

Introduction to Computer Networks

Contention-Free Multiple Access (§4.2.3)



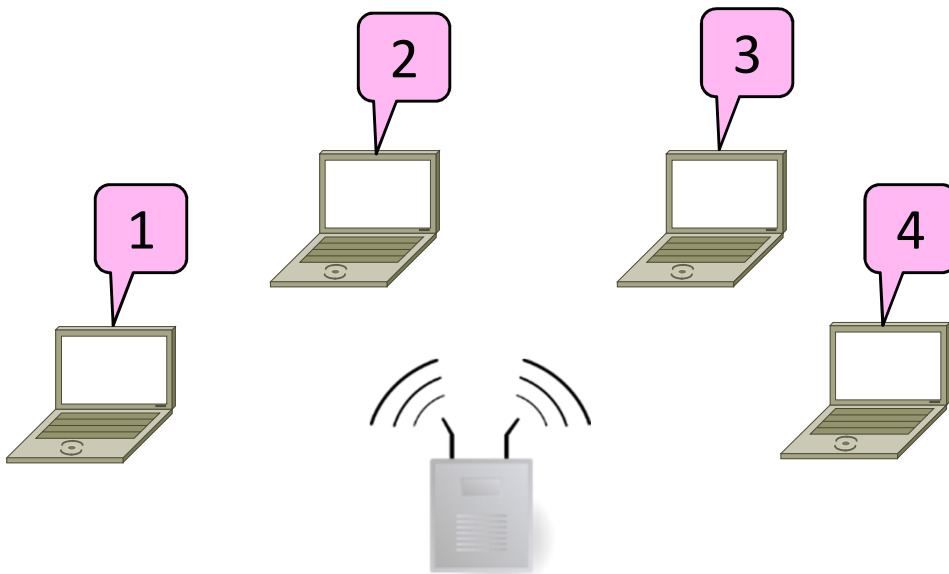
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Topic

- A new approach to multiple access
 - Based on turns, not randomization



Issues with Random Multiple Access

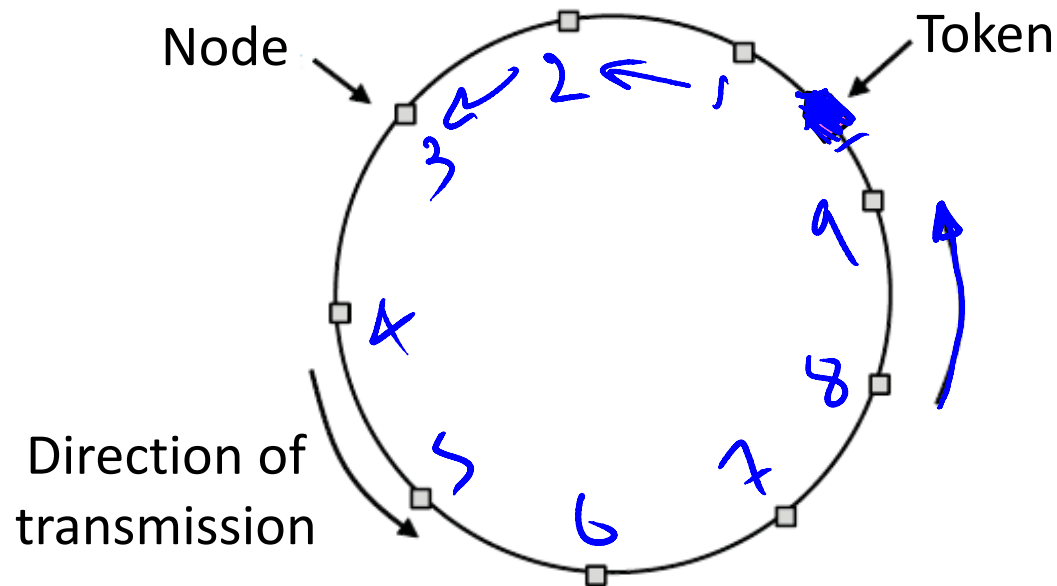
- ~~✗~~ CSMA is good under low load:
 - Grants immediate access
 - Little overhead (few collisions)
- ~~✗~~ But not so good under high load:
 - High overhead (expect collisions)
 - Access time varies (lucky/unlucky)
- We want to do better under load!

Turn-Taking Multiple Access Protocols

- They define an order in which nodes get a chance to send
 - Or pass, if no traffic at present
- We just need some ordering ...
 - E.g., Token Ring »
 - E.g., node addresses

Token Ring

- Arrange nodes in a ring; token rotates “permission to send” to each node in turn




Turn-Taking Advantages

- Fixed overhead with no collisions
 - More efficient under load
- Regular chance to send with no unlucky nodes
 - Predictable service, easily extended to guaranteed quality of service

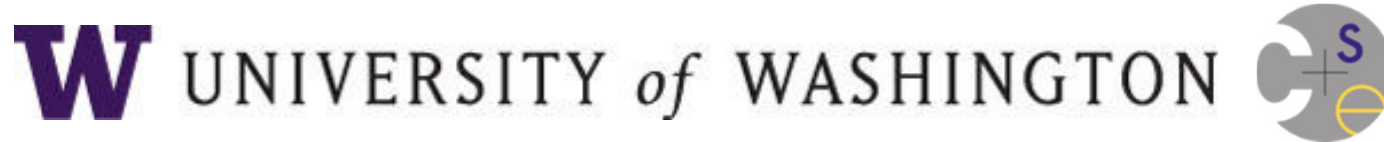
Turn-Taking Disadvantages

- Complexity
 - More things that can go wrong than random access protocols!
 - E.g., what if the token is lost?
 - Higher overhead at low load

Turn-Taking in Practice

- Regularly tried as an improvement offering better service
 - E.g., qualities of service
-  But random multiple access is hard to beat
 - Simple, and usually good enough
 - Scales from few to many nodes

END



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