802.11 Format and Overhead

Example 802.11n

MCS Index	Spatial Streams	Modulation	Coding	Data Rate (Mbps)			
				20MHz Channel		40 MHz Channel	
				800ns GI	400ns GI	800ns GI	400ns GI
0	1	BPSK	1/2	6.5	7.2	13.5	15.0
1	1	QPSK	1/2	13.0	14.4	27.0	30.0
2	1	QPSK	3/4	19.5	21.7	40.5	45.0
3	1	16-QAM	1/2	26	28.9	54.0	60.0
4	1	16-QAM	3/4	39	43.3	81.0	90.0
5	1	64-QAM	2/3	52	57.8	108.0	120.0
6	1	64-QAM	3/4	58.5	65.0	121.5	135.0
7	1	64-QAM	5/6	65	72.2	135.0	150.0

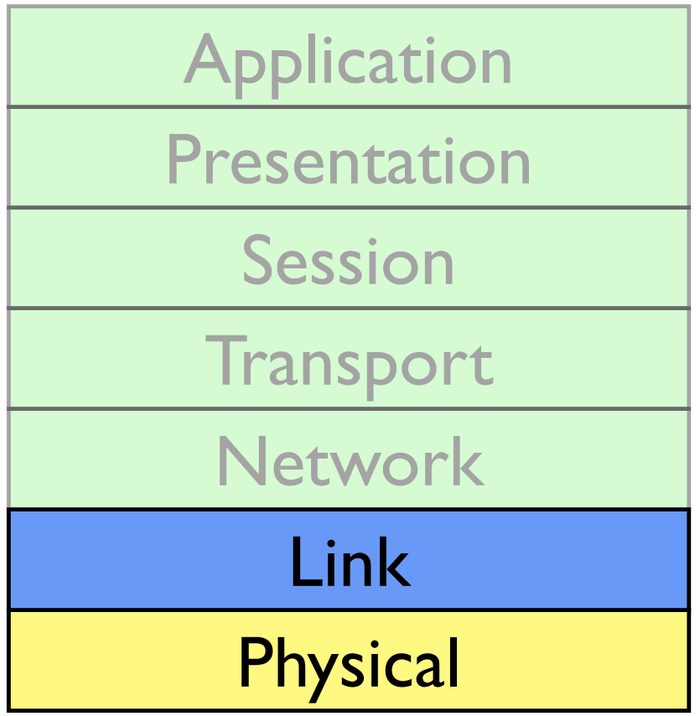
6.5 Mbps - 150 Mbps

802.11 (WiFi)

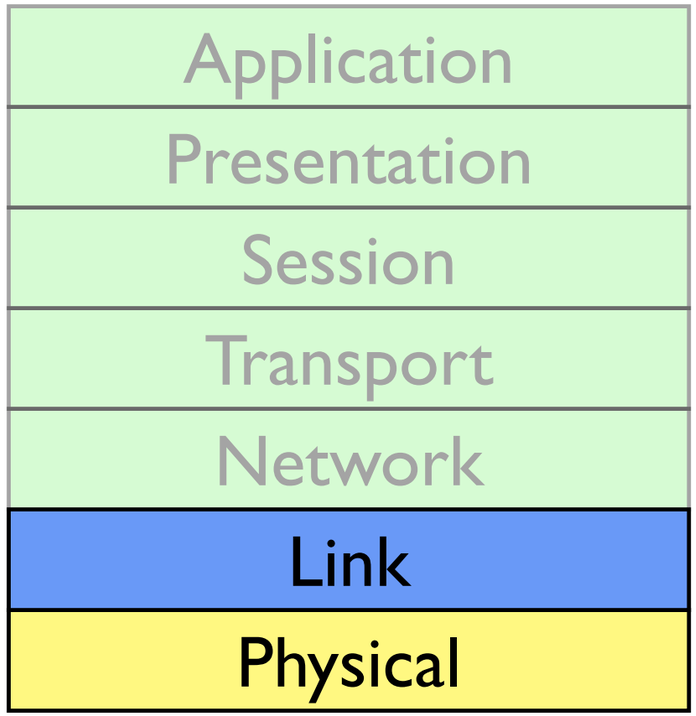
Basic challenge: support wide range and extensible bitrates

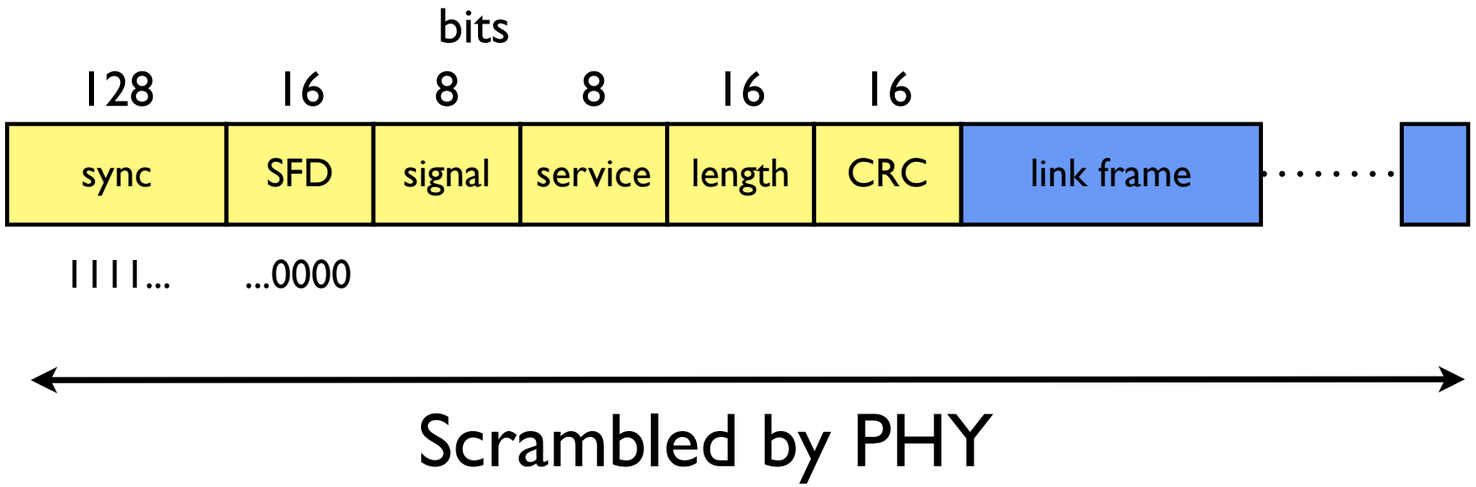
802.11 (WiFi)

Basic challenge: support a wide range of and extensible bitrates

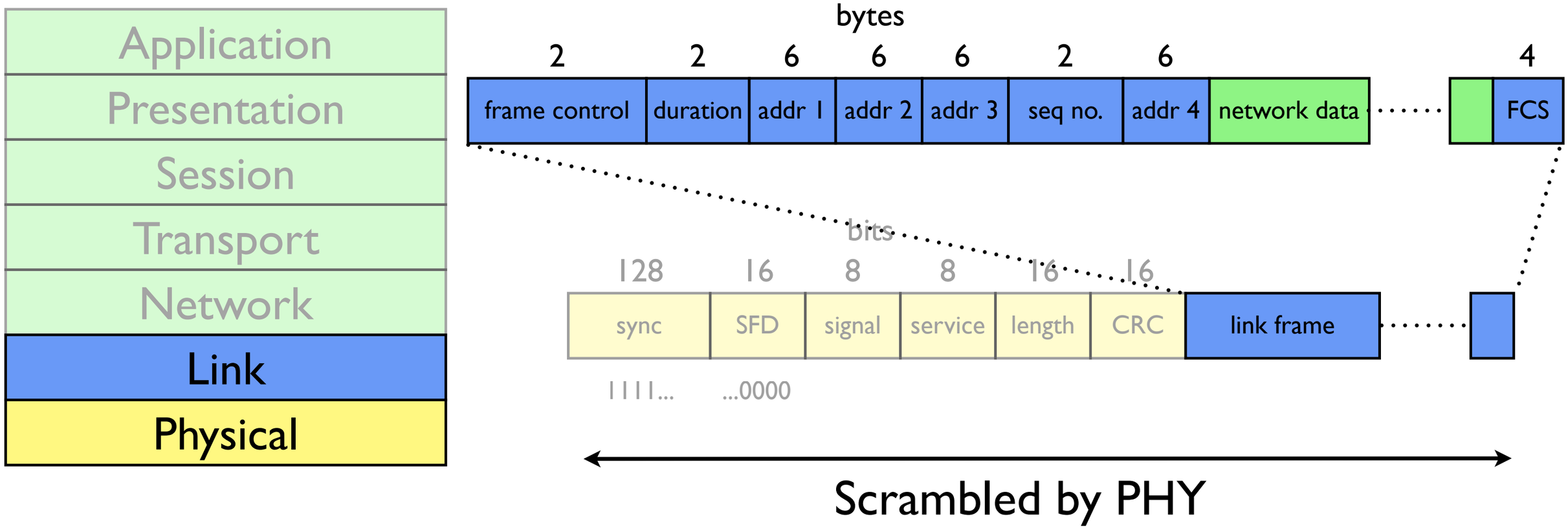


802.11b PHY

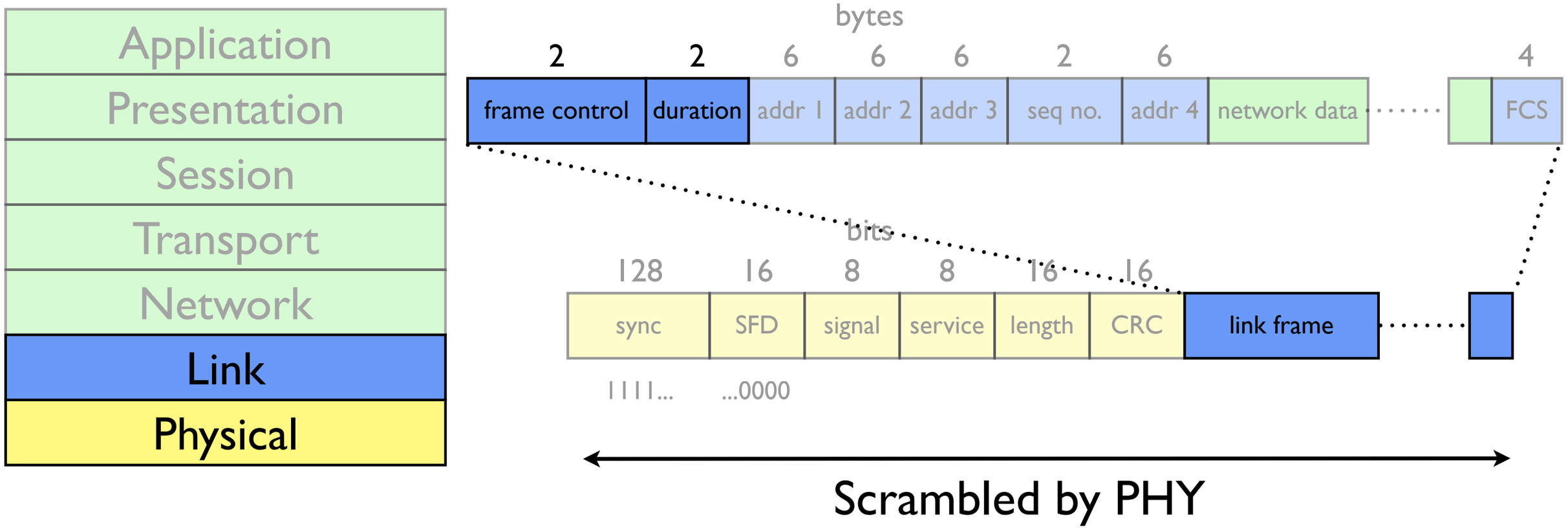

Application
Presentation
Session
Transport
Network
Link
Physical


bits
128
16
8
8
16
16
sync
SFD
signal
service
length
CRC
link frame
1111...
...0000
Scrambled by PHY

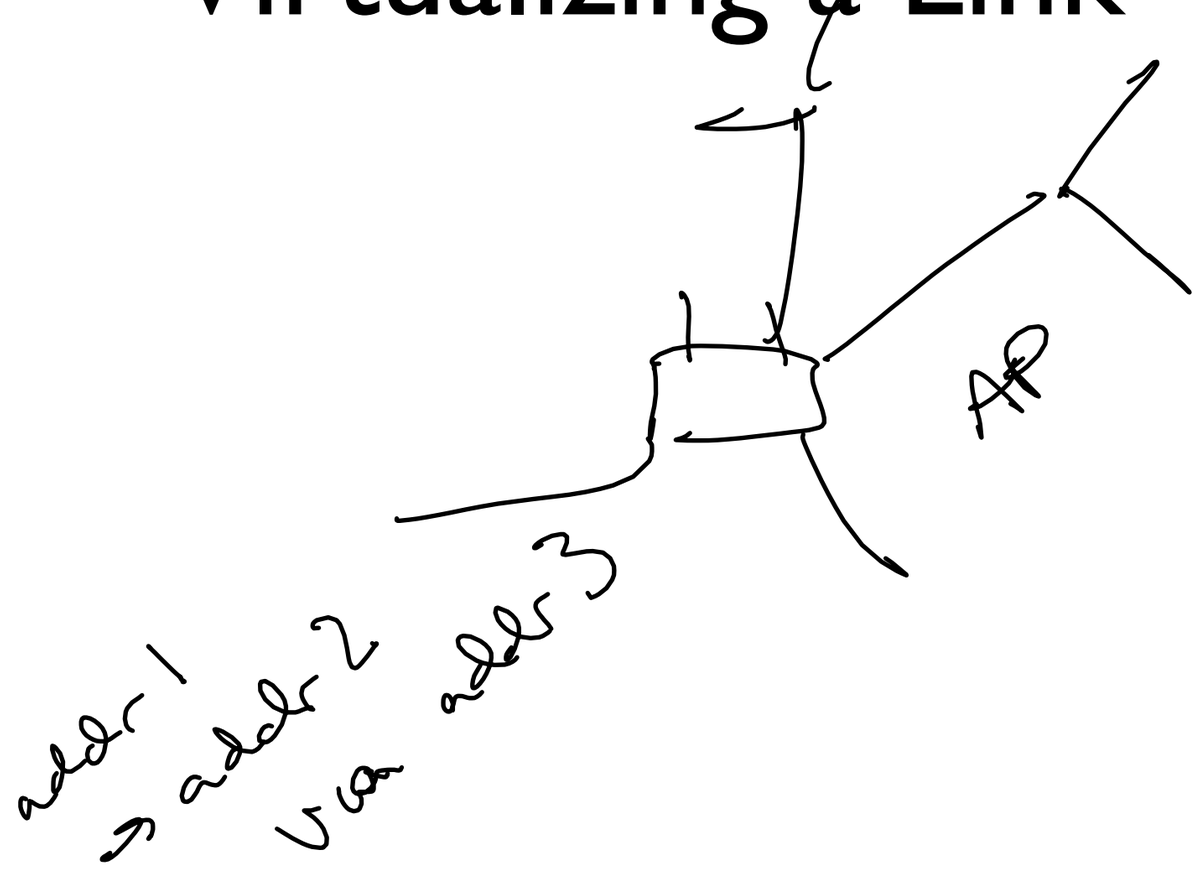
802.11 MAC

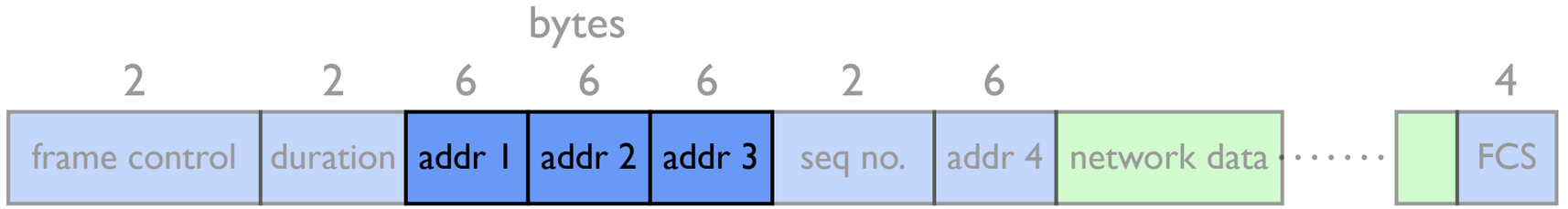

Application
Presentation
Session
Transport
Network
Link
Physical
bytes
2
2
6
6
6
2
6
4
frame control
duration
addr 1
addr 2
addr 3
seq no.
addr 4
network data
FCS
bits
128
16
8
8
16
16
sync
SFD
signal
service
length
CRC
link frame
1111...
...0000
Scrambled by PHY

Virtual Carrier Sense

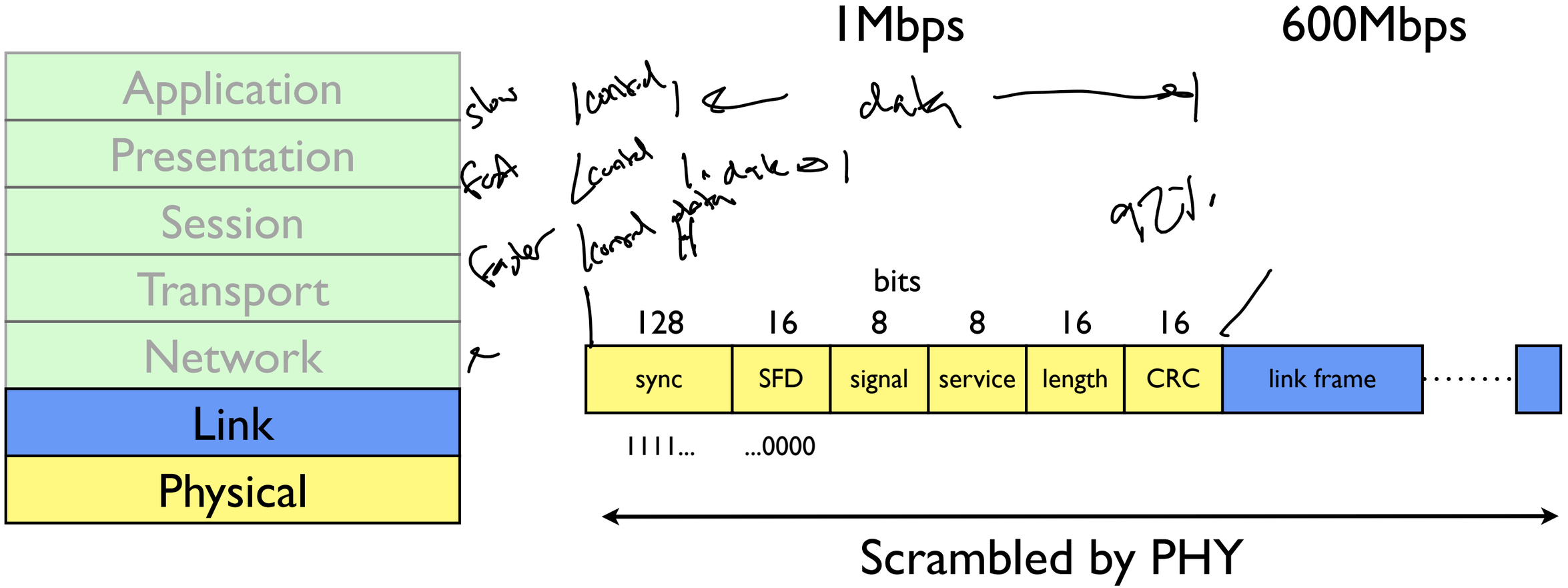


Virtualizing a Link





802.11 Overhead



802.11 Summary

- Basic MAC format to work on top of many physical layers
- Needs backwards compatibility
  - Use time, rather than bytes
- MAC control (virtual carrier sense) specified in terms of duration
- Virtualizes the link
  - Embed additional addresses
- Don't be fooled by 600Mbps!