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# 네트워크

## TCP (Transmission Control Protocol)

TCP/IP 프로토콜중 하나

OSI 계층모델 관점에서 4계층에 해당

양 종단 호스트 내 프로세스 상호 간에 신뢰적인 연결지향성 서비스를 제공

* IP의 비 신뢰적인 최선형 서비스에다가, 신뢰적인 연결지향성 서비스를 추가 제공하게 됨.
* IP는 패킷을 받는 순서가 다를 수 있는 비 신뢰적인 서비스임. 대신 목적지로 최대한 빨리 보내려고 함.

### 신뢰성

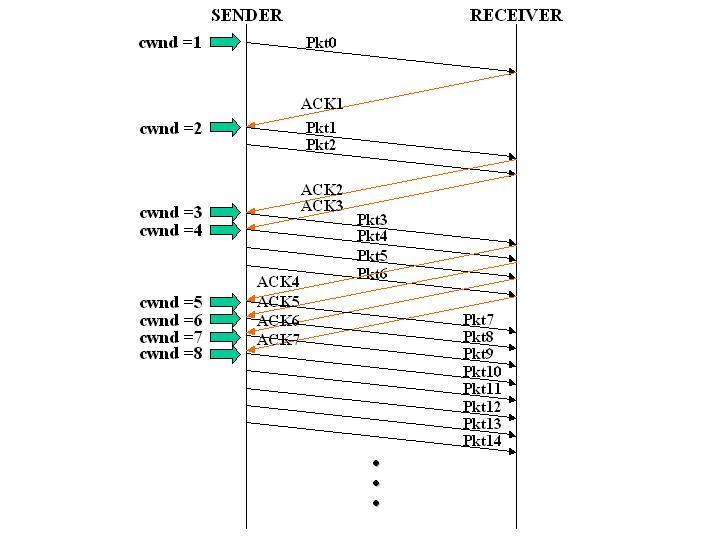
* + 흐름제어: 송신 측과 수신측 사이의 데이터 처리 속도 차이(흐름)을 제어하기 위한 기법. 데이터처리 속도를 조절하여 수신자 버퍼 오버플로를 방지

1. Stop And Wait(정지 – 대기): 매번 전송한 패킷에 대한 응답(ACK)을 받아야 다음 패킷을 전송가능 하다.
2. Sliding Window(슬라이딩 윈도우): 1번의 방식은 패킷이 하나씩만 전송되므로 비효율. 그렇기에 2번을 씀. 수신 측에서 설정한 윈도우 크기만큼 송신 쪽에서 확인없이 전송함. 전송받은 게 확인이 되면 다음 윈도우 크기로 확장되는 형태
   * 오류제어: 오류를 검출하여 재전송 ARQ(Auto Repeat Request)를 사용해 프레임이 손상되거나 손실되면, 재전송을 통해 오류를 복구. 흐름기법과 연관이 있음.
3. Stop And Wait ARQ: 흐름제어에서의 ACK나 NAK(Negative)를 받고, NAK면 다시 보내는 것. 다만 ACK NAK 둘 다 안 오면 일정 시간 뒤에 타임아웃으로 데이터를 재전송 함.
4. Go-Back-N ARQ: 슬라이딩 윈도우 방법에서의 신뢰성 보장인 것 같음. 패킷 손실이 난 이후의 모든 프레임을 폐기하고 싹 다 재전송함.

테이블이(가) 표시된 사진

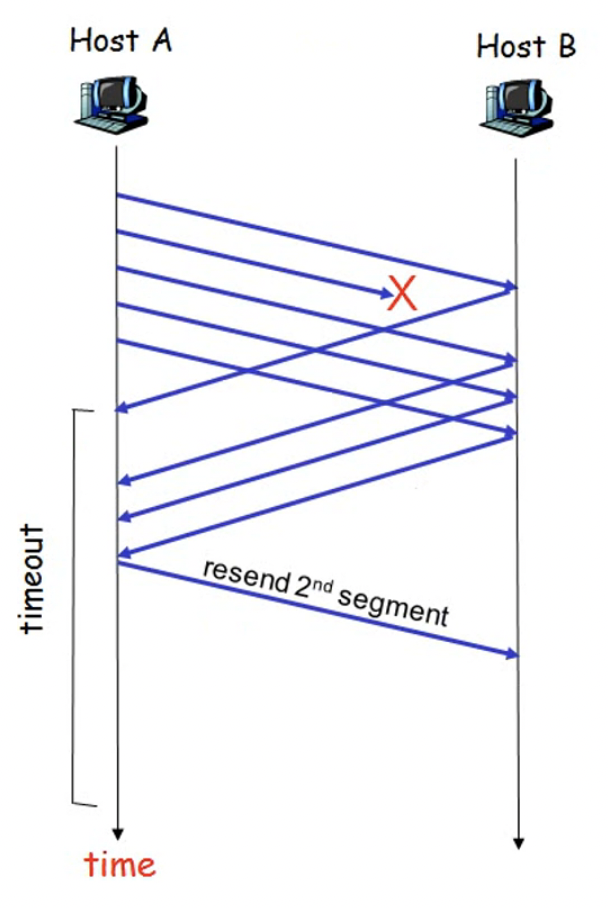
자동 생성된 설명

1. SR(Selectvie-Rejct) ARQ: GBn의 폐기하는 단점을 보완. 손실된 것만 보냄. 그 대신 구조가 복잡하고 프레임 순서 꼬인 거 재배열하기 위한 버퍼가 필요함.
   * 혼잡제어: 송신측의 데이터 전달과 네트워크 데이터 처리속도를 해결하기 위한 기법 네트워크 혼잡을 피하기 위해 송신측에서 전송 속도를 제어하는 것.
2. AIMD(Additive Increase Multicative Decrease): 합 증가/곱 감소 알고리즘. 패킷이 잘 도착되면 Window size를 1씩 증가시켜버림 유실이 되면 window size를 반으로 줄임.



단점으로는 네트워크가 혼잡해지고 나서야 대역폭을 줄이는 방식임. 미리 대응을 못함.

1. Slow Start: AIMD가 네트워크 수용량에선 효율적이지만, 초반 전송속도 올리는 것이 느림. 얘도 1부터 시작하긴 하지만 2배로 늘려줌. 혼잡현상이 발생하면 윈도우 크기를 1로 떨어트림
2. Fast Retransmit(빠른 재전송): 보통 다음 패킷의 순번을 ACK패킷에 실어 보내는데, 이때 순서가 맞지 않는 패킷을 3개 받으면 유실된 패킷의 Time Out 시간이 지나지 않았어도 해당 패킷을 재전송 시켜주게 된다. 아래 사진에서는 2번 패킷의 TimeOut시간이 되지 않았음에도 빠른 재전송 기법에 의해 재전송 되는 것을 보여줌.



1. Fast Recovery(빠른 회복): 혼잡상태시 윈도우 크기를 1로 줄이지 않고 반으로 줄이고 지수형태로 늘어나던 것을 선형 증가하는 방식. 이걸 적용하면 혼잡을 한번 겪으면 AIMD 방식으로 동작.

### TCP헤더

![테이블이(가) 표시된 사진

자동 생성된 설명](data:image/jpeg;base64,/9j/4AAQSkZJRgABAQEAYABgAAD/4RDcRXhpZgAATU0AKgAAAAgABAE7AAIAAAAKAAAISodpAAQAAAABAAAIVJydAAEAAAAIAAAQzOocAAcAAAgMAAAAPgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAOyerOuzteywqAAABZADAAIAAAAUAAAQopAEAAIAAAAUAAAQtpKRAAIAAAADMzcAAJKSAAIAAAADMzcAAOocAAcAAAgMAAAIlgAAAAAc6gAAAAgAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA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L9L/hR/Ztj/AM+dv/36X/CsvxdNLb+F3jimkRrme2s2mVtros08cTOCMYIVycjGCO1Ymp6Jbab8QPCMlnJPFArTW0Nkkm22gRLaTGyIYUHn7xycAAEDigDr/wCzbH/nzt/+/S/4Uf2bY/8APnb/APfpf8K8vgFx/wAJXc+JtSt9Ju5Y/EY0pElhdr6GMyiKPyZt4EShXEjRBCGUyMW+c47nwjGtpBqml267LTTdQeC1QdEjKJIEHoqmQqAOAqgdqANf+zbH/nzt/wDv0v8AhR/Ztj/z52//AH6X/CrNFAFb+zbH/nzt/wDv0v8AhR/Ztj/z52//AH6X/CrNFAHF/EaytYfDVm8VtCjDWdNwyxgEf6bDXQ+If+QSv/X1bf8Ao9KxfiV/yK9p/wBhrTP/AEthqj8SNe1bRI7UW0NtJYzOjF3RiyyI4cDIYDBwO3Y1tRg51EkZ1ZKMG2d3RWfoVxf3eh21zq0cUV1Mm944lICA8gcknOMZ960Kyas7Fp3VwooopDCiiigAooooAKKKKACiiigAooooAKjuf+PWX/cP8qkqK6AazmB5BjYH8qAOb+GP/JJ/Cv8A2Cbb/wBFLXU15f8AD34beDtQ+Gvhy8vfDtjNcXGmW8ksjx5LsYwST+NdH/wqvwN/0LGn/wDfugDraK5L/hVfgb/oWNP/AO/dH/Cq/A3/AELGn/8AfugDraK5L/hVfgb/AKFjT/8Av3R/wqvwN/0LGn/9+6AN7VtB0jXoEh13SrLUoo23pHeW6TKrYxkBgcHFTxafZwFDBaQRmOEQJsiA2xjogwOF9ulc1/wqvwN/0LGn/wDfuj/hVfgb/oWNP/790AbNx4X0C7WxW70PTZ105QtkJbSNhagYwI8j5ANq9MdB6VNPomlXWrwarc6ZZzajbLsgvJLdGmiXnhXIyB8x6HufWsD/AIVX4G/6FjT/APv3R/wqvwN/0LGn/wDfugDdl0DR7jyPP0mxl+ziUQ77ZD5QkBEgXI43AkNjrk5qIeF/D40Q6MNC03+yy242P2OPyCc5z5eNuc89OtY//Cq/A3/Qsaf/AN+6P+FV+Bv+hY0//v3QB0Fro2l2McMdlptpbJbsXhWGBUEbFdpKgDg7eMjtxT00ywiWJY7K3RYZnniCxKBHK27c444Y73yRydzeprnP+FV+Bv8AoWNP/wC/dH/Cq/A3/Qsaf/37oA6HVNMi1W0WGWSSFo5FlimhIDxOpyGGQR+BBBBIIINT/ZoPtf2ryI/tGzy/O2DfsznbnrjPOK5f/hVfgb/oWNP/AO/dH/Cq/A3/AELGn/8AfugDZbw5piXF9eafaW+m6lfRlJtStLeJbg57lyp3EEA/MCOBxV2xsrfTdPt7Kyj8q3t41iiQEnaqjAGTyeB1Ncz/AMKr8Df9Cxp//fuj/hVfgb/oWNP/AO/dAHW0VyX/AAqvwN/0LGn/APfuj/hVfgb/AKFjT/8Av3QB1tFcl/wqvwN/0LGn/wDfuj/hVfgb/oWNP/790AdbXJf81o/7l/8A9uKP+FV+Bv8AoWNP/wC/dN/4VP4E83zP+EXsN2Nv3D0+maAOvorkv+FV+Bv+hY0//v3R/wAKr8Df9Cxp/wD37oA62iuS/wCFV+Bv+hY0/wD790f8Kr8Df9Cxp/8A37oA62s228N6HZ6xLq1po2nwalNu828itUWaTPXLgbjnvk1if8Kr8Df9Cxp//fuj/hVfgb/oWNP/AO/dAGxq2j/bNDurDTotNh+1MTIl5Y/aIJNzZffEHTcW5/i6nJzWd4e8F2ek6Re2WoRafeLft+/t4LBYLQRhQqxJBlgEwCSCWJZmOcEAQf8ACq/A3/Qsaf8A9+6P+FV+Bv8AoWNP/wC/dAG/Z6HpOnWtrbafpdnawWcjS20UFuiLA7BgWQAYUkO4JHZm9TSXOhaTe2r2t5pdlcW8k3nvFLboyNJnO8gjBbPOetYP/Cq/A3/Qsaf/AN+6P+FV+Bv+hY0//v3QBs+IdFXX9KSxklEaLeWtyxaPeGENxHNsIyPveXtz2znB6U+18O6JY6TNpVlo9hb6dOGEtnDaokMm4YbcgGDkcHI5rD/4VX4G/wChY0//AL90f8Kr8Df9Cxp//fugDdtfD+jWGnpYWOk2NtZxyrMltDbIkayKwZXCgYDBgCD1BANTtpti0exrK3KeeLjaYlx5obcJMY+9uAO7rnmub/4VX4G/6FjT/wDv3R/wqvwN/wBCxp//AH7oA3JPD2iym/MukWDnUgovi1sh+1BRhRJx8+ATjdnFSWei6Vp9ra21hplnawWbM9tFBbqiwM24MUAGFJ3tkjruPqa5/wD4VX4G/wChY0//AL90f8Kr8Df9Cxp//fugDpNQsINU024sbxS0FxGY3CsVOCOoI5B7gjkHmhLGLbam6xd3Fqv7u5nRPM3bdrNwAFJGc7QByeMcVzf/AAqvwN/0LGn/APfuj/hVfgb/AKFjT/8Av3QBvnQ9JbWl1htLsjqapsW+NunnBcYx5mN2MEjGaXSdMi0jT1tYpJZjveSSaYgvNI7FndsADJYk4AAHQAAADn/+FV+Bv+hY0/8A790f8Kr8Df8AQsaf/wB+6AOtorkv+FV+Bv8AoWNP/wC/dH/Cq/A3/Qsaf/37oA62iuS/4VX4G/6FjT/+/dH/AAqvwN/0LGn/APfugA+JX/Ir2n/Ya0z/ANLYa6LUtMtNWtRb38QliWRZAp9VOR/h9Ca878beAPCmiaPY32k6FZ2l1HrOnBJY0wyg3kQP5gkV6fTTad0JpNWYUUUUhhRRRQAUUUUAFFFFABRRRQAUUUUAFFFFABUdz/x6y/7h/lUlR3P/AB6y/wC4f5UAc18Mf+ST+Ff+wTbf+ilrqa5b4Y/8kn8K/wDYJtv/AEUtdTQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAcvrMcms+MLbQ5726tLFbF7t47O4e3kuWDqgHmIQ6qmckKRksuTjIONd6tqXhF9d0/SZX1OOzjsJrNNSuHlMbXNw8bxNMcuR8oYFixXf/dCrXX6xoGna6kI1GKQvbsXgngnkgmiJGDskjZXXI4OCMjg1kap4IsZPCNzomlW8YW6uYp7hruV5muNsyO5kkfc7kqu0bieAo4AGADnvFes+KbTRNe0qbU9PS/tba3vIb6ytJYsxSSshQx+cSrAx8MHIIJG0Yyb9zr97pGt6vAbXTZtTEGlwC8jtzCJpbiWWIGT5mby0PzBck8sM5bNb9t4N0S203ULJbeeaPUl2XclzeTTzSrt2gea7mQADO3DDaSSMEk08+E9Ge3uoZraSdby3itp2nuJJHkSPcY8uzFtyl2IfO7ODnIGADntR8UeItDh1WyvBpl/qVqlnNbTQwyW8MqTzmHY6F3KkFWO4MQcjj5SC6XxF4ls49XsJhZXuoWElu32uz0+ZkSCUHLm2EjO7KUb5UfJBB7EHetvCGjW1lParbzTLcSxyzSXN3NPLI0bBkzK7FyFIBAzgc8cmpL7wxpWoTXM9xDMk915fmT291LDIPL3BdrowZDh2HykZDEHINAE+iXx1LRLW7a4guTLHkzW6MiOehIRssnTlCSVOVJOM1xMHxBv21i+t1ls723bSrvUbOWLTrmGMGEx4UTOdlyjCUHzI9o+Xp8wru9P0200rTYdPsYRHbQrtVCSxPqSTksSSSSSSSSSSTWLZfD/w3p77raymyLSSyQS3s8ojt327okDOQifIuFXAXHGMmgDF/wCEy17SI5X12LTrqSfRzqVpDaRyQ+U4ZFMMjsz7xmWP94FXgMdnQCzpKa3F8Skj8QXWn3Uv9juySWNu8AGZkypRnfpjht3OcbRjJ6G58N6ReEfa7JJgLJ7DbISymB9u5CCcEHYvJ5469ah0fwjo+hXzXlhBObtofINxc3k1xIY8ghN0rsdoIyB0GTjGTkA5vxvc2q+M9JttUl177G+m3cnk6I97vaVZIArMLX5uAzAFvlGfeqeveMNe8JeDrSW7ngl1Wy0v7Zf2slhNdzS7QTiR7c7LfOxh5rbkLBsDCHPoL6favqsWpNFm7hheBJNx4R2VmGM45Ma84zx9aytc8FaD4jnml1e1mla4t/s06xXc0KzxDdhZFRwHxvYjcCVJJGKAOT8f6trOq+D/ABymly6fBpmmWE9rOlzC7TXDNaCVmVw4EYCzKACrbiD0BBpfiFqmtal4R8dQ6bJp8GnaVYT2lxHcwu01wzWglZlcOBGAsygAq24g9AQa6fV/AXh3XZ7iTU7KWT7XALe5jS7mjjnQAhfMjRwrsAeGYFhhcEbRhdZ8CeHvEF1dT6rZSym8hEF1Gl3NFHcKAQPMjRwrsAeGILDC4I2jABjal4gvtP1TXV0ew01bsarp9mJpIiDKJliBeQqQWKh+PYAUL4r11bmTQZX01tbOrjT4rtbeRbfYbT7V5hhMhbIQMu0ScnByBnHUS+HtLmuZ7iS13S3FzDdSN5jfNLFt8tuvGNq8dDjnNZniLwxDeWV22n6TbXl3eXUVzL5+ozWZDogRZEljV2RgqqPlAyM5PJyASeFNV1TUJtctNbaykuNL1EWiy2UbIkim3hl3FWZiDmU8ZOOBk4yehrnPBfhuTw5p16LhYkuNQvGu5ooZnmWNtiRgeZJh5DtjUs7AFmLHHNdHQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAcl8Sv+RXtP+w1pn/pbDXW1yXxK/5Fe0/7DWmf+lsNdbQAUUUUAFFFFABRRRQAUUUUAFFFFABRRRQAUUUUAFNkQSxMjZwwIOD606igDirD4YWWm6fb2Nl4i8TRW9vGsUUaaq6hVUYAAHA49Ksf8K+h/wChm8Uf+DeSutooA5L/AIV9D/0M3ij/AMG8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/QzeKP/AAbyUf8ACvof+hm8Uf8Ag3krraKAOS/4V9D/ANDN4o/8G8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/AEM3ij/wbyUf8K+h/wChm8Uf+DeSutooA5L/AIV9D/0M3ij/AMG8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/QzeKP/AAbyUf8ACvof+hm8Uf8Ag3krraKAOS/4V9D/ANDN4o/8G8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/AEM3ij/wbyUf8K+h/wChm8Uf+DeSutooA5L/AIV9D/0M3ij/AMG8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/QzeKP/AAbyUf8ACvof+hm8Uf8Ag3krraKAOS/4V9D/ANDN4o/8G8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/AEM3ij/wbyUf8K+h/wChm8Uf+DeSutooA5L/AIV9D/0M3ij/AMG8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/QzeKP/AAbyUf8ACvof+hm8Uf8Ag3krraKAOS/4V9D/ANDN4o/8G8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/AEM3ij/wbyUf8K+h/wChm8Uf+DeSutooA5L/AIV9D/0M3ij/AMG8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/QzeKP/AAbyUf8ACvof+hm8Uf8Ag3krraKAOS/4V9D/ANDN4o/8G8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/AEM3ij/wbyUf8K+h/wChm8Uf+DeSutooA5L/AIV9D/0M3ij/AMG8lH/Cvof+hm8Uf+DeSutooA5L/hX0P/QzeKP/AAbyUf8ACvof+hm8Uf8Ag3krraKAOS/4V9D/ANDN4o/8G8lH/Cvof+hm8Uf+DeSutooA46X4a2Ny0H2vXfEV0kFxFcLFPqbyIzxuHXKngjcorsaKKACiiigAooooAKKKKACiiigAooooAKKKKACiiigD/9k=)

* Sequence Number: 데이터 세그먼트로 구분한 데이터의 순서번호를 표기한다.
  + MSS(Max Segment Size): TCP가 한방에 보낼 수 있는 최대 데이터 량. 큰 데이터를 보내면 MSS만큼 잘려서 보내지게 됨. 보통 1460byte
  + MTU(Maximum Transmission Unit): 한 프레임 또는 패킷의 최대 크기. 매체에 따라 달라짐 클라와 서버가 있다면, 보통 작은 측의 MTU에 맞춰서 데이터를 주고받음. windows는 보통 1500임
* Acknowledgement Number: 상대방으로부터 수신한 데이터 바로 다음에 수신할 데이터 순서 번호를 나타냄. Seq Num의 확인 응답. 다음 전송할 세그먼트의 Seq Num이기도 함.

## 프로토콜

테이블이(가) 표시된 사진

자동 생성된 설명



# 컴퓨터 구조

커널모드: 모든 자원을 접근하고 명령할 수 있는 모드. OS가 사용

유저모드: 접근할 수 있는 영역이 제한된 모드 응용 프로그램이 사용

프로세스는 유저모드에서 시스템 콜을 이용해 커널에 요청 -> 커널모드에서 처리를 하고 결과값을 시스템 콜의 리턴하며 유저모드로 복귀

If문 분기예측 실패 시 예측해놓은 파이프라인이 쓸모 없어지기 때문에 느려짐.

System call 사용시 유저모드에서 커널모드로 context switch가 일어나는데 그렇게 되면서 성능 저하. OS따라 다르다고는 함.

Context Switch: 현재 작업중인 프로세스에서 다른 프로세스로 넘어갈 때 지금까지의 상태를 저장하고 다른 프로세스의 저장된 상태를 다시 적재하는 과정을 Context Switch 라고 함. 프로세스의 상태는 PCB에 저장.

1. 멀티태스킹의 스케쥴러에 의해 Context switch
2. 커널모드 유저모드 전환에 의해 Context Switch

프로세스와 스레드의 차이점.

프로세스: 프로그램이 메모리에 올라와 운영체제로부터 cpu를 할당 받고 프로그램이 실행되고 있는 상태.

스레드: 프로세스 내에서 실행되는 흐름의 단위

차이점 – 자원공유 영역이 다르다. 프로세스는 서로 공유하지 않지만, 스레드는 Stack은 따로 할당받고 나머지는 공유한다.

레이턴시: 패킷을 전송하는 곳에서 받는 곳까지 이동하는데 걸린 시간. ->물리적으로 가까운 곳에 있기.

대역폭: 물리적으로 처리할 수 있는 최대 데이터 양 -> 물리적으로 늘려버림

RTT(Round Trip Time): 패킷이 목적지에 도달하고 응답이 다시 오기까지 걸리는 시간.

TCP 체크섬: 송신측에서, 전송할 모든 데이터를 16 비트 워드 단위로 구분하고,

- 1의 보수를 취하고, 그 합에 대한 결과를 전송하면,

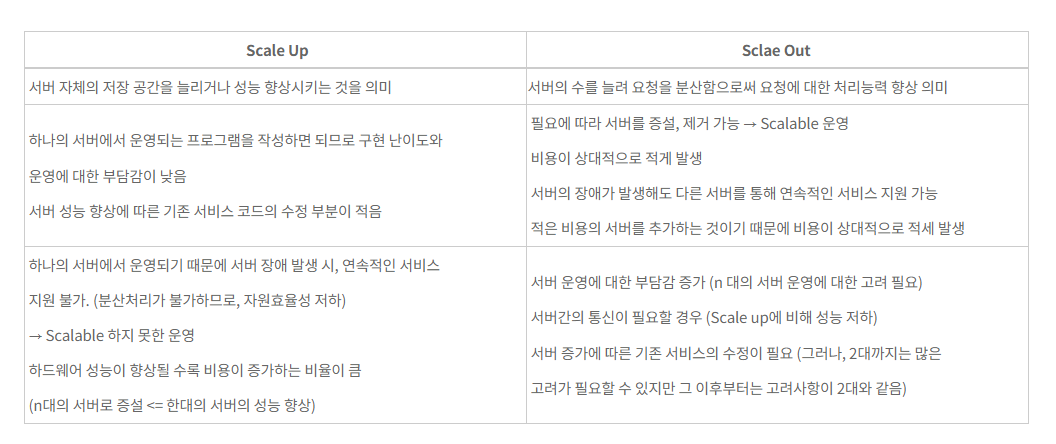
- 수신측에서, 같은 합을 해보아서 오류를 검출하는 방식

클러스터링 인덱스: 루트페이지와 리프페이지로 나뉨. 리프페이지는 데이터 그 자체, 30%이내에서 사용해야 좋은 선택도를 가짐.

논클러스터링 인덱스: 데이터는 그대로 두고 별도 장소에 인덱스 페이지를 만들음. 정렬함. 리프페이지는 데이터가아니라 데이터가 위치하는 포인터.

# 그외 잡다한 지식

Scale up, Scale out



SPOF(Single Point Of Failure): 시스템을 구성하는 요소중 하나라도 정상적으로 수행이 되지 않으면 전체가 중단될 수 있는 장애 발생 포인트.

해결방법: Scale Out

OOP원칙 (SOLID)

1. 단일 책임 원칙(Single responsibility principle) - 약어: SRP
   * 캡슐화
   * 하나의 모듈은 한가지 책임을 가져야함.
2. 개방 폐쇄 원칙(Open/closed principle) - 약어: OCP
   * 추상화,다형성
   * 확장에 대해 열려있고, 수정에 대해 닫혀있어야함.
3. 리스코프 치환 원칙(Liskov substitution principle) - 약어: LSP
   * 부모클래스에 자식클래스를 넣어도 잘 돌아가야함.
   * 하위타입은 상위타입을 대체할 수 있어야 함.
4. 인터페이스 분리 원칙(Interface segregation principle) - 약어: ISP
   * 클라이언트는 자신이 사용하지 않는 메소드에 의존 관계를 맺으면 안 된다.
5. 의존관계 역전 원칙(Dependency inversion principle) - 약어: DIP
   * 상위 모듈은 하위 모듈에 종속되어서는 안됨. 추상화에 의존
   * 추상화는 세부사항에 의존. 세부사항은 추상화에 의해 달라져야 함.

포인터와 레퍼런스 차이점: 직접참조, 간접참조//포인터는 매개변수로 넘길 때 복사가 일어난다. 유의하길! 포인터가 복사가 됨.

Nagle 알고리즘: 패킷을 한 번에 모아서 보내서 네트워크 부하를 줄이는 알고리즘



DML의 delete는 속도가 느리다. 로그 남긴다. Commit 이전에 rollback가능하다. 사용자가 commit을 해야한다.