

# Welcome to "Little Bits to Big Ideas"

Lab 12: The Internet

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# Three key protocols

## IP (Internet Protocol)

Routes messages between computers

Typically: computer → LAN → Internet → LAN → computer

## DNS (Domain Name System)

Finds IP address of a given domain

Multiple steps (`edu`, then `illinois.edu`, then `grainger.illinois.edu`, ...)

Cache prevents repeated checks for same domains

## TCP (Transmission Control Protocol)

IP is unreliable (drops some messages)

TCP adds message numbers and acknowledgements of receipt to add reliability



# LAN vs Internet

## **LAN** (Local Area Network)

Centrally managed (by U of I, Internet Service Provider, Cell carrier, ...)

Each has own infrastructure and policies about connection

## **Internet** (Inter = between, net = networks)

Sends information between special computers

Typically 1 computer per LAN (the “gateway”) is part of the Internet; others talk to it

Also has “backbone” computers that just forward messages along



# DNS records

DNS has many record types. Four of these will be used in this lab:

## **A**

IPv4 of a given domain

## **AAAA**

IPv6 of a given domain

## **CNAME**

Canonical name, telling us that one domain is shorthand for another

## **NS**

The hostname that answers DNS requests for subdomains of this domain



# The Cloud

Data and apps are **on the cloud** if

- Data/app owners pay **someone else** to host the data/app
- It doesn't matter **which computer** is hosting, nor **how many** are involved
- The owner can put **many** customers' apps/data on the **same** computer

This can result in

- Better load balancing (some apps busy while others idle)
- Incremental pricing (more users → more cost, no big “buy a new computer” moment)
- Economy of scale (full-time hard-drive replacers, etc)



# Being DNS

- some groups get a printed list of [domain → IP address]
  - 10.0.0.1 .. 4
  - .
  - .edu
  - dns[123].illinois.edu
  - courses.grainger.illinois.edu
- Someone is a client

