

# Getting Up to Speed with Networking in General

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# Overview



**Identify assumed networking knowledge that's in scope for AZ-104**

**Relate those concepts to Azure to ease your learning curve**

- Ethernet architecture and Azure
- TCP/IP networking and Azure

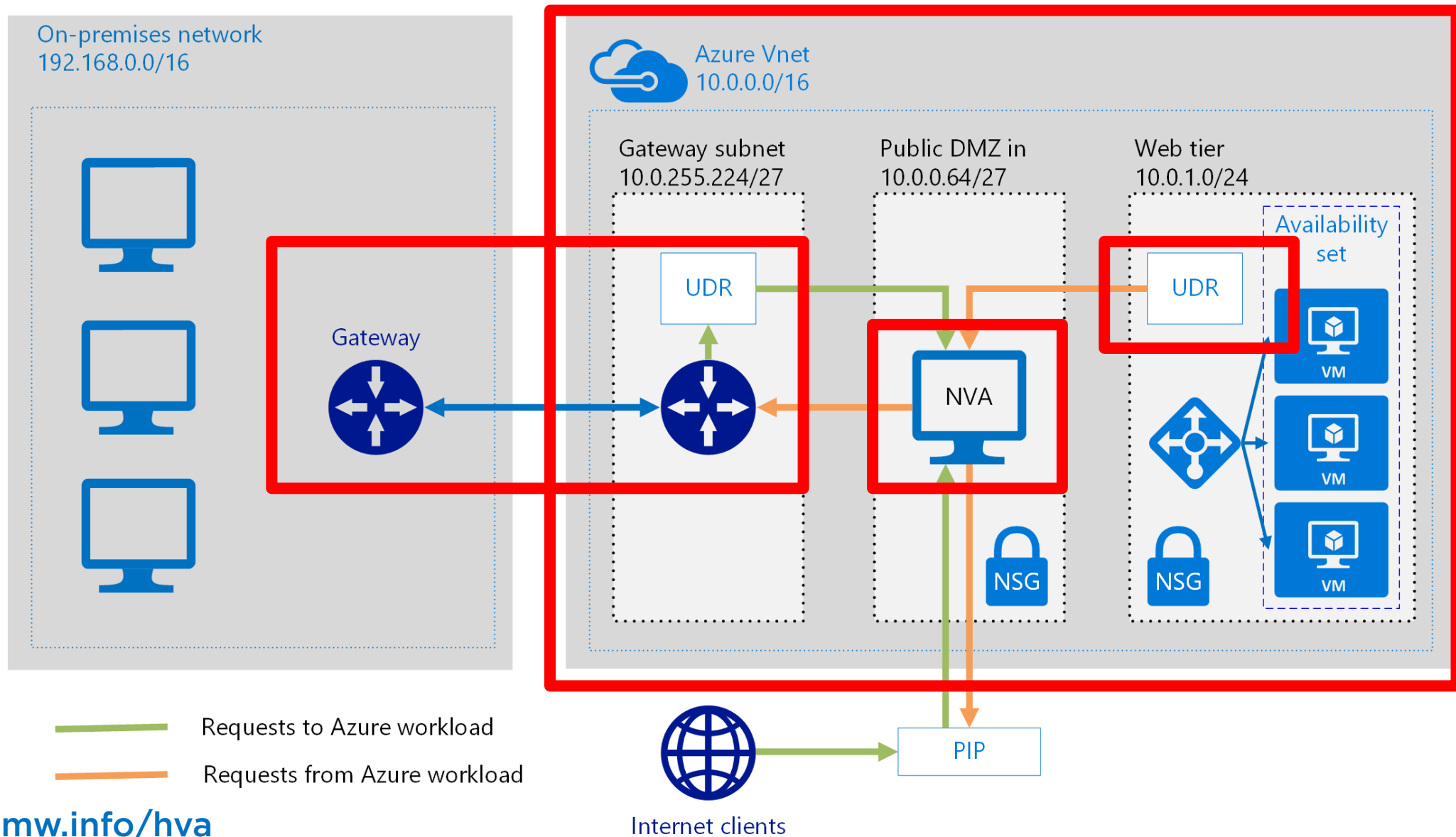
**Suggest foundational networking certifications for remedial instruction**

# Ethernet and Azure

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# Routing and Switching



# Packet Capture

Microsoft Azure

Search resources, services, and docs (G+)

tim@timw.info  
TIMW.INFO

Dashboard > Network Watcher

Network Watcher | Packet capture

Microsoft

packet

« + Add ↺ Refresh

Network diagnostic tools

Packet capture

Filter by name

Name	Target
No results.	

Add packet capture

Subscription \*

Microsoft Azure Sponsorship

Resource group \*

tim

Target virtual machine \*

tim-vm-01

Packet capture name \*

No Network Watcher found in the selected region, Network Watcher will be enabled automatically when you perform the operation.

Capture configuration

The packet capture output file (.cap) can be stored in a storage account and/or on the target VM.

☒ Storage account

☐ File

☐ Both

Storage accounts \*

cs210032000ac06d56c



# Packet Capture



Wireshark

tv-netflix-problems-2011-07-06.pcap

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

Apply a display filter ... <Ctrl-/> Expression...

No.	Time	Source	Destination	Protocol	Length	Info
343	65.142415	192.168.0.21	174.129.249.228	TCP	66	40555 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=491519346 TSecr=551811827
344	65.142715	192.168.0.21	174.129.249.228	HTTP	253	GET /clients/netflix/flash/application.swf?flash_version=flash_lite_2.1&v=1.5&nr
345	65.230738	174.129.249.228	192.168.0.21	TCP	66	80 → 40555 [ACK] Seq=1 Ack=188 Win=6864 Len=0 TSval=551811850 TSecr=491519347
346	65.240742	174.129.249.228	192.168.0.21	HTTP	828	HTTP/1.1 302 Moved Temporarily
347	65.241592	192.168.0.21	174.129.249.228	TCP	66	40555 → 80 [ACK] Seq=188 Ack=763 Win=7424 Len=0 TSval=491519446 TSecr=551811852
348	65.242532	192.168.0.21	192.168.0.1	DNS	77	Standard query 0x2188 A cdn-0.nflximg.com
349	65.276870	192.168.0.1	192.168.0.21	DNS	489	Standard query response 0x2188 A cdn-0.nflximg.com CNAME images.netflix.com.edge
350	65.277992	192.168.0.21	63.80.242.48	TCP	74	37063 → 80 [SYN] Seq=0 Win=5840 Len=0 MSS=1460 SACK_PERM=1 TSval=491519482 TSecr=
351	65.297757	63.80.242.48	192.168.0.21	TCP	74	80 → 37063 [SYN, ACK] Seq=0 Ack=1 Win=5792 Len=0 MSS=1460 SACK_PERM=1 TSval=3295
352	65.298396	192.168.0.21	63.80.242.48	TCP	66	37063 → 80 [ACK] Seq=1 Ack=1 Win=5888 Len=0 TSval=491519502 TSecr=3295534130
353	65.298687	192.168.0.21	63.80.242.48	HTTP	153	GET /us/nrd/clients/flash/814540.bun HTTP/1.1
354	65.318730	63.80.242.48	192.168.0.21	TCP	66	80 → 37063 [ACK] Seq=1 Ack=88 Win=5792 Len=0 TSval=3295534151 TSecr=491519503
355	65.321733	63.80.242.48	192.168.0.21	TCP	1514	[TCP segment of a reassembled PDU]

> Frame 349: 489 bytes on wire (3912 bits), 489 bytes captured (3912 bits)

> Ethernet II, Src: Globalsec\_00:3b:0a (f0:ad:4e:00:3b:0a), Dst: Vizio\_14:8a:e1 (00:19:9d:14:8a:e1)

> Internet Protocol Version 4, Src: 192.168.0.1, Dst: 192.168.0.21

> User Datagram Protocol, Src Port: 53 (53), Dst Port: 34036 (34036)

▼ Domain Name System (response)

[Request In: 348]

[Time: 0.034338000 seconds]

Transaction ID: 0x2188

> Flags: 0x8180 Standard query response, No error

Questions: 1

Answer RRs: 4

Authority RRs: 9

Additional RRs: 9

▼ Queries

> cdn-0.nflximg.com: type A, class IN

> Answers

> Authoritative nameservers

0020 00 15 00 35 84 f4 01 c7 83 3f 21 88 81 80 00 01 ...5... .?.....

0030 00 04 00 09 00 09 05 63 64 6e 2d 30 07 6e 66 6c .....c dn-0.nfl

0040 78 69 6d 67 03 63 6f 6d 00 00 01 00 01 c0 0c 00 ximg.com .....

0050 05 00 01 00 00 05 29 00 22 06 69 6d 61 67 65 73 .....). .images

0060 07 6e 65 74 66 6c 69 78 03 63 6f 6d 09 65 64 67 .netflix .com.edg

0070 65 73 75 69 74 65 03 6e 65 74 00 c0 2f 00 05 00 esuite.n et../...

Identification of transaction (dns.id), 2 bytes

Packets: 10299 · Displayed: 10299 (100.0%) · Load time: 0:0.182 | Profile: Default

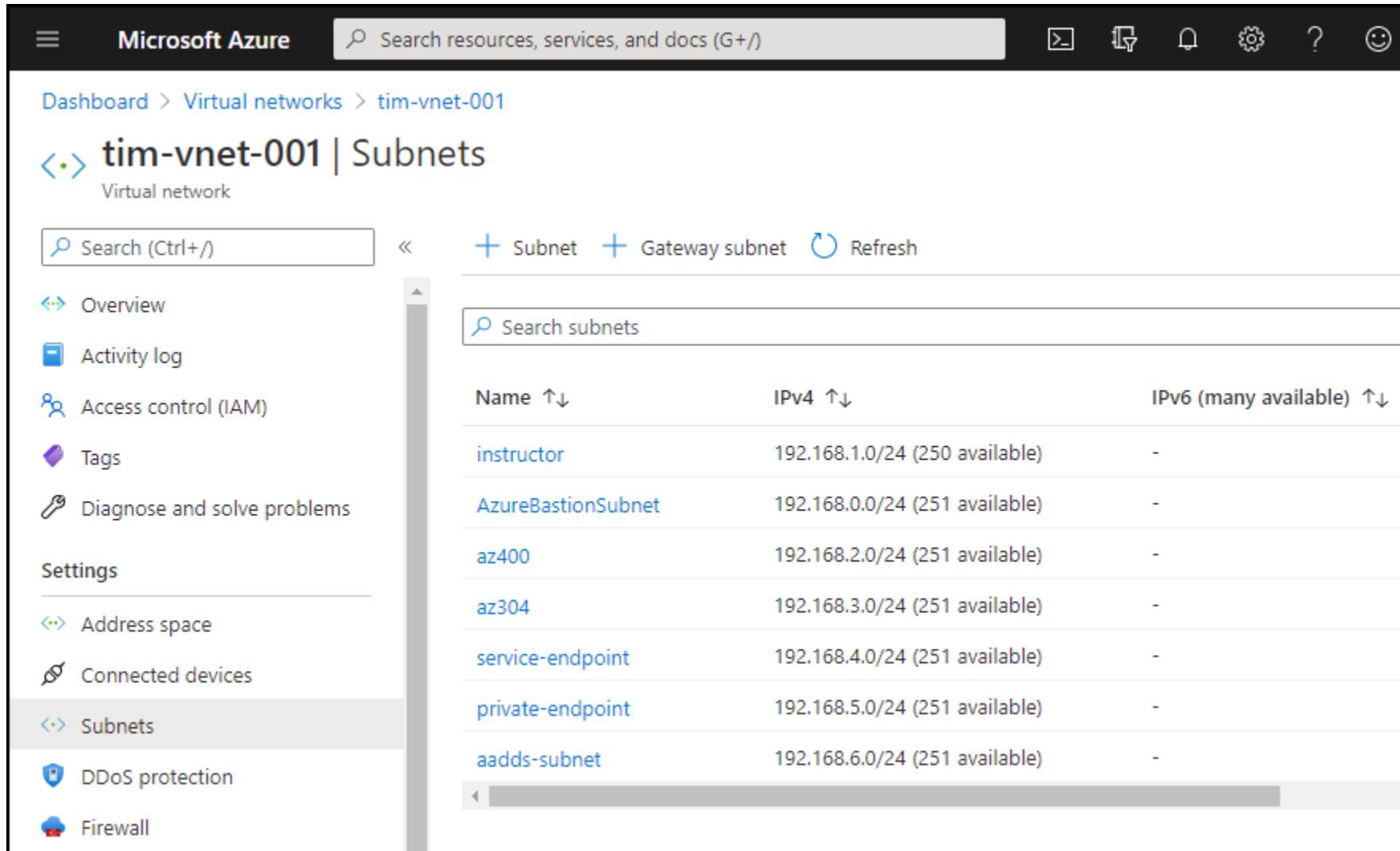


# TCP/IP and Azure

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# IPv4 Addressing and Subnetting



The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and navigation icons. The breadcrumb trail indicates the path: Dashboard > Virtual networks > tim-vnet-001. The main heading is "tim-vnet-001 | Subnets" with a sub-label "Virtual network". Below this, there's a search bar for subnets and buttons to add a subnet, gateway subnet, or refresh. A left sidebar contains navigation links: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Settings, Address space, Connected devices, Subnets (highlighted), DDoS protection, and Firewall. The main content area displays a table of subnets.

Name ↑↓	IPv4 ↑↓	IPv6 (many available) ↑↓
<a href="#">instructor</a>	192.168.1.0/24 (250 available)	-
<a href="#">AzureBastionSubnet</a>	192.168.0.0/24 (251 available)	-
<a href="#">az400</a>	192.168.2.0/24 (251 available)	-
<a href="#">az304</a>	192.168.3.0/24 (251 available)	-
<a href="#">service-endpoint</a>	192.168.4.0/24 (251 available)	-
<a href="#">private-endpoint</a>	192.168.5.0/24 (251 available)	-
<a href="#">aadds-subnet</a>	192.168.6.0/24 (251 available)	-





# OSI Layers

OSI	Protocol / Data Format	Azure Products
1. Physical	Raw data (bits)	



# OSI Layers

OSI	Protocol / Data Format	Azure Products
2. Data Link	Ethernet (frame)	
1. Physical	Raw data (bits)	



# OSI Layers

OSI	Protocol / Data Format	Azure Products
3. Network	IP; ICMP; IPSec (packets)	Network interface
2. Data Link	Ethernet (frame)	
1. Physical	Raw data (bits)	



# OSI Layers

OSI	Protocol / Data Format	Azure Products
4. Transport	TCP; UDP	Azure Load Balancer; Network Security Group
3. Network	IP; ICMP; IPSec (packets)	Network interface
2. Data Link	Ethernet (frame)	
1. Physical	Raw data (bits)	



# OSI Layers

OSI	Protocol / Data Format	Azure Products
5. Session	Socket	
4. Transport	TCP; UDP	Azure Load Balancer; Network Security Group
3. Network	IP; ICMP; IPSec (packets)	Network interface
2. Data Link	Ethernet (frame)	
1. Physical	Raw data (bits)	



# OSI Layers

OSI	Protocol / Data Format	Azure Products
6. Presentation	PNG; SSL/TLS	
5. Session	Socket	
4. Transport	TCP; UDP	Azure Load Balancer; Network Security Group
3. Network	IP; ICMP; IPSec (packets)	Network interface
2. Data Link	Ethernet (frame)	
1. Physical	Raw data (bits)	



# OSI Layers

OSI	Protocol / Data Format	Azure Products
7. Application	HTTP(S); DNS	Traffic Manager; Application Gateway
6. Presentation	PNG; SSL/TLS	
5. Session	Socket	
4. Transport	TCP; UDP	Azure Load Balancer; Network Security Group
3. Network	IP; ICMP; IPSec (packets)	Network interface
2. Data Link	Ethernet (frame)	
1. Physical	Raw data (bits)	



# Foundational Networking Certifications

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"If you need to skill up on networking anyway, then why not add a certification?"

**Tim's advice**



# Foundational Certifications



**CompTIA  
Network+**  
“Gold standard”



**CN301 TCP/IP**  
Consider  
Wireshark  
University as  
well



**Cisco CCNA**  
Consolidates  
CCENT and  
original CCNA



# Demo



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## Network Watcher

- IP Flow Verify
- Next Hop
- Packet capture w/ Wireshark



# Summary



Networking assistance is the Azure support team's most common request

Ethernet and TCP/IP is a career unto itself, then to adapt it to Azure is a heavy lift

We need to be eternal students anyway

Thanks!

Courses: [timw.info/ps](https://timw.info/ps)

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