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→ Router
→ Switch

250 Computers



NIC - Network Interface (MD)



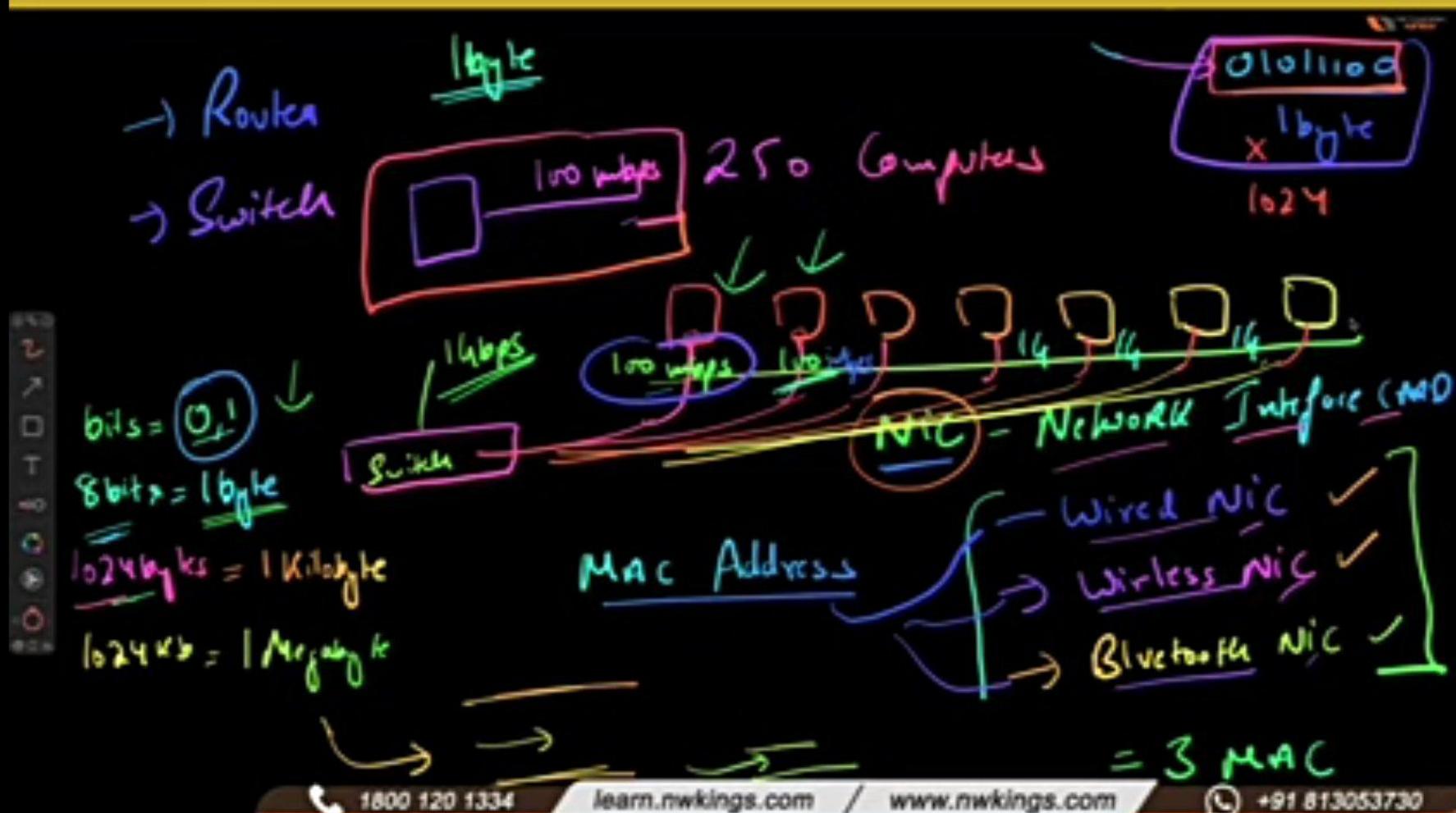
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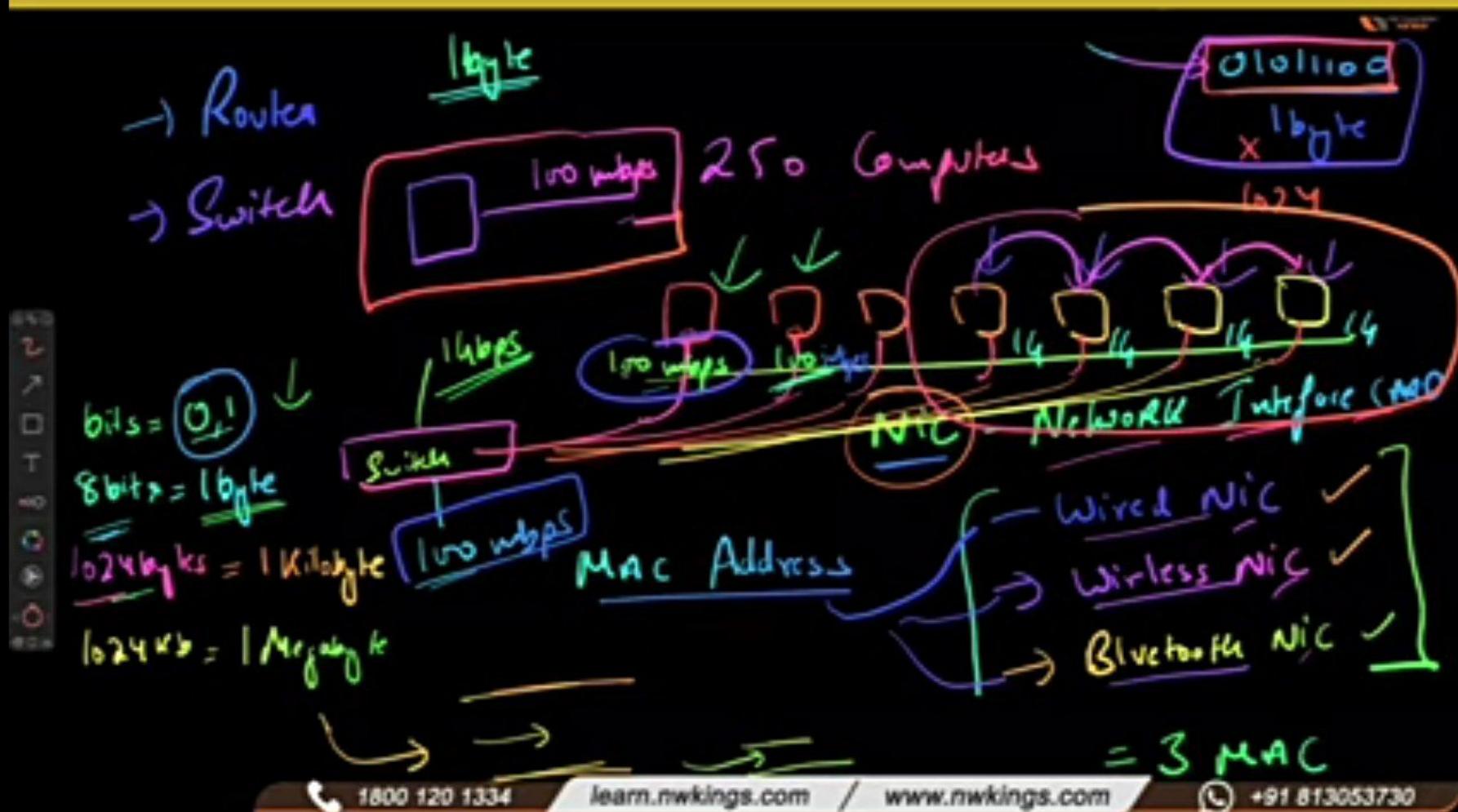
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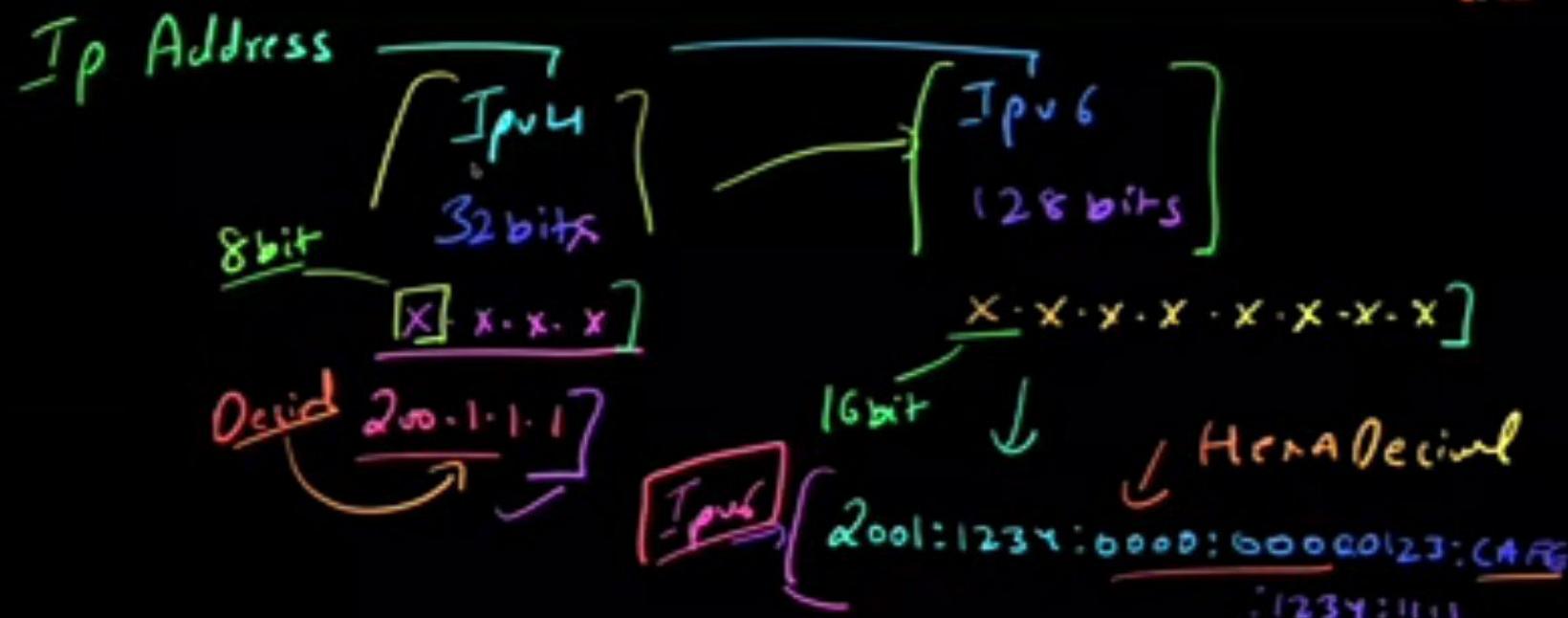
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Decimal to BINARY

(92.168-1.1)

	\times	\times	\times	\times
	8	8	8	8
2^7	2^6	2^5	2^4	2^3
128	64	32	16	8
192 →	1	1	0	0
168 →	1	0	1	0
1 →	0	0	0	0
1 →	0	0	0	0

0,1

(2)

$2^0 = 1$

$2^1 = 2$

$2^2 = 4$

$2^3 = 8$

$2^4 = 16$

$2^5 = 32$

$2^6 = 64$

$2^7 = 128$

$2^8 = 256$



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IANA - Internet Assigned Numbered Authority.

$\begin{matrix} & 1 \\ & \times \cdot x \cdot x \cdot x \end{matrix}$

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1

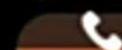
$0 \quad 0 = 0-127$ A

$1 \quad 0 = 128-191$ B

$1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 = 192-223$ C

$1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 \quad 0 = 224-239$

$1 \quad 1 \quad 1 \quad 1 \quad 0 \quad 0 \quad 0 \quad 0 = 240-255$ D



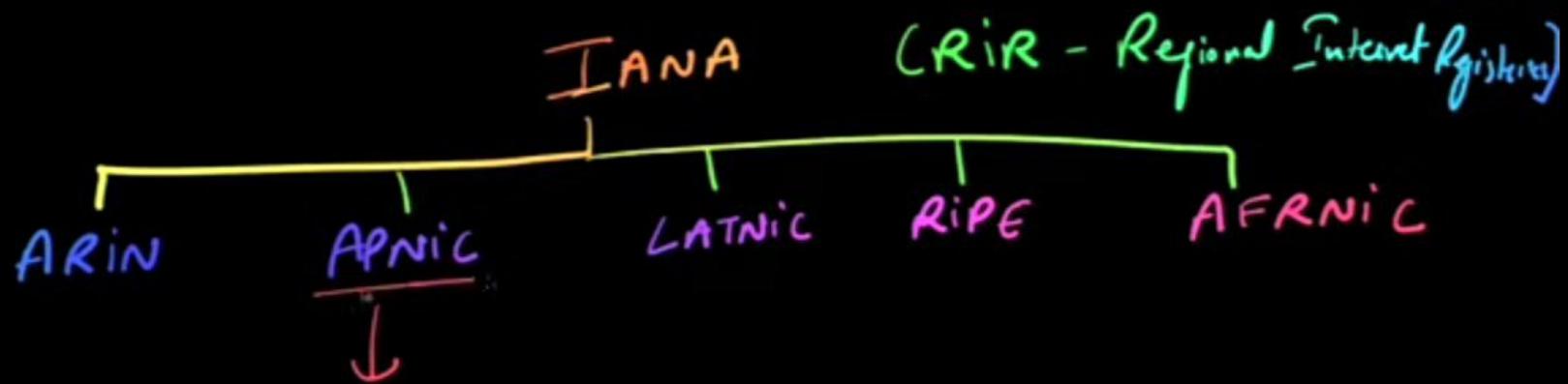
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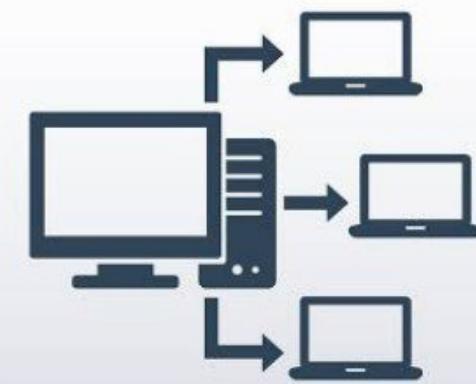
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COMPUTER NETWORKING SESSION

@collab__

...





Question



A bridge is a network device that connects two similar networks, communication channel or protocols to form a larger network. In other the process of aggregating networks is called bridging. Bridge uses the MAC address to forward data and interconnects to LANs. Bridges also monitor all data traffic in each of the LAN segments connected to its port.

Gateway is a device used to connect two dissimilar networks with different communication channel or protocols.



The differences between bridge and gateway are:

Sn	Bridge	Gateway
1.	Bridge connects two different LANs.	Gateway just converts the protocol.
2.	Bridge works in data link layer.	Gateway works in network layer.

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Question



dissimilar networks with different communication channel or protocols.

The differences between bridge and gateway are:

Sn	Bridge	Gateway
1.	Bridge connects two different LANs.	Gateway just converts the protocol.
2.	Bridge works in data link layer.	Gateway works in all layer.
3.	In bridge data or information is in the form of packet.	Whereas in gateway, data or information is also in the form of packet. 
4.	Format of the data packets is constant	Format of data packet is changed during protocol change in bridge.
5.	Bridge is not installed in router.	Gateway is installed in router. X

1 like 0 dislike



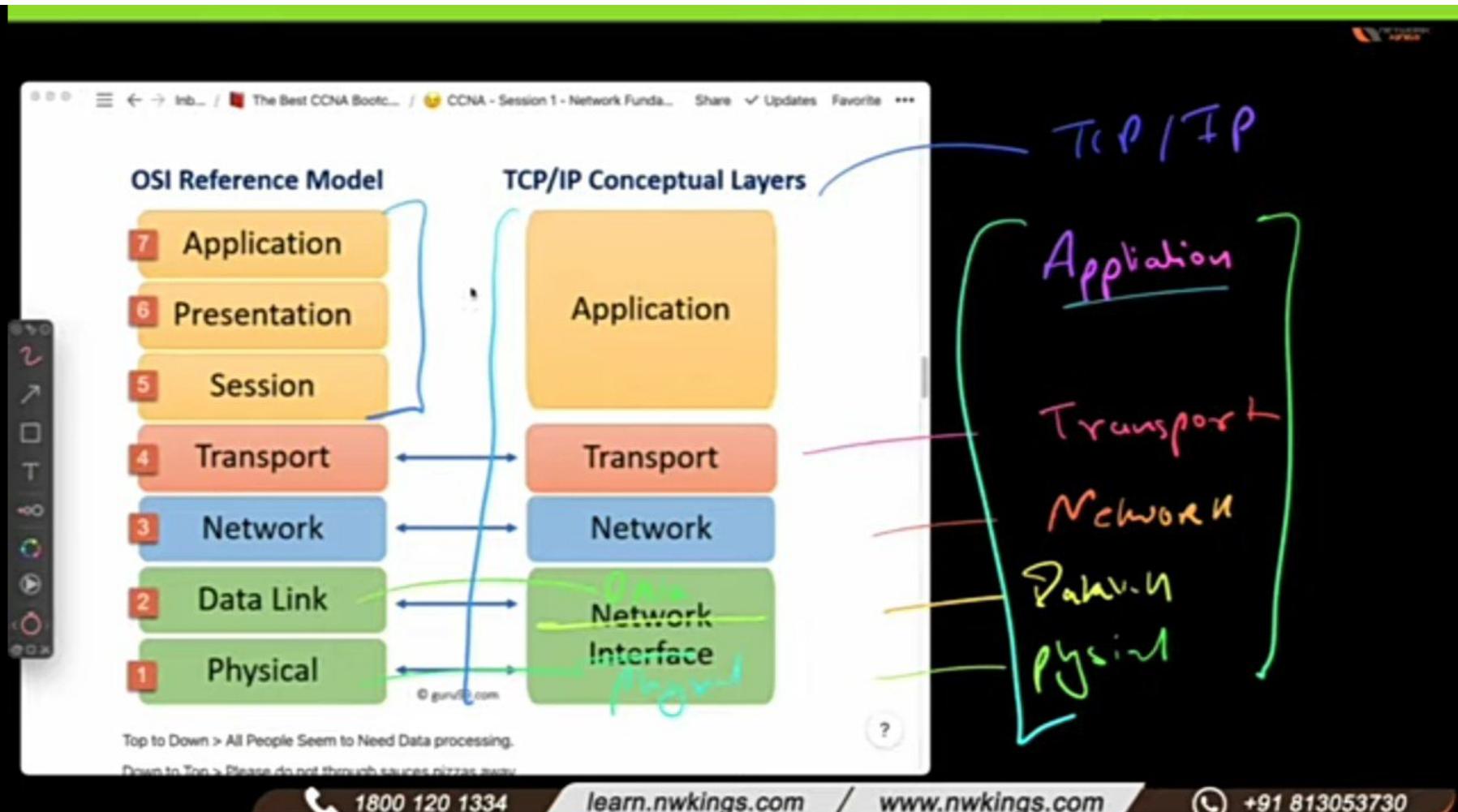
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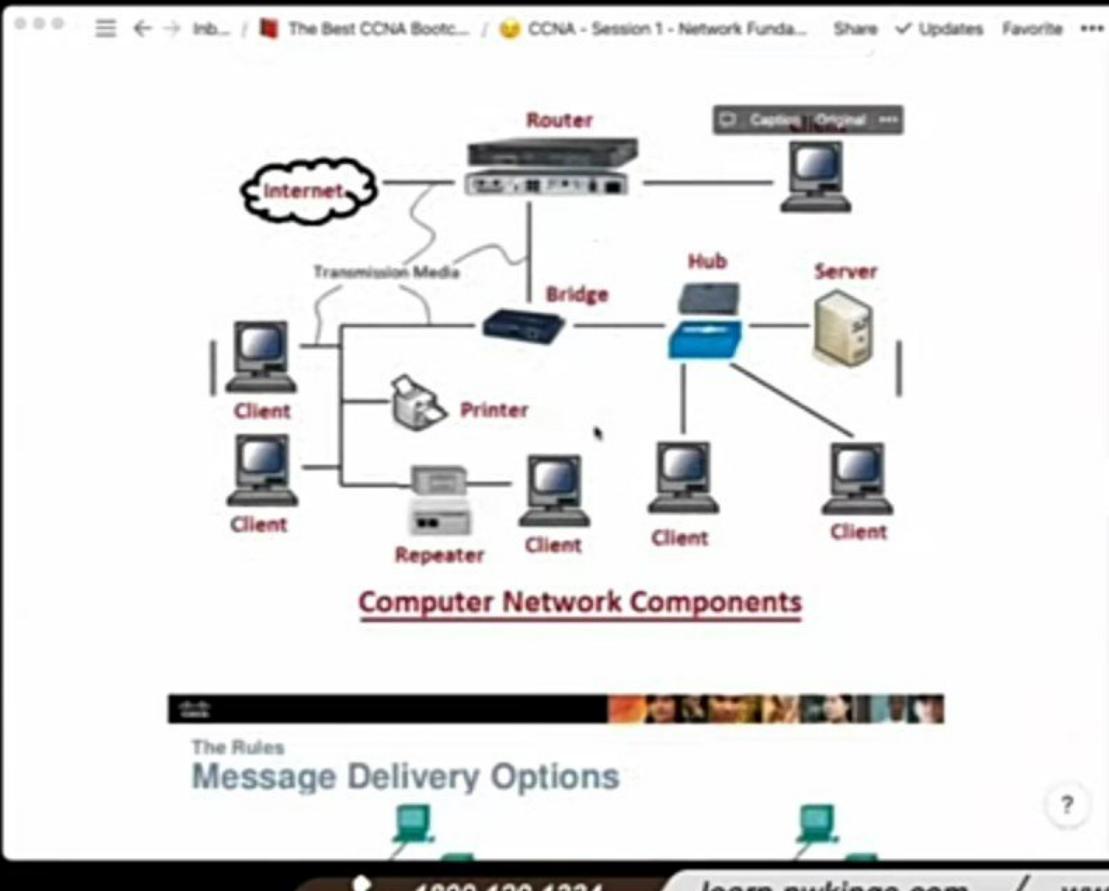


The Best CCNA Bootc... / CCNA - Session 1 - Network Funda... Share ✓ Updates Favorite ...

1. OSI Model - Open System Interconnection
2. TCP / IP - Transmission Control Protocol | Internet Protocol

A diagram illustrating various network components. It includes icons for a Hub (blue and grey), a Gateway (black server-like icon), a Router (cylinder with globe), a Repeater (grey rectangle), a Bridge (blue trapezoid), a Switch (blue rectangle with ports), and a Client (small blue square). There are also two additional Router icons at the bottom.

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The Rules

Message Delivery Options

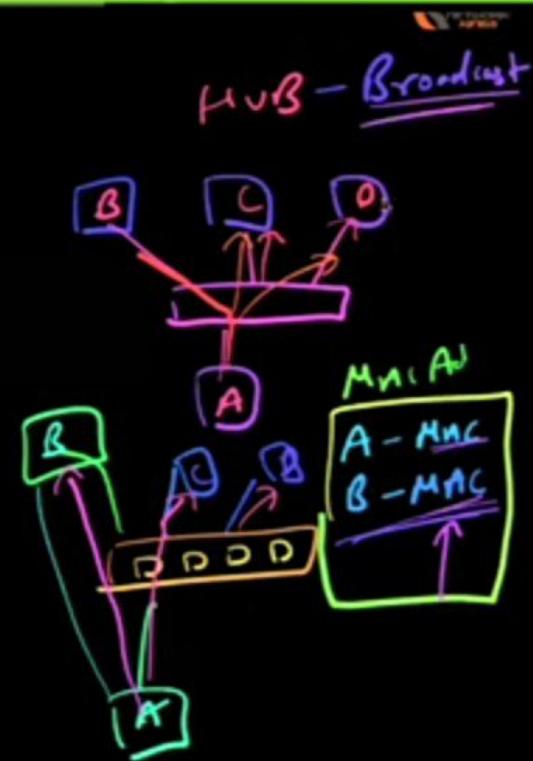
The diagram shows three network scenarios:

- Unicast:** A single computer (labeled A) is connected to a switch. A red arrow points from the switch to computer A, indicating a one-to-one connection.
- Multicast:** A single computer (labeled A) is connected to a switch. Multiple green arrows point from the switch to different computers (B, C, D), indicating a one-to-many connection.
- Broadcast:** All computers (A, B, C, D) are connected to a single switch. Blue arrows point from each computer to the switch, and from the switch to all other computers, indicating a one-to-all connection.

Legend:

- 1pc —— 1 pc [Unicast] - One to One
- 1pc —— Multiple pc [Multicast] - One to Many
- 1pc —— all pc [Broadcast] - One to All

NIC - Network Interface Card



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NIC - Network Interface Card

Gigabit Ethernet NIC

Ethernet port

PCI connection

TechTerms.com

Hub

To connect multiple computers with each other.

Less number of ports.

Hub

To connect multiple computers with each other.

Less number of ports.

Broadcast

Doesn't learn mac address



Bridge : Learn mac address | Reduce broadcast

less number of ports.

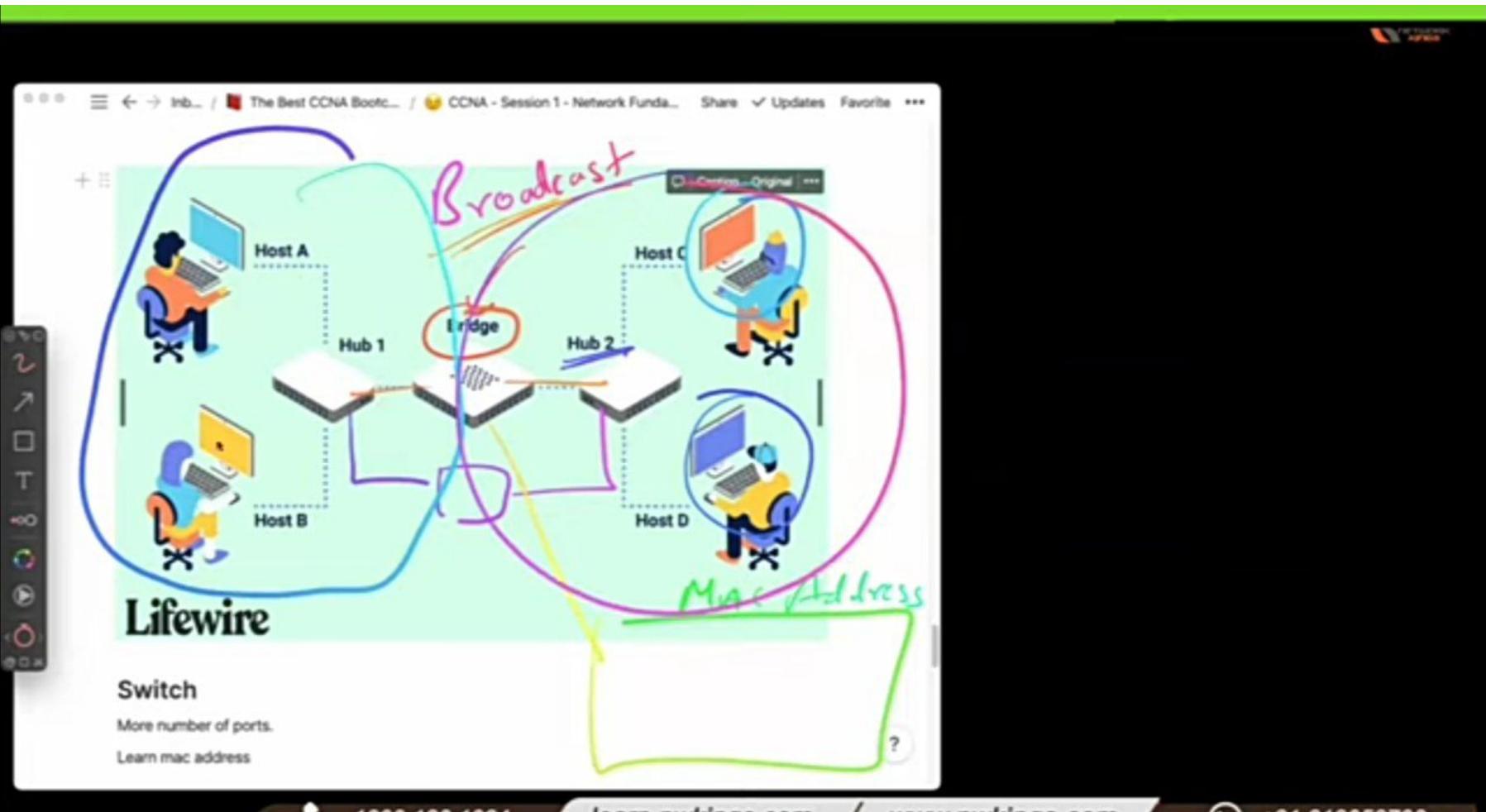
?

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Router : Router is a network device which is used to connect different networks with each other.

Caption Original ...

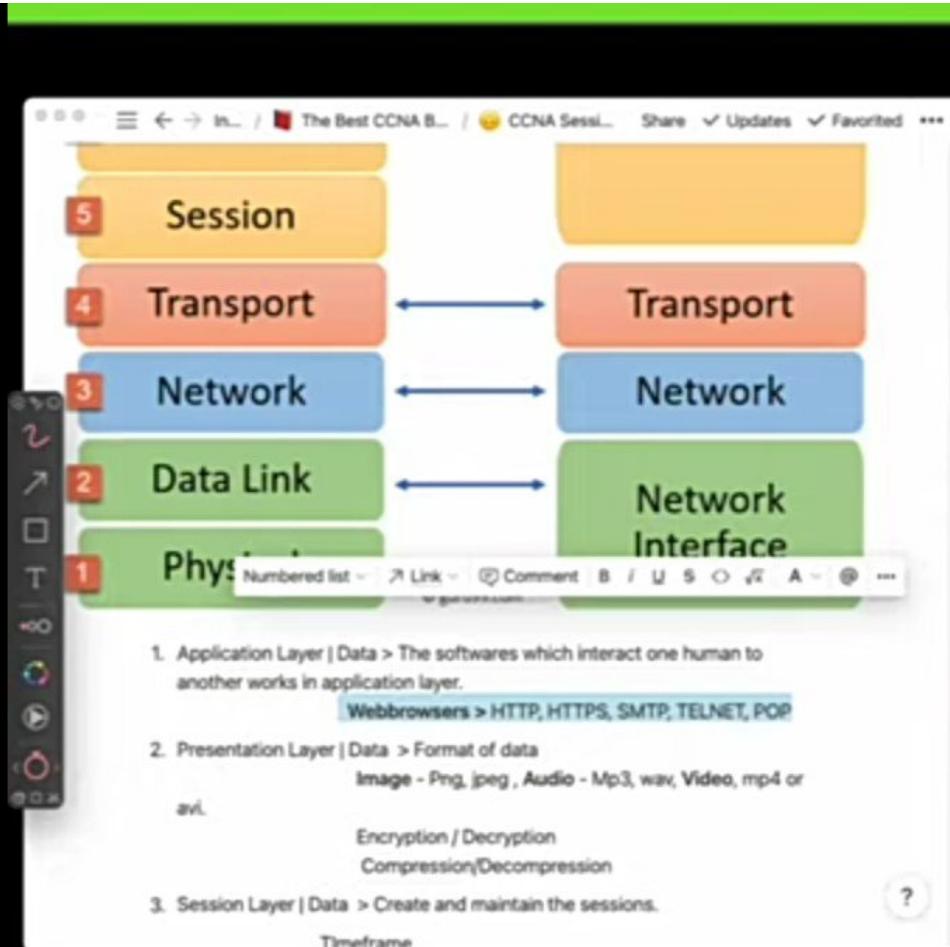
A diagram illustrating a network topology. At the bottom left, a computer monitor is connected to a switch. From the switch, two lines extend upwards to a central Router. The Router is represented by a blue icon with a white terminal symbol and the word "Router". Above the Router, several other network devices are shown, including a server rack, a smaller switch, and a wireless access point. These devices are interconnected by lines, forming a network. A question mark icon is located in the bottom right corner of the slide area.

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The image shows a screenshot of a video player interface. On the left, there is a toolbar with various icons for editing. The main content area displays a network diagram. At the top, there is a row of server racks. Below them, a horizontal line connects several network components: an Access Server, three Desktop Modems, a WAN Switch, two Core Routers, another WAN Switch, and a Router connected to a CSU/DSU device via a T1 line. Handwritten notes are overlaid on the right side of the screen:

- A green circle contains the text "Y000 - Branch".
- A blue circle contains the text "ASR" (underlined) followed by "Aggregation Service Router".
- A yellow circle contains the text "ISR" (underlined) followed by "Integrated Service Router".
- A green circle contains the text "CSR" (underlined) followed by "Carryin Saphir Router".

At the bottom of the screen, there is a footer bar with contact information: a phone icon followed by the number "1800 120 1334", the website "learn.nwkings.com", another website "www.nwkings.com", and a phone icon followed by the number "+91 813053730".



↗ Http / Https (www)
 ↗ Sntp / pop / Imap
 ↗ Ftp
 ↗ Telnet / SSH

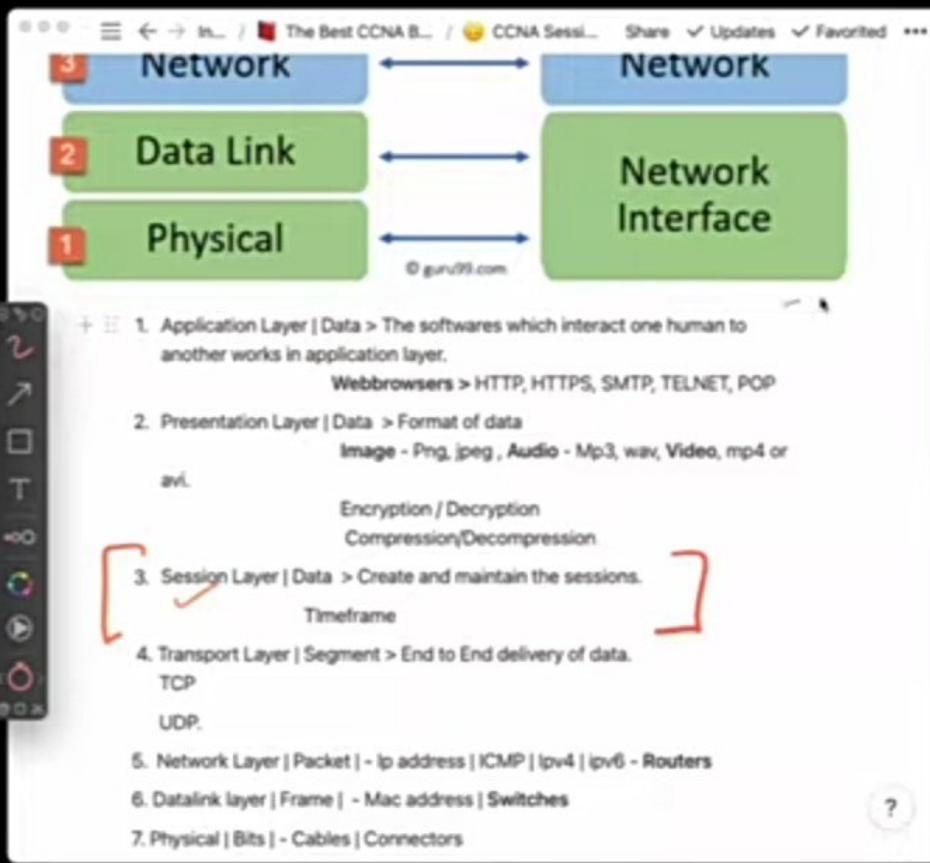
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The diagram illustrates the 7 layers of the OSI model and the TCP/IP stack, along with a hand-drawn diagram of data segmentation and retransmission.

OSI Model Layers:

- Layer 7: Application Layer** (Red box): Data > The softwares which interact one human to another works in application layer.
Webbrowsers > HTTP, HTTPS, SMTP, TELNET, POP
- Layer 6: Presentation Layer** (Blue box): Data > Format of data
Image - Png, jpeg , Audio - Mp3, wav, Video, mp4 or avi.
Encryption / Decryption
Compression/Decompression
- Layer 5: Session Layer** (Green box): Data > Create and maintain the sessions.
Timeframe
- Layer 4: Transport Layer** (Yellow box): Segment > End to End delivery of data.
TCP
UDP
- Layer 3: Network Layer** (Orange box): Packet > IP address | ICMP | Ipv4 | Ipv6 - Routers
- Layer 2: Data Link Layer** (Purple box): Frame > Mac address | Switches
- Layer 1: Physical Layer** (Grey box): Bits | Cables | Connectors

TCP/IP Stack:

- Network Layer
- Transport Layer
- Network Interface

Hand-drawn Diagram Labels:

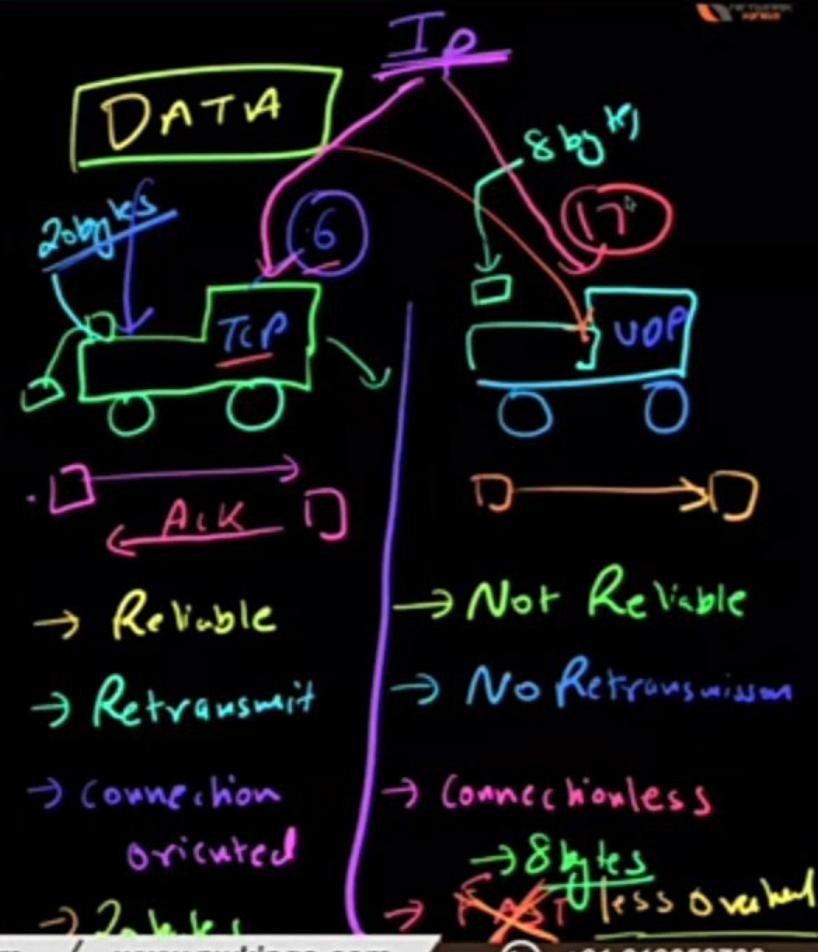
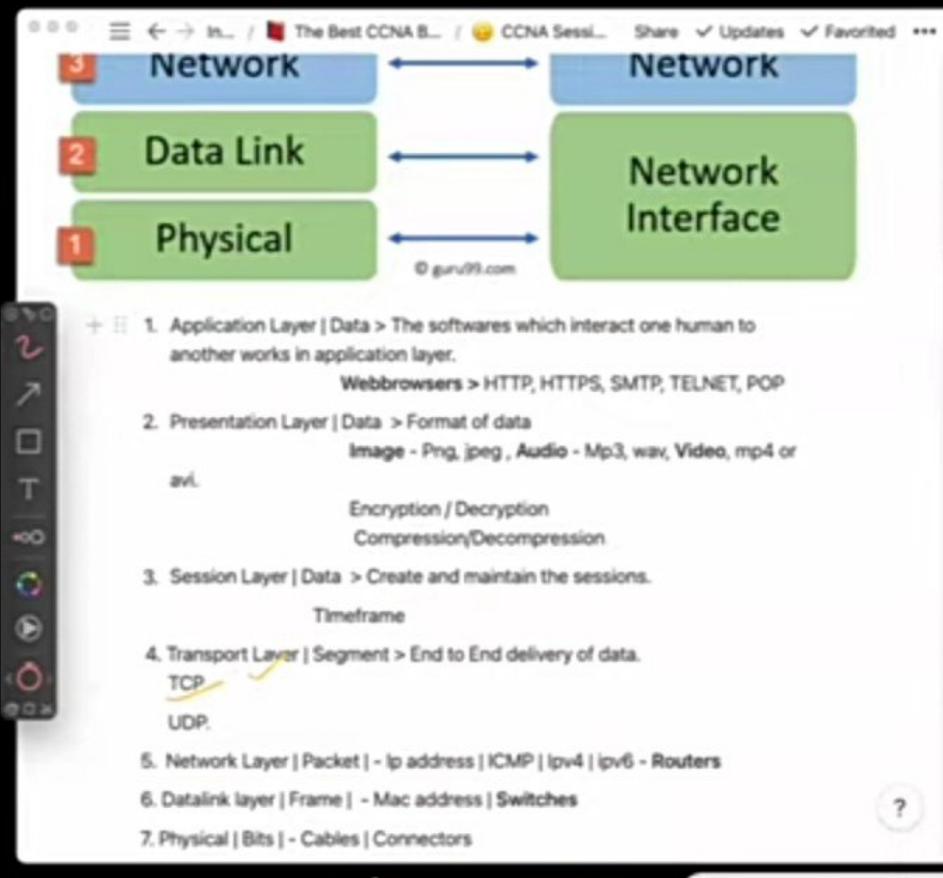
- Data
- Transport
- Segments
- Retransmission
- Segmentation
- Sequencing

Hand-drawn Diagram Description:

A hand-drawn diagram shows a green box labeled "Hello" connected to a blue box labeled "Transport". Below "Transport" is a bracket containing "Retransmission", "Segmentation", and "Sequencing". A blue line labeled "Segments" connects the Transport box to a sequence of five numbered boxes (1, 2, 3, 4, 5) arranged in two rows: (1, 2) and (3, 4, 5). A red line labeled "DATA" connects the "Data" box in the diagram to the same sequence of boxes. A green line labeled "DATA" also connects the "Data" box in the diagram to the "Segments" label.

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The slide illustrates the OSI model layers and their functions:

- Layer 3: Network** - Handles end-to-end communication.
- Layer 2: Data Link** - Provides reliable delivery between adjacent nodes.
- Layer 1: Physical** - Manages the physical connection and transmission of bits.
- Network Interface** - The interface between the physical layer and the network layer.

Hand-drawn annotations on the right side of the slide:

- DATA** (in blue box) points down to **Transport**.
- Transport** points down to **Segments** (in blue box).
- Segments** points down to **Network layer** (in pink).
- Network layer** points down to **PACKETS** (in pink).
- PACKETS** points down to **Frame** (in green).
- Frame** is shown as a large green rounded rectangle containing **SMAC / DMAC** (in blue) and **SIP / DIP** (in pink).
- Frame** also contains a smaller pink box labeled **PACKET**.
- PACKET** points down to **Segment** (in pink).
- Segment** is shown as a pink rounded rectangle containing **S Port** (in blue), **D Port** (in pink), and **DATA** (in green).

Page footer:

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The diagram illustrates the OSI model layers and their functions:

- Layer 3: Network** - Handles routing between networks.
- Layer 2: Data Link** - Provides the physical connection between devices on the same network segment.
- Layer 1: Physical** - Manages the physical transmission of data over the network interface.

Below the diagram, numbered points describe each layer:

- Application Layer | Data: The softwares which interact one human to another works in application layer.
Webbrowsers > HTTP, HTTPS, SMTP, TELNET, POP
- Presentation Layer | Data: Format of data
Image - Png, jpeg , Audio - Mp3, wav, Video, mp4 or avi.
Encryption / Decryption
Compression/Decompression
- Session Layer | Data: Create and maintain the sessions.
- Transport Layer | Segment: End to End delivery of data
TCP ✓
UDP. ✓
- Network Layer | Packet: - Ip address | ICMP | Ipv4 | Ipv6 - Routers
- Datalink layer | Frame: - Mac address | Switches
- Physical | Bits: - Cables | Connectors

Handwritten notes on the right side of the diagram:

DATA → **Transport Segments** → **Port No**

Segments → **Network layer (Routers)**

PACKETS → **SIP | DIP**

PACKETS → **Datalink layer (Switches)**

Frame → **(S MAC | D MAC)**

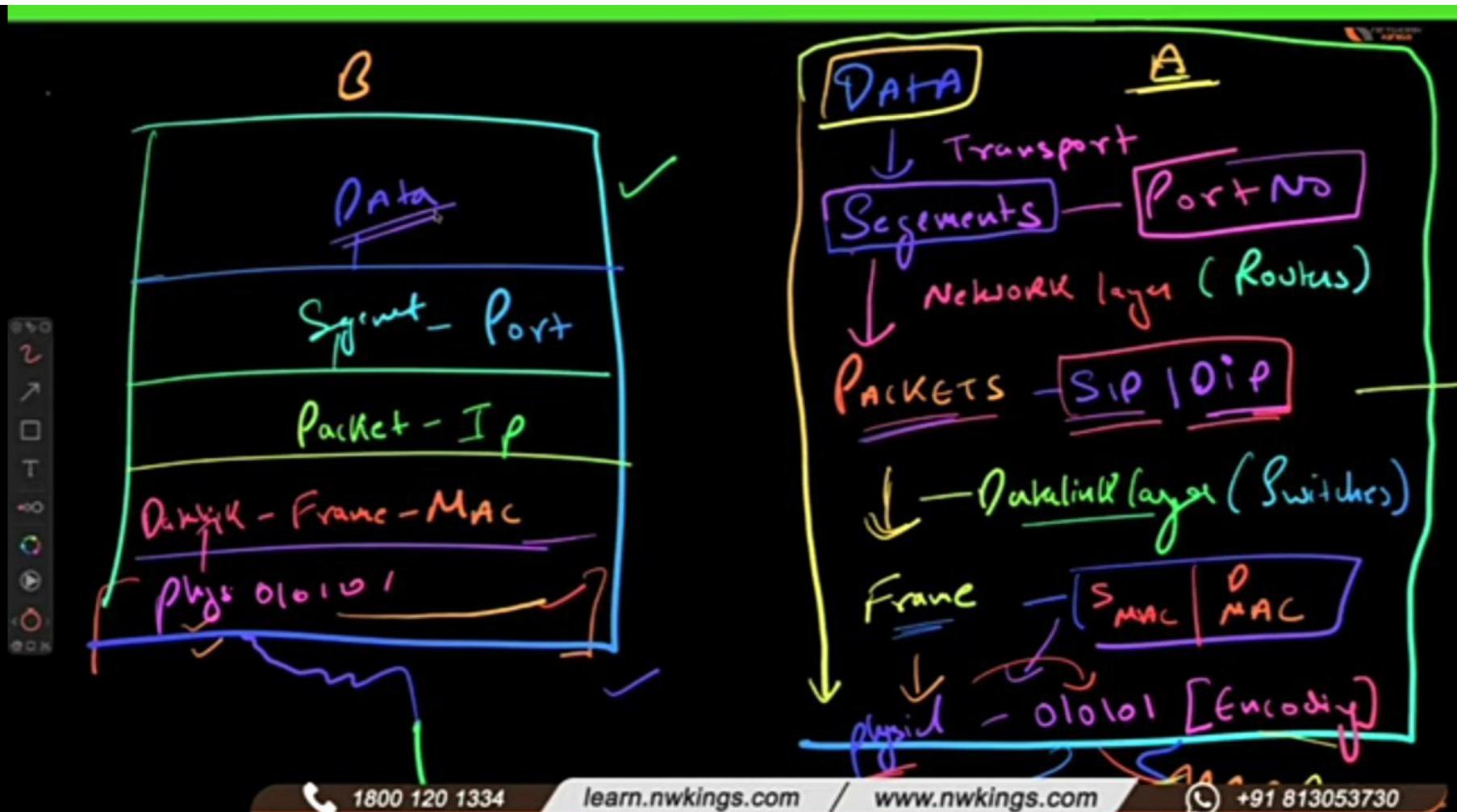
Frame → **physical - 010101 [Encoding]**

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Application → Application - Https / Sntp
Software

D
A
P
S
T
R
S
T
A
T
P
N
D
M
C
E

preservation → Format of Data
compression /
Encryption

Session → Create & maintain the session.

Transport → End to End delivery of Data

Network → Add IP Address IPv4 | IPv6

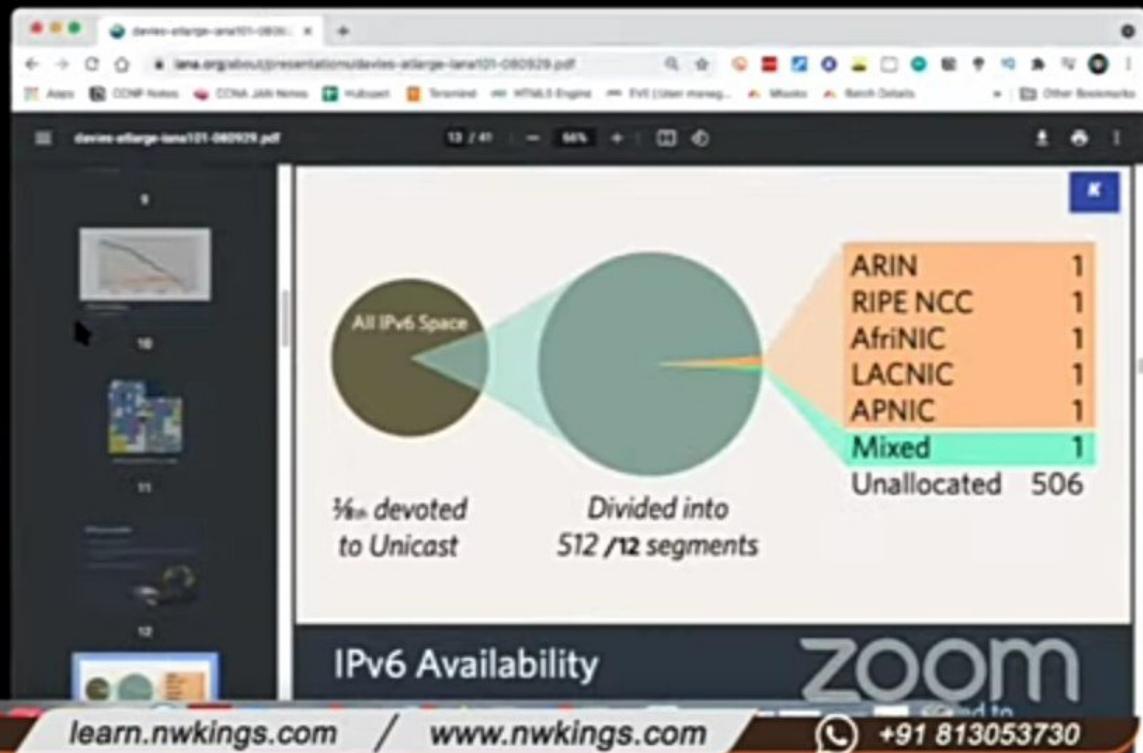
Device → Add MAC Address

Physical → Cables, Switches, Routers

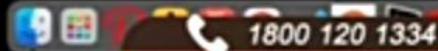
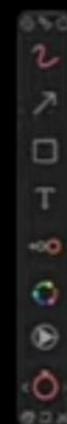
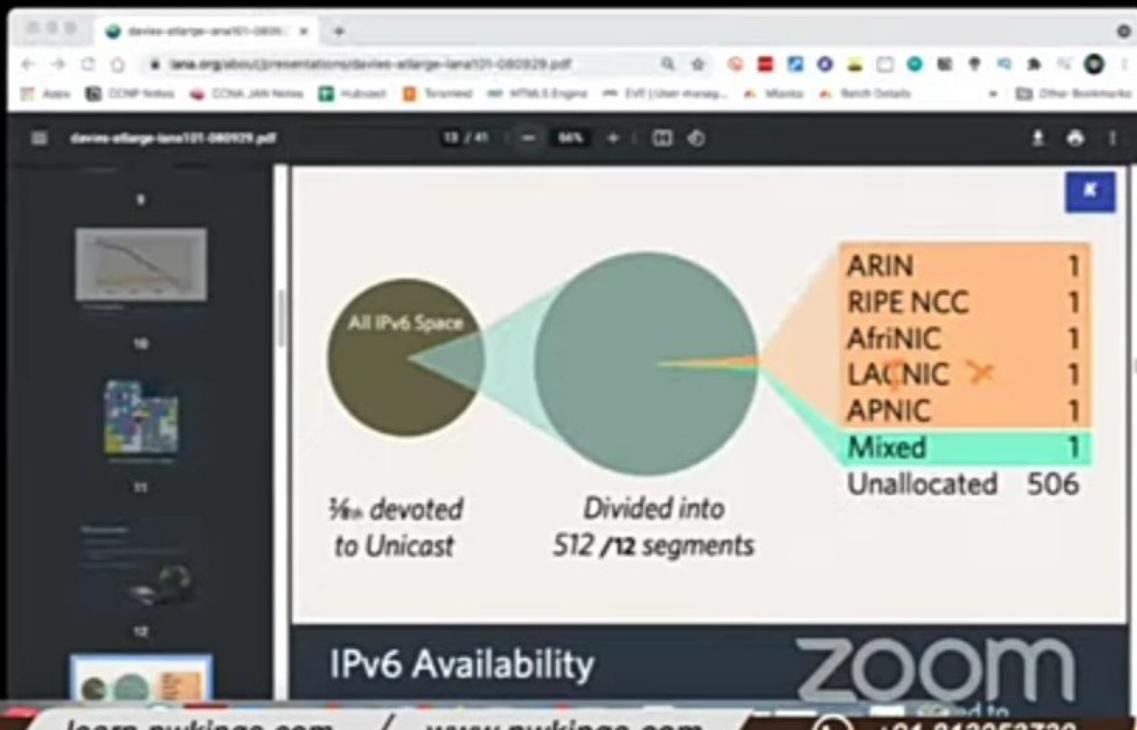
→ Segmentation
→ Segmentation
→ Retransmission

TCP - ACK

UDP - No ACK



↓ IANA
- ARIN
- RIPE
- APNIC
- LACNIC
→ AFRNIC



20-09-06/14 media-player 2

View Zoom Auto Mode Play

APNIC Asia Pacific Network Information Centre

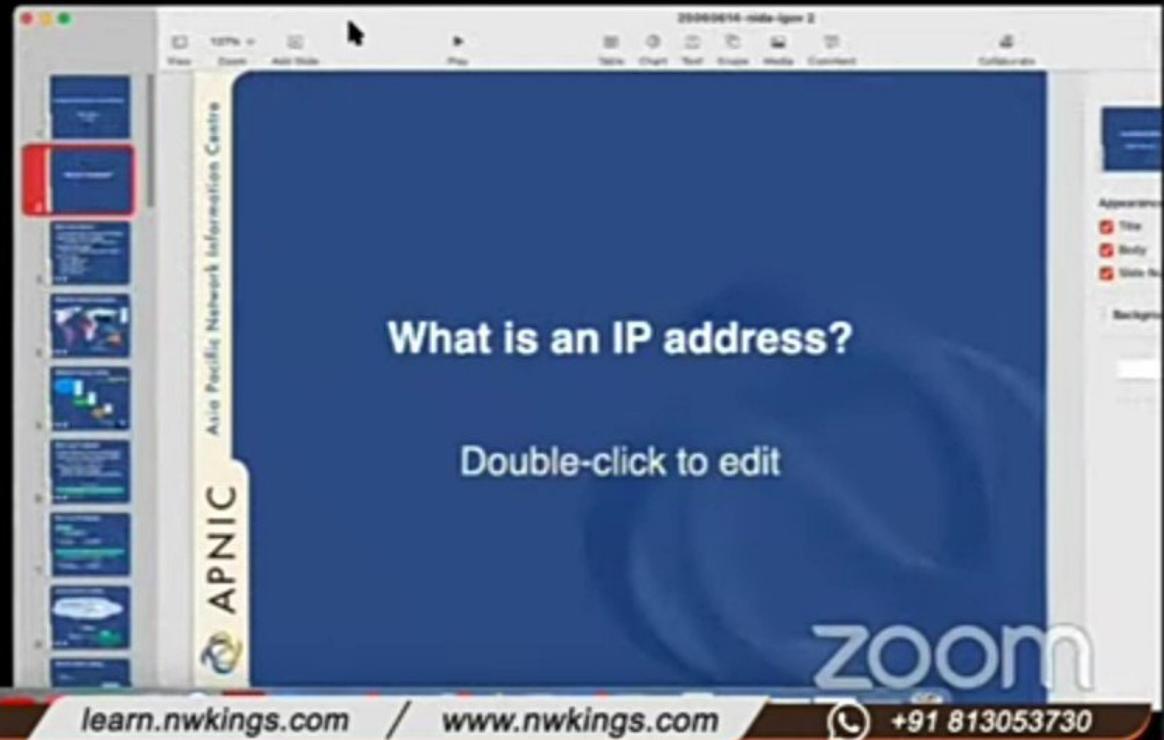
What is an IP address?

Double-click to edit

zoom

Appearance
Title
Body
Use Numbered List

Background



The image shows a Zoom video conference interface. A presentation slide is displayed in the center. The slide has a blue background and features the title "What is an address?" in large white font. Below the title is a bulleted list of five items. To the left of the slide, there is a vertical sidebar with the APNIC logo and the text "Asia Pacific Network Information Centre". On the right side of the slide, there is a sidebar with options for "Appearance" (Title, Body, Slide Number) and "Background". The top of the screen shows the Zoom control bar with various icons and the text "20-06-0618-mike-tiger 2".

What is an address?

- An identifier which includes information about how to find its subject
 - (according to some rules of interpretation)
- Normally hierarchical
 - Each part provides more specific detail
- For example...
 - +61 7 3858 3188
 - www.apnic.net
 - pwilson@apnic.net
 - 202.12.29.142

The image shows a Zoom video call interface. The main content area displays a presentation slide with the title "Telephone network geography". The slide features a world map with color-coded regions and a yellow line indicating a connection path from Australia to South Africa, labeled with the phone number "+01 7 3858 3188". On the left side of the slide, there is a vertical sidebar with the APNIC logo and the text "Asia Pacific Network Information Centre". The top of the slide has a navigation bar with options like "Title", "Chart", "Text", "Image", "Media", and "Comment". To the right of the slide, there is a "Customize" panel with settings for "Appearance" (Title, Body, Slide Number) and "Background". The bottom of the slide has a footer with the text "20-06-06-16-minutes.pptx 2". The overall background of the slide is dark blue.

Telephone network geography

+01 7 3858 3188

APNIC Asia Pacific Network Information Centre

20-06-06-16-minutes.pptx 2

The slide is titled "Telephone network routing" and features a diagram illustrating the three-tier routing model:

- Global:** Represented by a blue oval at the top.
- National:** Represented by a green rectangle in the middle.
- Local:** Represented by an orange hexagon at the bottom.

Each tier contains a "Prefix Table" with specific prefix entries:

- Global:** Prefix Table entries include: +61, 7, 3858, 3188, 17, 65, 61, 608, 61, ...
- National:** Prefix Table entries include: 0, 1, 2, 3, 4, 5, 6, 7, ...
- Local:** Prefix Table entries include: ...

A call icon and the number **+61 7 3858 3188** are prominently displayed on the right side of the slide.

The slide is presented in a Zoom video conference environment, indicated by the "zoom" watermark at the bottom right. The APNIC logo is visible on the left side of the slide area.



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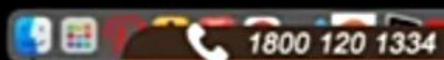
The slide is titled "What is an IP address?" and contains the following text:

- *Internet identifier including information about how to reach a network location*
 - (via the Internet routing system)
- Also a hierarchical identifier
 - Network part and Host part
 - Host part can be subdivided (subnetting)

Below the text is a diagram illustrating the structure of an IP address:

- A horizontal bar is divided into two sections: "Network address" (green) and "Host address" (green).
- An arrow above the bar is labeled "Fixed address length".
- An arrow below the bar is labeled "Variable prefix length".

The slide is part of a presentation titled "APNIC Asia Pacific Network Information Centre" and includes a navigation sidebar with various icons.



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zoom

What is an IP address?

IPv4: 32 bits

2^{32} = 4,294,967,296 addresses
= 4 billion addresses

e.g. 202.12.29/24 (network address)
202.12.29.142 (host address)

IPv6: 128 bits

2^{128} = 340,282,366,920,938,463,463,374,607,431,770,000,000
= 340 billion billion billion addresses ?

e.g. 2001:0400::/32 (network address)
2001:0400:3c00:af92:: (host address)

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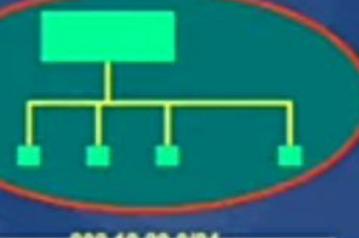
Internet address routing

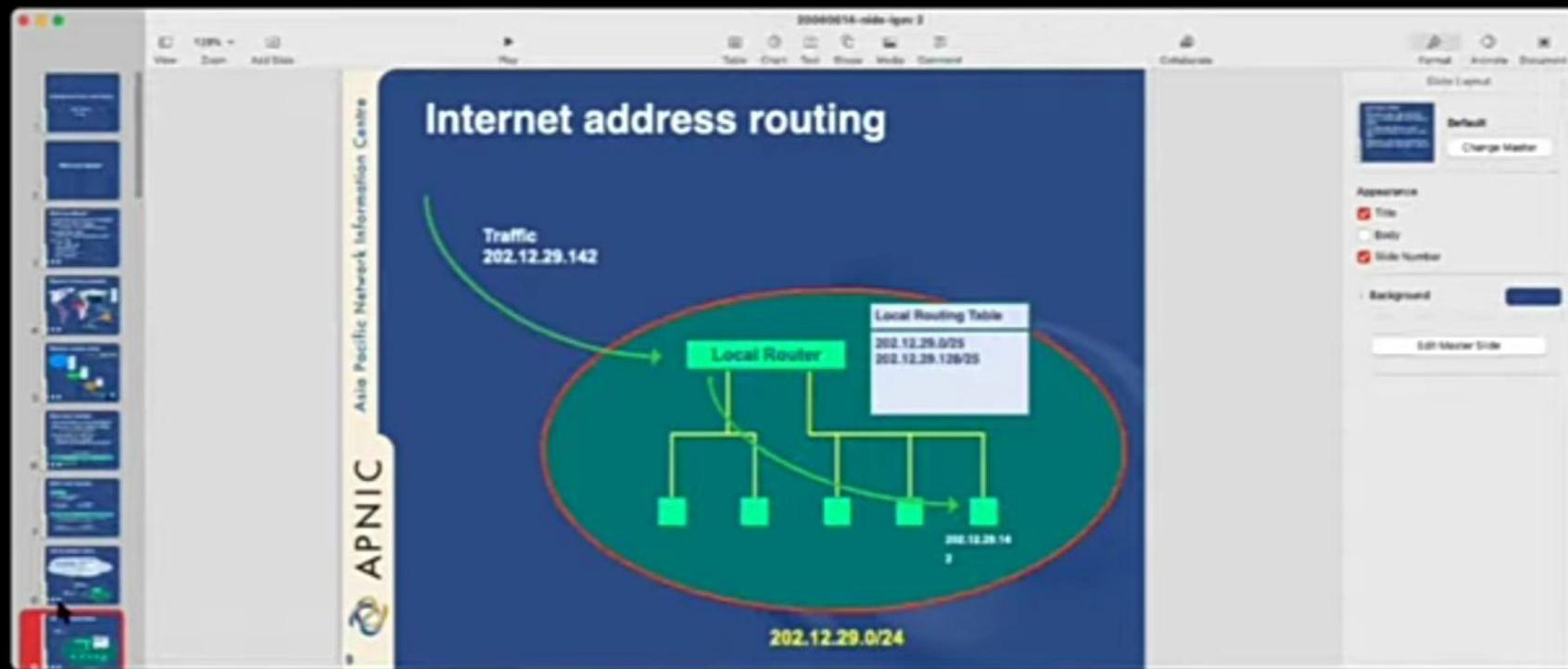
The Internet

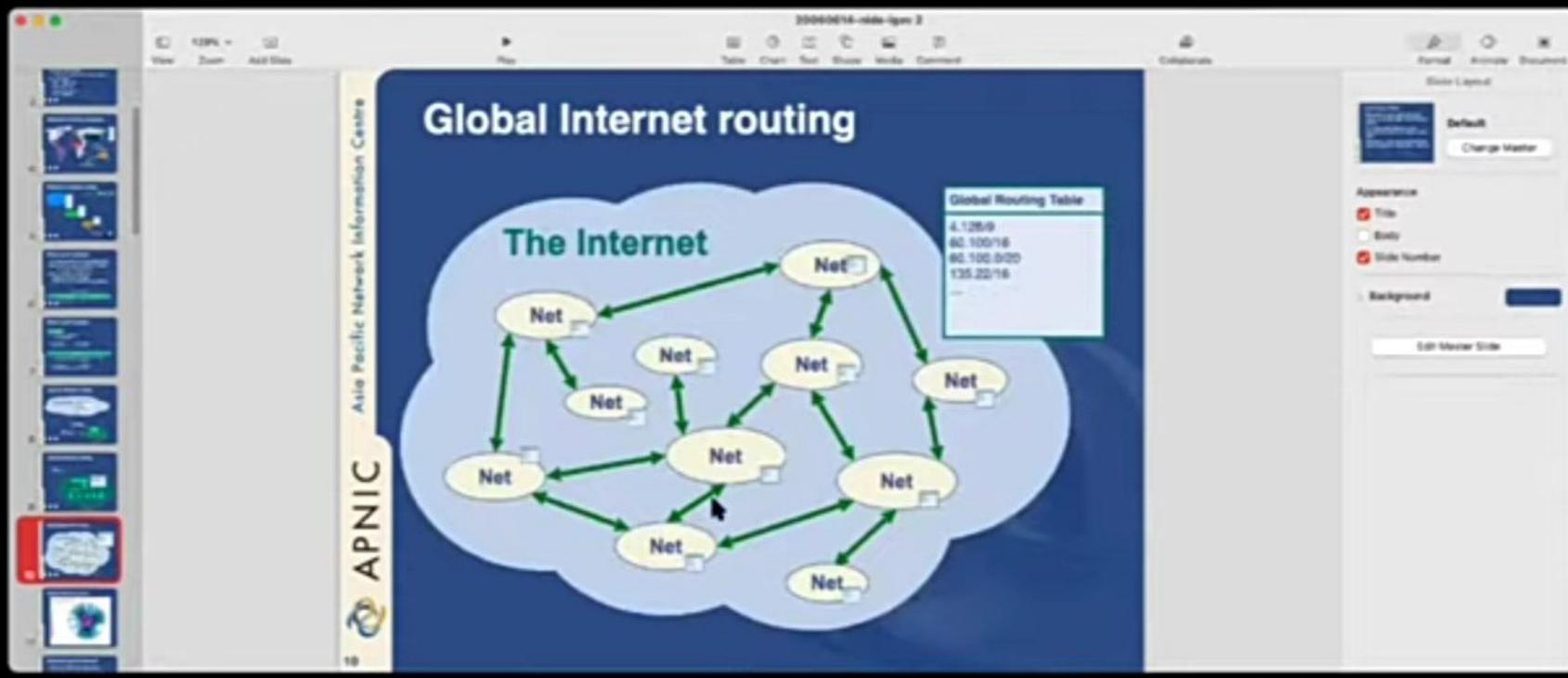
Global Routing Table

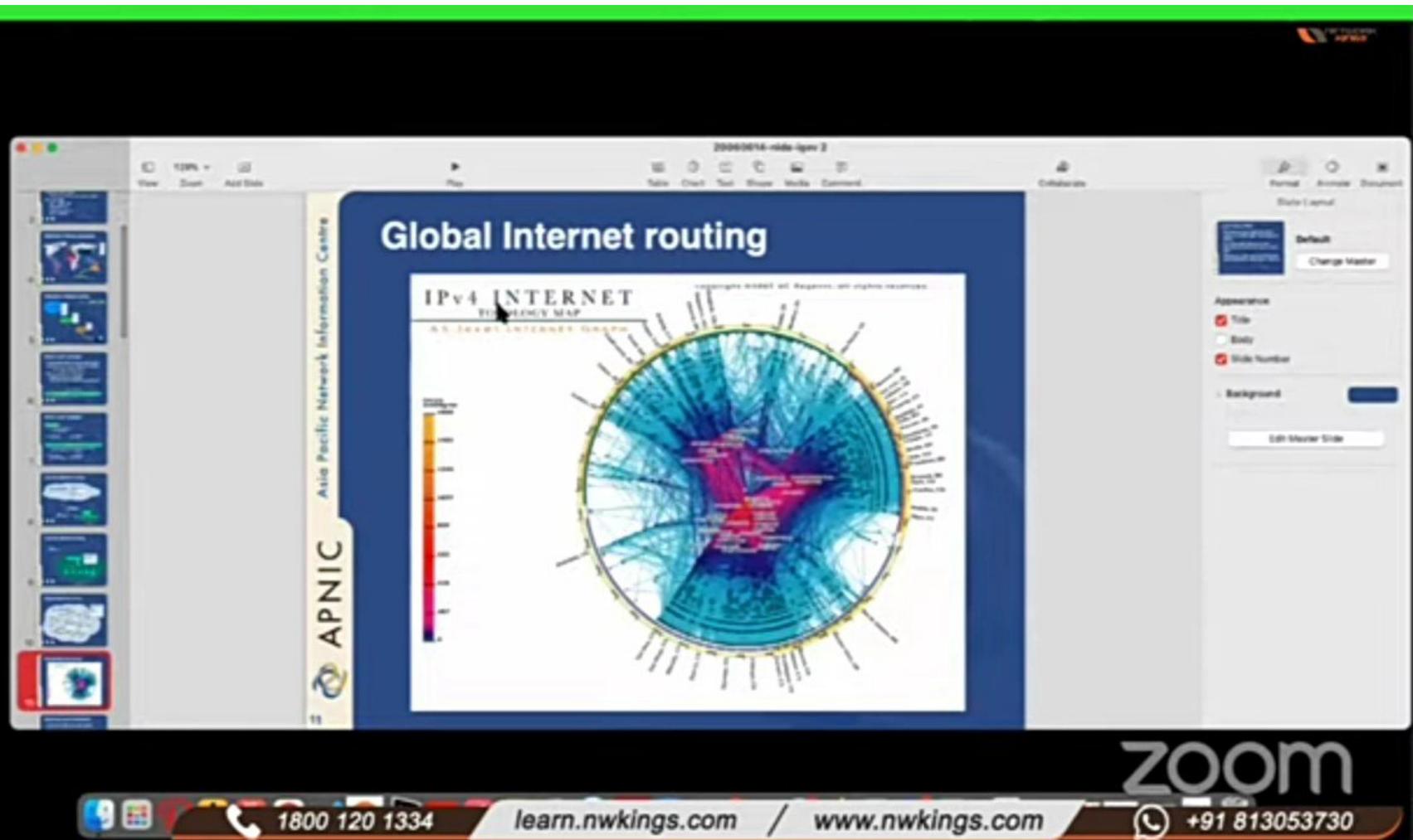
4.128/9
60.100/16
60.100.0/20
135.22/16
...

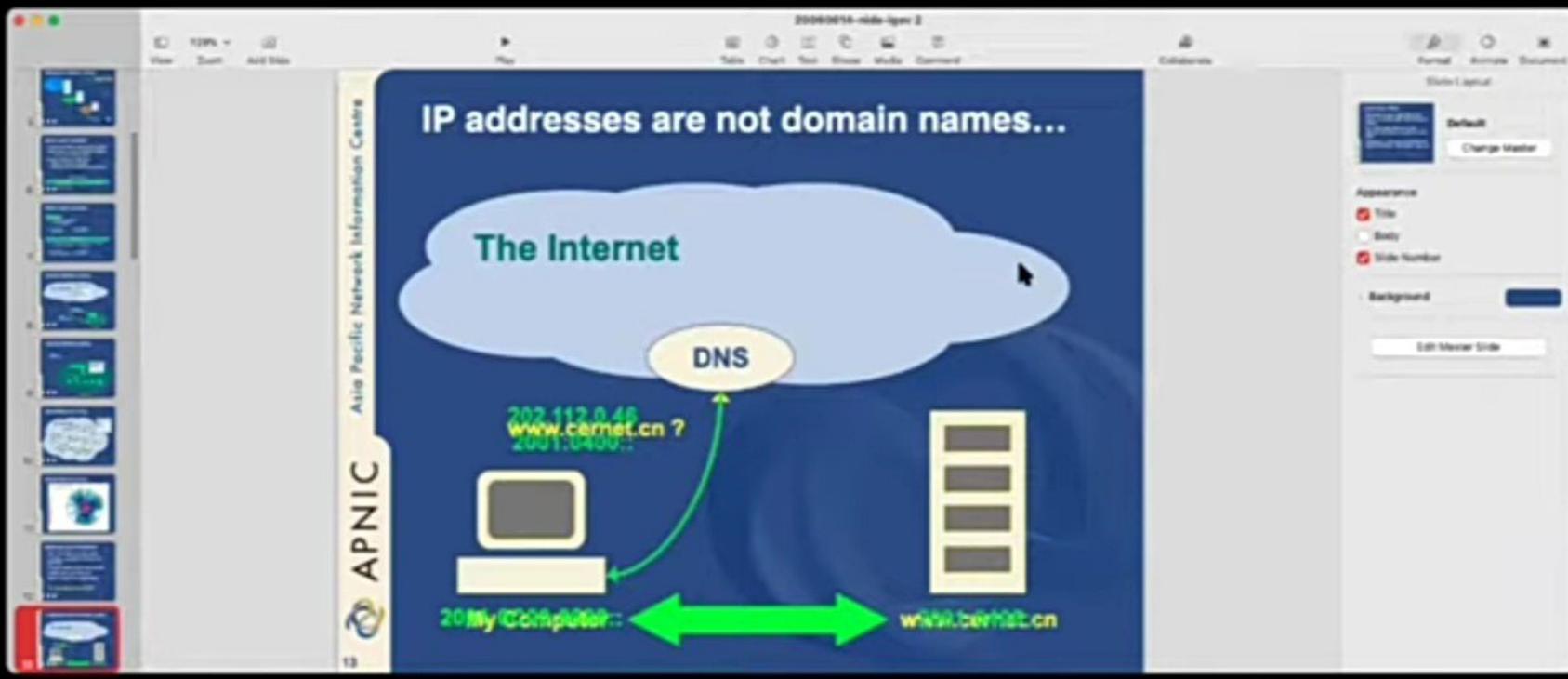
Announce
202.12.29.0/24

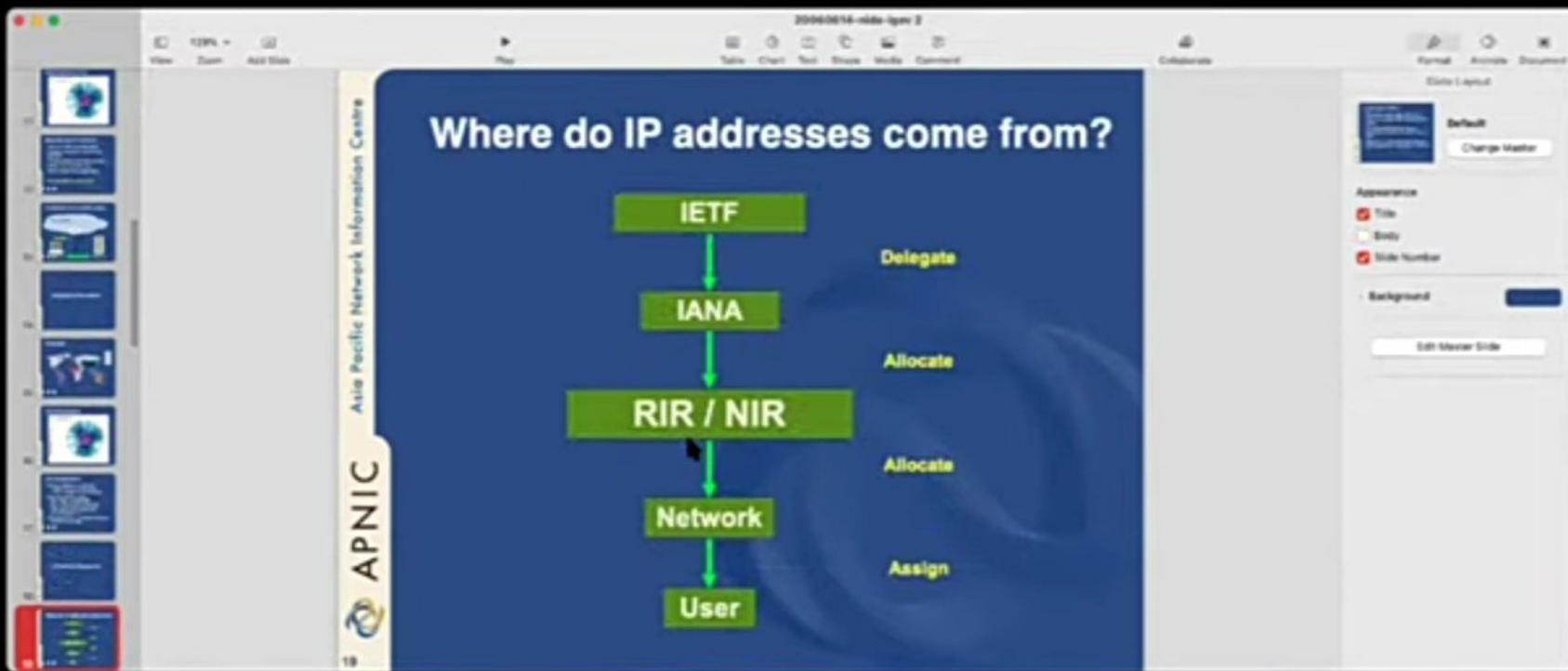












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zoom

APNIC Asia Pacific Network Information Centre

Early years: 1981 – 1992

1981:

"The assignment of numbers is also handled by Jon. If you are developing a protocol or application that will require the use of a link, socket, port, protocol, or network number **please contact Jon to receive a number assignment.**" (RFC 790)

21

2024/06/14 - slide Open 2

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Default Change Master

Appearance Title Body Slide Number

Background

Edit Master Slide



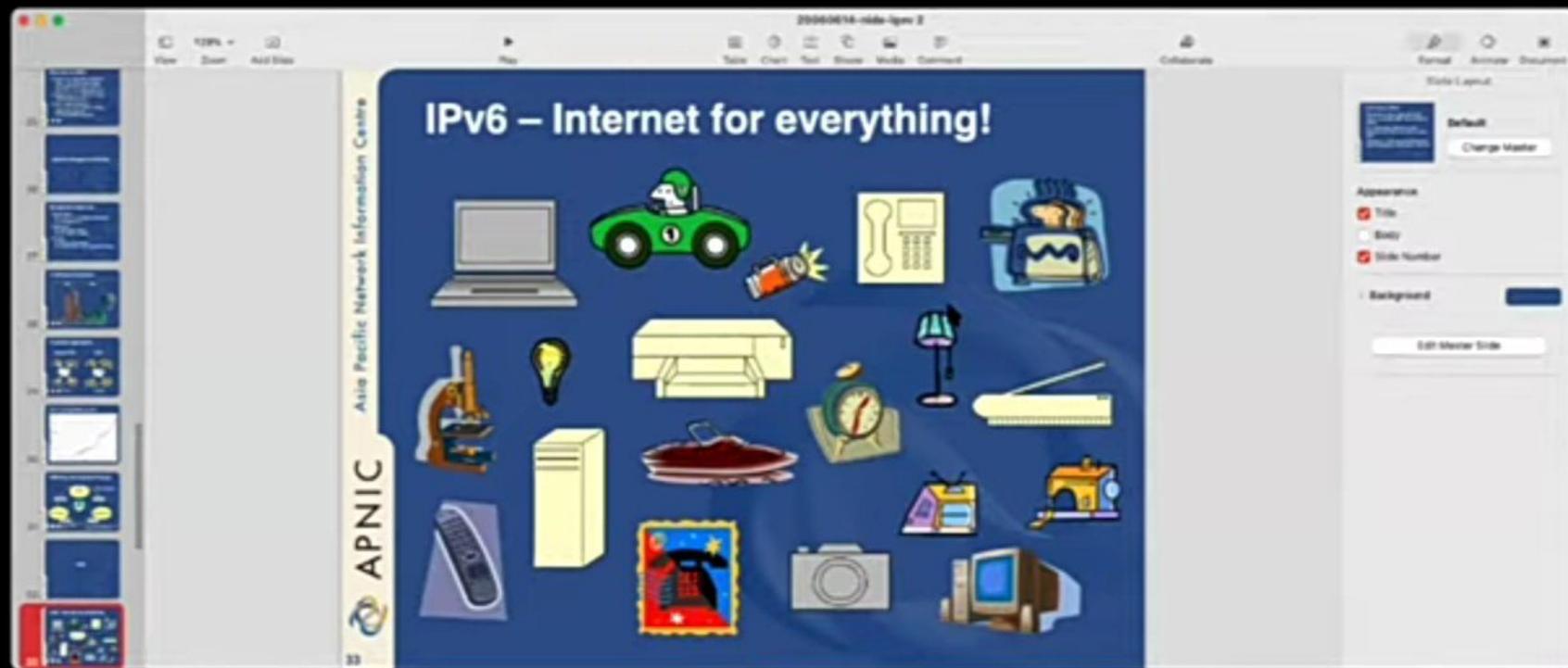
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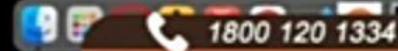
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