ComputerNetwork\_Chapter1\_권효재

Introduction “What is the Network”

Overview

- What is the Internet

- Network edges

- Network cores

- performance

- protocol layers, service models

- Security

Internet Structure View

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| Host – node 마지막에 붙어있는 end systems <end node>  network 사용하는 App존재  Packet switches – network switches <ex, routers, and switches>  Data를 forward함, packets = data의 묶음  Communication links – Wired (Fiber, copper) /// Wireless (radio, satellite)  Network -Collection of devices, routers, links  Everything -> Internet connected things  Internet – network of networks  다양한 network들을 묶어서 하나의 network 형성  Protocols – data를 주고받기 위한 약속  Internet standards으로 지정된 경우가 대부분 |

*Applications running on server hosts -> data server (Data center)*

Internet Service view

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| - 다양한 applications에 data를 주고받을 수 있는 인프라 <data exchange service> 제공  - Data를 Packet로 합쳐서 전송 |

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What is a protocol

Network protocols: network를 주고받기 위해 message를 주고받는 규칙

Protocol -> format, order of messages -> action 정의

Desktop

Server

----------TCP Connection Request-------------🡪

🡨-------TCP Connection Response-------------

------------Get <File name>-------------------🡪

🡨----------------<file>---------------------------

<This is Protocol>

Network edge

Host, Access Network, Physical media

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| Network edge  Host <Clients, Servers>  Servers <in data center>  Access Network <Physical media>  Wire, Wireless  Network Core  Data를 router -> router (Interconnected)  Connect ‘end systems’ to ‘edge router’  Access network  Host 받은 data를 Core로 전송  Core router과 연결되어 있음  <Core edge router> |

Access networks: Cable based Access

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| frequency조정으로 Channels생김 , 일부 channel -> data교환을 위한 채널    모든 가입자가 Cable을 공유함  HFC : hybrid fiber coax  ->data, TV shared cable distribution network  ->down stream 이 더 빠름 |

Access networks: Digital subscriber line

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| Data와 Voice Line이 dedicated돼있음 <Not Shared> |

Access networks : Home networks

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| **-Wireless access networks**  사람들이 network를 공유 -> base station or access point  WLANs (wireless local area networks) ~ 100ft(wifi)  **Wire area cellular access networks**  Provided by mobile, 4G->5G |

Access networks : Enterprise networks

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| 2가지 장비 필요   1. router -경로 탐색 2. switch -어느 device로 전송해야 하는지 선택   wired & wireless -> connect mix of switches |

Access networks : Data center networks

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| High-bandwidth link (Server간 data연결 활발) |

HOST-sends packets of Data

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| takes application message  message를 끊는다 -> packets제작 -> the length is L bits  Link의 속도 R  Transmission rate – capacity , link bandwidth  보내는데 걸리는 시간 : packet transmission delay = L/R(bits/sec) |

LINKS : physical media

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| 주고받는 데이터의 크기 단위  Bit : propagates between transmitter/receive pairs  Physical link  Guided media – propagate solidly -> TP(two insulated copper wires) /cata 5,6  Unguided media – propagate freely |

Link-Physical media TP

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| Make a connection between PC, Router |

Link physical media

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| Coaxial cable  모든 device가 동일한 cable 사용->하나라도 오류 시 모든 system down  Fiber optic cable  Lower error rate   1. repeaters(증폭기) spaced far apart 2. immune to electromagnetic noise   HIGH speed  전기신호 -> Optical Signal  Wireless radio  Broadcast channel – no wire  “half-duplex” – data를 보내면서 받지 못함 -> 보내는 신호 강함, 받는 신호 약함  Propagation environment effects   1. reflection 2. obstruction by objects 3. Interference/noise     Raido link types   1. Wireless LAN(Wi-Fi)   10’s of meters  10~100’s delay   1. Wide area (4G cellular)   10’s Mbps  Over 10km   1. Bluetooth -cable replacement   Short distance, limited rates   1. Terrestrial microwave   Point-to-point , 45Mbps channels   1. Satellite   Up to 45Mbps per channel  270msec delay |