

TCP Variations

<https://intronetworks.cs.luc.edu/current/html/>

<http://www.cis.udel.edu/~amer/856/tcpvariations-Amer.ppt>

<https://hpbn.co/building-blocks-of-tcp/>

<https://archive.is/20121212100254/http://research.csc.ncsu.edu/netsrv/?q=content/bic-and-cubic>

Issues

- High Overhead
 - Nagle
- cwnd growth tied to RTT
 - Bandwidth Delay Product (BDP)
- TCP causes congestion to detect congestion

Journey Through the Past

- RFC 791 – 1981 (IP)
- RFC 793 – 1981 (TCP)
 - no congestion control
 - receive window
 - TCP header set
- RFC 896 – 1984 – congestion control proposed
- RFC 2001 – 1997 – SS, CA, FR, FR
 - Tahoe and Reno - 1986
 - document existing algorithms (1988 / 1990)
- RFC 2582 – 1999 – NewReno
- RFC 8312 – 2018 - CUBIC

Variations

- Really, just different congestion control algorithms
 - NewReno
 - Vegas
 - CUBIC
- SACK (Selective ACK)
- Different handshake
 - Fast OPEN

Linux

```
chadd@zeus:~> cat /proc/sys/net/ipv4/tcp_congestion_control  
cubic
```

```
chadd@zeus:~> cat /proc/sys/net/ipv4/tcp_available_congestion_control  
cubic reno
```


NewReno (text)

- RFC 6582

NewReno (picture)

Vegas (text)

CUBIC

CUBIC

Selective ACK (SACK) (text)

SACK (picture)

Fast Open

- RFC 7413