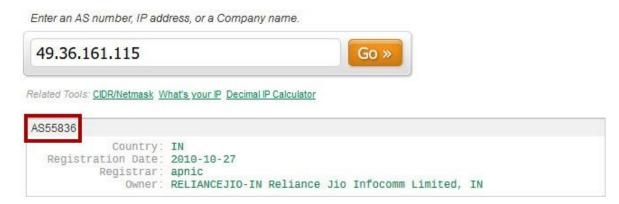
CN Assignment 5

Navneet Agarwal 2018348

Q1.

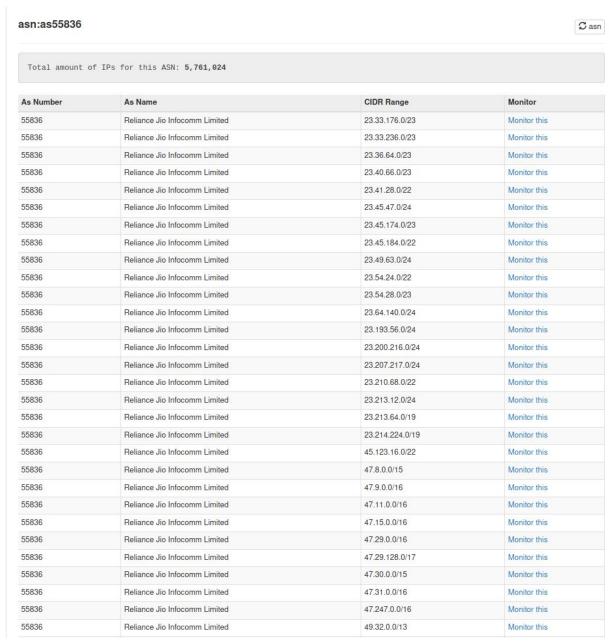
(a) My ASN Number is AS55836



(b) The owner of my AS is: RELIANCEJIO-IN Reliance Jio Infocomm Limited, IN

Enter an AS number, IP address, or a Company name. 49.36.161.115 Go » Related Tools: CIDR/Netmask What's your IP Decimal IP Calculator AS55836 Country: IN Registration Date: 2010-10-27 Owner: RELIANCEJIO-IN Reliance Jio Infocomm Limited, IN organisation: ORG-RJIL1-AP org-name: Reliance Jio Infocomm Limited country: IN
address: Reliance Coporate IT park LTD
address: Ghansoli NaviMumbai
+912279670000 fax-no: +912279610099 fax-no: e-mail: ip.management@ril.com mnt-ref: APNIC-HM mnt-by: APNIC-HM last-modified: 2017-11-15T12:56:20Z APNIC source:

(c) Some of the Range of IPV4 address space in my AS are shown below:



Rest can be found here:

https://mxtoolbox.com/SuperTool.aspx?action=asn%3aAS55836&run=toolpage

(i) ASN number for IIITD (https://www.iiitd.ac.in/) is AS55824

Whois Reco	ord for liltd.ac.in
Domain Profile	
Registrant	REDACTED FOR PRIVACY
Registrant Org	IIIT Delhi
Registrant Country	in
Registrar	ERNET India
	IANA ID: 800068
	URL: http://www.ernet.in
	Whois Server: —
Registrar Status	ok
Dates	4,505 days old
	Created on 2008-08-01
	Expires on 2029-08-01
	Updated on 2020-08-02
Name Servers	
Tech Contact	REDACTED FOR PRIVACY
	REDACTED FOR PRIVACY,
	REDACTED FOR PRIVACY, REDACTED FOR PRIVACY, REDACTED FOR PRIVACY, REDACTED
	FOR PRIVACY
	(p) × (f) ×
IP Address	103.25.231.301 other site is hosted on this server
IP Location	- Uttar Pradesh - Noida - Indraprastha Institute Of Information Technology Delhi
ASN	ASS5824 NKN-CORE-NW NKN Core Network, IN (registered Oct 19, 2010)

(ii) ASN number for IITB (http://www.iitb.ac.in/) is AS132423

Whois Record for IITB.ac.in

Registrant	REDACTED FOR PRIVACY
Registrant Org	Indian Institute Of Technology, Bombay
Registrant Country	In
Registrar	ERNET India
	IANA ID: 800068
	URL: http://www.ernet.in
	Whois Server: —
Registrar Status	ok
Dates	6,122 days old
	Created on 2004-02-27
	Expires on 2024-02-27
	Updated on 2017-04-25
Name Servers	
Tech Contact	REDACTED FOR PRIVACY
	REDACTED FOR PRIVACY,
	REDACTED FOR PRIVACY, REDACTED FOR PRIVACY, REDACTED FOR PRIVACY, REDACTED
	FOR PRIVACY
	(p) × (f) ×
IP Address	103.21.127.1141 other site is hosted on this server
IP Location	- Maharashtra - Mumbal - Powal
ASN	AS132423 IITB-IN Powal, IN (registered Sep 24, 2012)

(iii) ASN number for Google (https://www.google.com/)) is AS15169

Whois Record for Google.com

Registrant Org	Google LLC	
Registrant Country	us	
Registrar	MarkMonitor, Inc. MarkMonitor Inc.	
	IANA ID: 292	
	URL: http://www.markmonitor.com	
	Whols Server: whols.markmonitor.com	
	abusecomplaints@markmonitor.com	
	(p) 12083895770	
Registrar Status	clientDeleteProhibited, clientTransferProhibited, clientUpdateProhibited,	
	server Delete Prohibited, server Transfer Prohibited, server Update Prohibited	
Dates	8,478 days old	*
	Created on 1997-09-15	
	Expires on 2028-09-13	
	Updated on 2019-09-09	
Name Servers	NS1.GOOGLE.COM (has 14,474 domains)	-
	NS2.GOOGLE.COM (has 14,474 domains)	
	NS3.GOOGLE.COM (has 14,474 domains)	
	NS4.GOOGLE.COM (has 14,474 domains)	
Tech Contact		
IP Address	172.217.3.196 - 80 other sites hosted on this server	~
IP Location	■ - California - Mountain View - Google Lic	
ASN	AS15169 GOOGLE, US (registered Mar 30, 2000)	

(iv) ASN number for Facebook (https://www.facebook.com/) is AS32934

Domain Profile		
Registrant	REDACTED FOR PRIVACY (DT)	
Registrant Org	Facebook, Inc.	
Registrant Country	us	
Registrar	RegistrarSafe, LLC	
	IANA ID: 3237	
	URL: https://www.registrarsafe.com,http://www.registrarsafe.com	
	Whols Server: whols.registrarsafe.com	
	abusecomplaints@registrarsafe.com	
	(p) 16503087004	
Registrar Status	clientDeleteProhibited, clientTransferProhibited, clientUpdateProhibited,	
	server Delete Prohibited, server Transfer Prohibited, server Update Prohibited	
Dates	8,649 days old	
	Created on 1997-03-28	
	Expires on 2028-03-29	
	Updated on 2020-03-10	
Name Servers	A.NS.FACEBOOK.COM (has 11,504 domains)	
	B.NS.FACEBOOK.COM (has 11,504 domains)	
	C.NS.FACEBOOK.COM (has 11,504 domains)	
	D.NS.FACEBOOK.COM (has 11,504 domains)	
Tech Contact	REDACTED FOR PRIVACY (DT)	
	Facebook, Inc.	
	1601 Willow Rd,	
	Menlo Park, CA, 94025, us	
	(p) REDACTED FOR PRIVACY (DT) (f) REDACTED FOR PRIVACY (DT)	
IP Address	157.240.3.35 - 293 other sites hosted on this server	-
IP Location	Mashington - Seattle - Facebook Inc.	
ASN	AS32934 FACEBOOK, US (registered Aug 24, 2004)	

(a)

```
7251 210.289259
                      HonHaiPr_a3:0c:8d Broadcast
                                                                   ARP
                                                                              42 Who has 192.168.29.1? Tell 192.168.29.87
   7252 210.290363
                       Sercomm 1c:40
                                      HonHairi_as.oc.ed
                                             HonHaiPr_a3:0c:8d
                                                                              42 192.168.29.1 is at 58:95:d8:20:1c:40
   7252 210.290505 Ser Comm_10.40
                                                                              42 Uha has 102 169 20 97) Tall 102 169 20
                                                                  ADD
  6584 197.245010 HonHaiPr a3:0c:8d Sercomm 1c:40 ARP 42 192.168.29.87 is at 28:56:5a:a3:0c:8d
   7251 210.289259 HonHaiPr_a3:0c:8d Broadcast
                                                                            42 Who has 192.168.29.1? Tell 192.168.29.87
   7252 210.290363 Sercomm_1c:40 HonHaiPr_a3:0c:8d ARP 42 192.168.29.1 is at 58:95:d8:20:1c:40 8166 228.858959 Sercomm_1c:40 HonHaiPr_a3:0c:8d ARP 42 Who has 192.168.29.87? Tell 192.168.29.87
                                                                           42 Who has 192.168.29.87? Tell 192.168.29.1
   8167 228.858972 HonHaiPr_a3:0c:8d Sercomm_1c:40 ARP 9019 261.049197 Sercomm_1c:40 HonHaiPr_a3:0c:8d ARP
                                                                           42 192.168.29.87 is at 28:56:5a:a3:0c:8d
                                                                           42 Who has 192.168.29.87? Tell 192.168.29.1
   9020 261.049208 HonHaiPr_a3:0c:8d Sercomm_1c:40 ARP 42 192.168.29.87 is at 28:56:5a:a3:0c:8d
> Frame 7251: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF_{70BEF31C-0CFF-4306-86C9-
Ethernet II, Src: HonHaiPr_a3:0c:8d (28:56:5a:a3:0c:8d), Dst: Broadcast (ff:ff:ff:ff:ff:ff)

✓ Address Resolution Protocol (request)

     Hardware type: Ethernet (1)
     Protocol type: IPv4 (0x0800)
     Hardware size: 6
    Protocol size: 4
     Opcode: request (1)
     Sender MAC address: HonHaiPr a3:0c:8d (28:56:5a:a3:0c:8d)
     Sender IP address: 192.168.29.87
    Target MAC address: 00:00:00_00:00:00 (00:00:00:00:00:00)
     Target IP address: 192.168.29.1
```

7252 210.290363	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42 192.168.29.1 is at 58:95:d8:20:1c:40
8166 228.858959	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42 Who has 192.168.29.87? Tell 192.168.29.1
8167 228.858972	HonHaiPr_a3:0c:8d	Sercomm_1c:40	ARP	42 192.168.29.87 is at 28:56:5a:a3:0c:8d
9019 261.049197	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42 Who has 192.168.29.87? Tell 192.168.29.1
9020 261.049208	HonHaiPr a3:0c:8d	Sercomm 1c:40	ARP	42 192.168.29.87 is at 28:56:5a:a3:0c:8d
				on interface \Device\NPF_{70BEF31C-0CFF-4306-86C9} :0c:8d (28:56:5a:a3:0c:8d)
> Ethernet II, Src:	Sercomm_1c:40 (58:95:	d8:20:1c:40), Dst: Ho	nHaiPr_a3	:0c:8d (28:56:5a:a3:0c:8d)
Address Resolution	Protocol (reply)			
Hardware type:	Ethernet (1)			
Protocol type:	IPv4 (0x0800)			
Handanan alam				

```
Hardware type: Ethernet (1)
Protocol type: IPv4 (0x0800)
Hardware size: 6
Protocol size: 4
Opcode: reply (2)
Sender MAC address: Sercomm_1c:40 (58:95:d8:20:1c:40)
Sender IP address: 192.168.29.1
Target MAC address: HonHaiPr_a3:0c:8d (28:56:5a:a3:0c:8d)
Target IP address: 192.168.29.87
```

First packet is Packet number 7251 (request packet)

Second packet is Packet number 7252 (reply packet)

Differences observed are:

 In the first packet the Target MAC address is not known so it is mentioned as 00:00:00:00:00:00 under the ARP request section, while in the second packet the Target MAC address is present (This target MAC address in response packet is the source MAC address of the request packet).

- Since the target MAC address is not known in the first packet, so source sends a broadcast request, we get to know this as the destination is broadcast(ff:ff:ff:ff:ff:ff) while in the second packet destination MAC address is same as target MAC address.
- Opcode of the first packet is 1 and the second packet is 2.
- **(b)** Operation code for ARP request is 1 and ARP reply is 2

(c)

Since the first 24 bits of a MAC address are assigned to a particular manufacturer, which can help us figure out the manufacturer.

```
Sender MAC address: Sercomm_1c:40 (58:95:d8:20:1c:40)
Sender IP address: 192.168.29.1
Target MAC address: HonHaiPr_a3:0c:8d (28:56:5a:a3:0c:8d)
Target IP address: 192.168.29.87
```

When I analysed the ARP Reply packet I found the sourceMAC address as Sercomm_1c:40 (58:95:d8:20:1c:40) and the destination MAC address as HonHaiPr_a3:0c:8d (28:56:5a:a3:0c:8d)

So in the source's case we can see that the first 32 bits of MAC address(58:95:d8:20) correspond to "**Sercomm_**", so we can say that the manufacturer is Sercomm. I checked it up online to verify this and the below screenshot shows that.

	The MAC address "58:95:d8:20:1c:40" has been assigned by the IEEE to:	
MAC-Segment:	58:95:D8:20:00:00 - 58:95:D8:2F:FF:FF (MA-M)	
Vendor:	Sercomm Corporation.	
Address:	3F,No.81,Yu-Yih Rd.,Chu-Nan Chen	
	Miao-Lih Hsuan 115	
	TW	

Since a big chunk of MAC segments is allotted to Sercomm, that is why 32 bits matched the manufacturer's name.

So in the receiver's case we can see that the first 24 bits of MAC address(28:56:5a) correspond to "HonHaiPr_", so we can say that the manufacturer is HonHaiPr. I checked it up online to verify this and the below screenshot shows that.

	The MAC address "28:56:5a:a3:0c:8d" has been assigned by the IEEE to:	
MAC-Segment:	28:56:5A:00:00:00 - 28:56:5A:FF:FF:FF (MA-L)	
Vendor:	Hon Hai Precision Ind. Co.,Ltd.	
Address:	Building D21,No.1, East Zone 1st Road Chongqing Chongqing 401332	
	CN	

(d)

```
C:\WINDOWS\system32>arp -d
C:\WINDOWS\system32>arp -s 192.168.80.1
                                         00-aa-00-62-c6-06
C:\WINDOWS\system32>arp -s 192.168.80.2
                                         00-aa-00-62-c6-05
C:\WINDOWS\system32>arp -s 192.168.80.3
                                         00-aa-00-62-c6-04
C:\WINDOWS\system32>arp -a
Interface: 192.168.29.87 --- 0xd
 Internet Address Physical Address
                                            Type
                       58-95-d8-20-1c-40
  192.168.29.1
                                            dynamic
 192.168.29.255
                       ff-ff-ff-ff-ff
                                            static
 192.168.80.1
                       00-aa-00-62-c6-06
                                            static
 192.168.80.2
                       00-aa-00-62-c6-05
                                             static
                       00-aa-00-62-c6-04
 192.168.80.3
                                            static
```

Difference between static and dynamic type in ARP table:

- The static entries are manually added to the ARP table. These stay on the table permanently unless deleted. These entries need to be updated if the routes are added or changed.
- The dynamic entries are automatically added by the software according to the past ARP(request-reply) resolutions. These entries are stored in the table for a temporary period of time after which the entry gets deleted/updated.

lo.	Time	Source	Destination	Protocol	Length	Info
26	27 124.730338	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	Who has 192.168.29.87? Tell 192.168.29.1
26	28 124.730356	HonHaiPr_a3:0c:8d	Sercomm_1c:40	ARP	42	192.168.29.87 is at 28:56:5a:a3:0c:8d
55	51 163.019718	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	Who has 192.168.29.87? Tell 192.168.29.1
55	52 163.019730	HonHaiPr_a3:0c:8d	Sercomm_1c:40	ARP	42	192.168.29.87 is at 28:56:5a:a3:0c:8d
57	77 177.162297	HonHaiPr_a3:0c:8d	Broadcast	ARP	42	Who has 192.168.29.1? Tell 192.168.29.87
57	78 177.164921	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	192.168.29.1 is at 58:95:d8:20:1c:40
64	32 183.711124	HonHaiPr_a3:0c:8d	Broadcast	ARP	42	Who has 192.168.29.1? Tell 192.168.29.87
64	33 183.712299	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	192.168.29.1 is at 58:95:d8:20:1c:40
64	60 187.339922	HonHaiPr_a3:0c:8d	Broadcast	ARP	42	Who has 192.168.29.1? Tell 192.168.29.87
64	61 187.341504	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	192.168.29.1 is at 58:95:d8:20:1c:40
65	83 197.244997	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	Who has 192.168.29.87? Tell 192.168.29.1
65	84 197.245010	HonHaiPr_a3:0c:8d	Sercomm_1c:40	ARP	42	192.168.29.87 is at 28:56:5a:a3:0c:8d
72	51 210.289259	HonHaiPr_a3:0c:8d	Broadcast	ARP	42	Who has 192.168.29.1? Tell 192.168.29.87
72	52 210.290363	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42	192.168.29.1 is at 58:95:d8:20:1c:40
01	CC 220 0E00E0	Concomm 1 - 140	Uanuaina azanad	ADD	42	Uha has 100 100 00 07) Tall 100 100 00 1

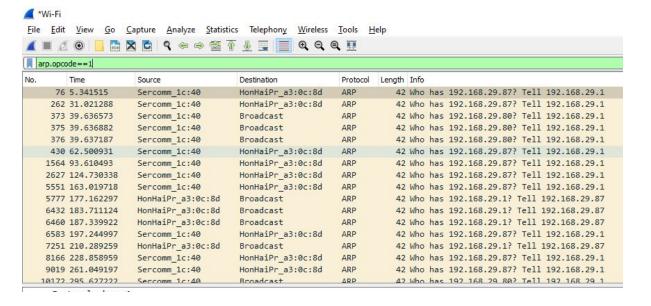
(a)

7251 210.289259 HonHaiPr_a3:0c:	Bd Broadcast	ARP	42 Who has 192.168.29.1? Tell 192.168.29.87	
7252 210.290363 Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42 192.168.29.1 is at 58:95:d8:20:1c:40	
9166 339 959050 Canana 14.40	UU-in2.00d	ADD	42 Uha haa 102 168 20 873 Tall 102 168 20 1	

> Frame 7251: 42 bytes on wire (336 bits), 42 bytes captured (336 bits) on interface \Device\NPF_{70BEF31C-0CFF-4306-86C9-}
> Ethernet II, Src: HonHaiPr_a3:0c:8d (28:56:5a:a3:0c:8d), Dst: Broadcast (ff:ff:ff:ff:ff)

Lets see the 7251th packet. The destination address is (ff:ff:ff:ff:ff:ff) Broadcast, which is not a real host. In this case the packet is transmitted to every node which is connected to the source via a direct link(or we can it will be broadcasted).

ARP request packet capture filter screenshot is attached below:

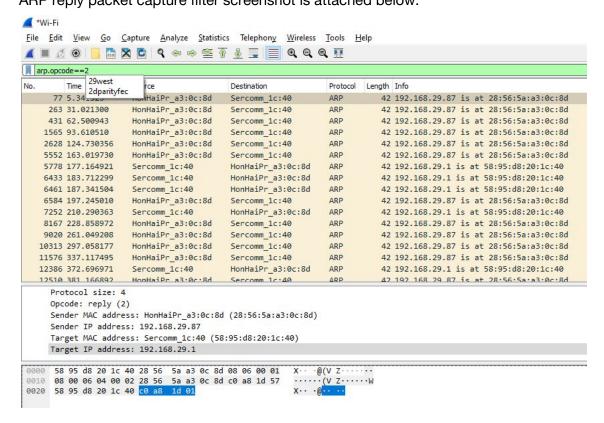


(b)

7251 210.289259	HonHaiPr_a3:0c:8d	Broadcast	ARP	42 Who has 192.168.29.1? Tell 192.168.29.87
7252 210.290363	Sercomm_1c:40	HonHaiPr_a3:0c:8d	ARP	42 192.168.29.1 is at 58:95:d8:20:1c:40
				40 14 1 400 400 00 000 7 22 400 400 00 4

Lets see the 7252th packet. Yes, the destination MAC address of the reply packet is a real host. (which was the source in case of request packet)

ARP reply packet capture filter screenshot is attached below:



(c)

Idx	Met	MTU	State	Name
1	75	4294967295	connected	Loopback Pseudo-Interface 1
15	5	1500	disconnected	Ethernet
13	55	1500	connected	Wi-Fi
16	35	1500	disconnected	Ethernet 2
25	25	1500	disconnected	Local Area Connection* 12
4	25	1500	disconnected	Local Area Connection* 13
21	65	1500	disconnected	Bluetooth Network Connection 2

```
C:\WINDOWS\system32>netsh interface ipv4 show interface 13
Interface Wi-Fi Parameters
IfLuid
                                           : wireless_32768
IfIndex
                                            : 13
State
                                            : connected
Metric
                                            : 55
Link MTU
                                            : 1500 bytes
                                            : 43500 ms
Reachable Time
Base Reachable Time
                                            : 30000 ms
                                                               Retransmission Interval
                                            : 1000 ms
DAD Transmits
Site Prefix Length
                                            : 64
Site Id
Forwarding
                                            : disabled
Advertising
                                            : disabled
Neighbor Discovery : enabled
Neighbor Unreachability Detection : enabled
                                            : enabled
Router Discovery
Managed Address Configuration
Other Stateful Configuration
                                            : dhcp
: enabled
                                            : enabled
Weak Host Sends
Weak Host Receives
                                            : disabled
                                            : disabled
Use Automatic Metric
                                            : enabled
Ignore Default Routes
                                            : disabled
Advertised Router Lifetime
                                            : 1800 seconds
Advertise Default Route
                                            : disabled
Current Hop Limit
Force ARPND Wake up patterns
Directed MAC Wake up patterns
                                            : 0
                                            : disabled
                                            : disabled
ECN capability
RA Based DNS Config (RFC 6106)
DHCP/Static IP coexistence
                                            : application: disabled
                                            : disabled
```

Timeout of ARP cache is mentioned as Reachable time in windows according to Microsoft official documents.

https://docs.microsoft.com/en-us/troubleshoot/windows-server/networking/address-resolution-protocol-arp-caching-behavior

So, the timeout of ARP cache is 43500 ms.