:b7e30:75:a', '7c:ea:38:0d:f9:ef:b6:fe:a8:34:35:e1', '6f:9c:59:31:28:f1:27:64:8e:9a:8:a:f5:8e:ec:35:1d', '1616267694.7086337]), (19, ['76.2.2.1', 'f4ef:0d:7:0:a:c:d7:c:2bd1:9b64', 'db:40:1f:40:d4:03:50:d2:c4:c7:1a:7f', '66:30:14:87:9c:75:f2:18:a2:5d:b5:ad:10:24:24:27', '1616267794.7086337]), (20, ['12.143.2.67', 'd4eb:f5:29:bb:88c3:c57a:85:7', '4d:6:f:dc:8:c3:aa:8:b3:87:e6:77:c3', 'ae:ea:74:7:b:d3:9e:28:f6:36:85:b8:4a:69:11:20', '1616267894.7086337]), (21, ['0.23.12.0', 'bad:9:8:8:51:53:f:6aa:dc3', '0b:c3:f9:04:e5:92:27:db:65:d3:70:0d', 'fc:fb:ab:6:f2:5a:31:58:9c:ff:8d:51:d9:f9:c0:e4:', '1616267994.7086337]), (22, ['2.0.1.1.76', '45dd:db:a:cb:5e85:e2:ac9:9fd', '1b:80:b7:21:77:72:f:e3:74:74:c5c', '51:72:b6:08:b8:17:83:a9:ff:b9:24:ab:79:73:54:b4', '1616268094.7086337]), (23, ['9.69.233.0', '01:9c:d89:d04:c:6:0:2:9693', '20:0:f:31:5:e:6b:7c:f6:e8:9a:63:4b:dc', 'af:67:98:27:c9:de:e1:f4:a9:b3:64:65:4b:d6:22:e3', 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['0.2.2.1.61', 'd38:7:5:a64c:e:7:54:51', 'fa:9a:8:52:8:f:49:7:b:92:50:51:f:5:d:a5', '99:3d:b1:95:68:c:d:e9:31:b2:e2:9:a:bd:75:90:82:cd', '1616270094.7086337]), (43, ['0.0.18.170', 'f:29:f85:6:f:6:8:c1:93:f:b', 'b8:ca:1:a:e6:06:f2:c7:8:b:ea:49:a:3:71', '7d:fb:be:bc:01:2:d:dc:6:c:e3:8:b:61:e7:aa:f8:06:10', '1616270194.7086337]), (44, ['17.163.0.2', '86:f6:f:9:51:6:c:e9:7:e47', '1a:24:b1:39:61:47:24:97:45:ab:8:a:d', '9:f6:e:d0:8:a:fe:f6:22:fc:bd:4:a:01:21:62:05:5:c:63', '1616270294.7086337]), (45, ['1.2.101.0', '24:8:f3d:5:d2:05:48:99:40:b5', '73:7d:fd:a5:65:8e:f6:bb:39:ce:4b:c2:b1:5e:c9:4a', '1616268294.7086337]), (46, ['22.1.217.23', '1616270294.7086337]), (47, ['2.15.15.3.126', '3:cf:3d7:a:8ab:7:e66:c:b4:a:123d', '58:cf:30:dc:7d:df:6:b:70:bb:e8:12:07', '50:ff:d3:ab:06:b:d9:95:e:8:c51:50:5:e4', '1616270594.7086337]), (48, ['141.226.2.25', 'c:7:8d:24:87:c729:e:f:386:8cb', 'c6:e6:47:f:63:a:6:0d:1d:32:b8:7e:de', 'e:39:2:f0:21:54:0:b:0:75:7e:f9:57:30:99:2:f5:5:a:c:e1:d1', 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